



# PRODUCT CATALOGUE

### OUR GLOBAL REACH

Our sales network is there for you in more than 50 countries. Thanks to our sales representation in China, Russia, USA and Poland, as well as our broad network of distributors, we are available whenever our products or services are required.

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# PREMIUM FLOW MANAGEMENT SOLUTIONS

Clorius Controls is a leading manufacturer of valves, actuators, and comprehensive control solutions supporting various marine and industrial applications. Aside from our extensive assortment of control valves and actuators, we provide tailored solutions, including electric, pneumatic, self-acting and direct-acting control systems to meet the specific requirements set by the customer.

Clorius' products are designed to meet the challenging requirements of our clients. Our products, constructed with premium materials ensure longer life cycle, minimal maintenance and lower cost of ownership.





**WE ARE SURPASSING EXPECTATIONS BY PROVIDING THE BEST FLOW MANAGEMENT SOLUTIONS, THE MOST EXPERIENCED PEOPLE, AND UNPARALLELED APPLICATION KNOWLEDGE.**



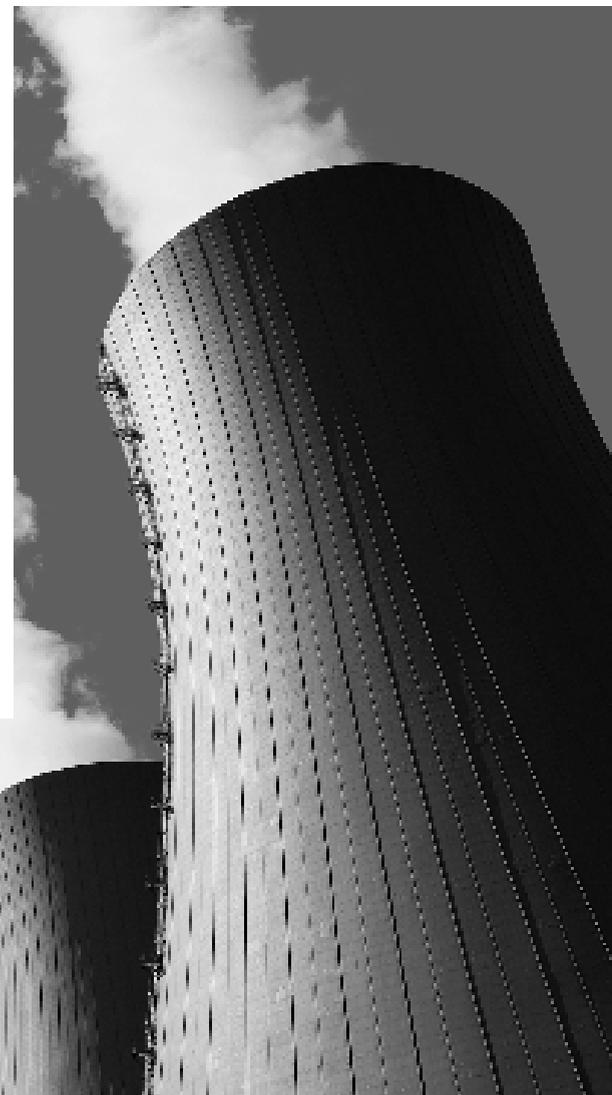
# A CENTURY OF DELIVERING QUALITY

Clorius specializes in the development and production of equipment for monitoring, controlling and regulating heating, cooling and ventilation.

The product range consists of valves, thermostats, pressure differential regulators and electronic controllers. The products make up a complete range within our field of expertise. We have a long-standing tradition of delivery to the ship building industry, industrial applications as well as building heating and ventilation. This means that our products and services are developed in order to match the high requirements set by the maritime industry.

Our vision is to ensure the most reliable and economic solutions whilst meeting the challenging requirements set by our clients.

Clorius' products, constructed with premium materials ensure longer life cycle, minimal maintenance and lower cost of ownership.



## **PREFERRED SUPPLIER TO THE MARITIME INDUSTRY**

With roots in the maritime industry that go back to 1902, Clorius has become a preferred supplier of solutions for relatively simple as well as far more complex challenges. By working closely with our clients and their suppliers, Clorius adds value throughout the entire lifecycle of the ship. With our focus on quality we provide solutions that guarantee optimal use of the equipment and the vessel.

We take pride in being the preferred supplier to the maritime industry by offering customer-specific, value-driven and long-lasting solutions.

All Clorius Controls solutions are designed with extensive research and development and is supported by over 115 years of experience in the maritime industry.

This is acknowledged by the type approvals for our solutions from multiple classification authorities, including Germanischer Lloyds, DNV GL, ABS, RINA, RS, CCS, KR to name a few.

Clorius' marine products are designed to meet the challenging requirements of shipbuilders around the globe, by delivering premium quality valves and actuators for various marine applications. Their robust construction coupled with premium materials ensures longer life cycle for the vessels, minimal maintenance and lower cost of ownership.



# INDUSTRIES WE SERVE

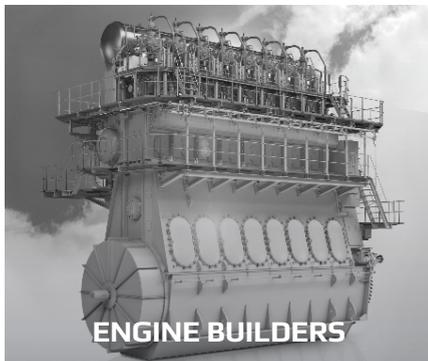
*Clorius Controls caters to the specific needs of our clients by supplying premium and highly efficient flow management solutions, comprising of top-quality control valves, actuators and positioners. Our industry insight and knowledge is grounded in the identification of key issues that our client face as well as firsthand experience gained from serving clients throughout out 100-year-plus history.*

## OUR MARKETS

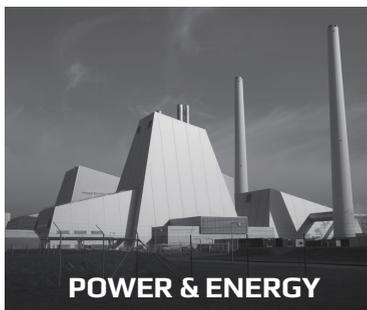


## TYPICAL APPLICATIONS

- Main and auxiliary engine cooling systems
- Fuel and lubricating oil temperature control
- Tank heating and cleaning



- Customer specific engineered valves for main and auxiliary engine cooling systems



- Cooling systems on Biomass, Oil & Gas and nuclear power plants
- Cooling water and lubricating oil temperature control on power units

# SOLUTIONS OVERVIEW

Clorius Controls specializes in a control valve and actuator portfolio with the lowest cost of ownership for use in challenging conditions. As one of the leading control valve manufacturers, we are committed to providing premium industrial solutions to our clients.

Below are just a few of the configurations we currently produce and supply.

## ELECTRIC

ELECTRIC ACTUATOR  
3 POINT, ANALOG



For 2-way and 3-way valve up to DN 800. Actuators for linear and rotating valve types. Handle for manual control available

## PNEUMATIC

PNEUMATIC ACTUATOR  
SPRING CLOSE/OPEN POSITIONER



For 2-way and 3-way valve up to DN 800. Actuators for linear and rotating valve types. PI or alternatively PID pneumatic controllers.

## SELF-ACTING

THERMOSTAT  
DN15 - 150



For 2-way and 3-way valve up to DN 150. No external power needed. Narrow neutral zone (1.5 °C - 2.5 °C) compared to all other brands.

# PRODUCT OVERVIEW

*Quality is at the heart of who we are – it shows up in our people, our conversations and our products. Product quality is the foundation we stand on and this foundation is comprised of three key areas: Material, performance and craftsmanship.*

Clorius Controls continually aims to develop our product portfolio by identifying the needs of the market and providing products and solutions of uncompromised quality. Our product range is divided into 5 different sections, offering an extensive range of equipment for monitoring and control of heating, cooling and ventilation systems.

Clorius valves are the preferred choice of the maritime industries, being installed in more than 1500 vessels within the last five years.

Simple, reliable and durable.

- Electric Control Valves
- Pneumatic Control Valves
- Self-acting temperature controls
- Self-acting pressure controls
- Controlling & Monitoring

## OUR SOLUTIONS

### SOLUTION 1



THERMOSTAT



2-WAY VALVE  
DN 15/4 - 150

### SOLUTION 2



THERMOSTAT



3-WAY VALVE  
DN 15 - 150

### SOLUTION 3



PRESSURE REDUCING  
VALVE  
DN 15 - 80

### SOLUTION 4



DIFFERENTIAL PRESSURE  
CONTROLS  
DN 15 - 80

**SOLUTION 5**



ELECTRIC ACTUATOR  
2 + 3 POINT, ANALOGUE

2 WAY VALVE  
DN 15/4 - 800 MM



CONTROLLER  
ER 2022  
ELECTRIC



SENSOR PT100

**SOLUTION 6**



ELECTRIC ACTUATOR  
SPRING CLOSE/OPEN

2 WAY VALVE  
DN 15/4 - 800 MM



CONTROLLER  
ER 2022  
ELECTRIC



SENSOR PT100

**SOLUTION 7**



PNEUMATIC ACTUATOR  
SPRING CLOSE/OPEN

2 WAY VALVE  
DN 15/4 - 800 MM



CONTROLLER  
PNEUMATIC



TRANSMITTER

**SOLUTION 8**



PNEUMATIC ACTUATOR  
SPRING CLOSE/OPEN

3 WAY VALVE  
DN 15 - 800 MM



CONTROLLER  
PNEUMATIC



TRANSMITTER

**SOLUTION 9**



PNEUMATIC ACTUATOR  
SPRING CLOSE/OPEN

2 WAY VALVE  
DN 15/4 - 800 MM



CONTROLLER  
ER 2022  
ELECTRIC



SENSOR PT100

**SOLUTION 10**



PNEUMATIC ACTUATOR  
SPRING CLOSE/OPEN

3 WAY VALVE  
DN 15 - 800 MM



CONTROLLER  
ER 2022  
ELECTRIC



SENSOR PT100

# APPLICATIONS OVERVIEW

Clorius Controls' control valves make up a uniquely integrated system of valve, actuator, positioner and process controller - working in perfect harmony for ideal results.

Clorius provides a comprehensive and carefully coordinated system of product solutions specifically tailored to your individual needs.

Possible applications include:

## TYPICAL APPLICATIONS

### MAIN ENGINE AND AUXILIARY ENGINE

- Jacket cooling water system
- Piston cooling
- Nozzle cooling
- Load and scavenging air cooling
- Lubricating oil cooling

### OIL PREHEATING

- Fuel or diesel oil in storing, settling and servicing tank
- Preheating prior to separation and injection

### HEAT EXCHANGERS

- Water heaters for radiator plant
- Water heaters for domestic plant
- Evaporators (production of fresh water)

### TANK HEATING

- Bilge water tank
- Cargo tank
- Sludge tank
- FO drain tank
- FO overflow tank
- Asphalt tank

### AIR CONDITIONING PLANT

- Preheating of air
- Reheating of air
- Cooling of air

Solutions are depending on the actual method required: 2 way with self-acting thermostat or with actuator, controller and sensor.

3 way valve (mixing or diverting) with self-acting thermostat or actuator, controller and sensor.

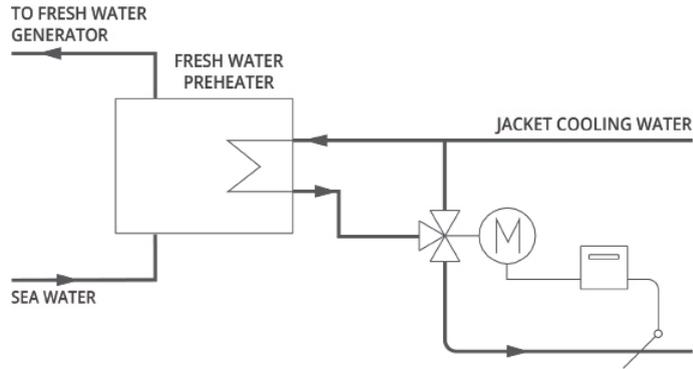
Actuators can be electrical, pneumatic or electro-pneumatic.

Hydraulic or electric/hydraulic actuators are optional solutions. Communication with central control system (RS 485 for controller type ER 2022)

Illustrations on the right side only displays a small fraction of the possible applications in our portfolio.

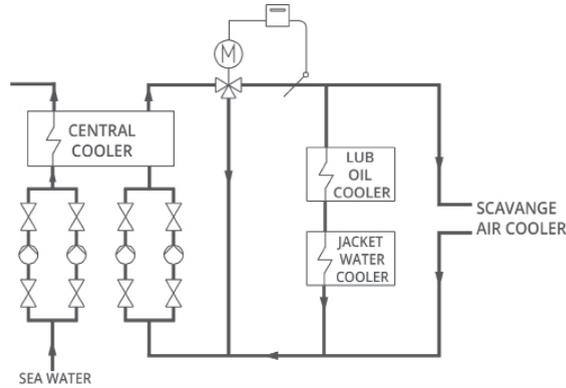
**HEAT EXCHANGERS - Heating system for fresh water generation**

TEMPERATURE CONTROLS



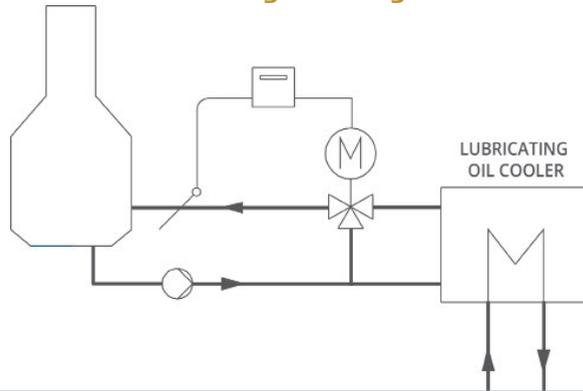
**MAIN AND AUXILIARY ENGINE - Central cooling water system**

TEMPERATURE CONTROLS



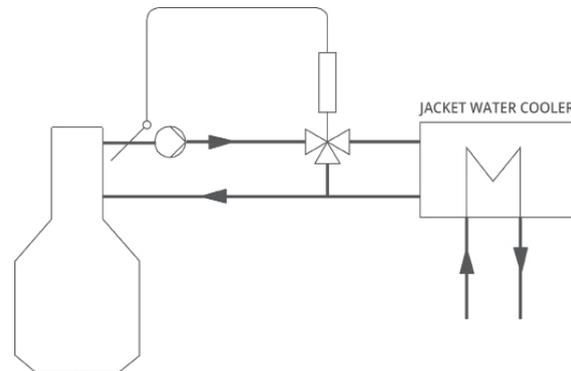
**MAIN AND AUXILIARY ENGINE - Lubricating oil cooling**

TEMPERATURE CONTROLS



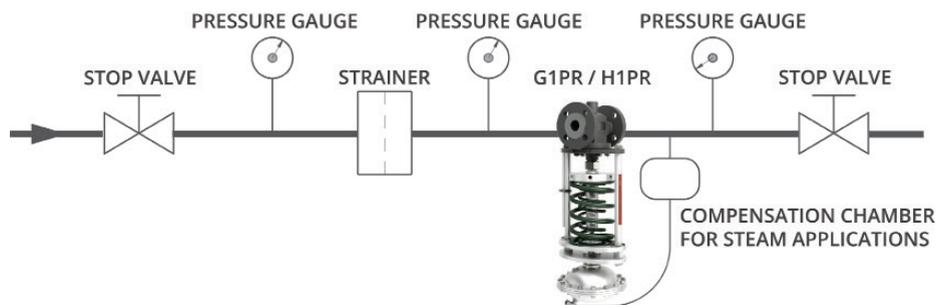
**MAIN AND AUXILIARY ENGINE - Engine jacket cooling water system - electric**

TEMPERATURE CONTROLS



**PRESSURE REDUCTION - Applicable for various media (eg. AIR, STEAM, LIQUID)**

PRESSURE CONTROLS



# ELECTRIC TEMPERATURE CONTROLS

***ELECTRONIC SYSTEM** - The electronic temperature and pressure control system combines an electrically actuated three-way control valve with an electronic controller and essential temperature sensor.*

Microprocessor-based Controller of the type ER 2022 for electronic temperature control is used for constant temperature control. It is suitable for all heating and cooling control systems. The ER 2022 is a single loop controller which is intended for marine installations and other industrial applications - such as cooling water and lubricating oil installations, flow temperature control etc.

The ER 2022 controllers are designed for panel mounting and are fully programmable, which allows for uncomplicated system configuration.

The valve is designed for mixing and diverting media flows for large flow control systems.



## SELECTING YOUR SOLUTION >>>

### STEP 1

*Choose your valve  
and actuator*

**ELECTRIC ACTUATOR**



**3-WAY VALVE**

### STEP 2

*Choose your controller*

**PLC  
PROGRAMMABLE  
LOGIC CONTROLLER**



**CONTROLLER ER 2022**

### STEP 3

*Choose your sensor*

**SENSOR**



# PNEUMATIC TEMPERATURE CONTROLS

**PNEUMATIC SYSTEM** - The pneumatic temperature control system integrates a pneumatically actuated three-way control valve with a pneumatic controller and temperature sensor and a pneumatic-pneumatic positioner. The pneumatic system is especially suitable when there is lack of electricity or when a fail-safe system is required.

## **ELECTRO-PNEUMATIC SYSTEM**

The electro-pneumatic temperature control system utilizes both electric and pneumatic technology, composed of a pneumatically actuated three-way control valve and electro-pneumatic positioner.

## **PERFECTED FOR HARSH ENVIRONMENTS**

Clorius Controls' EPR/PPR Electro-pneumatic/pneumatic-pneumatic positioner is a rugged control device especially suited for harsh environments and engineered to meet the highest and most demanding control performance that the process industries of today require.

The AD/ADHW pneumatic actuators are made according to the Scotch Yoke principle, which is characteristic for its high torque when required - at the beginning and at the end of each operation. This increases safety and reduces the energy consumption. The filter regulator, equipped with auto drain is protecting the positioner from dust, water and oil particles in the compressed air supply. With the backflow function it incorporates a mechanism to exhaust the air pressure in the outlet side reliably and quickly.



## SELECTING YOUR SOLUTION >>>

### STEP 1

*Choose your valve, actuator and positioner*



**3-WAY VALVE**



**PNEUMATIC ACTUATOR  
TYPE AD/ADHW**



**PPR/EPR  
POSITIONER**

### STEP 2

*Choose your air reduction valve/Filter*



**FILTER REGULATOR**

### STEP 3

*Choose your controller*

**PLC  
PROGRAMMABLE  
LOGIC CONTROLLER**



**PNEUMATIC  
CONTROLLER**



**CONTROLLER  
ER 2022**

### STEP 4

*Choose your sensor*



**SENSOR**





## STANDARDS & CERTIFICATES

*Clorius Controls routinely manufactures and tests its products to the most demanding customer specifications and recognized national and international industry standards.*

*A long-standing tradition of delivering to the shipbuilding industry means that products delivered by Clorius Controls A/S are developed to match the high requirements set by the maritime industry.*

Since 1993 we have been ISO 9001 certified for development, manufacturing, sales and servicing of controls for buildings, industrial and marine applications.

Clorius' internal standards for excellence are reflected in how we conduct our daily business. Our valves can be delivered with certificates issued by various recognized ship classification societies, stating that the classification society has participated in pressure test of the valve.

We can also deliver valves with certificates in accordance to:

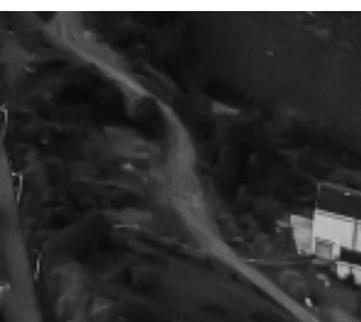
- EN 10.204 / 2.1
- EN 10.204 / 2.2
- EN 10.204 / 3.1

Furthermore, we conduct:

- Inspection and test plan
- Pressure and leakage test

Valves from Clorius Controls can be delivered in accordance with the following standard and conformity assessment systems.

- ANSI, EN, JIS



# VALVE SIZING & SELECTION SOFTWARE

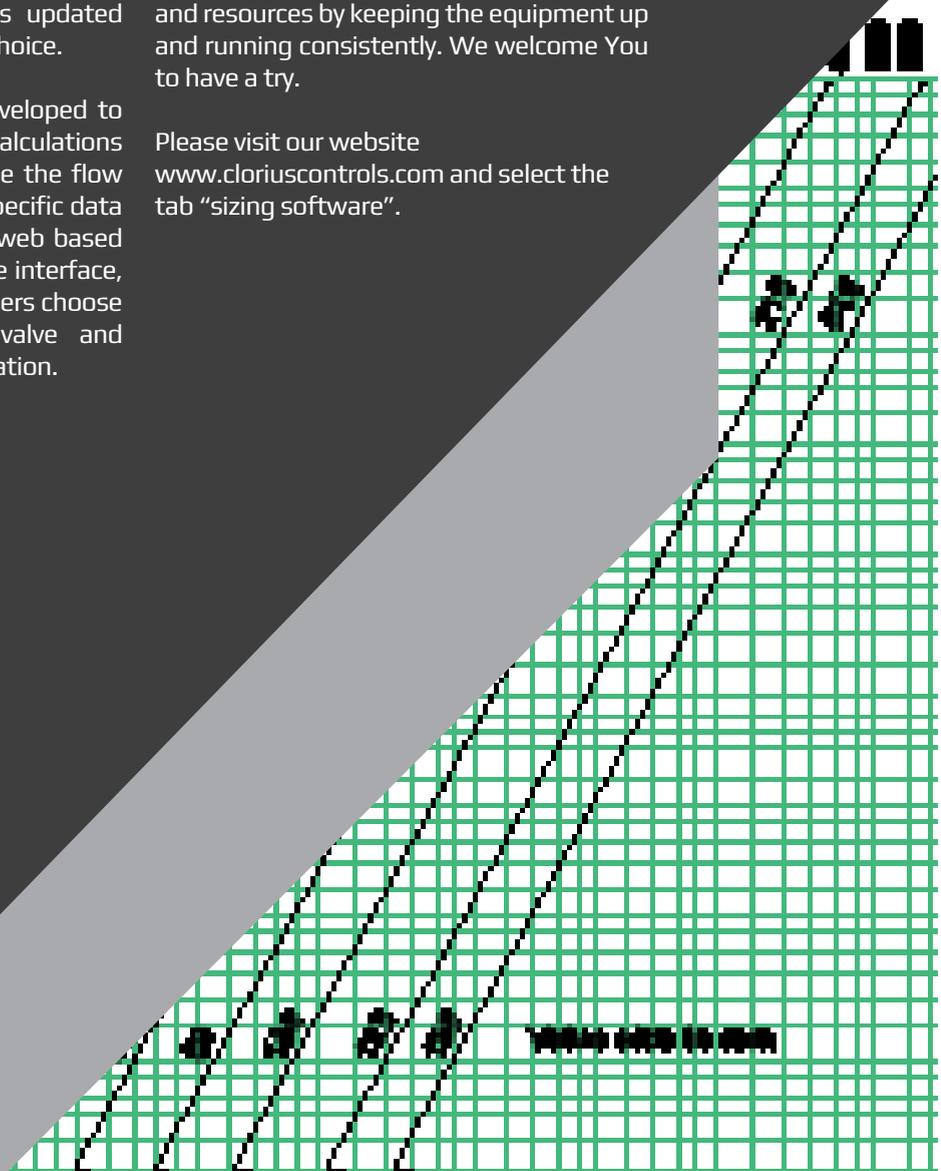
*The Clorius Controls Valve Sizing Program is a software for calculating and sizing control valves. The software calculates the valve-specific data (Kvs value, required nominal valve size, etc.)*

In an effort to provide leading support to our customers, Clorius Controls has updated the valve sizing software Quick Choice.

Our new software has been developed to quickly and accurately make calculations of a proper valve size, determine the flow coefficient and calculate valve specific data (Kvs value, pressure drop). The web based software provides an easy to use interface, and is meant to help our customers choose the proper Clorius Controls valve and actuator solution for their application.

Accurate sizing of valves saves time, energy and resources by keeping the equipment up and running consistently. We welcome You to have a try.

Please visit our website [www.cloriuscontrols.com](http://www.cloriuscontrols.com) and select the tab "sizing software".



# FREQUENTLY ASKED QUESTIONS

*Our Frequently Asked Questions attempts to provide answers to the most commonly asked questions relating to our products and services. If you don't find answers to your questions here, please get in touch with your nearest Clorius Controls representative.*

## How to determine the correct size of the valve and what actuator to choose?

In an attempt to simplify the process and avoid potential mistakes we advise our client to utilize our sizing software "Quick Choice 4" which enables you to size the control valve and select the right combination of actuator and control valve.

## What is the definition of $k_{VS}$ value and how to calculate the flow?

The  $k_{VS}$ -value is identical to the IEC flow coefficient  $k_V$  and defined as the water flow rate in  $m^3/h$  through the fully open valve by a constant differential pressure,  $\Delta p_V$ , of 1 bar.

The  $K_{VS}$  value is a special case of the  $K_V$  value, which indicates the flow at a given valve position and a pressure differential of 1 bar.

The flow at a lower pressure loss can be calculated by rearranging the equation:

$$K_{VS} = Q / \sqrt{\Delta P}$$

where

$K_{VS}$ :  $K_{VS}$  value [ $m^3/h$ ]

$Q$ : Flow [ $m^3/h$ ]

$\Delta P$ : Pressure differential across a regulating valve [bar]

$$k_{VS} = \frac{Q(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left( \frac{Q(m^3/h)}{k_{VS}} \right)^2$$

## Should I use a strainer with my control valve?

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

## What standards are used when manufacturing the valve?

All valves are manufactured under ISO 9001 certification and are pressure and leakage tested before shipment.

# REDUCE UP TO 10% IN FUEL CONSUMPTION

*Clorius Controls' low leakage control valve assures energy savings by reduction in fuel consumption, leading to reduced costs and downtime for shipowners.*

### BACKGROUND

In 2013 Clorius Controls successfully designed a robust low leakage valve in collaboration with MAN Diesel & Turbo, for a new internal cooling water system.

Today the low leakage control valve is used in the standard design of MAN Diesel & Turbo's two stroke engines, improving the performance of the engine cooling system.

The low leakage control valve is also installed on the world's largest container ships, the Triple E series.

### THE CHALLENGE

Shipowners are currently faced with two main challenges:

- Fresh water generation when slow steaming

When a ship is slow steaming, a high leakage cooling valve causes the fresh water generator to stop producing water, leaving two options; either to buy fresh water from the nearest shore or start the preheater.

- Unwanted engine cooling when in harbour

When the ship is in harbour, energy is wasted for preheating purposes as a result of leaking cooling water. The cooling water passing through the engines causes unwanted cooling.



## FEATURED TESTIMONIAL

“ Clorius Controls has been a trusted partner for many years, and their equipment has been included in the auxiliary systems for our two-stroke diesel engines during the last 30 years. Furthermore, their service and equipment have been an appreciated part in our systems, at our R&D center”.

*Ole Skeltved,  
Head of Marine Installation Department  
MAN Diesel & Turbo*

### THE SOLUTION

By installing Clorius Controls’ low leakage control valve, following savings can be achieved:

#### ■ By not starting the preheater for fresh water generation:<sup>1</sup>

|                             |                    |
|-----------------------------|--------------------|
| Water consumption           | = 7t /day          |
| 1 kg oil to produce         | = 13 kg water      |
| Oil consumption             | = 538 kg/day       |
| Savings in USD <sup>2</sup> | ~ <b>325\$/day</b> |

#### ■ By not wasting energy on leaking cooling water:

Oil consumption can be reduced up to **10%** by implementing a low leakage control valve, compared to valves with leakage rate of 5%.<sup>3</sup>

|                             |                    |
|-----------------------------|--------------------|
| Oil consumption             | = 7t/day           |
| Oil consumption saving      | = 0.7 t/day        |
| Savings in USD <sup>2</sup> | ~ <b>420\$/day</b> |

### THE RECOMMENDATION

Shipowners should specify leakage class IV with max 0.01% leakage rate for both new builds and existing installations.

ROI for installing or replacing existing valves, with a Clorius Controls’ low leakage control valve, is less than 1 month.

## THE FACTS

**LOCATION**  
COPENHAGEN, DENMARK

### TECHNICAL DATA

|                    |                       |
|--------------------|-----------------------|
| Valve body:        | Nodular cast iron     |
| Trim:              | Gun metal RG 5        |
| Size & Pressure:   |                       |
| DN 80-200          | PN 16                 |
| DN 250-300         | PN 10                 |
| Temperature range: | Max 150 °C            |
| Flowrate :         | 80-1250m <sup>3</sup> |
| Leakage Port AB-B: | <0,01% of KVS         |
| Lead time:         | 4-6 weeks             |

### European make

Valve supplied with electric or pneumatic actuation

<sup>1</sup> Example from a large container ship

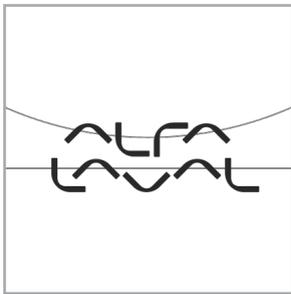
<sup>2</sup> Bunkerindex-MDO 05.02.2015: 601 USD/t

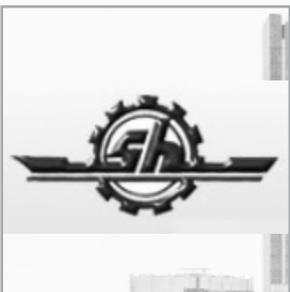
<sup>3</sup> Based on feedback from various shipowners.

# OUR CLIENTS

*We have had the good fortune of being involved with a large number of strong global companies. Our clients are our starting point. They drive everything we do and we work collaboratively with them to achieve results they can measure. Our size enables our specialists to work closely together to develop tailor-made solutions, that meet our clients' evolving needs.*

Here are some clients we have recently added to our growing list of partnerships.





# OVERVIEW OF CLORIUS VALVES

## AVAILABLE STANDARDS FOR CONNECTIONS

| Type                  | Material | Material      | DN        | INCH      | Flange connection |          |        |         |         |          | Internal Connection Threads |     |
|-----------------------|----------|---------------|-----------|-----------|-------------------|----------|--------|---------|---------|----------|-----------------------------|-----|
|                       |          |               |           |           | EN 1092           | ANSI 150 | JIS 5K | JIS 10K | JIS 16K | DIN86021 | ISO 7/1                     | NPT |
| L1S                   | RG5      | CuSn10-C      | 15/6 - 20 | ¾"        |                   |          |        |         |         |          | •                           | •   |
| L1SB                  | RG5      | CuSn10-C      | 15 - 32   | ½" - 1¼"  |                   |          |        |         |         | •        | •                           | •   |
| L1SBR                 | RG5      | CuSn10-C      | 15 - 32   | ½" - 1¼"  |                   |          |        |         |         |          | •                           | •   |
| L2S                   | RG5      | CuSn10-C      | 40 - 50   | 1½" - 2"  |                   |          |        |         |         |          | •                           |     |
| L2F                   | RG5      | CuSn10-C      | 65 - 150  | 2½" - 6"  |                   |          |        |         |         | •        |                             |     |
| L2SR                  | RG5      | CuSn10-C      | 40        | 1½"       |                   |          |        |         |         |          | •                           |     |
| L2SR                  | RG5      | CuSn10-C      | 50        | 2"        |                   |          |        |         |         |          | •                           | •   |
| L3S                   | RG5      | CuSn10-C      | 15 - 50   | ½" - 2"   |                   |          |        |         |         |          | •                           |     |
| L3F                   | RG5      | CuSn10-C      | 65 - 100  | 2½" - 4"  |                   | •        |        |         |         |          |                             |     |
| L3FA                  | RG5      | CuSn10-C      | 80 - 300  | 3" - 12"  |                   |          |        |         |         | •        |                             |     |
| L2FMT                 | RG5      | CuSn10-C      | 65 - 800  | 2½" - 32" | •                 | •        | •      | •       |         |          |                             |     |
| L3FMT                 | RG5      | CuSn10-C      | 65 - 800  | 2½" - 32" | •                 | •        | •      | •       |         |          |                             |     |
| H1F                   | GS-C25   | GP240GH       | 15/4 - 50 | 2"        | •                 | •        | •      | •       | •       |          |                             |     |
| H1FBN                 | GS-C25   | GP240GH       | 15 - 80   | ½" - 3"   | •                 | •        | •      | •       | •       |          |                             |     |
| H1FB                  | GS-C25   | GP240GH       | 25 - 80   | 1" - 3"   | •                 |          |        |         |         |          |                             |     |
| H1FBE - G1FBE         | GS-C25   | GP240GH       | 200 - 250 | 8" - 10"  | •                 | •        | •      | •       | •       |          |                             |     |
| H2F                   | GS-C25   | GP240GH       | 20 - 80   | ¾" - 3"   | •                 | •        | •      | •       | •       |          |                             |     |
| H2F                   | GS-C25   | GP240GH       | 100 - 150 | 4" - 6"   | •                 | •        |        |         |         |          |                             |     |
| H2FR                  | GS-C25   | GP240GH       | 20 - 80   | ¾" - 3"   | •                 | •        | •      | •       | •       |          |                             |     |
| H2FR                  | GS-C25   | GP240GH       | 100 - 150 | 4" - 6"   | •                 |          |        |         |         |          |                             |     |
| H3F                   | GS-C25   | GP240GH       | 20 - 65   | ¾" - 2½"  | •                 | •        | •      | •       | •       |          |                             |     |
| H3F                   | GS-C25   | GP240GH       | 100 - 150 | 4" - 6"   | •                 | •        |        |         |         |          |                             |     |
| G1F                   | GGG40    | EN-GJS-400-15 | 15/4 - 50 | 2"        | •                 | •        | •      | •       | •       |          |                             |     |
| G1FB                  | GGG40    | EN-GJS-400-15 | 25 - 65   | 1" - 2½"  | •                 |          |        |         |         |          |                             |     |
| G1FBN                 | GGG40    | EN-GJS-400-15 | 15 - 80   | ½" - 2½"  | •                 | •        | •      | •       | •       |          |                             |     |
| G2F                   | GGG40    | EN-GJS-400-15 | 20 - 80   | ¾" - 3"   | •                 | •        | •      | •       | •       |          |                             |     |
| G2F                   | GGG40    | EN-GJS-400-15 | 100 - 150 | 4" - 6"   | •                 | •        |        |         |         |          |                             |     |
| G2FR                  | GGG40    | EN-GJS-400-15 | 20 - 80   | ¾" - 2½"  | •                 | •        | •      | •       | •       |          |                             |     |
| G2FR                  | GGG40    | EN-GJS-400-15 | 100 - 150 | 4" - 6"   | •                 | •        |        |         |         |          |                             |     |
| G3F                   | GGG40    | EN-GJS-400-15 | 20 - 65   | 1" - 2½"  | •                 | •        | •      | •       | •       |          |                             |     |
| G3F                   | GGG40    | EN-GJS-400-15 | 80 - 150  | 2½" - 6"  | •                 | •        |        |         |         |          |                             |     |
| G3F-I with soft seats | GGG40    | EN-GJS-400-15 | 80 - 300  | 6" - 10"  | •                 |          |        |         |         |          |                             |     |
| G3FA-I with soft      | GGG40    | EN-GJS-400-15 | 80 - 300  | 6" - 10"  | •                 |          |        |         |         |          |                             |     |

| Type      | Material | Material             | DN        | INCH      | Flange connection |          |        |         |         |         |
|-----------|----------|----------------------|-----------|-----------|-------------------|----------|--------|---------|---------|---------|
|           |          |                      |           |           | EN 1092           | ANSI 150 | JIS 5K | JIS 10K | JIS 16K | Grooved |
| G3FA      | GGG40    | EN-GJS-400-15        | 80 - 300  | 3" - 12"  | •                 | •        |        | •       |         |         |
| G3FA-I    | GGG40    | EN-GJS-400-15        | 80 - 300  | 3" - 12"  | •                 | •        |        | •       |         |         |
| G2FM-T    | GGG40    | EN-GJS-400-15        | 65 - 800  | 2½" - 32" | •                 | •        | •      | •       |         |         |
| G3FM-T    | GGG40    | EN-GJS-400-15        | 65 - 800  | 2½" - 32" | •                 | •        | •      | •       |         |         |
| G3CM-TR/L | GGG40    | EN-GJS-400-15        | 100 - 300 | 4" - 6"   |                   |          |        |         |         | •       |
| M1F       | GG25     | EN-GJS-400-15        | 15/4 - 50 | 2"        | •                 | •        | •      | •       | •       |         |
| M1FBN     | GG25     | EN-GJS-400-15        | 15 - 80   | ½" - 3"   | •                 | •        | •      | •       | •       |         |
| M2F       | GG25     | EN-GJS-400-15        | 20 - 80   | ¾" - 3"   | •                 | •        | •      | •       | •       |         |
| M2F       | GG25     | EN-GJS-400-15        | 100 - 150 | 4" - 6"   | •                 |          |        |         |         |         |
| M2FR      | GG25     | EN-GJS-400-15        | 20 - 80   | ¾" - 3"   | •                 | •        | •      | •       | •       |         |
| M2FR      | GG25     | EN-GJS-400-15        | 80 - 150  | 3" - 6"   | •                 | •        |        |         |         |         |
| M3F       | GG25     | EN-GJS-400-15        | 20 - 65   | ¾" - 2½"  | •                 | •        | •      | •       | •       |         |
| M3F       | GG25     | EN-GJS-400-15        | 80 - 150  | 3" - 6"   | •                 | •        |        |         |         |         |
| M3FA      | GG25     | EN-GJS-400-15        | 80 - 150  | 3" - 6"   | •                 | •        |        | •       |         |         |
| M3FA-I    | GG25     | EN-GJS-400-15        | 80 - 300  | 3" - 6"   | •                 | •        |        | •       |         |         |
| S2FM-T    | AISI316  | AISI316              | 65 - 800  | 2½" - 6"  | •                 | •        | •      | •       |         |         |
| S3FM-T    | AISI316  | AISI316              | 65 - 800  | 2½" - 6"  | •                 | •        | •      | •       |         |         |
| TREX      | STEEL    | STEEL ST 235         | 15 - 40   | ½" 1½"    |                   |          |        |         |         | •       |
| TREX      | ALU      | ALUMINIUM AW 6082/T6 | 15 - 40   | ½" 1½"    |                   |          |        |         |         | •       |

# OVERVIEW OF CLORIUS ACTUATORS

## ELECTRIC AND PNEUMATIC ACTUATORS FOR ROTARY VALVES

### Type L3FMT-/L/R, G3FMT-/L/R, S3FMT-L/R VALVES

| DN         | KVS mixing | KVS Diverting | Required torque, Nm (P1≤5bar) | CAR | ADHW | AS & ASHW | AD  | Required torque, Nm (P1≤10bar) | CAR | ADHW | AS & ASHW | AD  |
|------------|------------|---------------|-------------------------------|-----|------|-----------|-----|--------------------------------|-----|------|-----------|-----|
| 65         | 95         | 120           | 28                            | 009 | 65   | 65        | 65  | 35                             | 009 | 100  | 65        | 65  |
| 80         | 122        | 154           | 30                            | 009 | 100  | 65        | 65  | 40                             | 009 | 100  | 100       | 65  |
| 100        | 175        | 220           | 55                            | 009 | 100  | 100       | 65  | 70                             | 009 | 100  | 100       | 100 |
| 125        | 245        | 330           | 90                            | 019 | 100  | 100       | 100 | 120                            | 019 | 100  | 125       | 100 |
| 150        | 395        | 425           | 120                           | 019 | 125  | 125       | 100 | 160                            | 028 | 125  | 125       | 100 |
| 200        | 800        | 1100          | 185                           | 028 | 125  | 125       | 100 | 250                            | 060 | 140  | 140       | 125 |
| 250        | 1500       | 2100          | 285                           | 060 | 140  | 140       | 125 | 395                            | 060 | 160  | 160       | 125 |
| 300        | 2000       | 2650          | 400                           | 060 | 160  | 160       | 125 | 550                            | 100 | 210  | 160       | 140 |
| 350        | 2530       | 3380          | 640                           | 100 | 210  | 210       | 140 | 980                            | 200 | 250  | 210       | 160 |
| 400        | 3050       | 3950          | 895                           | 100 | 210  | 210       | 160 | 1370                           | 200 | 250  | 250       | 210 |
| 450        | 3680       | 4480          | 1050                          | 200 | 250  | 210       | 160 | 1550                           | 200 | 250  | 250       | 210 |
| 500<br>550 | 4150       | 5250          | 1300                          | 200 | 250  | 250       | 210 | 1920                           | 250 | 300  | 300       | 250 |
| 600        | 4150       | 6050          | 1850                          | 200 | 300  | 250       | 210 | 2950                           | 300 | 300  | 300       | 250 |
| 800        | 6200       | 8000          | 2600                          | -   | 300  | -         | -   | 4000                           | -   | -    | -         | -   |

## ELECTRIC AND PNEUMATIC ACTUATORS FOR ROTARY VALVES

### Type L3FMT-M, G3FMT-T, S3FMT-T VALVES

| DN  | KVS mixing | KVS Diverting | Required torque, Nm (P1≤5bar) | CAR | ADHW | AS & ASHW | AD  | Required torque, Nm (P1≤10bar) | CAR | ADHW | AS & ASHW | AD  |
|-----|------------|---------------|-------------------------------|-----|------|-----------|-----|--------------------------------|-----|------|-----------|-----|
| 65  | 110        | 127           | 42                            | 009 | 65   | 100       | 65  | 50                             | 009 | 100  | 100       | 65  |
| 80  | 148        | 162           | 45                            | 009 | 100  | 100       | 65  | 55                             | 009 | 100  | 100       | 65  |
| 100 | 220        | 248           | 80                            | 009 | 100  | 100       | 100 | 97                             | 019 | 125  | 100       | 100 |
| 125 | 369        | 437           | 125                           | 019 | 125  | 125       | 100 | 153                            | 019 | 125  | 125       | 100 |
| 150 | 510        | 600           | 179                           | 019 | 125  | 125       | 100 | 215                            | 028 | 140  | 140       | 100 |
| 200 | 807        | 1100          | 285                           | 060 | 140  | 140       | 125 | 345                            | 060 | 160  | 160       | 125 |
| 250 | 1500       | 2100          | 465                           | 060 | 160  | 160       | 125 | 585                            | 060 | 210  | 210       | 140 |
| 300 | 2000       | 2650          | 650                           | 100 | 210  | 210       | 160 | 795                            | 100 | 250  | 210       | 160 |
| 350 | 2505       | 3515          | 980                           | 100 | 250  | 210       | 160 | 1350                           | 200 | 250  | 250       | 210 |
| 450 | 3400       | 4300          | 1550                          | 200 | 300  | 250       | 210 | 2100                           | 250 | 300  | 300       | 210 |

| DN         | KVS mixing | KVS Diverting | Required torque, Nm (P1≤16bar) | CAR | ADHW | AS & ASHW | AD  | Required torque, Nm (P1≤25bar) | CAR | ADHW | AS & ASHW | AD  |
|------------|------------|---------------|--------------------------------|-----|------|-----------|-----|--------------------------------|-----|------|-----------|-----|
| 65         | 95         | 120           | 46                             | 009 | 100  | 100       | 65  | 60                             | 009 | 100  | 100       | 65  |
| 80         | 122        | 154           | 55                             | 009 | 100  | 100       | 65  | 65                             | 009 | 100  | 100       | 65  |
| 100        | 175        | 220           | 90                             | 019 | 100  | 100       | 100 | 120                            | 019 | 125  | 125       | 100 |
| 125        | 245        | 330           | 150                            | 028 | 125  | 125       | 100 | 200                            | 028 | 125  | 125       | 100 |
| 150        | 395        | 425           | 200                            | 028 | 125  | 125       | 100 |                                |     |      |           |     |
| 200        | 800        | 1100          | 330                            | 060 | 160  | 140       | 125 |                                |     |      |           |     |
| 250        | 1500       | 2100          | 525                            | 060 | 210  | 160       | 140 |                                |     |      |           |     |
| 300        | 2000       | 2650          | 730                            | 100 | 210  | 210       | 160 |                                |     |      |           |     |
| 350        | 2530       | 3380          |                                |     |      |           |     |                                |     |      |           |     |
| 400        | 3050       | 3950          |                                |     |      |           |     |                                |     |      |           |     |
| 450        | 3680       | 4480          |                                |     |      |           |     |                                |     |      |           |     |
| 500<br>550 | 4150       | 5250          |                                |     |      |           |     |                                |     |      |           |     |
| 600        | 4150       | 6050          |                                |     |      |           |     |                                |     |      |           |     |
| 800        | 6200       | 8000          | 5800                           |     | -    | -         | -   |                                |     |      |           |     |

| DN  | KVS mixing | KVS Diverting | Required torque, Nm (P1≤16bar) | CAR | ADHW | AS & ASHW | AD  | Required torque, Nm (P1≤25bar) | CAR | ADHW | AS & ASHW | AD  |
|-----|------------|---------------|--------------------------------|-----|------|-----------|-----|--------------------------------|-----|------|-----------|-----|
| 65  | 110        | 127           | 60                             | 009 | 100  | 100       | 65  | 72                             | 009 | 100  | 100       | 100 |
| 80  | 148        | 162           | 67                             | 009 | 100  | 100       | 100 | 85                             | 009 | 100  | 100       | 100 |
| 100 | 220        | 248           | 115                            | 019 | 100  | 125       | 100 | 145                            | 019 | 125  | 125       | 100 |
| 125 | 369        | 437           | 197                            | 028 | 125  | 125       | 100 | 245                            | 028 | 125  | 140       | 125 |
| 150 | 510        | 600           | 259                            | 028 | 160  | 140       | 125 |                                |     |      |           |     |
| 200 | 807        | 1100          | 435                            | 060 | 210  | 160       | 125 |                                |     |      |           |     |
| 250 | 1500       | 2100          | 695                            | 100 | 210  | 210       | 160 |                                |     |      |           |     |
| 300 | 2000       | 2650          | 975                            | 100 | 250  | 210       | 160 |                                |     |      |           |     |
| 350 | 2505       | 3515          |                                |     |      |           |     |                                |     |      |           |     |
| 450 | 3400       | 4300          |                                |     |      |           |     |                                |     |      |           |     |

**MINIMAL LEAKAGE**  
**MAXIMAL PERFORMANCE**

Clorius Controls, linear and rotary control valves assure energy savings by reduction in oil consumption, leading to reduced cost and downtime for ships.



# CONTROL VALVES

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## OUR CONTROL VALVES PROGRAM INCLUDES:

| MATERIAL           | AVAILABLE SIZES  | PN               | GENERAL STANDARDS |
|--------------------|------------------|------------------|-------------------|
| GUN METAL          | 15/6 mm - 600 mm | PN10//PN16       | ANSI//JIS//EN     |
| CAST IRON          | 15/4 mm - 300 mm | PN10//PN16       | ANSI//JIS//EN     |
| CAST STEEL         | 15/4 mm - 150 mm | PN16//PN25//PN40 | ANSI//JIS//EN     |
| NODULAR CAST STEEL | 15/4 mm - 800 mm | PN10//PN16//PN25 | ANSI//JIS//EN     |
| STAINLESS STEEL    | 65 mm - 600 mm   | PN10//PN16       | ANSI//JIS//EN     |
| STEEL ST 235       | 15 mm - 40mm     | PN16             |                   |

# 2-way Control Valve type L1S

Gun Metal, PN 16, DN 15/6 – 20 mm. Single Seated

0-2.2.02-L

Page 1 of 2



## TECHNICAL DATA

### Materials:

- Valve body

- Components

- Gasket

Nominal pressure

Seating

Flow characteristic

Leakage rate

Regulating capability

Internal connection threads

Single seated and tight closing

Gun metal RG 5

Stainless steel

Reinz AFM34

PN 16

Single seated

Quadratic

$\leq 0.05\%$  of Kvs

Kvs/Kvr > 25

ISO 7/1

## APPLICATIONS

Control valves type L1S are designed for regulating low, medium and high pressure hot water, steam and lubricating oils with thermostats, pneumatic or electric actuators. The valves are installed combined with temperature or pressure differential regulators in control systems for heating of domestic premises, district heating, industrial processes or marine installations. They can also be used in cooling applications when used with an electric actuator.

## DESIGN

The valve components - spindle, seat and cone - are made of stainless steel. The valve body is made of gun metal RG 5. The thread for the actuator connection is G1B ISO 228. The valve is single seated. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

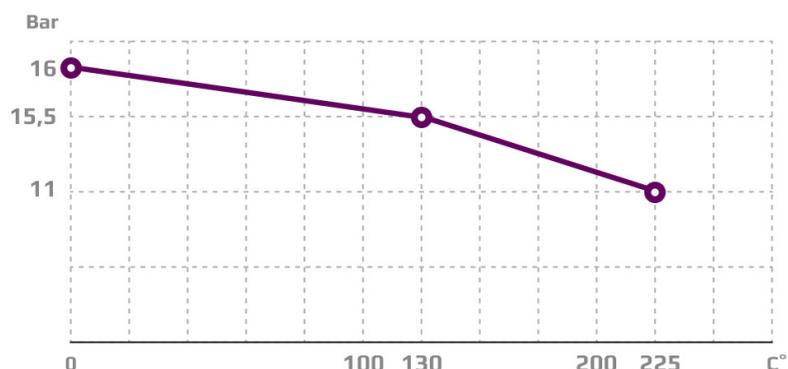
Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with thermostats, pneumatic or electric actuators, the valve will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly.
- Reliable and secure due to internal parts of stainless steel.
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



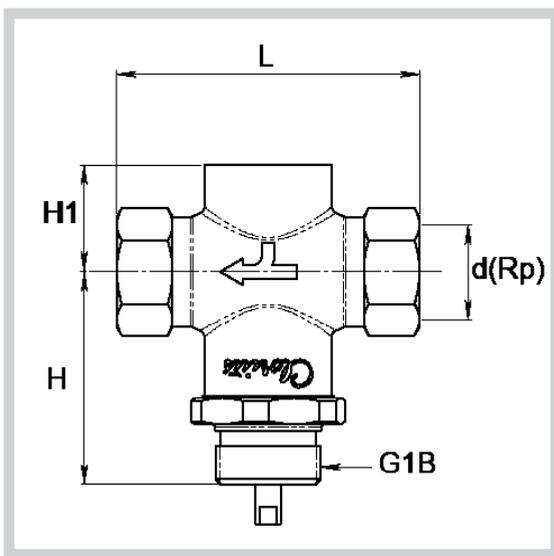
Subject to change without notice.

**MOUNTING**

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to datasheets for the electric actuators).



**DIMENSION SKETCH**



| Type      | L (mm) | H (mm) | H1 (mm) | d    |
|-----------|--------|--------|---------|------|
| 15/6 L15  | 85     | 65     | 20      | Rp ½ |
| 15/9 L15  | 85     | 65     | 20      | Rp ½ |
| 15/12 L15 | 85     | 65     | 20      | Rp ½ |
| 15 L15    | 85     | 65     | 26      | Rp ½ |
| 20 L15    | 95     | 67     | 32      | Rp ¾ |

**SPECIFICATIONS**

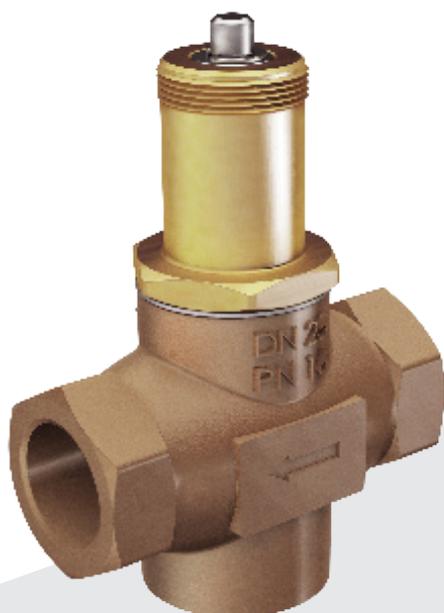
| Type      | Connection threads | DN (mm) | Opening (mm) | k <sub>vs</sub> -value m <sup>3</sup> /h | Lifting height (mm) | Weight (kg) |
|-----------|--------------------|---------|--------------|--|---------------------|-------------|
| 15/6 L15  | Rp ½               | 15      | 6            | 0.45                                     | 6                   | 0.7         |
| 15/9 L15  | Rp ½               | 15      | 9            | 0.95                                     | 6                   | 0.7         |
| 15/12 L15 | Rp ½               | 15      | 12           | 1.7                                      | 6                   | 0.7         |
| 15 L15    | Rp ½               | 15      | 15           | 2.75                                     | 6                   | 0.7         |
| 20 L15    | Rp ¾               | 20      | 20           | 5.00                                     | 7                   | 0.8         |

# 2-way Control Valve type L1SB

Gun Metal, PN 16, DN 15 - 32 mm

0-2.2.04-I

Page 1 of 2



## APPLICATIONS

Balanced control valves type L1SB are designed for regulation of hot water, steam and lubricating liquids. The valves are installed combined with our self-acting thermostats, pressure differential regulators, pneumatic or electric valve actuators for regulation in central heating plants, industrial plants, industrial processes or marine installations. Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of gun metal RG 5 (red brass). The thread for the actuator connection is G1B ISO 228. The valve is single seated, balanced. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats the valves will close at rising temperatures. In connection with our pneumatic or electric valve actuators the valves will either close or open depending on the application. The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

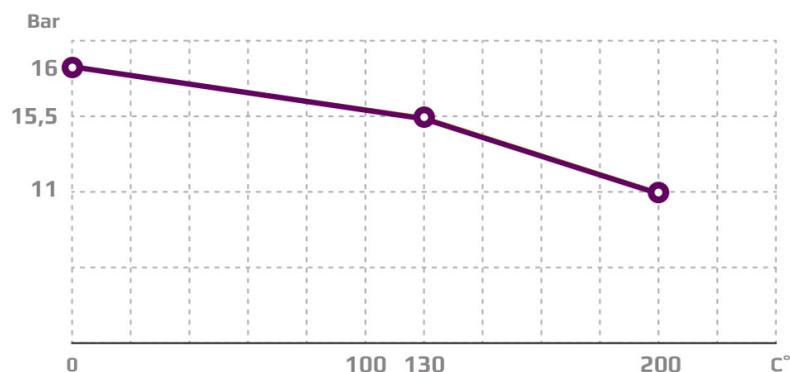
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly.
- Reliable and secure due to internal parts of stainless steel.
- Low leakage rate reduces the risk of overheating

## TECHNICAL DATA

### Materials:

|                                 |                      |
|---------------------------------|----------------------|
| - Valve body                    | Gun metal RG 5       |
| - Components                    | Stainless steel      |
| - O-ring                        | FPM, 75 SHOREA       |
| - Gasket                        | Reinz-AFM34          |
| Nominal pressure                | PN 16                |
| Seating                         | Single seated        |
| Flow characteristic             | Quadratic            |
| Leakage rate                    | $\leq 0.05\%$ of Kvs |
| Regulating capability           | Kvs/Kvr > 25         |
| Internal connection threads     | ISO 7/1              |
| Pressure balanced control valve |                      |

## PRESSURE/TEMPERATURE DIAGRAM

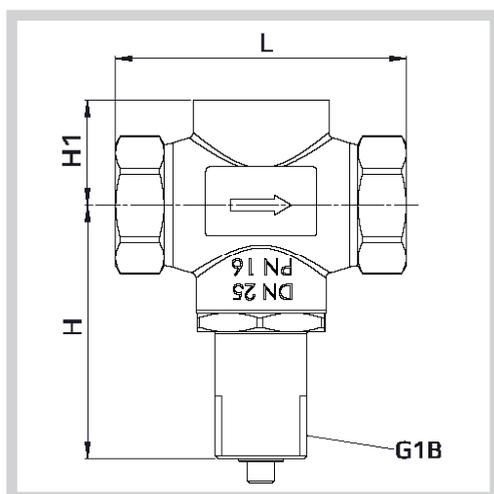


Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to datasheets for the electric actuators).

## DIMENSION SKETCH



| Type    | L (mm) | H (mm) | H1 (mm) |
|---------|--------|--------|---------|
| 15 L15B | 85     | 86     | 30      |
| 20 L15B | 95     | 94     | 35      |
| 25 L15B | 105    | 92     | 40      |
| 32 L15B | 138    | 94     | 54      |

## SPECIFICATIONS

| Type    | Connection threads | DN (mm) | Opening (mm) | $k_{vs}$ -value $m^3/h$ | Lifting height (mm) | Weight (kg) |
|---------|--------------------|---------|--------------|-------------------------|---------------------|-------------|
| 15 L15B | Rp ½               | 15      | 15           | 2.75                    | 6                   | 1.0         |
| 20 L15B | Rp ¾               | 20      | 20           | 5                       | 6.5                 | 1.3         |
| 25 L15B | Rp 1               | 25      | 25           | 7.5                     | 7                   | 1.6         |
| 32 L15B | Rp 1¼              | 32      | 32           | 12.5                    | 8                   | 2.9         |



# Balanced 2-way Control Valve type L1SBR

Gun Metal, PN 16, DN 15 – 32 mm, Reverse acting

0-2.2.04.01-D

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                             |                      |
|-----------------------------|----------------------|
| - Valve body                | Gun metal RG 5       |
| - Components                | Stainless steel      |
| - O-ring                    | FPM, 75 SHOREA       |
| - Gasket                    | Reinz-AFM34          |
| Nominal pressure            | PN 16                |
| Seating                     | Single seated        |
| Flow characteristic         | Quadratic            |
| Leakage rate                | $\leq 0.05\%$ of Kvs |
| Regulating capability       | Kvs/Kvr > 25         |
| Internal connection threads | ISO 7/1              |

## APPLICATIONS

Balanced control valves type L1SBR are mainly designed for regulation of cooling water and lubricating liquids. Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable. The valves are installed combined with our self-acting thermostats, pressure differential regulators or electric actuators for regulation in industrial plants, industrial processes or marine installations - especially in control systems for cooling.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of gun metal RG 5. The thread for the actuator connection is G1B ISO 228. The valve is single seated, balanced. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

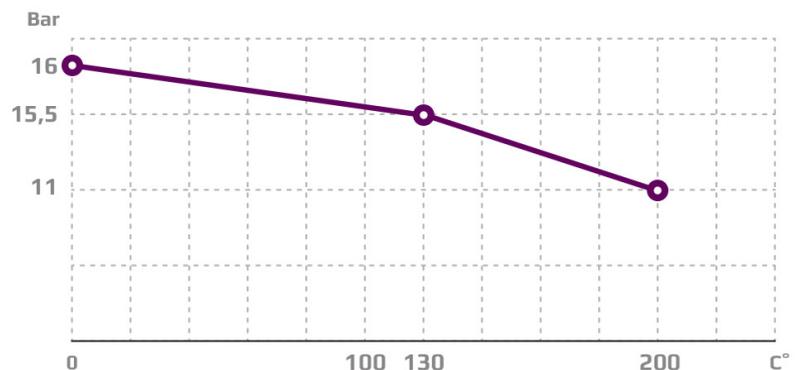
Without the actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens. In connection with our thermostats the valves will open at rising temperatures. In connection with our electric actuators the valves will either close or open depending on the application. The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly.
- Reliable and secure due to internal parts of stainless steel.
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

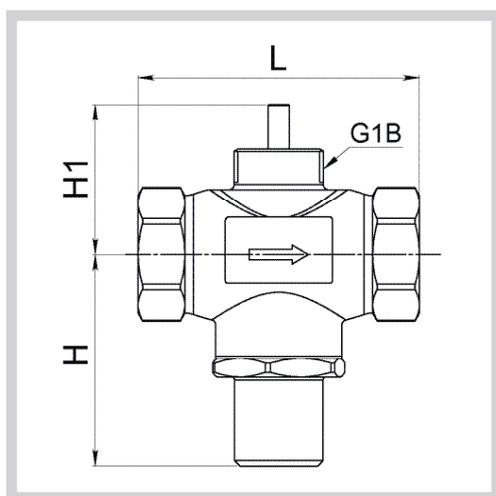


Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).

## DIMENSION SKETCH



| Type     | L (mm) | H (mm) | H1 (mm) |
|----------|--------|--------|---------|
| 15 L1SBR | 85     | 71     | 40      |
| 20 L1SBR | 95     | 79     | 46      |
| 25 L1SBR | 105    | 79     | 50      |
| 32 L1SBR | 138    | 81     | 64      |

## SPECIFICATIONS

| Type     | Connection threads | DN (mm) | Opening (mm) | $k_{vs}$ -value $m^3/h$ | Lifting height (mm) | Weight (kg) |
|----------|--------------------|---------|--------------|-------------------------|---------------------|-------------|
| 15 L1SBR | Rp ½               | 15      | 15           | 2.75                    | 6                   | 1.0         |
| 20 L1SBR | Rp ¾               | 20      | 20           | 5                       | 6.5                 | 1.3         |
| 25 L1SBR | Rp 1               | 25      | 25           | 7.5                     | 7                   | 1.6         |
| 32 L1SBR | Rp 1¼              | 32      | 32           | 12.5                    | 8                   | 2.9         |



# 2-way Control Valve type L2S

Gun Metal, PN 16, DN 40 – 50 mm

0-2.2.05-K

Page 1 of 2



## APPLICATIONS

Control valves type L2S are designed for regulation of hot water and lubricating oils. The valves are installed combined with one of our self-acting thermostats, pressure differential regulators or electric valve actuators for regulation in central heating plants, industrial plants, industrial processes or marine installations.

## DESIGN

The valve body, seats and cone are made of gun metal RG 5. The stem is made of brass. The thread for the actuator connection is G1B ISO 228. The valves are double seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.

## TECHNICAL DATA

### Materials:

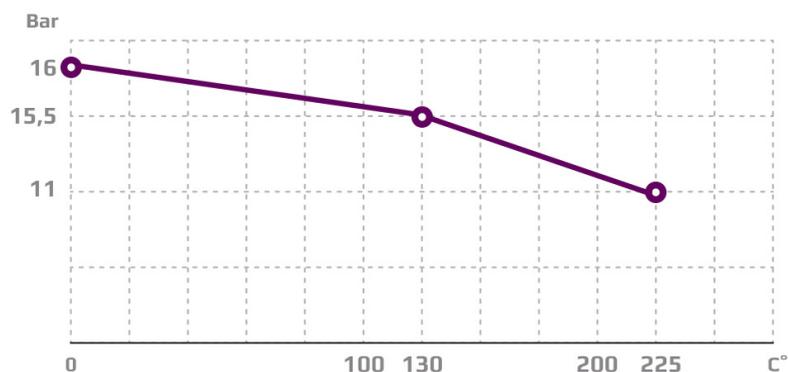
|                             |                     |
|-----------------------------|---------------------|
| - Valve body                | Gun metal RG 5      |
| - Components                | Gun metal RG 5      |
| - Stem                      | Brass               |
| - Gasket                    | Reinz-AFM34         |
| Nominal pressure            | PN 16               |
| Seating                     | Double seated       |
| Flow characteristic         | Linear              |
| Leakage rate                | $\leq 0.5\%$ of Kvs |
| Regulating capability       | Kvs/Kvr > 25        |
| Internal connection threads | ISO 7/1             |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly.

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



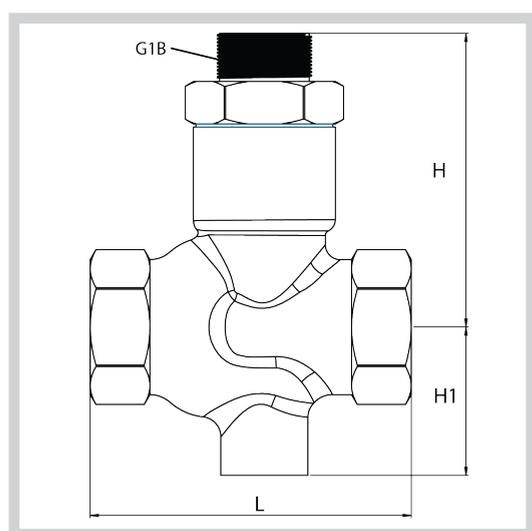
Subject to change without notice.



### MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).

### DIMENSION SKETCH



| Type   | L (mm) | H (mm) | H1 (mm) |
|--------|--------|--------|---------|
| 40 L25 | 129    | 118    | 68      |
| 50 L25 | 153    | 122    | 71      |

### SPECIFICATIONS

| Type   | Connection threads | DN (mm) | Opening (mm) | $k_{vs}$ -value $m^3/h$ | Lifting height (mm) | Weight (kg) |
|--------|--------------------|---------|--------------|-------------------------|---------------------|-------------|
| 40 L25 | Rp ½               | 40      | 40           | 20                      | 8                   | 2.9         |
| 50 L25 | Rp 2               | 50      | 50           | 30                      | 9                   | 3.8         |

# 2-way Control Valve type L2F

Gun metal, PN 10, DN 65 – 150 mm

0-2.2.05.01-B

Page 1 of 2



## APPLICATIONS

Control valves type L2F are designed for regulating hot water - and cold and hot sea water. The valves are used in connection with one of our temperature regulators in control systems for industrial processes or marine installations.

## DESIGN

The valve components - valve body, seats, cone and spindle - are made of sea water resistant materials with connection flanges drilled according to DIN 86021. The connection thread for the actuator is G1B.

## FUNCTION

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.

## TECHNICAL DATA

### Materials:

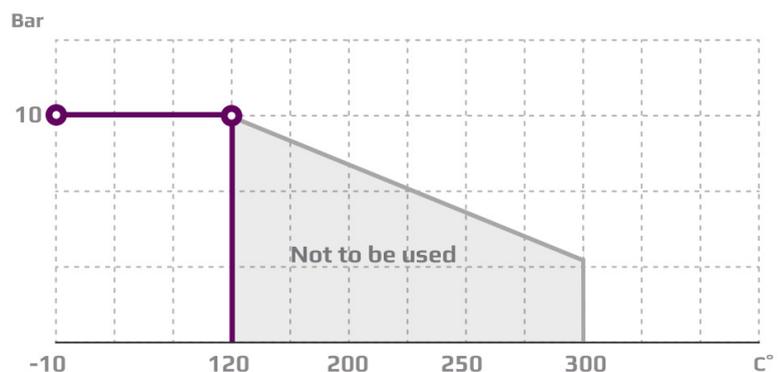
|                              |                                |
|------------------------------|--------------------------------|
| - Valve body                 | CuSn10                         |
| - Seats and cone             | CUAI10Fe5Ni5                   |
| - Spindle                    | W.no. 1.4436                   |
| - O-ring                     | 90 NBR                         |
| - Gasket                     | Reinz-AFM34                    |
| Nominal pressure             | PN 10                          |
| Seating                      | 2 balanced seats               |
| Flow characteristic          | Almost linear                  |
| Leakage rate                 | ≤ 0.5% of Kvs                  |
| Regulating capability        | Kvs/Kvr > 25                   |
| Flanges drilled according to | DIN 86021<br>or ANSI Class 150 |

## FEATURES

- Sea water resistant
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly.
- Reliable and secure due to internal parts of stainless steel.

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



Subject to change without notice.

### PORT NUMBERING

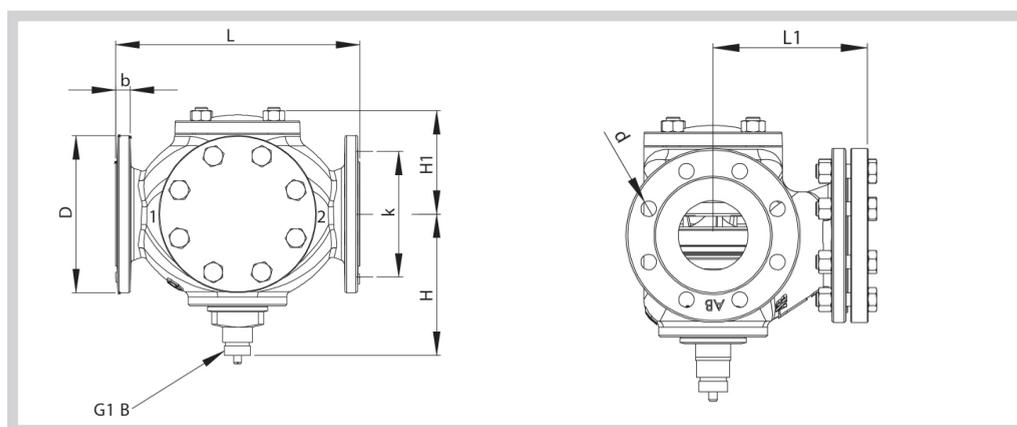
The ports of valves type L2F are marked with the figures 1 and 2. The letters in parentheses refer to the corresponding internationally adapted designations.



### MOUNTING

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

### DIMENSION SKETCH



| Type    | L (mm) | L1 (mm) | H (mm) | H1 (mm) | D (dia.) (mm) | b (mm) | k (dia.) (mm) | d mm dia. (number) |
|---------|--------|---------|--------|---------|---------------|--------|---------------|--------------------|
| 65 L2F  | 240    | 150     | 175    | 120     | 185           | 20     | 145           | 18x(4)             |
| 80 L2F  | 260    | 160     | 185    | 125     | 200           | 22     | 160           | 18x(8)             |
| 100 L2F | 350    | 205     | 195    | 145     | 220           | 22     | 180           | 18x(8)             |
| 125 L2F | 400    | 275     | 245    | 180     | 250           | 24     | 210           | 18x(8)             |
| 150 L2F | 480    | 305     | 280    | 189     | 285           | 24     | 240           | 22x(8)             |

### SPECIFICATIONS

| Type    | Flange connection DN in mm | Opening (mm) | $k_{vs}$ -value $m^3/h$ | Lifting height (mm) | Weight (kg) |
|---------|----------------------------|--------------|-------------------------|---------------------|-------------|
| 65 L2F  | 65                         | 65           | 50                      | 10.50               | 27          |
| 80 L2F  | 80                         | 80           | 80                      | 11                  | 36          |
| 100 L2F | 100                        | 100          | 125                     | 13                  | 62          |
| 125 L2F | 125                        | 125          | 215                     | 18                  | 102         |
| 150 L2F | 150                        | 150          | 310                     | 21                  | 145         |

# 2-way Control Valve type L2FM-T

Gun metal, PN 16, DN 65 – 125 / PN 10, DN 150 – 300 / PN 6, DN 350 – 800 mm

0-2.2.05.03-C

Page 1 of 4

## APPLICATIONS

Control valve type L2FM-T is a three-way control valve with blocked port making a two-way control valve. The slide for quarter turn operation designed for regulating of sea water. The valves are designed for use in conjunction with industrial processes, marine installations with large water quantities. The valves are designed for use in conjunction with valve motor type CAR-H with handle for manual operation or for use in conjunction with a pneumatic actuator.

## DESIGN

The valve body is made of gun metal and the valve slide is made of alu bronze. The valve flanges are drilled according to EN 1092-2 or ANSI Class 150.

## FUNCTION

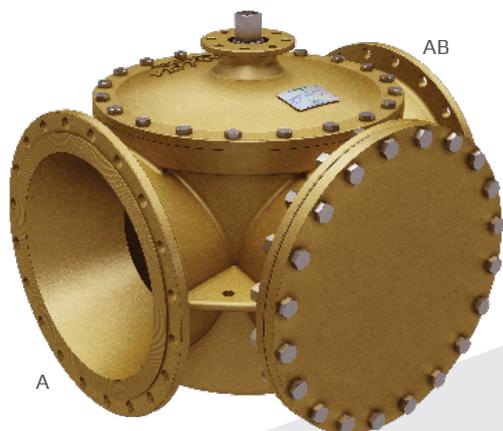
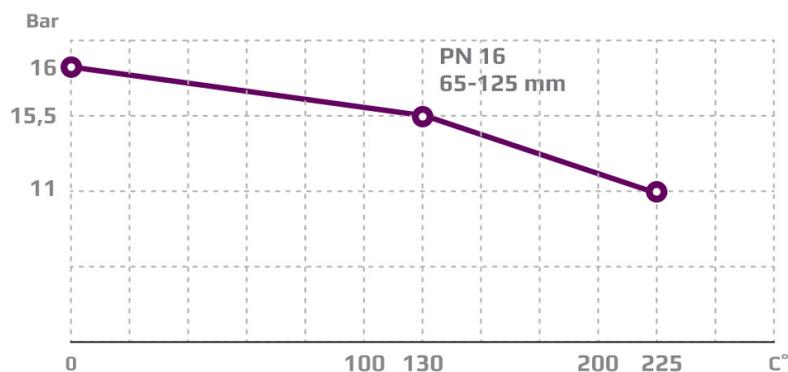
The slide is firmly connected with the motor spindle. When the slide is in the one extreme position by turning the spindle, flow from A to AB is kept fully open. In the other extreme position the valve is fully closed. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## FEATURES

- Sea water resistant
- Simple design secures reliable controls and reduces costly downtime.
- Low leakage rate secures energy savings.
- Flexible choice of port placements

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## TECHNICAL DATA

### Materials:

|              |              |
|--------------|--------------|
| - Valve body | CuSn10       |
| - Slide      | CuAl10Fe5Ni5 |
| - O-ring     | NBR 70A      |
| - U-ring     | PTFE         |
| - Gasket     | AF 1000      |

### - Nominal pressure DN 65-300 L3FM-T

PN 10, max. 100°C  
(option 120°C)

### DN 350-800 L3FM-T

PN 6, max. 100°C  
(option 120°C)

### Flow characteristic

Almost linear

### Leakage rate

≤ 0.5% of KV100

### Regulating capability

Kvs/Kvr > 25

### Flanges

EN 1092-2  
PN 6/10/16

### Counter flanges

ANSI Class 150

### (suggested)

DIN 2631 – PN 6

DIN 2632 – PN 10

DIN2633 – PN 16

### Max. pressure ΔpL, against which the control can close:

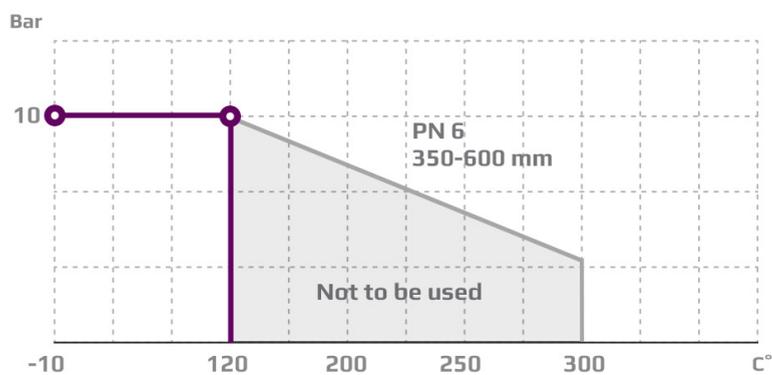
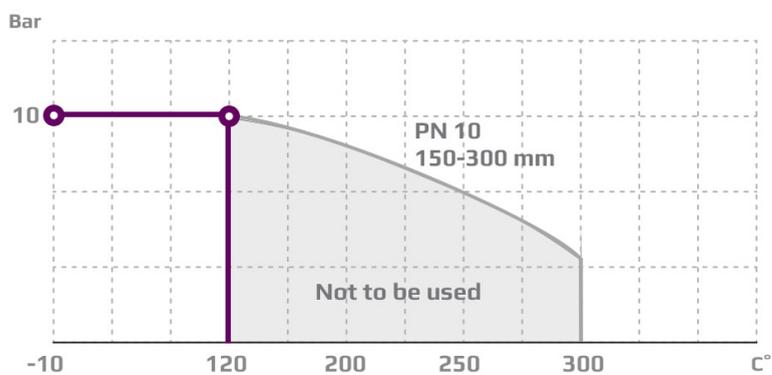
|                     |        |
|---------------------|--------|
| - DN 65-125 L3FM-T  | 16 bar |
| - DN 150-300 L3FM-T | 10 bar |
| - DN 350-800 L3FM-T | 6 bar  |

Slide in CuAl10Fe5Ni5

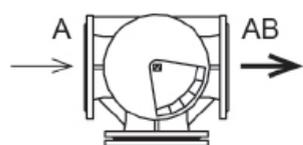
Subject to change without notice.

**PRESSURE/TEMPERATURE DIAGRAM**

According to DIN 2401



**PORT NUMBERING**



**MOUNTING**

The valve connections are marked A and AB. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

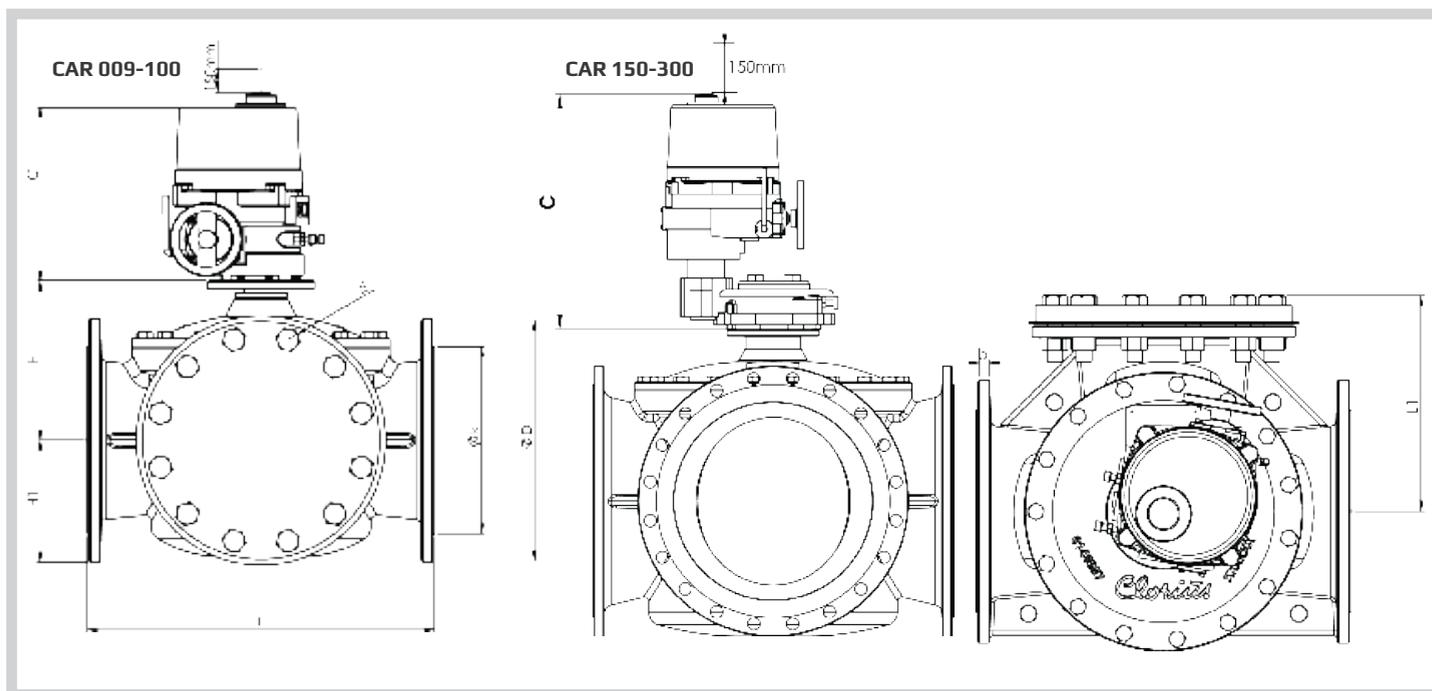
# 2-way Control Valve type L2FM-T

Gun metal, PN 16, DN 65 – 125 / PN 10, DN 150 – 300 / PN 6, DN 350 – 800 mm

0-2.2.05.03-C

Page 3 of 4

## DIMENSION SKETCH



| Type       | L<br>(mm) | L1<br>(mm) | H<br>(mm) | H1<br>(mm) | b<br>(mm) | C<br>(mm) | EN 1092-2           |                     |                          | ANSI Class 150      |                  |                          | JIS B 2210 5K    |                  |                          | JIS B 2210 10K   |                  |                          |
|------------|-----------|------------|-----------|------------|-----------|-----------|---------------------|---------------------|--------------------------|---------------------|------------------|--------------------------|------------------|------------------|--------------------------|------------------|------------------|--------------------------|
|            |           |            |           |            |           |           | D<br>(dia.)<br>(mm) | k<br>(dia.)<br>(mm) | d mm<br>dia.<br>(number) | D<br>(dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) | D (dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) | D (dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) |
| 65 L2FM-T  | 292       | 175        | 135       | 90         | 20        | 273       | 185                 | 145                 | 19x(8)                   | 180                 | 140              | 19x(4)                   | 165              | 130              | 15x(4)                   | 175              | 140              | 19x(4)                   |
| 80 L2FM-T  | 292       | 175        | 140       | 94         | 20        | 273       | 200                 | 160                 | 19x(8)                   | 190                 | 152              | 19x(4)                   | 180              | 145              | 19x(4)                   | 185              | 150              | 19x(8)                   |
| 100 L2FM-T | 350       | 205        | 158       | 112        | 17        | 273       | 220                 | 180                 | 19x(8)                   | 230                 | 190,9            | 19x(8)                   | 200              | 165              | 19x(8)                   | 210              | 175              | 19x(8)                   |
| 125 L2FM-T | 400       | 231        | 179       | 123        | 17        | 273       | 250                 | 210                 | 19x(8)                   | 255                 | 216              | 19x(8)                   | 235              | 200              | 19x(8)                   | 250              | 210              | 23x(8)                   |
| 150 L2FM-T | 438       | 249        | 196       | 139        | 20        | 276       | 285                 | 240                 | 23x(8)                   | 280                 | 241              | 22x(8)                   | 265              | 230              | 19x(8)                   | 280              | 240              | 23x(8)                   |
| 200 L2FM-T | 530       | 301        | 236       | 175        | 21        | 361       | 340                 | 295                 | 23x(12)                  | 343                 | 299              | 23x(8)                   | 320              | 280              | 23x(8)                   | 320              | 290              | 23x(12)                  |
| 250 L2FM-T | 592       | 333        | 273       | 205        | 23        | 361       | 395                 | 350                 | 23x(12)                  | 407                 | 362              | 26x(12)                  | 385              | 345              | 23x(12)                  | 400              | 355              | 25x(12)                  |
| 300 L2FM-T | 649       | 365        | 305       | 230        | 25.5      | 361       | 455                 | 400                 | 23x(12)                  | 483                 | 432              | 26x(12)                  | 430              | 390              | 23x(12)                  | 445              | 400              | 25x(16)                  |
| 350 L2FM-T | 717       | 395        | 337       | 255        | 25.5      | 361       | 490                 | 445                 | 23x(12)                  | 534                 | 477              | 29x(12)                  | 480              | 435              | 25x(12)                  | 490              | 445              | 25x(16)                  |
| 400 L2FM-T | 770       | 421        | 375       | 285        | 26        | 361       | 540                 | 495                 | 23x(16)                  | 597                 | 540              | 29x(16)                  | 540              | 495              | 25x(16)                  | 560              | 510              | 27x(16)                  |
| 450 L2FM-T | 820       | 446        | 391       | 310        | 26.5      | 556       | 595                 | 550                 | 23x(16)                  | 635                 | 578              | 32x(16)                  | 605              | 555              | 25x(16)                  | 620              | 565              | 27x(20)                  |
| 500 L2FM-T | 900       | 492        | 425       | 340        | 27.5      | 556       | 645                 | 600                 | 23x(20)                  | 699                 | 635              | 32x(20)                  | 655              | 605              | 25x(20)                  | 675              | 620              | 27x(20)                  |
| 550 L2FM-T | 900       | 492        | 425       | 373        | 27.5      | 556       |                     |                     |                          |                     |                  |                          | 720              | 665              | 27x(20)                  | 745              | 680              | 33x(20)                  |
| 600 L2FM-T | 1000      | 546        | 470       | 393        | 31.0      | 556       | 755                 | 705                 | 28x(20)                  | 813                 | 750              | 35x(20)                  | 770              | 715              | 25x(20)                  | 795              | 730              | 33x(24)                  |
| 700 L2FM-T | 1106      | 649        | 519       | 462        | 34.0      | 556       | 860                 | 810                 | 28x(24)                  |                     |                  |                          | 875              | 820              | 27x(24)                  | 905              | 840              | 33x(24)                  |
| 800 L2FM-T | 1200      | 702        | 579       | 507        | 37        | 556       | 975                 | 920                 | 31x(24)                  |                     |                  |                          | 995              | 930              | 33x(24)                  | 1020             | 950              | 33x(28)                  |

Subject to change without notice.

## SPECIFICATIONS

| Type       | Flange connection<br>DN in mm | $k_{vs}$ -value<br>m <sup>3</sup> /h | Torque<br>Nm<br>For inlet P* | Weight<br>kg |
|------------|-------------------------------|--------------------------------------|------------------------------|--------------|
| 65 L2FM-T  | 65                            | 120                                  | 46                           | 37           |
| 80 L2FM-T  | 80                            | 154                                  | 55                           | 41           |
| 100 L2FM-T | 100                           | 220                                  | 90                           | 56           |
| 125 L2FM-T | 125                           | 330                                  | 150                          | 73           |
| 150 L2FM-T | 150                           | 425                                  | 160                          | 84           |
| 200 L2FM-T | 200                           | 1100                                 | 250                          | 153          |
| 250 L2FM-T | 250                           | 2100                                 | 395                          | 215          |
| 300 L2FM-T | 300                           | 2650                                 | 550                          | 277          |
| 350 L2FM-T | 350                           | 3380                                 | 640                          | 340          |
| 400 L2FM-T | 400                           | 3950                                 | 895                          | 459          |
| 450 L2FM-T | 450                           | 4480                                 | 1050                         | 579          |
| 500 L2FM-T | 500                           | 5250                                 | 1300                         | 744          |
| 550 L2FM-T | 550                           | 5250                                 | 1300                         | 950          |
| 600 L2FM-T | 600                           | 6050                                 | 1850                         | 1090         |
| 700 L2FM-T | 700                           | 7000                                 | TBC                          | TBC          |
| 800 L2FM-T | 800                           | 8000                                 | 2600                         | 2100         |

\*Torque calculated at max inlet P for:  
 DN 65 - 125 = 16 Bar  
 DN 150-300 = 10 Bar  
 DN 350-800 = 5 Bar



# 2-way Control Valve type L2SR

Gun metal, PN 16, DN 40 – 50 mm, 2 seats, Reverse acting

0-2.2.06-L

Page 1 of 2



## APPLICATIONS

Valves type L2SR are mainly intended for control of cooling water, sea water and lubricating liquids. The valves are used in conjunction with temperature- or pressure differential regulators in industrial processes or marine installations - especially in control systems for cooling. As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure,  $\Delta p_L$ , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force.

## DESIGN

The valve body, seats and cone – are made of gun metal RG 5 and the stem of stainless steel – the valve body with threaded ends according to ISO 7-1. The thread for the actuator connection is G1B. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

### REVERSE ACTING

Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens. In connection with thermostats, pneumatic or electric valve actuators. The valves act as “cooling” valves, i.e. they open at rising temperatures.

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly.

## TECHNICAL DATA

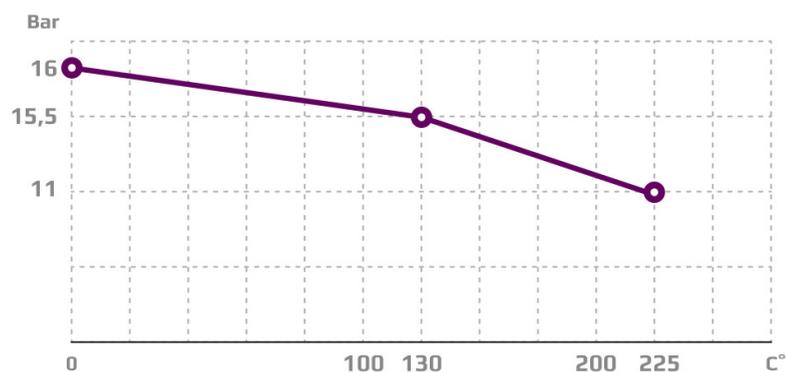
### Materials:

|                       |                                 |
|-----------------------|---------------------------------|
| - Valve body          | Gun metal RG 5<br>W.No. 2.1086  |
| - Stem                | Stainless steel<br>W.No. 1.4436 |
| - O-ring              | 70 NBR                          |
| - Gasket              | Reinz-AFM34                     |
| Nominal pressure      | PN 16                           |
| Seating               | Double seated                   |
| Flow characteristic   | Linear                          |
| Leakage rate          | $\leq 0.5\%$ of Kvs             |
| Regulating capability | Kvs/Kvr > 25                    |
| Connection threads    | ISO 7-1                         |

Reverse acting (normally closed)  
For cooling water and lubricants

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



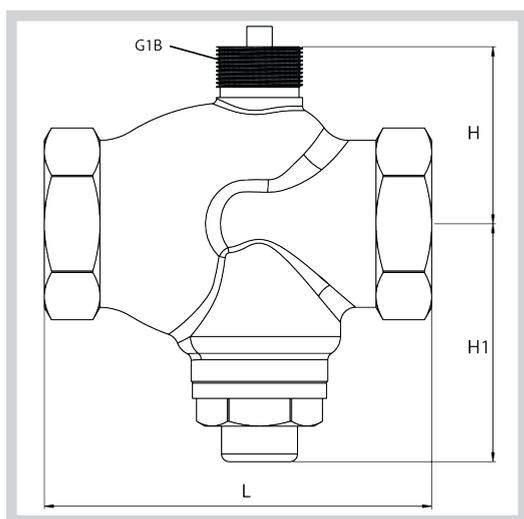
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



| Type    | L (mm) | H (mm) | H1 (mm) |
|---------|--------|--------|---------|
| 40 L2SR | 129    | 65     | 90      |
| 50 L2SR | 153    | 70     | 94      |

## SPECIFICATIONS

| Type    | Connection R <sub>p</sub> | Opening dia. Mm | k <sub>vs</sub> -value m <sup>3</sup> /h | Rated travel mm | Max. Δp <sub>L</sub> bar | Actuator Force N | Corresp. p <sub>1max</sub> bar | Weight kg |
|---------|---------------------------|-----------------|--|-----------------|--------------------------|------------------|--------------------------------|-----------|
| 40 L2SR | 1½"                       | 40              | 20.00                                    | 8               | 2.7                      | 400              | 16.0                           | 3.0       |
| 50 L2SR | 2"                        | 50              | 30.00                                    | 9               | 1.8                      | 400              | 16.0                           | 4.0       |

# 3-way Control Valve type L35

Gun metal, PN 10, DN 15 – 50 mm

0-2.2.07-K

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                              |                           |
|------------------------------|---------------------------|
| - Valve body, seats and cone | Gun metal RG 5            |
| - O-ring                     | 90 NBR                    |
| - Gasket                     | Reinz-AFM34               |
| Nominal pressure             | PN 10                     |
|                              | (max. 120°C option 200°C) |

|         |  |
|---------|--|
| Seating | Two single seats                         |
|         | 15-20 mm unbalanced<br>25-50 mm balanced |

|                     |               |
|---------------------|---------------|
| Flow characteristic | Almost linear |
|---------------------|---------------|

|              |               |
|--------------|---------------|
| Leakage rate | ≤ 0.5% of Kvs |
|--------------|---------------|

|                       |              |
|-----------------------|--------------|
| Regulating capability | Kvs/Kvr > 25 |
|-----------------------|--------------|

|                  |                           |
|------------------|---------------------------|
| Way of operation | When spindle is actuated: |
|------------------|---------------------------|

Gate 1-2 closes

Gate 1-3 opens

|                             |         |
|-----------------------------|---------|
| Internal connection threads | ISO 7/1 |
|-----------------------------|---------|

## APPLICATIONS

Control valves type L35 are designed for regulating fresh water, cold and hot sea-water and lubricating liquids. The valves are used in conjunction with temperature regulators in control systems for cooling and heating of domestic premises, district heating, industrial processes or marine installations.

## DESIGN

The valve components - valve body, seats and cone - are made of sea-water resistant gun metal RG 5. The valves are single seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174). Note: The design of the sizes DN 15 (½") and DN 20 (¾") is different from the bigger ones.

## FUNCTION

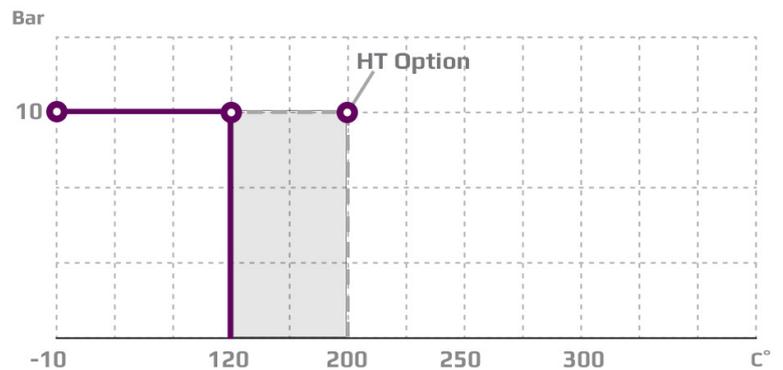
Without an actuator being connected, connection 2-1 is fully open and connection 3-1 completely closed by means of a spring. On increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.

## FEATURES

- Sea water resistant
- Simple design secures reliable controls and reduces costly downtime.
- Can be used for both mixing and diverting

## PRESSURE/TEMPERATURE DIAGRAM

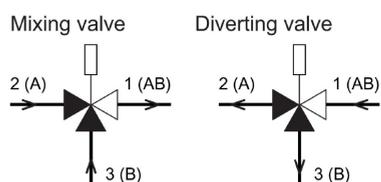
According to DIN 2401



Subject to change without notice.

### PORT NUMBERING

The ports of valves type L35 are marked with the figures 1, 2 and 3. The letters in parentheses refer to the corresponding internationally adapted designations.



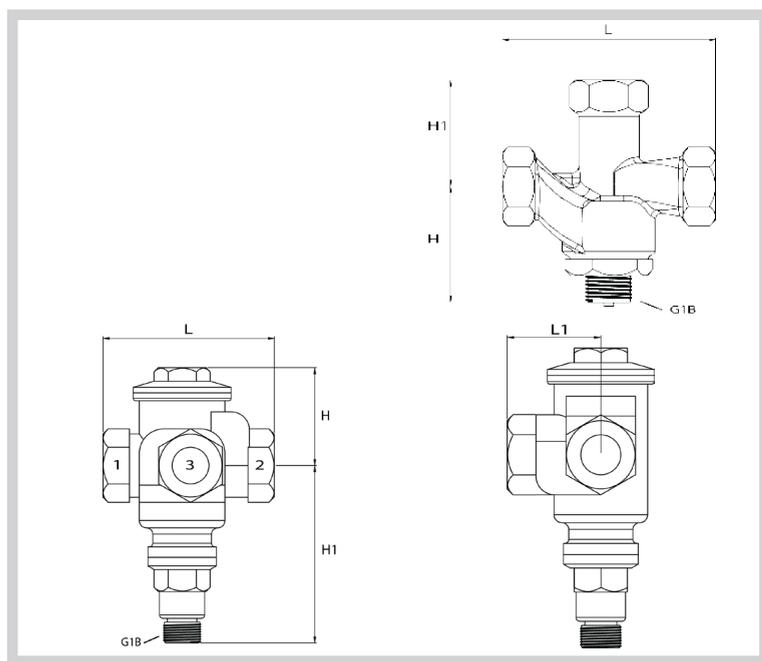
Port 1(AB) common port always open  
 Port 2(A) closes at load on spindle  
 Port 3(B) opens at load on spindle



### MOUNTING

The valves can be installed with vertical as well as horizontal spindles. The thermostat/actuator can be fitted below or above the valve.

### DIMENSION SKETCH



| Type   | L (mm) | L1 (mm) | H (mm) | H1 (mm) |
|--------|--------|---------|--------|---------|
| 15 L35 | 110    | -       | 60     | 55      |
| 20 L35 | 110    | -       | 60     | 55      |
| 25 L35 | 140    | 70      | 145    | 80      |
| 32 L35 | 140    | 70      | 145    | 80      |
| 40 L35 | 185    | 95      | 150    | 105     |
| 50 L35 | 185    | 95      | 150    | 105     |

### SPECIFICATIONS

| Type   | Connection threads | DN mm | Opening mm | $k_{vs}$ -value mixing valve $m^3/h$ | $k_{vs}$ -value diverting valve $m^3/h$ | Lifting height mm | Weight kg |
|--------|--------------------|-------|------------|--------------------------------------|---|-------------------|-----------|
| 15 L35 | Rp 1/2             | 15    | 15         | 2.75                                 | 2.4                                     | 3                 | 1         |
| 20 L35 | Rp 3/4             | 20    | 20         | 5                                    | 4.3                                     | 4                 | 1         |
| 25 L35 | Rp 1               | 25    | 25         | 7.5                                  | 6.4                                     | 4                 | 4.4       |
| 32 L35 | Rp 1 1/4           | 32    | 32         | 12.5                                 | 10.7                                    | 6                 | 4.5       |
| 40 L35 | Rp 1 1/2           | 40    | 40         | 20                                   | 17.2                                    | 6                 | 7.7       |
| 50 L35 | Rp 2               | 50    | 50         | 30                                   | 25.8                                    | 8                 | 8.3       |

# 3-way Control Valve type L3F

Gun metal, PN 10, DN 65 – 150 mm

0-2.2.08-K

Page 1 of 2

## APPLICATIONS

Control valves type L3F are designed for regulating hot water - and cold and hot sea water. The valves are used in connection with one of our temperature regulators in control systems for industrial processes or marine installations.

## DESIGN

The valve components - valve body, seats, cone and spindle - are made of sea water resistant materials with connection flanges drilled according to DIN 86021. The connection thread for the actuator is G1B.

## FUNCTION

Without an actuator being installed, connection 2-1 is fully open and connection 3-1 completely closed, by means of a spring. By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.



## TECHNICAL DATA

### Materials:

|                              |                     |
|------------------------------|---------------------|
| - Valve body                 | CuSn10              |
| - Seats, cone, spindle       | CuAl10Fe5Ni5        |
| - O-ring                     | 90 NBR              |
| - Gasket                     | Reinz-AFM34         |
| Nominal pressure             | PN 10               |
| Seating                      | 2 balanced seats    |
| Flow characteristic          | Almost linear       |
| Leakage rate                 | $\leq 0.5\%$ of Kvs |
| Regulating capability        | Kvs/Kvr > 25        |
| Flanges drilled according to | DIN 86021           |

### Important note

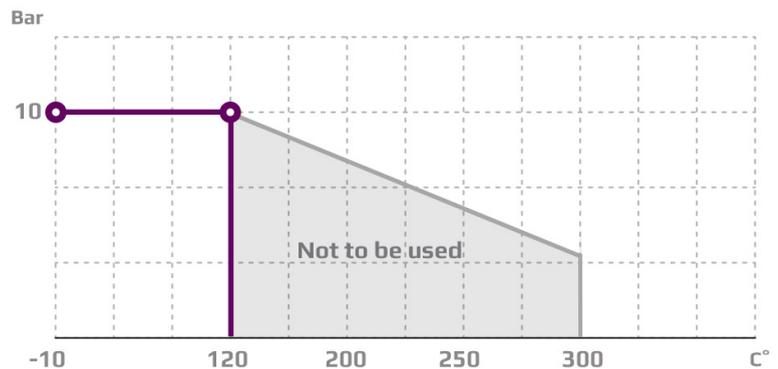
In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the Kvs-value will decrease by 14% as against mixing valves.

## FEATURES

- Sea water resistant
- Simple design secures reliable controls and reduces costly downtime.
- Can be used for both mixing and diverting

## PRESSURE/TEMPERATURE DIAGRAM

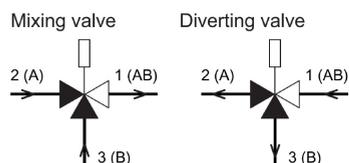
According to DIN 2401



Subject to change without notice.

### PORT NUMBERING

The ports of valves type L3F are marked with the letters AB, A and B.



Port 1(AB)  
Port 2(A)  
Port 3(B)

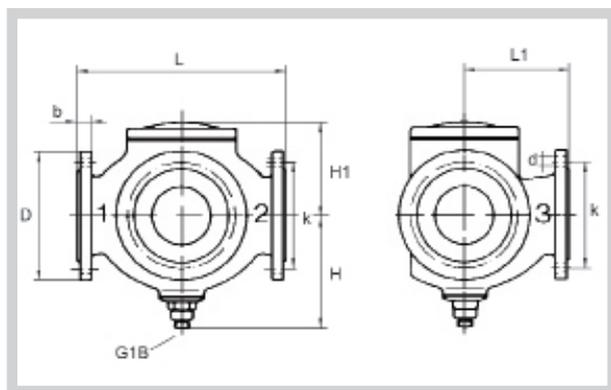
common port always open  
closes at load on spindle  
opens at load on spindle



### MOUNTING

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the actuator will be exposed to a minimum of moisture and unnecessary vibrations.

### DIMENSION SKETCH



| Type    | L (mm) | L1 (mm) | H (mm) | H1 (mm) | D (dia.) (mm) | b (mm) | k (dia.) (mm) | d mm dia. (number) |
|---------|--------|---------|--------|---------|---------------|--------|---------------|--------------------|
| 65 L3F  | 240    | 120     | 175    | 120     | 185           | 20     | 145           | 18x(4)             |
| 80 L3F  | 310    | 155     | 180    | 127     | 200           | 22     | 160           | 18x(8)             |
| 100 L3F | 350    | 175     | 195    | 145     | 220           | 22     | 180           | 18x(8)             |
| 125 L3F | 400    | 240     | 245    | 180     | 250           | 24     | 210           | 18x(8)             |
| 150 L3F | 480    | 270     | 280    | 189     | 285           | 24     | 240           | 22x(8)             |

### SPECIFICATIONS

| Type    | Flange connection DN in mm | Opening mm | Mixing valve $k_{vs}$ -value $m^3/h$ | Diverting valve $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|---------|----------------------------|------------|--------------------------------------|---|-------------------|-----------|
| 65 L3F  | 65                         | 65         | 50                                   | 43                                      | 10.5              | 22.5      |
| 80 L3F  | 80                         | 80         | 80                                   | 69                                      | 11                | 40        |
| 100 L3F | 100                        | 100        | 125                                  | 108                                     | 13                | 55        |
| 125 L3F | 125                        | 125        | 215                                  | 185                                     | 18                | 91        |
| 150 L3F | 150                        | 150        | 310                                  | 267                                     | 21                | 131       |

# 3-way control valve type L3FA

Gun metal, PN 10, DN 65 – 200 mm / PN 6, DN 300/250 – 300 mm

0-2.2.09.01-B

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## APPLICATIONS

Control valve type L3FA is designed for regulating of sea water. The valves are used in conjunction with marine installations, e.g. cooling of main and auxiliary engines. Designed for use in conjunction with Clorius valve motor type AVM234 or AVF234.

## DESIGN

The valve components (seats, cone and spindle) are made of alu bronze and the valve body is made of CuSn10. The valve flanges are drilled according to DIN 86021.

## FUNCTION

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one outer position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

## TECHNICAL DATA

### Materials:

|                       |              |
|-----------------------|--------------|
| - Valve body          | CuSn10       |
| - Seat, cone, spindle | CuAl10Fe5Ni5 |
| - O-ring              | AFLAS 75H    |
| - Gasket              | Reinz-AFM34  |

### Nominal pressure

|                  |                  |
|------------------|------------------|
| - 65-200 mm      | PN 10 max. 120°C |
| - 300/250-300 mm | PN 6 max. 120°C  |

**Seats** 2 balanced single seats

**Flow characteristic** Almost linear

**Leakage rate** ≤ 0.5%

**Regulating capability** Kvs/Kvr > 25

**Temperature range** Max. 120°C

**Flanges** According to DIN 86021

### Note!

Valve type 300/250 L3FA has outer measures and flanges drilled as valve type 300 L3FA

### For cooling and heating purposes

Sea water resistant

### Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the kvs-value will decrease by 14% as against mixing valves.

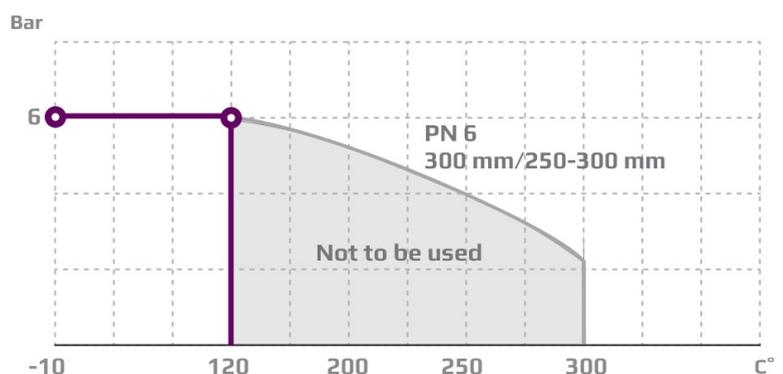
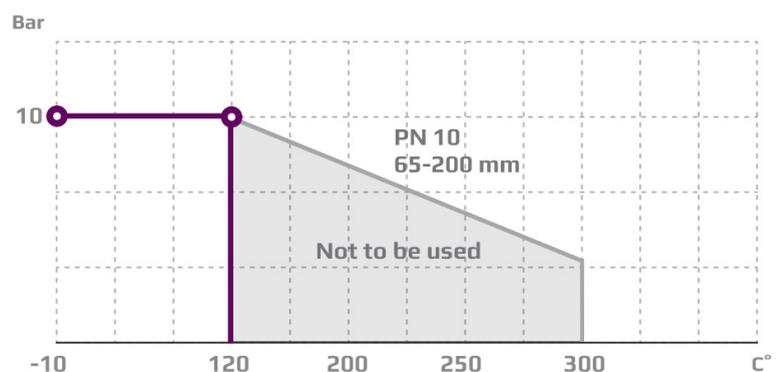
Subject to change without notice.

## FEATURES

- Sea water resistant
- Simple design secures reliable controls and reduces costly downtime.
- Can be used for both mixing and diverting

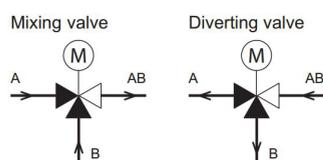
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING

The ports of valves type L3FA are marked with the letters AB, A and B.



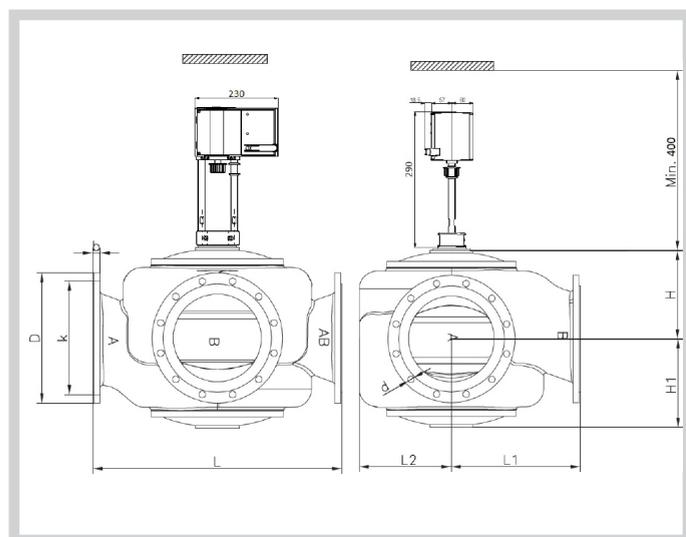
Port AB  
Port A  
Port B

common port always open  
closes at load on spindle  
opens at load on spindle

### MOUNTING

The valve can be installed vertical as well as horizontal. The valve must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM234 See drawing.

### DIMENSION SKETCH



| Type                       | L mm | L1 mm | H mm | H1 mm | b mm | D (dia.) mm | k (dia.) (mm) | d mm dia. (number) |
|----------------------------|------|-------|------|-------|------|-------------|---------------|--------------------|
| 65 L3FA                    |      |       |      |       |      |             |               |                    |
| 80 L3FA                    | 310  | 155   | 117  | 127   | 19   | 200         | 160           | 18x(8)             |
| 100 L3FA                   | 350  | 175   | 132  | 141   | 19   | 220         | 180           | 18x(8)             |
| 125 L3FA                   | 400  | 240   | 181  | 171   | 19   | 250         | 210           | 18x(8)             |
| 150 L3FA                   | 480  | 270   | 216  | 189   | 19   | 285         | 240           | 22x(8)             |
| 200/175 L3FA               | 600  | 325   | 238  | 238   | 20   | 340         | 295           | 22x(8)             |
| 200 L3FA                   | 600  | 325   | 238  | 238   | 20   | 340         | 295           | 22x(8)             |
| 300/250 L3FA <sup>2)</sup> | 850  | 450   | 305  | 305   | 25   | 445         | 400           | 22x(12)            |
| 300 L3FA                   | 850  | 450   | 305  | 305   | 25   | 445         | 400           | 22x(12)            |

### SPECIFICATIONS

<sup>2)</sup> Valve type 300/250 L3FA has outer measures and flanges drilled as type 300 L3FA.

| Type                       | Flange connection DN in mm | Opening (mm) | $k_{vs}$ -value <sup>1)</sup> Mixing valve m <sup>3</sup> /h | $k_{vs}$ -value <sup>1)</sup> Diverting valve m <sup>3</sup> /h | Lifting height (mm) | Weight (kg) |
|----------------------------|----------------------------|--------------|--|---|---------------------|-------------|
| 65 L3FA                    |                            |              |  |   |                     |             |
| 80 L3FA                    | 80                         | 80           | 80   | 69  | 11                  | 40          |
| 100 L3FA                   | 100                        | 100          | 125  | 108   | 13                  | 49          |
| 125 L3FA                   | 125                        | 125          | 215  | 185   | 18                  | 80          |
| 150 L3FA                   | 150                        | 150          | 310  | 267   | 20                  | 126         |
| 200/175 L3FA               | 200                        | 175          | 425  | 366   | 22                  | 195         |
| 200 L3FA                   | 200                        | 200          | 555  | 477   | 28                  | 190         |
| 300/250 L3FA <sup>2)</sup> | 300                        | 250          | 865  | 744   | 28                  | 365         |
| 300 L3FA                   | 300                        | 300          | 1250   | 1075  | 45                  | 355         |



# 3-way Control Valve type L3FM-T

Gun metal, PN16, DN65 - 125mm/ PN10, DN150 - 300mm/ PN6, DN350 - 800mm

0-2.2.10-G

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## APPLICATIONS

Control valve type L3FM-T is a three-way control valve with a slide for quarter turn operation designed for regulating of sea water. The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

## DESIGN

The valve body is made of gun metal, while the slide is made of aluminum bronze. The valve flanges are drilled according to EN 1092-2.

## FUNCTION

The slide is firmly connected with the actuator spindle. When the slide is in the one extreme position by turning the spindle, connection A-AB is kept fully open and connection B-AB is fully closed. In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## TECHNICAL DATA

|                   |              |
|-------------------|--------------|
| <b>Materials:</b> |              |
| - Valve body      | CuSn10       |
| - Slide           | CuAL10Fe5Ni5 |
| - O-ring          | NBR 70A      |
| - U-ring          | PTFE         |
| - Gasket          | AF1000       |

|                    |                                     |
|--------------------|-------------------------------------|
| - Nominal pressure |                                     |
| DN 65-125 L3FM-T   | PN 16, max. 100°C<br>(option 120°C) |

|                   |                                     |
|-------------------|-------------------------------------|
| DN 150-300 L3FM-T | PN 10, max. 100°C<br>(option 120°C) |
|-------------------|-------------------------------------|

|                   |                                    |
|-------------------|------------------------------------|
| DN 350-800 L3FM-T | PN 6, max. 100°C<br>(option 120°C) |
|-------------------|------------------------------------|

|                     |               |
|---------------------|---------------|
| Flow characteristic | Almost linear |
|---------------------|---------------|

|              |          |
|--------------|----------|
| Leakage rate | max 0.5% |
|--------------|----------|

|                       |              |
|-----------------------|--------------|
| Regulating capability | Kvs/Kvr > 25 |
|-----------------------|--------------|

|         |                          |
|---------|--------------------------|
| Flanges | EN 1092-2<br>PN 6/10 /16 |
|---------|--------------------------|

|                             |   |
|-----------------------------|---|
| Counter flanges (suggested) | DIN 2631 - PN 6<br>DIN 2632 - PN 10<br>DIN 2633 - PN 16 |
|-----------------------------|---|

Max. pressure  $\Delta p_L$ , against which the control can close:

|                  |        |
|------------------|--------|
| - 65-125 L3FM-T  | 16 bar |
| - 150-300 L3FM-T | 10 bar |
| - 350-800 L3FM-T | 6 bar  |

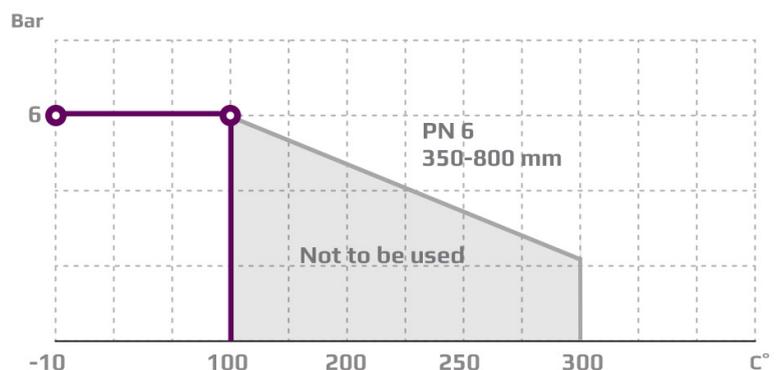
Subject to change without notice.

## FEATURES

- Sea water resistant
- Simple design secures reliable controls and reduces costly downtime
- Low leakage rate secures energy savings
- Flexible choice of port placements
- Can be used for both mixing and diverting

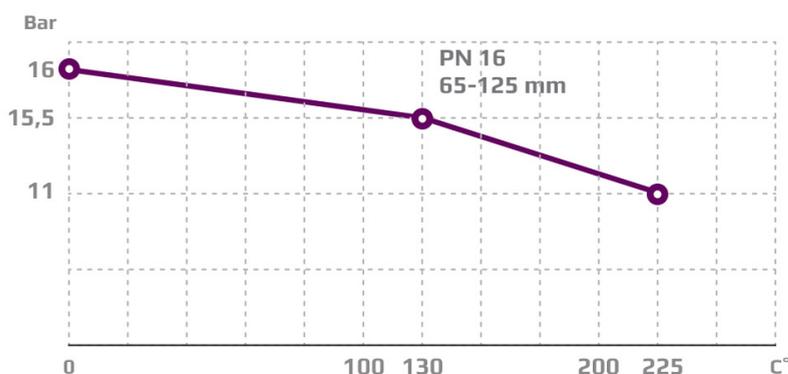
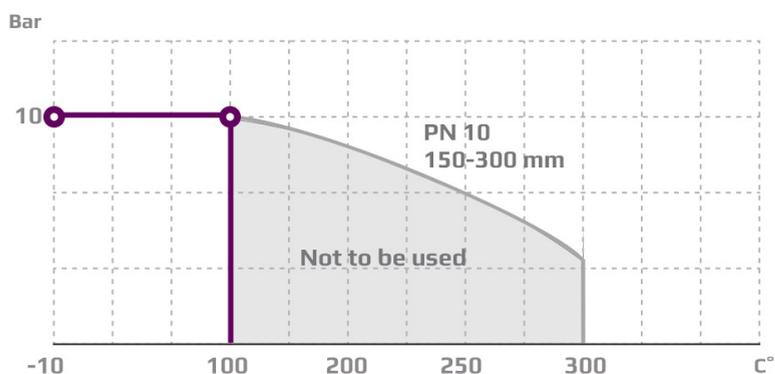
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

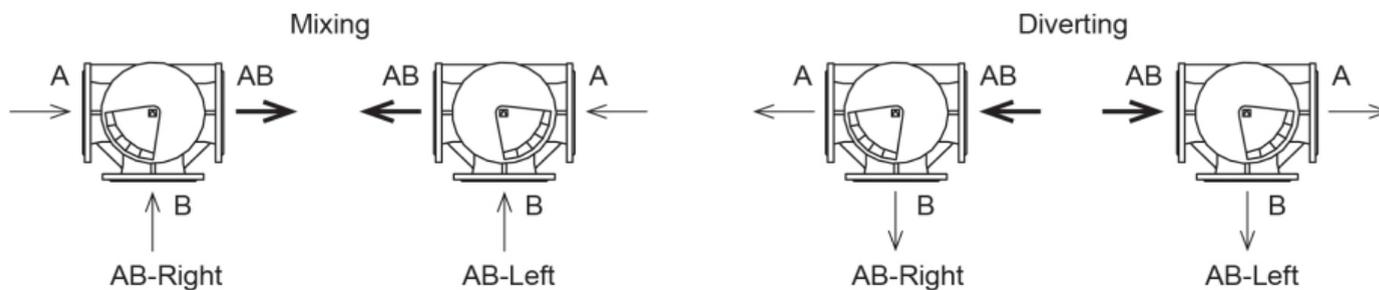


**PRESSURE/TEMPERATURE DIAGRAM**

According to DIN 2401



**PORT NUMBERING/CONFIGURATION**



Further specification for ordering (e.g. 400 L3FM-T, AB-Right)

**MOUNTING**

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. Valve can be supplied in two different configurations, AB-Right and AB-Left. A valve with AB-middle port is available on request. Please note that the supplied configuration is according to installation. The valve can be installed with vertical as well as horizontal spindles. The valve must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

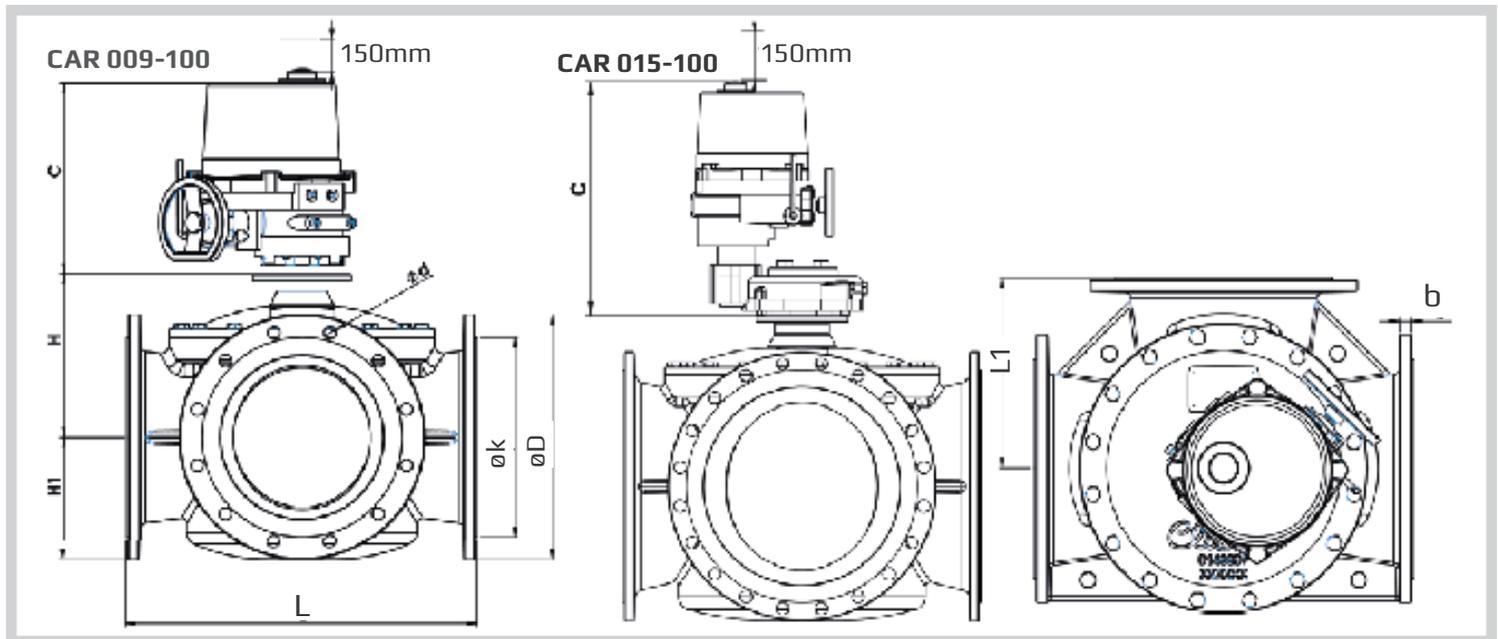
# 3-way Control Valve type L3FM-T

Gun metal, PN16, DN65 - 125mm/ PN10, DN150 - 300mm/ PN6, DN350 - 800mm

0-2.2.10-G

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## DIMENSION SKETCH



| Type        | Pressure DN | L mm | L1 mm | H mm | H1 mm | b mm | C mm | EN 1092-2   |             |                    | ANSI Class 150 |             |                    | JIS B 2210 5K |             |                    | JIS B 2210 10K |             |                    |
|-------------|-------------|------|-------|------|-------|------|------|-------------|-------------|--------------------|----------------|-------------|--------------------|---------------|-------------|--------------------|----------------|-------------|--------------------|
|             |             |      |       |      |       |      |      | D (dia.) mm | k (dia.) mm | d mm dia. (number) | D (dia.) mm    | k (dia.) mm | d mm dia. (number) | D (dia.) mm   | k (dia.) mm | d mm dia. (number) | D (dia.) mm    | k (dia.) mm | d mm dia. (number) |
| 65 L3FM-TR  | 16          | 292  | 146   | 135  | 90    | 20   | 273  | 185         | 145         | 19x(4)             | 180            | 140         | 19x(4)             | 155           | 130         | 15x(4)             | 175            | 140         | 19x(4)             |
| 80 L3FM-TR  | 16          | 292  | 146   | 140  | 94    | 20   | 273  | 200         | 160         | 19x(8)             | 190            | 152         | 19x(4)             | 180           | 145         | 19x(4)             | 185            | 150         | 19x(8)             |
| 100 L3FM-TR | 16          | 350  | 175   | 158  | 112   | 17   | 273  | 220         | 180         | 19x(8)             | 230            | 190.5       | 19x(8)             | 200           | 165         | 19x(8)             | 210            | 175         | 19x(8)             |
| 125 L3FM-TR | 16          | 400  | 200   | 179  | 123   | 17   | 273  | 250         | 210         | 19x(8)             | 255            | 216         | 22x(8)             | 235           | 200         | 19x(8)             | 250            | 210         | 23x(8)             |
| 150 L3FM-TR | 16          | 438  | 219   | 196  | 139   | 20   | 276  | 285         | 240         | 23x(8)             | 280            | 241         | 22x(8)             | 265           | 230         | 19x(8)             | 280            | 240         | 23x(8)             |
| 200 L3FM-TR | 10          | 530  | 270   | 236  | 175   | 21   | 361  | 340         | 295         | 23x(8)             | 343            | 298         | 22x(8)             | 320           | 280         | 23x(8)             | 330            | 290         | 23x(12)            |
| 250 L3FM-TR | 10          | 592  | 300   | 273  | 205   | 23   | 361  | 400         | 350         | 23x(12)            | 405            | 362         | 25x(12)            | 385           | 345         | 23x(12)            | 400            | 355         | 25x(12)            |
| 300 L3FM-TR | 10          | 649  | 330   | 305  | 230   | 25.5 | 361  | 455         | 400         | 23x(12)            | 483            | 432         | 25x(12)            | 430           | 390         | 23x(12)            | 445            | 400         | 25x(16)            |
| 350 L3FM-TR | 6           | 717  | 360   | 337  | 255   | 25.5 | 361  | 490         | 445         | 23x(12)            | 534            | 477         | 29x(12)            | 480           | 435         | 25x(12)            | 490            | 445         | 25x(16)            |
| 400 L3FM-TR | 6           | 770  | 385   | 375  | 285   | 26   | 361  | 540         | 495         | 23x(16)            | 597            | 540         | 29x(16)            | 540           | 495         | 25x(16)            | 560            | 510         | 27x(16)            |
| 450 L3FM-TR | 6           | 820  | 410   | 391  | 310   | 26.5 | 556  | 595         | 550         | 23x(16)            | 635            | 578         | 32x(16)            | 605           | 555         | 25x(16)            | 620            | 565         | 27x(20)            |
| 500 L3FM-TR | 6           | 900  | 455   | 425  | 340   | 27.5 | 556  | 645         | 600         | 23x(20)            | 699            | 635         | 32x(20)            | 655           | 605         | 25x(20)            | 675            | 620         | 27x(20)            |
| 550 L3FM-TR | 6           | 900  | 455   | 425  | 373   | 27,5 | 556  | -           | -           | -                  | -              | -           | -                  | 720           | 665         | 27x(20)            | 745            | 680         | 33x(20)            |
| 600 L3FM-TR | 6           | 1000 | 505   | 470  | 393   | 31.0 | 556  | 755         | 705         | 28x(20)            | 813            | 750         | 35x(20)            | 770           | 715         | 25x(20)            | 795            | 730         | 33x(24)            |
| 650 L3FM-TR | 6           | 1050 | 525   | 515  | 423   | 35   | 556  | -           | -           | -                  | -              | -           | -                  | 825           | 770         | 27x(24)            | 845            | 780         | 33x(24)            |
| 700 L3FM-TR | 6           | 1106 | 553   | 519  | 462   | 34.0 | 556  | 860         | 810         | 28x(24)            | -              | -           | -                  | 875           | 820         | 27x(24)            | 905            | 840         | 33x(24)            |
| 800 L3FM-TR | 6           | 1200 | 600   | 579  | 507   | 37   | 556  | 975         | 920         | 31x(24)            | -              | -           | -                  | 995           | 930         | 32x(24)            | 1020           | 950         | 33x(28)            |

**SPECIFICATIONS**

| Type       | Flange connection<br>DN in mm | $k_{vs}$ -value <sup>1)</sup><br>Mixing valve<br>m <sup>3</sup> /h | $k_{vs}$ -value <sup>1)</sup><br>Diverting valve<br>m <sup>3</sup> /h | Torque<br>Nm<br>For inlet P* | Weight<br>kg |
|------------|-------------------------------|--|---|------------------------------|--------------|
| 65 L3FM-T  | 65                            | 95   | 120   | 46                           | 28           |
| 80 L3FM-T  | 80                            | 122  | 154   | 55                           | 32           |
| 100 L3FM-T | 100                           | 175  | 220   | 90                           | 47           |
| 125 L3FM-T | 125                           | 245  | 330   | 150                          | 64           |
| 150 L3FM-T | 150                           | 395  | 425   | 160                          | 75           |
| 200 L3FM-T | 200                           | 800  | 1100  | 250                          | 114          |
| 250 L3FM-T | 250                           | 1500   | 2100  | 395                          | 159          |
| 300 L3FM-T | 300                           | 2000   | 2650  | 550                          | 207          |
| 350 L3FM-T | 350                           | 2530   | 3380  | 640                          | 278          |
| 400 L3FM-T | 400                           | 3050   | 3950  | 895                          | 346          |
| 450 L3FM-T | 450                           | 3680   | 4480  | 1050                         | 433          |
| 500 L3FM-T | 500                           | 4150   | 5250  | 1300                         | 563          |
| 550 L3FM-T | 550                           | 4150   | 5250  | 1300                         | 575          |
| 600 L3FM-T | 600                           | 4800   | 6050  | 1850                         | 816          |
| 700 L3FM-T | 700                           | 5500   | 7000  | TBC                          | 1150         |
| 800 L3FM-T | 800                           | 6200   | 8000  | 2600                         | 2100         |



1) kvs-value for port A and B 50% open.

\*Torque calculated at max inlet P for:  
 DN 65 - 125 = 16 Bar  
 DN 150-300 - 10 Bar  
 DN 350-800 - 5 Bar

# 2-way Control Valve type M1F

Cast iron, PN 16, DN 15/4 – 50 mm

0-2.3.02-L

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                       |                            |
|-----------------------|----------------------------|
| - Valve body          | Cast iron<br>EN-GJS-400-15 |
| - Components          | Stainless steel            |
| - Bolts, nuts         | 24 CrMo 4/A4               |
| - Gasket              | Graphite                   |
| Nominal pressure      | PN 16                      |
| Seating               | Single-seated,             |
| Flow characteristic   | Quadratic                  |
| Leakage rate          | $\leq 0,05\%$ of Kvs       |
| Regulating capability | Kvs/Kvr > 25               |

|                                      |                    |
|--------------------------------------|--------------------|
| Flanged ends<br>drilled according to | EN 1092-2<br>PN 16 |
| Counter flanges                      | DIN 2633/BS 4504   |

## APPLICATIONS

Control valves type M1F are designed for regulating low, medium and high pressure hot water, steam and lubricating oils. The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seat and cone - are made of stainless steel. The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves are single-seated. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

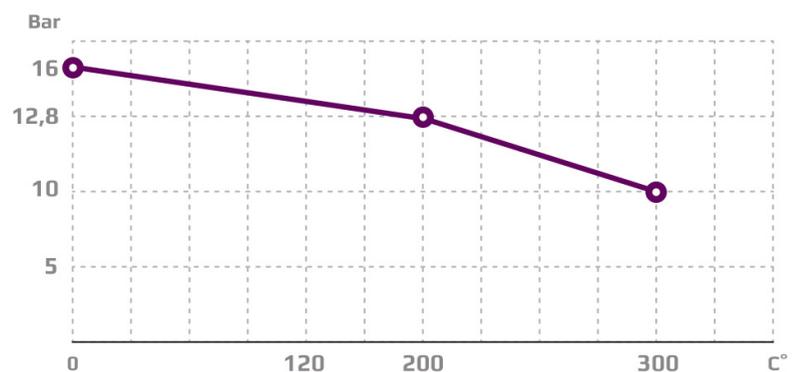
Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats, pneumatic or electronic actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



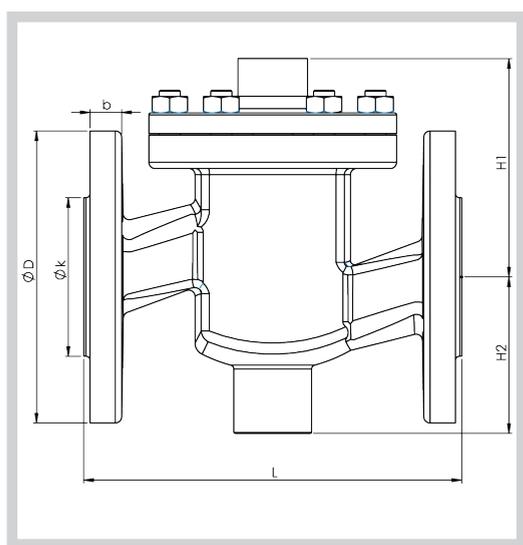
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to datasheets for the electric actuators).



## DIMENSION SKETCH



| Type      | L mm | H1 mm | H2 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|-----------|------|-------|-------|------|-------------|-------------|--------------------|
| 15/4 M1F  | 130  | 80    | 60    | 14   | 95          | 65          | 14x(4)             |
| 15/6 M1F  | 130  | 80    | 60    | 14   | 95          | 65          | 14x(4)             |
| 15/9 M1F  | 130  | 80    | 60    | 14   | 95          | 65          | 14x(4)             |
| 15/12 M1F | 130  | 80    | 60    | 14   | 95          | 65          | 14x(4)             |
| 15 M1F    | 130  | 80    | 60    | 14   | 95          | 65          | 14x(4)             |
| 20 M1F    | 150  | 85    | 65    | 16   | 105         | 75          | 14x(4)             |
| 25 M1F    | 160  | 95    | 70    | 16   | 115         | 85          | 14x(4)             |
| 32 M1F    | 180  | 105   | 75    | 18   | 140         | 100         | 14x(4)             |
| 40 M1F    | 200  | 110   | 85    | 18   | 150         | 110         | 14x(4)             |
| 50 M1F    | 230  | 125   | 95    | 20   | 165         | 125         | 14x(4)             |

## SPECIFICATIONS

| Type      | Flange connection DN in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|-----------|----------------------------|------------|-------------------------|-------------------|-----------|
| 15/4 M1F  | 15                         | 4          | 0.20                    | 6                 | 3         |
| 15/6 M1F  | 15                         | 6          | 0.45                    | 6                 | 3         |
| 15/9 M1F  | 15                         | 9          | 0.95                    | 6                 | 3.1       |
| 15/12 M1F | 15                         | 12         | 1.70                    | 6                 | 3.1       |
| 15 M1F    | 15                         | 15         | 2.75                    | 6                 | 3.1       |
| 20 M1F    | 20                         | 20         | 5                       | 6.5               | 4.2       |
| 25 M1F    | 25                         | 25         | 7.50                    | 7                 | 5.5       |
| 32 M1F    | 32                         | 32         | 12.50                   | 8                 | 8.1       |
| 40 M1F    | 40                         | 40         | 20                      | 9                 | 9.7       |
| 50 M1F    | 50                         | 50         | 30                      | 10                | 14        |

# Balanced 2-way Control Valve type M1FBN

Cast iron, PN 16, DN 15 – 80 mm

0-2.3.03.01-F

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                              |   |
|------------------------------|---|
| - Valve body                 | Cast iron<br>EN-GJS-400-15              |
| - Components                 | Stainless steel                         |
| - Nuts, bolts                | 24 CrMo 5/A4                            |
| - O-ring                     | A.75H FEPM                              |
| - Gasket                     | Graphite                                |
| Nominal pressure             | PN 16                                   |
| Pressure balanced valve      |   |
| Seating                      | Single-seated,<br>balanced              |
| Flow characteristic          | Quadratic                               |
| Leakage rate                 | $\leq 0.05\%$ of Kvs                    |
| Regulating capability        | Kvs/Kvr > 25                            |
| Flanges drilled according to | EN 1092-2<br>or ANSI B16.5<br>Class 150 |

## APPLICATIONS

Balanced control valves type M1FBN are designed for regulating hot water, steam and hot oil systems. Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable. The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components, spindle, seat and cone - are made of stainless steel. The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The thread for the actuator connection is G1B ISO 228. The valves are single-seated. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

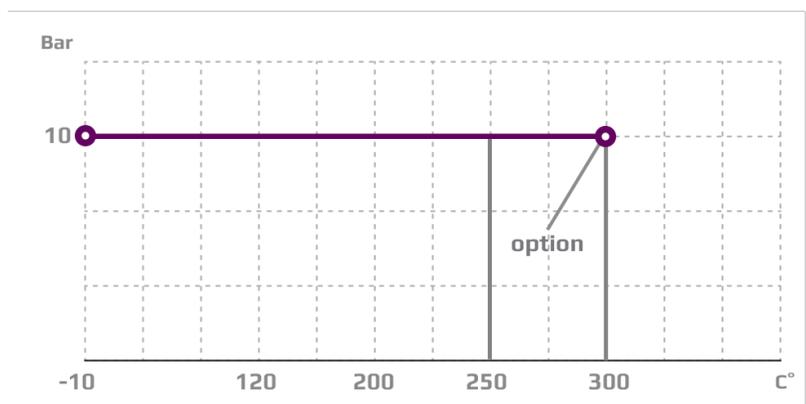
Without an actuator being connected, the valve is held in open position by means of a spring. With force on the spindle the valve will close. In connection with our thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

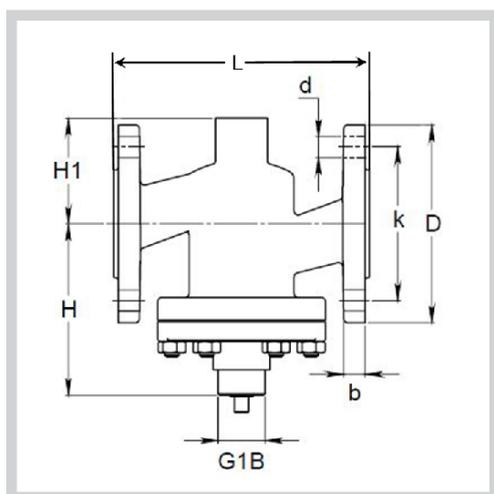


Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).

## DIMENSION SKETCH



| Type     | L mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|----------|------|------|-------|-------------|------|-------------|--------------------|
| 15 M1FBN | 130  | 101  | 80    | 95          | 14   | 65          | 14x(4)             |
| 20 M1FBN | 150  | 107  | 85    | 105         | 16   | 75          | 14x(4)             |
| 25 M1FBN | 160  | 112  | 70    | 115         | 16   | 85          | 14x(4)             |
| 32 M1FBN | 180  | 122  | 75    | 140         | 18   | 100         | 18x(4)             |
| 40 M1FBN | 200  | 125  | 85    | 150         | 19   | 110         | 18x(4)             |
| 50 M1FBN | 230  | 140  | 95    | 165         | 19   | 125         | 18x(4)             |
| 65 M1FBN | 290  | 154  | 110   | 185         | 19   | 145         | 18x(4)             |
| 80 M1FBN | 310  | 164  | 115   | 200         | 19   | 160         | 19x(8)             |

## SPECIFICATIONS

| Type     | Flange connection DN in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|----------|----------------------------|------------|-------------------------|-------------------|-----------|
| 15 M1FBN | 15                         | 15         | 4                       | 7.5               | 4         |
| 20 M1FBN | 20                         | 20         | 6.3                     | 7.5               | 5         |
| 25 M1FBN | 25                         | 25         | 10                      | 9                 | 6         |
| 32 M1FBN | 32                         | 32         | 16                      | 10                | 9         |
| 40 M1FBN | 40                         | 40         | 25                      | 11                | 13        |
| 50 M1FBN | 50                         | 50         | 35                      | 11.5              | 16        |
| 65 M1FBN | 65                         | 65         | 58                      | 14.5              | 23        |
| 80 M1FBN | 80                         | 80         | 80                      | 16                | 38        |



# 2-way Control Valve type M2F,

Cast iron, PN 16, DN 20 – 80 mm, 2 seats, Flanged ends

0-2.3.04-N

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                       |                                   |
|-----------------------|-----------------------------------|
| - Valve body          | Cast iron<br>EN-GJS-400-15        |
| - Spring              | 1.4568                            |
| - Cone                | 1.4408, 1.4305                    |
| - Gasket              | Stainless steel foil and graphite |
| - Upper seat          | AISI 303                          |
| - Lower seat          | 1.4301, 1.4305, 1.4307            |
| - Bolts, nuts         | 24 CrMo 4/A4                      |
| Nominal pressure      | PN 16                             |
| Seating               | Double-seated                     |
| Flow characteristic   | Quadratic                         |
| Leakage rate          | ≤ 0,5% of Kvs                     |
| Regulating capability | Kvs/Kvr > 25                      |

### Flanges drilled

|                            |                  |
|----------------------------|------------------|
| according to               | EN 1092-2 PN 16  |
| Counter flanges            | DIN 2633/BS 4504 |
| Adjustable seat interspace |                  |

## APPLICATIONS

Control valves type M2F are designed for regulating hot water, steam and lubricating oil systems. The double-seated valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a single-seated valve. The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



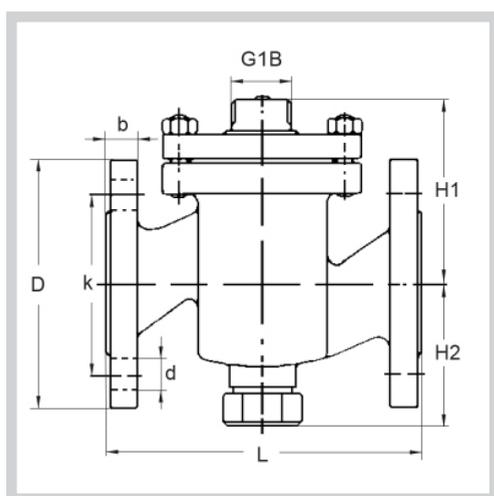
Subject to change without notice.

### MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



### DIMENSION SKETCH



| Type   | L mm | H1 mm | H2 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|--------|------|-------|-------|------|-------------|-------------|--------------------|
| 20 M2F | 150  | 85    | 70    | 16   | 105         | 75          | 14x(4)             |
| 25 M2F | 160  | 95    | 77    | 16   | 115         | 85          | 14x(4)             |
| 32 M2F | 180  | 105   | 82    | 18   | 140         | 100         | 19x(4)             |
| 40 M2F | 200  | 110   | 92    | 19   | 150         | 110         | 19x(4)             |
| 50 M2F | 230  | 125   | 102   | 19   | 165         | 125         | 19x(4)             |
| 65 M2F | 290  | 135   | 120   | 19   | 185         | 145         | 19x(4)             |
| 80 M2F | 310  | 145   | 130   | 19   | 200         | 160         | 19x(8)             |

### SPECIFICATIONS

| Type   | Flange connection DN in mm | Opening mm | $k_{vs}$ -value m <sup>3</sup> /h | Lifting height mm | Weight kg |
|--------|----------------------------|------------|-----------------------------------|-------------------|-----------|
| 20 M2F | 20                         | 20         | 5                                 | 6.5               | 5         |
| 25 M2F | 25                         | 25         | 7.5                               | 7                 | 6.5       |
| 32 M2F | 32                         | 32         | 12.5                              | 8                 | 9         |
| 40 M2F | 40                         | 40         | 20                                | 9                 | 11        |
| 50 M2F | 50                         | 50         | 30                                | 10                | 16        |
| 65 M2F | 65                         | 65         | 50                                | 11                | 21        |
| 80 M2F | 80                         | 80         | 80                                | 13                | 38        |

# 2-way Control Valve type M2F

Cast iron, PN 16, DN 100 – 150 mm

0-2.3.05-H

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## TECHNICAL DATA

### Materials:

|                       |                                     |
|-----------------------|-------------------------------------|
| - Valve body          | Cast iron<br>EN-GJS-400-15          |
| - Components          | Stainless steel                     |
| - Nuts, bolts         | 24 CrMo 4/A4                        |
| - Gasket              | Graphite                            |
| Nominal pressure      | PN 16                               |
| Seating               | Double-seated                       |
| Flow characteristic   | Almost quadratic                    |
| Function              | Closing with pressure<br>on spindle |
| Leakage rate          | $\leq 0,5\%$ of Kvs                 |
| Regulating capability | Kvs/Kvr > 25                        |

|                                 |           |
|---------------------------------|-----------|
| Flanges drilled<br>according to | EN 1092-2 |
| Counter flanges                 | DIN 2633  |

## APPLICATIONS

Control valves type M2F are designed for regulating hot water, steam and hot oil systems. The valves are installed combined with temperature or pressure differential regulators in control systems for heating to domestic premises, district and group heating schemes, industrial processes or marine installations.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The connection thread for the actuator connection is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

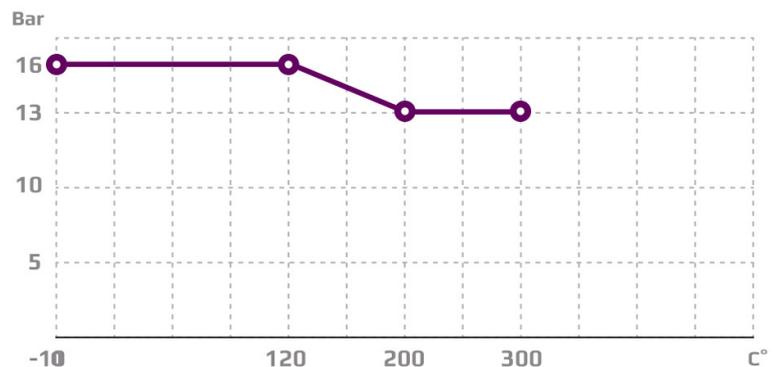
Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



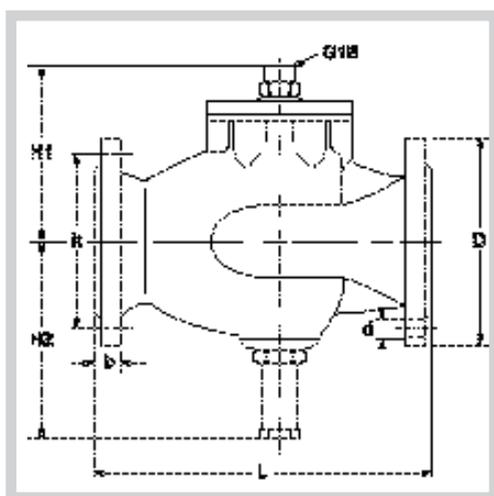
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



| Type    | L mm | H1 mm | H2 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|---------|------|-------|-------|------|-------------|-------------|--------------------|
| 100 M2F | 350  | 185   | 209   | 24   | 220         | 180         | 18x(8)             |
| 125 M2F | 400  | 205   | 224   | 26   | 250         | 210         | 18x(8)             |
| 150 M2F | 400  | 240   | 244   | 26   | 285         | 240         | 22x(8)             |

## SPECIFICATIONS

| Type    | Flange connection DN in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|---------|----------------------------|------------|-------------------------|-------------------|-----------|
| 100 M2F | 100                        | 100        | 125                     | 20                | 32        |
| 125 M2F | 125                        | 125        | 215                     | 20                | 50        |
| 150 M2F | 150                        | 150        | 310                     | 20                | 70        |

# 2-way Control Valve type M2FA,

Cast Iron, PN 10, DN 200 mm / PN 6, DN 250 – 300 mm

0-2.3.05.01-B

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## APPLICATIONS

Regulating valve type M2FA is designed for regulating water, lubricating oil and other liquid media. The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines. Is designed for use in conjunction with Clorius valve motor type AVM/AVF 234.

## DESIGN

The valve components (seats and cone) are made of alu bronze, the spindle of stainless steel. The valve body is made of cast iron and the valve flanges are drilled according to EN 1092-2.

## FUNCTION

The valve cone is firmly connected with the motor spindle. The valve will close or open at rising temperatures. Depending on the application a reverse acting actuator can be used. The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.

## TECHNICAL DATA

### Materials:

|                 |                                   |
|-----------------|-----------------------------------|
| - Valve body    | Cast iron EN-GJS-400-15           |
| - Trim          | Alu Bronze<br>CuAL10Fe5Ni5        |
| - Valve spindle | Stainless steel<br>(W.no. 1.4436) |
| - O-ring        | AFLAS A75H                        |
| - Gasket        | Reinz-AFM34                       |

### Nominal pressure

|                |                    |
|----------------|--------------------|
| - 200 M2FA     | PN 10 (max. 120°C) |
| - 250-300 M2FA | PN 6 (max. 120°C)  |

Seating Double-seated

Flow characteristic Almost linear

Leakage rate  $\leq 0.5\%$  of Kvs

Regulating capability Kvs/Kvr > 25

Flanges EN 1092-2 PN 10

**Note!** Type 250 M2FA has outer measures and flanges drilled as type 300 M2FA

### Counter flanges (suggested)

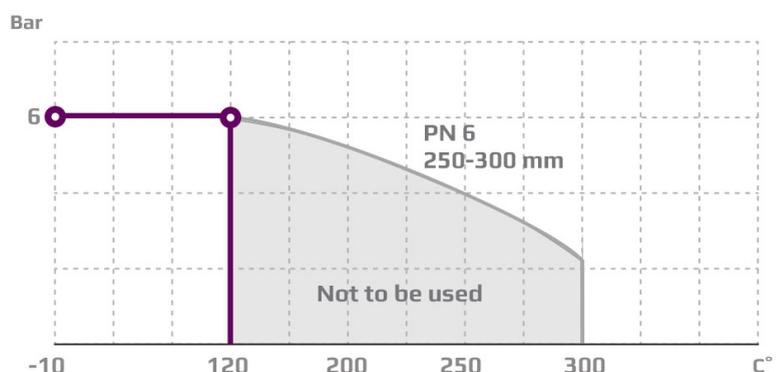
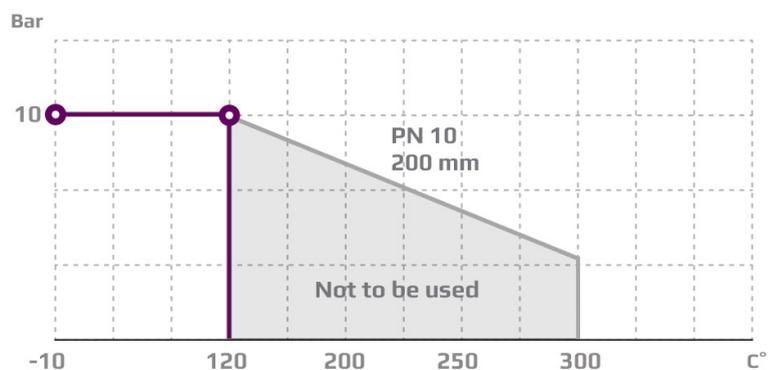
|                |                     |
|----------------|---------------------|
| - 200 M2FA     | DIN 2633 – PN 10/16 |
| - 250-300 M2FA | DIN 2632 – PN 10    |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

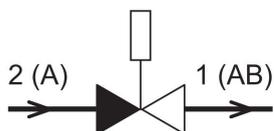
According to DIN 2401



Subject to change without notice.

### PORT NUMBERING

The ports of valves type M2FA are marked with the figures 1 and 2. The letters in parentheses refer to the corresponding internationally adapted designations.



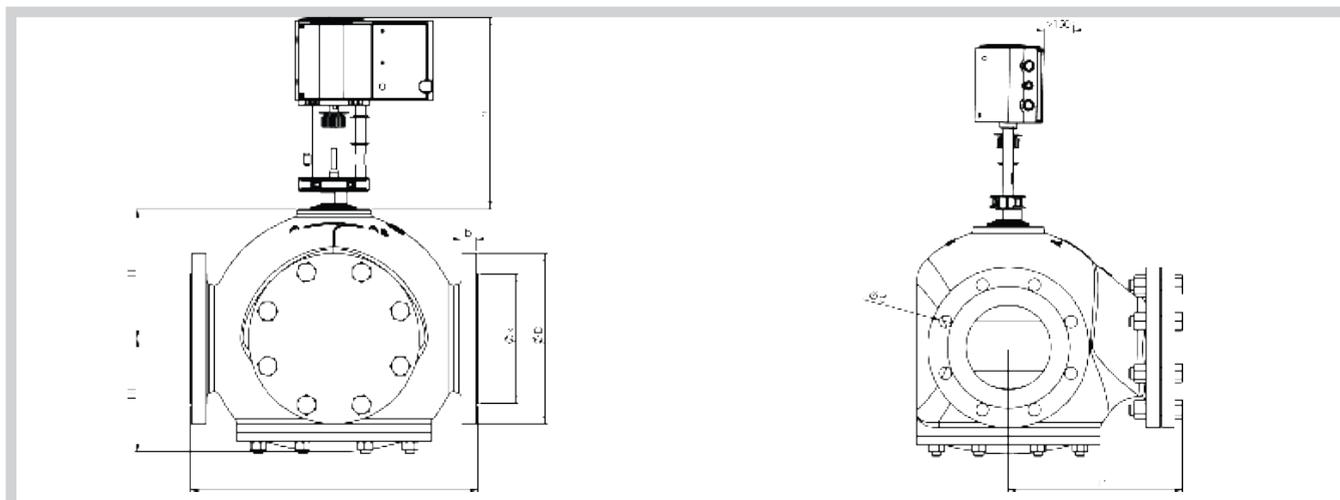
Port 2(A) closes at load on spindle.



### MOUNTING

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AFM 234 or AVF234 motor. See drawing.

### DIMENSION SKETCH



| Type                   | L mm | L1 mm | H mm | H1 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|------------------------|------|-------|------|-------|------|-------------|-------------|--------------------|
| 200 M2FA               | 600  | 380   | 238  | 238   | 26   | 340         | 295         | 22x(8)             |
| 250 M2FA <sup>1)</sup> | 850  | 510   | 305  | 305   | 28   | 445         | 400         | 23x(12)            |
| 300 M2FA               | 850  | 510   | 305  | 305   | 28   | 445         | 400         | 23x(12)            |

1) Valve type 250 M2FA has outer measures and flanges drilled as type 300 M2FA.

### SPECIFICATIONS

| Type                   | Flange connection mm | Opening DN in mm | k <sub>vs</sub> -value m <sup>3</sup> /h | Lifting height mm | Weight kg |
|------------------------|----------------------|------------------|--|-------------------|-----------|
| 200 M2FA               | 200                  | 200              | 555                                      | 28                | 160       |
| 250 M2FA <sup>1)</sup> | 300                  | 300              | 865                                      | 28                | 306       |
| 300 M2FA               | 300                  | 300              | 1250                                     | 45                | 290       |

1) Valve type 250 M2FA has outer measures and flanges drilled as type 300 M2FA.

# 2-way Control Valve type M2FR

Cast iron, PN 16, DN 20 – 80 mm, 2 seats, Reverse acting

0-2.3.06-N

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                              |                               |
|------------------------------|-------------------------------|
| - Valve body                 | Cast iron<br>EN-GJS-400-15    |
| - Trim                       | Stainless steel               |
| - Nuts, bolts                | 24 CrMo 4/A4                  |
| - Gasket                     | Graphite                      |
| Nominal pressure             | PN 16                         |
| Seating                      | Double-seated                 |
| Flow characteristic          | Quadratic                     |
| Function                     | Opens by pressing the spindle |
| Leakage rate                 | $\leq 0,5\%$ of Kvs           |
| Regulating capability        | Kvs/Kvr > 25                  |
| Flanges drilled according to | EN 1092-2                     |
| Counter flanges              | DIN 2633/BS 4504              |

Reverse acting (normally closed)  
For cooling systems or similar  
Adjustable seats

Subject to change without notice.

## APPLICATIONS

Valves type M2FR are mainly intended for control of cooling systems. The valves are used in conjunction with temperature or pressure differential regulators for controlling industrial processes or cooling systems. As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure,  $\Delta p_L$ , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force. The table on the next page shows the max. allowable values of  $\Delta p_L$  as well as the max. allowable inlet pressures for opening the valves,  $p_{1max}$ , for various actuator forces.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION REVERSE ACTING

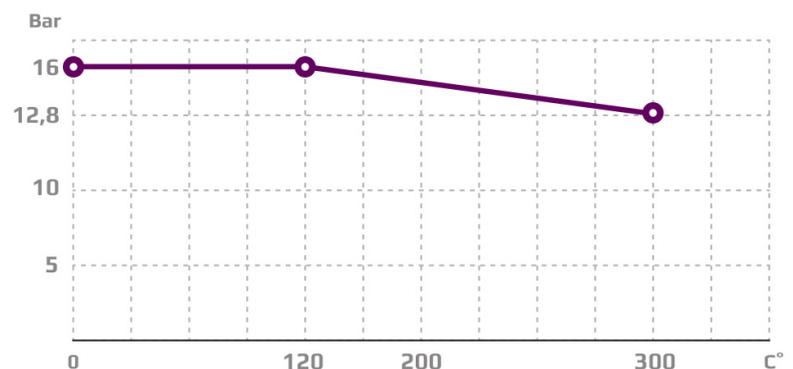
Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens. In connection with our actuators, the valves act as "cooling" valves, i.e. they open at rising temperatures. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

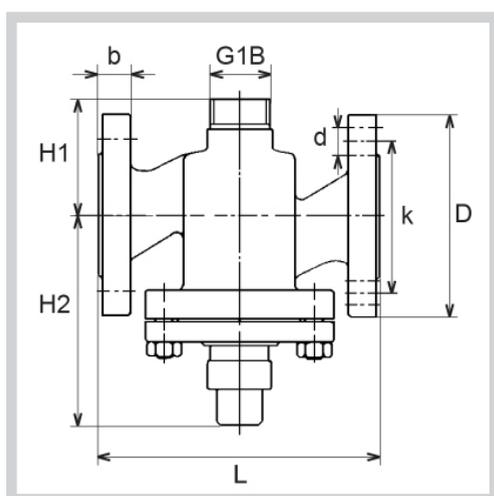


## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data-sheets for the electric actuators).



## DIMENSION SKETCH



| Type    | L mm | H1 mm | H2 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|---------|------|-------|-------|-------------|------|-------------|--------------------|
| 20 M2FR | 150  | 63    | 112   | 105         | 16   | 75          | 14x(4)             |
| 25 M2FR | 160  | 70    | 117   | 115         | 16   | 85          | 14x(4)             |
| 32 M2FR | 180  | 75    | 151   | 140         | 18   | 100         | 19x(4)             |
| 40 M2FR | 200  | 85    | 155   | 150         | 19   | 110         | 19x(4)             |
| 50 M2FR | 230  | 95    | 169   | 165         | 19   | 125         | 19x(4)             |
| 65 M2FR | 290  | 110   | 180   | 185         | 19   | 145         | 19x(4)             |
| 80 M2FR | 310  | 120   | 180   | 200         | 19   | 160         | 19x(8)             |

## SPECIFICATIONS

| Type    | Flange connection Dn in mm | Opening mm | $k_{vs}$ -value m <sup>3</sup> /h | Lifting height mm | Max. $\Delta p_L$ bar | Actuat. force N | Corresp. $p_{1max}$ bar | Weight kg |
|---------|----------------------------|------------|-----------------------------------|-------------------|-----------------------|-----------------|-------------------------|-----------|
| 20 M2FR | 20                         | 20         | 5                                 | 6.5               | 8.3                   | 200<br>400      | 9.4<br>16               | 5         |
| 25 M2FR | 25                         | 25         | 7.5                               | 7                 | 8                     | 200<br>400      | 8.8<br>16               | 6.5       |
| 32 M2FR | 32                         | 32         | 12.5                              | 8                 | 7                     | 400             | 16                      | 9         |
| 40 M2FR | 40                         | 40         | 20                                | 9                 | 6.6                   | 400             | 16                      | 11        |
| 50 M2FR | 50                         | 50         | 30                                | 10                | 5.8                   | 400             | 15                      | 16        |
| 65 M2FR | 65                         | 65         | 50                                | 11                | 10                    | 400<br>800      | 10<br>16                | 21        |
| 80 M2FR | 80                         | 80         | 80                                | 13                | 6.7                   | 400<br>800      | 10<br>16                | 38        |

# 2-way Control Valve type M2FR

Cast iron, PN 16, DN 100 – 150 mm, Reverse acting

0-2.3.07-I

Page 1 of 2



## APPLICATIONS

Valve type M2FR are mainly intended for control of cooling systems. The valves are used in conjunction with temperature or pressure differential regulators. As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure,  $\Delta p_L$ , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force. On the next page please find the max. allowable values of  $\Delta p_L$  as well as the max. allowable inlet pressures for opening the valve,  $p_{1_{max}}$  for various actuator forces.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of cast iron EN-GJL-250 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION REVERSE ACTING

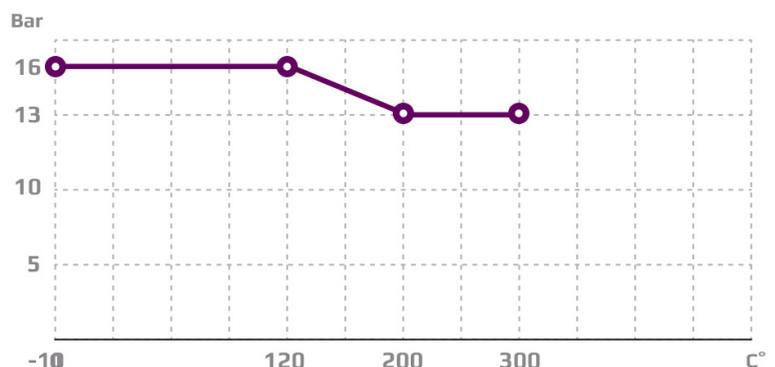
Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens. In connection with our thermostats, the valves act as "cooling" valves, i.e. they open at rising temperatures. The linear characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## TECHNICAL DATA

### Materials:

|                     |                                     |
|---------------------|-------------------------------------|
| - Valve body        | Cast iron<br>EN-GJS-400-15          |
| - Trim              | Stainless steel                     |
| - Nuts, bolts       | 24 CrMo 4/A4                        |
| - Gasket            | Graphite                            |
| Nominal pressure    | PN 16                               |
| Seating             | Double-seated                       |
| Flow characteristic | Quadratic                           |
| Function            | Opening with<br>pressure on spindle |

|                       |                     |
|-----------------------|---------------------|
| Leakage rate          | $\leq 0,5\%$ of Kvs |
| Regulating capability | Kvs/Kvr > 25        |
| Flanges               | EN 1092-2 PN 16     |
| Counter flanges       | DIN 2633 / DS623    |

Reverse acting (normally closed)  
For cooling water and lubrications

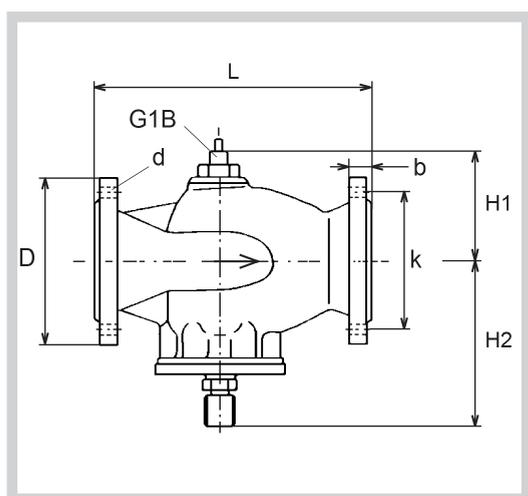
Subject to change without notice.

### MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data-sheets for the electric actuators).



### DIMENSION SKETCH



| Type     | L mm | H1 mm | H2 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|----------|------|-------|-------|-------------|------|-------------|--------------------|
| 100 M2FR | 350  | 145   | 240   | 220         | 24   | 180         | 18x(8)             |
| 125 M2FR | 400  | 160   | 260   | 250         | 26   | 210         | 18x(8)             |
| 150 M2FR | 400  | 180   | 293   | 285         | 26   | 240         | 22x(8)             |

### SPECIFICATIONS

| Type     | Flange connection Dn in mm | Opening mm | $k_{vs}$ -value m <sup>3</sup> /h | Lifting height mm | Max. $\Delta p_L$ bar | Actuat. force N | Weight kg |
|----------|----------------------------|------------|-----------------------------------|-------------------|-----------------------|-----------------|-----------|
| 100 M2FR | 100                        | 100        | 125                               | 20                | 12.1                  | 800             | 39        |
| 125 M2FR | 125                        | 125        | 215                               | 20                | 9                     | 800             | 53        |
| 150 M2FR | 150                        | 150        | 310                               | 20                | 7.5                   | 800             | 73        |

# 3-way control valve type M3F

Cast iron, PN 16, DN 20 – 65 mm, Flanged ends

0-2.3.08-J

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                  |                                       |
|------------------|---------------------------------------|
| - Valve body     | Cast iron<br>EN-GJS-400-15            |
| - seats and cone | ST.ST.1.4305<br>DIN/EN 1982<br>CC491K |
| - spindle        | Stainless steel<br>(W.No.1.4305       |
| - bolts, nuts    | 24 CrMo 4/A4                          |
| - Gasket         | Graphite                              |
| - O-ring         | 80 FPM                                |

|                       |                         |
|-----------------------|-------------------------|
| Nominal pressure      | PN 16                   |
| Seating               | 2 balanced single seats |
| Flow characteristic   | Quadratic/linear        |
| Leakage rate          | ≤ 0,5% of Kvs           |
| Regulating capability | Kvs/Kvr > 25            |
| Flanges - drilled     |                         |
| according to          | EN 1092-2 PN 16         |
| Counter flanges       | DIN 2633                |

Same Kvs-value as mixing and diverting valve  
Ideal for controlling process and central heating plants

Subject to change without notice.

## APPLICATIONS

Control valves type M3F are designed for lubricants, hot water and other liquids and can be installed in pipe systems as mixing or diverting valves. The valves are used in conjunction with our temperature regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - seats, cone and stem are made of stainless steel. The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 PN 16. The thread for the actuator connection is G1B ISO 228. The valves have two balanced single seats. The leakage rate is less than 0.5 % of the full flow (according to VDI/VDE 2174).

## FUNCTION

Without an actuator being installed, connection A-AB is fully open and connection B-AB completely closed by means of a spring.

By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection B-AB is fully open and connection A-AB completely closed.

The valve characteristics are as follows:

**Port A-AB and AB-A: quadratic**

**Port B-AB and AB-B: almost linear**

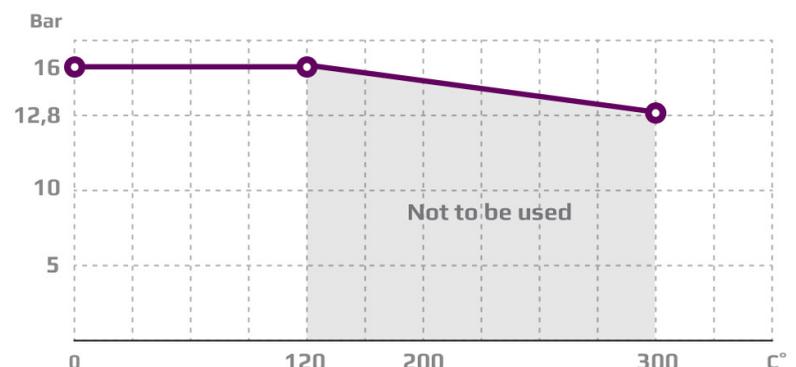
These characteristics ensure constant total flow under almost all pressure conditions and optimum circulation in the individual circuits.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

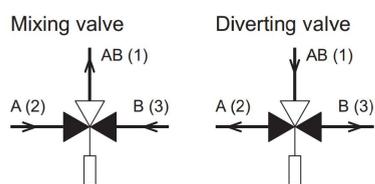
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING

Valves type M3F are marked with the internationally recognized port designations: A, B, AB



Port AB  
Port A  
Port B

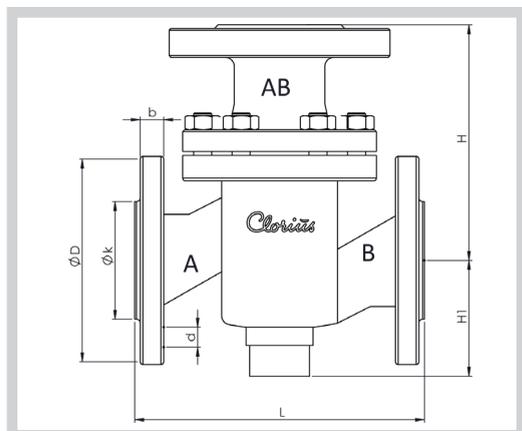
common port always open  
closes by activating the spindle  
opens by activating the spindle



### MOUNTING

The valves can be installed with vertical as well as horizontal spindles.

### DIMENSION SKETCH



| Type   | L mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|--------|------|------|-------|-------------|------|-------------|--------------------|
| 20 M3F | 150  | 115  | 63    | 105         | 16   | 75          | 14x(4)             |
| 25 M3F | 160  | 130  | 70    | 115         | 16   | 85          | 14x(4)             |
| 32 M3F | 180  | 150  | 75    | 140         | 18   | 100         | 18x(4)             |
| 40 M3F | 200  | 160  | 85    | 150         | 18   | 110         | 18x(4)             |
| 50 M3F | 230  | 190  | 95    | 165         | 20   | 125         | 18x(4)             |
| 65 M3F | 290  | 220  | 110   | 185         | 20   | 145         | 18x(4)             |

### SPECIFICATIONS

| Type   | Flange connection DN in mm | Opening mm | $k_{vs}$ -value* $m^3/h$ | Lifting height mm | Weight kg |
|--------|----------------------------|------------|--------------------------|-------------------|-----------|
| 20 M3F | 20                         | 20         | 6.3                      | 7.5               | 6         |
| 25 M3F | 25                         | 25         | 10                       | 9                 | 7         |
| 32 M3F | 32                         | 32         | 16                       | 10                | 10        |
| 40 M3F | 40                         | 40         | 25                       | 11                | 14        |
| 50 M3F | 50                         | 50         | 38                       | 11.5              | 18        |
| 65 M3F | 65                         | 65         | 63                       | 14.5              | 26        |

\*Same kvs-values for mixing and diverting valves

# 3-way Control Valve type M3F

Cast iron, PN 10, DN 80 – 150 mm

0-2.3.09-J

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## APPLICATIONS

Control valves type M3F are designed for regulating of water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" under Technical Data. The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

## DESIGN

The valve components - seats and cone are made of alu bronze, the spindle is made of stainless steel. The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228. The valves have two balanced single seats. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174). Tight between port 1(AB) og 3(B) is optional.

## FUNCTION

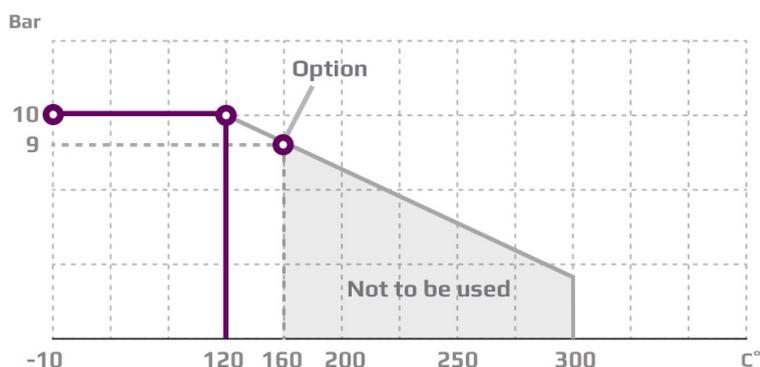
Without an actuator being installed, connection A-AB is fully open and connection B-AB completely closed, by means of a spring. By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection B-AB is fully open and connection A-AB completely closed.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## TECHNICAL DATA

### Materials:

|                  |                            |
|------------------|----------------------------|
| - Valve body     | Cast iron<br>EN-GJS-400-15 |
| - Seats and cone | Alu Bronze<br>CuAL10Fe5Ni5 |
| - Spindle        | Stainless steel            |
| - O-ring         | 90 NBR                     |
| - Gasket         | Reinz-AFM34                |

**Seating** Two balanced single seats

**Flow characteristic** Almost linear

**Leakage rate** ≤ 0.5% of Kvs

**Regulating capability** Kvs/Kvr > 25

**Flanges drilled according to** EN 1092-2 PN 10

**Counter flanges** DIN 2632

**Nominal pressure** PN 10 (10 bar/max 120°C,

option 9 bar/max 160 °C)

**For regulating of process and central heating plants**

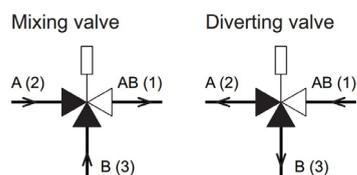
### Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the kvs-value will decrease by 14% as against mixing valves.

Subject to change without notice.

### PORT NUMBERING

The ports of valves type M3F are marked with the letters AB, A and B.



Port AB(1)  
Port A(2)  
Port B(3)

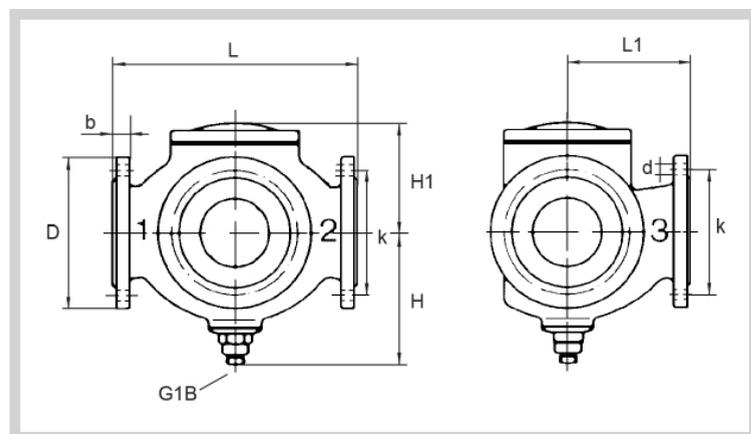
common port always open  
closes at load on spindle  
opens at load on spindle



### MOUNTING

The valve can be installed with vertical as well as horizontal spindles. The valve must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

### DIMENSION SKETCH



| Type    | L mm | L1 mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|---------|------|-------|------|-------|-------------|------|-------------|--------------------|
| 80 M3F  | 310  | 155   | 180  | 127   | 200         | 20   | 160         | 18x(8)             |
| 100 M3F | 350  | 175   | 195  | 141   | 220         | 22   | 180         | 18x(8)             |
| 125 M3F | 400  | 240   | 245  | 171   | 250         | 21   | 210         | 19x(8)             |
| 150 M3F | 480  | 270   | 280  | 189   | 285         | 22   | 240         | 22x(8)             |

### SPECIFICATIONS

| Type    | Flange connection DN in mm | Opening mm | Mixing valve $k_{vs}$ -value $m^3/h$ | Divertng valve $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|---------|----------------------------|------------|--------------------------------------|--|-------------------|-----------|
| 80 M3F  | 80                         | 80         | 80                                   | 69                                     | 11                | 35        |
| 100 M3F | 100                        | 100        | 125                                  | 108                                    | 13                | 44        |
| 125 M3F | 125                        | 125        | 215                                  | 185                                    | 18                | 72        |
| 150 M3F | 150                        | 150        | 310                                  | 267                                    | 20                | 111       |

# 3-way control valve type M3FA

PN 10, DN 80 – 300 mm, except DN 200/175 and 200 mm - PN 16

0-2.3.10.01-B

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## APPLICATIONS

Control valves type M3FA are designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines. The valve is designed for use in conjunction with Clorius valve motor type AVM234 or AVF234.

## DESIGN

The valve components (seats and cone) are made of alu bronze, the spindle of stainless steel. The valve body is made of cast iron and the valve flanges are drilled according to EN 1092-2. Tight between port 1(AB) og 3(B) is optional.

## FUNCTION

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed. In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.



## TECHNICAL DATA

### Materials:

|                               |               |                                    |
|-------------------------------|---------------|------------------------------------|
| - Valve body                  | 80 – 300 M3FA | Nodular cast iron<br>EN-GJS-400-15 |
| - Trim                        |               | Alu bronze, CuAL10Fe5Ni5           |
| - Valve spindle               |               | Stainless steel<br>(W.no. 1.4436)  |
| - O-ring                      |               | AFLAS A75H                         |
| - Gasket                      |               | Reinz-AFM34                        |
| <b>Nominal pressure PN 10</b> |               |                                    |
| - 80-150 mm                   |               | PN 10 max. 120°C                   |
| - 200/175-200 mm              |               | PN 16 max. 120°C                   |
| - 300/250-300 mm              |               | PN 10 max. 120°C                   |
| <b>Seals</b>                  |               | 2 balanced single seats            |
| <b>Flow characteristic</b>    |               | Almost linear                      |
| <b>Leakage rate</b>           |               | 0.5%                               |
| <b>Regulating capability</b>  |               | Kvs/Kvr > 25                       |
| <b>Temperature range</b>      |               | Max. 120° C                        |
| <b>Flanges</b>                |               | EN 1092-2 PN 10/16                 |

### Note !

Valve type 200/175 M3FA has outer measures and flanges drilled as valve type 200 M3FA. Valve type 300/250 M3FA has outer measures and flanges drilled as valve type 300 M3FA.

### Counter flanges (suggested)

80 – 150 M3FA: DIN 2632 – PN 10  
200/175 – 200 M3FA: DIN 2633 – PN 16  
300/250 – 300 M3FA: DIN 2632 – PN 10

### For cooling and heating purposes

#### Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the  $k_{vs}$ -value will decrease by 14% as against mixing.

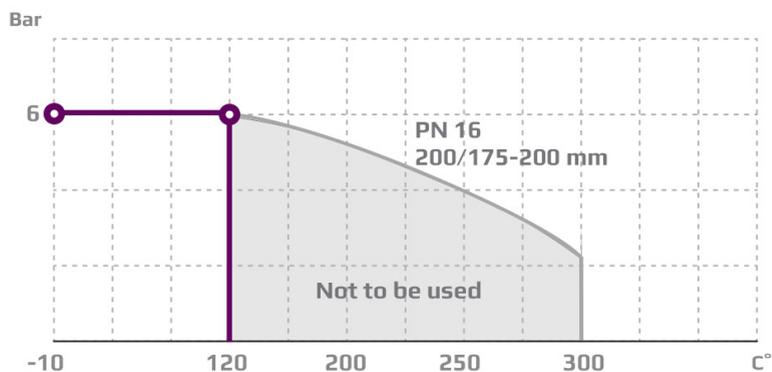
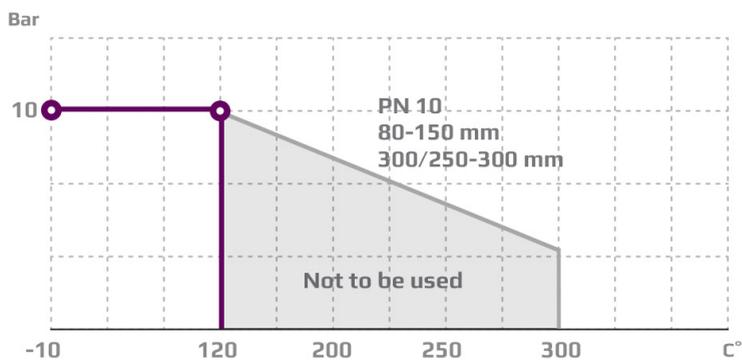
Subject to change without notice.

## FEATURES

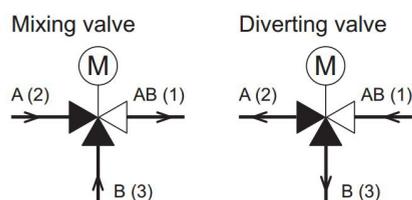
- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING



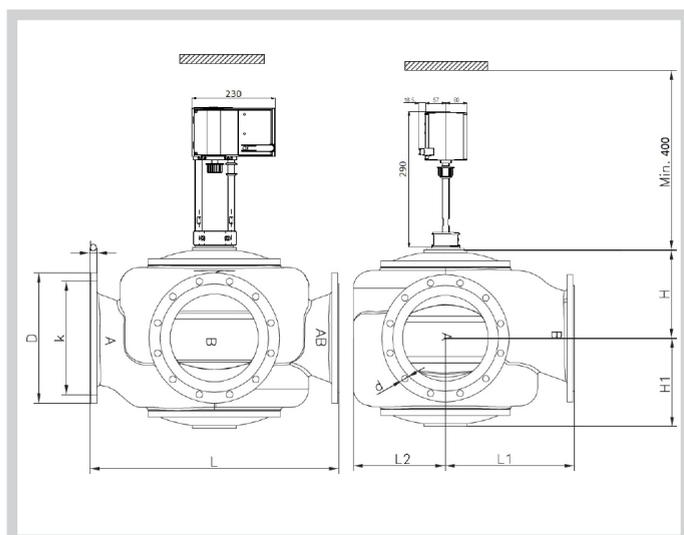
Port AB  
Port A  
Port B

common port always open  
closes at load on spindle  
opens at load on spindle



The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AFM 234 or AVF234 motor. See drawing.

### DIMENSION SKETCH



| Type         | L mm | L1 mm | H mm | H1 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|--------------|------|-------|------|-------|------|-------------|-------------|--------------------|
| 80 M3FA      | 310  | 155   | 117  | 127   | 20   | 200         | 160         | 18x(8)             |
| 100 M3FA     | 350  | 175   | 132  | 141   | 22   | 220         | 180         | 18x(8)             |
| 125 M3FA     | 400  | 240   | 181  | 171   | 24   | 250         | 210         | 18x(8)             |
| 150 M3FA     | 480  | 270   | 216  | 189   | 24   | 285         | 240         | 23x(8)             |
| 200/175 M3FA | 600  | 325   | 238  | 238   | 20   | 340         | 295         | 23x(12)            |
| 200 M3FA     | 600  | 325   | 238  | 238   | 20   | 340         | 295         | 23x(12)            |
| 300/250 M3FA | 850  | 450   | 305  | 305   | 25   | 445         | 400         | 23x(12)            |
| 300 M3FA     | 850  | 340   | 305  | 305   | 25   | 445         | 400         | 23x(12)            |

### SPECIFICATIONS

| Type         | Flange connection DN in mm | Opening mm | $k_{vs}$ -value <sup>1)</sup> mixing m <sup>3</sup> /h | $k_{vs}$ -value <sup>1)</sup> diverting m <sup>3</sup> /h | Lifting height mm | Weight kg |
|--------------|----------------------------|------------|--|---|-------------------|-----------|
| 80 M3FA      | 80                         | 80         | 80   | 69  | 11                | 35        |
| 100 M3FA     | 100                        | 100        | 125  | 108   | 13                | 44        |
| 125 M3FA     | 125                        | 125        | 215  | 185   | 18                | 72        |
| 150 M3FA     | 150                        | 150        | 310  | 267   | 20                | 111       |
| 200/175 M3FA | 200                        | 200        | 425  | 366   | 22                | 165       |
| 200 M3FA     | 200                        | 200        | 555  | 477   | 28                | 160       |
| 300/250 M3FA | 300                        | 300        | 865  | 744   | 28                | 306       |
| 300 M3FA     | 300                        | 300        | 1250   | 1075  | 45                | 290       |

<sup>1)</sup> The stated  $k_{vs}$  values apply for mixing valves. Diverting valves:  $0.86 \times (k_{vs} \text{ -values for mixing valves})$ .

# 3-way Control Valve type M3F-I

Cast iron, PN 10, DN 150 mm

0-2.3.12-B

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## TECHNICAL DATA

### Materials:

|                                 |                                   |
|---------------------------------|-----------------------------------|
| - Valve body                    | Cast iron<br>EN-GJS-400-15        |
| - Seats and cone                | Alu bronze<br>CuAL10Fe5Ni5        |
| - Spindle                       | Stainless steel<br>(W.no. 1.4436) |
| - O-ring                        | 90 NBR                            |
| - Gasket                        | Reinz-AFM34                       |
| Nominal pressure                | PN 10                             |
| Seating                         | Two balanced<br>single seats      |
| Flow characteristic             | Almost linear                     |
| Flanges drilled<br>according to | EN 1092-2 PN 10                   |
| Counter flanges                 | DIN 2632                          |
| Leakage rate                    | 0,5 %                             |
| Regulating capability           | Kvs/Kvr > 25                      |

For regulating of process and central heating plants

### Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the  $k_{vs}$ -value will decrease by 14% as against mixing valves.

Subject to change without notice.

## APPLICATIONS

Control valves type M3F-I are designed for regulating of water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" under Technical Data. The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

## DESIGN

The valve components - seats and cone are made of alu bronze, the spindle is made of stainless steel. The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228. The valves have two balanced single seats. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

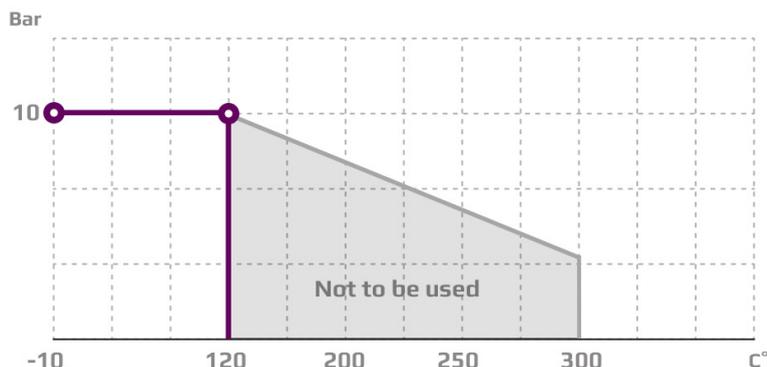
Without an actuator being installed, connection B-AB is fully open and connection A-AB completely closed, by means of a spring. By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection A-AB is fully open and connection B-AB completely closed.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

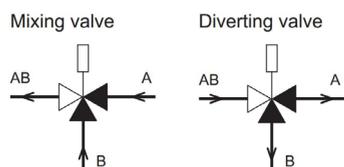
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING

The ports of valves type M3F-I are marked with the letters AB, A and B.



Port AB  
Port A  
Port B

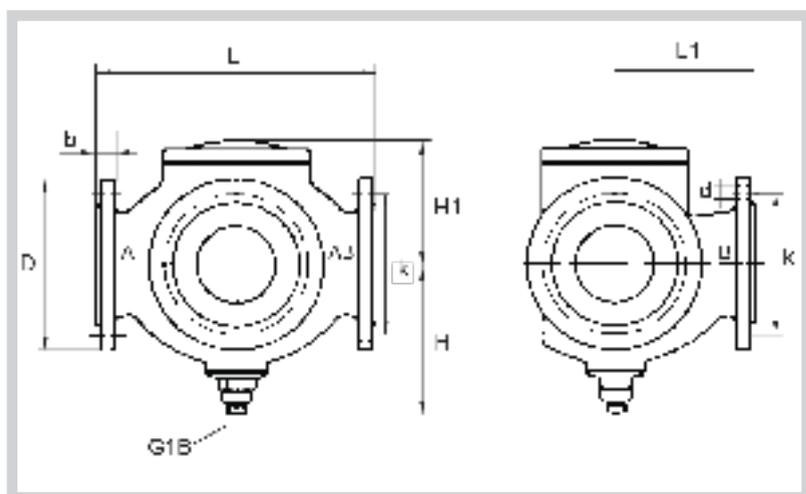
common port always open  
closes at load on spindle  
opens at load on spindle



### MOUNTING

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

### DIMENSION SKETCH



| Type      | L mm | L1 mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|-----------|------|-------|------|-------|-------------|------|-------------|--------------------|
| 150 M3F-I | 480  | 270   | 280  | 189   | 285         | 24   | 240         | 22x(8)             |

### SPECIFICATIONS

| Type      | Flange connection DN in mm | Opening mm | Mixing valve $k_{vs}$ -value $m^3/h$ | Divertng valve $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|-----------|----------------------------|------------|--------------------------------------|--|-------------------|-----------|
| 150 M3F-I | 150                        | 150        | 310                                  | 267                                    | 20                | 111       |

# 3-way Control Valve type M3FA-I (Ports A-AB interchanged)

Cast Iron, PN 10, DN 80 – 300 mm, DN 200/175 and 200 mm/PN 16

0-2.3.12.02-D

Page 1 of 2



## APPLICATIONS

Control valves type M3FA-I are designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines. To be used with AVM234 or AVF234 electric actuators.

## DESIGN

The valve components (seats and cone) are made of alu bronze, the spindle of stainless steel. The valve body is made of cast iron and the valve flanges are drilled according to EN 1092-2.

## FUNCTION

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection B-AB is kept fully open and connection A-AB is fully closed. In the other extreme position connection B-AB is fully closed and connection A-AB is fully open. In the intermediate positions the opening degrees change proportionally.

## TECHNICAL DATA

|                   |                                   |
|-------------------|-----------------------------------|
| <b>Materials:</b> |                                   |
| - Valve body      | Cast iron<br>EN-GJS-400-15        |
| - Trim            | Alu Bronze<br>CuAL10Fe5Ni5        |
| - Valve spindle   | Stainless steel<br>(W.no. 1.4436) |

**Nominal pressure**  
**- DN200/175-200 M3FA-I**  
 PN 16/232 psi max -20°C/248°F

**- DN300/250-300 M3FA-I**  
 PN 10/145 psi max.120°C/248°F

|                              |                         |
|------------------------------|-------------------------|
| <b>Seats</b>                 | 2 balanced single seats |
| <b>Flow characteristic</b>   | Almost linear           |
| <b>Leakage rate</b>          | 0.5%                    |
| <b>Regulating capability</b> | Kvs/Kvr > 25            |
| <b>Temperature range</b>     | Max. 120° C/248°F       |

**Flanges**  
 EN 1092-2 PN 10/16  
 EN 1092-2 145/232 psi

**Note !**  
 Valve type 200/175 M3FA-I has outer measures and flanges drilled as valve type 200 M3FA-I Valve type 300/250 M3FA-I has outer measures and flanges drilled as valve type 300 M3FA-I

**Counter flanges (suggested)**  
**- DN 200/175-200 M3FA-I** DIN 2633 – PN 16 -  
**- DN 300/250-300 M3FA-I** DIN 2632 – PN 10

### For cooling and heating purposes

#### Important note

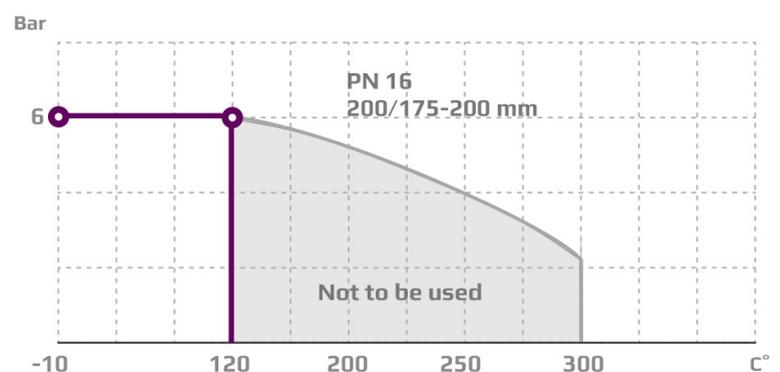
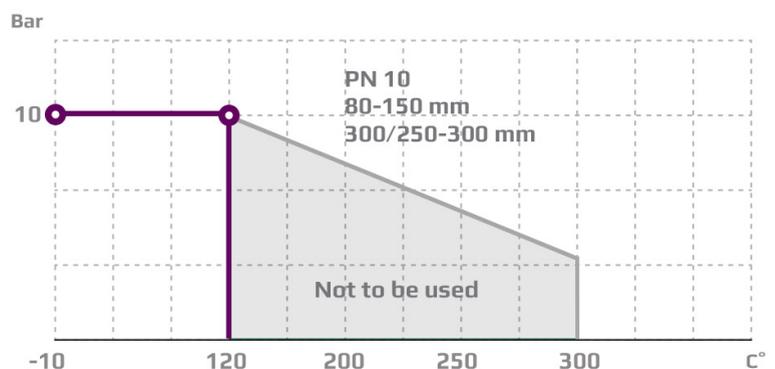
In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the kvs-value will decrease by 14% as against mixing valves.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

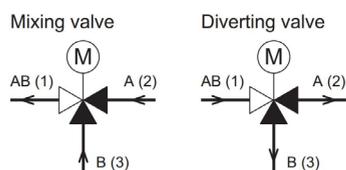
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING

The ports of valves type M3FA-I are marked with the letters AB, B and A.



Port AB  
Port A  
Port B

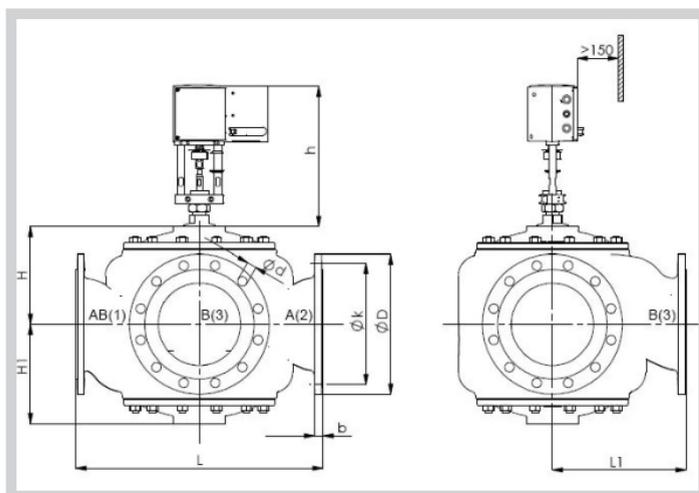
common port always open  
opens at load on spindle  
closes at load on spindle



### MOUNTING

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor. See drawing.

### DIMENSION SKETCH



| Type           | L mm | L1 mm | H mm | H1 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|----------------|------|-------|------|-------|------|-------------|-------------|--------------------|
| 80 M3FA-I      | 310  | 155   | 117  | 127   | 20   | 200         | 160         | 18x(8)             |
| 100 M3FA-I     | 350  | 175   | 132  | 141   | 22   | 220         | 180         | 18x(8)             |
| 125 M3FA-I     | 400  | 240   | 181  | 171   | 24   | 250         | 210         | 18x(8)             |
| 150 M3FA-I     | 480  | 270   | 216  | 189   | 24   | 285         | 240         | 23x(8)             |
| 200/175 M3FA-I | 600  | 325   | 238  | 238   | 20   | 340         | 295         | 23x(12)            |
| 200 M3FA-I     | 600  | 325   | 238  | 238   | 20   | 340         | 295         | 23x(12)            |
| 250 M3FA-I     | 850  | 340   | 305  | 305   | 25   | 445         | 400         | 23x(12)            |
| 300 M3FA-I     | 850  | 450   | 305  | 305   | 25   | 445         | 400         | 23x(12)            |

### SPECIFICATIONS

| Type           | Flange connection DN in mm | Opening mm | $k_{vs}$ -value <sup>1)</sup> mixing m <sup>3</sup> /h | $k_{vs}$ -value <sup>1)</sup> diverting m <sup>3</sup> /h | Lifting height mm | Weight kg |
|----------------|----------------------------|------------|--|---|-------------------|-----------|
| 80 M3FA-I      | 80                         | 80         | 80   | 69  | 11                | 35        |
| 100 M3FA-I     | 100                        | 100        | 125  | 108   | 13                | 44        |
| 125 M3FA-I     | 125                        | 125        | 215  | 185   | 18                | 72        |
| 150 M3FA-I     | 150                        | 150        | 310  | 267   | 20                | 111       |
| 200/175 M3FA-I | 200                        | 200        | 425  | 366   | 22                | 165       |
| 200 M3FA-I     | 200                        | 200        | 555  | 477   | 28                | 160       |
| 300/250 M3FA-I | 300                        | 300        | 865  | 744   | 28                | 306       |
| 300 M3FA-I     | 300                        | 300        | 1250   | 1075  | 45                | 290       |

<sup>1)</sup>The stated  $k_{vs}$  values apply for mixing valves. Diverting valves: 0.86 x ( $k_{vs}$ -values for mixing valves).

# 2-way Control Valve type H1F

Cast steel, PN 40, DN 15/4 – 50 mm

0-2.4.02-K

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## TECHNICAL DATA

|                                     |   |
|-------------------------------------|---|
| <b>Materials:</b>                   |   |
| - Valve body                        | Cast steel<br>GP240GH<br>(GS-C25)             |
| - Trim                              | Stainless steel                               |
| - Bolts, nuts                       | 24 CrMo 4/A4                                  |
| - Gasket                            | Graphite and stainless steel foil             |
| <b>Nominal pressure</b>             | PN 40   |
| <b>Seating</b>                      | Single seated,<br>tight closing               |
| <b>Flow characteristic</b>          | Quadratic                                     |
| <b>Leakage rate</b>                 | $\leq 0.05\%$ of Kvs                          |
| <b>Regulating capability</b>        | Kvs/Kvr > 25                                  |
| <b>Flanges drilled according to</b> | EN 1092-1 PN 40<br>or ANSI B16.5<br>Class 150 |
| <b>Counter flanges</b>              | DIN 2635                                      |

Subject to change without notice.

## APPLICATIONS

Control valves type H1F are designed for regulating hot water, steam and hot oil systems. The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seat and cone - are made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1 or ANSI B16.5 Class 150. The thread for the actuator connection is G1B ISO 228. The valves are single-seated. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

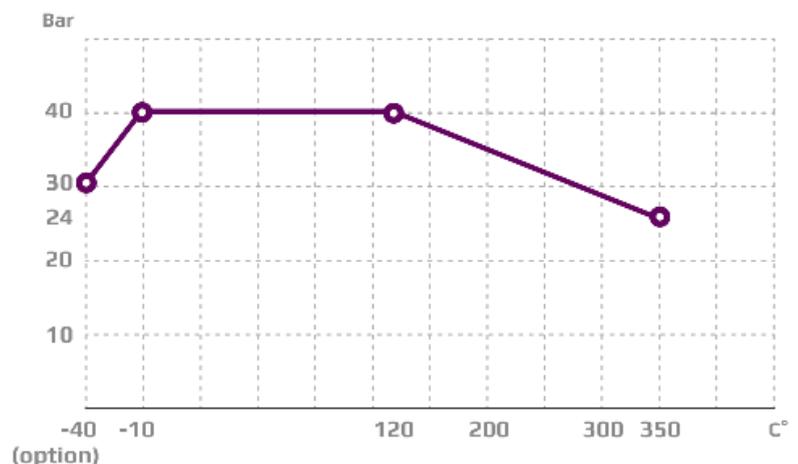
Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats, electric or pneumatic actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

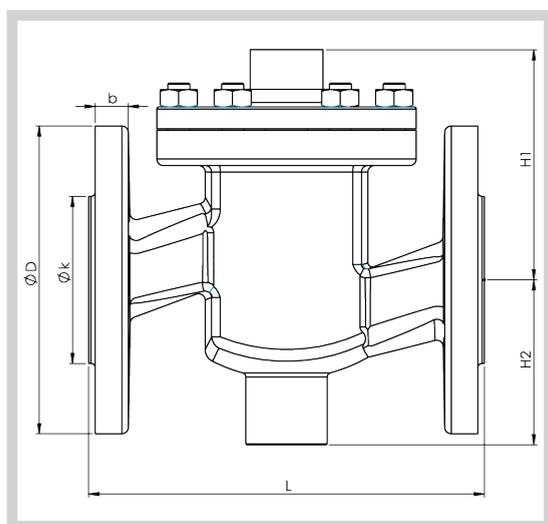


## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



## SPECIFICATIONS

| Type      | Flange connection DN in mm | Opening (mm) | $k_{vs}$ -value $m^3/h$ | Lifting height (mm) | Weight (kg) |
|-----------|----------------------------|--------------|-------------------------|---------------------|-------------|
| 15/4 H1F  | 15                         | 4            | 0.20                    | 6                   | 3.3         |
| 15/6 H1F  | 15                         | 6            | 0.45                    | 6                   | 3.3         |
| 15/9 H1F  | 15                         | 9            | 0.95                    | 6                   | 3.4         |
| 15/12 H1F | 15                         | 12           | 1.7                     | 6                   | 3.4         |
| 15 H1F    | 15                         | 15           | 2.75                    | 6                   | 3.4         |
| 20/4 H1F  | 20                         | 4            | 0.2                     | 6.5                 | 4.7         |
| 20/6 H1F  | 20                         | 6            | 0.45                    | 6.5                 | 4.7         |
| 20/9 H1F  | 20                         | 9            | 0.95                    | 6.5                 | 4.7         |
| 20 H1F    | 20                         | 20           | 5                       | 6.5                 | 4.9         |
| 25 H1F    | 25                         | 25           | 7.5                     | 7                   | 6.1         |
| 32 H1F    | 32                         | 32           | 12.5                    | 8                   | 9.0         |
| 40 H1F    | 40                         | 40           | 20                      | 9                   | 10.8        |
| 50 H1F    | 50                         | 50           | 30                      | 10                  | 15.5        |

| Type      | L (mm) | H1 (mm) | H2 (mm) | b (mm) | EN 1092-1     |               |                    | ANSI B16.5 Class 150 |               |                    |
|-----------|--------|---------|---------|--------|---------------|---------------|--------------------|----------------------|---------------|--------------------|
|           |        |         |         |        | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)        | k (dia.) (mm) | d mm dia. (number) |
| 15/4 H1F  | 130    | 80      | 60      | 16     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 15/6 H1F  | 130    | 80      | 60      | 16     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 15/9 H1F  | 130    | 80      | 60      | 16     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 15/12 H1F | 130    | 80      | 60      | 16     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 15 H1F    | 130    | 80      | 60      | 16     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 20/4 H1F  | 150    | 85      | 65      | 18     | 105           | 75            | 14x(4)             | 98                   | 70            | 16x(4)             |
| 20/6 H1F  | 150    | 85      | 65      | 18     | 105           | 75            | 14x(4)             | 98                   | 70            | 16x(4)             |
| 20/9 H1F  | 150    | 85      | 65      | 18     | 105           | 75            | 14x(4)             | 98                   | 70            | 16x(4)             |
| 20 H1F    | 150    | 85      | 65      | 18     | 105           | 75            | 14x(4)             | 98                   | 70            | 16x(4)             |
| 25 H1F    | 160    | 95      | 70      | 18     | 115           | 85            | 14x(4)             | 108                  | 79            | 16x(4)             |
| 32 H1F    | 180    | 105     | 75      | 18     | 140           | 100           | 18x(4)             | 118                  | 89            | 16x(4)             |
| 40 H1F    | 200    | 110     | 85      | 18     | 150           | 110           | 18x(4)             | 127                  | 98            | 16x(4)             |
| 50 H1F    | 230    | 125     | 95      | 20     | 165           | 125           | 18x(4)             | 153                  | 121           | 19x(4)             |

# Balanced 2-way Control Valve type H1FB

Cast steel, PN 40, DN 25 – 80 mm

0-2.4.03-I

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## TECHNICAL DATA

|                       |                                    |
|-----------------------|------------------------------------|
| <b>Materials:</b>     |                                    |
| - Valve body          | Cast steel<br>GP240GH<br>(GS-C25)  |
| - Components          | Stainless steel                    |
| - Gasket              | Copper and graphite<br>Reinz-AFM34 |
| - Bellows             | Stainless steel W.1.4541           |
| - Bolts, nuts         | 24 CrMo 4/A4                       |
| Nominal pressure      | PN 40                              |
| Seating               | Single seated,<br>tight closing    |
| Flow characteristic   | Quadratic                          |
| Leakage rate          | $\leq 0.05\%$ of Kvs               |
| Regulating capability | Kvs/Kvr $> 25$                     |
| Flanges               | EN 1092-1 PN 40                    |
| Pressure balanced     |                                    |

## APPLICATIONS

The pressure balanced control valves type H1FB are designed for regulating hot water, steam, hot oil etc. and can be used if a single-seated valve is required, but where the system pressure and valve size, out of regard for the pressure force of the actuator, necessitate a pressure balanced valve. The valves are installed combined with one of our temperature regulators in control systems in domestic premises, district heating systems, industrial processes or marine installations.

## DESIGN

The valve components - spindle, seat, cone and bellows - are made of stainless steel. The bellows for balancing the pressure is fitted on the valve spindle and it reduces the power necessary for closing the valve, as the upstream pressure of the medium through the hollow valve spindle acts outside and the pressure after the valve acts inside the bellows system. The valve body is made of cast steel GP240GH (GS-C25) with connection flanges drilled according to EN 1092-1. The connection thread for the actuator is G1B ISO 228. The valves are single seated and tight closing. The leakage is less than 0.05% of full flow (see VDI/VDE 2174).

## FUNCTION

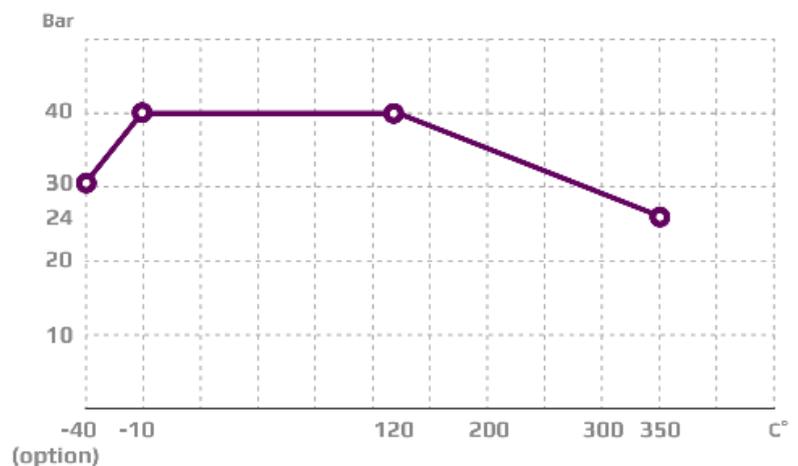
Without an actuator being connected, the valve is held in open position by means of a spring and the bellows system. With pressure on the spindle the valve will close. In connection with our thermostats, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



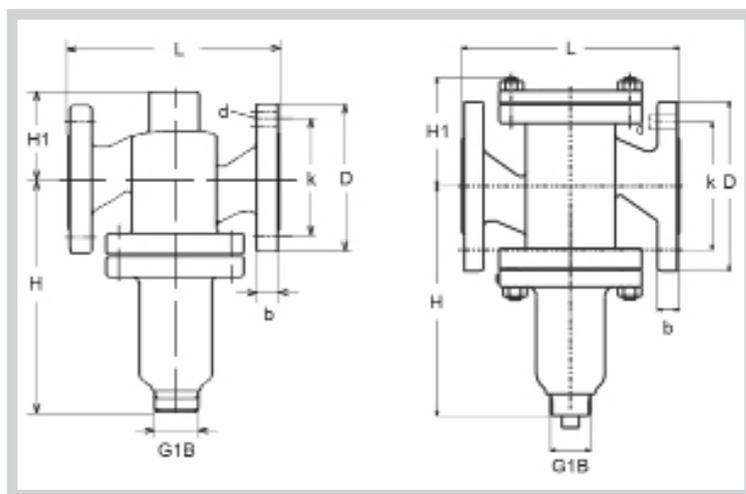
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



| Type    | L mm | H mm | H1 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|---------|------|------|-------|------|-------------|-------------|--------------------|
| 25 H1FB | 160  | 180  | 70    | 18   | 115         | 85          | 14x(4)             |
| 32 H1FB | 180  | 195  | 75    | 18   | 140         | 100         | 18x(4)             |
| 40 H1FB | 200  | 205  | 85    | 18   | 150         | 110         | 18x(4)             |
| 50 H1FB | 230  | 225  | 95    | 20   | 165         | 125         | 18x(4)             |
| 65 H1FB | 290  | 260  | 110   | 22   | 185         | 145         | 18x(8)             |
| 80 H1FB | 310  | 275  | 115   | 24   | 200         | 160         | 18x(8)             |

## SPECIFICATIONS

| Type    | Flange connection DN in mm | Opening (mm) | $k_{vs}$ -value m <sup>3</sup> /h | Lifting height (mm) | Weight (kg) |
|---------|----------------------------|--------------|-----------------------------------|---------------------|-------------|
| 25 H1FB | 25                         | 25           | 7.5                               | 7                   | 6           |
| 32 H1FB | 32                         | 32           | 12.5                              | 8                   | 9           |
| 40 H1FB | 40                         | 40           | 20                                | 9                   | 13          |
| 50 H1FB | 50                         | 50           | 30                                | 10                  | 16          |
| 65 H1FB | 65                         | 65           | 50                                | 13                  | 23          |
| 80 H1FB | 80                         | 80           | 80                                | 16                  | 38          |

# Balanced 2-way Control Valve type H1FBN

Cast steel, PN 40, DN 15 – 80 mm

0-2.4.03.01-G

Page 1 of 2



## TECHNICAL DATA

### Materials:

|               |                                   |
|---------------|-----------------------------------|
| - Valve body  | Cast steel<br>GP240GH<br>(G5-C25) |
| - Components  | Stainless steel                   |
| - Nuts, bolts | 24 CrMo 5/A4                      |
| - Gasket      | Stainless steel foil              |
| - O-ring      | A75H FEPM                         |

Nominal pressure PN 40  
Seating Single seated, balanced

Flow characteristic Quadratic  
Leakage rate  $\leq 0.05\%$  of Kvs  
Regulating capability Kvs/Kvr > 25

Flanges drilled according to EN 1092-1 PN 40  
Pressure balanced valve

## APPLICATIONS

Balanced control valves type H1FBN are designed for regulating hot water, steam and hot oil systems. Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable. The valves are used in conjunction with our temperature- or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seat, cone - are made of stainless steel. The valve body is made of cast steel GP240GH (G5-C25). The thread for the actuator connection is G1B ISO 228. The valves are single-seated. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

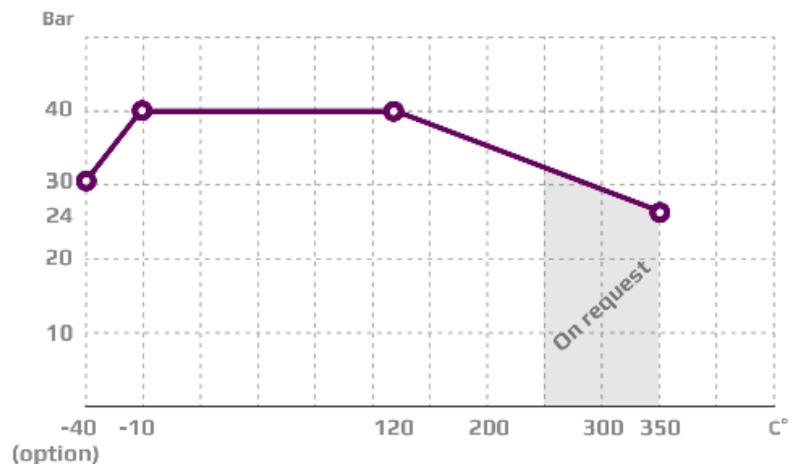
Without an actuator being connected, the valve is held in open position by means of a spring. With force on the spindle the valve will close. In connection with our thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting double seated valve can be used with our self-acting thermostats. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



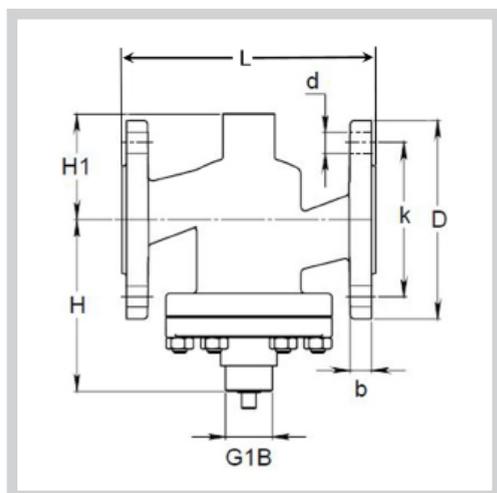
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



| Type    | L mm | H mm | H1 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|---------|------|------|-------|------|-------------|-------------|--------------------|
| 15 H1FB | 130  | 101  | 80    | 14   | 95          | 65          | 14x(4)             |
| 20 H1FB | 150  | 107  | 85    | 16   | 105         | 75          | 14x(4)             |
| 25 H1FB | 160  | 112  | 70    | 16   | 115         | 85          | 14x(4)             |
| 32 H1FB | 180  | 122  | 75    | 18   | 140         | 100         | 18x(4)             |
| 40 H1FB | 200  | 125  | 85    | 19   | 150         | 110         | 18x(4)             |
| 50 H1FB | 230  | 140  | 95    | 19   | 165         | 125         | 18x(4)             |
| 65 H1FB | 290  | 154  | 110   | 19   | 185         | 145         | 18x(8)             |
| 80 H1FB | 310  | 164  | 115   | 19   | 200         | 160         | 19x(8)             |

## SPECIFICATIONS

| Type     | Flange connection DN in mm | Opening (mm) | $k_{vs}$ -value $m^3/h$ | Lifting height (mm) | Weight (kg) |
|----------|----------------------------|--------------|-------------------------|---------------------|-------------|
| 15 H1FBN | 15                         | 15           | 4                       | 7.5                 | 4           |
| 20 H1FBN | 20                         | 20           | 6.3                     | 7.5                 | 5           |
| 25 H1FBN | 25                         | 25           | 10                      | 9                   | 6           |
| 32 H1FBN | 32                         | 32           | 16                      | 10                  | 9           |
| 40 H1FBN | 40                         | 40           | 25                      | 11                  | 13          |
| 50 H1FBN | 50                         | 50           | 35                      | 11.5                | 16          |
| 65 H1FBN | 65                         | 65           | 58                      | 14.5                | 23          |
| 80 H1FBN | 80                         | 80           | 80                      | 16                  | 38          |

# 2-Way Control Valve Type H1FBE and H1FBE HV

with SC Pneumatic Actuator and PPL or PS-2 Positioners

Cast Steel, Single Seat Balanced, PN 25, DN 200-300, Flanged Ends

O-2.4.04-A

Page 1 of 4



## APPLICATIONS

Control valves type H1FBE and H1FBE HV are designed for regulating steam hot water systems and liquid medias other than water.

The valves are used in conjunction with our temperature or pressure regulators for controlling industrial processes, municipal or domestic heating systems and marine installations.

Control valves type H1FBE HV are equipped with an additional cooling unit located between the valve and pneumatic actuator. This allows the system to be used in high ambient temperature environments. It also protects additional equipment such as positioners, filter regulators etc. from over-heating and prevents damage caused as a result.

## DESIGN

The valve components - spindle, seat and cone - are made of stainless steel. The valve body is made of cast steel GP240GH with flanges drilled according to EN 1092-1. The leakage rate is 0.01%.

## FUNCTION

Pressure on the spindle causes the valve to close.

The steam valve is based on a "balancing plug" design.

This means that a low and constant actuating force is necessary to operate the valve over all pressure ranges (0 – 25 Bar/0-363 psi)

## TECHNICAL DATA

|                                     |   |
|-------------------------------------|---|
| <b>Valve size</b>                   | DN 200/8"<br>DN 250/10"<br>DN 300/12"   |
| <b>Valve design</b>                 | Linear  |
| <b>Max working temperature</b>      | 225°C/437°F   |
| <b>Materials</b>                    |   |
| Valve body/cover                    | Cast Steel P240GH   |
| Cone/seat/shaft                     | Stainless steel   |
| Gasket                              | TFM and PVMQ  |
|                                     | Graphite metal  |
| Bolts/nuts                          | Stainless steel A2-70   |
| <b>Color</b>                        |   |
| Valve                               | RAL7016   |
| Protection shield                   | RAL6018   |
| <b>Flange drilled according to:</b> | EN 1092-1 PN 25/363 psi<br>ANSI 150   |
| <b>Counter flanges</b>              | JIS 5K, JIS 10K<br>DIN2635  |
| <b>Kvs-value (M<sup>3</sup>/h)</b>  | DN 200/8" 725 M <sup>3</sup> /h<br>DN 250/10" 1,000 M <sup>3</sup> /h<br>DN 300/12" 1,500 M <sup>3</sup> /h |
| <b>Flow characteristic</b>          | Up to 0.01% of Kvs<br>Equal percentage + linear   |
| <b>Regulating capability</b>        | kvs/kvr > 50  |

## Accessories

PNEUMATIC POSITIONER PPL (See data sheet O-6.6.01)

PNEUMATIC POSITIONER EPL (See data sheet O-6.6.02)

SMART POSITIONER PS-2 (See data sheet O-6.9.01)

FILTER REGULATOR AW20K (See data sheet O-6.8.01)

Subject to change without notice.

## FEATURES

- 2-way steam valve with linear pneumatic actuator type SC
- Manual override operation
- Linear - equal percentage flow characteristic
- For high flow applications
- For control devices such as PPL, EPL and PS-2

## FUNCTION continued

Pneumatic actuator SC (Spring Close ) means that springs close the valve cone in case of air failure.

The pneumatic actuator contains a manual override function.

The manual override should be operated as follows:

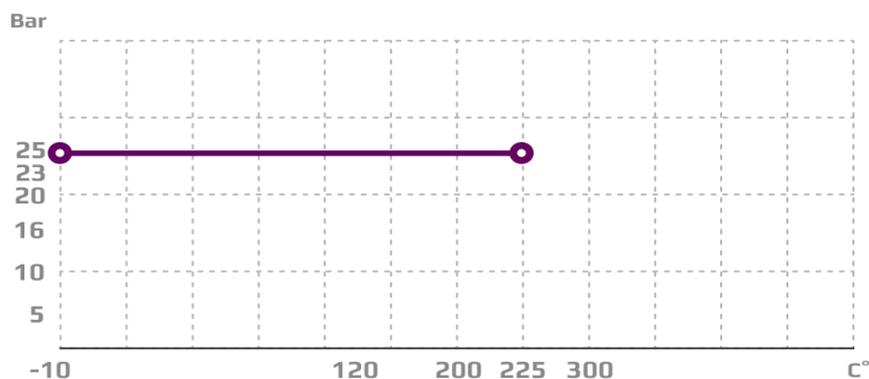
**AIR PRESSURE MUST BE DISCONNECTED WHEN USING THE MANUAL OVERRIDE. BEFORE CHANGING FROM MANUAL CONTROL TO AUTOMATIC MODE, THE MANUAL OVERRIDE MUST BE SET TO MINIMUM (CLOSE) POSITION.**

## OPTIONS

- The protection shield of the pneumatic actuators can be supplied without air ventilation holes. This allows the system to be used in rugged environments.
- Pneumatic 3/2 WAY VALVE – AUTO/MANUAL SWITCH

**PRESSURE/TEMPERATURE DIAGRAM**

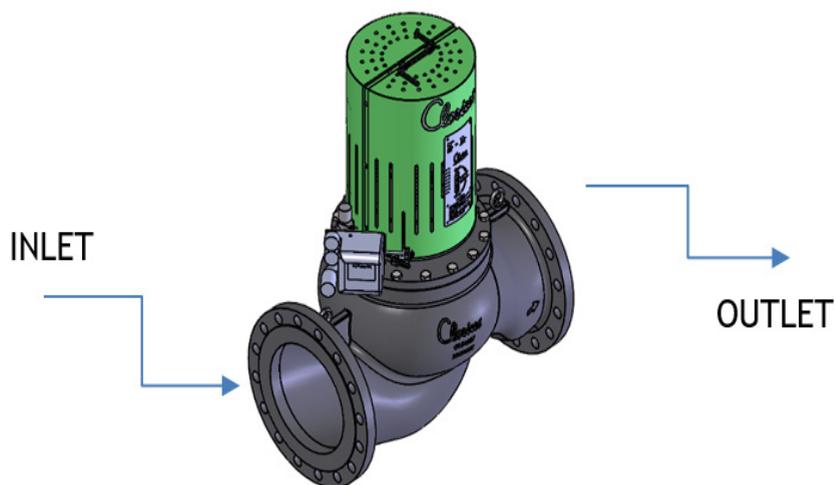
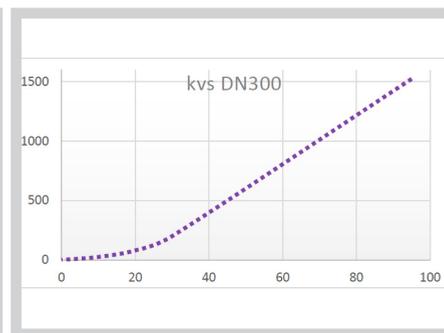
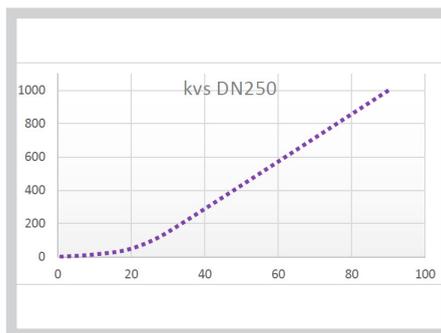
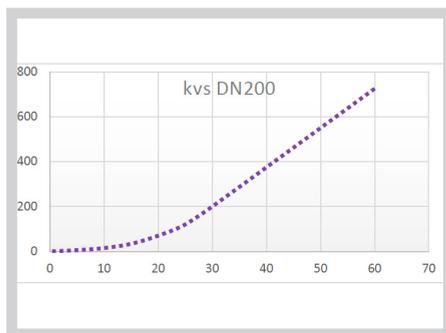
According to DIN 2401



**MOUNTING**

The valve can be installed both vertically and horizontally.

**CHARACTERISTICS**



# 2-Way Control Valve Type H1FBE and H1FBE HV

with SC Pneumatic Actuator and PPL or PS-2 Positioners

Cast Steel, Single Seat Balanced, PN 25, DN 200-250, Flanged Ends

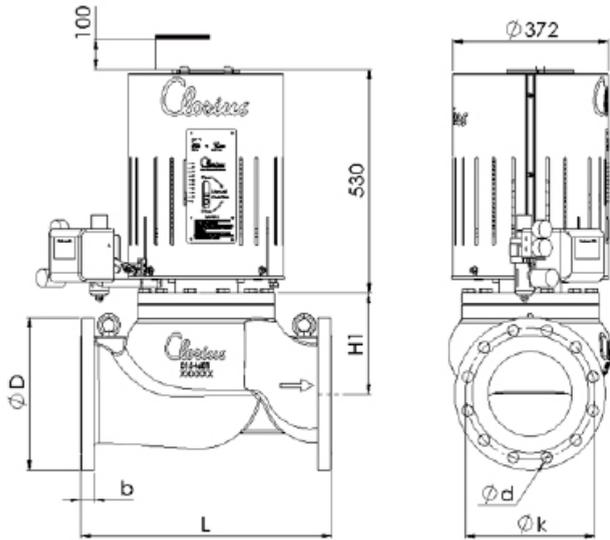
O-2.4.04-A

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## DIMENSION SKETCH

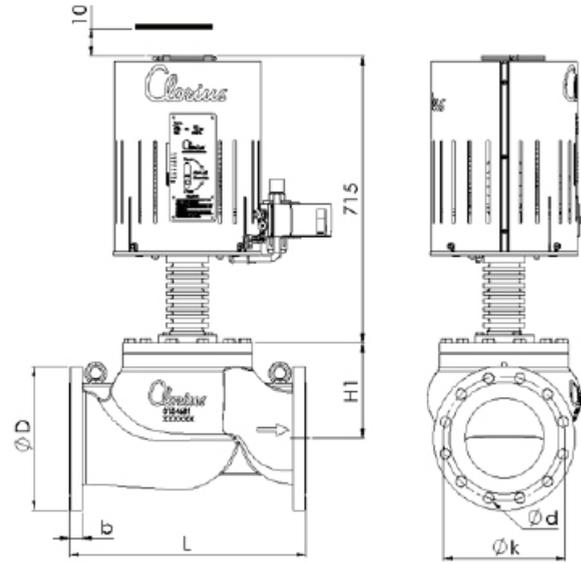
### DIMENSIONS IN MM

Control valve H1FBE with pneumatic actuator and positioner



### DIMENSIONS IN MM

Control valve H1FBE HV with pneumatic actuator, positioner and cooling unit



| Size   | Norm          | L (mm) | L (inch) | H1 (mm) | H1 (inch) | D (dia.) (mm) | D (dia.) (inch) | b (mm) | b (inch) | k (dia.) (mm) | k (dia.) (inch) | d (mm/inch) dia. |
|--------|---------------|--------|----------|---------|-----------|---------------|-----------------|--------|----------|---------------|-----------------|------------------|
| DN 200 | EN1092-1 PN25 | 600    | 24       | 238     | 9.3       | 360           | 14              | 30     | 1        | 310           | 12              | 12 x Ø26/1       |
|        | ANSI150       | 600    | 24       | 238     | 9.3       | 343           | 13.5            | 30     | 1        | 298           | 12              | 8 x Ø22/0.8      |
|        | JIS 5K        | 600    | 24       | 238     | 9.3       | 320           | 12.5            | 30     | 1        | 280           | 11              | 8 x Ø23/0.9      |
|        | JIS 10K       | 600    | 24       | 238     | 9.3       | 320           | 12.5            | 30     | 1        | 290           | 11              | 12 x Ø23/09      |
| DN 250 | EN1092-1 PN25 | 730    | 29       | 227     | 8.9       | 425           | 17              | 32     | 1.3      | 370           | 14.5            | 12 x Ø30/1       |
|        | ANSI150       | 730    | 29       | 227     | 8.9       | 406           | 16              | 32     | 1.3      | 362           | 14              | 12 x Ø25/0.9     |
|        | JIS 5K        | 730    | 29       | 227     | 8.9       | 385           | 15              | 32     | 1.3      | 345           | 13.5            | 12 x Ø23/0.9     |
|        | JIS 10K       | 730    | 29       | 227     | 8.9       | 400           | 16              | 32     | 1.3      | 355           | 14              | 12 x Ø25/0.9     |
| DN 300 | EN1092-1 PN25 | 850    | 33       | 301     | 11.8      | 485           | 19              | 32     | 1.3      | 430           | 17              | 16 x Ø30/1       |
|        | ANSI150       | 850    | 33       | 301     | 11.8      | 483           | 19              | 32     | 1.3      | 432           | 17              | 12 x Ø25/0.9     |
|        | JIS 5K        | 850    | 33       | 301     | 11.8      | 430           | 17              | 32     | 1.3      | 390           | 15              | 12 x Ø23/09      |
|        | JIS 10K       | 850    | 33       | 301     | 11.8      | 445           | 17.5            | 32     | 1.3      | 400           | 16              | 16 x Ø25/0.9     |

**SPECIFICATION**

| Type            | Opening<br>mm/inch | k <sub>vs</sub> rating<br>m <sup>3</sup> /h | Lifting height<br>mm/inch | Weight<br>kg/lbs |
|-----------------|--------------------|---|---------------------------|------------------|
| DN 200 H1FBE    | 200/8              | 725   | 75/3                      | 220/485 lbs      |
| DN 200 H1FBE HV | 200/8              | 725   | 75/3                      | 225/496 lbs      |
| DN 250 H1FBE    | 250/10             | 1,000                                       | 90/3.5                    | 258/568 lbs      |
| DN 250 H1FBE HV | 250/10             | 1,000                                       | 90/3.5                    | 263/579 lbs      |
| DN 300 H1FBE    | 300/12             | 1,500                                       | 95/3.7                    | 320/705 lbs      |
| DN 300 H1FBE HV | 300/12             | 1,500                                       | 95/3.7                    | 320/705 lbs      |

**ITEM NUMBERS**

for standard Clorius Controls kits

| Item no.  | Description  | Material | Pressure      |
|-----------|--|----------|---------------|
| 1-7511750 | VALVE DN 200 H1FBE PN 25 with SC pneumatic actuator and positioner PPL     | GP240GH  | PN 25/363 psi |
| 1-7511752 | VALVE DN 200 H1FBE PN 25 with SC pneumatic actuator and positioner PS-2    | GP240GH  | PN 25/363 psi |
| 1-7511754 | VALVE DN 200 H1FBE HV PN 25 with SC pneumatic actuator and positioner PPL  | GP240GH  | PN 25/363 psi |
| 1-7511756 | VALVE DN 200 H1FBE HV PN 25 with SC pneumatic actuator and positioner PS-2 | GP240GH  | PN 25/363 psi |
| 1-7511760 | VALVE DN 250 H1FBE PN 25 with SC pneumatic actuator and positioner PPL     | GP240GH  | PN 25/363 psi |
| 1-7511762 | VALVE DN 250 H1FBE PN 25 with SC pneumatic actuator and positioner PS-2    | GP240GH  | PN 25/363 psi |
| 1-7511764 | VALVE DN 250 H1FBE HV PN 25 with SC pneumatic actuator and positioner PPL  | GP240GH  | PN 25/363 psi |
| 1-7511766 | VALVE DN 250 H1FBE HV PN 25 with SC pneumatic actuator and positioner PS-2 | GP240GH  | PN 25/363 psi |
| 1-7511770 | VALVE DN 300 H1FBE PN 25 with SC pneumatic actuator and positioner PPL     | GP240GH  | PN 25/363 psi |
| 1-7511772 | VALVE DN 300 H1FBE PN 25 with SC pneumatic actuator and positioner PS-2    | GP240GH  | PN 25/363 psi |
| 1-7511774 | VALVE DN 300 H1FBE HV PN 25 with SC pneumatic actuator and positioner PPL  | GP240GH  | PN 25/363 psi |
| 1-7511776 | VALVE DN 300 H1FBE HV PN 25 with SC pneumatic actuator and positioner PS-2 | GP240GH  | PN 25/363 psi |

# 2-way Control Valve type H2F

Cast Steel, PN 40, DN 20 – 80 mm

0-2.4.05-L

Page 1 of 2



## TECHNICAL DATA

|                       |                                   |
|-----------------------|-----------------------------------|
| <b>Materials:</b>     |                                   |
| - Valve body          | Cast steel<br>GP240GH<br>(GS-C25) |
| - Spring              | 1.4568                            |
| - Cone                | 1.4408, 1.4305                    |
| - Gasket              | Stainless steel foil and graphite |
| - Upper seat          | AISI 303                          |
| - Lower seat          | 1.4301, 1.4305, 1.4307            |
| - Bolts, nuts         | 24 CrMo 4/A4                      |
| Nominal pressure      | PN 40                             |
| Seating               | Double-seated                     |
| Flow characteristic   | Quadratic                         |
| Function              | Closes by pressing the spindle    |
| Leakage rate          | $\leq 0.5\%$ of Kvs               |
| Regulating capability | Kvs/Kvr > 25                      |

|                              |                 |
|------------------------------|-----------------|
| Flanges drilled according to | EN 1092-1 PN 40 |
| Counter flanges              | DIN 2635        |
| Adjustable seat interspace   |                 |

Subject to change without notice.

## APPLICATIONS

Control valves type H2F are designed for regulating hot water, steam and hot oil systems. The double-seated valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a single-seated valve. The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1. The connection thread for the actuator is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

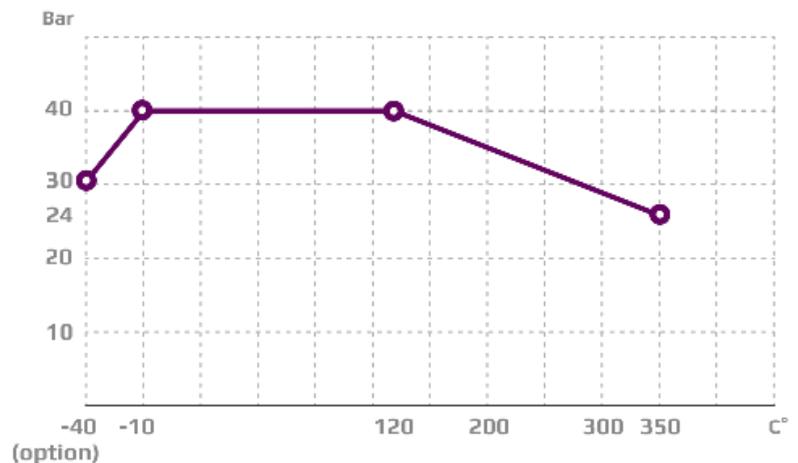
Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

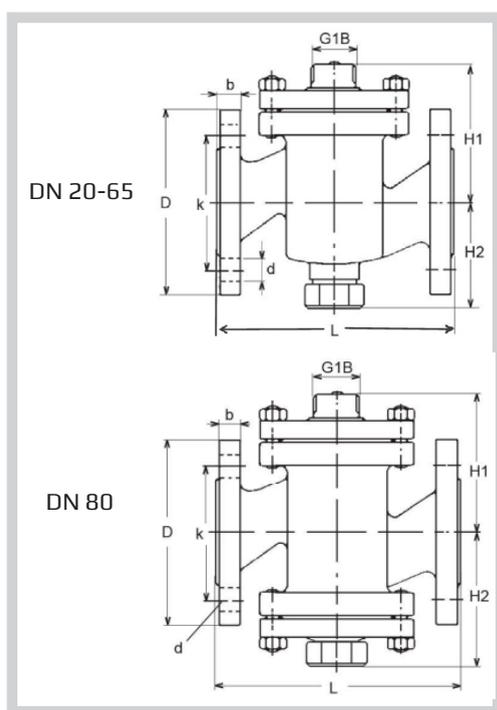




### MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).

### DIMENSION SKETCH



| Type   | L mm | H1 mm | H2 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|--------|------|-------|-------|------|-------------|-------------|--------------------|
| 20 H2F | 150  | 85    | 70    | 18   | 105         | 75          | 14x(4)             |
| 25 H2F | 160  | 95    | 77    | 18   | 115         | 85          | 14x(4)             |
| 32 H2F | 180  | 105   | 82    | 18   | 140         | 100         | 18x(4)             |
| 40 H2F | 200  | 110   | 92    | 18   | 150         | 110         | 18x(4)             |
| 50 H2F | 230  | 125   | 102   | 20   | 165         | 125         | 18x(4)             |
| 65 H2F | 290  | 135   | 120   | 22   | 185         | 145         | 18x(8)             |
| 80 H2F | 310  | 145   | 165   | 24   | 200         | 160         | 18x(8)             |

### SPECIFICATIONS

| Type   | Flange connection DN in mm | Opening (mm) | $k_{vs}$ -value m <sup>3</sup> /h | Lifting height (mm) | Weight (kg) |
|--------|----------------------------|--------------|-----------------------------------|---------------------|-------------|
| 20 H2F | 20                         | 20           | 5                                 | 6.5                 | 5           |
| 25 H2F | 25                         | 25           | 7.5                               | 7                   | 6.5         |
| 32 H2F | 32                         | 32           | 12.5                              | 8                   | 9           |
| 40 H2F | 40                         | 40           | 20                                | 9                   | 11          |
| 50 H2F | 50                         | 50           | 30                                | 10                  | 16          |
| 65 H2F | 65                         | 65           | 50                                | 11                  | 21          |
| 80 H2F | 80                         | 80           | 80                                | 13                  | 38          |

# 2-way Control Valve type H2F

Cast Steel, PN 25, DN 100 – 150 mm / PN 16, DN 150 - 200 mm

0-2.4.06-M

Page 1 of 2



## TECHNICAL DATA

|                       |                                     |
|-----------------------|-------------------------------------|
| <b>Materials:</b>     |                                     |
| - Valve body          | Cast steel<br>GP240GH<br>(GS-C25)   |
| - Components          | Stainless steel                     |
| - Bolts, nuts         | 24 CrMo 4/A4                        |
| - Gaskets             | Stainless steel foil and copper     |
| Nominal pressure      | PN 25                               |
| Seating               | Double seated                       |
| Flow characteristic   | Almost quadratic                    |
| Function              | Closing with pressure<br>on spindle |
| Leakage rate          | $\leq 0.5\%$ of Kvs                 |
| Regulating capability | Kvs/Kvr > 25                        |

**Flanges drilled according to** EN1092-1 PN 25 - PN16 - DN 200  
**Counter flanges** N 2635

**Note**  
All Clorius valves are approved in accordance to the Pressure Equipment Directive (PED). Valve type 150 H2F is only approved for nominal pressure PN 16, but for applications not effected by the PED, valve type 150 H2F can be delivered for nominal pressure PN 25

Subject to change without notice.

## APPLICATIONS

Control valves type H2F are designed for use in regulating high pressure hot water, steam and heat transfer oil. The valves are used in conjunction with temperature or pressure differential regulators for controlling district or central heating plants, industrial processes or marine installations.

## DESIGN

The valve components – spindle, seats and cone – are made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1. The connection thread for the actuator is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

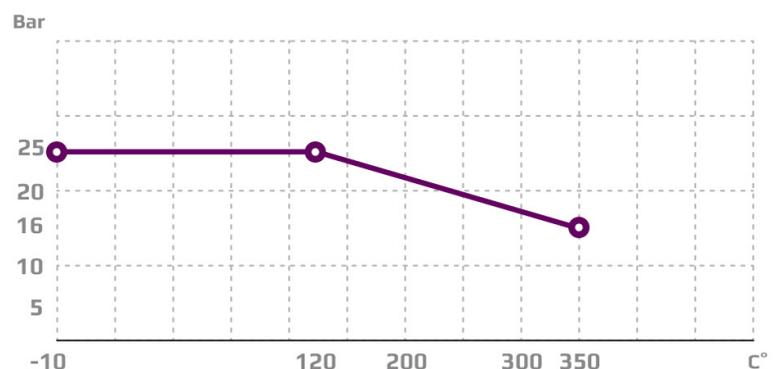
Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

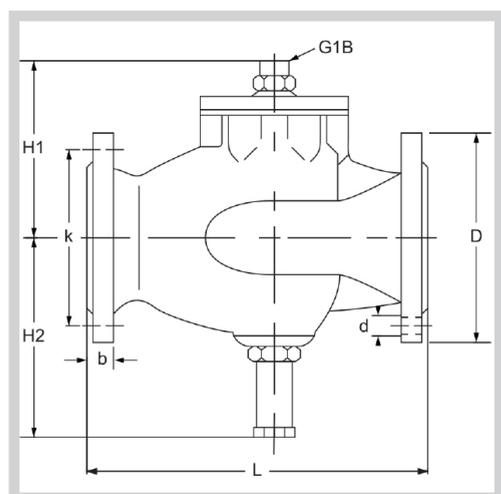




### MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).

### DIMENSION SKETCH



| Type     | L mm | H1 mm | H2 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|----------|------|-------|-------|-------------|------|-------------|--------------------|
| 100 H2F  | 350  | 185   | 209   | 235         | 24   | 190         | 23x(8)             |
| 125 H2F  | 400  | 240   | 230   | 270         | 26   | 220         | 27x(8)             |
| 150 H2F  | 400  | 240   | 230   | 300         | 28   | 250         | 27x(8)             |
| *200 H2F | 600  | 276   | 273   | 340         | 26   | 295         | 23x(12)            |

\*EN1092-1 - PN16

### SPECIFICATIONS

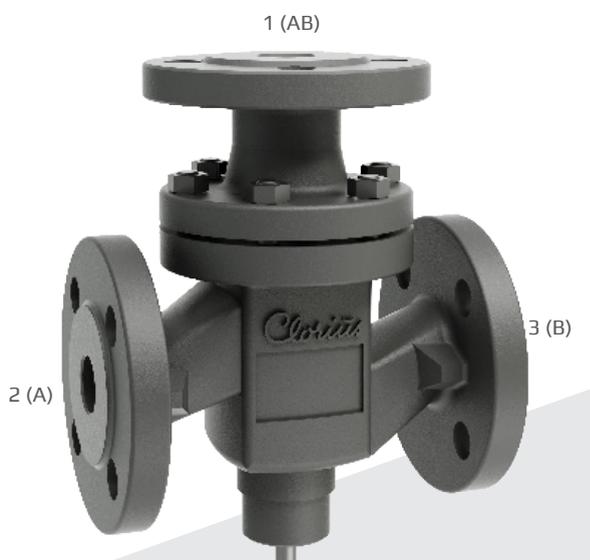
| Type    | Flange connection DN in mm | Opening (mm) | k <sub>vs</sub> -value m <sup>3</sup> /h | Lifting height (mm) | Weight (kg) |
|---------|----------------------------|--------------|--|---------------------|-------------|
| 100 H2F | 100                        | 100          | 125                                      | 20                  | 38          |
| 125 H2F | 125                        | 125          | 215                                      | 20                  | 73          |
| 150 H2F | 150                        | 150          | 310                                      | 20                  | 76          |
| 200 H2F | 200                        | 200          | 500                                      | 22                  | 120         |

# 3-way Control Valve type H3F

Cast steel, PN 40, DN 20 – 65 mm, Flanged ends

0-2.4.07-L

Page 1 of 2



## APPLICATIONS

Control valves type H3F are designed for control of hot oil, water and other liquids and can be installed in pipe systems as mixing or diverting valves. The valves are used in conjunction with our temperature regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1. The thread for the actuator connection is G1B ISO 228. The valves have two balanced single seats. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

Without an actuator being installed, connection A-AB is fully open and connection B-AB completely closed, by means of a spring.

By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection B-AB is fully open and connection A-AB completely closed.

The valve characteristics are as follows:

**Port A-AB and AB-A: quadratic**

**Port B-AB and AB-B: almost linear**

These characteristics ensure constant total flow under almost all pressure conditions and optimum circulation in the individual circuits.

## TECHNICAL DATA

### Materials:

|                       |   |
|-----------------------|---|
| - Valve body          | Cast steel<br>GP240GH<br>(GS-C25) (W. No. 1.0619) |
| - Trim                | Stainless steel<br>(W. No. 1.4305)                |
| - Bolts, nuts         | Steel (24 CrMo 4/A4)                              |
| - Gasket              | Stainless steel foil and graphite                 |
| - O-Ring              | 70 EPM  |
| Nominal pressure      | PN 40   |
| Seating               | 2 balanced single seats                           |
| Flow characteristic   | Quadratic/linear                                  |
| Leakage rate          | ≤ 0.5% of Kvs                                     |
| Regulating capability | Kvs/Kvr > 25                                      |

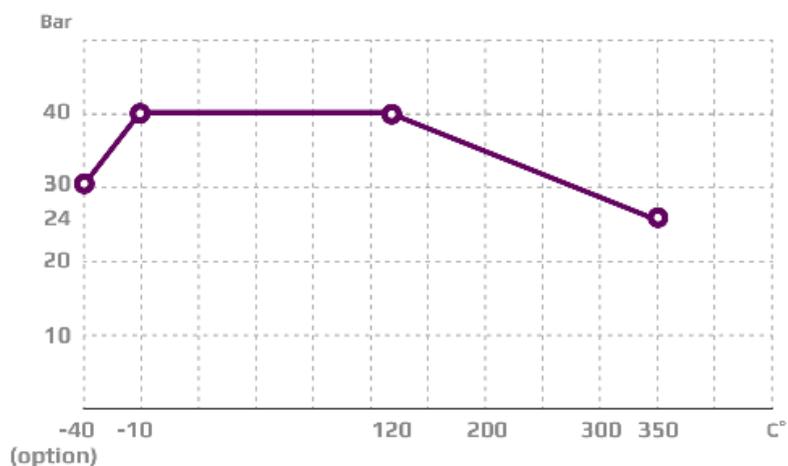
Flanges drilled according to EN 1092-1 PN 40  
Counter flanges DIN 2635  
Same Kvs-value as mixing and diverting valve

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

## PRESSURE/TEMPERATURE DIAGRAM

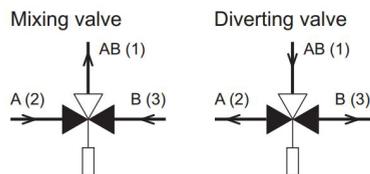
According to DIN 2401



Subject to change without notice.

### PORT NUMBERING

Valves type H3F are marked with the internationally recognized port designations: A, B, AB.



Port AB  
Port A  
Port B

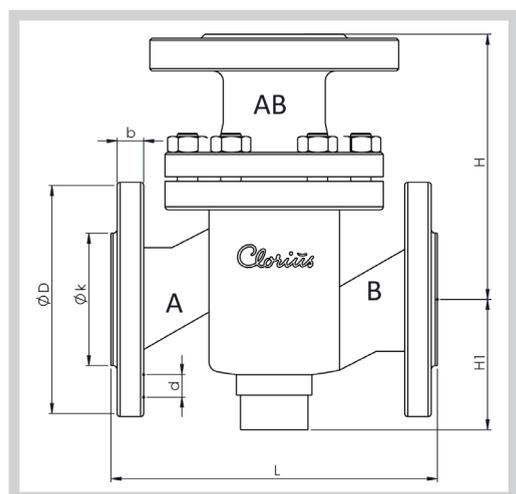
common port always open  
closes by activating the spindle  
opens by activating the spindle



### MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).

### DIMENSION SKETCH



| Type   | L mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|--------|------|------|-------|-------------|------|-------------|--------------------|
| 20 H3F | 150  | 115  | 63    | 105         | 16   | 75          | 14x(4)             |
| 25 H3F | 160  | 130  | 70    | 115         | 18   | 85          | 14x(4)             |
| 32 H3F | 180  | 150  | 75    | 140         | 18   | 100         | 18x(4)             |
| 40 H3F | 200  | 160  | 85    | 150         | 18   | 110         | 18x(4)             |
| 50 H3F | 230  | 190  | 95    | 165         | 20   | 125         | 18x(4)             |
| 60 H3F | 290  | 220  | 110   | 185         | 20   | 145         | 18x(8)             |

### SPECIFICATIONS

| Type   | Flange connection DN in mm | Opening (mm) | $k_{vs}$ -value* $m^3/h$ | Lifting height (mm) | Weight (kg) |
|--------|----------------------------|--------------|--------------------------|---------------------|-------------|
| 20 H3F | 20                         | 20           | 6.3                      | 7.5                 | 6           |
| 25 H3F | 25                         | 25           | 10                       | 9                   | 7           |
| 32 H3F | 32                         | 32           | 16                       | 10                  | 10          |
| 40 H3F | 40                         | 40           | 25                       | 11                  | 14          |
| 50 H3F | 50                         | 50           | 38                       | 11.5                | 18          |
| 65 H3F | 65                         | 65           | 63                       | 14.5                | 26          |

\* Same  $k_{vs}$ -values for mixing and diverting valves

# 3-way Control Valve type H3F

Cast steel, PN 16, DN 80 – 150 mm

0-2.4.08-B

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                       |                                   |
|-----------------------|-----------------------------------|
| - Valve body          | Cast steel<br>GP240GH<br>(GS-C25) |
| - Seats and cone      | Alu Bronze<br>CuAL10Fe5Ni5        |
| - Spindle             | Stainless steel<br>(W.no. 1.4436) |
| - Gasket              | Reinz-AFM34                       |
| - O-ring              | 90 NBR                            |
| Nominal pressure      | PN 16                             |
| Seating               | 2 balanced single<br>seats        |
| Flow characteristic   | Almost linear                     |
| Temperature range     | Max. 120°C<br>(160°C option)      |
| Leakage rate          | ≤ 0.5% of Kvs                     |
| Regulating capability | Kvs/Kvr > 25                      |

Flanges drilled according to EN 1092-2 PN 16 or ANSI B16.5 Class 150

Counter flanges DIN 2633

For regulating of process- and central heating plants

### Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the kvs-value will decrease by 14% as against mixing valves.

Subject to change without notice.

## APPLICATIONS

Control valves type H3F are designed for regulating of hot water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" under technical data. The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

## DESIGN

The valve components - seats and cone - are made of alu bronze, the spindle is made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The connection thread for the actuator is G1B ISO 228. The valves have two balanced single seats. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174). Tight between port 1(AB) og 3(B) is optional.

## FUNCTION

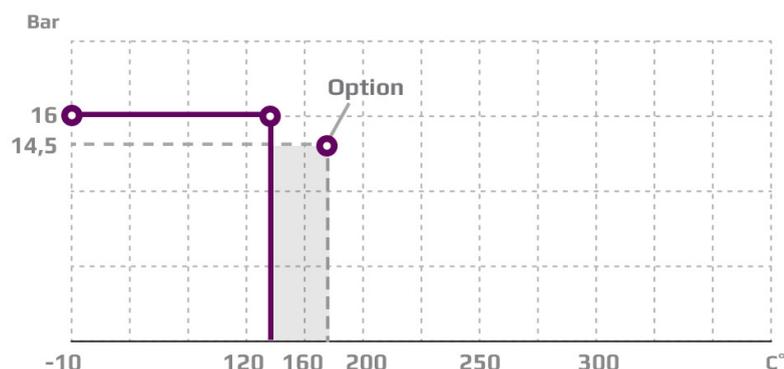
Without an actuator being installed, connection 2-1 is fully open and connection 3-1 completely closed, by means of a spring. By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

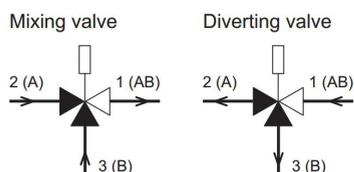
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING

The ports of valves type H3F are marked with the figures 1, 2 and 3. The letters in parentheses refer to the corresponding internationally adapted designations.



Port 1(AB)  
Port 2(A)  
Port 3(B)

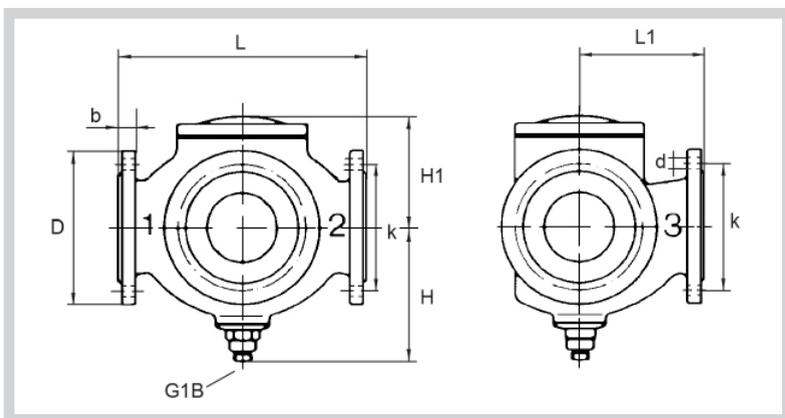
common port always open  
closes at load on spindle  
opens at load on spindle



### MOUNTING

The valve must always be mounted with vertical spindle, preferable with the motorconnection over the valve. Besides, the valve should be mounted so that the valve motor is exposed to a minimum of moisture and unnecessary vibrations. Free height above/below the valve must be minimum 400 mm for mounting and operating of the AVM/AVF 234 motor, otherwise minimum 745 mm for pneumatic actuators.

### DIMENSION SKETCH



| Type    | L mm | L1 mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|---------|------|-------|------|-------|-------------|------|-------------|--------------------|
| 80 H3F  | 310  | 155   | 180  | 127   | 200         | 19   | 160         | 19x(8)             |
| 100 H3F | 350  | 175   | 195  | 141   | 220         | 19   | 180         | 19x(8)             |
| 125 H3F | 400  | 240   | 245  | 171   | 250         | 21   | 210         | 19x(8)             |
| 150 H3F | 480  | 270   | 280  | 189   | 285         | 22   | 240         | 23x(8)             |

### SPECIFICATIONS

| Type    | Flange connection DN in mm | Opening mm | Mixing value $k_{vs}$ -value $m^3/h$ | Diverting value $k_{vs}$ -value $m^3/h$ | Lifting height (mm) | Weight (kg) |
|---------|----------------------------|------------|--------------------------------------|---|---------------------|-------------|
| 80 H3F  | 80                         | 80         | 80                                   | 69                                      | 11                  | 35          |
| 100 H3F | 100                        | 100        | 125                                  | 108                                     | 13                  | 44          |
| 125 H3F | 125                        | 125        | 215                                  | 185                                     | 18                  | 72          |
| 150H3F  | 150                        | 150        | 310                                  | 267                                     | 20                  | 111         |

# 2-way Control Valve type H2FR

Cast Steel, PN 40, DN 20 – 80 mm, 2 Seats, Reverse acting

0-2.4.09-1

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                       |  |
|-----------------------|--|
| - Valve body          | Cast steel<br>GP240GH<br>(GS-C25)                |
| - Trim                | Stainless steel                                  |
| - Nuts, bolts         | 24 CrMo 4/A4                                     |
| - Gasket              | Graphite with stainless steel foil and<br>copper |
| Nominal pressure      | PN 40  |
| Seating               | Double seated                                    |
| Flow characteristic   | Quadratic  |
| Leakage rate          | $\leq 0.5\%$ of Kvs                              |
| Regulating capability | Kvs/Kvr > 25                                     |

|                                 |                               |
|---------------------------------|-------------------------------|
| Function                        | Opens by pressing the spindle |
| Flanges drilled<br>according to | EN 1092-1 PN 40               |
| Counter flanges                 | DIN 2635/BS 4504              |

Reverse acting (normally closed)  
For cooling systems or similar  
Adjustable seat interspace

## APPLICATIONS

Valves type H2FR are mainly intended for control of cooling systems. The valves are used in conjunction with temperature or pressure differential regulators for controlling industrial processes or cooling systems. As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure,  $\Delta p_L$ , against which a valve can close depends on the spring. When opening the valve, the actuator has to overcome the spring force. The table on the next page shows max. allowable values of  $\Delta p_L$  as well as the max. allowable inlet pressures for opening the valves,  $p_{1max}$ , for various actuator forces.

## DESIGN

The valve components – spindle, seat and cone - are made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1. The thread for the actuator connection is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION REVERSE ACTING

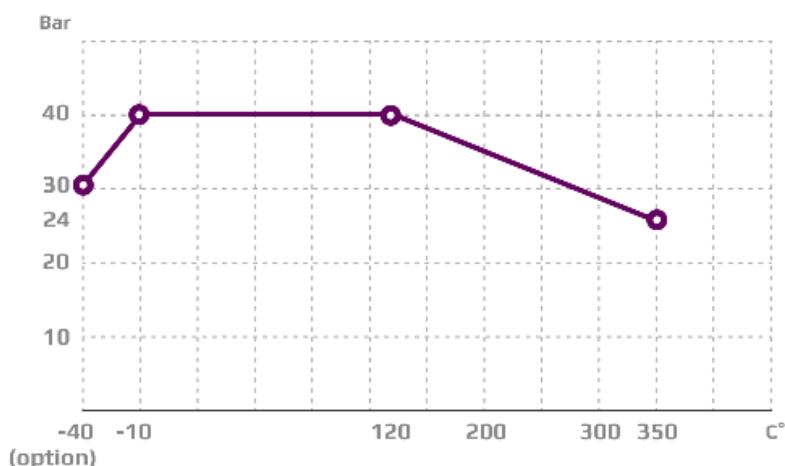
Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens. In connection with our actuators, the valves act as “cooling” valves, i.e. they open at rising temperatures. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



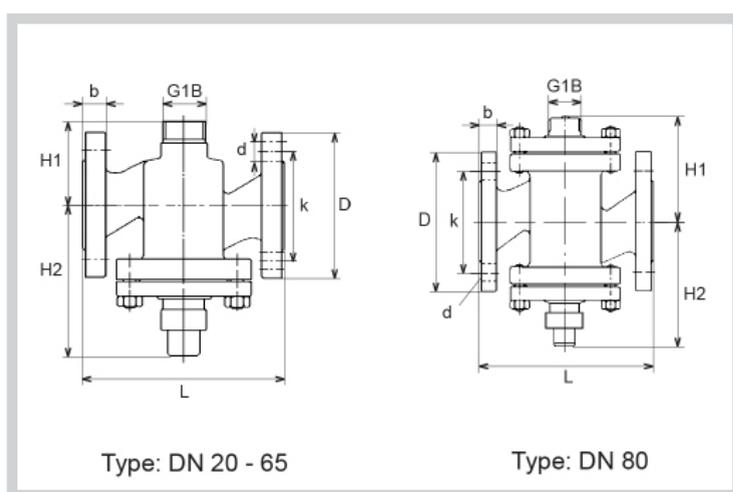
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



| Type    | L mm | H1 mm | H2 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|---------|------|-------|-------|-------------|------|-------------|--------------------|
| 20 H2FR | 150  | 63    | 112   | 105         | 18   | 75          | 14x(4)             |
| 25 H2FR | 160  | 70    | 117   | 115         | 18   | 85          | 14x(4)             |
| 32 H2FR | 180  | 75    | 151   | 140         | 18   | 100         | 18x(4)             |
| 40 H2FR | 200  | 85    | 155   | 150         | 18   | 110         | 18x(4)             |
| 50 H2FR | 230  | 95    | 169   | 165         | 20   | 125         | 18x(4)             |
| 65 H2FR | 290  | 110   | 180   | 185         | 22   | 145         | 18x(8)             |
| 80 H2FR | 310  | 155   | 195   | 200         | 24   | 160         | 18x(8)             |

## SPECIFICATIONS

| Type    | Flange connection Dn in mm | Opening mm | $k_{vs}$ -value m <sup>3</sup> /h | Lifting height mm | Max. $\Delta p_L$ bar | Actuat. force N | Corresp. $p_{1max}$ bar | Weight kg |
|---------|----------------------------|------------|-----------------------------------|-------------------|-----------------------|-----------------|-------------------------|-----------|
| 20 H2FR | 20                         | 20         | 5                                 | 6.5               | 8.3                   | 200<br>400      | 9.4<br>25               | 5         |
| 25 H2FR | 25                         | 25         | 7.5                               | 7                 | 8                     | 200<br>400      | 8.8<br>25               | 6.5       |
| 32 H2FR | 32                         | 32         | 12.5                              | 8                 | 7                     | 400             | 16                      | 9         |
| 40 H2FR | 40                         | 40         | 20                                | 9                 | 6.6                   | 400             | 16                      | 11        |
| 50 H2FR | 50                         | 50         | 30                                | 10                | 5.8                   | 400             | 15                      | 16        |
| 65 H2FR | 65                         | 65         | 50                                | 11                | 10                    | 400<br>800      | 10<br>40                | 21        |
| 80 H2FR | 80                         | 80         | 80                                | 13                | 6.7                   | 400<br>800      | 10<br>40                | 38        |

# 2-way control valve type H2FR

Cast steel, PN 25, DN 100 – 125 mm / PN 16, DN 150 mm, Reverse acting

0-2.4.10-G

Page 1 of 2



## APPLICATIONS

Valves type H2FR are mainly intended for control of cooling systems. The valves are used in conjunction with temperature- or pressure differential regulators. As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure,  $\Delta p_L$ , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force. On the next page please find the max. allowable values of  $\Delta p_L$  as well as the max. allowable inlet pressures for opening the valves,  $p_{1max}$  for various actuator forces.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1. The connection thread for the actuator is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

### REVERSE ACTING

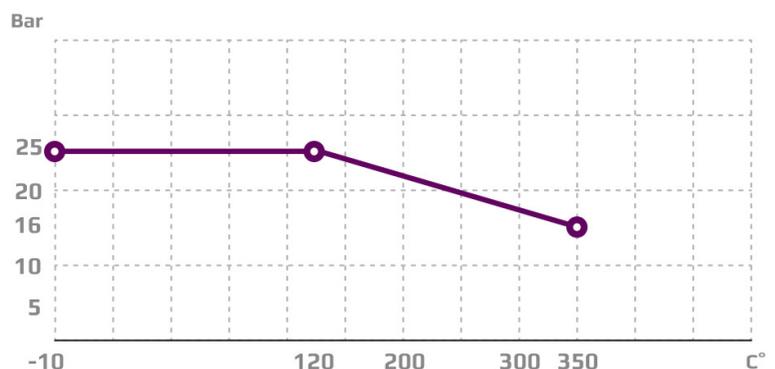
Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens. In connection with our actuators, the valves act as "cooling" valves, i.e. they open at rising temperatures. The linear characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## TECHNICAL DATA

### Materials:

|               |                                   |
|---------------|-----------------------------------|
| - Valve body  | Cast steel<br>GP240GH<br>(GS-C25) |
| - Trim        | Stainless steel<br>CuSn5Zn5Pb5-C  |
| - Bolts, nuts | 24 CrMo 4/A4                      |
| - Gasket      | Stainless steel foil<br>Copper    |

|                       |                               |
|-----------------------|-------------------------------|
| Nominal pressure      | PN 25                         |
| Seating               | Double seated                 |
| Flow characteristic   | Almost quadratic              |
| Function              | Opens by pressing the spindle |
| Leakage rate          | $\leq 0.5\%$ of Kvs           |
| Regulating capability | Kvs/Kvr > 25                  |
| Flanges               | EN 1092-1 PN 25               |
| Counter flanges       | DIN 2635/DS625                |

Reverse acting (normally closed)  
For cooling water and lubrications

### Important note

All Clorius valves are approved in accordance to the Pressure Equipment Directive (PED). Valve type 150 H2FR is only approved for nominal pressure PN 16, but for applications not effected by the PED, valve type 150 H2FR can be delivered for nominal pressure PN 25.

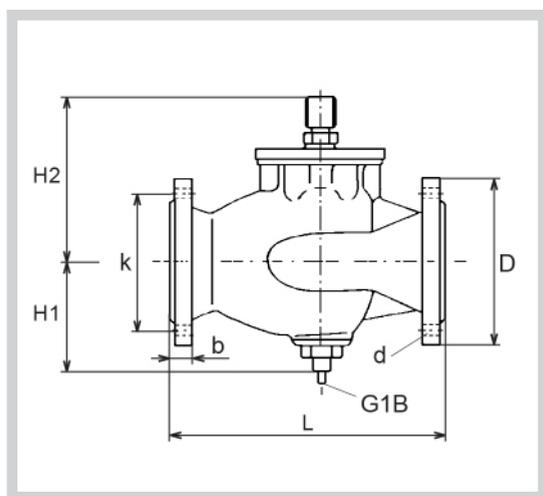
Subject to change without notice.

### MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



### DIMENSION SKETCH



| Type     | L mm | H1 mm | H2 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|----------|------|-------|-------|-------------|------|-------------|--------------------|
| 100 M2FR | 350  | 145   | 240   | 220         | 24   | 190         | 23x(8)             |
| 125 M2FR | 400  | 180   | 290   | 250         | 26   | 220         | 27x(8)             |
| 150 M2FR | 400  | 180   | 290   | 285         | 28   | 250         | 27x(8)             |

### SPECIFICATIONS

| Type     | Flange connection Dn in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Max. $\Delta p_L$ bar | Actuat. force N | Weight kg |
|----------|----------------------------|------------|-------------------------|-------------------|-----------------------|-----------------|-----------|
| 100 H2FR | 100                        | 100        | 125                     | 20                | 12.1                  | 800             | 39        |
| 125 H2FR | 125                        | 125        | 215                     | 20                | 9                     | 800             | 73        |
| 150 H2FR | 150                        | 150        | 310                     | 20                | 7.5                   | 800             | 76        |

# 2-way Control Valve type G1F

Nodular cast iron, PN 25, DN 15/4 – 50 mm

0-2.5.02-I

Page 1 of 2



## TECHNICAL DATA

### Materials:

|               |                                    |
|---------------|------------------------------------|
| - Valve body  | Nodular cast iron<br>EN-GJS-400-15 |
| - Components  | Stainless steel                    |
| - Nuts, bolts | 24 CrMo 4/A4                       |
| - Gasket      | Stainless steel foil               |

|                       |                     |
|-----------------------|---------------------|
| Nominal pressure      | PN 25               |
| Seating               | Single seated       |
| Flow characteristic   | Quadratic           |
| Leakage rate          | $\leq 0.5\%$ of Kvs |
| Regulating capability | Kvs/Kvr $> 25$      |

|                              |                                      |
|------------------------------|--------------------------------------|
| Flanges drilled according to | EN 1092-2 or ANSI B16.5<br>Class 150 |
| Counter flanges              | DIN2634                              |

Subject to change without notice.

## APPLICATIONS

Control valves type G1F are designed for regulating hot water, steam and hot oil systems. The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seat and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The thread for the actuator connection is G1B ISO 228. The valves are single-seated. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

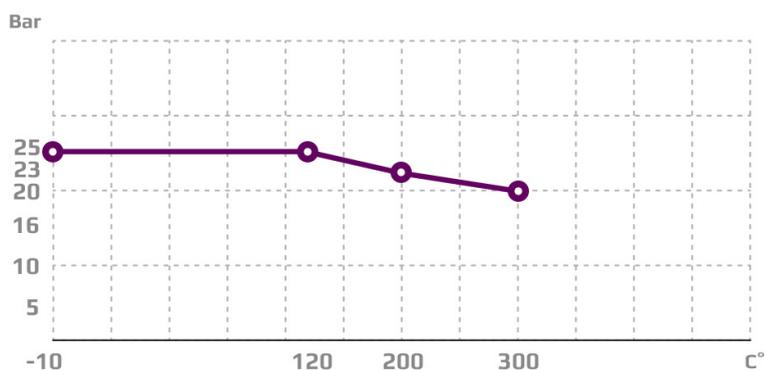
Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

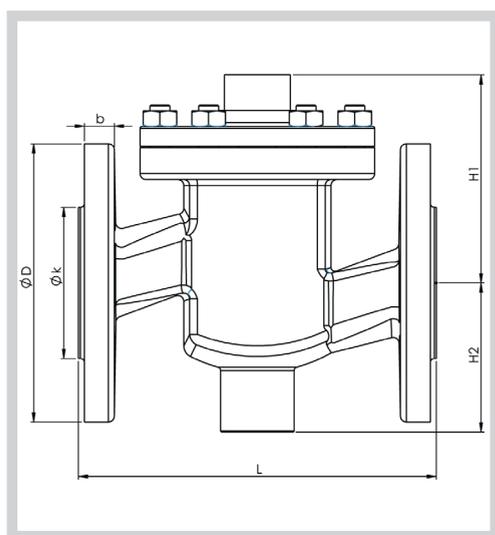


## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



## SPECIFICATIONS

| Type      | Flange connection DN in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|-----------|----------------------------|------------|-------------------------|-------------------|-----------|
| 15/4 G1F  | 15                         | 4          | 0.20                    | 6                 | 3.0       |
| 15/6 G1F  | 15                         | 6          | 0.45                    | 6                 | 3.0       |
| 15/9 G1F  | 15                         | 9          | 0.95                    | 6                 | 3.1       |
| 15/12 G1F | 15                         | 12         | 1.7                     | 6                 | 3.1       |
| 15 G1F    | 15                         | 15         | 2.75                    | 6                 | 3.1       |
| 20 G1F    | 20                         | 20         | 5                       | 6.5               | 4.2       |
| 25 G1F    | 25                         | 25         | 7.5                     | 7                 | 5.5       |
| 32 G1F    | 32                         | 32         | 12.5                    | 8                 | 8.1       |
| 40 G1F    | 40                         | 40         | 20                      | 9                 | 9.7       |
| 50 G1F    | 50                         | 50         | 30                      | 10                | 14.0      |

| Type      | L (mm) | H1 (mm) | H2 (mm) | b (mm) | EN 1092-2     |               |                    | ANSI B16.5 Class 150 |               |                    |
|-----------|--------|---------|---------|--------|---------------|---------------|--------------------|----------------------|---------------|--------------------|
|           |        |         |         |        | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)        | k (dia.) (mm) | d mm dia. (number) |
| 15/4 G1F  | 130    | 80      | 60      | 14     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 15/6 G1F  | 130    | 80      | 60      | 14     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 15/9 G1F  | 130    | 80      | 60      | 14     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 15/12 G1F | 130    | 80      | 60      | 14     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 15 G1F    | 130    | 80      | 60      | 14     | 95            | 65            | 14x(4)             | 89                   | 61            | 16x(4)             |
| 20 G1F    | 150    | 85      | 65      | 16     | 105           | 75            | 14x(4)             | 98                   | 70            | 16x(4)             |
| 25 G1F    | 160    | 95      | 70      | 16     | 115           | 85            | 14x(4)             | 108                  | 79            | 16x(4)             |
| 32 G1F    | 180    | 105     | 75      | 18     | 140           | 100           | 18x(4)             | 118                  | 89            | 16x(4)             |
| 40 G1F    | 200    | 110     | 85      | 18     | 150           | 110           | 18x(4)             | 127                  | 98            | 16x(4)             |
| 50 G1F    | 230    | 125     | 95      | 20     | 165           | 125           | 18x(4)             | 153                  | 121           | 19x(4)             |

# Balanced 2-way Control Valve type G1FB

Nodular cast iron, PN 25, DN 25 – 65 mm

0-2.5.03-E

Page 1 of 2



## TECHNICAL DATA

### Materials:

|               |                                    |
|---------------|------------------------------------|
| - Valve body  | Nodular cast iron<br>EN-GJS-400-15 |
| - Components  | Stainless steel                    |
| - Nuts, bolts | 24 CrMo 5/A4                       |
| - Gasket      | Reinz-AFM34 Metal<br>- Copper      |
| - Bellow      | Stainless steel W.1.1541           |

**Nominal pressure** PN 25  
**Seating** Single-seated,  
tight closing

**Flow characteristic** Quadratic

**Leakage rate**  $\leq 0.05\%$  of Kvs

**Regulating capability** Kvs/Kvr > 25

**Flanges** EN 1092-2  
PN 25

**Pressure balanced valve**

## APPLICATIONS

The pressure balanced control valves type G1FB are designed for regulating hot water, steam and hot oil systems. Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable.

The valves are used in conjunction with our temperature- or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seat, cone and bellow - are made of stainless steel. The bellows for balancing the pressure are fitted on the valve spindle which reduces the force necessary for closing the valve, as the upstream pressure of the medium through the hollow valve spindle acts outside and the pressure after the valve acts inside the bellow system. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves are single-seated. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

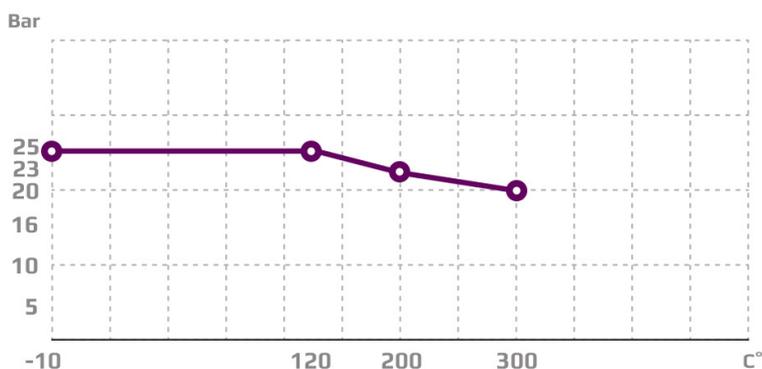
Without an actuator being connected, the valve is held in open position by means of a spring and the bellow system. With pressure on the spindle the valve will close. In connection with our thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting double seated valve can be used with our self-acting thermostats. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



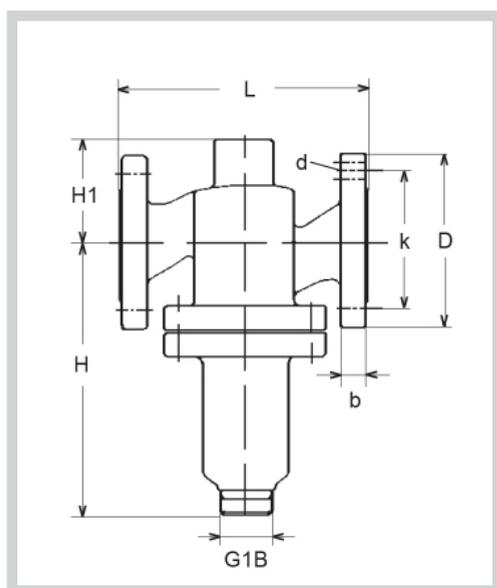
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



| Type    | L mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|---------|------|------|-------|-------------|------|-------------|--------------------|
| 25 H1FB | 160  | 180  | 70    | 115         | 16   | 85          | 14x(4)             |
| 32 H1FB | 180  | 195  | 75    | 140         | 18   | 100         | 18x(4)             |
| 40 H1FB | 200  | 205  | 85    | 150         | 19   | 110         | 18x(4)             |
| 50 H1FB | 230  | 225  | 95    | 165         | 19   | 125         | 18x(4)             |
| 65 H1FB | 290  | 260  | 110   | 185         | 19   | 145         | 18x(8)             |

## SPECIFICATIONS

| Type    | Flange connection DN in mm | Opening (mm) | $k_{vs}$ -value $m^3/h$ | Lifting height (mm) | Weight (kg) |
|---------|----------------------------|--------------|-------------------------|---------------------|-------------|
| 25 G1FB | 25                         | 25           | 7.5                     | 7                   | 6           |
| 32 G1FB | 32                         | 32           | 12.5                    | 8                   | 9           |
| 40 G1FB | 40                         | 40           | 20                      | 9                   | 13          |
| 50 G1FB | 50                         | 50           | 30                      | 10                  | 16          |
| 65 G1FB | 65                         | 65           | 50                      | 13                  | 23          |

# Balanced 2-way Control Valve type G1FBN

Nodular cast iron, PN 25, DN 15 – 80 mm

0-2.5.03.01-H

Page 1 of 2



## TECHNICAL DATA

### Materials:

|               |                                    |
|---------------|------------------------------------|
| - Valve body  | Nodular cast iron<br>EN-GJS-400-15 |
| - Components  | Stainless steel                    |
| - Nuts, bolts | 24 CrMo 5/A4                       |
| - Gasket      | Stainless steel foil               |
| - O-ring      | A75H FEPM 75 CO                    |

|                  |                            |
|------------------|----------------------------|
| Nominal pressure | PN 25                      |
| Seating          | Single-seated,<br>balanced |

|                       |                      |
|-----------------------|----------------------|
| Flow characteristic   | Quadratic            |
| Leakage rate          | $\leq 0,05\%$ of Kvs |
| Regulating capability | Kvs/Kvr > 25         |

|                              |   |
|------------------------------|---|
| Flanges drilled according to | EN 1092-2 PN 25<br>or ANSI B16.5<br>Class 150 |
|------------------------------|---|

Pressure balanced valve

## APPLICATIONS

Balanced control valves type G1FBN are designed for regulating hot water, steam and hot oil systems. Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable. The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seat, cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The thread for the actuator connection is G1B ISO 228. The valves are single-seated. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

## FUNCTION

Without an actuator being connected, the valve is held in open position by means of a spring. With force on the spindle the valve will close. In connection with our thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting double seated valve can be used with our self-acting thermostats. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel
- Low leakage rate reduces the risk of overheating

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



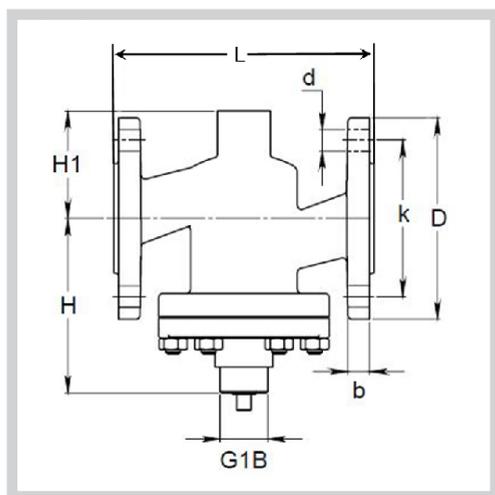
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



| Type     | L mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|----------|------|------|-------|-------------|------|-------------|--------------------|
| 15 G1FBN | 130  | 101  | 80    | 95          | 14   | 65          | 14x(4)             |
| 20 G1FBN | 150  | 107  | 85    | 105         | 16   | 75          | 14x(4)             |
| 25 G1FBN | 160  | 112  | 70    | 115         | 16   | 85          | 14x(4)             |
| 32 G1FBN | 180  | 122  | 75    | 140         | 18   | 100         | 18x(4)             |
| 40 G1FBN | 200  | 125  | 85    | 150         | 19   | 110         | 18x(4)             |
| 50 G1FBN | 230  | 140  | 95    | 165         | 19   | 125         | 18x(4)             |
| 65 G1FBN | 290  | 154  | 110   | 185         | 19   | 145         | 18x(4)             |
| 80 G1FBN | 310  | 164  | 115   | 200         | 19   | 160         | 19x(8)             |

## SPECIFICATIONS

| Type     | Flange connection DN in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|----------|----------------------------|------------|-------------------------|-------------------|-----------|
| 15 G1FBN | 15                         | 15         | 4                       | 7.5               | 4         |
| 20 G1FBN | 20                         | 20         | 6.3                     | 7.5               | 5         |
| 25 G1FBN | 25                         | 25         | 10                      | 9                 | 6         |
| 32 G1FBN | 32                         | 32         | 16                      | 10                | 9         |
| 40 G1FBN | 40                         | 40         | 25                      | 11                | 13        |
| 50 G1FBN | 50                         | 50         | 35                      | 11.5              | 16        |
| 65 G1FBN | 65                         | 65         | 58                      | 14.5              | 23        |
| 80 G1FBN | 80                         | 80         | 80                      | 16                | 38        |

# 2-way Control Valve type H1FBE

Nodular cast iron, Single seat balanced, PN 25, DN 200 - 250 mm, Flanged ends

0-2.5.03.02-B

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                       |                               |
|-----------------------|-------------------------------|
| - Valve body          | Nodular cast iron             |
|                       | EN-GJS-400-15                 |
| - Spring              | 1.4568                        |
| - Cone                | 1.4408, 1.4305                |
| - Gasket              | TFM and PVMQ                  |
| - Bolts, Nuts         | 4 CrMo 4/A4                   |
| Nominal pressure      | PN 25                         |
| Seating               | Single seated balanced        |
| Flow characteristic   | Equal percentage              |
| Leakage rate          | $\leq 0.01\%$ of Kvs Class IV |
| Regulating capability | Kvs/Kvr $> 25$                |

### Flanges drilled according to

EN 1092-2 PN 25  
(ANSI)  
(JIS)

### Counter flanges

DIN2634

### Adjustable seat interspace

## APPLICATIONS

Control valves type H1FBE are designed for regulating steam and hot water systems. The valves are used in conjunction with our temperature or pressure regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seat and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The leakage rate is 0.01% Class IV of the full flow (according to VDI/VDE 2174)

## FUNCTION

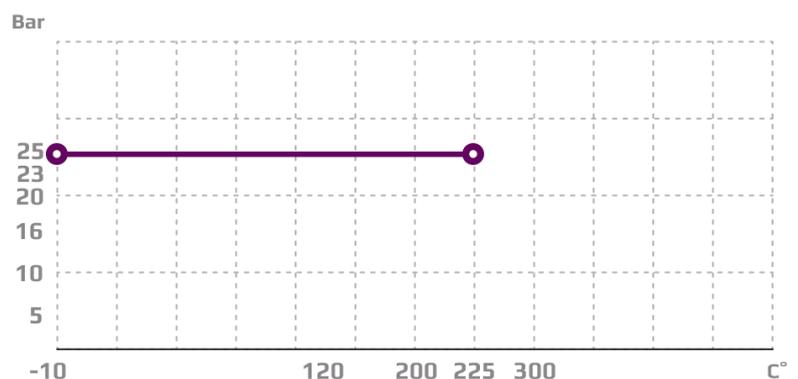
With pressure on the spindle the valve will close. Because of the balanced plug, the closing force is pressure independent. In connection with our pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator or positioner. The equal percentage characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Easy maintenance
- Hand wheel for manual override

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

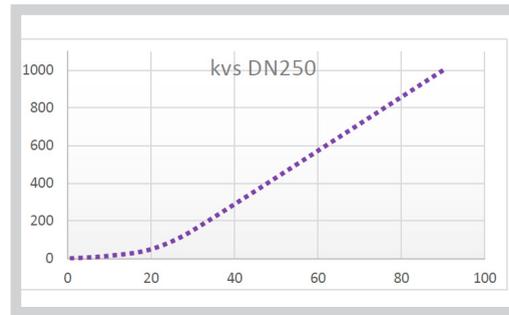
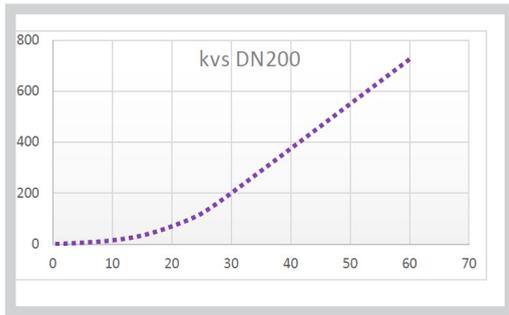


Subject to change without notice.

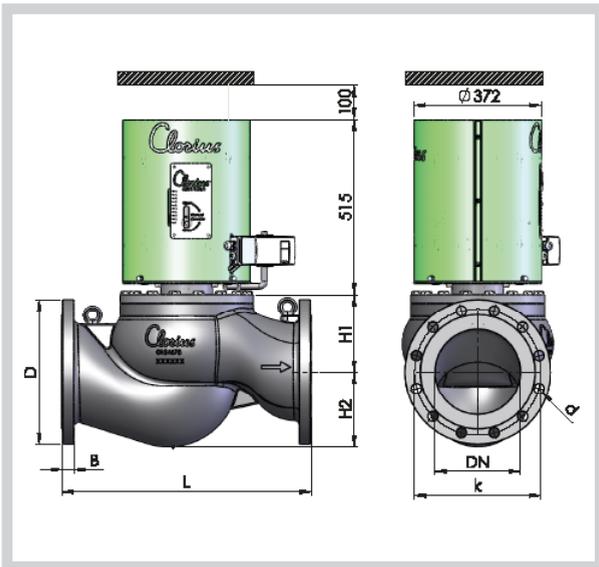
**MOUNTING**

The valve can be installed with vertical as well as horizontal spindles.

**CHARACTERISTICS**



**DIMENSION SKETCH**



| Type    | L (mm) | H1 (mm) | H2 (mm) | D (dia.) (mm) | b (mm) | k (dia.) (mm) | d mm dia. (number) |
|---------|--------|---------|---------|---------------|--------|---------------|--------------------|
| 200 G1F | 600    | 238     | 180     | 360           | 32     | 310           | 12xø26             |
| 250 G1F | 730    | 227     | 220     | 425           | 35     | 370           | 12xø30             |

**SPECIFICATIONS**

| Type    | Flange connection DN in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|---------|----------------------------|------------|-------------------------|-------------------|-----------|
| 200 G1F | DIN1092 PN25               | 200        | 725                     | 80                | 220*      |
| 250 G1F | DIN1092 PN25               | 250        | 1000                    | 95                | 258*      |

\*including actuator

# 2-way Control Valve type G1FBE

Nodular cast iron, Single seat balanced, PN 25, DN 200 - 300 mm, Flanged ends

0-2.5.04.02-A

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                       |                               |
|-----------------------|-------------------------------|
| - Valve body          | Nodular cast iron             |
|                       | EN-GJS-400-15                 |
| - Spring              | 1.4568                        |
| - Cone                | 1.4408, 1.4305                |
| - Gasket              | TFM and PVMQ                  |
| - Bolts, Nuts         | 4 CrMo 4/A4                   |
| Nominal pressure      | PN 25                         |
| Seating               | Single seated balanced        |
| Flow characteristic   | Equal percentage              |
| Leakage rate          | $\leq 0.01\%$ of Kvs Class IV |
| Regulating capability | Kvs/Kvr $> 25$                |

### Flanges drilled according to

EN 1092-2 PN 25  
(ANSI)  
(JIS)

### Counter flanges

DIN2634

### Adjustable seat interspace

## APPLICATIONS

Control valves type G1FBE are designed for regulating steam and hot water systems. The valves are used in conjunction with our temperature or pressure regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seat and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The leakage rate is 0.01% Class IV of the full flow (according to VDI/VDE 2174)

## FUNCTION

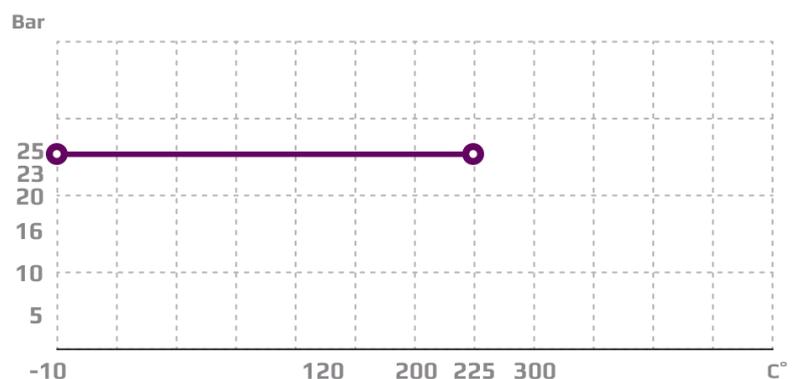
With pressure on the spindle the valve will close. Because of the balanced plug, the closing force is pressure independent. In connection with our pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator or positioner. The equal percentage characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Easy maintenance
- Hand wheel for manual override

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

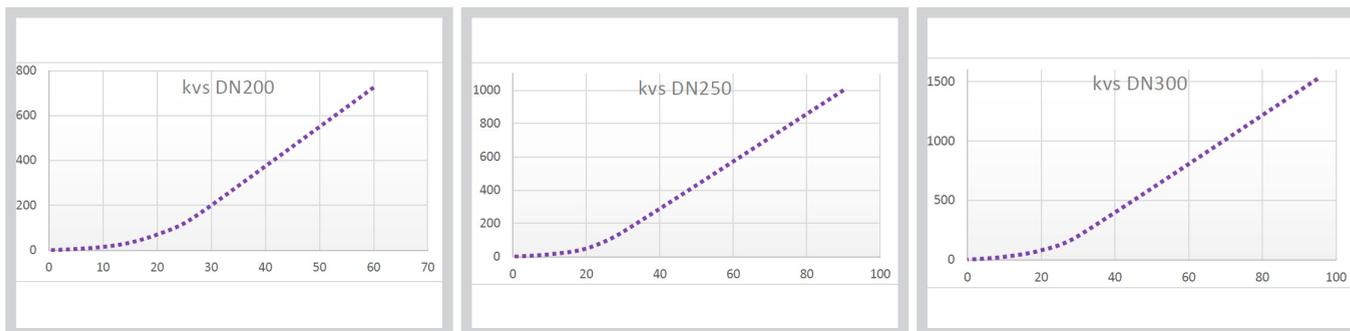


Subject to change without notice.

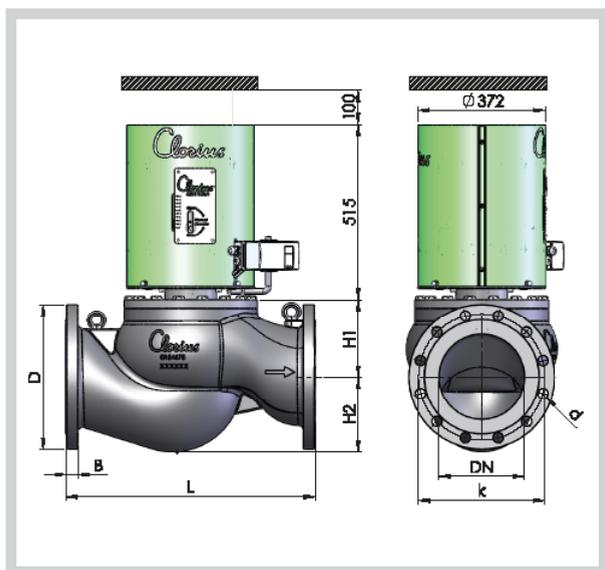
## MOUNTING

The valve can be installed with vertical as well as horizontal spindles.

## CHARACTERISTICS



## DIMENSION SKETCH



| Type    | L (mm) | H1 (mm) | H2 (mm) | D (dia.) (mm) | b (mm) | k (dia.) (mm) | d mm dia. (number)   |
|---------|--------|---------|---------|---------------|--------|---------------|----------------------|
| 200 G1F | 600    | 238     | 180     | 360           | 32     | 310           | 12x $\varnothing 26$ |
| 250 G1F | 730    | 227     | 220     | 425           | 35     | 370           | 12x $\varnothing 30$ |
| 300 G1F | 850    | 301     | 250     | 485           | 38     | 430           | 16x $\varnothing 30$ |

## SPECIFICATIONS

| Type    | Flange connection DN in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|---------|----------------------------|------------|-------------------------|-------------------|-----------|
| 200 G1F | DIN1092 PN25               | 200        | 725                     | 80                | 220*      |
| 250 G1F | DIN1092 PN25               | 250        | 1000                    | 95                | 258*      |
| 300 G1F | DIN1092 PN25               | 300        | 1500                    | 95                | 370*      |

\*including actuator



# 2-way Control Valve type G2F

Nodular cast iron, 2 seats, PN 25, DN 20 – 80 mm, Flanged ends

0-2.5.04-F

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## TECHNICAL DATA

### Materials:

|                       |                                    |
|-----------------------|------------------------------------|
| - Valve body          | Nodular cast iron<br>EN-GJS-400-15 |
| - Spring              | 1.4568                             |
| - Cone                | 1.4408, 1.4305                     |
| - Gasket              | Stainless steel foil and graphite  |
| - Upper seat          | AISI 303                           |
| - Lower seat          | 1.4301, 1.4305, 1.4307             |
| - Bolts, nuts         | 24 CrMo 4/A4                       |
| Nominal pressure      | PN 25                              |
| Seating               | Double seated                      |
| Flow characteristic   | Quadratic                          |
| Leakage rate          | $\leq 0.5\%$ of Kvs                |
| Regulating capability | Kvs/Kvr > 25                       |

|                              |                 |
|------------------------------|-----------------|
| Flanges drilled according to | EN 1092-2 PN 25 |
| Counter flanges              | DIN 2634        |
| Adjustable seat interspace   |                 |

## APPLICATIONS

Control valves type G2F are designed for regulating hot water, steam and hot oil systems. The double-seated valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a single-seated valve. The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



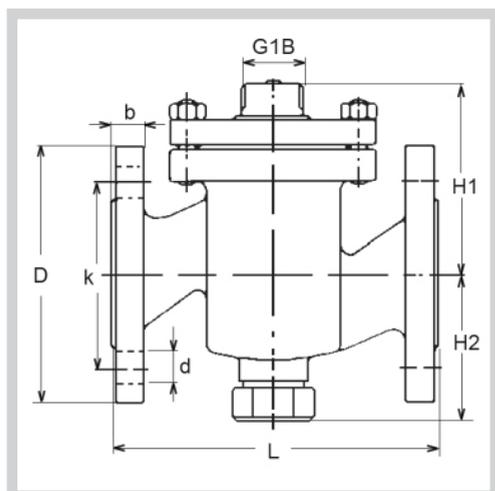
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).



## DIMENSION SKETCH



| Type   | L mm | H1 mm | H2 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|--------|------|-------|-------|-------------|------|-------------|--------------------|
| 20 G2F | 150  | 85    | 70    | 105         | 16   | 75          | 14x(4)             |
| 25 G2F | 160  | 95    | 77    | 115         | 16   | 85          | 14x(4)             |
| 32 G2F | 180  | 105   | 82    | 140         | 18   | 100         | 19x(4)             |
| 40 G2F | 200  | 110   | 92    | 150         | 19   | 110         | 19x(4)             |
| 50 G2F | 230  | 125   | 102   | 165         | 19   | 125         | 19x(4)             |
| 65 G2F | 290  | 135   | 120   | 185         | 19   | 145         | 19x(4)             |
| 80 G2F | 310  | 145   | 130   | 200         | 19   | 160         | 19x(8)             |

## SPECIFICATIONS

| Type   | Flange connection DN in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|--------|----------------------------|------------|-------------------------|-------------------|-----------|
| 20 G2F | 20                         | 20         | 5                       | 6.5               | 5         |
| 25 G2F | 25                         | 25         | 7.5                     | 7                 | 6.5       |
| 32 G2F | 32                         | 32         | 12.5                    | 8                 | 9         |
| 40 G2F | 40                         | 40         | 20                      | 9                 | 11        |
| 50 G2F | 50                         | 50         | 30                      | 10                | 16        |
| 65 G2F | 65                         | 65         | 50                      | 11                | 21        |
| 80 G2F | 80                         | 80         | 80                      | 13                | 38        |

# 2-way Control Valve type G2F

Nodular cast iron, PN 16, DN 100 – 150 mm

0-2.5.05-D

Page 1 of 2



## TECHNICAL DATA

### Materials:

|               |                                    |
|---------------|------------------------------------|
| - Valve body  | Nodular cast iron<br>EN-GJS-400-15 |
| - Components  | Stainless steel                    |
| - Nuts, bolts | 24 CrMo 5/A4                       |
| - Gasket      | Stainless steel foil<br>- Copper   |

### Nominal pressure

PN 16

### Seating

Double seated

### Flow characteristic

Almost quadratic

### Function

Closing with pressure  
on spindle

### Leakage rate

$\leq 0.5\%$  of Kvs

### Regulating capability

Kvs/Kvr > 25

### Flanges drilled

EN 1092-2

### according to

DIN 2633

### Counter flanges

Subject to change without notice.

## APPLICATIONS

Control valves type G2F are designed for use in regulating high pressure hot water, steam and heat transfer oil. The valves are used in conjunction with temperature or pressure differential regulators for controlling district or central heating plants, industrial processes or marine installations.

## DESIGN

The valve components – spindle, seats and cone – are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close. In connection with our thermostats, pneumatic or electric actuators, the valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. Alternatively a reverse acting valve can be used with our self-acting thermostats. The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

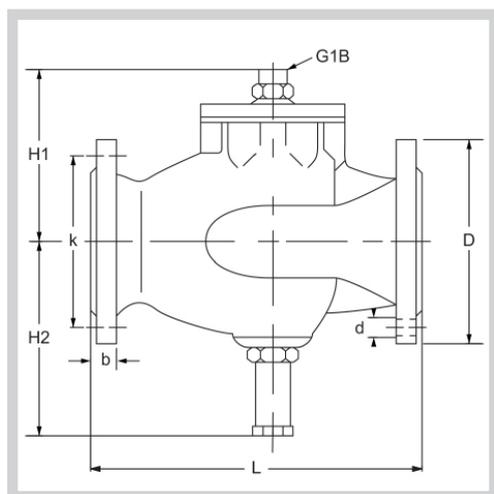




### MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).

### DIMENSION SKETCH



| Type    | L mm | H1 mm | H2 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|---------|------|-------|-------|-------------|------|-------------|--------------------|
| 100 G2F | 350  | 185   | 209   | 220         | 19   | 180         | 19x(8)             |
| 125 G2F | 400  | 205   | 224   | 250         | 19   | 210         | 19x(8)             |
| 150 G2F | 400  | 240   | 244   | 285         | 19   | 240         | 23x(8)             |

### SPECIFICATIONS

| Type    | Flange connection DN in mm | Opening mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|---------|----------------------------|------------|-------------------------|-------------------|-----------|
| 100 G2F | 100                        | 100        | 125                     | 20                | 32        |
| 125 G2F | 125                        | 125        | 215                     | 20                | 50        |
| 150 G2F | 150                        | 150        | 310                     | 20                | 70        |

# 2-way Control Valve type G2FM-T

Nodular cast iron PN 25, DN 65-125 mm / PN 16, DN 150 – 300 / PN 10, DN 350 – 600 mm

0-2.5.05.01-E

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## APPLICATIONS

Control valve type G2FM-T is a two-way control valve with blocked port making a two-way control valve. The slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil quantities. The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 or ANSI Class 150.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one extreme position by turning the spindle, connection A-AB is kept fully open. In the other extreme position connection the valve is fully closed. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## TECHNICAL DATA

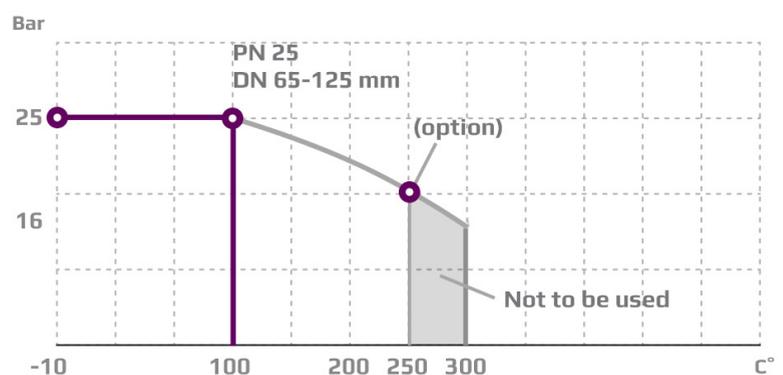
|  |  |
|--|--|
| <b>Materials:</b>  |  |
| - Valve body, slide  | Nodular cast iron<br>EN-GJS-400-15   |
| - O-ring   | NBR 70A  |
| - Nuts, bolts  | 24 CrMo 5/A4   |
| - U-ring   | PTFE   |
| <b>Nominal pressure</b>  |  |
| - DN 65-125  | PN 25,<br>max. 100°C (option 250°C)  |
| - DN 150-300   | PN 16,<br>max. 100°C (option 250°C)  |
| - DN 350-600   | PN 10,<br>max. 100°C (option 250°C)  |
| <b>Flow characteristic</b>   | Almost linear  |
| <b>Leakage rate</b>  | Max. 0.5%  |
| <b>Regulating capability</b>   | Kvs/Kvr > 25   |
| <b>Flanges</b>   |  |
|  | EN 1092-2<br>PN 10/16/25   |
| <b>Counter flanges (suggested)</b>   |  |
|  | ANSI Class 150<br>DIN 2632 – PN 10<br>DIN 2633 – PN 16<br>DIN 2634 – PN 25 |
| <b>Max. pressure <math>\Delta p_L</math>, against which the control can close:</b> |  |
| - DN 65-125  | 25 bar   |
| - DN 150-300   | 16 bar   |
| - DN 350-600   | 10 bar   |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Low leakage rate secures energy savings and avoids overheating.

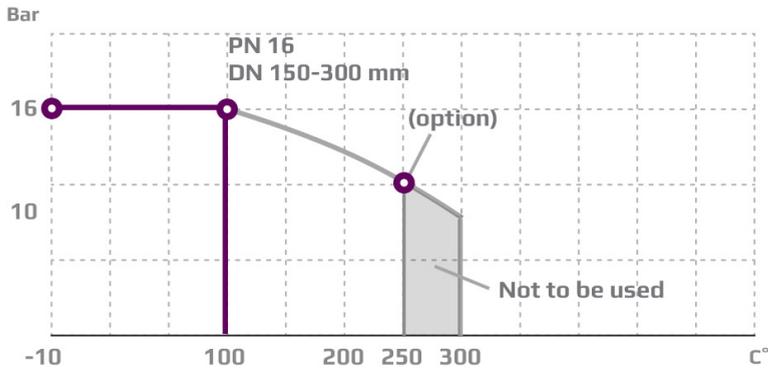
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

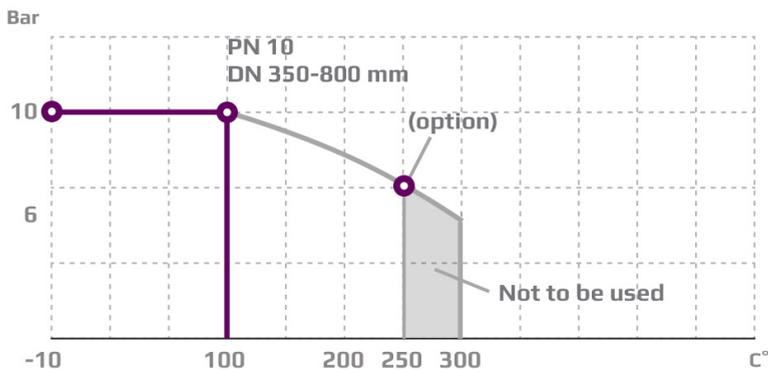


**PRESSURE/TEMPERATURE DIAGRAM**

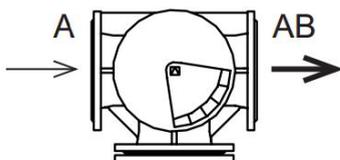
According to DIN 2401



\* DN125 available on request in PN16



**PORT NUMBERING**



**MOUNTING**

The valve connections are marked A and AB. Check slide position before installation of the valve. The slide position is marked on the top of the shaft. The valve can be installed with vertical as well as horizontal spindles. The valve must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

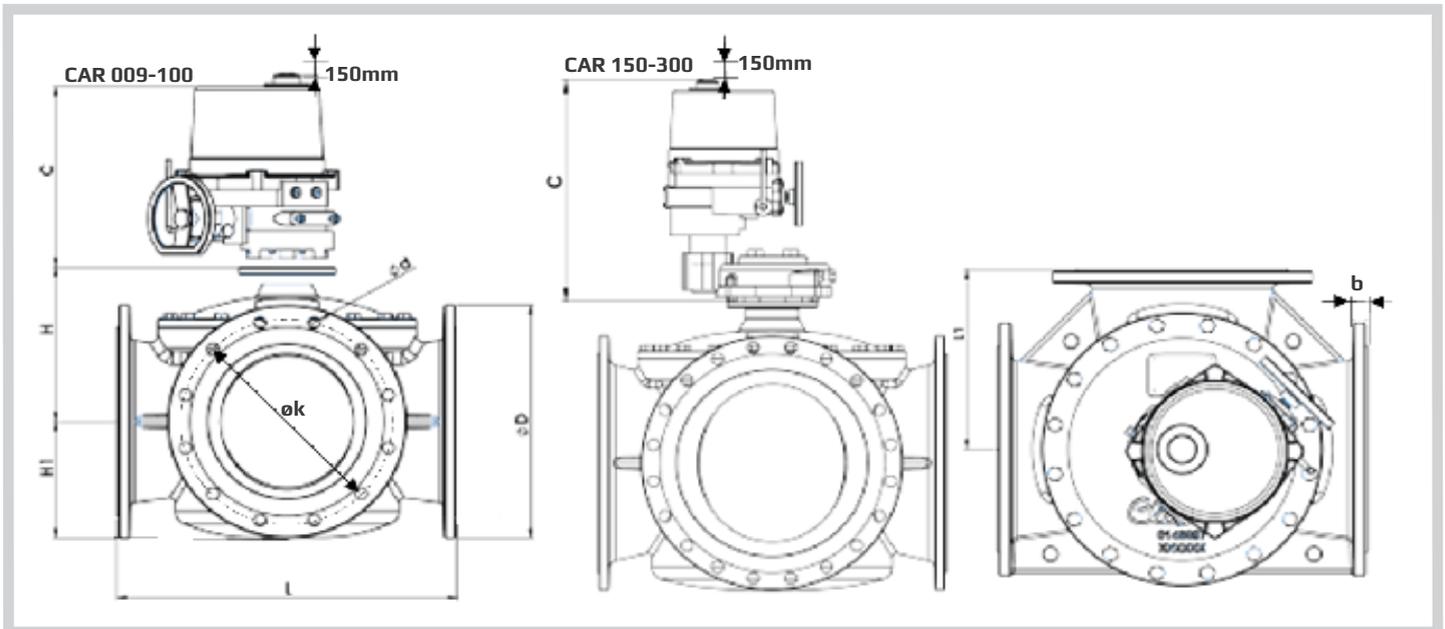
# 2-way Control Valve type G2FM-T

Nodular cast iron PN 25, DN 65-125 mm / PN 16, DN 150 – 300 / PN 10, DN 350 – 600 mm

0-2.5.05.01-E

Page 3 of 4

## DIMENSION SKETCH



| Type        | L<br>(mm) | L1<br>(mm) | H<br>(mm) | H1<br>(mm) | b<br>(mm) | C<br>(mm) | EN 1092-2           |                  |                            | ANSI Class 150      |                  |                          | JIS B 2210 5K       |                  |                          | JIS B 2210 10K      |                  |                          |
|-------------|-----------|------------|-----------|------------|-----------|-----------|---------------------|------------------|----------------------------|---------------------|------------------|--------------------------|---------------------|------------------|--------------------------|---------------------|------------------|--------------------------|
|             |           |            |           |            |           |           | D<br>(dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number)   | D<br>(dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) | D<br>(dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) | D<br>(dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) |
| 65 G3FM-TR  | 292       | 146        | 135       | 92         | 19        | 273       | 185                 | 145              | 19x(8)                     | 180                 | 140              | 19x(4)                   | 155                 | 130              | 15x(4)                   | 175                 | 140              | 19x(4)                   |
| 80 G3FM-TR  | 292       | 146        | 140       | 94         | 20        | 273       | 200                 | 160              | 19x(8)                     | 190                 | 152              | 19x(4)                   | 180                 | 145              | 19x(4)                   | 185                 | 150              | 19x(8)                   |
| 100 G3FM-TR | 350       | 175        | 158       | 112        | 17        | 273       | 235                 | 190              | 23x(8)                     | 230                 | 190.9            | 19x(8)                   | 200                 | 165              | 19x(8)                   | 210                 | 175              | 19x(8)                   |
| 125 G3FM-TR | 400       | 200        | 179       | 123        | 19        | 273       | 270                 | 220              | 28x(8)                     | 255                 | 216              | 22x(8)                   | 235                 | 200              | 19x(8)                   | 250                 | 210              | 23x(8)                   |
| 150 G3FM-TR | 437       | 218.5      | 196       | 139        | 19        | 276       | 285                 | 240              | 23x(8)                     | 280                 | 241              | 22x(8)                   | 265                 | 230              | 19x(8)                   | 280                 | 240              | 23x(8)                   |
| 200 G3FM-TR | 530       | 265        | 232       | 169        | 20        | 361       | 340                 | 295              | 23x(12)                    | 343                 | 299              | 23x(8)                   | 320                 | 280              | 23x(8)                   | 320                 | 290              | 23x(12)                  |
| 250 G3FM-TR | 592       | 296        | 272       | 199        | 22        | 361       | 400                 | 355              | 28x(12)                    | 407                 | 362              | 26x(12)                  | 385                 | 345              | 23x(12)                  | 400                 | 355              | 25x(12)                  |
| 300 G3FM-TR | 649       | 324.5      | 302       | 227        | 25        | 361       | 455                 | 410              | 28x(12)                    | 483                 | 432              | 26x(12)                  | 430                 | 390              | 23x(12)                  | 445                 | 400              | 25x(16)                  |
| 350 G3FM-TR | 717       | 358.5      | 334.5     | 251.5      | 25        | 361       | 505                 | 460              | 23x(16)                    | 534                 | 477              | 29x(12)                  | 480                 | 435              | 25x(12)                  | 490                 | 445              | 25x(16)                  |
| 400 G3FM-TR | 770       | 385        | 370       | 282        | 25        | 361       | 565                 | 515              | 28x(16)                    | 597                 | 540              | 29x(16)                  | 540                 | 495              | 25x(16)                  | 560                 | 510              | 27x(16)                  |
| 450 G3FM-TR | 820       | 410        | 391       | 307        | 26        | 556       | 615                 | 565              | 28x(20)                    | 635                 | 578              | 32x(16)                  | 605                 | 555              | 25x(16)                  | 620                 | 565              | 27x(20)                  |
| 500 G3FM-TR | 900       | 450        | 421       | 335        | 27        | 556       | 670                 | 620              | 28x(20)                    | 699                 | 635              | 32x(20)                  | 655                 | 605              | 25x(20)                  | 675                 | 620              | 27x(20)                  |
| 550 G3FM-TR | 900       | 450        | 421       | 335        | 27        | 556       | -                   | -                | -                          | -                   | -                | -                        | 720                 | 665              | 27x(20)                  | 745                 | 680              | 33x(20)                  |
| 600 G3FM-TR | 918       | 459        | 470       | 354        | 31        | 556       | 780                 | 725              | 31x(20)                    | 813                 | 750              | 35x(20)                  | 770                 | 715              | 25x(20)                  | 795                 | 730              | 33x(24)                  |
| 650 G3FM-TR | 1050      | 525        | 534       | 426        | 37        | 556       | -                   | -                | -                          | -                   | -                | -                        | 825                 | 770              | 27x(24)                  | 845                 | 780              | 33x(24)                  |
| 800 G3FM-TR | 1230      | 615        | 596       | 461        | 53        | 556       | 1085                | 990              | 34x(24)<br>50x(24)<br>PN25 | -                   | -                | -                        | 995                 | 930              | 33x(24)                  | 1020                | 950              | 33x(28)                  |

## SPECIFICATIONS

| Type       | Flange connection<br>DN in mm | $k_{vs}$ -value<br>$m^3/h$ | Torque<br>Nm<br>For inlet P* | Weight<br>kg |
|------------|-------------------------------|----------------------------|------------------------------|--------------|
| 60 G2FM-T  | 65                            | 120                        | 60                           | 37           |
| 80 G2FM-T  | 80                            | 154                        | 65                           | 41           |
| 100 G2FM-T | 100                           | 220                        | 120                          | 56           |
| 125 G2FM-T | 125                           | 330                        | 200                          | 73           |
| 150 G2FM-T | 150                           | 425                        | 200                          | 84           |
| 200 G2FM-T | 200                           | 1100                       | 330                          | 153          |
| 250 G2FM-T | 250                           | 2100                       | 525                          | 215          |
| 300 G2FM-T | 300                           | 2650                       | 730                          | 277          |
| 350 G2FM-T | 350                           | 3380                       | 980                          | 340          |
| 400 G2FM-T | 400                           | 3950                       | 1370                         | 459          |
| 450 G2FM-T | 450                           | 4480                       | 1550                         | 579          |
| 500 G2FM-T | 500                           | 5250                       | 1920                         | 744          |
| 550 G2FM-T | 550                           | 5250                       | 1920                         | 1090         |
| 600 G2FM-T | 600                           | 6050                       | 2950                         | 950          |
| 800 G2FM-T | 800                           | 8000                       | 4000                         | 2100         |

\*Torque calculated at max inlet P for:

DN 65 - 125 = 25 Bar

DN 150-300 = 16 Bar

DN 350-800 = 10 Bar



# 2-way Control Valve type G2FA

Nodular cast iron, PN 16, DN 200 mm / PN 10, DN 300/250 – 300 mm

0-2.5.05.03-A

Page 1 of 2



## APPLICATIONS

Regulating valve type G2FA is designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with large industrial processes, district heating and marine installations. G2FA is used in conjunction with Clorius valve motor type AVM/AVF 234 or Clorius pneumatic actuators.

## DESIGN

The valve components (seats and cone) are made of alu bronze, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2.

## FUNCTION

The valve cone is firmly connected with the motor spindle. The valves will close at rising temperatures. For cooling circuits the valve can be used in conjunction with a reverse acting electric actuator. The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.

## TECHNICAL DATA

### Materials:

|                 |                                   |
|-----------------|-----------------------------------|
| - Valve body    | Cast iron EN-GJS-400-15           |
| - Trim          | Alu Bronze<br>CuAL10Fe5Ni5        |
| - Valve spindle | Stainless steel<br>(W.no. 1.4436) |
| - O-ring        | AFLAS A75H                        |
| - Gasket        | Reinz-AFM34                       |

### Nominal pressure

|                    |                           |
|--------------------|---------------------------|
| - 200 G2FA         | PN 16<br>(max. 120/160°C) |
| - 300/250-300 G2FA | PN 10<br>(max. 120/160°C) |

|                       |               |
|-----------------------|---------------|
| Seating               | Double seated |
| Leakage rate          | ≤ 0.5%        |
| Regulating capability | Kvs/Kvr > 25  |

|                      |                            |
|----------------------|----------------------------|
| Flow characteristic  | Almost linear              |
| Flanges according to | EN 1092-2<br>PN 16 & PN 10 |

**Note!** 300/250 G2FA has outer measures and flanges drilled as a 300 G2FA

### Counter flanges:

|                    |                  |
|--------------------|------------------|
| - 200 G2FA         | DIN 2633 - PN 16 |
| - 300/250-300 G2FA | DIN 2632 - PN 10 |

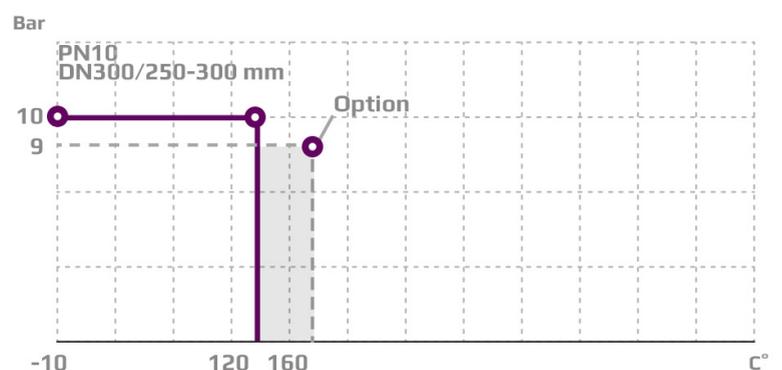
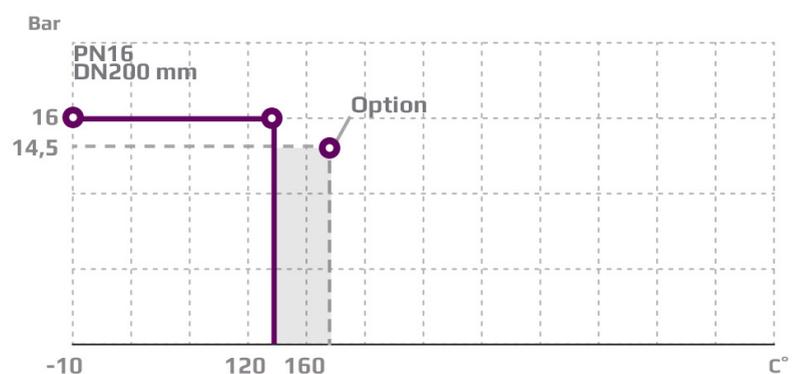
Subject to change without notice.

## FEATURES

- Simple design secures reliable controls and reduces costly downtime
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

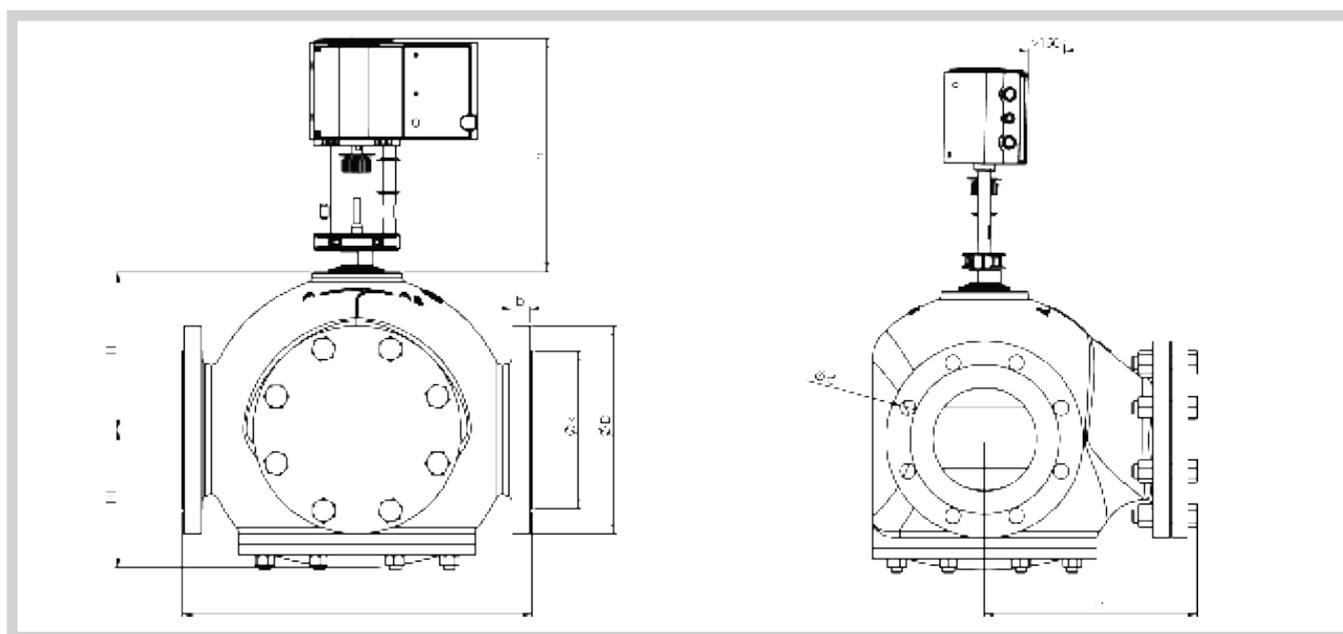
According to DIN 2401



## MOUNTING

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AFM 234 or AVF234 motor. See drawing.

## DIMENSION SKETCH



| Type                       | L<br>mm | L1<br>mm | H<br>mm | H1<br>mm | b<br>mm | D (dia.)<br>mm | k (dia.)<br>mm | d mm dia.<br>(number) |
|----------------------------|---------|----------|---------|----------|---------|----------------|----------------|-----------------------|
| 200 G2FA                   | 600     | 380      | 238     | 238      | 26      | 340            | 295            | 22x(8)                |
| 300/250 G2FA <sup>1)</sup> | 850     | 510      | 305     | 305      | 28      | 445            | 400            | 23x(12)               |
| 300 G2FA                   | 850     | 510      | 305     | 305      | 28      | 445            | 400            | 23x(12)               |

1) Valve type 300/250 G2FA has outer measures and flanges drilled as type 300 G2FA.

## SPECIFICATIONS

| Type                       | Flange connection<br>DN in mm | Opening<br>mm | $k_{vs}$ -value<br>m <sup>3</sup> /h | Lifting height<br>mm | Weight<br>kg |
|----------------------------|-------------------------------|---------------|--------------------------------------|----------------------|--------------|
| 200 G2FA                   | 200                           | 200           | 555                                  | 28                   | 160          |
| 300/250 G2FA <sup>1)</sup> | 300                           | 300           | 865                                  | 28                   | 311          |
| 300 G2FA                   | 300                           | 300           | 1250                                 | 45                   | 300          |

1) Valve type 300/250 G2FA has outer measures and flanges drilled as type 300 G2FA.

# 2-way Control Valve type G2FR

Nodular cast iron, PN 25, DN 20 – 80 mm, Reverse acting

0-2.5.06-F

Page 1 of 2



## TECHNICAL DATA

|                              |  |
|------------------------------|--|
| <b>Materials:</b>            |  |
| - Valve body                 | Nodular cast iron<br>EN-GJS-400-15             |
| - Trim                       | Stainless steel                                |
| - Nuts, bolts                | 24 CrMo 5/A4                                   |
| - Gasket                     | Graphite with stainless steel foil<br>- Copper |
| <b>Nominal pressure</b>      | PN 25  |
| <b>Seating</b>               | Double seated                                  |
| <b>Flow characteristic</b>   | Quadratic                                      |
| <b>Function</b>              | Opens by pressing the spindle                  |
| <b>Leakage rate</b>          | $\leq 0.5\%$ of Kvs                            |
| <b>Regulating capability</b> | Kvs/Kvr > 25                                   |
| <b>Flanges</b>               | EN 1092-2<br>PN 25                             |
| <b>Counter flanges:</b>      | DIN 2634                                       |

Reverse acting (normally closed)  
For cooling systems or similar  
Adjustable seats

## APPLICATIONS

Valves type G2FR are mainly intended for control of cooling systems. The valves are used in conjunction with temperature or pressure differential regulators. As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure,  $\Delta p_L$ , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force. On the next page please find the max. allowable values of  $\Delta p_L$  as well as the max. allowable inlet pressures for opening the valves,  $p_{1max}$ , for various actuator forces.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves are double-seated. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

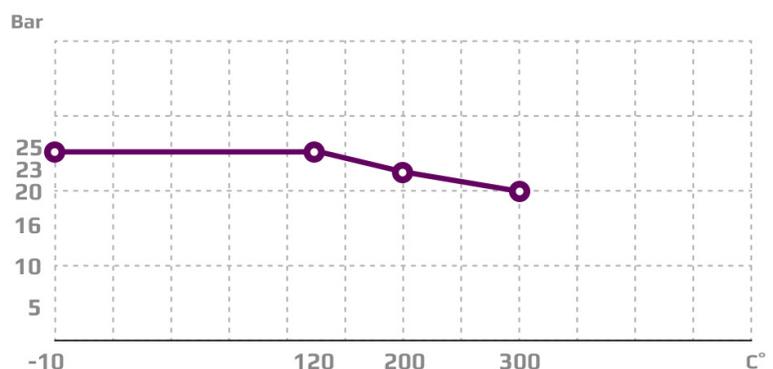
Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens. In connection with our actuators, the valves act as "cooling" valves, i.e. they open at rising temperatures. The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



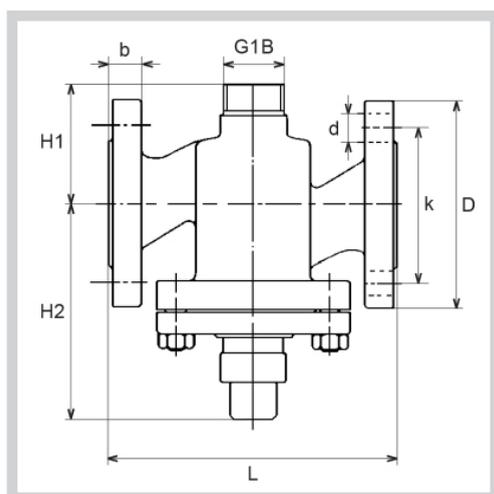
Subject to change without notice.

## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data-sheets for the electric actuators).



## DIMENSION SKETCH



| Type    | L mm | H1 mm | H2 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|---------|------|-------|-------|-------------|------|-------------|--------------------|
| 20 G2FR | 150  | 63    | 112   | 105         | 16   | 75          | 14x(4)             |
| 25 G2FR | 160  | 70    | 117   | 115         | 16   | 85          | 14x(4)             |
| 32 G2FR | 180  | 75    | 151   | 140         | 18   | 100         | 19x(4)             |
| 40 G2FR | 200  | 85    | 155   | 150         | 19   | 110         | 19x(4)             |
| 50 G2FR | 230  | 95    | 169   | 165         | 19   | 125         | 19x(4)             |
| 65 G2FR | 290  | 110   | 180   | 185         | 19   | 145         | 19x(4)             |
| 80 G2FR | 310  | 120   | 180   | 200         | 19   | 160         | 19x(8)             |

## SPECIFICATIONS

| Type    | Flange connection Dn in mm | Opening mm | $k_{vs}$ -value m <sup>3</sup> /h | Lifting height mm | Max. $\Delta p_L$ bar | Actuat. force N | Corresp. $p_{1max}$ bar | Weight kg |
|---------|----------------------------|------------|-----------------------------------|-------------------|-----------------------|-----------------|-------------------------|-----------|
| 20 G2FR | 20                         | 20         | 5                                 | 6.5               | 8.3                   | 200<br>400      | 9.4<br>25               | 5         |
| 25 G2FR | 25                         | 25         | 7.5                               | 7                 | 8                     | 200<br>400      | 8.8<br>25               | 6.5       |
| 32 G2FR | 32                         | 32         | 12.5                              | 8                 | 7                     | 400             | 27                      | 9         |
| 40 G2FR | 40                         | 40         | 20                                | 9                 | 6.6                   | 400             | 26                      | 11        |
| 50 G2FR | 50                         | 50         | 30                                | 10                | 5.8                   | 400             | 15                      | 16        |
| 65 G2FR | 65                         | 65         | 50                                | 11                | 10                    | 400<br>800      | 10<br>16                | 21        |
| 80 G2FR | 80                         | 80         | 80                                | 13                | 6.7                   | 400<br>800      | 10<br>16                | 38        |

# 2-way Control Valve type G2FMT-ULL (Ultra Low Leakage)

Nodular cast iron, PN10, DN100 - 400 mm

0-2.5.30-A

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## APPLICATIONS

Control valve type G2FMT-ULL is a two way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR -H with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 - option JIS B 2210 5K/10K and ANSI class 150.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one extreme position by turning the spindle, connection A-AB is kept fully open. In the other extreme position connection the valve is fully closed. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. PTFE sealing element and O-ring are mounted in the slider groove to minimize leakage.

This section to be read together with sketches page 2 this data sheet.

## TECHNICAL DATA

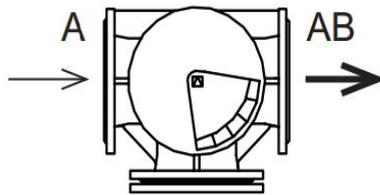
|   |                                     |
|---|-------------------------------------|
| <b>Materials:</b>   |                                     |
| - Valve body, slide   | Nodular cast iron<br>EN-GJS-400-15  |
| - Sealing element and O-ring  | Silicone/PTFE                       |
| <b>Flow characteristic</b>  | Almost linear                       |
| <b>Leakage rate</b>   | ANSI class IV/EN 1349<br>< 0.01%    |
| <b>Flanges</b>  | EN 1092-2 PN 10                     |
| - Option  | JIS B 2210 5K/10K<br>ANSI class 150 |
| <b>Max. pressure <math>\Delta p</math>, against which the valve can close</b> | 5 bar                               |
| <b>Nominal pressure</b>   | PN 10                               |
| <b>Design temperature</b>   | 120°C                               |
| <b>Optional temperature</b>   | 150°C                               |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime
- Ultra Low Leakage rate secures energy savings - Best in class
- Most compact valve on the market

Subject to change without notice.

## PORT NUMBERING

**1**

## MOUNTING

The valve connections are marked A and AB. Check slide position before installation of the valve. The slide position is marked on the top of the shaft. The valve can be installed with vertical as well as horizontal spindles. The valve must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

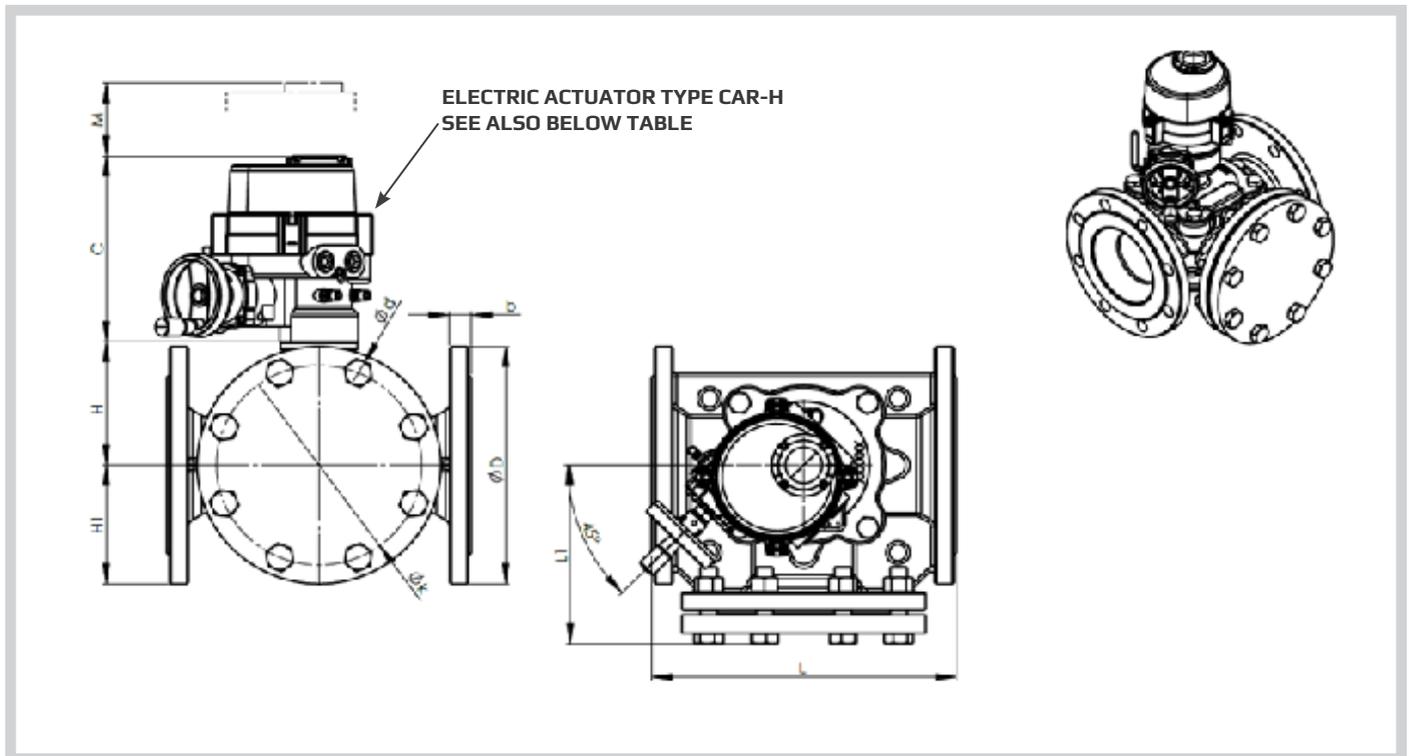
# 2-way Control Valve type G2FMT-ULL (Ultra Low Leakage)

Nodular cast iron, PN10, DN100 - 400 mm

0-2.5.30-A

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## DIMENSION SKETCH



**SPECIFICATIONS - TABLE 1** (read this together with table on page 4)

| Type                  | L<br>(mm) | L1<br>(mm) | H<br>(mm) | H1<br>(mm) | b<br>(mm) | C1<br>(mm) | M<br>(mm) | Electric Actuator<br>Type CAR-H |
|-----------------------|-----------|------------|-----------|------------|-----------|------------|-----------|---------------------------------|
| 100 G2FMT-ULL (*HF)   | 296       | 180        | 140       | ØD/2       | 24        | 223        | 110       | CAR-H 006/010                   |
| 125 G2FMT-ULL         | 330       | 199        | 140       | ØD/2       | 24        | 223        | 110       | CAR-H 006/010                   |
| 125 G2FMT-ULL (JIS5K) | 320       | 194        | 140       | ØD/2       | 19        | 223        | 110       | CAR-H 006/010                   |
| 150 G2FMT-ULL         | 356       | 214,5      | 149       | ØD/2       | 25,4      | 223        | 110       | CAR-H 006/010                   |
| 200 G2FMT-ULL         | 410       | 243,5      | 182       | ØD/2       | 28,4      | 261        | 150       | CAR-H 016                       |
| 200 G2FMT-ULL (**L)   | 484       | 280,5      | 182       | ØD/2       | 28,4      | 261        | 150       | CAR-H -016                      |
| 250 G2FMT-ULL         | 480       | 280,5      | 202       | ØD/2       | 31        | 261        | 150       | CAR-H -016                      |
| 300 G2FMT-ULL (**RF)  | 580       | 330,5      | 202       | ØD/2       | 32        | 261        | 150       | CAR-H 016                       |
| 300 G2FMT-ULL         | 560       | 320,5      | 237       | ØD/2       | 32        | 315        | 180       | CAR-H -035                      |
| 350 G2FMT-ULL         | 660       | 370,5      | 256       | ØD/2       | 36        | 315        | 180       | CAR-H 050                       |
| 400 G2FMT-ULL         | 720       | 403        | 278       | ØD/2       | 38        | 315        | 180       | CAR-H 050                       |

\* High Flow

\*\* Long Version

\*\*\* Reduced Flow

ØD/2 - Depends on flange type (see also table 2)

Subject to change without notice.

SPECIFICATIONS - TABLE 2

| Flange connections | EN 1092-2     |               |                    | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |
|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|                    | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) |
| DN100              | 220           | 180           | 19x(8)             | 230            | 191           | 19x(8)             | 200           | 165           | 19x(8)             | 210            | 175           | 19x(8)             |
| DN125              | 250           | 210           | 19x(8)             | 255            | 216           | 22x(8)             | 235           | 200           | 19x(8)             | 250            | 210           | 23x(8)             |
| DN150              | 285           | 240           | 23x(8)             | 280            | 241           | 22x(8)             | 265           | 230           | 19x(8)             | 280            | 240           | 23x(8)             |
| DN200              | 343           | 295           | 22x(8)             | 343            | 298           | 22x(8)             | 320           | 280           | 23x(8)             | 330            | 290           | 23x(12)            |
| DN250              | 405           | 350           | 23x(12)            | 405            | 362           | 25x(12)            | 385           | 345           | 23x(12)            | 400            | 355           | 25x(12)            |
| DN300              | 455           | 400           | 23x(12)            | 483            | 432           | 25x(12)            | 430           | 390           | 23x(12)            | 445            | 400           | 25x(16)            |
| DN350              | 505           | 460           | 23x(16)            | 533            | 476           | 29x(12)            | 480           | 435           | 25x(12)            | 490            | 445           | 25x(16)            |
| DN400              | 565           | 515           | 28x(16)            | 597            | 540           | 29x(16)            | 540           | 495           | 25x(16)            | 560            | 510           | 27x(16)            |

SPECIFICATIONS - TABLE 3

| Type          | Flange connection<br>DN in mm | Kv5<br>m <sup>3</sup> /h | Torque<br>Nm<br>For inlet P* | Weight<br>kg    |
|---------------|-------------------------------|--------------------------|------------------------------|-----------------|
| DN100 (*HF)   | 100                           | 259                      | 40                           | 32              |
| DN125         | 125                           | 259                      | 40                           | 43              |
| DN125 (JIS5K) | 125                           | 259                      | 40                           | 43              |
| DN150         | 150                           | 430                      | 90                           | 53              |
| DN200 (**L)   | 200                           | 770                      | 120                          | 85              |
| DN200         | 200                           | 770                      | 120                          | 85              |
| DN250         | 250                           | 1.230                    | 150                          | 122             |
| DN300 (**RF)  | 300                           | 1.190                    | 150                          | 174             |
| DN300         | 300                           | 2.090                    | 320                          | 162             |
| DN350         | 350                           | 2.950                    | 418                          | 215 (estimated) |
| DN400         | 400                           | 3.760                    | 530                          | 269 (estimated) |

\*Torque calculated at max  $\Delta P$  for: DN100 - 300 - 5 Bar

\* High Flow

\*\* Long Version

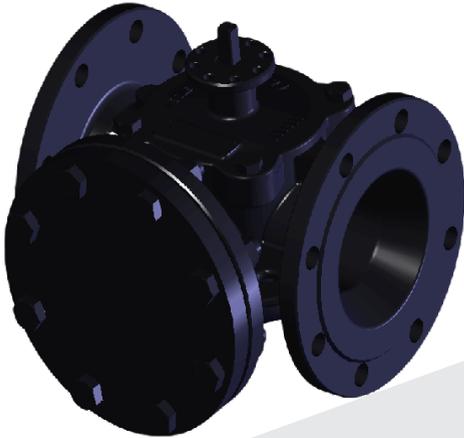
\*\*\* Reduced Flow

# 2-way Control Valve type G2FMT-SL

Nodular cast iron, PN10, DN100 - 400 mm

0-2.5.31-A

Page 1 of 4



## APPLICATIONS

Control valve type G2FMT-SL is a two way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR-H with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 - option JIS B 2210 5K/10k and ANSI class 150.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one extreme position by turning the spindle, connection A-AB is kept fully open. In the other extreme position connection the valve is fully closed. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide.

This section to be read together with sketches page 2 this data sheet.

## TECHNICAL DATA

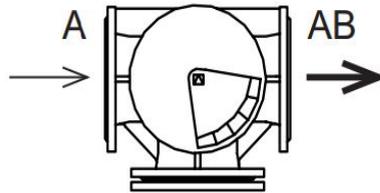
|   |                                     |
|---|-------------------------------------|
| <b>Materials:</b>   |                                     |
| - Valve body, slide   | Nodular cast iron<br>EN-GJS-400-15  |
| - Sealing element and O-ring  | Silicone/PTFE                       |
| <b>Flow characteristic</b>  | Almost linear                       |
| <b>Leakage rate</b>   | ANSI class I                        |
| <b>Flanges</b>  | EN 1092-2 PN 10                     |
| - Option  | JIS B 2210 5K/10K<br>ANSI class 150 |
| <b>Max. pressure <math>\Delta p</math>, against which the valve can close</b> | 5 bar                               |
| <b>Nominal pressure</b>   | PN 10                               |
| <b>Design temperature</b>   | 120°C                               |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime
- Most compact valve on the market

Subject to change without notice.

### PORT NUMBERING



### MOUNTING

The valve connections are marked A and AB. Check slide position before installation of the valve. The slide position is marked on the top of the shaft. The valve can be installed with vertical as well as horizontal spindles. The valve must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

**1**

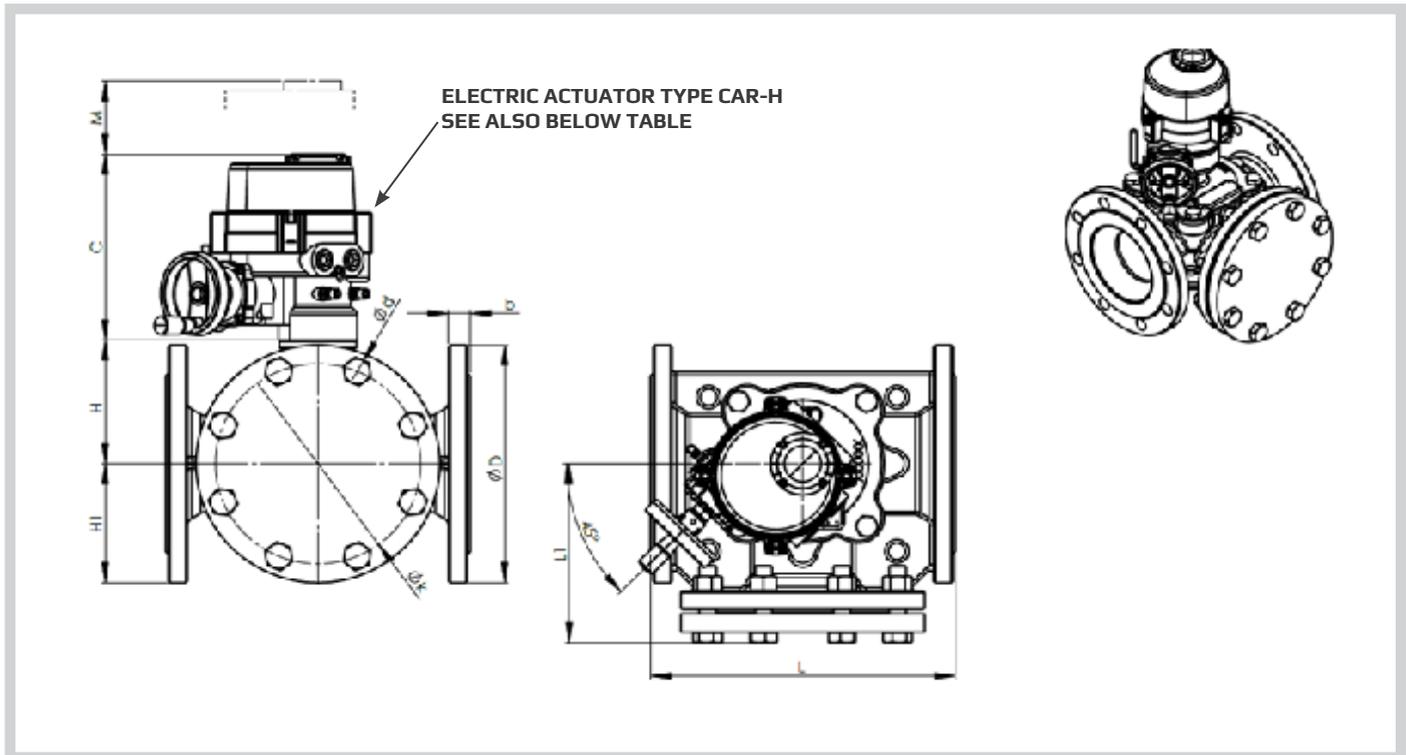
# 2-way Control Valve type G2FMT-SL

Nodular cast iron, PN10, DN80 - 400 mm

O-2.5.31-A

Page 3 of 4

## DIMENSION SKETCH



**SPECIFICATIONS - TABLE 1** (read this together with table on page 4)

| Type                 | L (mm) | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C1 (mm) | M (mm) | Electric Actuator Type CAR-H |
|----------------------|--------|---------|--------|---------|--------|---------|--------|------------------------------|
| 100 G2FMT-SL (*HF)   | 296    | 180     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006/010                |
| 125 G2FMT-SL         | 330    | 199     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006/010                |
| 125 G2FMT-SL (J155K) | 320    | 194     | 140    | ØD/2    | 19     | 223     | 110    | CAR-H 006/010                |
| 150 G2FMT-SL         | 356    | 214,5   | 149    | ØD/2    | 25,4   | 223     | 110    | CAR-H 006/010                |
| 200 G2FMT-SL         | 410    | 243,5   | 182    | ØD/2    | 28,4   | 223     | 110    | CAR-H 016                    |
| 200 G2FMT-SL (**L)   | 484    | 280,5   | 182    | ØD/2    | 28,4   | 223     | 110    | CAR-H -016                   |
| 250 G2FMT-SL         | 480    | 280,5   | 202    | ØD/2    | 31     | 223     | 110    | CAR-H -016                   |
| 300 G2FMT-SL (**RF)  | 580    | 330,5   | 202    | ØD/2    | 32     | 223     | 110    | CAR-H 016                    |
| 300 G2FMT-SL         | 560    | 320,5   | 237    | ØD/2    | 32     | 261     | 150    | CAR-H -035                   |
| 350 G2FMT-SL         | 660    | 370,5   | 256    | ØD/2    | 36     | 261     | 150    | CAR-H 050                    |
| 400 G2FMT-SL         | 720    | 403     | 278    | ØD/2    | 38     | 315     | 180    | CAR-H 050                    |

\* High Flow  
 \*\* Long Version  
 \*\*\* Reduced Flow

ØD/2 - Depends on flange type (see also table 2)

Subject to change without notice.

**SPECIFICATIONS - TABLE 2**

| Flange connections | EN 1092-2     |               |                    | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |
|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|                    | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) |
| DN100              | 220           | 180           | 19x(8)             | 230            | 191           | 19x(8)             | 200           | 165           | 19x(8)             | 210            | 175           | 19x(8)             |
| DN125              | 250           | 210           | 19x(8)             | 255            | 216           | 22x(8)             | 235           | 200           | 19x(8)             | 250            | 210           | 23x(8)             |
| DN150              | 285           | 240           | 23x(8)             | 280            | 241           | 22x(8)             | 265           | 230           | 19x(8)             | 280            | 240           | 23x(8)             |
| DN200              | 343           | 295           | 22x(8)             | 343            | 298           | 22x(8)             | 320           | 280           | 23x(8)             | 330            | 290           | 23x(12)            |
| DN250              | 405           | 350           | 23x(12)            | 405            | 362           | 25x(12)            | 385           | 345           | 23x(12)            | 400            | 355           | 25x(12)            |
| DN300              | 455           | 400           | 23x(12)            | 483            | 432           | 25x(12)            | 430           | 390           | 23x(12)            | 445            | 400           | 25x(16)            |
| DN350              | 505           | 460           | 23x(16)            | 533            | 476           | 29x(12)            | 480           | 435           | 25x(12)            | 490            | 445           | 25x(16)            |
| DN400              | 565           | 515           | 28x(16)            | 597            | 540           | 29x(16)            | 540           | 495           | 25x(16)            | 560            | 510           | 27x(16)            |

**SPECIFICATIONS - TABLE 3**

| Type           | Flange connection DN in mm | Kv5 m <sup>3</sup> /h | Torque Nm For inlet P* | Weight kg       |
|----------------|----------------------------|-----------------------|------------------------|-----------------|
| DN100 (*HF)    | 100                        | 259                   | 40                     | 32              |
| DN125          | 125                        | 259                   | 40                     | 43              |
| DN125 (JIS5K)  | 125                        | 259                   | 40                     | 43              |
| DN150          | 150                        | 430                   | 90                     | 53              |
| DN200          | 200                        | 770                   | 120                    | 85              |
| DN200 (**L)    | 200                        | 770                   | 120                    | 85              |
| DN250          | 250                        | 1.230                 | 150                    | 122             |
| DN300 (***)RF) | 300                        | 1.190                 | 150                    | 174             |
| DN300          | 300                        | 2.090                 | 320                    | 162             |
| DN350          | 350                        | 2.950                 | 418                    | 215 (estimated) |
| DN400          | 400                        | 3.760                 | 530                    | 269 (estimated) |

\*Torque calculated at max Δ P for: DN100 - 300 - 5 Bar

\* High Flow

\*\* Long Version

\*\*\* Reduced Flow

# 2-way Control Valve type G2FR

Nodular cast iron, PN 16, DN 100 – 150 mm, Reverse acting

0-2.5.07-E

Page 1 of 2



## TECHNICAL DATA

### Materials:

|               |                                    |
|---------------|------------------------------------|
| - Valve body  | Nodular cast iron<br>EN-GJS-400-15 |
| - Trim        | Stainless steel                    |
| - Bolts, nuts | 24 CrMo 4/A4                       |
| - Gasket      | Stainless steel foil<br>- Copper   |

|                       |                               |
|-----------------------|-------------------------------|
| Nominal pressure      | PN 16                         |
| Seating               | Double seated                 |
| Flow characteristic   | Almost quadratic              |
| Function              | Opens by pressing the spindle |
| Leakage rate          | $\leq 0.5\%$ of Kvs           |
| Regulating capability | Kvs/Kvr > 25                  |

|                 |                 |
|-----------------|-----------------|
| Flanges         | EN 1092-2 PN 16 |
| Counter flanges | DIN 2633        |

Reverse acting (normally closed)  
For cooling water and lubrications

Subject to change without notice.

## APPLICATIONS

Valves type G2FR are mainly intended for control of cooling systems. The valves are used in conjunction with temperature- or pressure differential regulators. As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure,  $\Delta p_L$ , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force. On the next page please find the max. allowable values of  $\Delta p_L$  as well as the max. allowable inlet pressures for opening the valves,  $p_{1max}$  for various actuator forces.

## DESIGN

The valve components; spindle, seats and cone are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228. The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION REVERSE ACTING

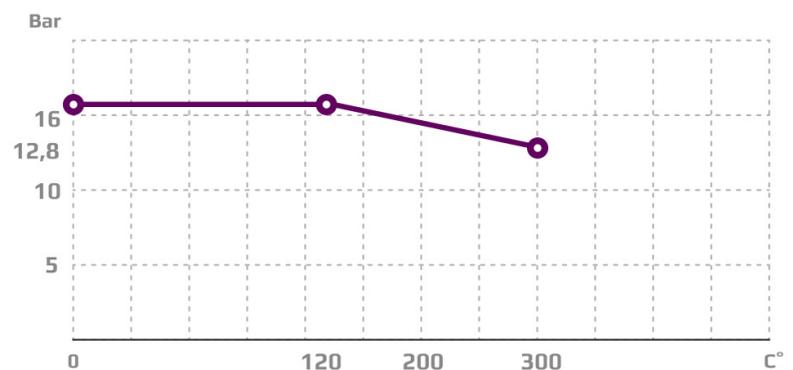
Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens. In connection with our actuators, the valves act as "cooling" valves, i.e. they open at rising temperatures. The linear characteristic will not cease until the flow has dropped below 4% of the full flow.

## FEATURES

- Simple design secures reliable controls.
- Location of the pack box in the actuator makes the valve service friendly
- Reliable and secure due to internal parts of stainless steel

## PRESSURE/TEMPERATURE DIAGRAM

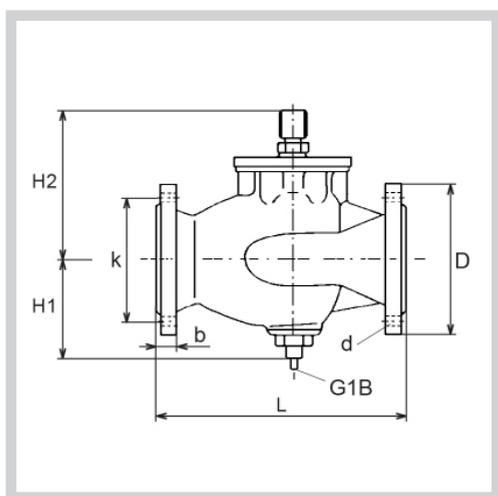
According to DIN 2401



## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data sheets for the electric actuators).

## DIMENSION SKETCH



| Type     | L mm | H1 mm | H2 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|----------|------|-------|-------|-------------|------|-------------|--------------------|
| 100 G2FR | 350  | 145   | 240   | 220         | 24   | 180         | 18x(8)             |
| 125 G2FR | 400  | 160   | 260   | 250         | 26   | 210         | 18x(8)             |
| 150 G2FR | 400  | 180   | 293   | 285         | 26   | 240         | 22x(8)             |

## SPECIFICATIONS

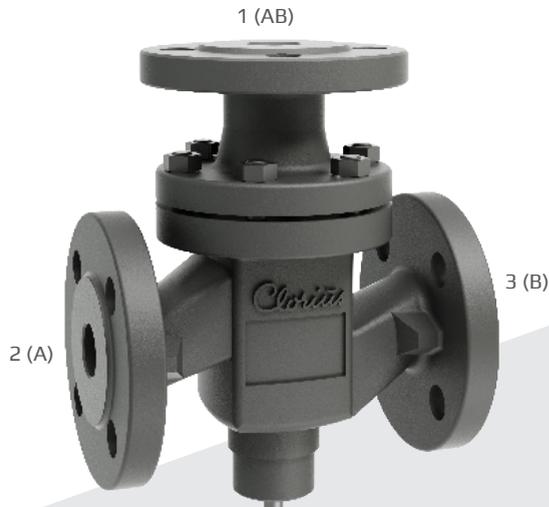
| Type     | Flange connection Dn in mm | Opening mm | k <sub>vs</sub> -value m <sup>3</sup> /h | Lifting height mm | Max. Δp <sub>L</sub> bar | Actuat. force N | Weight kg |
|----------|----------------------------|------------|--|-------------------|--------------------------|-----------------|-----------|
| 100 G2FR | 100                        | 100        | 125                                      | 20                | 12.1                     | 800             | 39        |
| 125 G2FR | 125                        | 125        | 215                                      | 20                | 9                        | 800             | 53        |
| 150 G2FR | 150                        | 150        | 310                                      | 20                | 7.5                      | 800             | 73        |

# 3-way Control Valve type G3F

Nodular cast iron, PN 25, DN 20 – 65 mm, Flanged ends

0-2.5.08-I

Page 1 of 2



## TECHNICAL DATA

### Materials:

|               |                                    |
|---------------|------------------------------------|
| - Valve body  | Nodular cast iron<br>EN-GJS-400-15 |
| - Components  | Stainless steel                    |
| - Nuts, bolts | 24 CrMo 5/A4                       |
| - Gasket      | Graphite with stainless steel foil |
| - O-ring      | 70 FPM                             |

|                  |                         |
|------------------|-------------------------|
| Nominal pressure | PN 25                   |
| Seating          | 2 balanced single seats |

|                       |                     |
|-----------------------|---------------------|
| Flow characteristic   | Quadratic/linear    |
| Leakage rate          | $\leq 0.5\%$ of Kvs |
| Regulating capability | Kvs/Kvr > 25        |

|                                |                 |
|--------------------------------|-----------------|
| Flanges - drilled according to | EN 1092-2 PN 25 |
| Counter flanges                | DIN 2634        |

Same Kvs-value as mixing and diverting valve

Subject to change without notice.

## APPLICATIONS

Control valves type G3F are designed for hot water and hot oil systems and can be installed in pipe systems as mixing or diverting valves. The valves are used in conjunction with our temperature regulators for controlling industrial processes, district or central heating plants or marine installations.

## DESIGN

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves have two balanced single seats and are designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

## FUNCTION

Without an actuator being installed, connection A-AB is fully open and connection B-AB completely closed, by means of a spring. By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection B-AB is fully open and connection A-AB completely closed.

The valve characteristics are as follows:

**Port A-AB and AB-A: quadratic**

**Port B-AB and AB-B: almost linear**

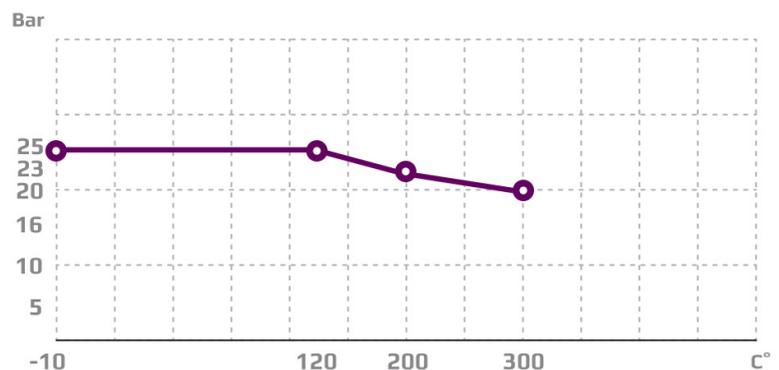
These characteristics ensure constant total flow under almost all pressure conditions and optimum circulation in the individual circuits.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

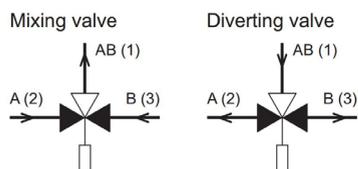
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## PORT NUMBERING

Valves type G3F are marked with the internationally recognized port designations: A, B, AB.



Port AB  
Port A  
Port B

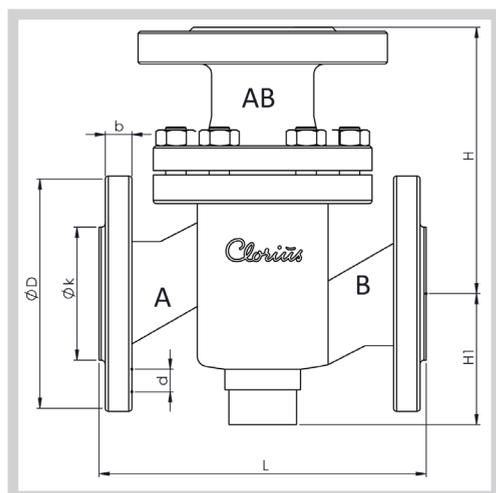
common port always open  
closes by activating the spindle  
opens by activating the spindle



## MOUNTING

The valve can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170 °C, the thermostat/ actuator can be fitted below or above the valve. For valve mounted with thermostats in media temperatures above 170 °C, a cooling unit has to be applied with connection downwards (please refer to data sheet for thermostat accessories). For electric actuators a high temperature adaptor must be used (please refer to data-sheets for the electric actuators).

## DIMENSION SKETCH



| Type   | L mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|--------|------|------|-------|-------------|------|-------------|--------------------|
| 20 G3F | 150  | 115  | 63    | 105         | 16   | 75          | 14x(4)             |
| 25 G3F | 160  | 130  | 70    | 115         | 16   | 85          | 14x(4)             |
| 32 G3F | 180  | 150  | 75    | 140         | 18   | 100         | 18x(4)             |
| 40 G3F | 200  | 160  | 85    | 150         | 18   | 110         | 18x(4)             |
| 50 G3F | 230  | 190  | 95    | 165         | 20   | 125         | 18x(4)             |
| 65 G3F | 290  | 220  | 110   | 185         | 20   | 145         | 18x(8)             |

## SPECIFICATIONS

| Type   | Flange connection DN in mm | Opening mm | $k_{vs}$ -value* m <sup>3</sup> /h | Lifting height mm | Weight kg |
|--------|----------------------------|------------|------------------------------------|-------------------|-----------|
| 20 G3F | 20                         | 20         | 6.3                                | 7.5               | 6         |
| 25 G3F | 25                         | 25         | 10                                 | 9                 | 7         |
| 32 G3F | 32                         | 32         | 16                                 | 10                | 10        |
| 40 G3F | 40                         | 40         | 25                                 | 11                | 14        |
| 50 G3F | 50                         | 50         | 38                                 | 11.5              | 18        |
| 65 G3F | 65                         | 65         | 63                                 | 14.5              | 26        |

\*Same  $k_{vs}$ -values for mixing and diverting valves

# 3-way Control Valve type G3F

Nodular cast iron, PN 16, DN 80 – 150 mm

0-2.5.09-E

Page 1 of 2



## TECHNICAL DATA

### Materials:

|   |   |
|---|---|
| - Valve body                            | <b>Nodular</b> cast iron<br>EN-GJS-400-15     |
| - Seats and cone                        | Alu Bronze<br>CuAL10Fe5Ni5                    |
| - Spindle                               | Stainless steel                               |
| - O-ring                                | 90 NBR  |
| - Gasket                                | Reinz-AFM34                                   |
| <b>Nominal pressure</b>                 | PN 16   |
| <b>Seating</b>                          | Two balanced<br>single seats                  |
| <b>Flow characteristic</b>              | Almost linear                                 |
| <b>Flanges drilled<br/>according to</b> | EN 1092-2 PN 16<br>or ANSI B16.5<br>Class 150 |
| <b>Counter flanges</b>                  | DIN 2633                                      |
| <b>Regulating capability</b>            | Kvs/Kvr > 25                                  |

For regulating of process- and central heating plants

### Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the  $k_{vs}$ -value will decrease by 14% as against mixing valves.

Subject to change without notice.

## APPLICATIONS

Control valves type G3F are designed for regulating of water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" under technical data. The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

## DESIGN

The valve components - seats and cone - are made of alubronze, the spindle is made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The connection thread for the actuator is G1B ISO 228. The valves have two balanced single seats and are designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174). [Tight between port 1(AB) og 3(B) is optional.]

## FUNCTION

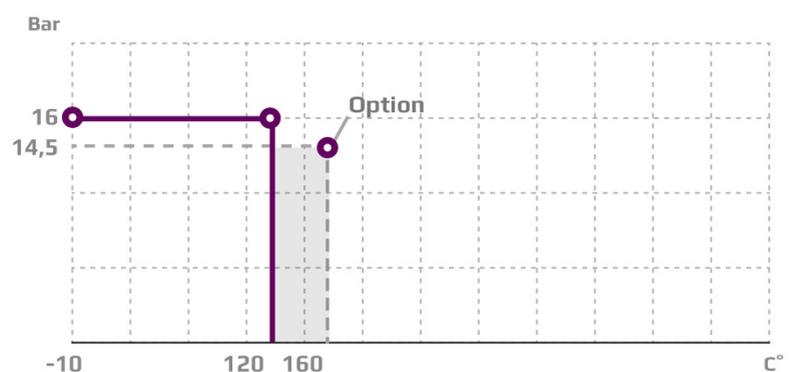
Without an actuator being installed, connection 2-1 is fully open and connection 3-1 completely closed, by means of a spring. By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

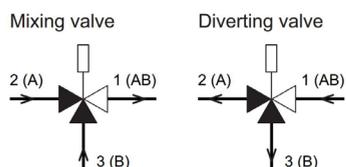
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## PORT NUMBERING

The ports of valves type G3F are marked with the figures 1, 2 and 3. The letters in parentheses refer to the corresponding internationally adapted designations.



Port 1(AB)  
Port 2(A)  
Port 3(B)

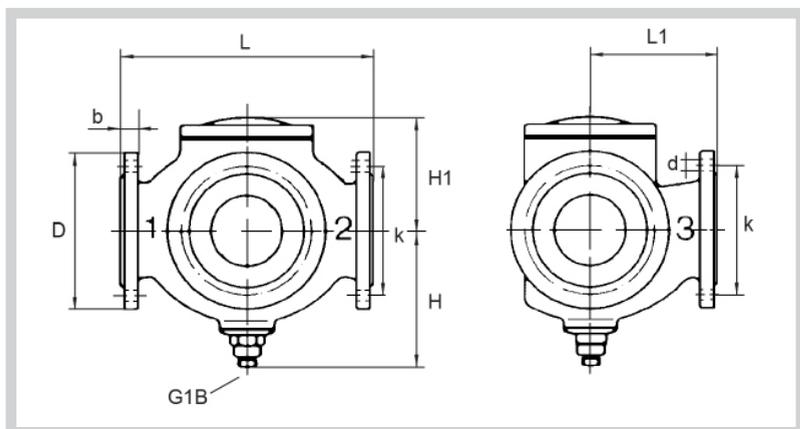
common port always open  
closes at load on spindle  
opens at load on spindle



## MOUNTING

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor, otherwise minimum 745 mm for pneumatic actuators.

## DIMENSION SKETCH



| Type    | L<br>mm | L1<br>mm | H<br>mm | H1<br>mm | D (dia.)<br>mm | b<br>mm | k (dia.)<br>mm | d mm dia.<br>(number) |
|---------|---------|----------|---------|----------|----------------|---------|----------------|-----------------------|
| 80 G3F  | 310     | 155      | 180     | 127      | 200            | 19      | 160            | 19x(8)                |
| 100 G3F | 350     | 175      | 195     | 141      | 220            | 19      | 180            | 19x(8)                |
| 125 G3F | 400     | 240      | 245     | 171      | 250            | 19      | 210            | 19x(8)                |
| 150 G3F | 480     | 270      | 280     | 189      | 285            | 24      | 240            | 23x(8)                |

## SPECIFICATIONS

| Type    | Flange connection<br>DN in mm | Opening<br>mm | Mixing valve<br>$k_{vs}$ -value<br>$m^3/h$ | Diverting valve<br>$k_{vs}$ -value<br>$m^3/h$ | Lifting height<br>mm | Weight<br>kg |
|---------|-------------------------------|---------------|--|---|----------------------|--------------|
| 80 G3F  | 80                            | 80            | 80   | 69  | 11                   | 35           |
| 100 G3F | 100                           | 100           | 125  | 108   | 13                   | 44           |
| 125 G3F | 125                           | 125           | 215  | 185   | 18                   | 72           |
| 150 G3F | 150                           | 150           | 310  | 267   | 20                   | 111          |

# 3-way Control Valve type G3F-I

(Ports A-AB interchanged) Nodular cast iron, PN 16, DN 80 – 150 mm

0-2.5.09.01-A

Page 1 of 2



## APPLICATIONS

Control valves type G3F-I are designed for regulating of water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" on page 2. The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

## DESIGN

The valve components - seats and cone - are made of alubronze, the spindle is made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The connection thread for the actuator is G1B ISO 228. The valves have two balanced single seats and are designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174). Tight between port 1(AB) og 3(B) is optional.

## FUNCTION

Without an actuator being installed, connection 2-1 is fully open and connection 3-1 completely closed, by means of a spring. By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.

## TECHNICAL DATA

### Materials:

|                                 |   |
|---------------------------------|---|
| - Valve body                    | Nodular cast iron<br>EN-GJS-400-15            |
| - Seats and cone                | Alu Bronze<br>CuAL10Fe5Ni5                    |
| - Spindle                       | Stainless steel                               |
| - O-ring                        | 90 NBR  |
| - Gasket                        | Reinz-AFM34                                   |
| Nominal pressure                | PN 16   |
| Seating                         | Two balanced<br>single seats                  |
| Flow characteristic             | Almost linear                                 |
| Flanges drilled<br>according to | EN 1092-2 PN 16<br>or ANSI B16.5<br>Class 150 |
| Counter flanges                 | DIN 2633                                      |
| Regulating capability           | Kvs/Kvr > 25                                  |

For regulating of process- and central heating plants

### Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the  $k_{vs}$ -value will decrease by 14% as against mixing valves.

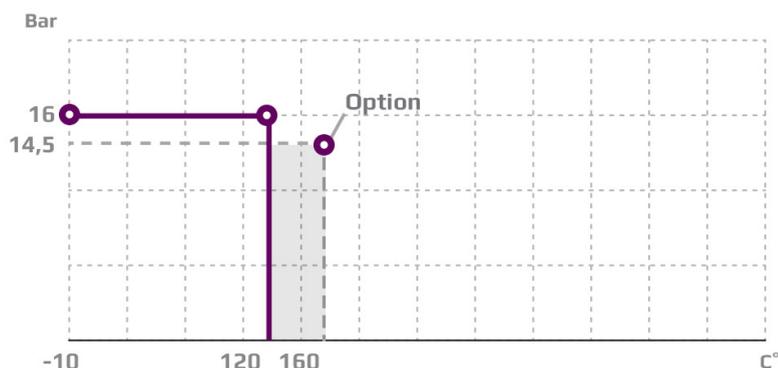
Subject to change without notice.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Reliable and secure due to internal parts of stainless steel

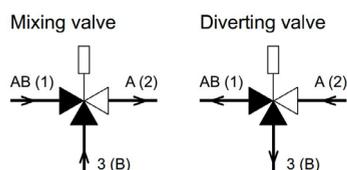
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## PORT NUMBERING

The ports of valves type G3F-I are marked with the figures 1, 2 and 3. The letters in parentheses refer to the corresponding internationally adapted designations.



Port AB(1)  
Port A(2)  
Port 3(B)

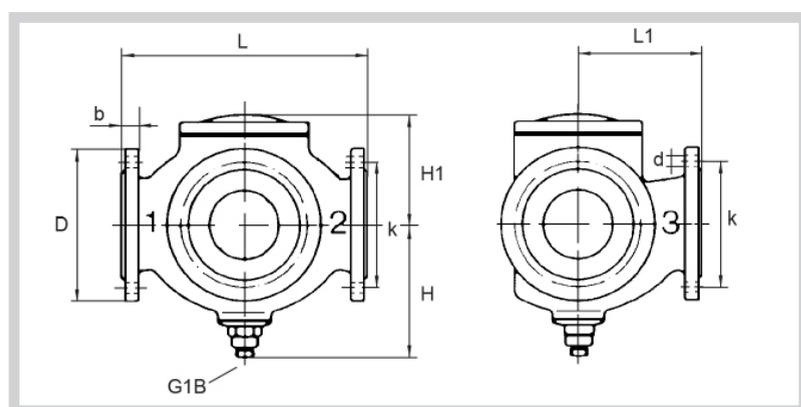
common port always open  
closes at load on spindle  
opens at load on spindle



## MOUNTING

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor, otherwise minimum 745 mm for pneumatic actuators.

## DIMENSION SKETCH



| Type      | L mm | L1 mm | H mm | H1 mm | D (dia.) mm | b mm | k (dia.) mm | d mm dia. (number) |
|-----------|------|-------|------|-------|-------------|------|-------------|--------------------|
| 80 G3F-I  | 310  | 155   | 180  | 127   | 200         | 19   | 160         | 19x(8)             |
| 100 M3F-I | 350  | 175   | 195  | 141   | 220         | 19   | 180         | 19x(8)             |
| 125 M3F-I | 400  | 240   | 245  | 171   | 250         | 19   | 210         | 19x(8)             |
| 150 M3F-I | 480  | 270   | 280  | 189   | 285         | 24   | 240         | 23x(8)             |

## SPECIFICATIONS

| Type      | Flange connection DN in mm | Opening mm | Mixing valve $k_{vs}$ -value $m^3/h$ | Diverting valve $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|-----------|----------------------------|------------|--------------------------------------|---|-------------------|-----------|
| 80 G3F-I  | 80                         | 80         | 80                                   | 69                                      | 11                | 35        |
| 100 G3F-I | 100                        | 100        | 125                                  | 108                                     | 13                | 44        |
| 125 G3F-I | 125                        | 125        | 215                                  | 185                                     | 18                | 72        |
| 150 G3F-I | 150                        | 150        | 310                                  | 267                                     | 20                | 111       |

# 3-way Control Valve type Low Leakage

Nodular Cast Iron, PN16, DN80 – 300 mm / PN10, DN300/250 mm

0-2.5.14-A

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## APPLICATIONS

Control valves type G3FA soft seated are designed for regulating of load dependant cylinder liner (LDCL), cooling water systems.

## DESIGN

The valve components (seats and cone) are made of alubronzel, the spindle of alu. bronze. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2 (JIS B 2210 option). The valve has two balanced single seats and the port AB-B is designed 100 % tight.

## FUNCTION

The valve cone is firmly connected with the actuator spindle. When the valve cone is in the one extreme position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed. In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

## TECHNICAL DATA

|                              |  |
|------------------------------|--|
| <b>Materials:</b>            |  |
| - Valve body                 | Nodular cast iron<br>EN-GJS-400-15       |
| - Seats and cone             | Alu Bronze<br>CuAL10Fe5Ni5               |
| - Spindle                    | Stainless steel<br>(W.no 1.4436)         |
| - O-ring                     | A75H- Gasket<br>Reinz-AFM34              |
| <b>Nominal pressure</b>      |  |
| - DN 80-200                  | PN 16 (max.150°C)                        |
| - DN 300/250-300             | PN 10 (max.150°C)                        |
| - DN 80-300                  | JIS 10K (option)                         |
| <b>Seats</b>                 | 2 balanced single seats                  |
| <b>Flow characteristic</b>   | Almost linear                            |
| <b>Leakage Port AB-B</b>     | 0.0%                                     |
| <b>Flanges</b>               | According to EN 1092-2,<br>PN 16 & PN 10 |
| - Option:                    | According to JIS B 2210 10K              |
| <b>Regulating capability</b> | Kvs/Kvr > 25                             |

### Note!

Valve DN 200/175 has outer measures and flanges drilled as valve DN 200. Valve DN 300/250 has outer measures and flanges drilled as valve DN 300

### Counter flanges (suggested for EN 1092-2)

|                   |                  |
|-------------------|------------------|
| - DN 80-200:      | DIN 2633 – PN 16 |
| - DN 300/250-300: | DIN 2632 – PN 10 |

Soft seat with O-ring  
Leakage class IV

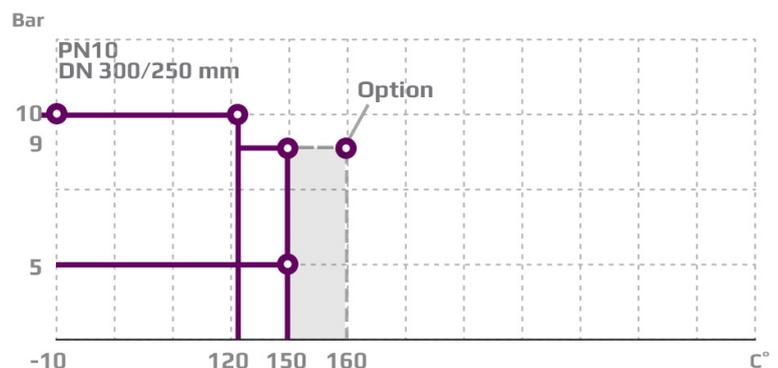
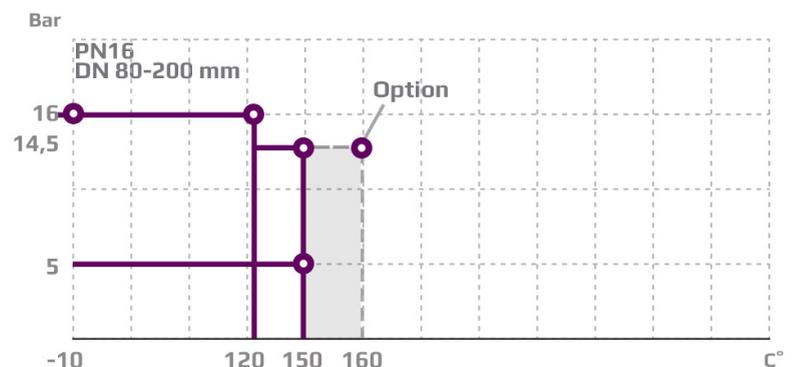
Subject to change without notice.

## FEATURES

- Soft-seat makes the valve 99.99% tight between port AB-B for energy savings
- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



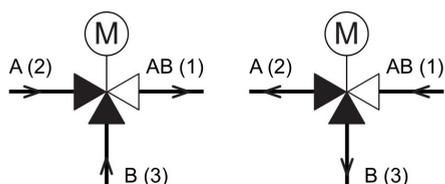
### MOUNTING

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor, otherwise minimum 745mm for pneumatic actuators.

### PORT NUMBERING

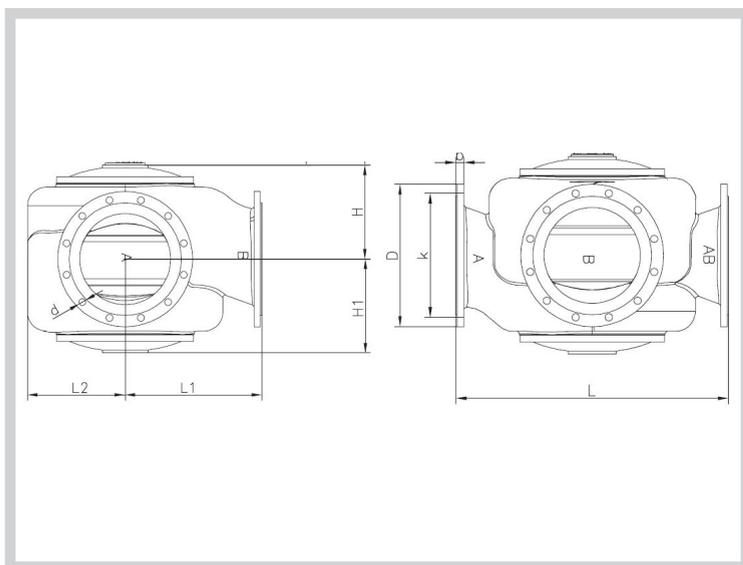
Mixing valve

Diverting valve



Port AB (1) common port always open  
 Port A (2) closes at load on spindle  
 Port B (3) opens at load on spindle

### DIMENSION SKETCH



### SPECIFICATIONS

| DN      | Flange connection<br>DN in mm | Opening<br>(mm) | $k_{vs}$ -value<br>$m^3/h$ | Lifting height<br>(mm) | Weight<br>(kg) |
|---------|-------------------------------|-----------------|----------------------------|------------------------|----------------|
| 80      | 80                            | 80              | 80                         | 11                     | 35             |
| 100     | 100                           | 100             | 125                        | 13                     | 44             |
| 125     | 125                           | 125             | 215                        | 18                     | 72             |
| 150     | 150                           | 150             | 310                        | 22                     | 111            |
| 200/175 | 200                           | 200             | 425                        | 23                     | 165            |
| 200     | 200                           | 200             | 555                        | 29                     | 160            |
| 300/250 | 300                           | 300             | 865                        | 31                     | 306            |
| 300     | 300                           | 300             | 1250                       | 45                     | 306            |

The stated  $k_{vs}$  values apply for mixing valves. Diverting valves:  $0.86 \times (k_{vs} \text{ -values for mixing valves})$

| DN      | L<br>(mm) | L1<br>(mm) | L2<br>(mm) | H<br>(mm) | H1<br>(mm) | b<br>(mm) | EN 1092-2        |                  |                       | JIS B 2210 10K   |                  |                       |
|---------|-----------|------------|------------|-----------|------------|-----------|------------------|------------------|-----------------------|------------------|------------------|-----------------------|
|         |           |            |            |           |            |           | D (dia.)<br>(mm) | k (dia.)<br>(mm) | d mm dia.<br>(number) | D (dia.)<br>(mm) | k (dia.)<br>(mm) | d mm dia.<br>(number) |
| 80      | 310       | 155        | 102        | 117       | 127        | 19        | 200              | 160              | 19x(8)                | 185              | 150              | 19x(8)                |
| 100     | 350       | 175        | 112        | 132       | 141        | 19        | 220              | 180              | 19x(8)                | 210              | 175              | 19x(8)                |
| 125     | 400       | 240        | 138        | 181       | 171        | 19        | 250              | 210              | 19x(8)                | 250              | 210              | 23x(8)                |
| 150     | 480       | 270        | 165        | 216       | 189        | 24        | 285              | 240              | 23x(8)                | 280              | 240              | 23x(8)                |
| 200/175 | 600       | 325        | 230        | 238       | 238        | 20        | 340              | 295              | 23x(12)               | 330              | 290              | 23x(12)               |
| 200     | 600       | 325        | 230        | 238       | 238        | 20        | 340              | 295              | 23x(12)               | 330              | 290              | 23x(12)               |
| 300/250 | 850       | 450        | 325        | 305       | 305        | 25        | 445              | 400              | 23x(12)               | 445              | 400              | 25x(16)               |
| 300     | 850       | 450        | 325        | 305       | 305        | 25        | 445              | 400              | 23x(12)               | 445              | 400              | 25x(16)               |

# 3-way Control Valve type Low Leakage (INVERTED)

Nodular Cast Iron, PN16, DN 80 – 300 mm / PN10, DN300/250 mm

0-2.5.14.01-A

Page 1 of 2



## TECHNICAL DATA

|                              |  |
|------------------------------|--|
| <b>Materials:</b>            |  |
| - Valve body                 | Nodular cast iron<br>EN-GJS-400-15       |
| - Seats and cone             | Alu Bronze<br>CuAL10Fe5Ni5               |
| - Spindle                    | Stainless steel<br>(W.no 1.4436)         |
| - O-ring                     | <b>A75H- Gasket</b><br>Reinz-AFM34       |
| <b>Nominal pressure</b>      |  |
| - DN 80-200                  | PN 16 (max.150°C)                        |
| - DN 300/250-300             | PN 10 (max.150°C)                        |
| - DN 80-300                  | JIS 10K (option)                         |
| <b>Seats</b>                 | 2 balanced single seats                  |
| <b>Flow characteristic</b>   | Almost linear                            |
| <b>Leakage Port AB-B</b>     | 0.0%                                     |
| <b>Flanges</b>               | According to EN 1092-2,<br>PN 16 & PN 10 |
| - <b>Option:</b>             | According to JIS B 2210 10K              |
| <b>Regulating capability</b> | Kvs/Kvr > 25                             |

### Note!

Valve DN 200/175 has outer measures and flanges drilled as valve DN 200. Valve DN 300/250 has outer measures and flanges drilled as valve DN 300

### Counter flanges (suggested for EN 1092-2)

|                              |                  |
|------------------------------|------------------|
| - DN 80-200:                 | DIN 2633 – PN 16 |
| - DN 300/250-300:            | DIN 2632 – PN 10 |
| <b>Soft seat with O-ring</b> |                  |
| <b>Leakage class IV</b>      |                  |

Subject to change without notice.

## APPLICATIONS

Control valves type Low Leakage are designed for regulating of load dependant cylinder liner (LDCL), cooling water systems. The valve is designed with inverted ports for application with common port on the left side.

## DESIGN

The valve components (seats and cone) are made of alubronzel, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2 (JIS B 2210 option). The valve has two balanced single seats and the port AB-B is designed 100 % tight.

## FUNCTION

The valve cone is firmly connected with the actuator spindle. When the valve cone is in the one extreme position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed.

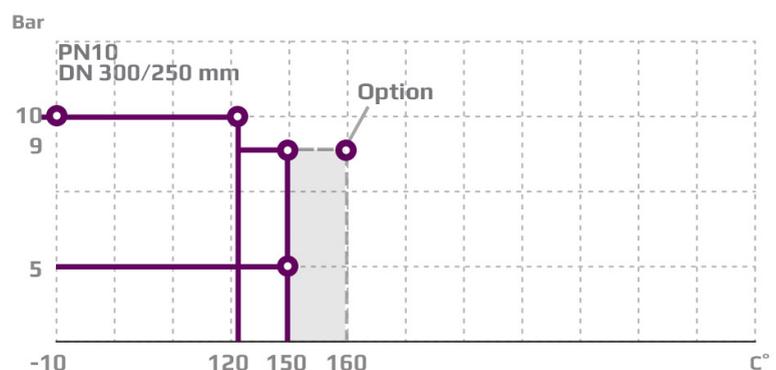
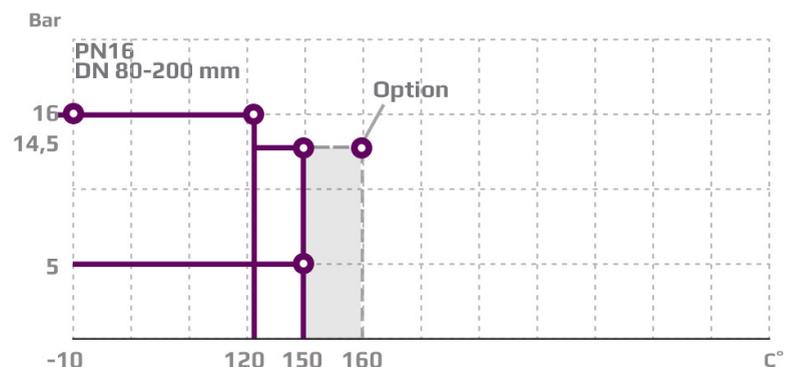
In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

## FEATURES

- Soft-seat makes the valve 99.99% tight between port AB-B for energy savings
- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Comment port AB on the left side

## PRESSURE/TEMPERATURE DIAGRAM

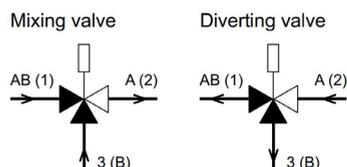
According to DIN 2401



## MOUNTING

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor, otherwise minimum 745 mm for pneumatic actuators.

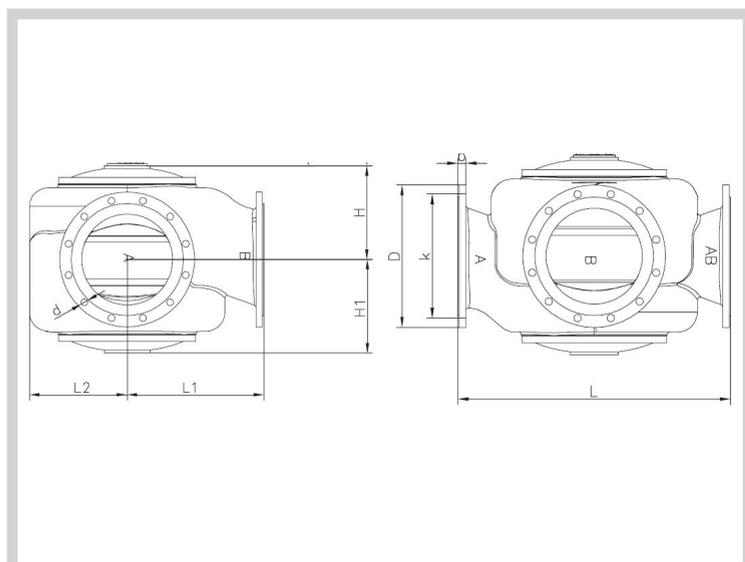
## PORT NUMBERING



Port AB(1)  
Port A(2)  
Port 3(B)

common port always open  
closes at load on spindle  
opens at load on spindle

## DIMENSION SKETCH



## SPECIFICATIONS

| DN      | Flange connection DN in mm | Opening (mm) | $k_{vs}$ -value $m^3/h$ | Lifting height (mm) | Weight (kg) |
|---------|----------------------------|--------------|-------------------------|---------------------|-------------|
| 80      | 80                         | 80           | 80                      | 11                  | 35          |
| 100     | 100                        | 100          | 125                     | 13                  | 44          |
| 125     | 125                        | 125          | 215                     | 18                  | 72          |
| 150     | 150                        | 150          | 310                     | 22                  | 111         |
| 200/175 | 200                        | 200          | 425                     | 23                  | 165         |
| 200     | 200                        | 200          | 555                     | 29                  | 160         |
| 300/250 | 300                        | 300          | 865                     | 31                  | 306         |
| 300     | 300                        | 300          | 1250                    | 45                  | 306         |

<sup>1)</sup>The stated  $k_{vs}$  values apply for mixing valves. Diverting valves:  $0.86 \times (k_{vs}$  -values for mixing valves)

| DN      | L (mm) | L1 (mm) | L2 (mm) | H (mm) | H1 (mm) | b (mm) | EN 1092-2     |               |                    | JIS B 2210 10K |               |                    |
|---------|--------|---------|---------|--------|---------|--------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|         |        |         |         |        |         |        | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) |
| 80      | 310    | 155     | 102     | 117    | 127     | 19     | 200           | 160           | 19x(8)             | 185            | 150           | 19x(8)             |
| 100     | 350    | 175     | 112     | 132    | 141     | 19     | 220           | 180           | 19x(8)             | 210            | 175           | 19x(8)             |
| 125     | 400    | 240     | 138     | 181    | 171     | 19     | 250           | 210           | 19x(8)             | 250            | 210           | 23x(8)             |
| 150     | 480    | 270     | 165     | 216    | 189     | 24     | 285           | 240           | 23x(8)             | 280            | 240           | 23x(8)             |
| 200/175 | 600    | 325     | 230     | 238    | 238     | 20     | 340           | 295           | 23x(12)            | 330            | 290           | 23x(12)            |
| 200     | 600    | 325     | 230     | 238    | 238     | 20     | 340           | 295           | 23x(12)            | 330            | 290           | 23x(12)            |
| 300/250 | 850    | 450     | 325     | 305    | 305     | 25     | 445           | 400           | 23x(12)            | 445            | 400           | 25x(16)            |
| 300     | 850    | 450     | 325     | 305    | 305     | 25     | 445           | 400           | 23x(12)            | 445            | 400           | 25x(16)            |

# 3-way Control Valve type G3FA

Nodular cast iron, PN16, DN 80 – 300 mm / PN10, DN300/250 mm

0-2.5.16-A

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## APPLICATIONS

Control valves type G3FA are designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary en-gines. Is used in conjunction with Clorius valve motor type AVM/AVF 234 or Clorius pneumatic actuators.

## DESIGN

The valve components (seats and cone) are made of alubronze, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2 (JIS B 2210 option). Tight between port 1(AB) og 3(B) is optional.

## FUNCTION

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed. In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

## TECHNICAL DATA

|                              |  |
|------------------------------|--|
| <b>Materials:</b>            |  |
| - Valve body                 | Nodular cast iron<br>EN-GJS-400-15       |
| - Seats and cone             | Alu Bronze<br>CuAL10Fe5Ni5               |
| - Spindle                    | Stainless steel<br>(W.no 1.4436)         |
| - O-ring                     | A75H                                     |
| - Gasket                     | Reinz-AFM34                              |
| <b>Nominal pressure</b>      |  |
| - 80-200 G3FA:               | PN 16 (max.120/160°C)                    |
| - 300/250-300 G3FA:          | PN 10 (max<br>120/160°C)                 |
| - 80-300 G3FA:               | JIS 10K (option)                         |
| <b>Seats</b>                 | 2 balanced single seats                  |
| <b>Flow characteristic</b>   | Almost linear                            |
| <b>Leakage rate</b>          | ≤ 0.5%                                   |
| <b>Regulating capability</b> | Kvs/Kvr > 25                             |
| <b>Flanges</b>               | According to EN 1092-2,<br>PN 16 & PN 10 |
| - Option:                    | According to JIS B 2210 10K              |

### Note !

Valve type 200/175 G3FA has outer measures and flanges drilled as valve type 200 G3FA. Valve type 300/250 G3FA has outer measures and flanges drilled as valve type 300 G3FA.

### Counter flanges (suggested for EN 1092-2)

|                     |                  |
|---------------------|------------------|
| - 80-200 G3FA:      | DIN 2633 – PN 16 |
| - 300/250-300 G3FA: | DIN 2632 – PN 10 |

### For cooling and heating purposes

#### Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the kvs-value will decrease by 14% as against mixing valves.

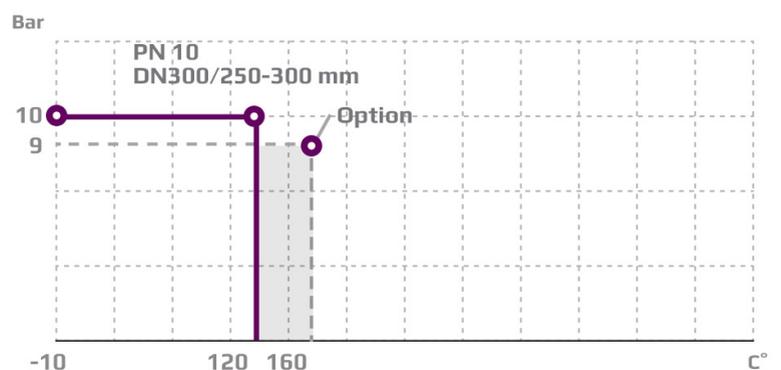
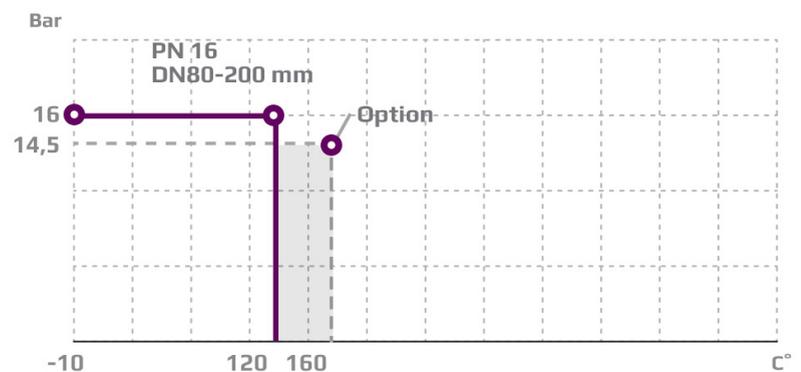
Subject to change without notice.

## FEATURES

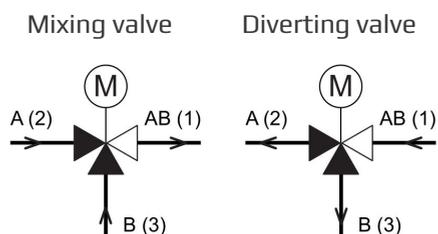
- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## PORT NUMBERING



Port AB (1)  
Port A (2)  
Port B (3)

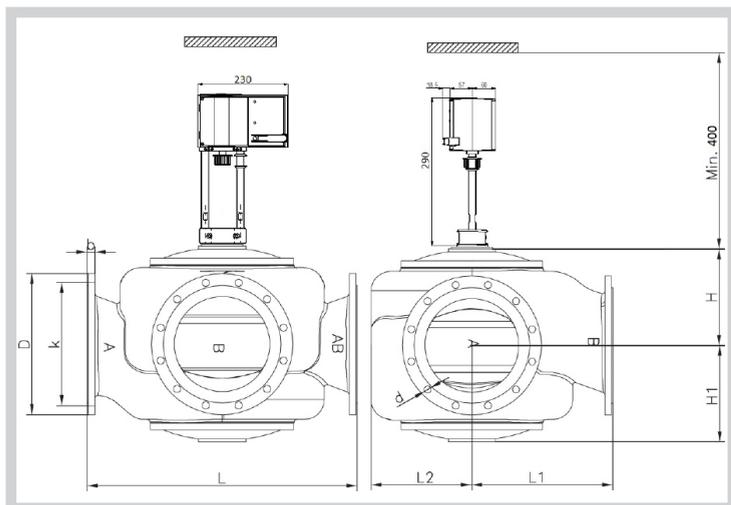
common port always open  
closes at load on spindle  
opens at load on spindle



## MOUNTING

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor, otherwise minimum 745 mm for pneumatic actuators.

## DIMENSION SKETCH



## SPECIFICATIONS

| Type         | Flange connection DN in mm | Opening mm | $k_{vs}$ -value <sup>1)</sup> m <sup>3</sup> /h | Lifting height mm | Weight kg |
|--------------|----------------------------|------------|---|-------------------|-----------|
| 80 G3FA      | 80                         | 80         | 80  | 11                | 35        |
| 100 G3FA     | 100                        | 100        | 125   | 13                | 44        |
| 125 G3FA     | 125                        | 125        | 215   | 18                | 72        |
| 150 G3FA     | 150                        | 150        | 310   | 20                | 111       |
| 200/175 G3FA | 200                        | 200        | 425   | 22                | 165       |
| 200 G3FA     | 200                        | 200        | 555   | 28                | 160       |
| 300/250 G3FA | 300                        | 300        | 865   | 28                | 306       |
| 300 G3FA     | 300                        | 300        | 1250  | 45                | 290       |

1) The stated kvs values apply for mixing valves. Diverting valves: 0.86 x (kvs-values for mixing valves).

| Type         | L mm | L1 mm | L2 mm | H mm | H1 mm | b mm | EN 1092-2   |             |                    | JIS B 2210 10 |             |                    |
|--------------|------|-------|-------|------|-------|------|-------------|-------------|--------------------|---------------|-------------|--------------------|
|              |      |       |       |      |       |      | D (dia.) mm | k (dia.) mm | d mm dia. (number) | D (dia.) mm   | k (dia.) mm | d mm dia. (number) |
| 80 G3FA      | 310  | 155   | 102   | 117  | 127   | 19   | 200         | 160         | 19x(8)             | 185           | 150         | 19x(8)             |
| 100 G3FA     | 350  | 175   | 112   | 132  | 141   | 19   | 220         | 180         | 19x(8)             | 210           | 175         | 19x(8)             |
| 125 G3FA     | 400  | 240   | 138   | 181  | 171   | 19   | 250         | 210         | 19x(8)             | 250           | 210         | 23x(8)             |
| 150 G3FA     | 480  | 270   | 165   | 216  | 189   | 24   | 285         | 240         | 23x(8)             | 280           | 240         | 23x(8)             |
| 200/175 G3FA | 600  | 325   | 230   | 238  | 238   | 20   | 340         | 295         | 23x(12)            | 330           | 290         | 23x(12)            |
| 200 G3FA     | 600  | 325   | 230   | 238  | 238   | 20   | 340         | 295         | 23x(12)            | 330           | 290         | 23x(12)            |
| 300/250 G3FA | 850  | 450   | 325   | 305  | 305   | 25   | 445         | 400         | 23x(12)            | 445           | 400         | 25x(16)            |
| 300 G3FA     | 850  | 450   | 325   | 305  | 305   | 25   | 445         | 400         | 23x(12)            | 445           | 400         | 25x(16)            |

# 3-way Control Valve type G3FA-HT

Nodular cast iron, PN 16, DN 80 – 200 mm / PN 10, DN 300/250 – 300 mm

**HIGH TEMPERATURE (TEFLON GRAPHITE SEALING)**

0-2.5.17.01-B

Page 1 of 2

## APPLICATIONS

Control valves type G3FA-HT are designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines. The valve is used in conjunction with Clorius valve motor type MT90 Marine.

## DESIGN

The valve components (seats and cone) are made of alubronze, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2.

## FUNCTION

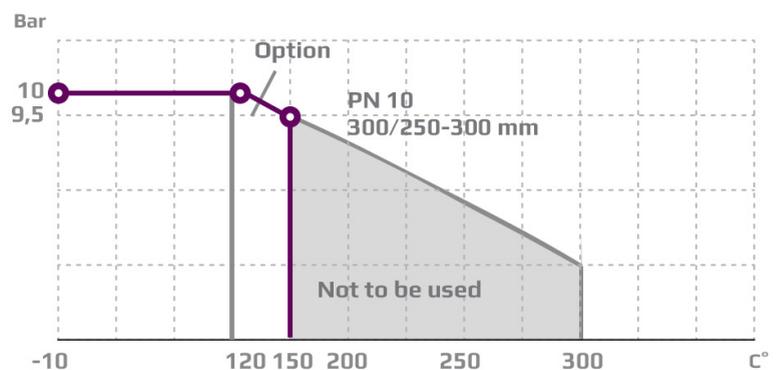
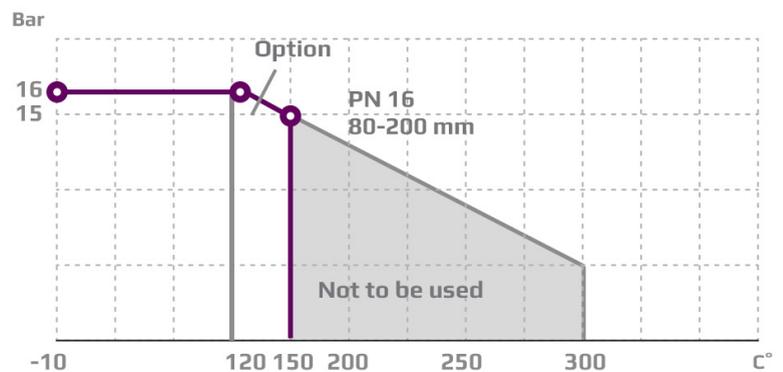
The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed. In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## TECHNICAL DATA

### Materials:

|                  |                                    |
|------------------|------------------------------------|
| - Valve body     | Nodular cast iron<br>EN-GJS-400-15 |
| - Seats and cone | Alu Bronze<br>CuAL10Fe5Ni5         |
| - Spindle        | Stainless steel<br>(W.no 1.4436)   |
| - O-ring         | A75H                               |
| - Gasket         | Reinz-AFM34                        |

### Nominal pressure

|                        |                       |
|------------------------|-----------------------|
| - 80-200 G3FA-HT:      | PN 16 (max.120/150°C) |
| - 300/250-300 G3FA-HT: | PN 10 (max.120/150°C) |

Seats 2 balanced single seats

Flow characteristic Almost linear

Leakage rate  $\leq 0.5\%$

Regulating capability  $Kvs/Kvr > 25$

Flanges According to EN 1092-2, PN 16 & PN 10

### Note !

Valve type 200/175 G3FA has outer measures and flanges drilled as valve type 200 G3FA. Valve type 300/250 G3FA has outer measures and flanges drilled as valve type 300 G3FA.

### Counter flanges (suggested for EN 1092-2)

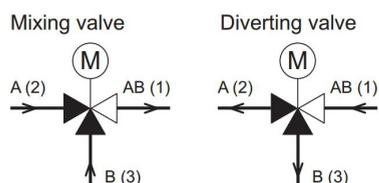
|                        |                  |
|------------------------|------------------|
| - 80-200 G3FA-HT:      | DIN 2633 – PN 16 |
| - 300/250-300 G3FA-HT: | DIN 2632 – PN 10 |

For cooling and heating purposes

Subject to change without notice.

## PORT NUMBERING

The ports of valves type G3FA-HT are marked with the letters AB, A and B. The letters in parentheses refer to the corresponding internationally adapted designations.



Port AB (1)  
Port A (2)  
Port B (3)

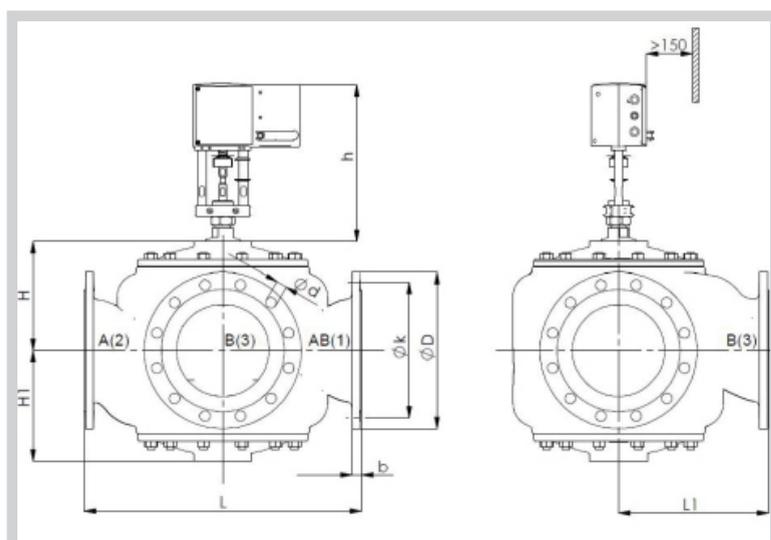
common port always open  
closes at load on spindle  
opens at load on spindle



## MOUNTING

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor, otherwise minimum 745 mm for pneumatic actuators.

## DIMENSION SKETCH



| Type            | L mm | L1 mm | H mm | H1 mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|-----------------|------|-------|------|-------|------|-------------|-------------|--------------------|
| 80 G3FA-HT      | 310  | 155   | 117  | 127   | 19   | 200         | 160         | 19x(8)             |
| 100 G3FA-HT     | 350  | 175   | 132  | 141   | 19   | 220         | 180         | 19x(8)             |
| 125 G3FA-HT     | 400  | 240   | 181  | 171   | 19   | 250         | 210         | 19x(8)             |
| 150 G3FA-HT     | 480  | 270   | 216  | 189   | 24   | 285         | 240         | 23x(8)             |
| 200/175 G3FA-HT | 600  | 325   | 238  | 238   | 20   | 340         | 295         | 23x(12)            |
| 200 G3FA-HT     | 600  | 325   | 238  | 238   | 20   | 340         | 295         | 23x(12)            |
| 300/250 G3FA-HT | 850  | 450   | 305  | 305   | 25   | 445         | 400         | 23x(12)            |
| 300 G3FA-HT     | 850  | 450   | 305  | 305   | 25   | 445         | 400         | 23x(12)            |

## SPECIFICATIONS

| Type            | Flange connection DN in mm | Opening mm | $k_{vs}$ -value <sup>1)</sup> m <sup>3</sup> /h | Lifting height mm | Weight kg |
|-----------------|----------------------------|------------|---|-------------------|-----------|
| 80 G3FA-HT      | 80                         | 80         | 80  | 11                | 35        |
| 100 G3FA-HT     | 100                        | 100        | 125   | 13                | 44        |
| 125 G3FA-HT     | 125                        | 125        | 215   | 18                | 72        |
| 150 G3FA-HT     | 150                        | 150        | 310   | 20                | 111       |
| 200/175 G3FA-HT | 200                        | 200        | 425   | 22                | 165       |
| 200 G3FA-HT     | 200                        | 200        | 555   | 28                | 160       |
| 300/250 G3FA-HT | 300                        | 300        | 865   | 28                | 306       |
| 300 G3FA-HT     | 300                        | 300        | 1250  | 45                | 290       |

<sup>1)</sup> The stated  $k_{vs}$  values apply for mixing valves. Diverting valves:  $0.86 \times (k_{vs}\text{-values for mixing valves})$ .

# 3-way Control Valve type G3FA-I

Nodular cast iron, DN 80 - 200 mm - PN 16, DN 300/250 and 300 mm - PN 10  
 (PORTS A-AB INTERCHANGED)  
 0-2.5.18-A

## APPLICATIONS

Control valves type G3FA-I are designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary en-gines. Is used in conjunction with Clorius valve motor type AVM/F 234 or Clorius pneumatic actuators

## DESIGN

The valve components (seats and cone) are made of alubronze, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

## FUNCTION

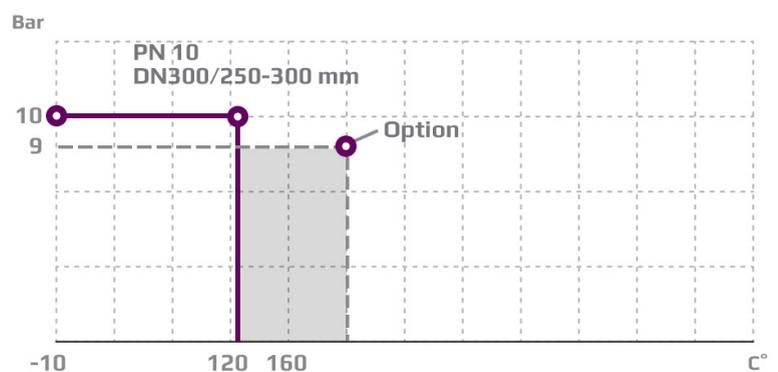
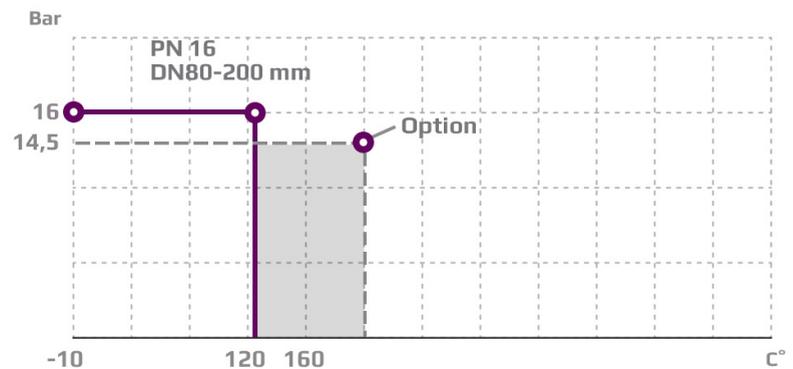
The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection B-AB is kept fully open and connection A-AB is fully closed. In the other extreme position connection B-AB is fully closed and connection A-AB is fully open. In the intermediate positions the opening degrees change proportionally.

## FEATURES

- Can be used for both mixing and diverting
- Simple design secures reliable controls and reduces costly downtime.
- Location of the pack box in the actuator makes the valve service friendly

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



## TECHNICAL DATA

|                              |  |
|------------------------------|--|
| <b>Materials:</b>            |  |
| - Valve body                 | Nodular cast iron<br>EN-GJS-400-15       |
| - Seats and cone             | Alu Bronze<br>CuAL10Fe5Ni5               |
| - Spindle                    | Stainless steel<br>(W.no 1.4436)         |
| - O-ring                     | A75H                                     |
| - Gasket                     | Reinz-AFM34                              |
| <b>Nominal pressure</b>      |  |
| - 80-200 G3FA-I:             | PN 16 (max.120/160°C)                    |
| - 300/250-300 G3FA-I:        | PN 10 (max<br>120/160°C)                 |
| - 200/175-300 G3FA-I:        | JIS 10K (option)                         |
| <b>Seats</b>                 | 2 balanced single seats                  |
| <b>Flow characteristic</b>   | Almost linear                            |
| <b>Leakage rate</b>          | ≤ 0.5%                                   |
| <b>Regulating capability</b> | Kvs/Kvr > 25                             |
| <b>Flanges</b>               | According to EN 1092-2,<br>PN 16 & PN 10 |
| - Option:                    | According to JIS B 2210 10K              |

### Note !

Valve type 200/175 G3FA-I has outer measures and flanges drilled as valve type 200 G3FA-I.  
 Valve type 300/250 G3FA-I has outer measures and flanges drilled as valve type 300 G3FA-I.

### Counter flanges (suggested for EN 1092-2)

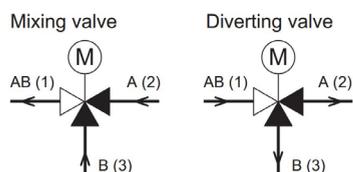
|                      |                  |
|----------------------|------------------|
| - 80-200 G3FA-I:     | DIN 2633 – PN 16 |
| - 300/250-300 G3FA-I | DIN 2632 – PN 10 |

### For cooling and heating purposes

Subject to change without notice.

## PORT NUMBERING

The ports of valves type G3FA-I are marked with the letters AB, A and B. The letters in parentheses refer to the corresponding internationally adapted designations.



Port AB (1)  
Port A (2)  
Port B (3)

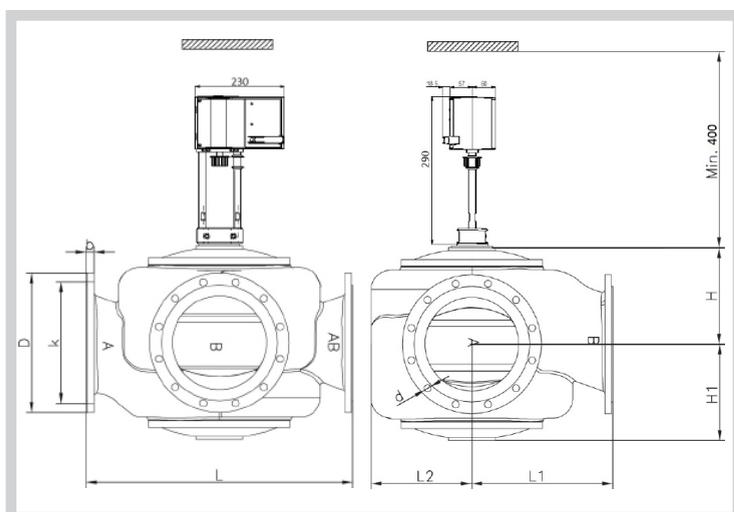
common port always open  
opens at load on spindle  
closes at load on spindle



## MOUNTING

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor, otherwise minimum 745 mm for pneumatic actuators.

## DIMENSION SKETCH



## SPECIFICATIONS

| Type           | Flange connection DN in mm | Opening mm | $k_{vs}$ -value <sup>(1)</sup> m <sup>3</sup> /h | Lifting height mm | Weight kg |
|----------------|----------------------------|------------|--|-------------------|-----------|
| 80 G3FA-I      | 80                         | 80         | 80   | 11                | 35        |
| 100 G3FA-I     | 100                        | 100        | 125  | 13                | 44        |
| 125 G3FA-I     | 125                        | 125        | 215  | 18                | 72        |
| 150 G3FA-I     | 150                        | 150        | 310  | 20                | 111       |
| 200/175 G3FA-I | 200                        | 200        | 425  | 22                | 165       |
| 200 G3FA-I     | 200                        | 200        | 555  | 28                | 160       |
| 300/250 G3FA-I | 300                        | 300        | 865  | 28                | 306       |
| 300 G3FA-I     | 300                        | 300        | 1250   | 45                | 290       |

1)The stated  $k_{vs}$  values apply for mixing valves. Diverting valves: 0.86 x ( $k_{vs}$ -values for mixing valves).

| Type           | L mm | L1 mm | L2 mm | H mm | H1 mm | b mm | EN 1092-2   |             |                    | JIS B 2210 10K |             |                    |
|----------------|------|-------|-------|------|-------|------|-------------|-------------|--------------------|----------------|-------------|--------------------|
|                |      |       |       |      |       |      | D (dia.) mm | k (dia.) mm | d mm dia. (number) | D (dia.) mm    | k (dia.) mm | d mm dia. (number) |
| 80 G3FA-I      | 310  | 155   | 102   | 117  | 127   | 19   | 200         | 160         | 19x(8)             | 185            | 150         | 19x(8)             |
| 100 G3FA-I     | 350  | 175   | 112   | 132  | 141   | 19   | 220         | 180         | 19x(8)             | 210            | 175         | 19x(8)             |
| 125 G3FA-I     | 400  | 240   | 138   | 181  | 171   | 19   | 250         | 210         | 19x(8)             | 250            | 210         | 23x(8)             |
| 150 G3FA-I     | 480  | 270   | 165   | 216  | 189   | 24   | 285         | 240         | 23x(8)             | 280            | 240         | 23x(8)             |
| 200/175 G3FA-I | 600  | 325   | 230   | 238  | 238   | 20   | 340         | 295         | 23x(12)            | 330            | 290         | 23x(12)            |
| 200 G3FA-I     | 600  | 325   | 230   | 238  | 238   | 20   | 340         | 295         | 23x(12)            | 330            | 290         | 23x(12)            |
| 300/250 G3FA-I | 850  | 450   | 325   | 305  | 305   | 25   | 445         | 400         | 23x(12)            | 445            | 400         | 25x(16)            |
| 300 G3FA-I     | 850  | 450   | 325   | 305  | 305   | 25   | 445         | 400         | 23x(12)            | 445            | 400         | 25x(16)            |

# 3-way Control Valve type G3FA Soft Seat/Low Leakage

Nodular Cast Iron, PN16, DN 80 – 200 mm / PN10, DN300/250 - 300 mm

0-2.5.19-B

Page 1 of 2



## APPLICATIONS

G3FA soft seat control valves are designed for regulating of low and high temperature cooling systems for marine engines.

## DESIGN

The valve components (seats, cone and spindle) are made of aluminum bronze. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2 (JIS B 2210 option). The valve has two balanced single seats and the design of port AB-B is 100 % tight.

## FUNCTION

The valve cone is firmly connected to the actuator spindle. When the valve cone is located in one extreme position by drawing on the spindle, port A-AB is kept fully open and port B-AB is fully closed. In the other extreme position port A-AB is fully closed and port B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

## TECHNICAL DATA

|                              |  |
|------------------------------|--|
| <b>Materials:</b>            |  |
| - Valve body                 | Nodular cast iron<br>EN-GJS-400-15       |
| - Color                      | RAL 7016 (anthracite grey)               |
| - Seats and cone             | Aluminum Bronze<br>CuAL10Fe5Ni5          |
| - Spindle                    | CuAL10Fe5Ni5<br>(W.no 1.4436)            |
| - O-ring                     | A75H                                     |
| - Gasket                     | Reinz-AFM34                              |
| <b>Nominal pressure</b>      |  |
| - 80-200 G3FA:               | PN 16 (max.120/160°C)                    |
| - 300/250-300 G3FA:          | PN 10 (max<br>120/160°C)                 |
| - 80-300 G3FA:               | JIS 10K (option)                         |
| <b>Seats</b>                 | 2 balanced single seats                  |
| <b>Flow characteristic</b>   | Almost linear                            |
| <b>Leakage rate</b>          | ≤ 0.01%                                  |
| <b>Regulating capability</b> | Kvs/Kvr > 25                             |
| <b>Flanges</b>               | According to EN 1092-2,<br>PN 16 & PN 10 |
| - Option:                    | According to JIS B 2210 10K              |

### Note !

Valve type 200/175 G3FA has outer measures and flanges drilled as for valve type 200 G3FA. Valve type 300/250 G3FA has outer measures and flanges drilled as valve type 300 G3FA.

### Counter flanges (suggested for EN 1092-2)

|                     |                  |
|---------------------|------------------|
| - 80-200 G3FA:      | DIN 2633 – PN 16 |
| - 300/250-300 G3FA: | DIN 2632 – PN 10 |

### For cooling and heating purposes

#### Important note

If the valves are applied as diverting valves, the pressure drop will increase by 35% and the Kvs-value will decrease by 14% compared with mixing valves.

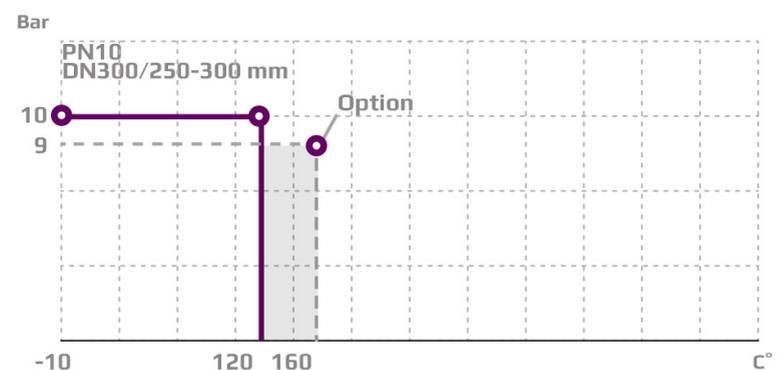
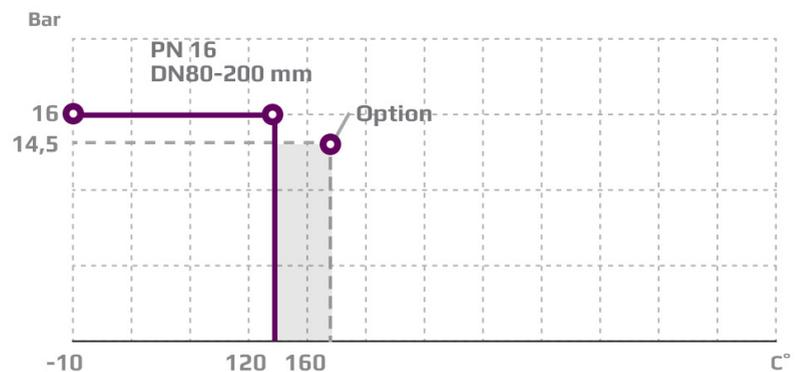
Subject to change without notice.

## FEATURES

- Soft-seat makes the valve 99.99% tight between port AB-B for energy savings
- Can be used for both mixing and diverting
- Simple design endures reliable control and reduces costly downtimes
- Designed for linear electric actuators

## PRESSURE/TEMPERATURE DIAGRAM

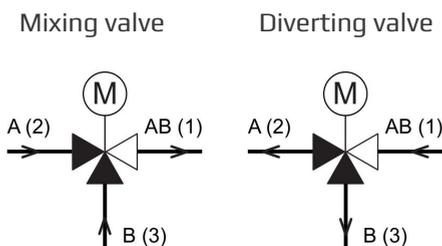
According to DIN 2401



### MOUNTING

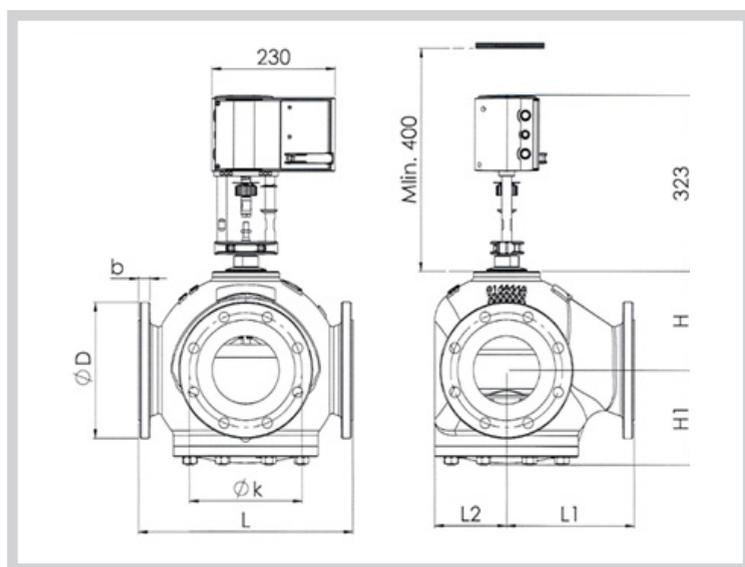
The valves can be installed both vertically and horizontally. The valves must be mounted in such a way that the valve motor is exposed to minimal moisture and unnecessary vibrations. Free height above / below the valve must be a minimum 400 mm to mount and operate of the AVM/AVF 234 motor.

### PORT NUMBERING



Port AB (1) common port always open  
 Port A (2) closes for load on spindle  
 Port B (3) opens for load on spindle

### DIMENSION SKETCH



### SPECIFICATIONS

| Type         | Flange connection DN in mm | Opening mm | $k_{vs}$ -value <sup>1)</sup> m <sup>3</sup> /h | Lifting height mm | Weight kg |
|--------------|----------------------------|------------|---|-------------------|-----------|
| 80 G3FA      | 80                         | 80         | 80  | 11                | 35        |
| 100 G3FA     | 100                        | 100        | 125   | 13                | 44        |
| 125 G3FA     | 125                        | 125        | 215   | 18                | 72        |
| 150 G3FA     | 150                        | 150        | 310   | 20                | 111       |
| 200/175 G3FA | 200                        | 200        | 425   | 22                | 165       |
| 200 G3FA     | 200                        | 200        | 555   | 28                | 160       |
| 300/250 G3FA | 300                        | 300        | 865   | 28                | 306       |
| 300 G3FA     | 300                        | 300        | 1250  | 45                | 290       |

1) The stated kvs values apply for mixing valves. Diverting valves: 0.86 x (kvs-values for mixing valves).

| Type         | L mm | L1 mm | L2 mm | H mm | H1 mm | b mm | EN 1092-2   |             |                    | JIS B 2210 10 |             |                    |
|--------------|------|-------|-------|------|-------|------|-------------|-------------|--------------------|---------------|-------------|--------------------|
|              |      |       |       |      |       |      | D (dia.) mm | k (dia.) mm | d mm dia. (number) | D (dia.) mm   | k (dia.) mm | d mm dia. (number) |
| 80 G3FA      | 310  | 155   | 102   | 117  | 127   | 19   | 200         | 160         | 19x(8)             | 185           | 150         | 19x(8)             |
| 100 G3FA     | 350  | 175   | 112   | 132  | 141   | 19   | 220         | 180         | 19x(8)             | 210           | 175         | 19x(8)             |
| 125 G3FA     | 400  | 240   | 138   | 181  | 171   | 19   | 250         | 210         | 19x(8)             | 250           | 210         | 23x(8)             |
| 150 G3FA     | 480  | 270   | 165   | 216  | 189   | 24   | 285         | 240         | 23x(8)             | 280           | 240         | 23x(8)             |
| 200/175 G3FA | 600  | 325   | 230   | 238  | 238   | 20   | 340         | 295         | 23x(12)            | 330           | 290         | 23x(12)            |
| 200 G3FA     | 600  | 325   | 230   | 238  | 238   | 20   | 340         | 295         | 23x(12)            | 330           | 290         | 23x(12)            |
| 300/250 G3FA | 850  | 450   | 325   | 305  | 305   | 25   | 445         | 400         | 23x(12)            | 445           | 400         | 25x(16)            |
| 300 G3FA     | 850  | 450   | 325   | 305  | 305   | 25   | 445         | 400         | 23x(12)            | 445           | 400         | 25x(16)            |

# 3-way Control Valve type G3FM-TR (AB-Right)

Nodular cast iron, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.6.02-x

Page 1 of 4



## APPLICATIONS

Control valve type G3FM-TR is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## TECHNICAL DATA

### Materials:

|                       |                                    |
|-----------------------|------------------------------------|
| - Valve body, slide   | Nodular cast iron<br>EN-GJS-400-15 |
| - O-ring              | NBR 70A                            |
| - U-ring              | PTFE                               |
| Flow characteristic   | Almost linear                      |
| Leakage rate          | Max. 0.5%                          |
| Regulating capability | Kvs/Kvr > 25                       |

|          |                          |
|----------|--------------------------|
| Flanges  | EN 1092-2<br>PN 10/16/25 |
| - Option | JIS B 2210 5K            |

Counter flanges (suggested for EN 1092-2)  
DIN 2632 – PN 10  
DIN 2633 – PN 16  
DIN 2634 – PN 25

### Max. pressure $\Delta p_L$ , against which the valve can close:

|               |        |
|---------------|--------|
| - DN 65 - 125 | 25 bar |
| - DN 150-300  | 16 bar |
| - DN 350-800  | 10 bar |

### Nominal pressure

|                 |                                  |
|-----------------|----------------------------------|
| - DN 65-125 mm  | PN 25 max. 100 °C (option 250°C) |
| - DN 150-300 mm | PN 16, max. 100°C (option 250°C) |
| - DN 350-800 mm | PN 10, max. 100°C (option 250°C) |
| - DN 150-800 mm | JIS 5K (option)                  |

Slide in Nodular cast iron

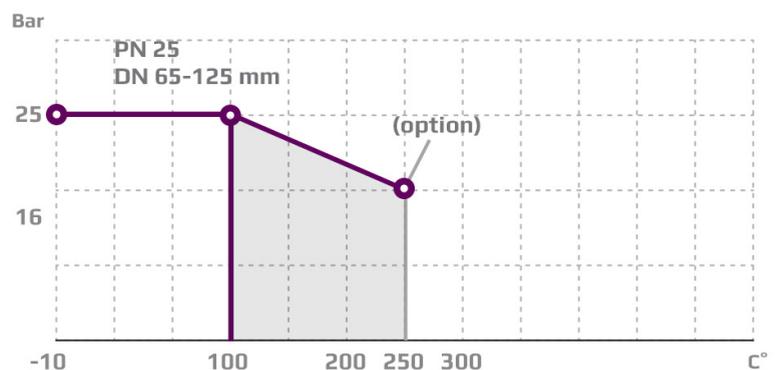
Subject to change without notice.

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Low leakage rate secures energy savings.
- Flexible choice of port placement

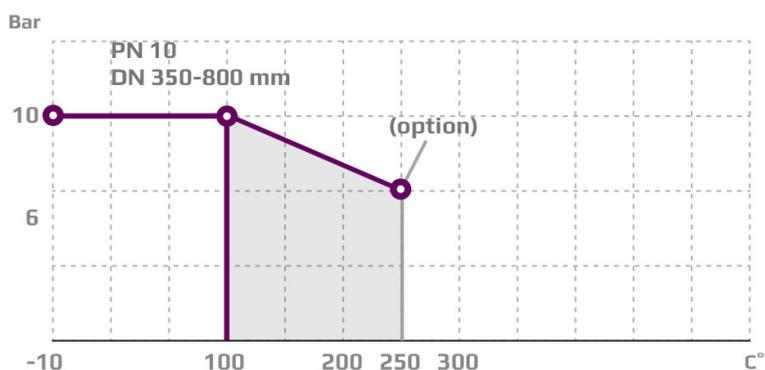
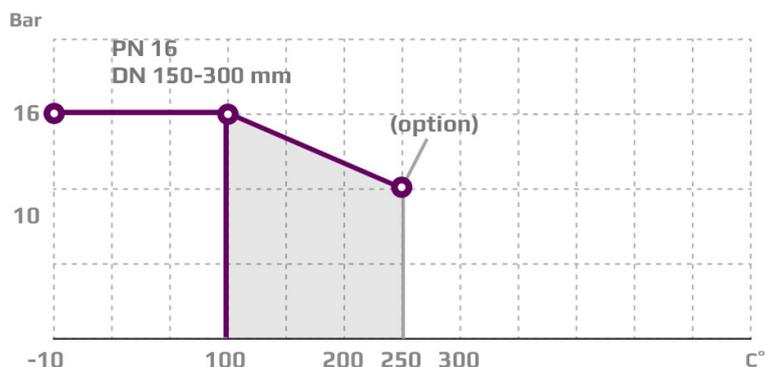
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



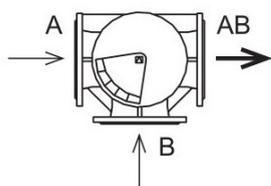
### PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

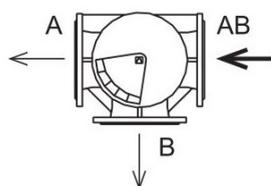


### PORT NUMBERING

Mixing



Diverting



### MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

Valves can also be supplied in AB-Left configuration (data sheet 2.6.03) and AB-Middle (data sheet 2.6.03.02).

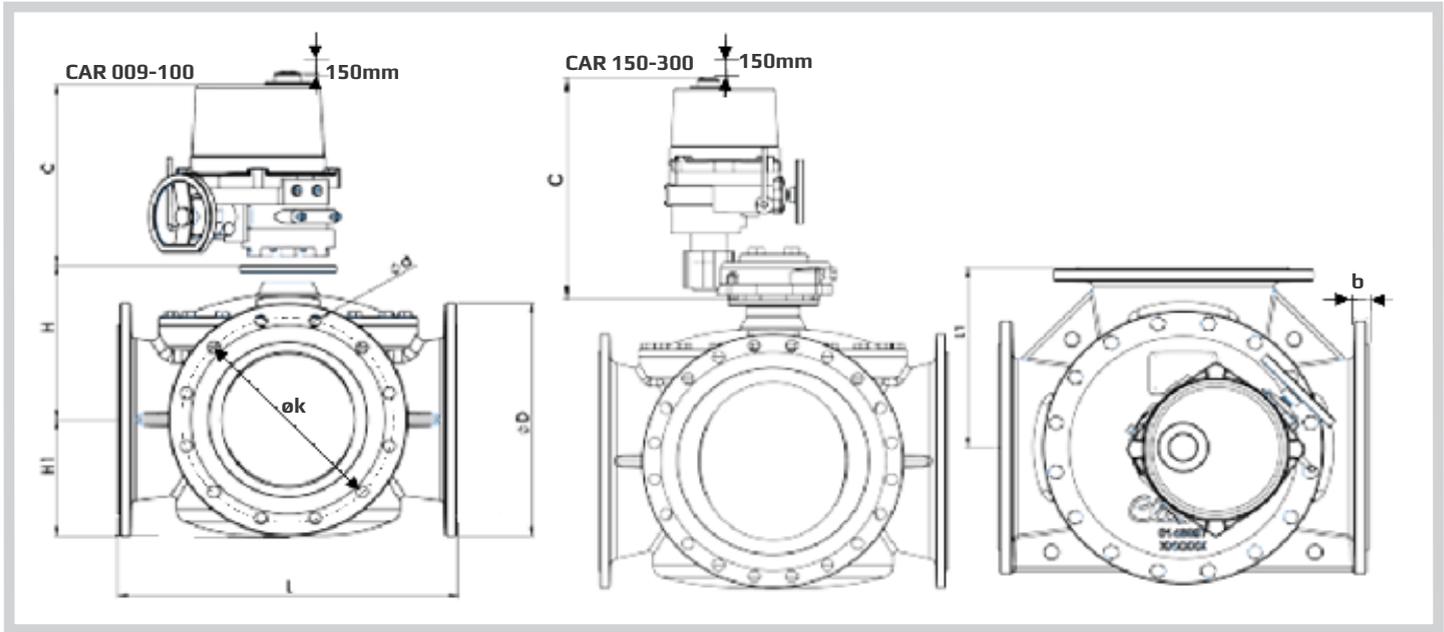
# 3-way Control Valve type G3FM-TR (AB-Right)

Nodular cast iron, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.6.02-X

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## DIMENSION SKETCH



| Type        | EN 1092-2 |         |        |         |        |        | ANSI Class 150 |               |                            | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |               |               |                    |
|-------------|-----------|---------|--------|---------|--------|--------|----------------|---------------|----------------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|
|             | L (mm)    | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C (mm) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number)         | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) |
| 65 G3FM-TR  | 292       | 146     | 135    | 92      | 19     | 273    | 185            | 145           | 19x(8)                     | 180           | 140           | 19x(4)             | 155            | 130           | 15x(4)             | 175           | 140           | 19x(4)             |
| 80 G3FM-TR  | 292       | 146     | 140    | 94      | 20     | 273    | 200            | 160           | 19x(8)                     | 190           | 152           | 19x(4)             | 180            | 145           | 19x(4)             | 185           | 150           | 19x(8)             |
| 100 G3FM-TR | 350       | 175     | 158    | 112     | 17     | 273    | 235            | 190           | 23x(8)                     | 230           | 190.9         | 19x(8)             | 200            | 165           | 19x(8)             | 210           | 175           | 19x(8)             |
| 125 G3FM-TR | 400       | 200     | 179    | 123     | 19     | 273    | 270            | 220           | 28x(8)                     | 255           | 216           | 22x(8)             | 235            | 200           | 19x(8)             | 250           | 210           | 23x(8)             |
| 150 G3FM-TR | 437       | 218.5   | 196    | 139     | 19     | 276    | 285            | 240           | 23x(8)                     | 280           | 241           | 22x(8)             | 265            | 230           | 19x(8)             | 280           | 240           | 23x(8)             |
| 200 G3FM-TR | 530       | 265     | 232    | 169     | 20     | 361    | 340            | 295           | 23x(12)                    | 343           | 299           | 23x(8)             | 320            | 280           | 23x(8)             | 320           | 290           | 23x(12)            |
| 250 G3FM-TR | 592       | 296     | 272    | 199     | 22     | 361    | 400            | 355           | 28x(12)                    | 407           | 362           | 26x(12)            | 385            | 345           | 23x(12)            | 400           | 355           | 25x(12)            |
| 300 G3FM-TR | 649       | 324.5   | 302    | 227     | 25     | 361    | 455            | 410           | 28x(12)                    | 483           | 432           | 26x(12)            | 430            | 390           | 23x(12)            | 445           | 400           | 25x(16)            |
| 350 G3FM-TR | 717       | 358.5   | 334.5  | 251.5   | 25     | 361    | 505            | 460           | 23x(16)                    | 534           | 477           | 29x(12)            | 480            | 435           | 25x(12)            | 490           | 445           | 25x(16)            |
| 400 G3FM-TR | 770       | 385     | 370    | 282     | 25     | 361    | 565            | 515           | 28x(16)                    | 597           | 540           | 29x(16)            | 540            | 495           | 25x(16)            | 560           | 510           | 27x(16)            |
| 450 G3FM-TR | 820       | 410     | 391    | 307     | 26     | 556    | 615            | 565           | 28x(20)                    | 635           | 578           | 32x(16)            | 605            | 555           | 25x(16)            | 620           | 565           | 27x(20)            |
| 500 G3FM-TR | 900       | 450     | 421    | 335     | 27     | 556    | 670            | 620           | 28x(20)                    | 699           | 635           | 32x(20)            | 655            | 605           | 25x(20)            | 675           | 620           | 27x(20)            |
| 550 G3FM-TR | 900       | 450     | 421    | 335     | 27     | 556    | -              | -             | -                          | -             | -             | -                  | 720            | 665           | 27x(20)            | 745           | 680           | 33x(20)            |
| 600 G3FM-TR | 918       | 459     | 470    | 354     | 31     | 556    | 780            | 725           | 31x(20)                    | 813           | 750           | 35x(20)            | 770            | 715           | 25x(20)            | 795           | 730           | 33x(24)            |
| 650 G3FM-TR | 1050      | 525     | 534    | 426     | 37     | 556    | -              | -             | -                          | -             | -             | -                  | 825            | 770           | 27x(24)            | 845           | 780           | 33x(24)            |
| 800 G3FM-TR | 1230      | 615     | 596    | 461     | 53     | 556    | 1085           | 990           | 34x(24)<br>50x(24)<br>PN25 | -             | -             | -                  | 995            | 930           | 33x(24)            | 1020          | 950           | 33x(28)            |

## SPECIFICATIONS

| Type        | Flange connection<br>DN in mm | $k_{vs}$ -value <sup>(1)</sup><br>Mixing valve<br>m <sup>3</sup> /h | $k_{vs}$ -value <sup>(1)</sup><br>Diverting valve<br>m <sup>3</sup> /h | Torque<br>Nm<br>For inlet P* | Weight<br>kg |
|-------------|-------------------------------|---|--|------------------------------|--------------|
| 65 G3FM-TR  | 65                            | 95  | 120  | 60                           | 26           |
| 80 G3FM-TR  | 80                            | 122   | 154  | 65                           | 29           |
| 100 G3FM-TR | 100                           | 175   | 220  | 120                          | 41           |
| 125 G3FM-TR | 125                           | 245   | 330  | 200                          | 58           |
| 150 G3FM-TR | 150                           | 395   | 425  | 200                          | 71           |
| 200 G3FM-TR | 200                           | 800   | 1100   | 330                          | 114          |
| 250 G3FM-TR | 250                           | 1500  | 2100   | 525                          | 159          |
| 300 G3FM-TR | 300                           | 2000  | 2650   | 730                          | 207          |
| 350 G3FM-TR | 350                           | 2530  | 3380   | 980                          | 278          |
| 400 G3FM-TR | 400                           | 3050  | 3950   | 1370                         | 346          |
| 450 G3FM-TR | 450                           | 3680  | 4480   | 1550                         | 433          |
| 500 G3FM-TR | 500                           | 4150  | 5250   | 1920                         | 563          |
| 550 G3FM-TR | 550                           | 4150  | 5250   | 1920                         | 575          |
| 600 G3FM-TR | 600                           | 4800  | 6050   | 2950                         | 816          |
| 650 G3FM-TR | 650                           | 6700  | 7800   | TBC                          | 1050         |
| 800 G3FM-TR | 800                           | 6200  | 8000   | 4000                         | 2100         |

<sup>1)</sup> $k_{vs}$ -value for port A and B 50% open.

\*Torque calculated at max inlet P for:

DN 65 - 125 = 25 Bar

DN 150-300 - 16 Bar

DN 350-800 - 10 Bar



# 3-way Control Valve type G3FM-TL (AB-Left)

Nodular cast iron, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.6.03-I

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## TECHNICAL DATA

### Materials:

|                       |                                 |
|-----------------------|---------------------------------|
| - Valve body, slide   | Nodular cast iron EN-GJS-400-15 |
| - O-ring              | NBR 70A                         |
| - U-ring              | PTFE                            |
| Flow characteristic   | Almost linear                   |
| Leakage rate          | Max. 0.5%                       |
| Regulating capability | Kvs/Kvr > 25                    |

|          |                    |
|----------|--------------------|
| Flanges  | EN 1092-2 PN 10/16 |
| - Option | JIS B 2210 5K      |

### Counter flanges (suggested for EN 1092-2)

DIN 2632 – PN 10  
DIN 2633 – PN 16

### Max. pressure $\Delta p_L$ , against which the valve can close:

|               |        |
|---------------|--------|
| - DN 65 - 125 | 25 bar |
| - DN 150-300  | 16 bar |
| - DN 350-800  | 10 bar |

### Nominal pressure

|                 |                                  |
|-----------------|----------------------------------|
| - DN 65-125 mm  | PN 25 max. 100 °C (option 250°C) |
| - DN 150-300 mm | PN 16, max. 100°C (option 250°C) |
| - DN 350-800 mm | PN 10, max. 100°C (option 250°C) |
| - DN 150-800 mm | JIS 5K (option)                  |

Slide in Nodular cast iron

Subject to change without notice.

## APPLICATIONS

Control valve type G3FM-TL is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

## FUNCTION

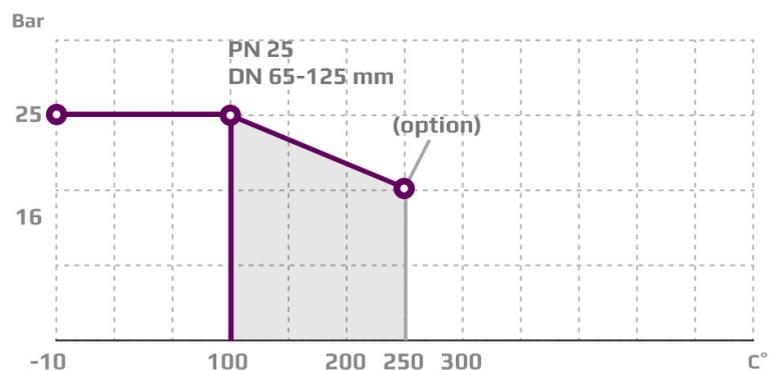
The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Low leakage rate secures energy savings.
- Flexible choice of port placement

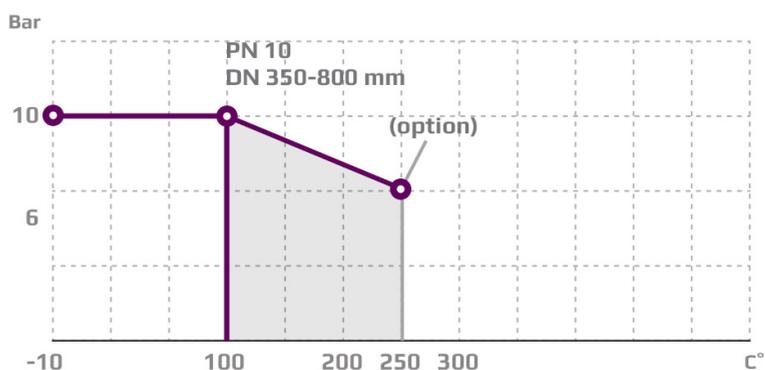
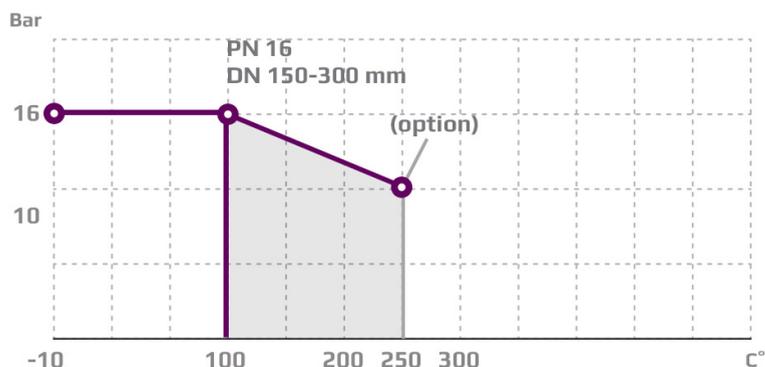
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

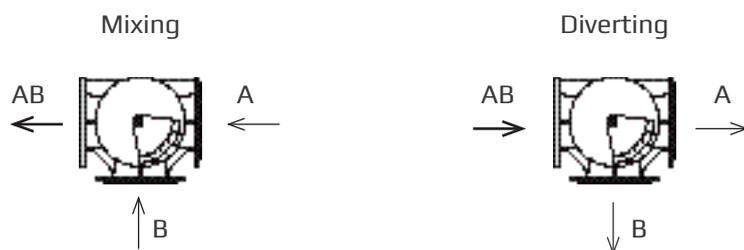


### PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING



### MOUNTING

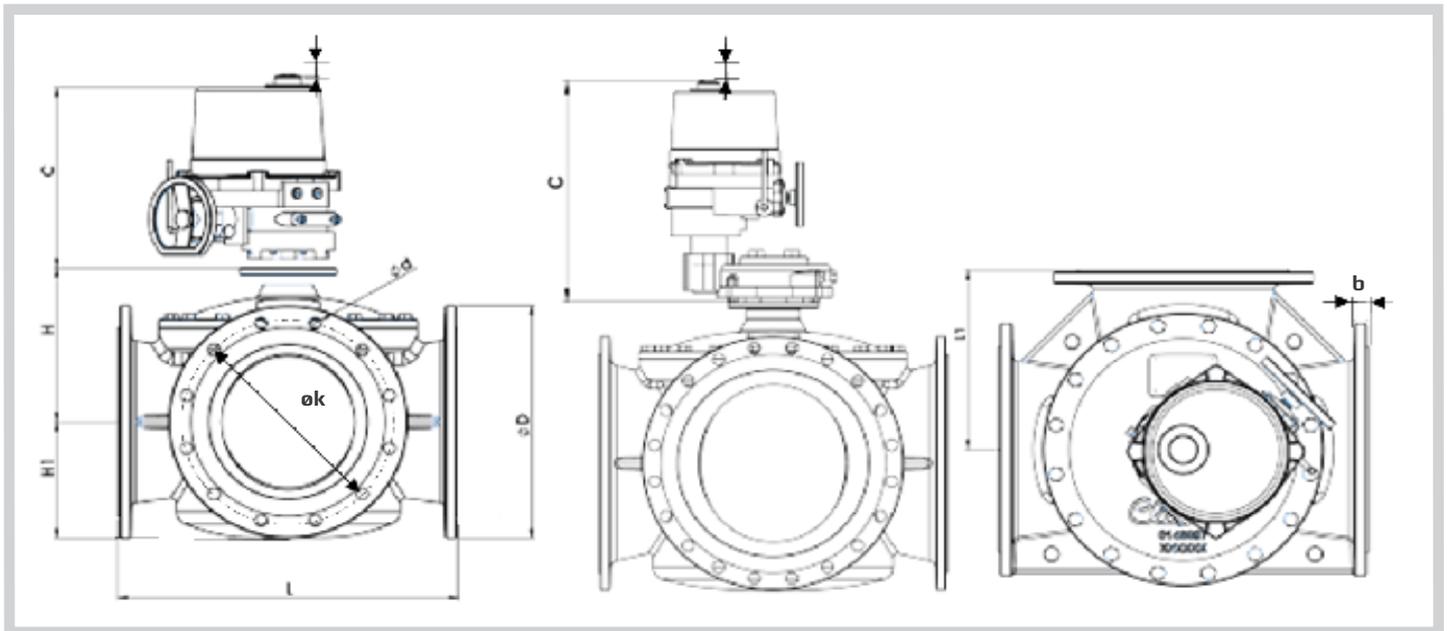
The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations. Valves can also be supplied in AB-Right configuration (data sheet 0.2.6.02).

# 3-way Control Valve type G3FM-TL (AB-Left)

Nodular cast iron, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.6.03-I

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| Type        | EN 1092-2 |         |        |         |        |        | ANSI Class 150 |               |                            | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |               |               |                    |
|-------------|-----------|---------|--------|---------|--------|--------|----------------|---------------|----------------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|
|             | L (mm)    | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C (mm) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number)         | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) |
| 65 G3FM-TR  | 292       | 146     | 135    | 92      | 19     | 273    | 185            | 145           | 19x(8)                     | 180           | 140           | 19x(4)             | 155            | 130           | 15x(4)             | 175           | 140           | 19x(4)             |
| 80 G3FM-TR  | 292       | 146     | 140    | 94      | 20     | 273    | 200            | 160           | 19x(8)                     | 190           | 152           | 19x(4)             | 180            | 145           | 19x(4)             | 185           | 150           | 19x(8)             |
| 100 G3FM-TR | 350       | 175     | 158    | 112     | 17     | 273    | 235            | 190           | 23x(8)                     | 230           | 190.9         | 19x(8)             | 200            | 165           | 19x(8)             | 210           | 175           | 19x(8)             |
| 125 G3FM-TR | 400       | 200     | 179    | 123     | 19     | 273    | 270            | 220           | 28x(8)                     | 255           | 216           | 22x(8)             | 235            | 200           | 19x(8)             | 250           | 210           | 23x(8)             |
| 150 G3FM-TR | 437       | 218.5   | 196    | 139     | 19     | 276    | 285            | 240           | 23x(8)                     | 280           | 241           | 22x(8)             | 265            | 230           | 19x(8)             | 280           | 240           | 23x(8)             |
| 200 G3FM-TR | 530       | 265     | 232    | 169     | 20     | 361    | 340            | 295           | 23x(12)                    | 343           | 299           | 23x(8)             | 320            | 280           | 23x(8)             | 320           | 290           | 23x(12)            |
| 250 G3FM-TR | 592       | 296     | 272    | 199     | 22     | 361    | 400            | 355           | 28x(12)                    | 407           | 362           | 26x(12)            | 385            | 345           | 23x(12)            | 400           | 355           | 25x(12)            |
| 300 G3FM-TR | 649       | 324.5   | 302    | 227     | 25     | 361    | 455            | 410           | 28x(12)                    | 483           | 432           | 26x(12)            | 430            | 390           | 23x(12)            | 445           | 400           | 25x(16)            |
| 350 G3FM-TR | 717       | 358.5   | 334.5  | 251.5   | 25     | 361    | 505            | 460           | 23x(16)                    | 534           | 477           | 29x(12)            | 480            | 435           | 25x(12)            | 490           | 445           | 25x(16)            |
| 400 G3FM-TR | 770       | 385     | 370    | 282     | 25     | 361    | 565            | 515           | 28x(16)                    | 597           | 540           | 29x(16)            | 540            | 495           | 25x(16)            | 560           | 510           | 27x(16)            |
| 450 G3FM-TR | 820       | 410     | 391    | 307     | 26     | 556    | 615            | 565           | 28x(20)                    | 635           | 578           | 32x(16)            | 605            | 555           | 25x(16)            | 620           | 565           | 27x(20)            |
| 500 G3FM-TR | 900       | 450     | 421    | 335     | 27     | 556    | 670            | 620           | 28x(20)                    | 699           | 635           | 32x(20)            | 655            | 605           | 25x(20)            | 675           | 620           | 27x(20)            |
| 550 G3FM-TR | 900       | 450     | 421    | 335     | 27     | 556    | -              | -             | -                          | -             | -             | -                  | 720            | 665           | 27x(20)            | 745           | 680           | 33x(20)            |
| 600 G3FM-TR | 918       | 459     | 470    | 354     | 31     | 556    | 780            | 725           | 31x(20)                    | 813           | 750           | 35x(20)            | 770            | 715           | 25x(20)            | 795           | 730           | 33x(24)            |
| 650 G3FM-TR | 1050      | 525     | 534    | 426     | 37     | 556    | -              | -             | -                          | -             | -             | -                  | 825            | 770           | 27x(24)            | 845           | 780           | 33x(24)            |
| 800 G3FM-TR | 1230      | 615     | 596    | 461     | 53     | 556    | 1085           | 990           | 34x(24)<br>50x(24)<br>PN25 | -             | -             | -                  | 995            | 930           | 33x(24)            | 1020          | 950           | 33x(28)            |

## SPECIFICATIONS

| Type        | Flange connection<br>DN in mm | $k_{vs}$ -value <sup>(1)</sup><br>Mixing valve<br>m <sup>3</sup> /h | $k_{vs}$ -value <sup>(1)</sup><br>Diverting valve<br>m <sup>3</sup> /h | Torque<br>Nm<br>For inlet P* | Weight<br>kg |
|-------------|-------------------------------|---|--|------------------------------|--------------|
| 65 G3FM-TL  | 65                            | 95  | 120  | 60                           | 26           |
| 80 G3FM-TL  | 80                            | 122   | 154  | 65                           | 29           |
| 100 G3FM-TL | 100                           | 175   | 220  | 120                          | 41           |
| 125 G3FM-TL | 125                           | 245   | 330  | 200                          | 58           |
| 150 G3FM-TL | 150                           | 395   | 425  | 200                          | 71           |
| 200 G3FM-TL | 200                           | 800   | 1100   | 330                          | 114          |
| 250 G3FM-TL | 250                           | 1500  | 2100   | 525                          | 159          |
| 300 G3FM-TL | 300                           | 2000  | 2650   | 730                          | 207          |
| 350 G3FM-TL | 350                           | 2530  | 3380   | 980                          | 278          |
| 400 G3FM-TL | 400                           | 3050  | 3950   | 1370                         | 346          |
| 450 G3FM-TL | 450                           | 3680  | 4480   | 1550                         | 433          |
| 500 G3FM-TL | 500                           | 4150  | 5250   | 1920                         | 563          |
| 550 G3FM-TL | 550                           | 4150  | 5250   | 1920                         | 575          |
| 600 G3FM-TL | 600                           | 4800  | 6050   | 2950                         | 816          |
| 650 G3FM-TL | 650                           | 6700  | 7800   | TBC                          | 1050         |
| 800 G3FM-TL | 800                           | 6200  | 8000   | 4000                         | TBC          |

<sup>1)</sup> $k_{vs}$ -value for port A and B 50% open.

\*Torque calculated at max inlet P for:  
 DN 65 - 125 = 25 Bar  
 DN 150-300 = 16 Bar  
 DN 350-800 = 10 Bar

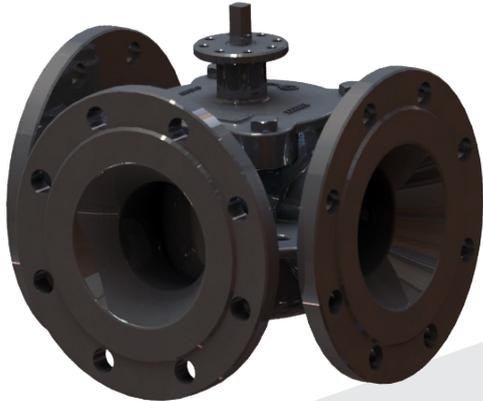


# 3-way Control Valve type G3FMT-ULL (Ultra Low Leakage)

Nodular cast iron, PN10, DN 80 - 450 mm

0-2.6.15-I

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## TECHNICAL DATA

|   |                                     |
|---|-------------------------------------|
| <b>Materials:</b>   |                                     |
| - Valve body, slide   | Nodular cast iron<br>EN-GJS-400-15  |
| - Sealing element and O-ring  | Silicone/PTFE                       |
| <b>Flow characteristic</b>  | Almost linear                       |
| <b>Leakage rate</b>   | ANSI class IV/EN 1349<br>< 0.01%    |
| <b>Flanges</b>  | EN 1092-2 PN 10                     |
| - Option  | JIS B 2210 5K/10K<br>ANSI class 150 |
| <b>Max. pressure <math>\Delta p</math>, against which the valve can close</b> | 5 bar                               |
| <b>Nominal pressure</b>   | PN 10                               |
| <b>Design temperature</b>   | 120°C                               |
| <b>Optional temperature</b>   | 150°C                               |

## APPLICATIONS

Control valve type G3FMT-ULL is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR-H with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 - option JIS B 2210 5K/10K and ANSI class 150.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. PTFE sealing element and O-ring are mounted in the slider groove to minimize leakage.

Connection described for AB-Left valves - reverse connection for AB-Right valves.

This section to be read together with sketches page 2 this data sheet.

## FEATURES

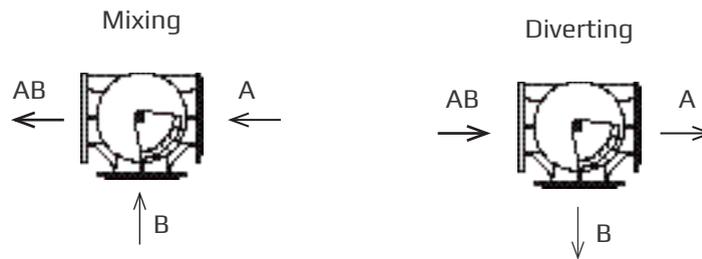
- Simple design secures reliable controls and reduces costly downtime
- Ultra Low Leakage rate secures energy savings - Best in class
- Most compact valve on the market
- Full flexibility on port orientation on AB right or AB left

Subject to change without notice.

**PORT NUMBERING: AB-RIGHT**



**PORT NUMBERING: AB-LEFT**



**MOUNTING**

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

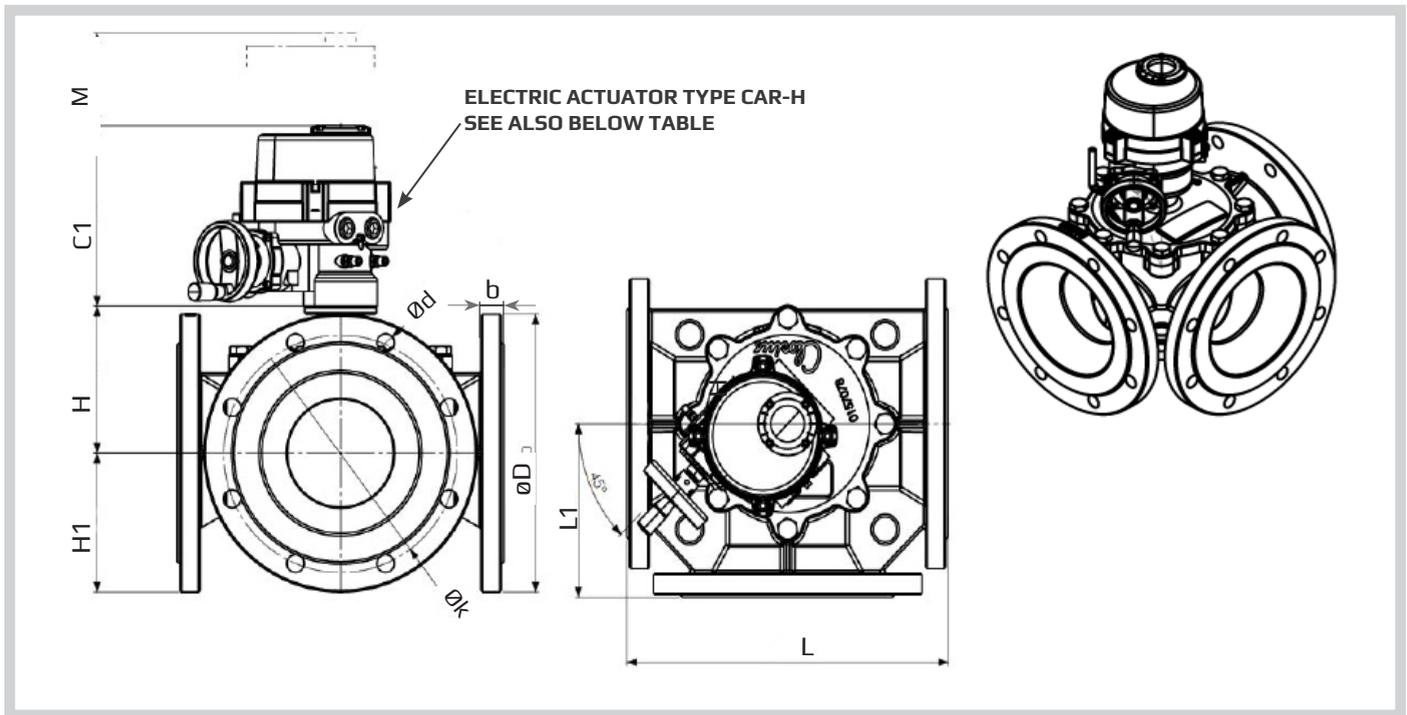
# 3-way Control Valve type G3FMT-ULL (Ultra Low Leakage)

Nodular cast iron, PN10, DN 80 - 450 mm

0-2.6.15-I

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## DIMENSION SKETCH



**SPECIFICATIONS - TABLE 1** (read this together with table on page 4)

| Type                  | L (mm) | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C1 (mm) | M (mm) | Electric Actuator Type CAR-H |
|-----------------------|--------|---------|--------|---------|--------|---------|--------|------------------------------|
| 80 G3FMT-ULL          | 254    | 127     | 125.5  | ØD/2    | 19     | 223     | 110    | CAR-H 006                    |
| 100 G3FMT-ULL         | 296    | 148     | 134.5  | ØD/2    | 24     | 223     | 110    | CAR-H 006                    |
| 125 G3FMT-ULL         | 330    | 165     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006                    |
| 125 G3FMT-ULL (JIS5K) | 320    | 160     | 140    | ØD/2    | 19     | 223     | 110    | CAR-H 006                    |
| 150 G3FMT-ULL         | 356    | 178     | 149    | ØD/2    | 25,4   | 223     | 110    | CAR-H 010                    |
| 200 G3FMT-ULL         | 410    | 205     | 182    | ØD/2    | 28,4   | 261     | 150    | CAR-H 016                    |
| 200 G3FMT-ULL (*L)    | 484    | 242     | 182    | ØD/2    | 28,4   | 261     | 150    | CAR-H -016                   |
| 250 G3FMT-ULL         | 480    | 240     | 202    | ØD/2    | 31     | 261     | 150    | CAR-H -016                   |
| 300 G3FMT-ULL (**RF)  | 580    | 290     | 202    | ØD/2    | 32     | 261     | 150    | CAR-H 016                    |
| 300 G3FMT-ULL         | 560    | 280     | 237    | ØD/2    | 32     | 315     | 180    | CAR-H -035                   |
| 350 G3FMT-ULL         | 660    | 330     | 256    | ØD/2    | 36     | 315     | 180    | CAR-H 050                    |

\* Long Version  
\*\* Reduced Flow

ØD/2 - Depends on flange type (see also table 2)

Subject to change without notice.

SPECIFICATIONS - TABLE 2

| Flange connections | EN 1092-2     |               |                    | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |
|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|                    | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) |
| DN80               | 200           | 160           | 19x(8)             | -              | -             | -                  | -             | -             | -                  | -              | -             | -                  |
| DN100              | 220           | 180           | 19x(8)             | -              | -             | -                  | -             | -             | -                  | -              | -             | -                  |
| DN125              | 250           | 210           | 19x(8)             | 255            | 216           | 22x(8)             | 235           | 200           | 19x(8)             | 250            | 210           | 23x(8)             |
| DN150              | 285           | 240           | 23x(8)             | 280            | 241           | 22x(8)             | 265           | 230           | 19x(8)             | 280            | 240           | 23x(8)             |
| DN200              | 343           | 295           | 22x(8)             | 343            | 298           | 22x(8)             | 320           | 280           | 23x(8)             | 330            | 290           | 23x(12)            |
| DN250              | 405           | 350           | 23x(12)            | 405            | 362           | 25x(12)            | 385           | 345           | 23x(12)            | 400            | 355           | 25x(12)            |
| DN300              | 455           | 400           | 23x(12)            | 483            | 432           | 25x(12)            | 430           | 390           | 23x(12)            | 445            | 400           | 25x(16)            |
| DN350              | 505           | 460           | 23x(16)            | 533            | 476           | 29x(12)            | 480           | 435           | 25x(12)            | 490            | 445           | 25x(16)            |
| DN400              | 565           | 515           | 28x(16)            | 597            | 540           | 29x(16)            | 540           | 495           | 25x(16)            | 560            | 510           | 27x(16)            |

SPECIFICATIONS - TABLE 3

| Type         | Flange connection DN in mm | KvS m <sup>3</sup> /h** | Torque Nm For inlet P* | Weight kg |
|--------------|----------------------------|-------------------------|------------------------|-----------|
| DN80         | 80                         | 100                     | 35                     | 21        |
| DN100        | 100                        | 180                     | 38                     | 26        |
| DN125        | 125                        | 260                     | 40                     | 34        |
| DN150        | 150                        | 430                     | 90                     | 42        |
| DN200        | 200                        | 770                     | 120                    | 67        |
| DN250        | 250                        | 1.230                   | 150                    | 95        |
| DN300 (**RF) | 300                        | 1.190                   | 150                    | 140       |
| DN300        | 300                        | 2.030                   | 320                    | 130       |
| DN350        | 350                        | 2.850                   | 418                    | 175       |
| DN400        | 400                        | 3.760                   | 530                    | 220       |
| DN450        | 450                        | 4.600                   | 654                    | 227       |

\*Torque calculated at max  $\Delta P$  for: DN 80 - 450 - 5 Bar

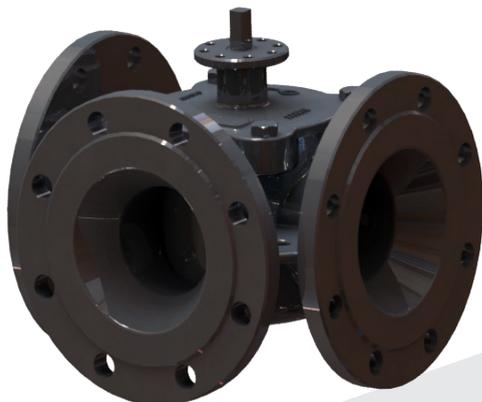
\*\*NOTE: KvS is max. KvS value

# 3-way Control Valve type G3FMT-ULL (Ultra Low Leakage) - High Flow

Nodular cast iron, PN10, DN100, 200 & 350 mm

0-2.6.19-A

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## APPLICATIONS

Control valve type G3FMT-ULL is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR-H with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 - option JIS B 2210 5K/10K and ANSI class 150.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. PTFE sealing element and O-ring are mounted in the slider groove to minimize leakage.

Connection described for AB-Left valves - reverse connection for AB-Right valves.

This section to be read together with sketches page 2 this data sheet.

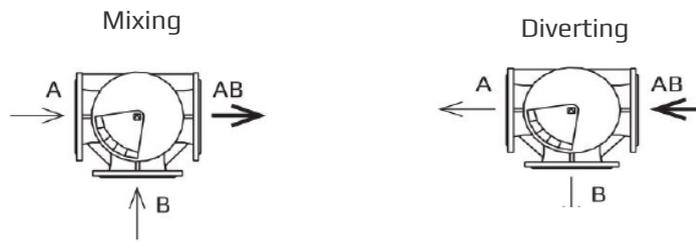
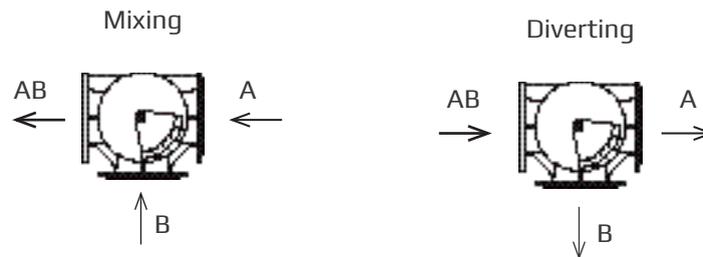
## TECHNICAL DATA

|   |  |
|---|--|
| <b>Materials:</b>   |  |
| - Valve body, slide   | Nodular cast iron<br>EN-GJS-400-15                     |
| - Sealing element and O-ring  | Silicone/PTFE  |
| <b>Flow characteristic</b>  | Almost linear  |
| <b>Leakage rate</b>   | ANSI class IV/EN 1349<br>< 0.01%                       |
| <b>Flanges<br/>- Option</b>   | EN 1092-2 PN 10<br>JIS B 2210 5K/10K<br>ANSI class 150 |
| <b>Max. pressure <math>\Delta p</math>, against<br/>which the valve can close</b> | 5 bar  |
| <b>Nominal pressure</b>   | PN 10  |
| <b>Design temperature</b>   | 120°C  |
| <b>Optional temperature</b>   | 150°C  |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime
- Ultra Low Leakage rate secures energy savings - Best in class
- Most compact valve on the market
- Full flexibility on port orientation on AB right or AB left

Subject to change without notice.

**PORT NUMBERING: AB-RIGHT**

**PORT NUMBERING: AB-LEFT**

**MOUNTING**

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

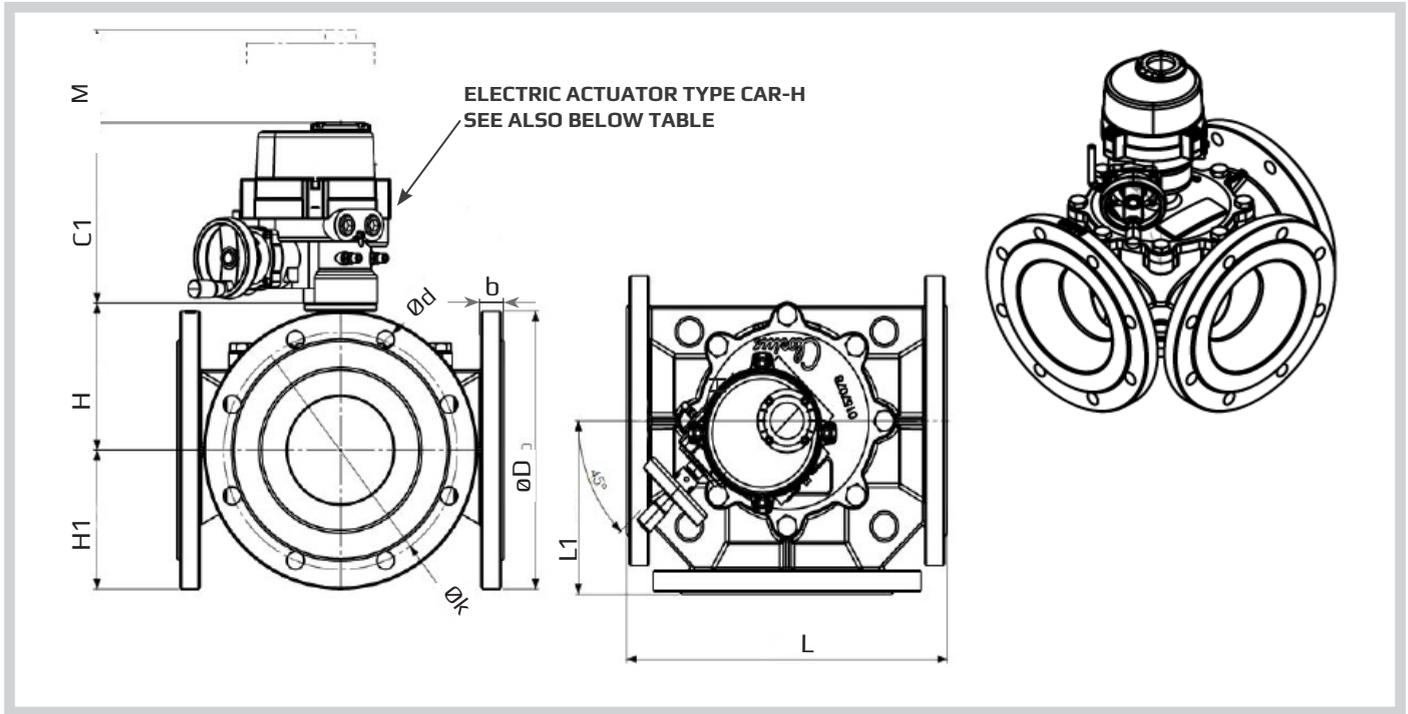
# 3-way Control Valve type G3FMT-ULL (Ultra Low Leakage) - High Flow

Nodular cast iron, PN10, DN100, 200 & 350 mm

0-2.6.19-A

Page 3 of 4

## DIMENSION SKETCH



**SPECIFICATIONS - TABLE 1** (read this together with table on page 4)

| Type          | L (mm) | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C1 (mm) | M (mm) | Electric Actuator Type CAR-H |
|---------------|--------|---------|--------|---------|--------|---------|--------|------------------------------|
| 100 G3FMT-ULL | 296    | 148     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006/010                |
| 200 G3FMT-ULL | 410    | 205     | 202    | ØD/2    | 28,4   | 261     | 150    | CAR-H -016                   |
| 350 G3FMT-ULL | 660    | 330     | 277,5  | ØD/2    | 36     | 315     | 180    | CAR-H 050                    |

ØD/2 - Depends on flange type (see also table 2)

Subject to change without notice.

**SPECIFICATIONS - TABLE 2**

| Flange connections | EN 1092-2     |               |                    | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |
|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|                    | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) |
| DN100              | 220           | 180           | 19x(8)             | 230            | 191           | 19x(8)             | 200           | 165           | 19x(8)             | 210            | 175           | 19x(8)             |
| DN200              | 343           | 295           | 22x(8)             | 343            | 298           | 22x(8)             | 320           | 280           | 23x(8)             | 330            | 290           | 23x(12)            |
| DN350              | 505           | 460           | 23x(16)            | 533            | 476           | 29x(12)            | 480           | 435           | 25x(12)            | 490            | 445           | 25x(16)            |

**SPECIFICATIONS - TABLE 3**

| Type  | Flange connection DN in mm | KvS m <sup>3</sup> /h** | Torque Nm For inlet P* | Weight kg |
|-------|----------------------------|-------------------------|------------------------|-----------|
| DN100 | 100                        | 270                     | 40                     | 28        |
| DN200 | 200                        | 1.300                   | 150                    | 72        |
| DN350 | 350                        | 3.840                   | 530                    | 183       |

\*Torque calculated at max Δ P for: DN100 - 450 - 5 Bar

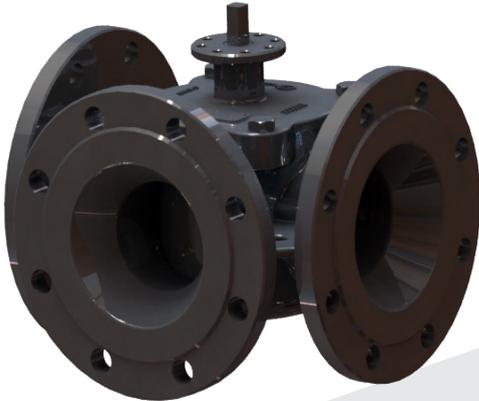
\*\*NOTE: KvS is max. KvS value

# 3-way Control Valve type G3FMT-UULLM Ultra Low Leakage (Middle)

Nodular cast iron, PN10, DN100 - 250 mm

0-2.6.17-A

Page 1 of 4



## TECHNICAL DATA

|   |                                     |
|---|-------------------------------------|
| <b>Materials:</b>   |                                     |
| - Valve body, slide   | Nodular cast iron<br>EN-GJS-400-15  |
| - Sealing element and O-ring  | Silicone/PTFE                       |
| <b>Flow characteristic</b>  | Almost linear                       |
| <b>Leakage rate</b>   | ANSI class IV/EN 1349<br>< 0.01%    |
| <b>Flanges</b>  | EN 1092-2 PN 10                     |
| - Option  | JIS B 2210 5K/10K<br>ANSI class 150 |
| <b>Max. pressure <math>\Delta p</math>, against which the valve can close</b> | 5 bar                               |
| <b>Nominal pressure</b>   | PN 10                               |
| <b>Design temperature</b>   | 120°C                               |
| <b>Optional temperature</b>   | 150°C                               |

## APPLICATIONS

Control valve type G3FMT-UULLM is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR -H with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 - option JIS B 2210 5K/10K and ANSI class 150.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open.

In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide.

PTFE sealing element and O-ring are mounted in the slider groove to minimize leakage.

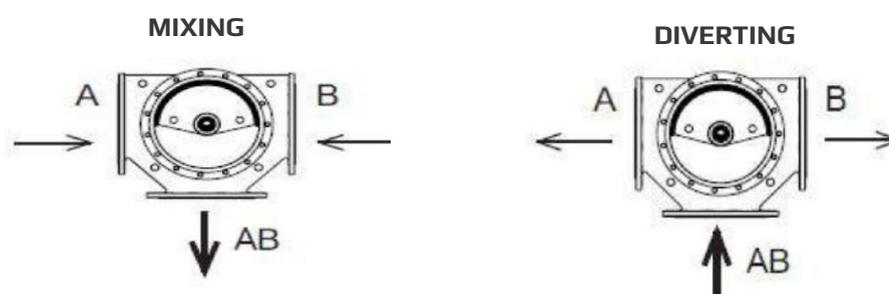
This section to be read together with sketches page 2 this data sheet.

## FEATURES

- Simple design secures reliable controls and reduces costly downtime
- Ultra Low Leakage rate secures energy savings - Best in class
- Most compact valve on the market
- Full flexibility on port orientation

Subject to change without notice.

**PORT NUMBERING: AB-MIDDLE**



**MOUNTING**

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

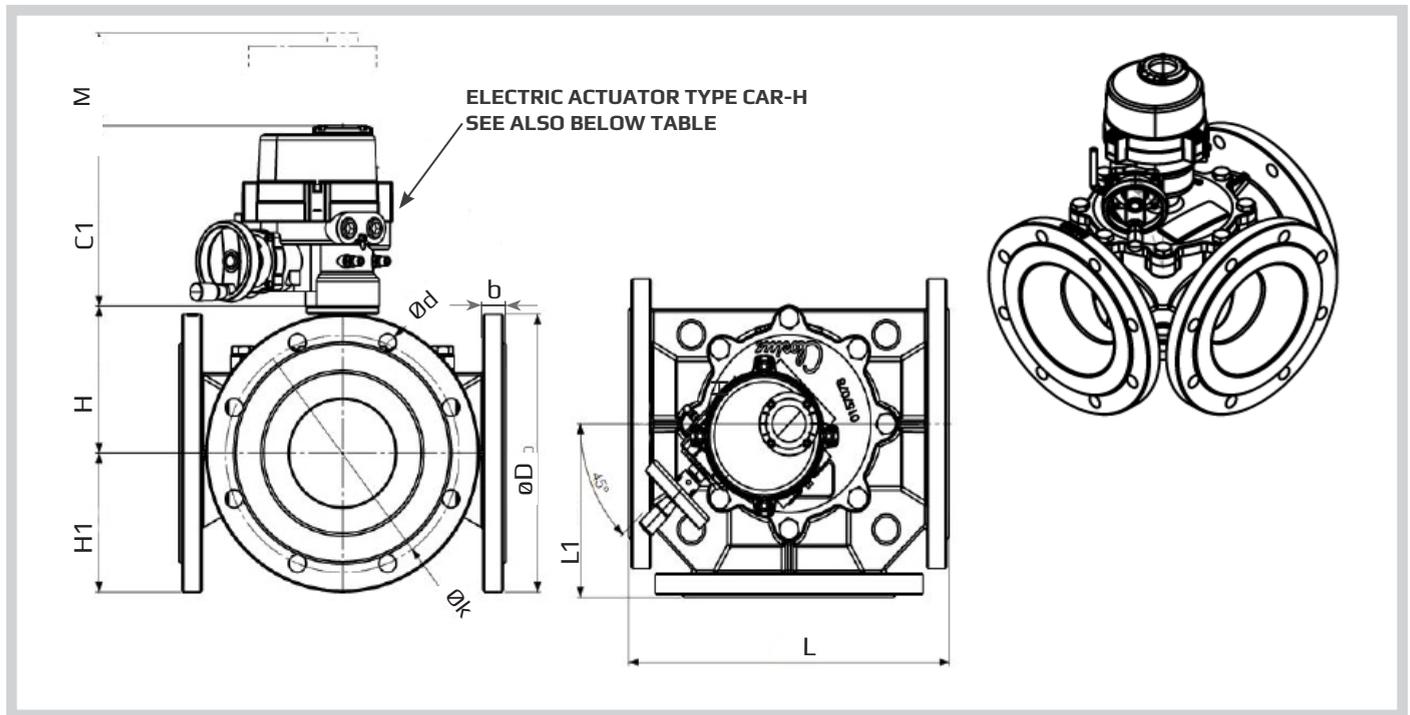
# 3-way Control Valve type G3FMT- ULLM Ultra Low Leakage (Middle)

Nodular cast iron, PN10, DN100 - 250 mm

0-2.6.17-A

Page 3 of 4

## DIMENSION SKETCH



**SPECIFICATIONS - TABLE 1** (read this together with table on page 4)

| Type                 | L (mm) | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C1 (mm) | M (mm) | Electric Actuator Type CAR-H |
|----------------------|--------|---------|--------|---------|--------|---------|--------|------------------------------|
| 100 G3FMT-ULLM (*HF) | 296    | 148     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006/010                |
| 125 G3FMT-ULLM       | 330    | 165     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006/010                |
| 125 G3FMT-ULLM JI55K | 320    | 160     | 140    | ØD/2    | 19     | 223     | 110    | CAR-H 006/010                |
| 150 G3FMT-ULLM       | 356    | 178     | 149    | ØD/2    | 25,4   | 223     | 110    | CAR-H 006/016                |
| 200 G3FMT-ULLM       | 410    | 205     | 182    | ØD/2    | 28,4   | 261     | 150    | CAR-H 016                    |
| 200 G3FMT-ULLM (**L) | 484    | 242     | 182    | ØD/2    | 28,4   | 261     | 150    | CAR-H -016                   |
| 250 G3FMT-ULLM       | 480    | 240     | 202    | ØD/2    | 31     | 261     | 150    | CAR-H -020                   |

\* High Flow

\*\* Long Version

ØD/2 - Depends on flange type (see also table 2)

Subject to change without notice.

**SPECIFICATIONS - TABLE 2**

| Flange connections | EN 1092-2     |               |                    | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |
|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|                    | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) |
| DN100              | 220           | 180           | 19x(8)             | 230            | 191           | 19x(8)             | 200           | 165           | 19x(8)             | 210            | 175           | 19x(8)             |
| DN125              | 250           | 210           | 19x(8)             | 255            | 216           | 22x(8)             | 235           | 200           | 19x(8)             | 250            | 210           | 23x(8)             |
| DN150              | 285           | 240           | 23x(8)             | 280            | 241           | 22x(8)             | 265           | 230           | 19x(8)             | 280            | 240           | 23x(8)             |
| DN200              | 343           | 295           | 22x(8)             | 343            | 298           | 22x(8)             | 320           | 280           | 23x(8)             | 330            | 290           | 23x(12)            |
| DN250              | 405           | 350           | 23x(12)            | 405            | 362           | 25x(12)            | 385           | 345           | 23x(12)            | 400            | 355           | 25x(12)            |

**SPECIFICATIONS - TABLE 3**

| Type        | Flange connection DN in mm | KvS m <sup>3</sup> /h | Torque Nm For inlet P | Weight kg |
|-------------|----------------------------|-----------------------|-----------------------|-----------|
| DN100 (*HF) | 100                        | 179                   | 40                    | 27        |
| DN125       | 125                        | 179                   | 40                    | 36        |
| DN150       | 150                        | 310                   | 90                    | 44,5      |
| DN200       | 200                        | 550                   | 120                   | 71        |
| DN250       | 250                        | 830                   | 150                   | 102       |

\*Torque calculated at max  $\Delta P$  for: DN100 - 450 - 5 Bar

\*\*NOTE: KvS is max. KvS value

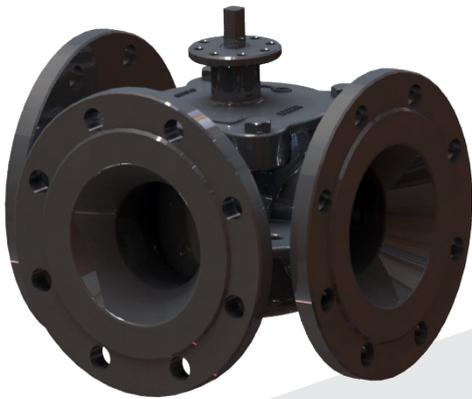
**NOTE: DN300/350/400 ARE AVAILABLE ON REQUEST**

# 3-way Control Valve type G3FMT-SL

Nodular cast iron, PN10, DN125 - DN 550 & DN 650 mm

0-2.6.16-G

Page 1 of 4



## TECHNICAL DATA

### Materials:

|                              |                                    |
|------------------------------|------------------------------------|
| - Valve body, slide          | Nodular cast iron<br>EN-GJS-400-15 |
| - Sealing element and O-ring | Silicone/PTFE                      |

Flow characteristic Almost linear

Leakage rate ANSI class I

Flanges EN 1092-2 PN 10  
- Option JIS B 2210 5K/10K  
ANSI class 150

Max. pressure  $\Delta p$ , against which the valve can close 5 bar

Nominal pressure PN 10

Design temperature 120°C

## APPLICATIONS

Control valve type G3FMT-SL is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR-H with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 - option JIS B 2210 5K/10k and ANSI class 150.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide.

Connection described for AB-Left valves - reverse connection for AB-Right valves.

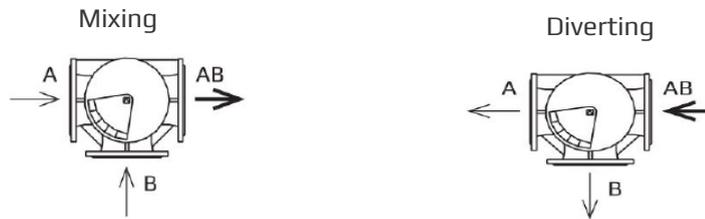
This section to be read together with sketches page 2 this data sheet.

## FEATURES

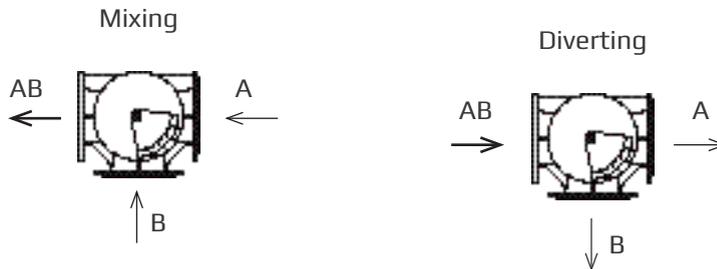
- Simple design secures reliable controls and reduces costly downtime
- Most compact valve on the market
- Full flexibility on port orientation AB right or AB left

Subject to change without notice.

**PORT NUMBERING: AB-RIGHT**



**PORT NUMBERING: AB-LEFT**



**MOUNTING**

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

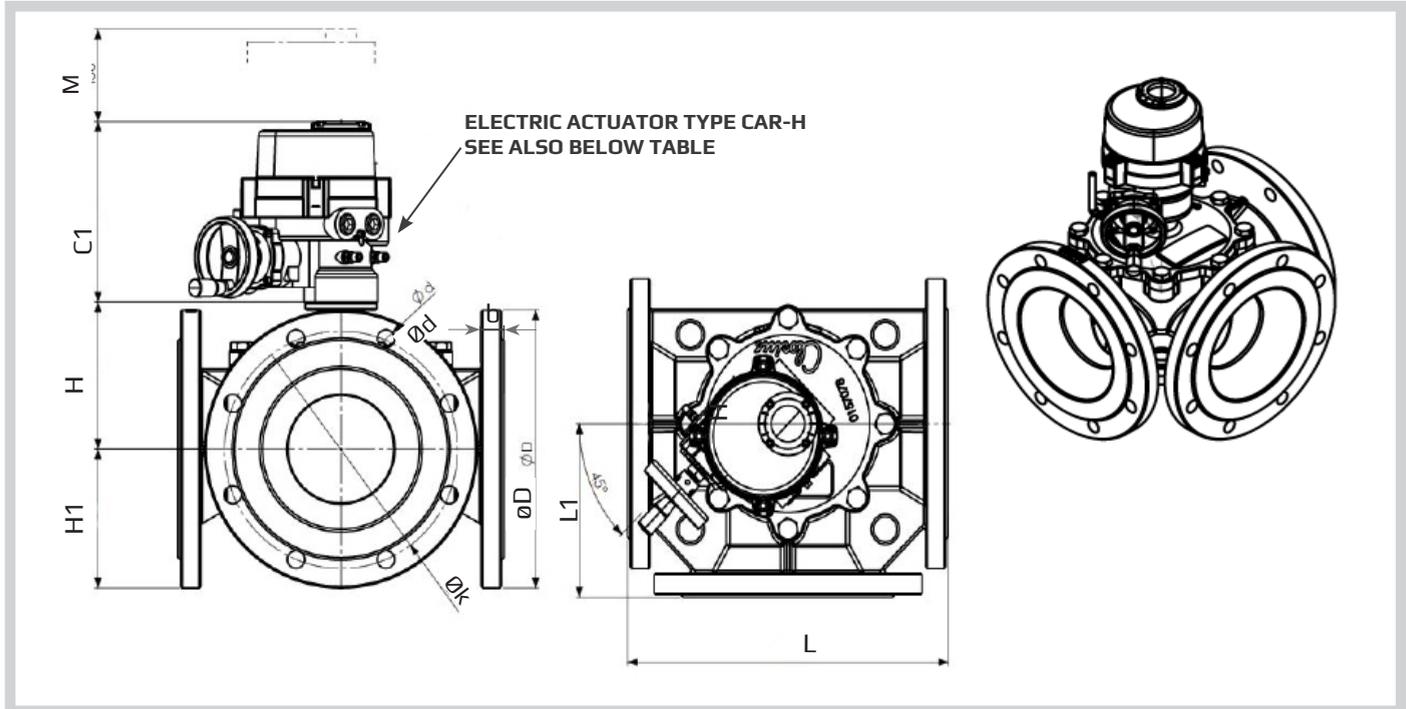
# 3-way Control Valve type G3FMT-SL

Nodular cast iron, PN10, DN125 - DN 550 & DN 650 mm

0-2.6.16-G

Page 3 of 4

## DIMENSION SKETCH



**SPECIFICATIONS - TABLE 1** (read this together with table on page 4)

| Type                | L (mm) | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C1 (mm) | M (mm) | Electric Actuator Type CAR-H |
|---------------------|--------|---------|--------|---------|--------|---------|--------|------------------------------|
| 125 G3FMT-SL        | 330    | 165     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006                    |
| 125 G3FMT-SL JI55K  | 320    | 160     | 140    | ØD/2    | 19     | 223     | 110    | CAR-H 006                    |
| 150 G3FMT-SL        | 356    | 178     | 149    | ØD/2    | 25,4   | 223     | 110    | CAR-H 006                    |
| 200 G3FMT-SL        | 410    | 205     | 182    | ØD/2    | 28,4   | 223     | 110    | CAR-H 010                    |
| 200 G3FMT-SL (*L)   | 484    | 242     | 182    | ØD/2    | 28,4   | 223     | 110    | CAR-H - 010                  |
| 250 G3FMT-SL        | 480    | 240     | 202    | ØD/2    | 31     | 223     | 110    | CAR-H -010                   |
| 300 G3FMT-SL (**RF) | 580    | 290     | 202    | ØD/2    | 32     | 223     | 110    | CAR-H 010                    |
| 300 G3FMT-SL        | 560    | 280     | 237    | ØD/2    | 32     | 261     | 150    | CAR-H -020                   |
| 350 G3FMT-SL        | 660    | 330     | 256    | ØD/2    | 36     | 261     | 150    | CAR-H 024                    |
| 400 G3FMT-SL        | 720    | 360     | 278    | ØD/2    | 38     | 315     | 180    | CAR-H 035                    |
| 500 G3FMT-SL        | 840    | 420     | 308    | ØD/2    | 32     | 315     | 180    | CAR-H 050                    |
| 550 G3FMT-SL        | 840    | 420     | 308    | ØD/2    | 32     | 315     | 180    | CAR-H 050                    |
| 650- G3FMT-SL       | 950    | 475     | 339    | ØD/2    | 32     | 353     | 200    | CAR-H 080                    |

\* Long Version  
\*\* Reduced Flow

ØD/2 - Depends on flange type (see also table 2)

Subject to change without notice.

**SPECIFICATIONS - TABLE 2**

| Flange connections | EN 1092-2     |               |                    | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |
|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|                    | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) |
| DN125              | 250           | 210           | 19x(8)             | 255            | 216           | 22x(8)             | 235           | 200           | 19x(8)             | 250            | 210           | 23x(8)             |
| DN150              | 285           | 240           | 23x(8)             | 280            | 241           | 22x(8)             | 265           | 230           | 19x(8)             | 280            | 240           | 23x(8)             |
| DN200              | 343           | 295           | 22x(8)             | 343            | 298           | 22x(8)             | 320           | 280           | 23x(8)             | 330            | 290           | 23x(12)            |
| DN250              | 405           | 350           | 23x(12)            | 405            | 362           | 25x(12)            | 385           | 345           | 23x(12)            | 400            | 355           | 25x(12)            |
| DN300              | 455           | 400           | 23x(12)            | 483            | 432           | 25x(12)            | 430           | 390           | 23x(12)            | 445            | 400           | 25x(16)            |
| DN350              | 505           | 460           | 23x(16)            | 533            | 476           | 29x(12)            | 480           | 435           | 25x(12)            | 490            | 445           | 25x(16)            |
| DN400              | 565           | 515           | 28x(16)            | 597            | 540           | 29x(16)            | 540           | 495           | 25x(16)            | 560            | 510           | 27x(16)            |
| DN500              | 670           | 620           | 28x(20)            | 699            | 635           | 32x(20)            | 655           | 605           | 25x(20)            | 675            | 620           | 27x(20)            |
| DN550              | -             | -             | -                  | -              | -             | -                  | 720           | 665           | 27x(20)            | 745            | 680           | 33x(20)            |
| DN650              | -             | -             | -                  | -              | -             | -                  | 825           | 770           | 27x(24)            | 845            | 780           | 33x(24)            |

**SPECIFICATIONS - TABLE 3**

| Type         | Flange connection | KvS m3/h | Torque Nm | Weight kg |
|--------------|-------------------|----------|-----------|-----------|
| DN125        | 125               | 260      | 40        | 34        |
| DN150        | 150               | 430      | 45        | 42        |
| DN200        | 200               | 770      | 90        | 67        |
| DN250        | 250               | 1.230    | 115       | 96        |
| DN300 (**RF) | 300               | 1.190    | 115       | 142       |
| DN300        | 300               | 2.030    | 160       | 130       |
| DN350        | 350               | 2.850    | 210       | 175       |
| DN400        | 400               | 3.760    | 265       | 220       |
| DN500        | 500               | 4.560    | 396       | 249       |
| DN550        | 550               | 4.560    | 396       | 298       |
| DN650        | 650               | 5.890    | 640       | 483       |

KvS-value for port A and B 50% open

\*Torque calculated at max Δ P for: DN100 - 300 - 5 Bar

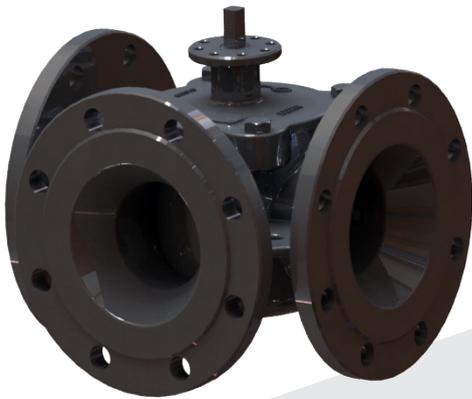
\*\*NOTE: KvS is max. KvS value

# 3-way Control Valve type G3FMT-SL - High Flow

Nodular cast iron, PN10, DN100, 200, 350 & 600 mm

0-2.6.20-B

Page 1 of 4



## TECHNICAL DATA

|   |                                     |
|---|-------------------------------------|
| <b>Materials:</b>   |                                     |
| - Valve body, slide   | Nodular cast iron<br>EN-GJS-400-15  |
| - Sealing element and O-ring  | Silicone/PTFE                       |
| <b>Flow characteristic</b>  | Almost linear                       |
| <b>Leakage rate</b>   | ANSI class I                        |
| <b>Flanges</b>  | EN 1092-2 PN 10                     |
| - Option  | JIS B 2210 5K/10K<br>ANSI class 150 |
| <b>Max. pressure <math>\Delta p</math>, against which the valve can close</b> | 5 bar                               |
| <b>Nominal pressure</b>   | PN 10                               |
| <b>Design temperature</b>   | 120°C                               |

## APPLICATIONS

Control valve type G3FMT-SL is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR-H with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 - option JIS B 2210 5K/10k and ANSI class 150.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide.

Connection described for AB-Left valves - reverse connection for AB-Right valves.

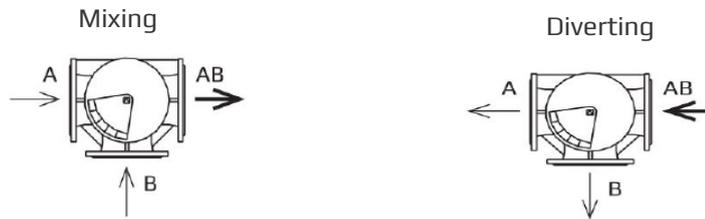
This section to be read together with sketches page 2 this data sheet.

## FEATURES

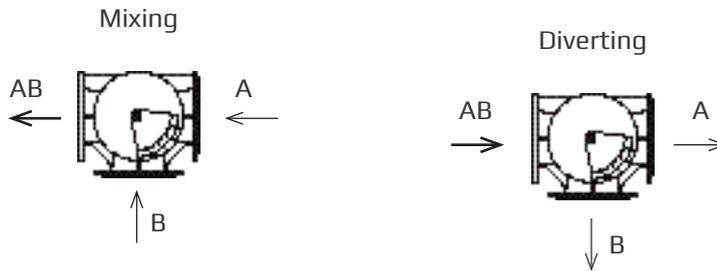
- Simple design secures reliable controls and reduces costly downtime
- Most compact valve on the market
- Full flexibility on port orientation AB right or AB left

Subject to change without notice.

**PORT NUMBERING: AB-RIGHT**



**PORT NUMBERING: AB-LEFT**



**MOUNTING**

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

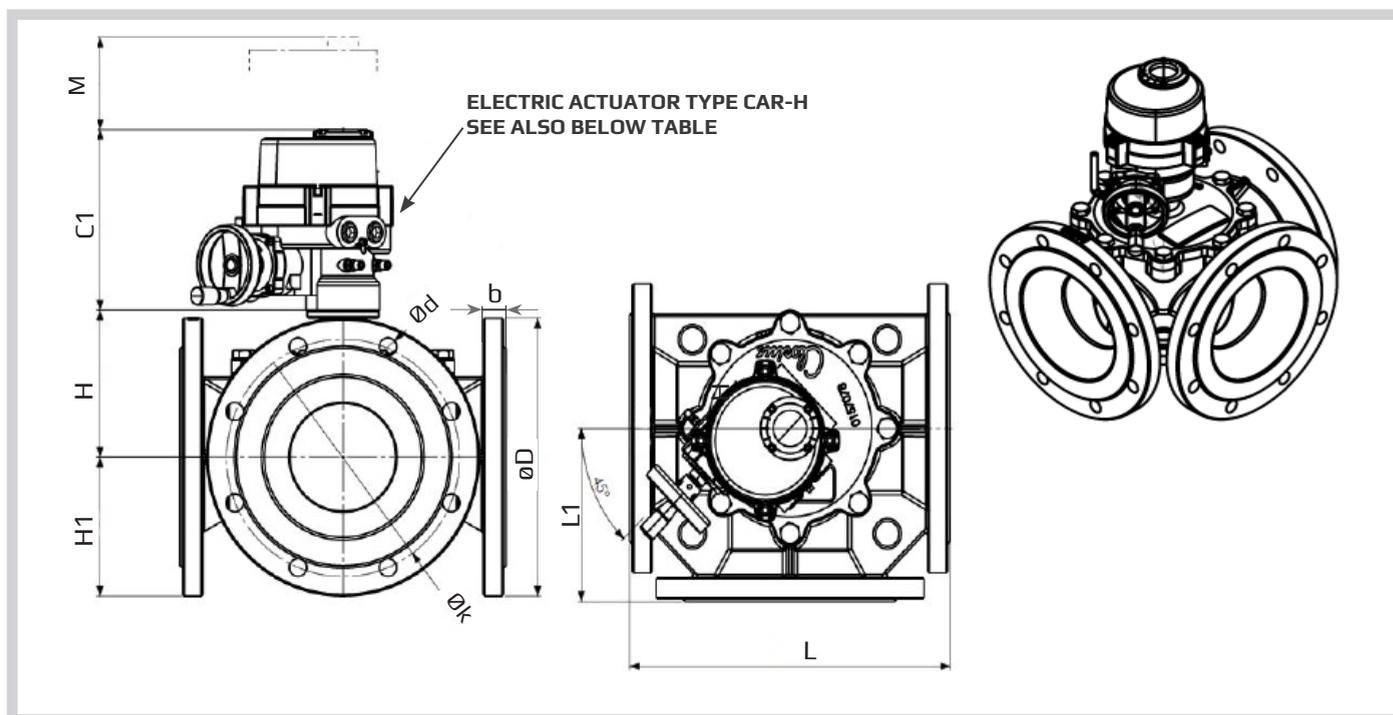
# 3-way Control Valve type G3FMT-SL - High Flow

Nodular cast iron, PN10, DN100, 200, 350 & 600 mm

0-2.6.20-B

Page 3 of 4

## DIMENSION SKETCH



**SPECIFICATIONS - TABLE 1** (read this together with table on page 4)

| Type         | L (mm) | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C1 (mm) | M (mm) | Electric Actuator Type CAR-H |
|--------------|--------|---------|--------|---------|--------|---------|--------|------------------------------|
| 100 G3FMT-SL | 296    | 148     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006                    |
| 200 G3FMT-SL | 410    | 205     | 202    | ØD/2    | 28,4   | 223     | 110    | CAR-H 010                    |
| 350 G3FMT-SL | 660    | 330     | 277,5  | ØD/2    | 36     | 315     | 150    | CAR-H 035                    |
| 600 G3FMT-SL | 950    | 475     | 339    | ØD/2    | 32     | 353     | 200    | CAR-H 080                    |

ØD/2 - Depends on flange type (see also table 2)

Subject to change without notice.

**SPECIFICATIONS -  
TABLE 2**

| Flange connections | EN 1092-2           |                     |                          | ANSI Class 150      |                     |                          | JIS B 2210 5K       |                     |                          | JIS B 2210 10K      |                     |                          |
|--------------------|---------------------|---------------------|--------------------------|---------------------|---------------------|--------------------------|---------------------|---------------------|--------------------------|---------------------|---------------------|--------------------------|
|                    | D<br>(dia.)<br>(mm) | k<br>(dia.)<br>(mm) | d mm<br>dia.<br>(number) |
| DN100              | 220                 | 180                 | 19x(8)                   | 230                 | 191                 | 19x(8)                   | 200                 | 165                 | 19x(8)                   | 210                 | 175                 | 19x(8)                   |
| DN200              | 343                 | 295                 | 22x(8)                   | 343                 | 298                 | 22x(8)                   | 320                 | 280                 | 23x(8)                   | 330                 | 290                 | 23x(12)                  |
| DN350              | 505                 | 460                 | 23x(16)                  | 533                 | 476                 | 29x(12)                  | 480                 | 435                 | 25x(12)                  | 490                 | 445                 | 25x(16)                  |
| DN600              | 780                 | 725                 | 31X(20)                  | 813                 | 749                 | 22x(8)                   | 770                 | 715                 | 27X(20)                  | 795                 | 730                 | 33X(24)                  |

**SPECIFICATIONS - TABLE 3**

| Type  | Flange connection | KvS<br>m <sup>3</sup> /h | Torque<br>Nm | Weight<br>kg |
|-------|-------------------|--------------------------|--------------|--------------|
| DN100 | 100               | 270                      | 40           | 28           |
| DN200 | 200               | 1.300                    | 115          | 72           |
| DN350 | 350               | 3.840                    | 265          | 183          |
| DN600 | 600               | 5.760                    | 640          | 438          |

\*Torque calculated at max  $\Delta P$  for: DN100 - 300 - 5 Bar

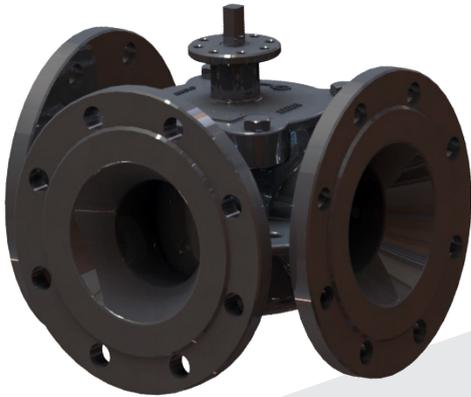
\*\*NOTE: KvS is max. KvS value

# 3-way Control Valve type G3FMT-SLM (Middle)

Nodular cast iron, PN10, DN100 - 250 mm

0-2.6.18-A

Page 1 of 4



## APPLICATIONS

Control valve type G3FMT-SLM is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR -H with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 - option JIS B 2210 5K/10k and ANSI class 150.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide.

This section to be read together with sketches page 2 this data sheet.

## TECHNICAL DATA

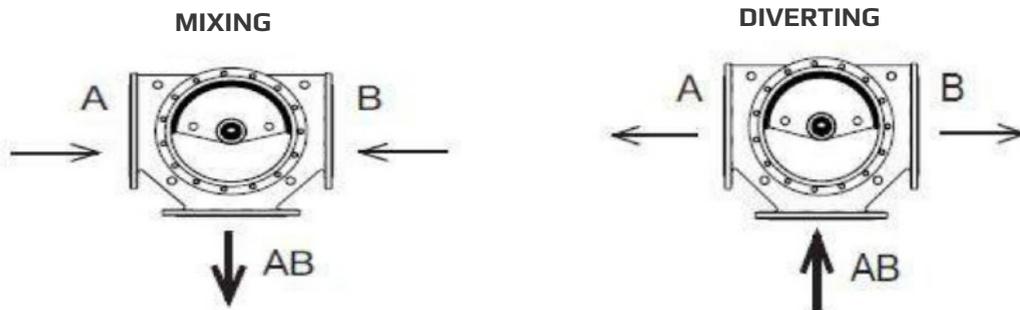
|   |                                     |
|---|-------------------------------------|
| <b>Materials:</b>   |                                     |
| - Valve body, slide   | Nodular cast iron<br>EN-GJS-400-15  |
| - Sealing element and O-ring  | Silicone/PTFE                       |
| <b>Flow characteristic</b>  | Almost linear                       |
| <b>Leakage rate</b>   | ANSI class I                        |
| <b>Flanges</b>  | EN 1092-2 PN 10                     |
| - Option  | JIS B 2210 5K/10K<br>ANSI class 150 |
| <b>Max. pressure <math>\Delta p</math>, against which the valve can close</b> | 5 bar                               |
| <b>Nominal pressure</b>   | PN 10                               |
| <b>Design temperature</b>   | 120°C                               |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime
- Most compact valve on the market
- Full flexibility on port orientation

Subject to change without notice.

**PORT NUMBERING: AB-MIDDLE**



**MOUNTING**

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

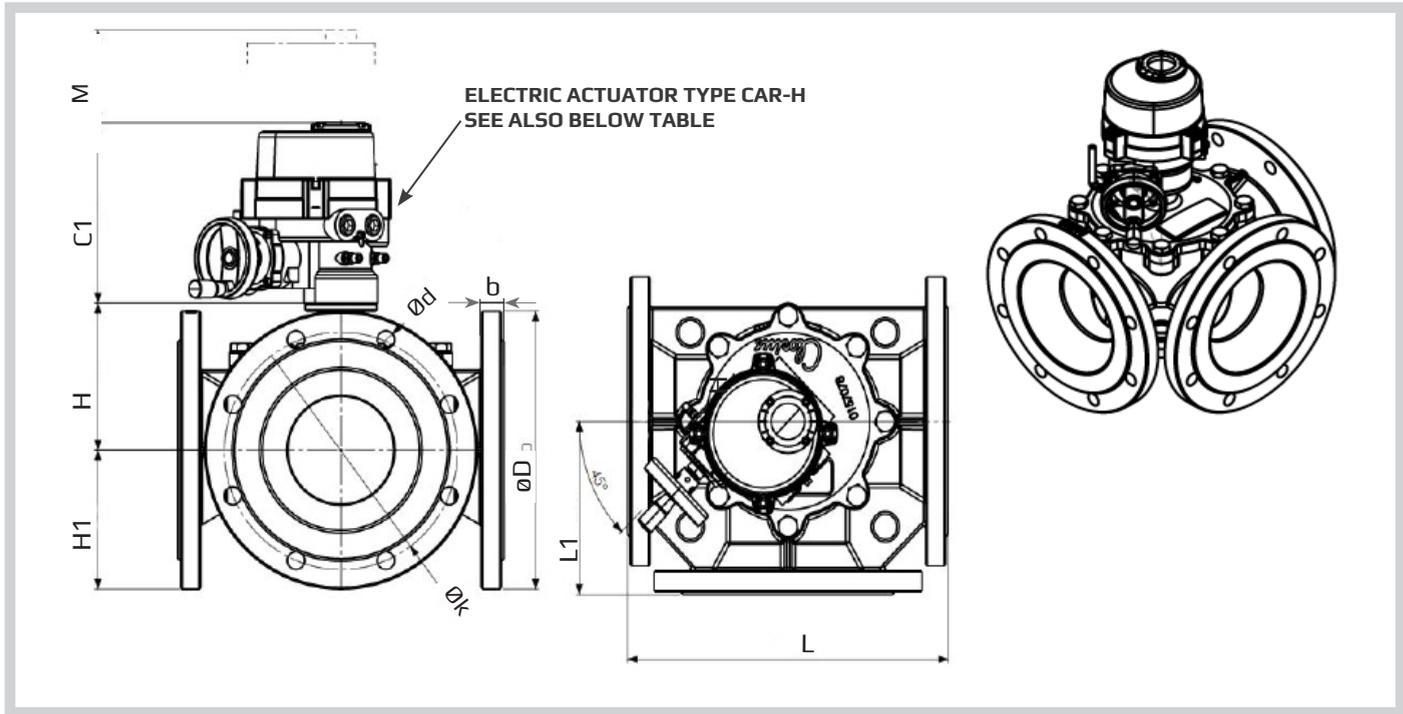
# 3-way Control Valve type G3FMT-SLM (Middle)

Nodular cast iron, PN10, DN100 - 250 mm

0-2.6.18-A

Page 3 of 4

## DIMENSION SKETCH



**SPECIFICATIONS - TABLE 1** (read this together with table on page 4)

| Type                  | L (mm) | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C1 (mm) | M (mm) | Electric Actuator Type CAR-H |
|-----------------------|--------|---------|--------|---------|--------|---------|--------|------------------------------|
| 100 G3FMT-SLM (*HF)   | 296    | 148     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006                    |
| 125 G3FMT-SLM         | 330    | 165     | 140    | ØD/2    | 24     | 223     | 110    | CAR-H 006                    |
| 125 G3FMT-SLM (JIS5K) | 320    | 160     | 140    | ØD/2    | 19     | 223     | 110    | CAR-H 006                    |
| 150 G3FMT-SLM         | 356    | 178     | 149    | ØD/2    | 25,4   | 223     | 110    | CAR-H 006                    |
| 200 G3FMT-SLM         | 410    | 205     | 182    | ØD/2    | 28,4   | 223     | 110    | CAR-H 010                    |
| 200 G3FMT-SLM (**L)   | 484    | 242     | 182    | ØD/2    | 28,4   | 223     | 110    | CAR-H -010                   |
| 250 G3FMT-SLM         | 480    | 240     | 202    | ØD/2    | 31     | 223     | 110    | CAR-H -010                   |

\* High Flow

\*\* Long Version

ØD/2 - Depends on flange type (see also table 2)

Subject to change without notice.

**SPECIFICATIONS - TABLE 2**

| Flange connections | EN 1092-2     |               |                    | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |
|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|                    | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) |
| DN100              | 220           | 180           | 19x(8)             | 230            | 191           | 19x(8)             | 200           | 165           | 19x(8)             | 210            | 175           | 19x(8)             |
| DN125              | 250           | 210           | 19x(8)             | 255            | 216           | 22x(8)             | 235           | 200           | 19x(8)             | 250            | 210           | 23x(8)             |
| DN150              | 285           | 240           | 23x(8)             | 280            | 241           | 22x(8)             | 265           | 230           | 19x(8)             | 280            | 240           | 23x(8)             |
| DN200              | 343           | 295           | 22x(8)             | 343            | 298           | 22x(8)             | 320           | 280           | 23x(8)             | 330            | 290           | 23x(12)            |
| DN250              | 405           | 350           | 23x(12)            | 405            | 362           | 25x(12)            | 385           | 345           | 23x(12)            | 400            | 355           | 25x(12)            |

**SPECIFICATIONS - TABLE 3**

| Type        | Flange connection DN in mm | KvS m <sup>3</sup> /h | Torque Nm For inlet P | Weight kg |
|-------------|----------------------------|-----------------------|-----------------------|-----------|
| DN100 (*HF) | 100                        | 180                   | 40                    | 30        |
| DN125       | 125                        | 179                   | 40                    | 36        |
| DN150       | 150                        | 310                   | 45                    | 44,5      |
| DN200       | 200                        | 550                   | 90                    | 71        |
| DN250       | 250                        | 830                   | 115                   | 102       |

Torque calculated at max  $\Delta P$  for: DN100 - 250 - 5 Bar

**\*\*NOTE: KvS is max. KvS value**

NOTE: DN300/350/400 ARE AVAILABE ON REQUEST

# 3-way Control Valve type G3FM-TM (AB-Middle)

Nodular cast iron, PN16, DN 80 - 250 mm / PN10, DN 300 - 450 mm

0-2.6.03.02-D

Page 1 of 4



## APPLICATIONS

Control valve type G3FM-TM is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

## DESIGN

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## TECHNICAL DATA

### Materials:

|                       |                                    |
|-----------------------|------------------------------------|
| - Valve body, slide   | Nodular cast iron<br>EN-GJS-400-15 |
| - O-ring              | NBR 70A                            |
| - U-ring              | PTFE                               |
| Flow characteristic   | Almost linear                      |
| Leakage rate          | Max. 0.5%                          |
| Regulating capability | Kvs/Kvr > 25                       |

|          |                    |
|----------|--------------------|
| Flanges  | EN 1092-2 PN 10/16 |
| - Option | JIS B 2210 5K      |

Counter flanges (suggested for EN 1092-2) DIN 2633 – PN 16

Max. pressure  $\Delta p_L$ , against which the valve can close:

- DN 250 16 Bar
- DN 450 10 Bar

### Nominal pressure

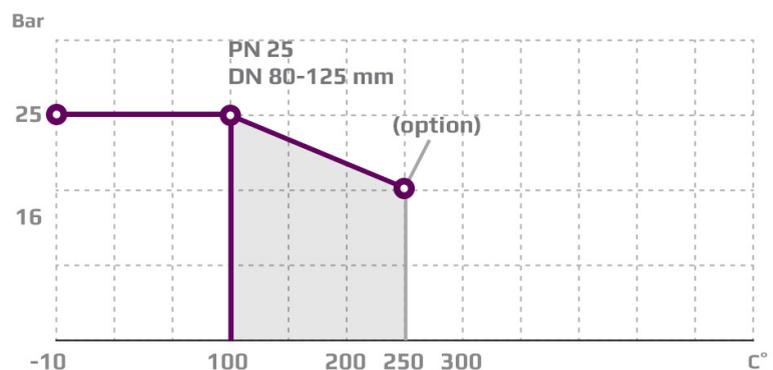
|             |                    |
|-------------|--------------------|
| - DN 250 mm | PN 16, max. 100°C  |
| - DN 450 mm | PN 10, max. 100 °C |

Slide in Nodular cast iron

## FEATURES

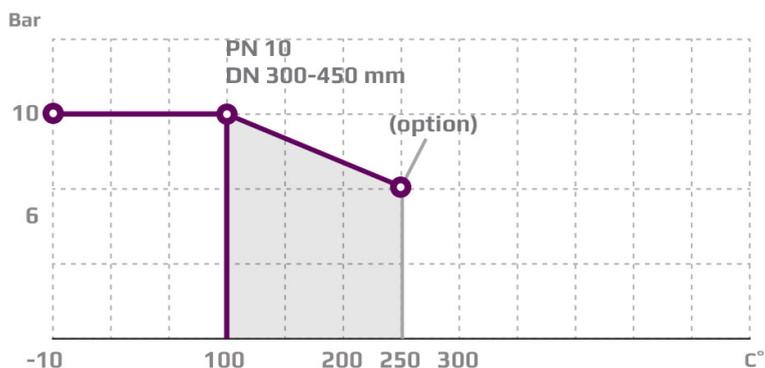
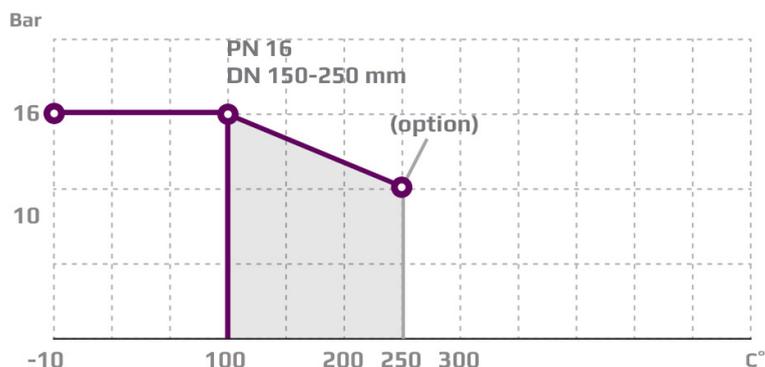
- Simple design secures reliable controls and reduces costly downtime.
- Low leakage rate secures energy savings.
- Flexible choice of port placement

Subject to change without notice.

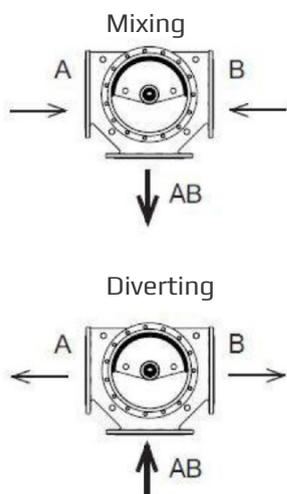


### PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING



### MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations. Valves can also be supplied in AB-Right configuration (data sheet 0.2.6.02.01) or AB-Left (data sheet 0.2.6.03).

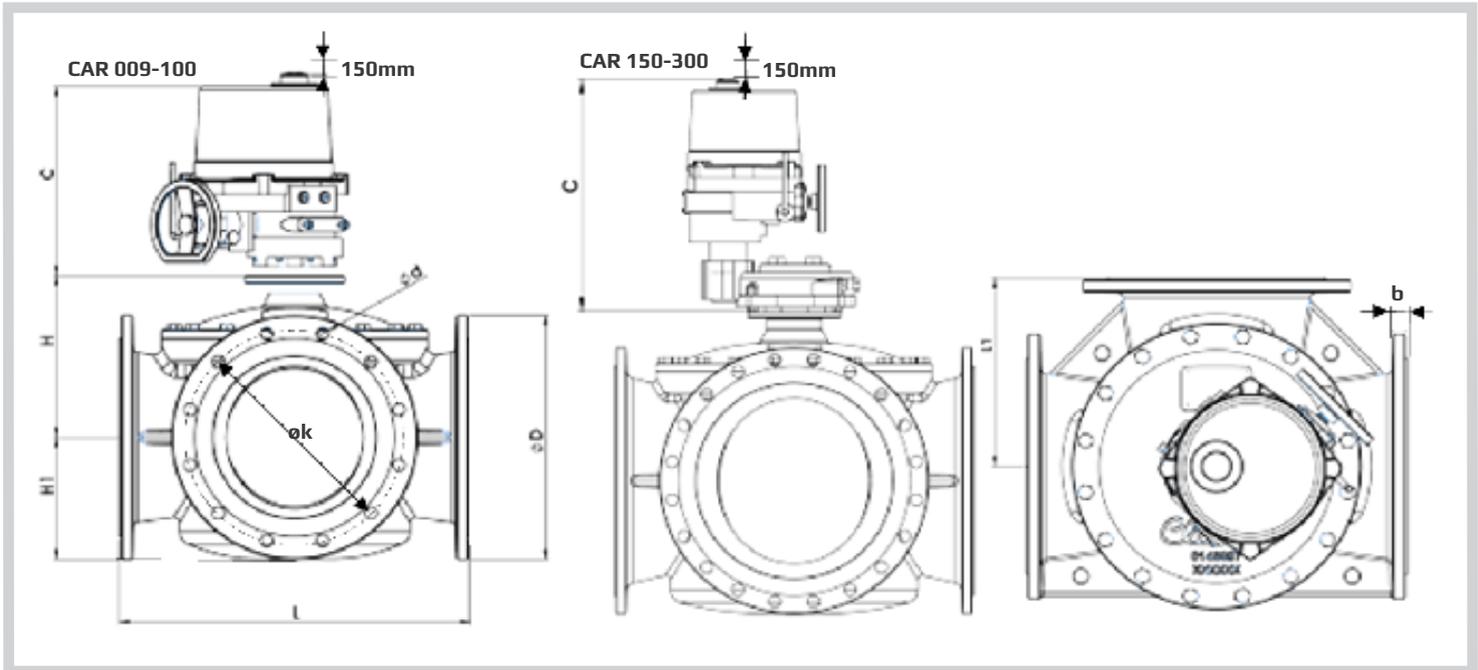
# 3-way Control Valve type G3FM-TM (AB-Middle)

Nodular cast iron, PN16, DN 80 - 250 mm / PN10, DN 300 - 450 mm

0-2.6.03.02-D

Page 3 of 4

## DIMENSION SKETCH



| Type        | L<br>(mm) | L1<br>(mm) | H<br>(mm) | H1<br>(mm) | b<br>(mm) | C<br>(mm) | EN 1092-2           |                     |                          | ANSI Class 150      |                     |                          | JIS B 2210 5K    |                  |                          | JIS B 2210 10K   |                  |                          |
|-------------|-----------|------------|-----------|------------|-----------|-----------|---------------------|---------------------|--------------------------|---------------------|---------------------|--------------------------|------------------|------------------|--------------------------|------------------|------------------|--------------------------|
|             |           |            |           |            |           |           | D<br>(dia.)<br>(mm) | k<br>(dia.)<br>(mm) | d mm<br>dia.<br>(number) | D<br>(dia.)<br>(mm) | k<br>(dia.)<br>(mm) | d mm<br>dia.<br>(number) | D (dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) | D (dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) |
| 80 G3FM-TM  | 292       | 146        | 140       | 94         | 20        | 273       | 200                 | 160                 | 19x(8)                   | 190                 | 190.8               | 19x(8)                   | 180              | 145              | 19x(4)                   | 185              | 150              | 19x(8)                   |
| 100 G3FM-TM | 350       | 175        | 158       | 112        | 17        | 273       | 235                 | 190                 | 23x(8)                   | 230                 | 190.9               | 19x(8)                   | 200              | 165              | 19x(8)                   | 210              | 175              | 19x(8)                   |
| 125 G3FM-TM | 400       | 200        | 179       | 123        | 19        | 273       | 270                 | 220                 | 28x(8)                   | 255                 | 216                 | 22x(8)                   | 235              | 200              | 19x(8)                   | 250              | 210              | 23x(8)                   |
| 150 G3FM-TM | 437       | 218,5      | 196       | 139        | 19        | 276       | 285                 | 240                 | 23x(8)                   | 280                 | 241                 | 22x(8)                   | 265              | 230              | 19x(8)                   | 280              | 240              | 23x(8)                   |
| 200 G3FM-TM | 530       | 265        | 232       | 169        | 20        | 361       | 340                 | 295                 | 23x(12)                  | 343                 | 299                 | 23x(8)                   | 320              | 280              | 23x(8)                   | 320              | 290              | 23x(12)                  |
| 250 G3FM-TM | 592       | 296        | 272       | 199        | 22        | 361       | 400                 | 355                 | 28x(12)                  | 407                 | 362                 | 26x(12)                  | 385              | 345              | 23x(12)                  | 400              | 355              | 25x(12)                  |
| 300 G3FM-TM | 649       | 324,5      | 302       | 227        | 25        | 361       | 455                 | 410                 | 28x(12)                  | 483                 | 432                 | 26x(12)                  | 430              | 390              | 23x(12)                  | 445              | 400              | 25x(16)                  |
| 350 G3FM-TM | 717       | 358,5      | 334,5     | 251,5      | 25        | 361       | 505                 | 460                 | 23x(16)                  | 534                 | 477                 | 29x(12)                  | 480              | 435              | 25x(12)                  | 490              | 445              | 25x(16)                  |
| 400 G3FM-TM | 770       | 385        | 370       | 282        | 25        | 361       | 565                 | 515                 | 28x(16)                  | 597                 | 540                 | 29x(16)                  | 540              | 495              | 25x(16)                  | 560              | 510              | 27x(16)                  |
| 450 G3FM-TM | 820       | 410        | 391       | 307        | 26        | 556       | 615                 | 565                 | 28x(20)                  | 635                 | 578                 | 32x(16)                  | 605              | 555              | 25x(16)                  | 620              | 565              | 27x(20)                  |

## SPECIFICATIONS

| Type        | Flange connection<br>DN in mm | $k_{vs}$ -value <sup>(1)</sup><br>Mixing valve<br>m <sup>3</sup> /h | $k_{vs}$ -value <sup>(1)</sup><br>Diverting valve<br>m <sup>3</sup> /h | Torque<br>Nm<br>for inlet P* | Weight<br>kg |
|-------------|-------------------------------|---|--|------------------------------|--------------|
| 65 G3FM-TM  | 65                            | 110   | 127  | 72                           | 20           |
| 80 G3FM-TM  | 80                            | 122   | 154  | 85                           | 29           |
| 100 G3FM-TM | 100                           | 220   | 248  | 145                          | 41           |
| 125 G3FM-TM | 125                           | 369   | 437  | 245                          | 58           |
| 150 G3FM-TM | 150                           | 510   | 600  | 259                          | 71           |
| 200 G3FM-TM | 200                           | 807   | 1100   | 435                          | 114          |
| 250 G3FM-TM | 250                           | 1500  | 2100   | 695                          | 159          |
| 300 G3FM-TM | 300                           | 2000  | 2650   | 795                          | 207          |
| 350 G3FM-TM | 350                           | 2530  | 3380   | 1350                         | 278          |
| 400 G3FM-TM | 400                           | 3050  | 3950   | TBC                          | 346          |
| 450 G3FM-TM | 450                           | 3680  | 4480   | 2100                         | 433          |

<sup>1)</sup> $k_{vs}$ -value for port A and B 50% open.

\*Torque calculated at max inlet P for:

DN 65 - 125 = 25 Bar

DN 150-250 - 16 Bar

DN 300-450 - 10 Bar



# 3-WAY CONTROL VALVE TYPE G3CM-T

Nodular Cast Iron, PN25 DN 100 – 125 mm, PN16 DN 150 - 300 mm, Grooved Joints

0-2.6.05-B

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                     |               |
|---------------------|---------------|
| - Valve body, slide | EN-GJS-400-15 |
| - O-ring            | NBR 70A       |
| - U-ring            | PTFE          |

|                       |               |
|-----------------------|---------------|
| Flow characteristic   | Almost linear |
| Leakage rate          | Max. 0.5%     |
| Regulating capability | Kvs/Kvr > 25  |

|            |   |
|------------|---|
| Connection | Grooved joints acc. to<br>ANSI/AWWA<br>C-606 (Victaulic joints) |
|------------|---|

Max. pressure  $\Delta p_L$ , against which the valve can close 16 bar

Nominal pressure  
DN 100 - 125mm PN 25, max. 100°C (option 250°C)  
DN 150 - 300mm PN 16, max. 100°C (option 250°C)

Slide in Nodular cast iron

## APPLICATIONS

Control valve type G3CM-T is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

## DESIGN

The valve body and the valve slide are made of nodular cast iron.

## FUNCTION

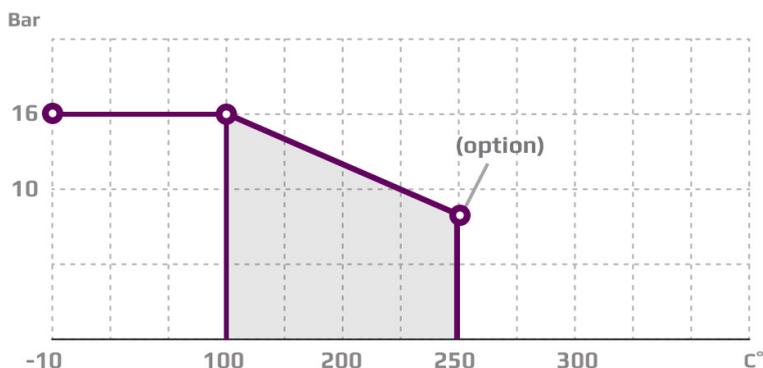
The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Grooved ends - ready for coupling installation
- No need for counter flange

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



Subject to change without notice.

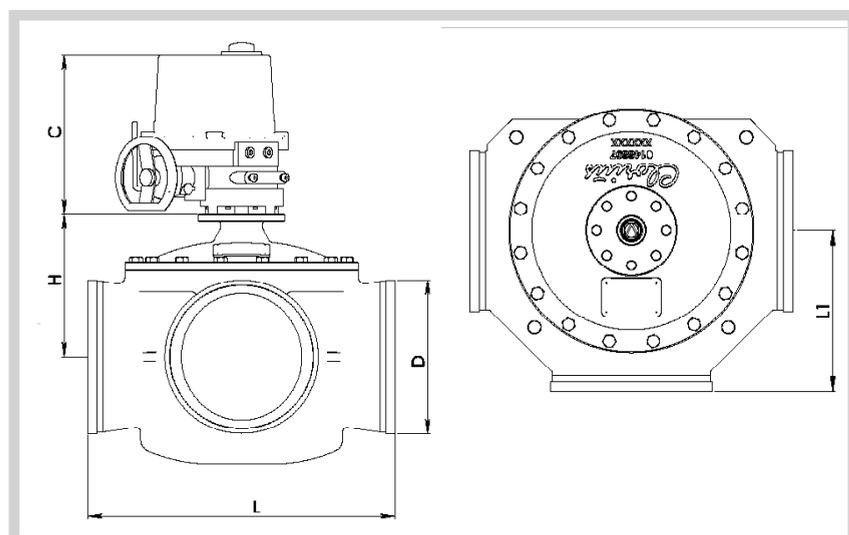
## PORT NUMBERING



## MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed vertically as well as horizontally. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

## DIMENSION SKETCH



| Type       | L mm | L1 mm | H mm | B mm | C mm | D (dia.) mm |
|------------|------|-------|------|------|------|-------------|
| 100 G3CM-T | 350  | 175   | 132  | 19   | 470  | 114         |
| 150 G3CM-T | 480  | 270   | 216  | 24   | 470  | 168         |
| 200 G3CM-T | 530  | 270   | 236  | 21   | 361  | 219         |
| 250 G3CM-T | 592  | 300   | 273  | 23   | 361  | 273         |
| 300 G3CM-T | 649  | 330   | 305  | 25.5 | 361  | 324         |

## SPECIFICATIONS

| Type                    | Connection DN in mm | $k_{vs}$ -value <sup>(1)</sup> Mixing valve m <sup>3</sup> /h | $k_{vs}$ -value <sup>(1)</sup> Diverting valve m <sup>3</sup> /h | Weight kg |
|-------------------------|---------------------|---|--|-----------|
| 100 G3CM <sup>(2)</sup> | 100                 | 125   | 107.5  | 33        |
| 150 G3CM                | 150                 | 310   | 266.6  | 88        |
| 200 G3CM-T              | 200                 | 800   | 1100   | 92        |
| 250 G3CM-T              | 250                 | 1500  | 2100   | 130       |
| 300 G3CM-T              | 300                 | 2000  | 2650   | 170       |

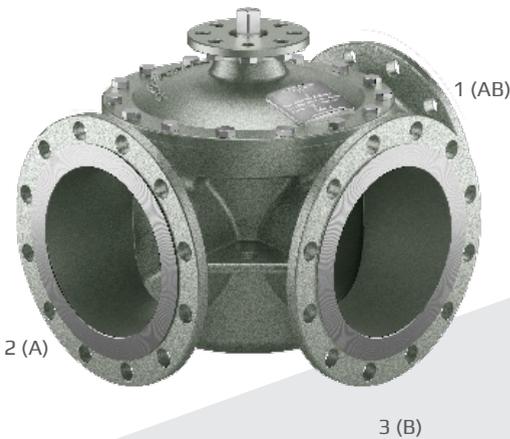
<sup>1)</sup> kvs-value for port A and B 50% open. <sup>2)</sup> available from 2015

# 3-way Control Valve type S3FM-TR (AB-Right)

Stainless Steel, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.7.01-D

Page 1 of 4



## APPLICATIONS

Control valve type S3FM-T is a three way control valve with a slide for quarter turn operation, designed for most industrial fluids and aggressive media.

## DESIGN

The valve body and the valve slide are made of stainless steel AISI316. The valve flanges are drilled according to EN 1092-2. Optional: ANSI, JIS and Grooved Victaulic Joints. Valves can also be supplied in AB-Left configuration (data sheet 2.7.02) and AB-Middle (data sheet 2.7.03)

## FUNCTION

The slide is firmly connected with the actuator spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a minimum gap between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## TECHNICAL DATA

|   |  |
|---|--|
| <b>Materials:</b>                               |  |
| - Valve body, slide                             | Stainless steel<br>- AISI316/<br>(Option DUPLEX) |
| - O-ring  | A75H   |
| - U-ring  | PTFE   |
| <b>Flow characteristic</b>                      | Almost linear                                    |
| <b>Leakage rate</b>                             | Max. 0.5%  |
| <b>Regulating capability</b>                    | Kvs/Kvr > 25                                     |
| <b>Flanges</b>                                  |  |
|   | EN 1092-2<br>PN 10/16                            |
| - Option  | JIS B 2210 5K, ANSI,<br>Grooved Victaulic Joints |
| <b>Counter flanges (suggested for EN1092-2)</b> |  |
|   | DIN 2632 – PN 10<br>DIN 2633 – PN 16             |

### Max. pressure $\Delta p_L$ , against which the valve can close:

|               |        |
|---------------|--------|
| - DN 65 - 125 | 25 bar |
| - DN 150-300  | 16 bar |
| - DN 350-800  | 10 bar |

### Nominal pressure

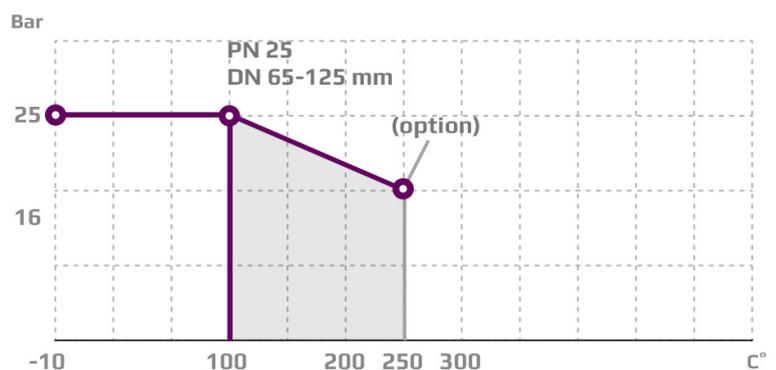
|               |                                     |
|---------------|-------------------------------------|
| - DN 65-125:  | PN 25, max. 100 °C (optional 250°C) |
| - DN 150-300: | PN 16, max. 100 °C (optional 250°C) |
| - DN 350-800: | PN 10, max. 100 °C (optional 250°C) |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Low leakage rate secures energy savings and avoids overheating.
- Flexible choice of port placement
- Corrosion resistance
- Designed for high precision control

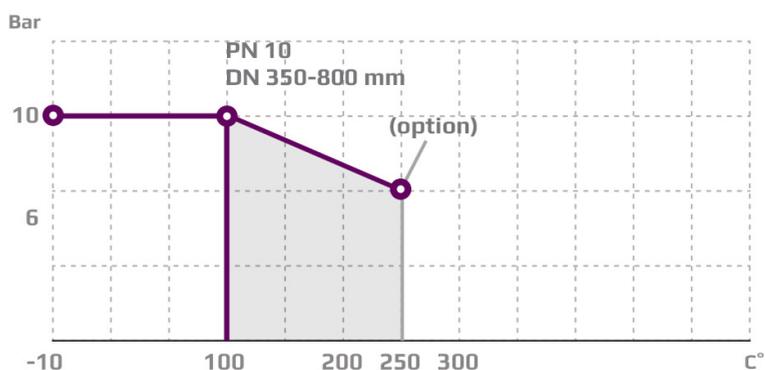
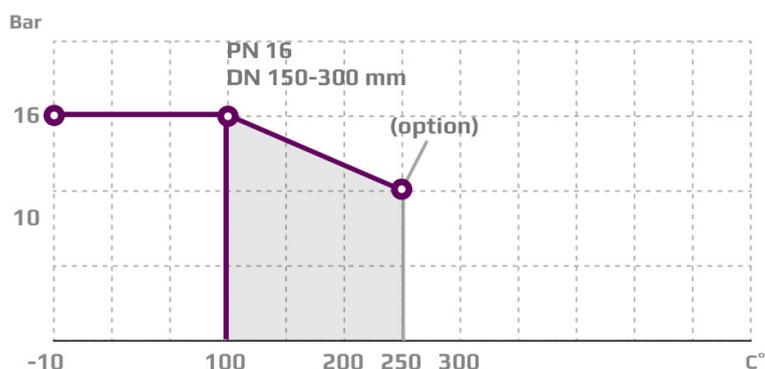
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

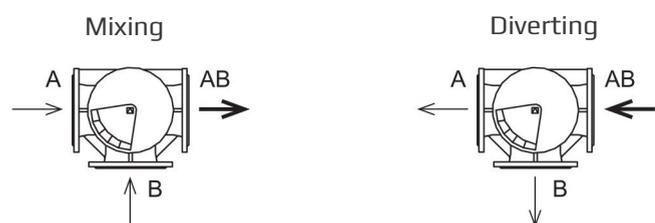


**PRESSURE/TEMPERATURE DIAGRAM**

According to DIN 2401



**PORT NUMBERING**



**MOUNTING**

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

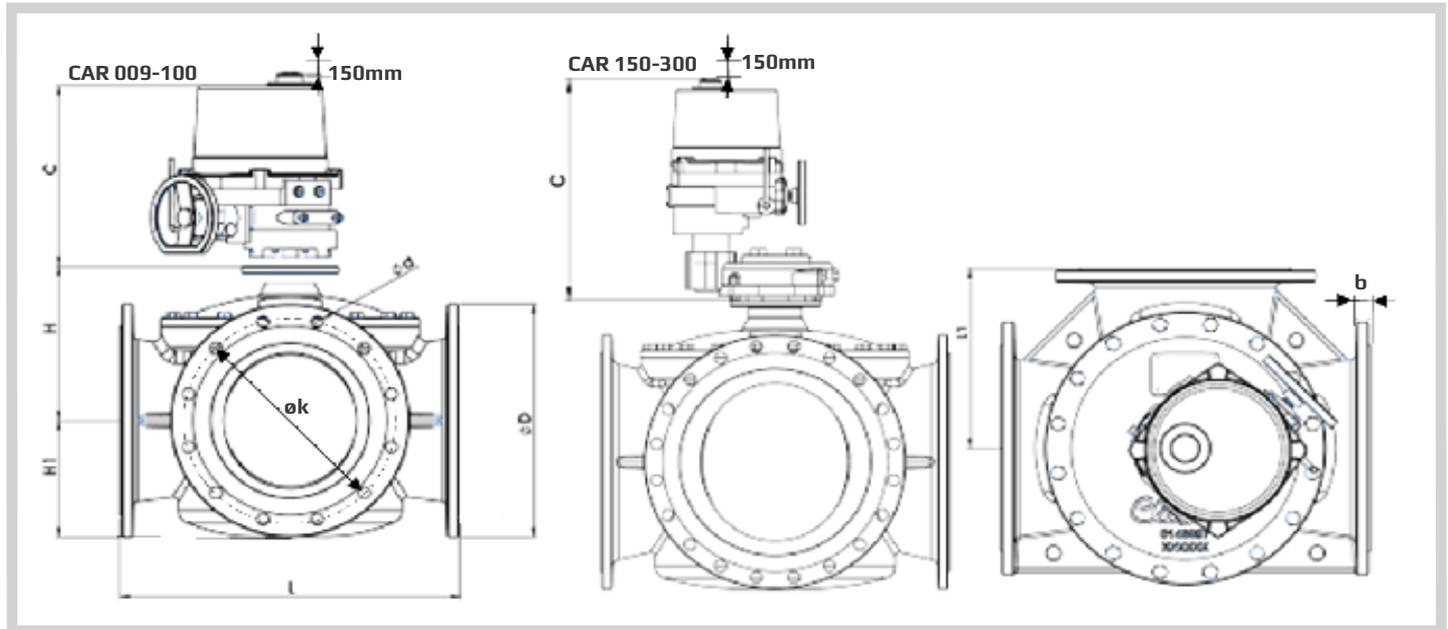
# 3-way Control Valve type S3FM-TR (AB-Right)

Stainless Steel, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.7.01-D

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## DIMENSION SKETCH



| Type        | EN 1092-2 |         |        |         |        |        |               | ANSI Class 150 |                            |               | JIS B 2210 5K |                    |               | JIS B 2210 10K |                    |               |               |                    |
|-------------|-----------|---------|--------|---------|--------|--------|---------------|----------------|----------------------------|---------------|---------------|--------------------|---------------|----------------|--------------------|---------------|---------------|--------------------|
|             | L (mm)    | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C (mm) | D (dia.) (mm) | k (dia.) (mm)  | d mm dia. (number)         | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm)  | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) |
| 65 G3FM-TR  | 292       | 146     | 135    | 92      | 19     | 273    | 185           | 145            | 19x(8)                     | 180           | 140           | 19x(4)             | 155           | 130            | 15x(4)             | 175           | 140           | 19x(4)             |
| 80 G3FM-TR  | 292       | 146     | 140    | 94      | 20     | 273    | 200           | 160            | 19x(8)                     | 190           | 152           | 19x(4)             | 180           | 145            | 19x(4)             | 185           | 150           | 19x(8)             |
| 100 G3FM-TR | 350       | 175     | 158    | 112     | 17     | 273    | 235           | 190            | 23x(8)                     | 230           | 190.9         | 19x(8)             | 200           | 165            | 19x(8)             | 210           | 175           | 19x(8)             |
| 125 G3FM-TR | 400       | 200     | 179    | 123     | 19     | 273    | 270           | 220            | 28x(8)                     | 255           | 216           | 22x(8)             | 235           | 200            | 19x(8)             | 250           | 210           | 23x(8)             |
| 150 G3FM-TR | 437       | 218.5   | 196    | 139     | 19     | 276    | 285           | 240            | 23x(8)                     | 280           | 241           | 22x(8)             | 265           | 230            | 19x(8)             | 280           | 240           | 23x(8)             |
| 200 G3FM-TR | 530       | 265     | 232    | 169     | 20     | 361    | 340           | 295            | 23x(12)                    | 343           | 299           | 23x(8)             | 320           | 280            | 23x(8)             | 320           | 290           | 23x(12)            |
| 250 G3FM-TR | 592       | 296     | 272    | 199     | 22     | 361    | 400           | 355            | 28x(12)                    | 407           | 362           | 26x(12)            | 385           | 345            | 23x(12)            | 400           | 355           | 25x(12)            |
| 300 G3FM-TR | 649       | 324.5   | 302    | 227     | 25     | 361    | 455           | 410            | 28x(12)                    | 483           | 432           | 26x(12)            | 430           | 390            | 23x(12)            | 445           | 400           | 25x(16)            |
| 350 G3FM-TR | 717       | 358.5   | 334.5  | 251.5   | 25     | 361    | 505           | 460            | 23x(16)                    | 534           | 477           | 29x(12)            | 480           | 435            | 25x(12)            | 490           | 445           | 25x(16)            |
| 400 G3FM-TR | 770       | 385     | 370    | 282     | 25     | 361    | 565           | 515            | 28x(16)                    | 597           | 540           | 29x(16)            | 540           | 495            | 25x(16)            | 560           | 510           | 27x(16)            |
| 450 G3FM-TR | 820       | 410     | 391    | 307     | 26     | 556    | 615           | 565            | 28x(20)                    | 635           | 578           | 32x(16)            | 605           | 555            | 25x(16)            | 620           | 565           | 27x(20)            |
| 500 G3FM-TR | 900       | 450     | 421    | 335     | 27     | 556    | 670           | 620            | 28x(20)                    | 699           | 635           | 32x(20)            | 655           | 605            | 25x(20)            | 675           | 620           | 27x(20)            |
| 550 G3FM-TR | 900       | 450     | 421    | 335     | 27     | 556    | -             | -              | -                          | -             | -             | -                  | 720           | 665            | 27x(20)            | 745           | 680           | 33x(20)            |
| 600 G3FM-TR | 918       | 459     | 470    | 354     | 31     | 556    | 780           | 725            | 31x(20)                    | 813           | 750           | 35x(20)            | 770           | 715            | 25x(20)            | 795           | 730           | 33x(24)            |
| 650 G3FM-TR | 1050      | 525     | 534    | 426     | 37     | 556    | -             | -              | -                          | -             | -             | -                  | 825           | 770            | 27x(24)            | 845           | 780           | 33x(24)            |
| 800 G3FM-TR | 1230      | 615     | 596    | 461     | 53     | 556    | 1085          | 990            | 34x(24)<br>50x(24)<br>PN25 | -             | -             | -                  | 995           | 930            | 33x(24)            | 1020          | 950           | 33x(28)            |

## SPECIFICATIONS

| Type        | Flange connection<br>DN in mm | $k_{vs}$ -value <sup>(1)</sup><br>Mixing valve<br>m <sup>3</sup> /h | $k_{vs}$ -value <sup>(1)</sup><br>Diverting valve<br>m <sup>3</sup> /h | Torque<br>Nm<br>for inlet P* | Weight<br>kg |
|-------------|-------------------------------|---|--|------------------------------|--------------|
| 65 S3FM-TR  | 65                            | 95  | 120  | 60                           | 28           |
| 80 S3FM-TR  | 80                            | 122   | 154  | 65                           | 32           |
| 100 S3FM-TR | 100                           | 175   | 220  | 120                          | 47           |
| 125 S3FM-TR | 125                           | 245   | 330  | 200                          | 64           |
| 150 S3FM-TR | 150                           | 395   | 425  | 200                          | 71           |
| 200 S3FM-TR | 200                           | 800   | 1100   | 330                          | 114          |
| 250 S3FM-TR | 250                           | 1500  | 2100   | 525                          | 159          |
| 300 S3FM-TR | 300                           | 2000  | 2650   | 730                          | 207          |
| 350 S3FM-TR | 350                           | 2530  | 3380   | 980                          | 278          |
| 400 S3FM-TR | 400                           | 3050  | 3950   | 1370                         | 346          |
| 450 S3FM-TR | 450                           | 3680  | 4480   | 1550                         | 433          |
| 500 S3FM-TR | 500                           | 4150  | 5250   | 1920                         | 563          |
| 550 S3FM-TR | 550                           | 4150  | 5250   | 1920                         | 575          |
| 600 S3FM-TR | 600                           | 4800  | 6050   | 2950                         | TBC          |
| 650 S3FM-TR | 650                           | 6700  | 7800   | TBC                          | 1050         |
| 800 S3FM-TR | 800                           | 6200  | 8000   | 4000                         | 2100         |

<sup>1)</sup> $k_{vs}$ -value for port A and B 50% open.

\*Torque calculated at max inlet P for:

DN 65 - 125 = 25 Bar  
 DN 150-300 = 16 Bar  
 DN 350-800 = 10 Bar



# 3-way Control Valve type S3FM-TL (AB-Left)

Stainless Steel, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.7.02-C

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## APPLICATIONS

Control valve type S3FM-TL is a three way control valve with a slide for quarter turn operation, designed for most industrial fluids and aggressive media.

## DESIGN

The valve body and the valve slide are made of stainless steel AISI316. The valve flanges are drilled according to EN 1092-2. Optional: ANSI, JIS and Grooved Victaulic Joints Valves can also be supplied in AB-Right configuration (data sheet 0.2.7.01) and AB-Middle (data sheet 0.2.7.03).

## FUNCTION

The slide is firmly connected with the actuator spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a minimum gap between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## TECHNICAL DATA

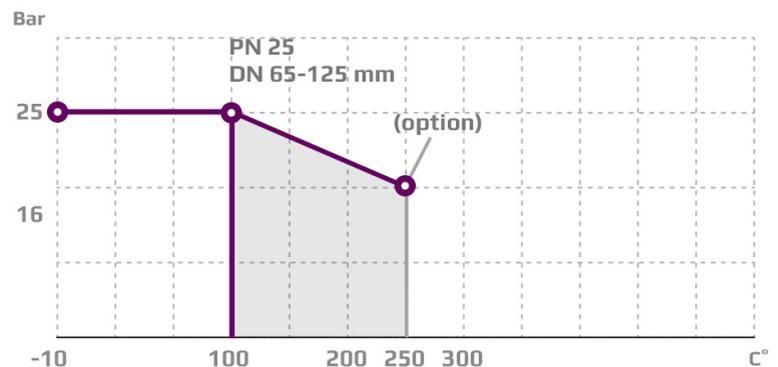
|  |  |
|--|--|
| <b>Materials:</b>  |  |
| - Valve body, slide  | Stainless steel<br>- AISI316                     |
|  | Option (DUPLEX)                                  |
| - O-ring   | A75H   |
| - U-ring   | PTFE   |
| Flow characteristic  | Almost linear                                    |
| Leakage rate   | Max. 0.5%  |
| Regulating capability  | Kvs/Kvr > 25                                     |
| <b>Flanges</b>   | EN 1092-2<br>PN 10/16                            |
| - Option   | JIS B 2210 5K, ANSI,<br>Grooved Victaulic Joints |
| <b>Counter flanges (suggested to EN1092-2)</b>                                   |  |
|  | DIN 2632 – PN 10                                 |
|  | DIN 2633 – PN 16                                 |
| <b>Max. pressure <math>\Delta p_L</math>, against which the valve can close:</b> |  |
| - DN 65 - 125  | 25 bar   |
| - DN 150-300   | 16 bar   |
| - DN 350-800   | 10 bar   |
| <b>Nominal pressure</b>  |  |
| - DN 65-125: PN 25, max. 100 °C (optional 250°C)                                 |  |
| - DN 150-300: PN 16, max. 100 °C (optional 250°C)                                |  |
| - DN 350-800: PN 10, max. 100 °C (optional 250°C)                                |  |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Low leakage rate secures energy savings and avoids overheating.
- Flexible choice of port placement
- Corrosion resistance
- Designed for high precision control

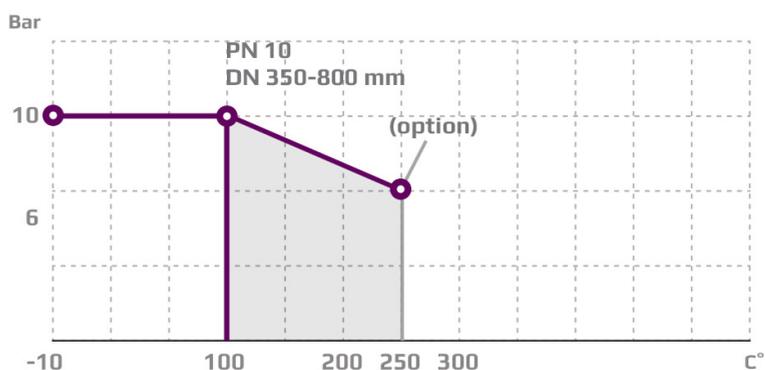
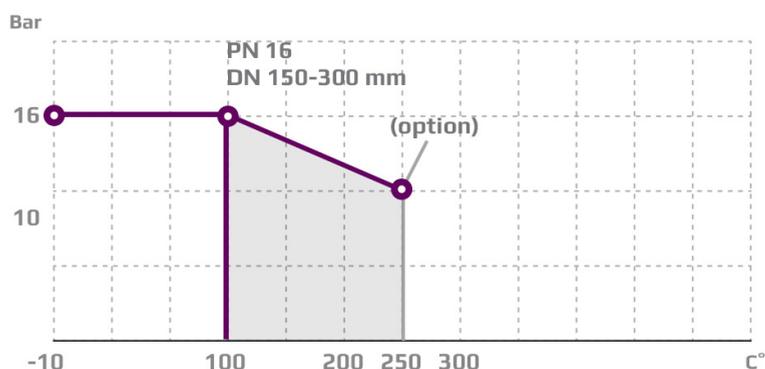
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

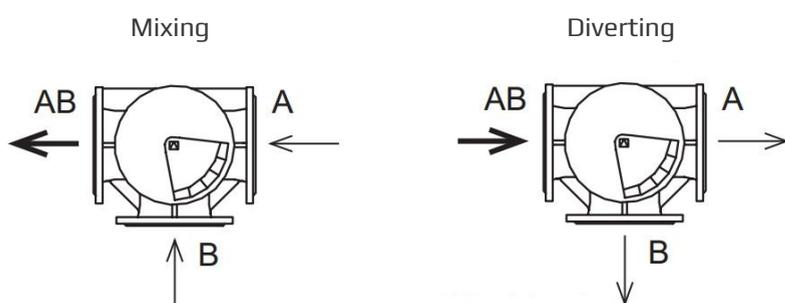


### PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING



### MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

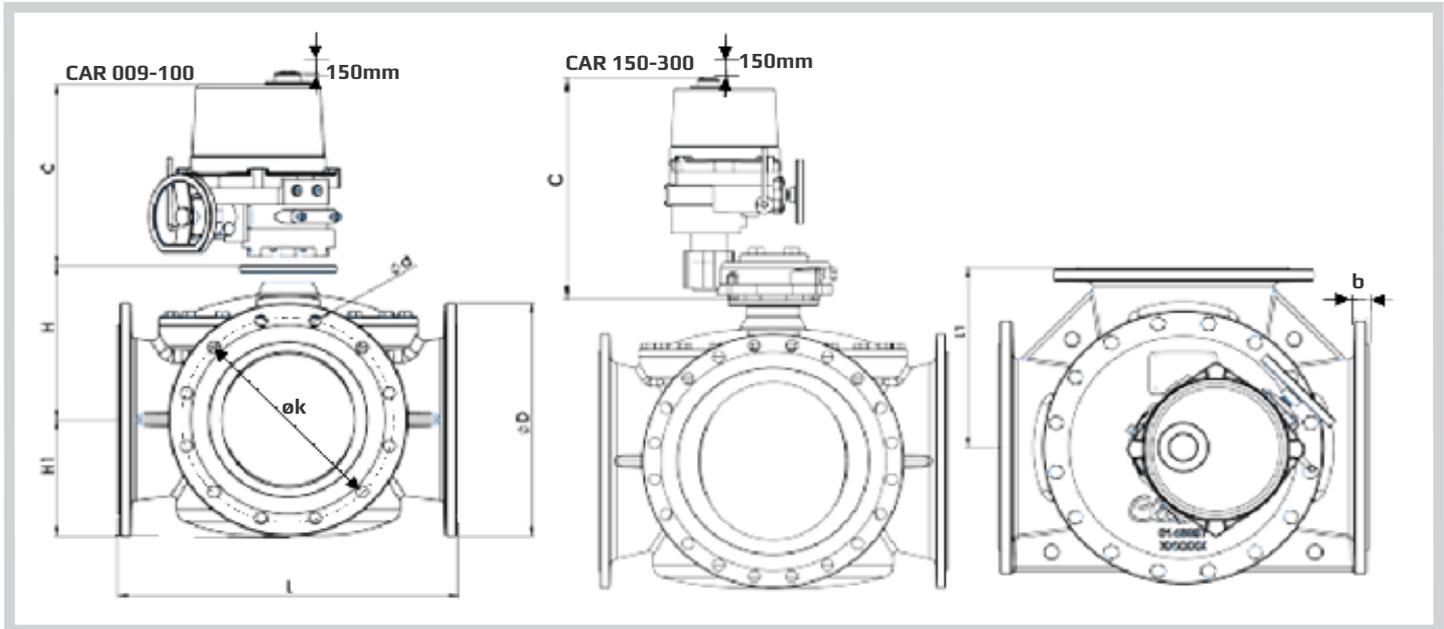
# 3-way Control Valve type S3FM-TL (AB-Left)

Stainless Steel, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.7.02-C

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## DIMENSION SKETCH



| Type        | L (mm) | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C (mm) | EN 1092-2     |               |                            | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |
|-------------|--------|---------|--------|---------|--------|--------|---------------|---------------|----------------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|             |        |         |        |         |        |        | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number)         | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) |
| 65 G3FM-TR  | 292    | 146     | 135    | 92      | 19     | 273    | 185           | 145           | 19x(8)                     | 180            | 140           | 19x(4)             | 155           | 130           | 15x(4)             | 175            | 140           | 19x(4)             |
| 80 G3FM-TR  | 292    | 146     | 140    | 94      | 20     | 273    | 200           | 160           | 19x(8)                     | 190            | 152           | 19x(4)             | 180           | 145           | 19x(4)             | 185            | 150           | 19x(8)             |
| 100 G3FM-TR | 350    | 175     | 158    | 112     | 17     | 273    | 235           | 190           | 23x(8)                     | 230            | 190.9         | 19x(8)             | 200           | 165           | 19x(8)             | 210            | 175           | 19x(8)             |
| 125 G3FM-TR | 400    | 200     | 179    | 123     | 19     | 273    | 270           | 220           | 28x(8)                     | 255            | 216           | 22x(8)             | 235           | 200           | 19x(8)             | 250            | 210           | 23x(8)             |
| 150 G3FM-TR | 437    | 218.5   | 196    | 139     | 19     | 276    | 285           | 240           | 23x(8)                     | 280            | 241           | 22x(8)             | 265           | 230           | 19x(8)             | 280            | 240           | 23x(8)             |
| 200 G3FM-TR | 530    | 265     | 232    | 169     | 20     | 361    | 340           | 295           | 23x(12)                    | 343            | 299           | 23x(8)             | 320           | 280           | 23x(8)             | 320            | 290           | 23x(12)            |
| 250 G3FM-TR | 592    | 296     | 272    | 199     | 22     | 361    | 400           | 355           | 28x(12)                    | 407            | 362           | 26x(12)            | 385           | 345           | 23x(12)            | 400            | 355           | 25x(12)            |
| 300 G3FM-TR | 649    | 324.5   | 302    | 227     | 25     | 361    | 455           | 410           | 28x(12)                    | 483            | 432           | 26x(12)            | 430           | 390           | 23x(12)            | 445            | 400           | 25x(16)            |
| 350 G3FM-TR | 717    | 358.5   | 334.5  | 251.5   | 25     | 361    | 505           | 460           | 23x(16)                    | 534            | 477           | 29x(12)            | 480           | 435           | 25x(12)            | 490            | 445           | 25x(16)            |
| 400 G3FM-TR | 770    | 385     | 370    | 282     | 25     | 361    | 565           | 515           | 28x(16)                    | 597            | 540           | 29x(16)            | 540           | 495           | 25x(16)            | 560            | 510           | 27x(16)            |
| 450 G3FM-TR | 820    | 410     | 391    | 307     | 26     | 556    | 615           | 565           | 28x(20)                    | 635            | 578           | 32x(16)            | 605           | 555           | 25x(16)            | 620            | 565           | 27x(20)            |
| 500 G3FM-TR | 900    | 450     | 421    | 335     | 27     | 556    | 670           | 620           | 28x(20)                    | 699            | 635           | 32x(20)            | 655           | 605           | 25x(20)            | 675            | 620           | 27x(20)            |
| 550 G3FM-TR | 900    | 450     | 421    | 335     | 27     | 556    | -             | -             | -                          | -              | -             | -                  | 720           | 665           | 27x(20)            | 745            | 680           | 33x(20)            |
| 600 G3FM-TR | 918    | 459     | 470    | 354     | 31     | 556    | 780           | 725           | 31x(20)                    | 813            | 750           | 35x(20)            | 770           | 715           | 25x(20)            | 795            | 730           | 33x(24)            |
| 650 G3FM-TR | 1050   | 525     | 534    | 426     | 37     | 556    | -             | -             | -                          | -              | -             | -                  | 825           | 770           | 27x(24)            | 845            | 780           | 33x(24)            |
| 800 G3FM-TR | 1230   | 615     | 596    | 461     | 53     | 556    | 1085          | 990           | 34x(24)<br>50x(24)<br>PN25 | -              | -             | -                  | 995           | 930           | 33x(24)            | 1020           | 950           | 33x(28)            |

## SPECIFICATIONS

| Type        | Flange connection<br>DN in mm | $k_{vs}$ -value <sup>(1)</sup><br>Mixing valve<br>m <sup>3</sup> /h | $k_{vs}$ -value <sup>(1)</sup><br>Diverting valve<br>m <sup>3</sup> /h | Torque<br>Nm | Weight<br>kg |
|-------------|-------------------------------|---|--|--------------|--------------|
| 65 S3FM-TL  | 65                            | 95  | 120  | 46           | 28           |
| 80 S3FM-TL  | 80                            | 122   | 154  | 49           | 32           |
| 100 S3FM-TL | 100                           | 175   | 220  | 52           | 47           |
| 125 S3FM-TL | 125                           | 245   | 330  | 98           | 64           |
| 150 S3FM-TL | 150                           | 395   | 425  | 135          | 75           |
| 200 S3FM-TL | 200                           | 800   | 1100   | 330          | 114          |
| 250 S3FM-TL | 250                           | 1500  | 2100   | 450          | 159          |
| 300 S3FM-TL | 300                           | 2000  | 2650   | 700          | 207          |
| 350 S3FM-TL | 350                           | 2530  | 3380   | 780          | 278          |
| 400 S3FM-TL | 400                           | 3050  | 3950   | 880          | 346          |
| 450 S3FM-TL | 450                           | 3680  | 4480   | 1250         | 433          |
| 500 S3FM-TL | 500                           | 4150  | 5250   | 1450         | 563          |
| 550 S3FM-TL | 550                           | 4150  | 5250   | 1450         | 575          |
| 600 S3FM-TL | 600                           | 4800  | 6050   | 1750         | 816          |
| 800 S3FM-TL | 800                           | 6200  | 8000   | 2550         | 2100         |

1)  $k_{vs}$ -value for port A and B 50% open.



# 3-way Control Valve type S3FM-TM (AB-Middle)

Stainless Steel, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 450 mm

0-2.7.03-C

Page 1 of 4

## APPLICATIONS

Control valve type S3FM-TM is a three way control valve with a slide for quarter turn operation, designed for most industrial fluids and aggressive media.

## DESIGN

The valve body and the valve slide are made of stainless steel AISI316. The valve flanges are drilled according to EN 1092-2. Optional: ANSI, JIS and Grooved Victaulic Joints.

Valves can also be supplied in AB-Right configuration (data sheet 0.2.7.01) and AB-Left (data sheet 0.2.7.02)

## FUNCTION

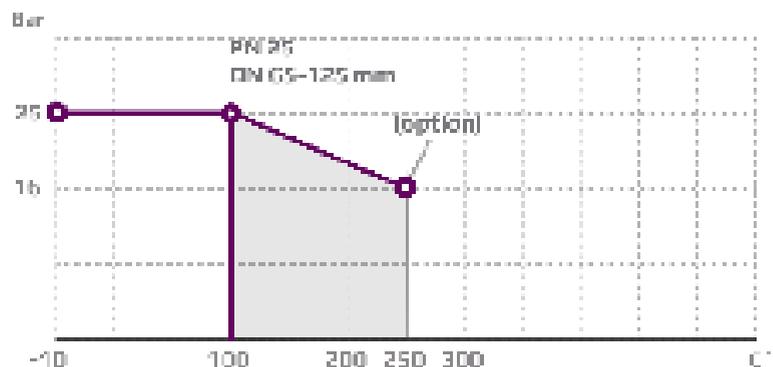
The slide is firmly connected with the actuator spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a minimum gap between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Low leakage rate secures energy savings and avoids overheating.
- Flexible choice of port placement
- Corrosion resistance
- Designed for high precision control

## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



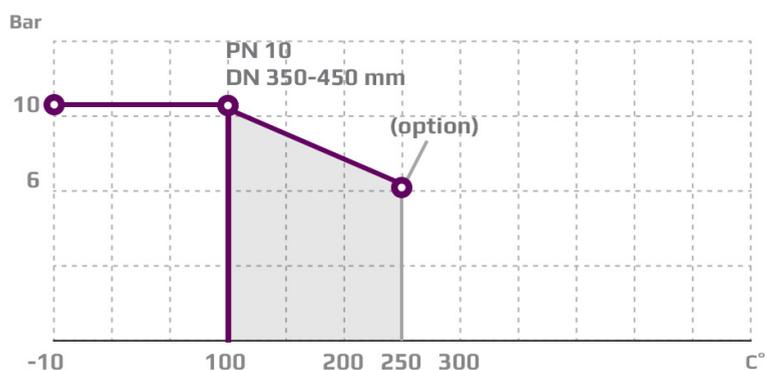
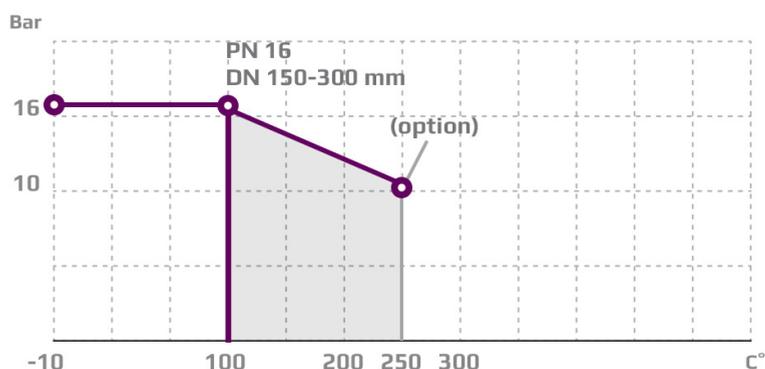
## TECHNICAL DATA

|  |  |
|--|--|
| <b>Materials:</b>  |  |
| - Valve body, slide  | Stainless steel<br>- AISI316<br>(option DUPLEX)  |
| - O-ring   | A75H   |
| - U-ring   | PTFE   |
| Flow characteristic  | Almost linear                                    |
| Leakage rate   | Max. 0.5%  |
| Regulating capability  | Kvs/Kvr > 25                                     |
| <b>Flanges</b>   | EN 1092-2<br>PN 10/16                            |
| - Option   | JIS B 2210 5K, ANSI,<br>Grooved Victaulic Joints |
| <b>Counter flanges (suggested for EN 1092-2)</b>                                 | DIN 2632 – PN 10<br>DIN 2633 – PN 16             |
| <b>Max. pressure <math>\Delta p_L</math>, against which the valve can close:</b> |  |
| - DN 250   | 16 Bar   |
| - DN 450   | 10 Bar   |
| <b>Nominal pressure</b>  |  |
| - DN 65-125:   | PN 25, max. 100 °C (optional 250°C)              |
| - DN 150-300:  | PN 16, max. 100 °C (optional 250°C)              |
| - DN 350-450:  | PN 10, max. 100 °C (optional 250°C)              |

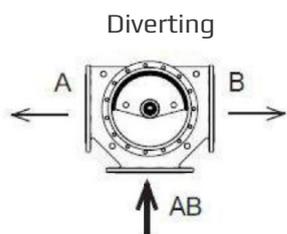
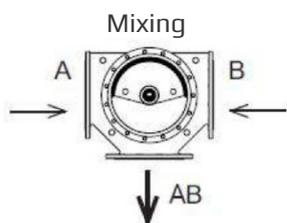
Subject to change without notice.

### PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING



### MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

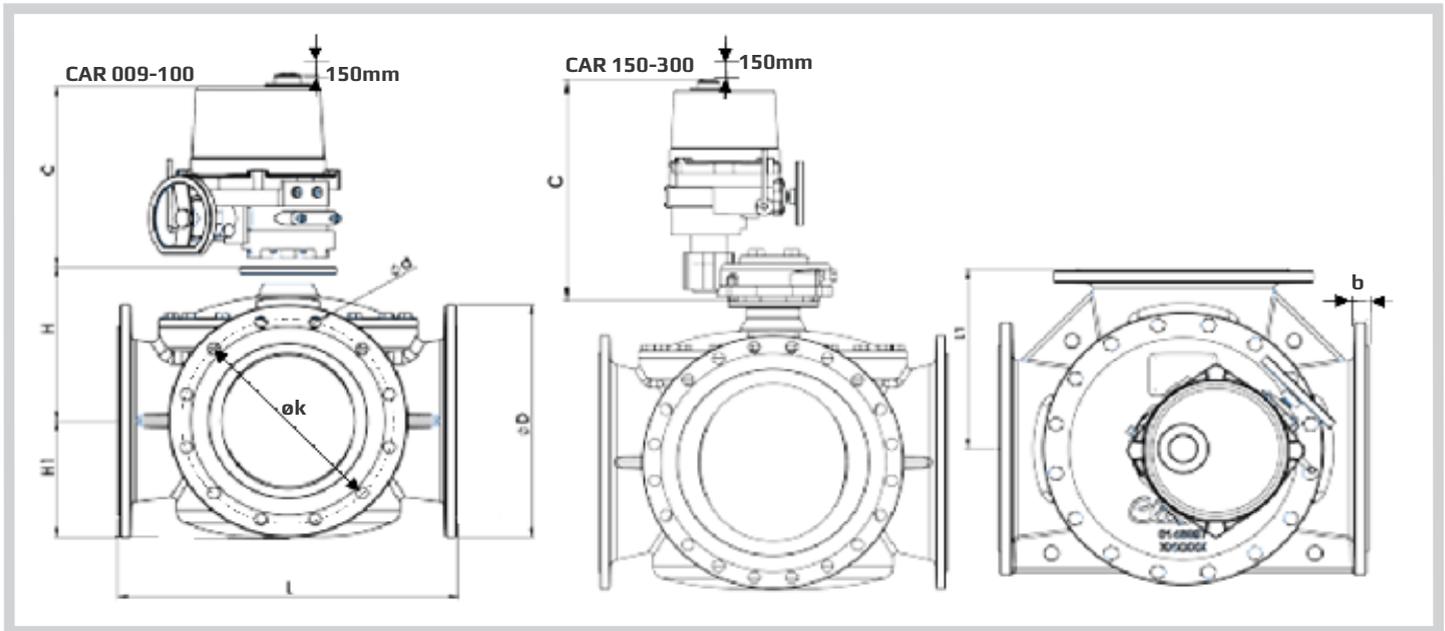
# 3-way Control Valve type S3FM-TM (AB-Middle)

Stainless Steel, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 450 mm

0-2.7.03-C

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## DIMENSION SKETCH



| Type        | EN 1092-2 |         |        |         |        |        | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |               |               |                    |
|-------------|-----------|---------|--------|---------|--------|--------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|
|             | L (mm)    | L1 (mm) | H (mm) | H1 (mm) | b (mm) | C (mm) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm)  | k (dia.) (mm) | d mm dia. (number) | D (dia.) (mm) | k (dia.) (mm) | d mm dia. (number) |
| 80 S3FM-TM  | 292       | 146     | 140    | 94      | 20     | 273    | 200            | 160           | 19x(8)             | 190           | 190.8         | 19x(8)             | 180            | 145           | 19x(4)             | 185           | 150           | 19x(8)             |
| 100 S3FM-TM | 350       | 175     | 158    | 112     | 17     | 273    | 235            | 190           | 23x(8)             | 230           | 190.9         | 19x(8)             | 200            | 165           | 19x(8)             | 210           | 175           | 19x(8)             |
| 125 S3FM-TM | 400       | 200     | 179    | 123     | 19     | 273    | 270            | 220           | 28x(8)             | 255           | 216           | 22x(8)             | 235            | 200           | 19x(8)             | 250           | 210           | 23x(8)             |
| 150 S3FM-TM | 437       | 218,5   | 196    | 139     | 19     | 276    | 285            | 240           | 23x(8)             | 280           | 241           | 22x(8)             | 265            | 230           | 19x(8)             | 280           | 240           | 23x(8)             |
| 200 S3FM-TM | 530       | 265     | 232    | 169     | 20     | 361    | 340            | 295           | 23x(12)            | 343           | 299           | 23x(8)             | 320            | 280           | 23x(8)             | 320           | 290           | 23x(12)            |
| 250 S3FM-TM | 592       | 265     | 232    | 169     | 20     | 361    | 400            | 355           | 28x(12)            | 407           | 362           | 26x(12)            | 385            | 345           | 23x(12)            | 400           | 355           | 25x(12)            |
| 300 S3FM-TM | 649       | 324,5   | 302    | 227     | 25     | 361    | 455            | 410           | 28x(12)            | 483           | 432           | 26x(12)            | 430            | 390           | 23x(12)            | 445           | 400           | 25x(16)            |
| 350 S3FM-TM | 717       | 358,5   | 334,5  | 251,5   | 25     | 361    | 505            | 460           | 23x(16)            | 534           | 477           | 29x(12)            | 480            | 435           | 25x(12)            | 490           | 445           | 25x(16)            |
| 400 S3FM-TM | 770       | 385     | 370    | 282     | 25     | 361    | 565            | 515           | 28x(16)            | 597           | 540           | 29x(16)            | 540            | 495           | 25x(16)            | 560           | 510           | 27x(16)            |
| 450 S3FM-TM | 820       | 410     | 391    | 307     | 26     | 556    | 615            | 565           | 28x(20)            | 635           | 578           | 32x(16)            | 605            | 555           | 25x(16)            | 620           | 565           | 27x(20)            |

## SPECIFICATIONS

| Type        | Flange connection<br>DN in mm | $k_{vs}$ -value <sup>(1)</sup><br>Mixing valve<br>m <sup>3</sup> /h | $k_{vs}$ -value <sup>(1)</sup><br>Diverting valve<br>m <sup>3</sup> /h | Torque<br>Nm<br>for inlet P* | Weight<br>kg |
|-------------|-------------------------------|---|--|------------------------------|--------------|
| 65 S3FM-TM  | 65                            | 95  | 120  | 72                           | 22           |
| 80 S3FM-TM  | 80                            | 122   | 154  | 85                           | 29           |
| 100 S3FM-TM | 100                           | 220   | 248  | 145                          | 41           |
| 125 S3FM-TM | 125                           | 369   | 437  | 245                          | 58           |
| 150 S3FM-TM | 150                           | 510   | 600  | 259                          | 71           |
| 200 S3FM-TM | 200                           | 807   | 1100   | 435                          | 114          |
| 250 S3FM-TM | 250                           | 1500  | 2100   | 695                          | 159          |
| 300 S3FM-TM | 300                           | 2000  | 2650   | 975                          | 207          |
| 350 S3FM-TM | 350                           | 2530  | 3380   | 1350                         | 278          |
| 400 S3FM-TM | 400                           | 3050  | 3950   | TBC                          | 346          |
| 450 S3FM-TM | 450                           | 3680  | 4480   | 2100                         | 433          |

<sup>1)</sup> $k_{vs}$ -value for port A and B 50% open.

\*Torque calculated at max inlet P for:

DN 65 - 125 = 25 Bar  
 DN 150-300 = 16 Bar  
 DN 350-450 = 10 Bar



# 2-way Control Valve type S2FM-T

Stainless Steel, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.7.04-B

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## APPLICATIONS

Control valve type S2FM-T is a three-way control valve with blocked port making a two-way control valve. The slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil quantities. The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

## DESIGN

The valve body and the valve slide are made of stainless steel AISI316. The valve flanges are drilled according to EN 1092-2. Optional: ANSI, JIS and Grooved Victalic Joints.

## FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one extreme position by turning the spindle, connection A-AB is kept fully open. In the other extreme position connection the valve is fully closed. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

## TECHNICAL DATA

|                              |   |
|------------------------------|---|
| <b>Materials:</b>            |   |
| - Valve body, slide          | Stainless steel<br>- AISI316<br>(option DUPLEX) |
| - O-ring                     | A75H  |
| - U-ring                     | PTFE  |
| <b>Nominal pressure:</b>     |   |
| - 65-125 S2FM-T              | PN 25   |
| - 150-300 S2FM-T             | PN 16   |
| - 350-600 S2FM-T             | PN 10   |
| <b>Flow characteristic</b>   | Almost linear                                   |
| <b>Leakage rate</b>          | Max. 0.5%                                       |
| <b>Regulating capability</b> | Kvs/Kvr > 25                                    |
| <b>Flanges</b>               | EN 1092-2<br>PN 10/16                           |

**Counter flanges (suggested):**  
DIN 2632 – PN 10  
DIN 2633 – PN 16

|  |        |
|--|--------|
| <b>Max. pressure <math>\Delta p_L</math>, against which the valve can close:</b> |        |
| - DN 65 - 125  | 25 bar |
| - DN 150-300   | 16 bar |
| - DN 350-800   | 10 bar |

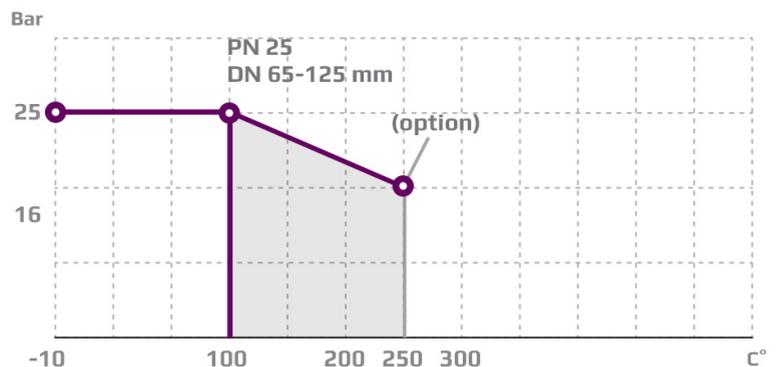
|   |  |
|---|--|
| <b>Nominal pressure</b>                           |  |
| - DN 65-125: PN 25, max. 100 °C (optional 250°C)  |  |
| - DN 150-300: PN 16, max. 100 °C (optional 250°C) |  |
| - DN 350-800: PN 10, max. 100 °C (optional 250°C) |  |

## FEATURES

- Simple design secures reliable controls and reduces costly downtime.
- Low leakage rate secures energy savings and avoids overheating.
- Corrosion resistance

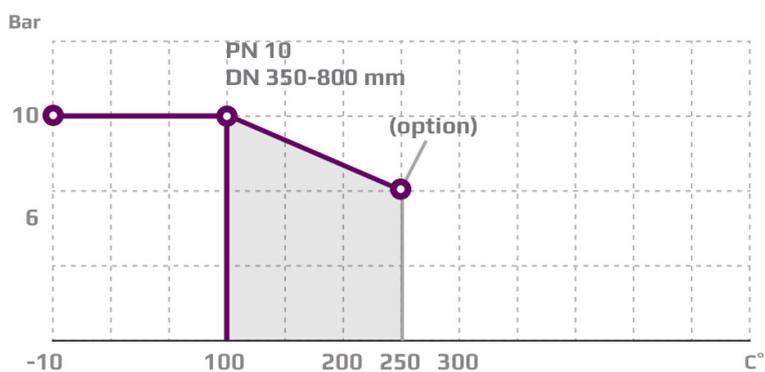
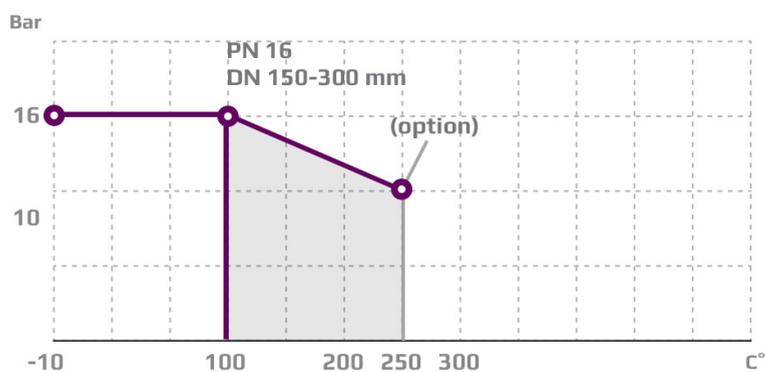
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401

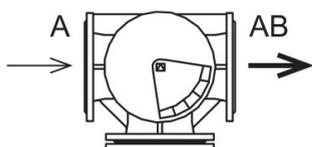


### PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



### PORT NUMBERING



### MOUNTING

The valve connections are marked A and AB. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

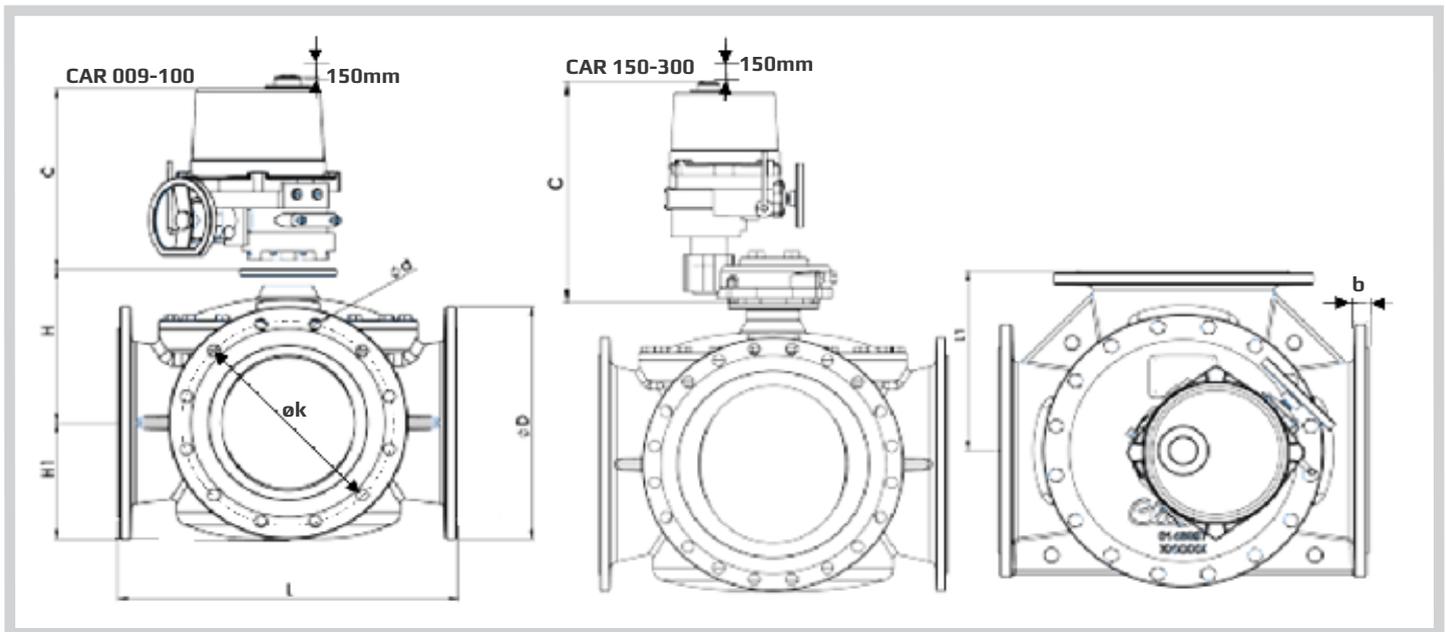
# 2-way Control Valve type S2FM-T

Stainless Steel, PN25, DN 65 – 125 mm / PN16, DN150 - 300 mm / PN10, DN 350 - 800 mm

0-2.7.04-B

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## DIMENSION SKETCH



| Type        | L<br>(mm) | L1<br>(mm) | H<br>(mm) | H1<br>(mm) | b<br>(mm) | C<br>(mm) | EN 1092-2           |                  |                            | ANSI Class 150      |                  |                          | JIS B 2210 5K       |                  |                          | JIS B 2210 10K      |                  |                          |
|-------------|-----------|------------|-----------|------------|-----------|-----------|---------------------|------------------|----------------------------|---------------------|------------------|--------------------------|---------------------|------------------|--------------------------|---------------------|------------------|--------------------------|
|             |           |            |           |            |           |           | D<br>(dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number)   | D<br>(dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) | D<br>(dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) | D<br>(dia.)<br>(mm) | k (dia.)<br>(mm) | d mm<br>dia.<br>(number) |
| 65 G3FM-TR  | 292       | 146        | 135       | 92         | 19        | 273       | 185                 | 145              | 19x(8)                     | 180                 | 140              | 19x(4)                   | 155                 | 130              | 15x(4)                   | 175                 | 140              | 19x(4)                   |
| 80 G3FM-TR  | 292       | 146        | 140       | 94         | 20        | 273       | 200                 | 160              | 19x(8)                     | 190                 | 152              | 19x(4)                   | 180                 | 145              | 19x(4)                   | 185                 | 150              | 19x(8)                   |
| 100 G3FM-TR | 350       | 175        | 158       | 112        | 17        | 273       | 235                 | 190              | 23x(8)                     | 230                 | 190.9            | 19x(8)                   | 200                 | 165              | 19x(8)                   | 210                 | 175              | 19x(8)                   |
| 125 G3FM-TR | 400       | 200        | 179       | 123        | 19        | 273       | 270                 | 220              | 28x(8)                     | 255                 | 216              | 22x(8)                   | 235                 | 200              | 19x(8)                   | 250                 | 210              | 23x(8)                   |
| 150 G3FM-TR | 437       | 218.5      | 196       | 139        | 19        | 276       | 285                 | 240              | 23x(8)                     | 280                 | 241              | 22x(8)                   | 265                 | 230              | 19x(8)                   | 280                 | 240              | 23x(8)                   |
| 200 G3FM-TR | 530       | 265        | 232       | 169        | 20        | 361       | 340                 | 295              | 23x(12)                    | 343                 | 299              | 23x(8)                   | 320                 | 280              | 23x(8)                   | 320                 | 290              | 23x(12)                  |
| 250 G3FM-TR | 592       | 296        | 272       | 199        | 22        | 361       | 400                 | 355              | 28x(12)                    | 407                 | 362              | 26x(12)                  | 385                 | 345              | 23x(12)                  | 400                 | 355              | 25x(12)                  |
| 300 G3FM-TR | 649       | 324.5      | 302       | 227        | 25        | 361       | 455                 | 410              | 28x(12)                    | 483                 | 432              | 26x(12)                  | 430                 | 390              | 23x(12)                  | 445                 | 400              | 25x(16)                  |
| 350 G3FM-TR | 717       | 358.5      | 334.5     | 251.5      | 25        | 361       | 505                 | 460              | 23x(16)                    | 534                 | 477              | 29x(12)                  | 480                 | 435              | 25x(12)                  | 490                 | 445              | 25x(16)                  |
| 400 G3FM-TR | 770       | 385        | 370       | 282        | 25        | 361       | 565                 | 515              | 28x(16)                    | 597                 | 540              | 29x(16)                  | 540                 | 495              | 25x(16)                  | 560                 | 510              | 27x(16)                  |
| 450 G3FM-TR | 820       | 410        | 391       | 307        | 26        | 556       | 615                 | 565              | 28x(20)                    | 635                 | 578              | 32x(16)                  | 605                 | 555              | 25x(16)                  | 620                 | 565              | 27x(20)                  |
| 500 G3FM-TR | 900       | 450        | 421       | 335        | 27        | 556       | 670                 | 620              | 28x(20)                    | 699                 | 635              | 32x(20)                  | 655                 | 605              | 25x(20)                  | 675                 | 620              | 27x(20)                  |
| 550 G3FM-TR | 900       | 450        | 421       | 335        | 27        | 556       | -                   | -                | -                          | -                   | -                | -                        | 720                 | 665              | 27x(20)                  | 745                 | 680              | 33x(20)                  |
| 600 G3FM-TR | 918       | 459        | 470       | 354        | 31        | 556       | 780                 | 725              | 31x(20)                    | 813                 | 750              | 35x(20)                  | 770                 | 715              | 25x(20)                  | 795                 | 730              | 33x(24)                  |
| 650 G3FM-TR | 1050      | 525        | 534       | 426        | 37        | 556       | -                   | -                | -                          | -                   | -                | -                        | 825                 | 770              | 27x(24)                  | 845                 | 780              | 33x(24)                  |
| 800 G3FM-TR | 1230      | 615        | 596       | 461        | 53        | 556       | 1085                | 990              | 34x(24)<br>50x(24)<br>PN25 | -                   | -                | -                        | 995                 | 930              | 33x(24)                  | 1020                | 950              | 33x(28)                  |

## SPECIFICATIONS

| Type       | Flange connection<br>DN in mm | $k_{vs}$ -value<br>m <sup>3</sup> /h | Torque<br>Nm<br>for inlet P* | Weight<br>kg |
|------------|-------------------------------|--------------------------------------|------------------------------|--------------|
| 65 S2FM-T  | 65                            | 120                                  | 60                           | 37           |
| 80 S2FM-T  | 80                            | 154                                  | 65                           | 41           |
| 100 S2FM-T | 100                           | 220                                  | 120                          | 56           |
| 125 S2FM-T | 125                           | 330                                  | 200                          | 73           |
| 150 S2FM-T | 150                           | 425                                  | 200                          | 84           |
| 200 S2FM-T | 200                           | 1100                                 | 330                          | 153          |
| 250 S2FM-T | 250                           | 2100                                 | 525                          | 215          |
| 300 S2FM-T | 300                           | 2650                                 | 730                          | 277          |
| 350 S2FM-T | 350                           | 3380                                 | 980                          | 340          |
| 400 S2FM-T | 400                           | 3950                                 | 1370                         | 459          |
| 450 S2FM-T | 450                           | 4480                                 | 1550                         | 579          |
| 500 S2FM-T | 500                           | 5250                                 | 1920                         | 744          |
| 550 S2FM-T | 550                           | 5250                                 | 1920                         | 1090         |
| 600 S2FM-T | 600                           | 6050                                 | 2950                         | TBC          |
| 800 S2FM-T | 800                           | 8000                                 | 4000                         | 2100         |

\*Torque calculated at max inlet P for:

DN 65 - 125 = 25 Bar

DN 150-300 = 16 Bar

DN 350-800 = 10 Bar



# TREX Thermostatic Control Valve

Steel & Aluminum, PN16, DN15 to DN40 - ½" to 1½"

0-2.10.01-B



## TECHNICAL DATA

### Materials:

- Valve body Steel ST 235  
- Valve body Aluminium AW 6082/T6

- Colour body RAL 7016  
- Colour body, adapter RAL 9006

- O-rings Silicone  
- Cartridge PPS/GF40

### Available with leakholes

Recommended pressure drop across the valve 0.5-7 PSI/ .03-0.5 bar

Nominal pressure 232 PSI/16 bar

Table 2

| Control temperatures |            |
|----------------------|------------|
| 75°F/24°C            | 140°F/60°C |
| 85°F/29°C            | 150°F/66°C |
| 95°F/35°C            | 160°F/71°C |
| 100°F/38°C           | 170°F/77°C |
| 110°F/43°C           | 175°F/79°C |
| 120°F/49°C           | 180°F/82°C |
| 130°F/54°C           | 190°F/88°C |



## APPLICATION

TREX thermostatic control valves are designed to regulate fresh water, lubricating oils and other liquids. The valves are designed for marine and industrial applications such as engines (LT/HT), compressors (gas and air), boilers, heat systems, generator sets and can be used to divert or mix liquids.

## DESIGN

TREX thermostatic control valves are very compact and robust, designed to fit in applications with high vibration levels and do not require any kind of external power source. The valves are designed to fully close between port A and port C and regulate the set temperature very precisely. If a setup requires continuous flow, the valve can be delivered with a leak hole.

A range of different control temperatures can be supplied. Please consult Clorius Controls if you need other temperatures than those specified in Table 2.

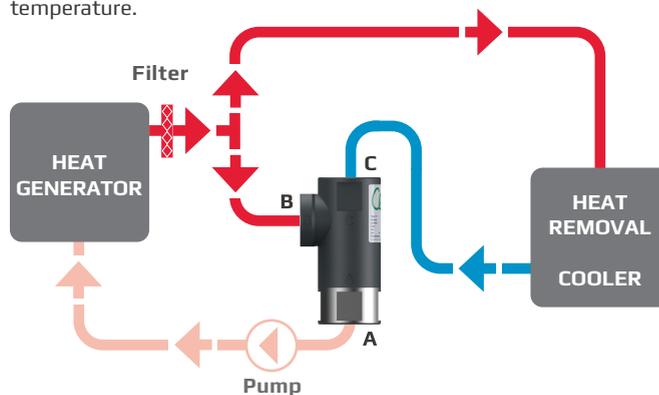
Table 1

| Size     | Cv/Kv    | Body material     | Connections   |
|----------|----------|-------------------|---|
| ½"/DN15  | 7.0/6.1  | Steel             | BSPP ISO 7 Rp thread<br>BSPT ISO 7 Rt/JIS thread<br>NPT ASME B1.20.1 thread<br>SAE J1926-1 ORB thread |
| ¾"/DN20  | 9.5/8.2  | Steel & Aluminium |   |
| 1"/DN25  | 10.4/9.0 | Steel & Aluminium |   |
| 1¼"/DN32 | 11.0/9.5 | Steel             |   |
| 1½"/DN40 | 11.0/9.5 | Steel             |   |

## TYPICAL SETUP

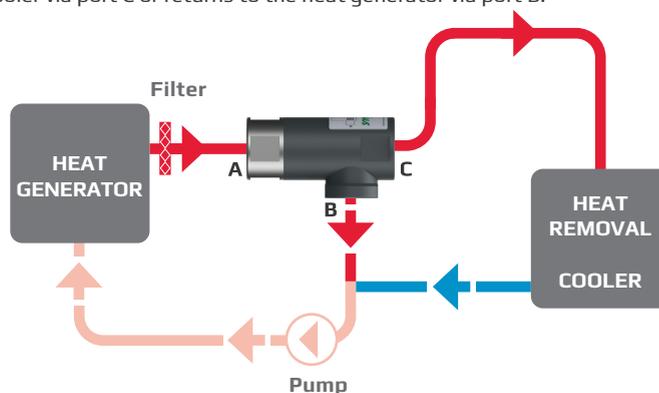
### MIXING SETUP

The hot media enters port B and port C is closed. If the temperature rises, port B begins to close and port C begins to open, forcing the water through the cooler, port A allows the mixed media to return to the heat generator at the controlled temperature.



### DIVERTING SETUP

The hot media enters in port A and depending on the temperature, it is led to the cooler via port C or returns to the heat generator via port B.







### ENSURING CONTINUOUS OPERATION

Self-acting temperature controller will operate in all conditions — without external controls or energy supply, resulting in continuous operation instead of disastrous breakdown.

# THERMOSTATS

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**OUR CONTROL VALVES PROGRAM INCLUDES:**

| THERMOSTAT TYPES            | V2.05  | V4.03 | V4.05  | V4.10  | V8.09  | V8.18  |
|-----------------------------|--------|-------|--------|--------|--------|--------|
| MAX. CLOSING FORCE          | 400N   | 500N  | 500N   | 500N   | 800N   | 800N   |
| STANDARD SETTING RANGE (°C) | 0-60   | 0-160 | 0-120  | 0-60   | 0-120  | 0-60   |
|                             | 30-90  |       | 40-160 | 30-90  | 40-160 | 30-90  |
|                             | 60-120 |       |        | 60-120 |        | 60-120 |

# V2, V4 and V8 Thermostats

Self-acting Temperature Controls

0-3.4.01-M

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## TECHNICAL DATA

|                          |   |
|--------------------------|---|
| <b>Closing force</b>     | 400 N, 500 N and 800 N                  |
| <b>Capillary length</b>  | 3m to 21m                               |
| <b>Neutral zone</b>      | 1,5°C - 2,5°C                           |
| <b>Temperature range</b> | 0 to 160°C<br>(-30 to 280°C on request) |

For linear valves up to DN150  
For heating or cooling valves

## APPLICATIONS

The temperature controller, which consists of a thermostat and a valve, is used for controlling the temperature in central heating systems, district heating systems, industrial plants or industrial processes and in marine systems. It can be used for the control of cold or hot water, steam or oil in heating as well as cooling systems.

## DESIGN

### Thermostat

A thermostat consists of a sensor and a capillary tube, filled with liquid, and an adjusting cylinder. The thermostat type designations and technical data are specified in fig. 2. With temperatures above 170°C, a cooling unit must be fitted between the valve and the thermostat - see fig. 1. The thermostat is self-acting and works on the principle of liquid expansion, it is sturdy in its design, and works with a large closing force - see fig. 2

### Sensor

The following sensor types are available - see fig. 4:

- 4.1. Rod sensor in copper or stainless steel and spiral sensor in copper with threaded connection according to ISO R7/1.
- 4.2. Spiral sensor (copper only) with air duct flange.
- 4.3. Rod/spiral sensor with steel flange DN 50, PN 40 and DN 50, PN 160.
- 4.4. Sensor without connection. Usually used with capillary pack box for temperature control in tanks.

### Capillary Tube

The capillary tube is made of copper, stainless steel, or of PVC-coated copper - see fig. 3, but can also be delivered with a flexible iron tube protection.

### Valve

A wide range of valve types for heating as well as cooling systems can be delivered. For quick and accurate valve selection and valve sizing, we advise you to visit our website [www.cloriuscontrols.com](http://www.cloriuscontrols.com) or contact us on [mail@cloriuscontrols.com](mailto:mail@cloriuscontrols.com).

## FEATURES

- No external power required.
- For use in hazardous area.
- Simple design secures reliable controls and reduces costly downtime.
- Customizable, User friendly, Plug & Control
- No special tools needed for service
- Low installation cost
- Sturdy and reliable

## FUNCTION

The adjusting cylinder of the thermostat is set at the required temperature for the heating medium in °C or °F. This setting can be fixed, if required. The temperature control is carried out by the thermostatically controlled valve reducing or increasing the flow of the heating (or cooling) medium. The sensor and the capillary tube, which are filled with a liquid, constitute - together with the adjusting cylinder - a closed system. If the temperature of a medium to be heated is above the required level, the temperature of the sensor liquid rises and expands, causing the piston of the thermostat to act upon the valve, reducing the flow of the heating medium.

Subject to change without notice.

**FUNCTION**

If the temperature of the medium to be heated is below the required level, the temperature of the sensor liquid falls, reducing the volume of the liquid, so that the piston allows the valve to open under its internal spring, thus increasing the flow of the heating medium. The neutral zone of a thermostat is the temperature difference which can occur at the sensor without any movement of the valve spindle. This represents the sensitivity of the control system to temperature changes: V2 = 2.5°C, V4 = 2°C and V8 = 1.5°C. (see fig. 2.)

**CHOICE OF TEMPERATURE CONTROL**

The selection of the correct temperature controller is determined by the sizing of the valve and thermostat respectively, which may be chosen by using our web-based software "Quick Choice" available on our website.

**Fig. 1** indicates whether the temperature of the heating medium necessitates a cooling unit, and how the thermostat is to be mounted in relation to the valve; for a temperature range -30°C to 170°C the thermostat may be installed both above and below the valve.

**Fig. 2** shows the type designation of the thermostat, its closing force in N and its setting range in °C.

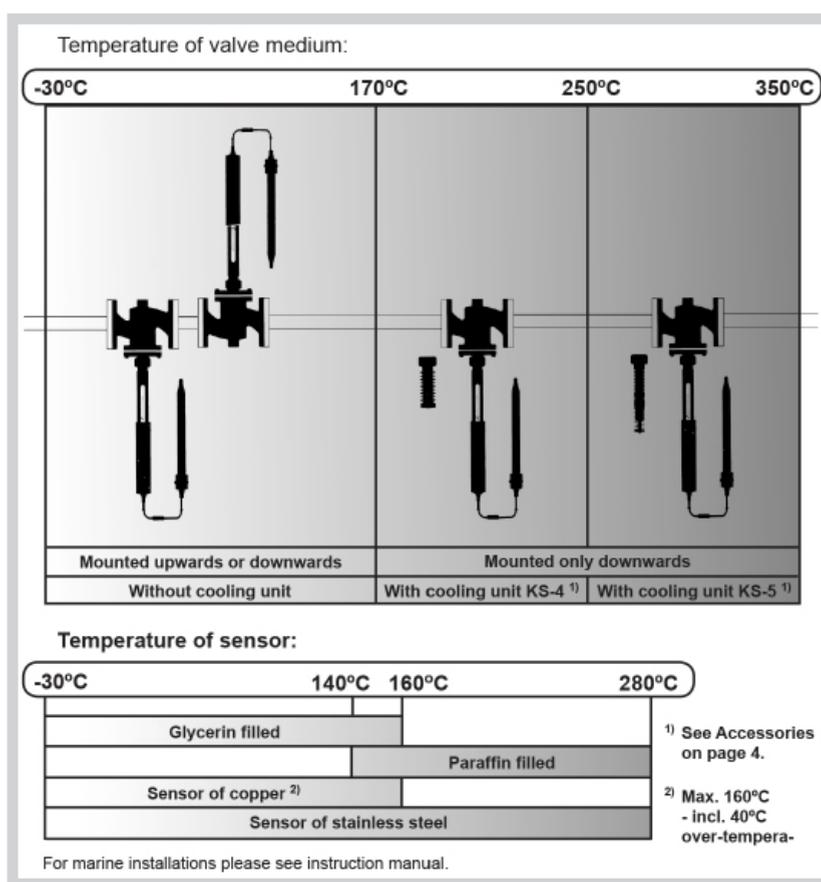
**Fig. 3** shows the choices of length and material for the capillary tubes.

**Fig. 4** shows the different types of sensors.

**Fig. 5** shows the time coefficients for the sensors. **Fig. 6** shows the choices of sensor materials, etc.

**Fig. 7** shows the dimensions and weights of the sensors as well as the weight of adjusting cylinders and the thermostats.

**FIG. 1. TEMPERATURE LIMITS**



**FIG. 2. TEMPERATURE TYPES**

| Technical Data                                       |                            | Thermostat Types |       |        |        |        |        |
|--|----------------------------|------------------|-------|--------|--------|--------|--------|
|  |                            | V2.05            | V4.03 | V4.05  | V4.10  | V8.09  | V8.18  |
| Max. closing force                                   | N                          | 400              | 500   | 500    | 500    | 800    | 800    |
| Setting range for standard thermostats <sup>1)</sup> | °C                         | 0-60             | 0-160 | 0-120  | 0-60   | 0-120  | 0-60   |
|  |                            | 30-90            |       | 40-160 | 30-90  | 40-160 | 30-90  |
|  |                            | 60-120           |       |        | 60-120 |        | 60-120 |
| Neutral zone   | °C                         | 2.5              | 2     | 2      | 2      | 1.5.   | 1.5.   |
| For valves with rated travel up to:                  | mm                         | 10               | 21    | 21     | 21     | 21     | 21     |
| Travel (amplification) in range: mm/°C               | -30 to 160°C <sup>2)</sup> | 0.5              | 0.3   | 0.5    | 1      | 0.9    | 1.8    |
|  | 140 to 280°C <sup>3)</sup> | 0.7              | 0.33  | 0.7    | 1.33   | 1.2    | 2.4    |

<sup>1)</sup> Setting ranges from -30 to 280°C on request. - Excess temp. safety range: 40°C <sup>2)</sup> Glycerine <sup>3)</sup> Paraffin

# V2, V4 and V8 Thermostats

Self-acting Temperature Controls

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## Rod Sensor

## Spiral Sensor

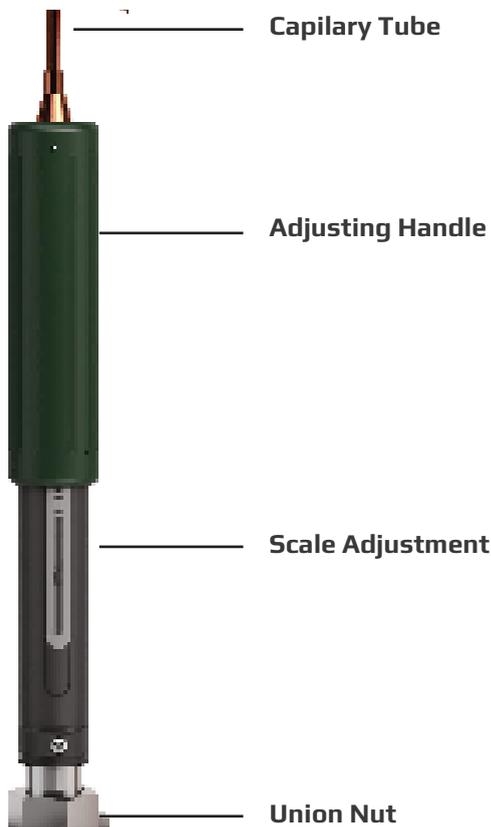
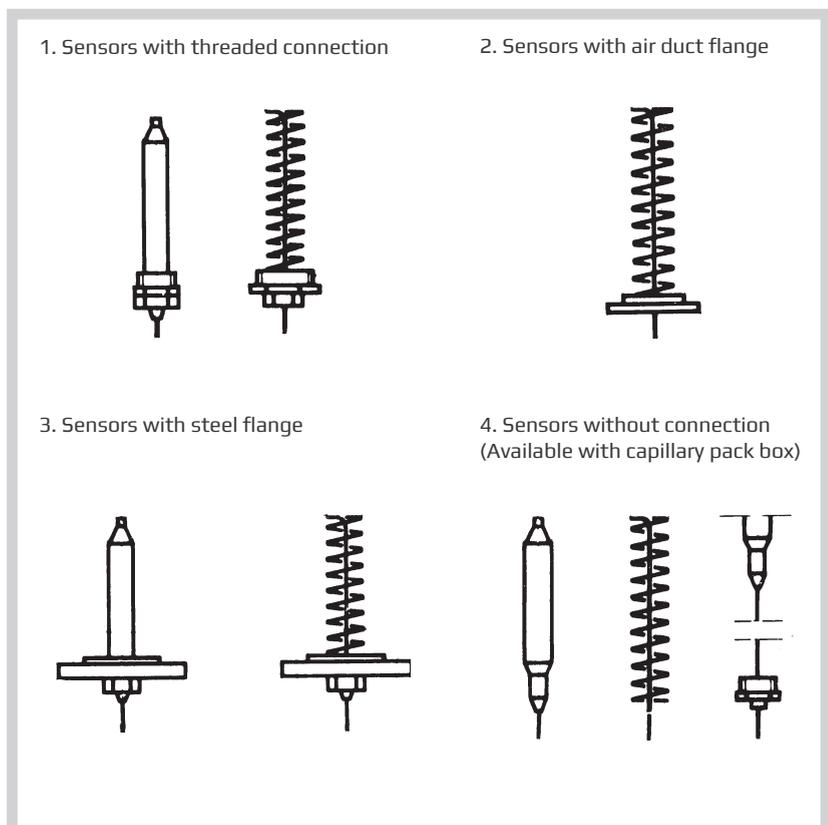


FIG. 3. CAPILLARY TUBES

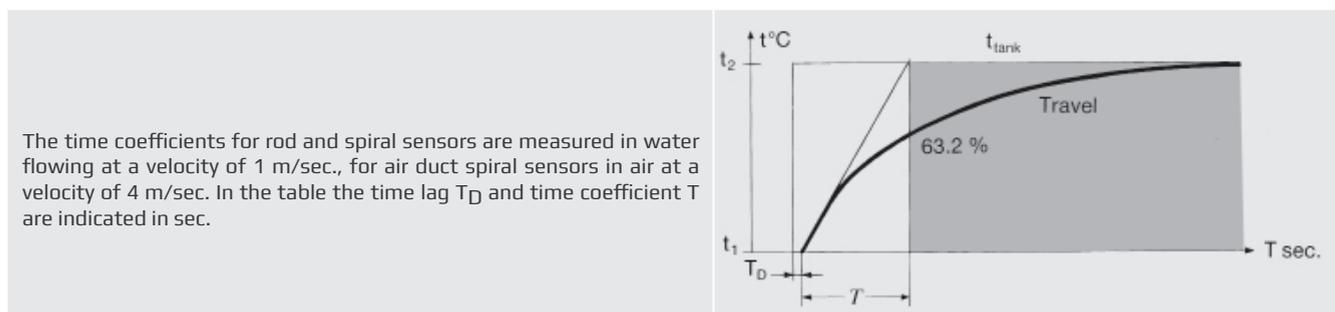
Choice of capillary tube, length and material, is determined according to the table below, independent of the choice of the thermostat type.

| Length | Copper threads | PVC-coated copper | Stainless steel |
|--------|----------------|-------------------|-----------------|
| 3 m    | ✓              | ✓                 | ✓               |
| 4.5 m  |                |                   | ✓               |
| 6 m    | ✓              | ✓                 | ✓               |
| 7.5 m  |                |                   | ✓               |
| 9 m    | ✓              | ✓                 | ✓               |
| 10.5 m |                |                   | ✓               |
| 12 m   | ✓              | ✓                 | ✓               |
| 13.5 m |                |                   | ✓               |
| 15 m   | ✓              | ✓                 | ✓               |
| 16.5 m |                |                   | ✓               |
| 18 m   | ✓              | ✓                 | ✓               |
| 19.5 m |                |                   | ✓               |
| 21 m   | ✓              | ✓                 | ✓               |

FIG. 4. SENSOR TYPES



**FIG. 5. TIME COEFFICIENT FOR SENSORS**



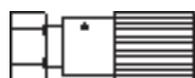
| Type  | Copper     |     |               |    |                            | Acid-resistant stainless steel (mm) |     |               |    | Copper with sensor pocket |      |                         |
|-------|------------|-----|---------------|----|----------------------------|-------------------------------------|-----|---------------|----|---------------------------|------|-------------------------|
|       | Rod sensor |     | Spiral sensor |    | Spiral sensor for air duct | Rod sensor                          |     | Spiral sensor |    | Rod sensor                |      | Liquid in sensor pocket |
|       | $T_D$      | T   | $T_D$         | T  | T                          | $T_D$                               | T   | $T_D$         | T  | $T_D$                     | T    |                         |
| V2.05 | 10         | 85  | 3             | 20 | 360                        | 10                                  | 85  | 3             | 20 | 20                        | 210  | Hot oil                 |
| V4.03 | 6          | 120 | 3             | 20 | 360                        | 6                                   | 90  | 3             | 20 | 20                        | 250  | Hot oil                 |
| V4.05 | 6          | 130 | 2             | 20 | 360                        | 6                                   | 100 | 2             | 20 | 20                        | 200  | Hot oil                 |
| V4.10 | 8          | 165 | 2             | 20 | 360                        | 8                                   | 150 | 2             | 25 | 25                        | 300  | Hot oil                 |
| V8.09 | 8          | 165 | 2             | 30 | 600                        | 9                                   | 220 | 2             | 30 | 25                        | 450  | Hot oil                 |
| V8.18 |            |     |               |    |                            | 9                                   | 280 | 10            | 65 | 28*                       | 570* | Hot oil                 |

**FIG. 6. SENSOR MATERIAL ETC.**

| Adjusting Cylinder         | Copper sensors       |                      |                     |               | Acid-resistant stainless steel sensors |                     |                      |                      | Capillary tubes                   |
|----------------------------|----------------------|----------------------|---------------------|---------------|--|---------------------|----------------------|----------------------|-----------------------------------|
|                            |                      |                      |                     |               |  |                     |                      |                      | Copper = c<br>Stainless steel = n |
| DIN/EN no.<br>Material no. | a<br>10088<br>1.4301 | b<br>17440<br>1.4305 | c<br>1787<br>2.0090 | d<br>OM-Metal | e<br>17100<br>1.0134                   | f<br>1725<br>3.2581 | h<br>17440<br>1.4436 | k<br>17440<br>1.4435 | n<br>17440<br>1.4301              |

**ACCESSORIES**

**Manual Adjusting Device**



With stuffing box. For tightening and manual operation of the valves, when a thermostat has not been fitted, e.g. during periods of construction etc.

**Cooling Unit KS-4**



Cooling unit protecting the stuffing box of the thermostat. To be applied at valve temperatures between 170°C and 250°C.

**Cooling Unit KS-5**



Cooling unit with built-in bellows gland. Replaces the stuffing box of thermostat. Must be applied by valve temperatures between 250°C and 350°C.

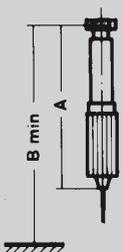
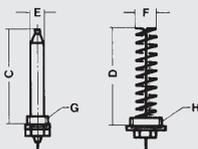
# V2, V4 and V8 Thermostats

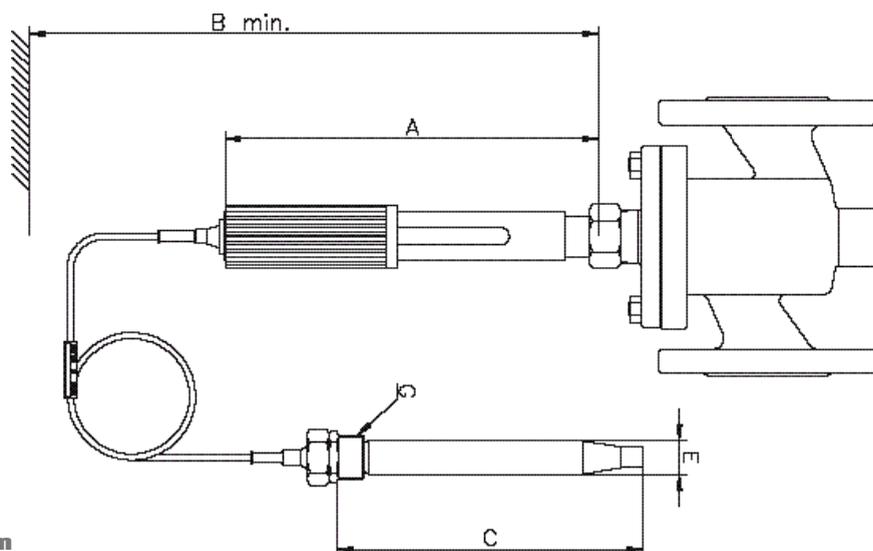
Self-acting Temperature Controls

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FIG. 7. DIMENSIONS AND WEIGHTS

|  |           | Thermostat / Sensor material  |                               |            |     |            |     |            |     |            |     |            |     |    |
|--|-----------|-------------------------------|-------------------------------|------------|-----|------------|-----|------------|-----|------------|-----|------------|-----|----|
|  |           | Type V2.05                    |                               | Type V4.03 |     | Type V4.05 |     | Type V4.10 |     | Type V8.09 |     | Type V8.18 |     |    |
|  |           | c                             | s                             | c          | s   | c          | s   | c          | s   | c          | s   | c          | s   |    |
| <p>The measurements G and H are pipe threads according to ISO R7/1. All other measurements are mm.<br/>Weight: Net.<br/>c = Copper sensor.<br/>s = Acid-resistant stainless steel sensor.</p>    |           |                               |                               |            |     |            |     |            |     |            |     |            |     |    |
| <p><b>Adjusting cylinder</b></p>  <p>Weights see below</p>  | <b>A</b>  | 305                           | 305                           | 385        | 385 | 385        | 385 | 385        | 385 | 560        | 560 |            | 560 |    |
|  | <b>B</b>  | 405                           | 406                           | 525        | 525 | 525        | 525 | 525        | 525 | 740        | 740 |            | 740 |    |
| <p><b>Sensor with threaded connection</b></p>  <p>Weight incl. G-connection<br/>Weight incl. H-connection</p> | <b>C</b>  | 210                           | 190                           | 210        | 190 | 390        | 380 | 490        | 515 | 710        | 745 |            | 800 |    |
|  | <b>D</b>  | 235                           | 170                           | 235        | 170 | 235        | 250 | 325        | 325 | 425        | 435 |            | 810 |    |
|  | <b>E</b>  | 22                            | 22                            | 22         | 22  | 22         | 22  | 28         | 25  | 28         | 25  |            | 34  |    |
|  | <b>F</b>  | 49                            | 49                            | 49         | 49  | 49         | 49  | 49         | 49  | 49         | 49  |            | 49  |    |
|  | <b>G</b>  | R <sup>3</sup> / <sub>4</sub> | R <sup>3</sup> / <sub>4</sub> | R1         | R1  | R1         | R1  | R1         | R1  | R1         | R2  | R2         |     | R2 |
|  | <b>H</b>  | R2                            | R2                            | R2         | R2  | R2         | R2  | R2         | R2  | R2         | R2  | R2         |     | R2 |
|  | <b>kg</b> | 1.8                           | 1.8                           | 2.4        | 2.4 | 2.6        | 2.6 | 3.3        | 3.3 | 6.3        | 6.3 |            | 7.3 |    |
| <b>kg</b>  | 2.3       | 2.3                           | 2.9                           | 2.9        | 3.1 | 3.1        | 3.8 | 3.8        | 6.3 | 6.3        |     | 7.3        |     |    |
| <p><b>Sensors with air duct flange</b></p>    | <b>F</b>  | 49                            |                               | 49         |     | 49         |     | 49         |     | 49         |     |            |     |    |
|  | <b>I</b>  | 430                           |                               | 430        |     | 430        |     | 430        |     | 450        |     |            |     |    |
|  | <b>L</b>  | 60                            |                               | 60         |     | 60         |     | 60         |     | 60         |     |            |     |    |
|  | <b>M</b>  | 95                            |                               | 95         |     | 95         |     | 95         |     | 95         |     |            |     |    |
|  | <b>kg</b> | 1.8                           |                               | 2.4        |     | 2.6        |     | 3.3        |     | 5.8        |     |            |     |    |



**FIG. 7. DIMENSIONS AND WEIGHTS**

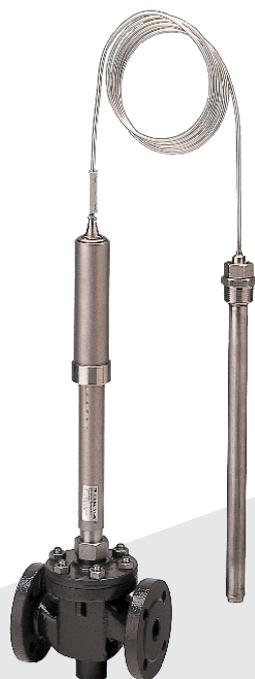
| The measurements G and H are pipe threads according to ISO R7/1. All other measurements are mm.<br>Weight: Net.<br>c = Copper sensor.<br>s = Acid-resistant stainless steel sensor. |   | Thermostat / Sensor material |      |            |      |            |      |            |      |            |      |            |      |
|---|---|------------------------------|------|------------|------|------------|------|------------|------|------------|------|------------|------|
|   |   | Type V2.05                   |      | Type V4.03 |      | Type V4.05 |      | Type V4.10 |      | Type V8.09 |      | Type V8.18 |      |
|   |   | c                            | s    | c          | s    | c          | s    | c          | s    | c          | s    | c          | s    |
| <b>Sensor with steel flange<br/>DN 50, PN 40</b><br><br>  | <b>E</b>  | 22                           | 22   | 22         | 22   | 22         | 22   | 28         | 25   | 28         | 25   |            | 34   |
|   | <b>F</b>  | 49                           | 49   | 49         | 49   | 49         | 49   | 49         | 49   | 49         | 49   |            | 49   |
|   | <b>N</b>  | 200                          | 180  | 200        | 180  | 380        | 360  | 480        | 505  | 700        | 735  |            | 790  |
|   | <b>O</b>  | 225                          | 160  | 225        | 160  | 225        | 240  | 315        | 315  | 415        | 425  |            | 800  |
|   | <b>P</b>  | 4x18                         | 4x18 | 4x18       | 4x18 | 4x18       | 4x18 | 4x18       | 4x18 | 4x18       | 4x18 |            | 4x18 |
|   | <b>R</b>  | 125                          | 125  | 125        | 125  | 125        | 125  | 125        | 125  | 125        | 125  |            | 125  |
|   | <b>S</b>  | 165                          | 165  | 165        | 165  | 165        | 165  | 165        | 165  | 165        | 165  |            | 165  |
|   | <b>T</b>  | 22                           | 22   | 22         | 22   | 22         | 22   | 22         | 22   | 22         | 22   |            | 22   |
|   | <b>kg</b>   | 5.3                          | 5.3  | 5.9        | 5.9  | 6.1        | 6.1  | 6.8        | 6.8  | 9.3        | 9.3  |            | 10.3 |
|   | <b>Sensor with steel flange<br/>DN 50, PN 160</b><br><br> | <b>E</b>                     | 22   | 22         | 22   | 22         | 22   | 22         | 28   | 25         | 28   | 25         |      |
| <b>F</b>  |   | 49                           | 49   | 49         | 49   | 49         | 49   | 49         | 49   | 49         | 49   |            | 49   |
| <b>N</b>  |   | 180                          | 160  | 180        | 160  | 360        | 340  | 460        | 485  | 680        | 715  |            | 770  |
| <b>O</b>  |   | 205                          | 140  | 205        | 140  | 205        | 220  | 295        | 295  | 395        | 405  |            | 780  |
| <b>P</b>  |   | 4x27                         | 4x27 | 4x27       | 4x27 | 4x27       | 4x27 | 4x27       | 4x27 | 4x27       | 4x27 |            | 4x27 |
| <b>R</b>  |   | 145                          | 145  | 145        | 145  | 145        | 145  | 145        | 145  | 145        | 145  |            | 145  |
| <b>S</b>  |   | 195                          | 195  | 195        | 195  | 195        | 195  | 195        | 195  | 195        | 195  |            | 195  |
| <b>T</b>  |   | 45                           | 45   | 45         | 45   | 45         | 45   | 45         | 45   | 45         | 45   |            | 45   |
| <b>kg</b>   |   | 11.3                         | 11.3 | 11.9       | 11.9 | 12.1       | 12.1 | 12.8       | 12.8 | 15.3       | 15.3 |            | 16.3 |
| <b>Sensors without connection</b><br>Available with capillary pack box<br>in stainless steel (1.4436)<br><br>   |   | <b>E</b>                     | 22   | 22         | 22   | 22         | 22   | 22         | 28   | 25         | 28   | 25         |      |
|   | <b>F</b>  | 49                           | 49   | 49         | 49   | 49         | 49   | 49         | 49   | 49         | 49   |            | 49   |
|   | <b>G</b>  | R1                           | R1   | R1         | R1   | R1         | R1   | R1         | R1   | R2         | R2   |            | R2   |
|   | <b>H</b>  | R2                           | R2   | R2         | R2   | R2         | R2   | R2         | R2   | R2         | R2   |            | R2   |
|   | <b>U</b>  | 250                          | 230  | 250        | 230  | 430        | 410  | 535        | 555  | 750        | 785  |            | 840  |
|   | <b>V</b>  | 290                          | 220  | 290        | 220  | 290        | 310  | 375        | 370  | 470        | 490  |            | 860  |
|   | <b>kg<sup>1)</sup></b>                                    | 1.6                          | 1.6  | 2.2        | 2.2  | 2.3        | 2.3  | 3          | 3    | 5.5        | 5.5  |            | 6.5  |
|   | <b>kg<sup>2)</sup></b>                                    | 1.6                          | 1.6  | 2.2        | 2.2  | 2.4        | 2.4  | 3.1        | 3.1  | 5.6        | 5.6  |            | 6.6  |
|   | <b>kg<sup>3)</sup></b>                                    | 1.8                          | 1.8  | 2.4        | 2.4  | 2.6        | 2.6  | 3.3        | 3.3  | 6.3        | 6.3  |            | 7.3  |
|   | <b>kg<sup>4)</sup></b>                                    | 2.3                          | 2.3  | 2.9        | 2.9  | 3.1        | 3.1  | 3.8        | 3.8  | 6.3        | 6.3  |            | 7.3  |



# Thermostats of stainless steel types V4.03 and V4.05

0-3.4.05-F

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## TECHNICAL DATA

|   |                                     |
|---|-------------------------------------|
| <b>Max. closing force</b>                   | 500 N                               |
| <b>Standard settings:</b>                   |                                     |
| - Type V4.03                                | 0-160 °C                            |
| - Type V4.05                                | 0-120, 40-160 °C                    |
| <b>Reinforcement (mm/°C):</b>               |                                     |
| - Glycerine                                 | Type V4.03: 0.3<br>Type V4.05: 0.5  |
| - Paraffin                                  | Type V4.03: 0.33<br>Type V4.05: 0.7 |
| <b>For valves with lifting height up to</b> | 21 mm                               |
| <b>Time constant for rod sensor:</b>        |                                     |
| - Type V4.03:                               | 90 sec.                             |
| - Type V4.05:                               | 100 sec.                            |
| <b>Time constant for spiral sensor,</b>     | 20 sec.                             |
| <b>Neutral zone</b>                         | < 2°C                               |
| <b>Excess temperature protection</b>        | 40°C                                |
| <b>Materials:</b>                           |                                     |
| - Spring:                                   | 1.4401                              |
| - Capillary:                                | 1.4301                              |
| - Adjusting cylinder:                       | 1.4501                              |

**Sensor material** W. No. 1.4436

Subject to change without notice.

## APPLICATIONS

The thermostat is particularly suitable for installation in demanding environments such as tank installations, outdoor plants and where it must be non-magnetic, e.g. in submarines.

## FUNCTION

The adjusting cylinder of the thermostat is set at the temperature in °C for the required heated medium. The temperature is regulated by the thermostatically controlled valve reducing or increasing the flow of the heating medium. Together with the adjusting cylinder, the liquid-filled sensor and capillary tube constitute a closed system. If the temperature of the medium to be heated is above the required level, the sensor liquid expands, causing the spindle of the thermostat to act upon the valve, thereby reducing the flow of the heating medium. If the temperature is below the required level, the temperature of the liquid in the sensor decreases and the volume is reduced, thereby the valve spring opens the valve causing an increasing flow of the heating medium.

## CONSTRUCTION

The parts of the thermostat are made of stainless steel. The thermostat consists of a liquid-filled sensor, a capillary tube, and an adjusting cylinder. The adjusting cylinder has O-ring sealings and is sealed with silicone glue at the top for hermetical closure. The thermostat is available with settings between -30°C and +280°C. At flow temperatures above 170°C, a cooling unit must be installed between the valve and the thermostat. Please see datasheet no. 8.5.00.

## FEATURES

- No external power required.
- For use in hazardous area.
- Simple design secures reliable controls and reduces costly downtime.
- Customizable, User friendly, Plug & Control.
- No special tools needed for service.
- Low installation cost.
- For outdoor installation even on open ship deck.
- Self-acting
- P-controller
- Completely sealed
- Excess temperature protection
- All parts made of stainless steel
- Non-magnetic

## NEUTRAL ZONE

The neutral zone of the thermostat, which is less than 2 °C, is the temperature difference which can occur at the sensor without the thermostat spindle being actuated.

## SENSOR TYPES

Rod sensors of stainless steel with pipe thread. Sensors are also available with a pack-box on the capillary tube for applications where the sensor is to be lowered into a tank etc.

### SENSOR LIQUID

Glycerine at a scale range between - 30 °C and 160 °C. Paraffin at a scale range between 140 °C and 280 °C.

### CAPILLARY TUBE

The capillary tube is made of stainless steel and is available in lengths from 3 m up to 21 m.

### VALVES

The thermostat may be used for valves up to DN 150 mm for heating and cooling plants. For quick and accurate valve selection and valve sizing, we advise you to visit our website [www.cloriuscontrols.com](http://www.cloriuscontrols.com) and select our sizing software Quick Choice 4.

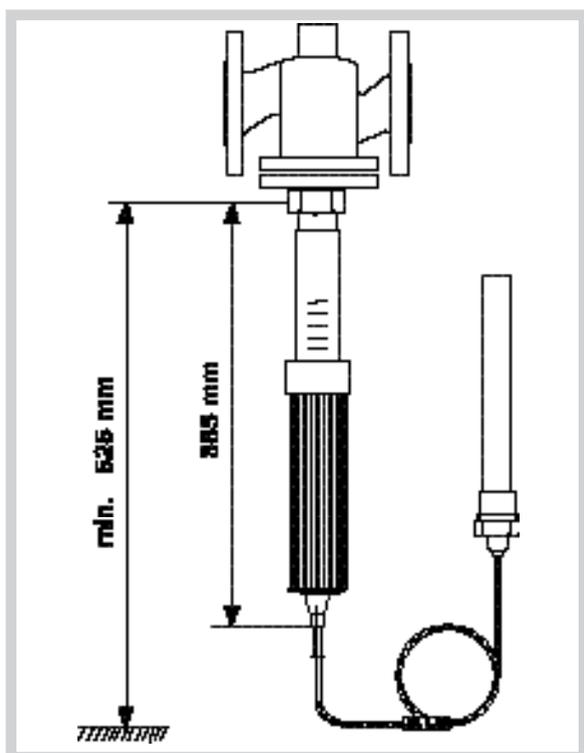
2

| Sensors with pipe thread      | Type V4.03   | Type V4.05            |                       |
|-------------------------------|--------------|-----------------------|-----------------------|
|                               | C<br>E<br>G* | 190 mm<br>22 mm<br>1" | 380 mm<br>22 mm<br>1" |
| Weight including G connection | 2.4 kg       | 2.6 kg                |                       |

| Sensors without connection<br>Available with capillary packbox | Type V4.03   | Type V4.05             |                       |
|--|--------------|------------------------|-----------------------|
| 1)   | E<br>U<br>G* | 22 mm<br>230 mm<br>1"  | 22 mm<br>410 mm<br>1" |
| 3)   | Weight       | 1) 2.2 kg<br>2) 2.4 kg | 2.3 kg<br>2.6 kg      |

\* The measurements G and H are pipe threads according to ISO R7/1.

### DIMENSION SKETCH

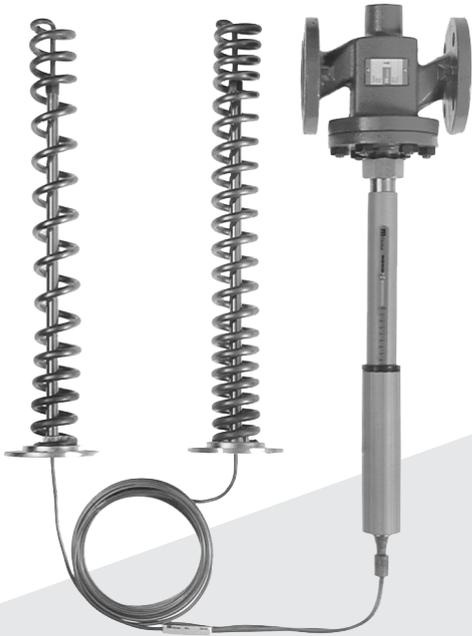


# Duostats

Self-acting Temperature Controls

0-3.5.01-G

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## TECHNICAL DATA

|                   |   |
|-------------------|---|
| Closing force     | 500 N                                   |
| Capillary length  | 3m to 21m                               |
| Neutral zone      | 1,5°C - 2,5°C                           |
| Temperature range | 0 to 160°C<br>(-30 to 280°C on request) |

For linear valves up to DN150  
For heating or cooling valves

## CLORIUS DUOSTATS

Duostats are thermostats, type V, which via two sensing elements in a common hydraulic system act on one and the same control valve.

Two basic types are available: V4.05 or V4.10, depending on the preferable proportional band PB, and the valve size.

The sensing elements are two spiral sensors for the ventilation duct or two rod sensors (a combination of one spiral sensor and one rod sensor may be supplied in certain combinations). The effect, which the two sensing elements have on the adjustment, is proportional to the liquid volume of the individual sensors. Duostats are therefore available with varying proportions between the liquid volumes of the two sensors (sensor proportions) and in that way they can meet the requirements made by a number of different adjustment problems. As the adjustment result is a weighted average value of the temperatures of the two sensors, no fixed adjustment value can be indicated. Hence, Duostats are not equipped with a temperature scale, but with a marking for adjustment towards higher or lower temperatures, respectively.

## SELECTION OF DUOSTAT TYPES

For quick and accurate valve selection and valve sizing, we advise you to visit our website [www.cloriuscontrols.com](http://www.cloriuscontrols.com) or write to us at [mail@cloriuscontrols.com](mailto:mail@cloriuscontrols.com).

## APPLICATIONS

1. Adjustment of discharge air temperatures in hot-air heating plants, dependent on the outdoor temperature.
2. Adjustment of two temperatures which are interdependent. E.g. the hot-water tank of a district heating plant with simultaneous control that the return water temperature does not become too high.

## FEATURES

- No external power required.
- For use in hazardous area.
- Simple design secures reliable controls and reduces costly downtime.
- Customizable, User friendly, Plug & Control.
- No special tools needed for service.
- Low installation cost.

Subject to change without notice.

**APPLICATIONS**

**Air Heating Plants**

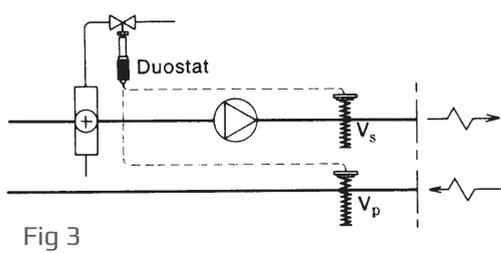
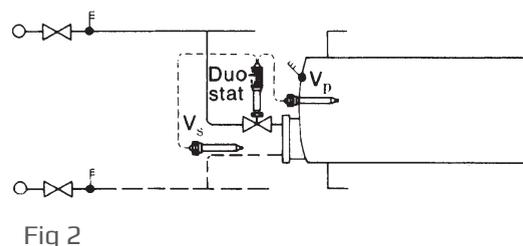
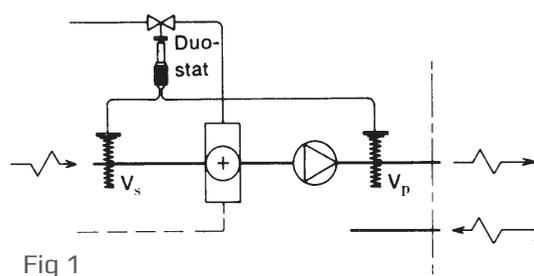
For air heating plants Duostats with two spiral sensing elements for air ducts are used. **Fig. 1** shows an example of a plant with Duostat. The primary sensor  $V_p$  (red) is the real control sensor which goes into the controlled system. The secondary sensor  $V_s$  (blue) which is located outside the controlled system, registers the outdoor temperature and determines the necessary air temperature by  $V_p$ . If there is no supply air duct, where the secondary sensor can be built in, it can be placed in free air. For this purpose a wall bracket is available. In order to determine the correct Duostat, use diagram A where the combinations of spiral sensors for air ducts are found on the left hand.

**Other Applications**

Duostats are sometimes used for purposes where both sensing elements go into the same controlled system (see examples 2 and 3). The controlled condition will then be a weighted average of the registrations of the two sensors, as shown in the following examples.

In **fig. 2** a hot-water tank connected to district heating is adjusted by a Duostat whose one sensor - the primary sensor - controls the temperature of the tank which should be constant. The secondary sensor registers the temperature of the water which is led back to the district heating network. It secures that the valve does not open so much that the temperature of the return water rises in an uncontrolled manner, when a large water consumption reduces the temperature in the tank.

**Fig. 3** shows a room heated by hot air. The primary sensor is built into the extract air duct in order to serve as a room thermostat from this place. The secondary sensor is built into the discharge air duct where it counteracts that the discharge air temperature becomes too low - which would feel like a draught - when the room temperature rises as a result of the heat development which may come from persons or heating processes in the room.





## THEORETICAL BASIS

The theoretical basis for the use of Duostats for room heating plants rests on the balance between the heat brought to the plant, and the thermal loss from the heated rooms to the surroundings. By hot-air plants (**fig. 1**) this may approximately be expressed by equation 1), but with small changes, these considerations may be applied to central heating plants with water as the heat carrier.

$$1) Lc_p (t_i - t_u) = \Sigma kf(t_r - t_u)$$

Here L is the quantity of air which is heated from the outdoor temperature  $t_u$  to the discharge temperature  $t_i$ , and  $c_p$  is the specific heat of the air.  $k \cdot f$  expresses the sum of transmission surfaces, joints, etc., through which heat is lost to the surroundings by the difference between the temperatures of the heated rooms  $t_r$  and the outdoor temperature  $t_u$ . As L,  $c_p$ ,  $k \cdot f$  and the room temperature are constant sizes, equation 1) can be converted into:

$$2) (t_{i \max} - t_{i \min}) / (t_{u \max} - t_{u \min}) = \Delta t_i / \Delta t_u = n$$

Here  $t_{i \max}$  and  $t_{u \min}$  are belonging values for the calculated discharge air temperature by the outdoor temperature for which the plant has been dimensioned. In the same way,  $t_{i \min}$  and  $t_{u \max}$  are interbelonging values by the condition where the thermal loss is 0 (normally 20°C). The size n expresses how many degrees  $t_i$  has to be raised, when  $t_u$  falls one degree. It is constant for the individual plant, but varies from plant to plant. This problem can be met by supplying the Duostats with different sensor proportions. The proportion between the liquid volume in secondary and primary sensors is:

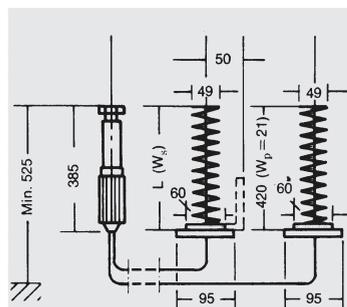
$$3) V_s / V_p = 1.25n$$

This formula is approximate, as the expansion coefficient of the liquid (glycerine) varies with the temperature, which is compensated for with the factor 1.25.

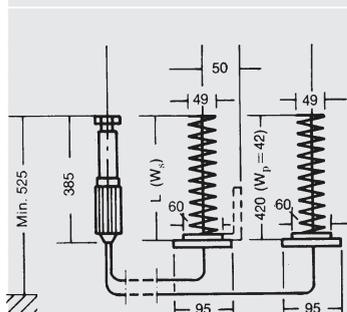
## ORDER DIAGRAM

By specifications of Duostats, the following information is given:

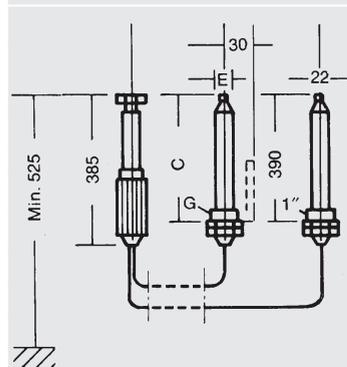
|  |                   |
|--|-------------------|
| 1. Valve. Dimension and type   | Example<br>15 M1F |
| 2. Duostat. Basic type and sensor proportion                             | V4.05 C           |
| 3. Capillary tube from adjusting cylinder to secondary sensor (Vs, blue) | 6 m               |
| 4. Capillary tube from adjusting cylinder to primary sensor (Vp, red)    | 3 m               |



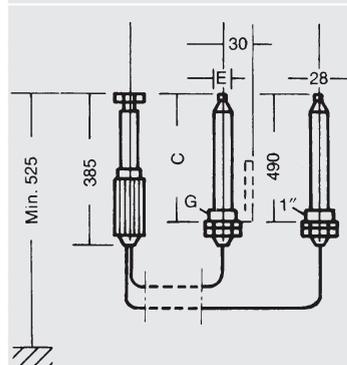
| Type                               |       | V4.05 A | V4.05 B | V4.05 C | V4.05 D | V4.05 E |
|------------------------------------|-------|---------|---------|---------|---------|---------|
| Closing power                      | N     | 500     | 500     | 500     | 500     | 500     |
| Length of secondary sensor L       | mm    | 430     | 430     | 430     | 430     | 430     |
| Secondary sensor's windings $W_s$  |       | 7       | 10      | 14      | 21      | 29      |
| Secondary sensor's time constant * | sec.  | 360     | 360     | 360     | 360     | 360     |
| Primary sensors's time constant *  | sec.  | 360     | 360     | 360     | 360     | 360     |
| Sensor proportion $V_s : V_p$      |       | 0.35:1  | 0.5:1   | 0.7:1   | 1:1     | 1.4:1   |
| Excess temperature protector       | °C    | 80      | 80      | 80      | 80      | 80      |
| Max. lifting height                | mm    | 21      | 21      | 21      | 21      | 21      |
| Travel                             | mm/°C | 0.5     | 0.5     | 0.5     | 0.5     | 0.5     |



| Type                               |       | V4.10 A | V4.05 B | V4.05 C | V4.05 D | V4.05 E |
|------------------------------------|-------|---------|---------|---------|---------|---------|
| Closing power                      | N     | 500     | 500     | 500     | 500     | 500     |
| Length of secondary sensor L       | mm    | 430     | 430     | 430     | 430     | 430     |
| Secondary sensor's windings $W_s$  |       | 14      | 21      | 29      | 42      | 42      |
| Secondary sensor's time constant * | sec.  | 360     | 360     | 360     | 360     | 360     |
| Primary sensors's time constant *  | sec.  | 360     | 360     | 360     | 360     | 360     |
| Sensor proportion $V_s : V_p$      |       | 0.35:1  | 0.5:1   | 0.7:1   | 1:1     | 1.45:1  |
| Excess temperature protector       | °C    | 40      | 40      | 40      | 40      | 40      |
| Max. lifting height                | mm    | 21      | 21      | 21      | 21      | 21      |
| Travel                             | mm/°C | 1       | 1.0     | 1.0     | 1.0     | 1.0     |



| Type                              |         | V4.05 L | V4.05 M |
|-----------------------------------|---------|---------|---------|
| Closing power                     | N       | 500     | 500     |
| Length of secondary sensor C      | mm      | 390     | 490     |
| Secondary sensor's diam. E        | mm      | 22      | 28      |
| Secondary sensor's thread conn. G | ISO 7/1 | R1      | R1      |
| Secondary sensor's time constant* | sec.    | 130     | 165     |
| Primary sensor's time constant    | sec.    | 130     | 130     |
| Sensor proportion $V_s : V_p$     |         | 1:1     | 2:01    |
| Excess temperature protector      | °C      | 0:00    | 80      |
| Max. lifting height               | mm      | 21      | 21      |
| Travel                            | mm/°C   | 0.5     | 0.5     |



| Type                              |         | V4.10 L | V4.10 N |
|-----------------------------------|---------|---------|---------|
| Closing power                     | N       | 500     | 500     |
| Length of secondary sensor C      | mm      | 490     | 800     |
| Secondary sensor's diam. E        | mm      | 28      | 34      |
| Secondary sensor's thread conn. G | ISO 7/2 | R1      | R2      |
| Secondary sensor's time constant* | sec.    | 165     | 280     |
| Primary sensor's time constant    | sec.    | 165     | 165     |
| Sensor proportion $V_s : V_p$     |         | 1:1     | 2.9:1   |
| Excess temperature protector      | °C      | 0:00    | 40      |
| Max. lifting height               | mm      | 21      | 21      |
| Travel                            | mm/°C   | 1       | 1.0     |

\*The time constants are for spiral sensing elements for air ducts measured in air with a velocity of 4 m/sec. For rod sensing elements they are measured in water with a velocity of 1 m/sec.



**HIGH PRECISION  
& REPEATABILITY**

Our Electric actuators are compact and powerful actuator systems, which provide a long service life. Designed for our range of both linear and rotary valves

# ELECTRIC ACTUATORS

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## OUR ELECTRIC ACTUATOR PROGRAM INCLUDES:

### ACTUATOR TYPE

ROTARY ELECTRIC

LINEAR ELECTRIC

LINEAR WITH FAIL SAFE FUNCTION

### ACTUATOR MODEL

CAR-H 006 - S400

AVM321, AVM322, AVM234

AVF234

# ELECTRIC VALVE ACTUATOR TYPE CAR-H

FOR 2 & 3-WAY VALVES TYPE G/L/M/S 2FM-T & G/L/S/T AND TM

O-4.11.09-D

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## APPLICATIONS

Electric valve actuator type CAR-H is specially designed to meet the demands of the powerful low frequency vibration environments in marine installations.

The main applications are cooling of fresh water, sea water and lubricating oil systems for main and auxiliary engines. The actuator is used for Clorius 2 or 3-way valves type L3FM-T, M3FM-T, G3FM-T and S3FM-T, H3FM-T and type TM with double slides.

## MOUNTING

For mounting and starting up, the instructions delivered with the actuator must be followed carefully.

## SERVICE

No special service is needed. It is recommended to check and grease the actuator at every docking or every three years.

## FEATURES

- Robust design
- Maintenance free
- Reliable even in rough environments
- Easy installation
- User friendly

## TECHNICAL DATA

**Protection class:** IP67/IP68 option

**Ambient temperature:** -20°C to +60°C

### Power supply:

110/230 VAC + -10% (50-60Hz)

24VDC: CAR-H 006-0250 - ON/OFF

24VDC: CAR-H 006-035 - PCU or CPT

**Torque switches:** Open/Close

**Limit switches:** 2x Open/Close

**Stall protection:** Built-in thermal protection  
Cut-off at 125°C ± 5°C /  
reset at 90°C ± 15°C

**Travel angle:** 90°±5°

**Indicator:** Continuous position indicator  
**Manual override:** AUTO declutching mechanism  
**Worm gear:** Permanently lubricated and self-locking

**Mechanical stops:** External adjustable limit stops

**Space heater:** 5W  
Anti-condensation

**Cable glands:** 2 x M20 x 1,5mm

**Lubrication:** Grease NLGI grade 2 (EP-type)

**Materials:** Steel, aluminium alloy, Al-bronze  
**External coating:** anodizing and dry powder epoxy painted RAL 6018 (green)

**Duty cycle:** ON/OFF AC230V,S2: 10min

**Modulating:** S4-25% ~ 600 start/hour

**Anti-vibration:** XYZ 10g 02 ~ 34Hz, 30min

**Overvoltage:** CAT. III

### Available actuator size

**STANDARD:** On-Off, 3-Point

### Modulating/PCU

**Command signal input:** 4-20mA or 0-10V

**Analogue feedback signal:** 4-20mA or 0-10V self powered

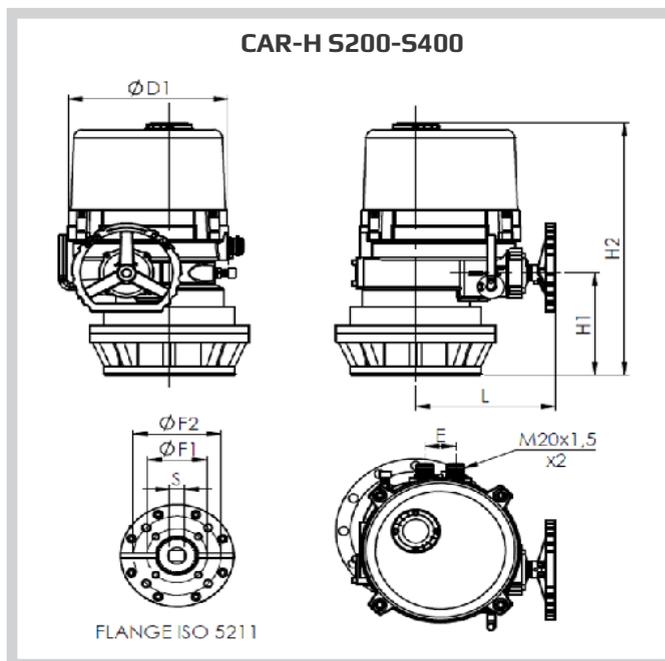
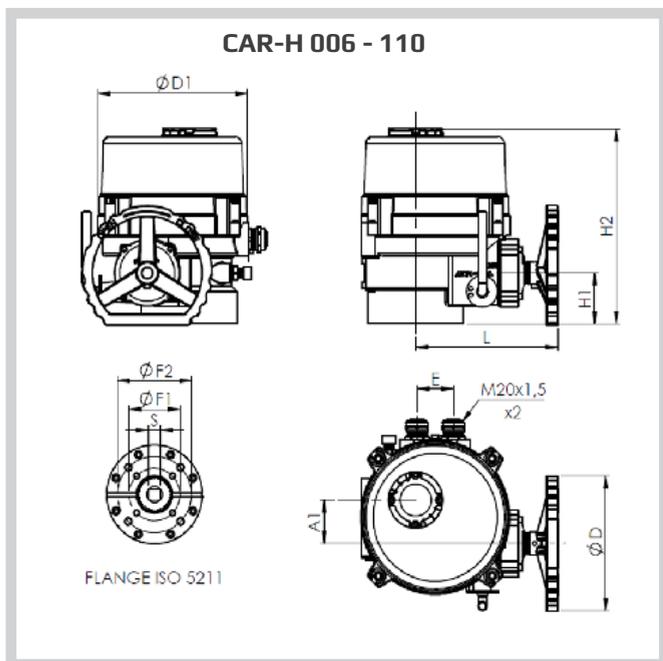
**Deep band:** 1,0% adjustable

**CPT:** feedback signal 4-20mA

## SPECIFICATIONS

| Type       | Max. torque Nm | Operating time sek/90° (50/60 Hz) | RATED CURRENT (A) 230 V AC | RATED CURRENT (A) 110 V AC | RATED CURRENT (A) 24 V AC/DC | Power (W) | Duty cycle S2 (min) ON-OFF | Duty cycle S4 (%) | Weight (kg) |
|------------|----------------|-----------------------------------|----------------------------|----------------------------|------------------------------|-----------|----------------------------|-------------------|-------------|
| CAR-H 006  | 60             | 26/22                             | 0,45                       | -                          | -                            | 20        | 10                         | 25                | 8           |
| CAR-H 010  | 100            | 26/22                             | 0,5                        | 1,0                        | 1,7                          | 20        | 10                         | 25                | 8           |
| CAR-H 016  | 160            | 28/23                             | 0,6                        | 1,45                       | 2,0                          | 40        | 10                         | 25                | 14          |
| CAR-H 020  | 200            | 28/23                             | 0,6                        | 1,5                        | 2,2                          | 40        | 10                         | 25                | 14          |
| CAR-H 024  | 240            | 28/23                             | 0,7                        | 1,6                        | 2,8                          | 45        | 10                         | 25                | 14          |
| CAR-H 035  | 350            | 32/27                             | 0,9                        | 1,8                        | 4,0                          | 60        | 10                         | 25                | 18          |
| CAR-H 050  | 500            | 32/27                             | 1,3                        | 3,2                        | 6,9                          | 90        | 10                         | 25                | 19          |
| CAR-H 080  | 800            | 36/30                             | 1,5                        | 3,9                        | 9,8                          | 120       | 10                         | 25                | 24          |
| CAR-H 110  | 1100           | 36/30                             | 2,2                        | 4,2                        | 12,5                         | 180       | 10                         | 25                | 26          |
| CAR-H S200 | 2000           | 55/46                             | 2,2                        | 4,2                        | 12,5                         | 180       | 10                         | 25                | 46          |
| CAR-H S250 | 2500           | 110/92                            | 2,2                        | 4,2                        | 12,5                         | 180       | 10                         | 25                | 46          |
| CAR-H S400 | 4000           | 150/125                           | 2,2                        | 4,2                        | 12,5                         | 180       | 10                         | 25                | 61          |

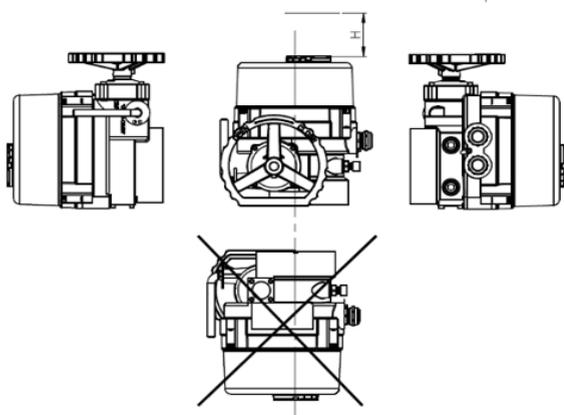
**DIMENSION SKETCH**



3

| Type       | A1   | ØD  | ØD1 | H1  | H2  | L   | E  | ISO FLANGE 5211 |     |     |     |               |
|------------|------|-----|-----|-----|-----|-----|----|-----------------|-----|-----|-----|---------------|
|            |      |     |     |     |     |     |    | F1              | F2  | M1  | M2  | S             |
|            |      |     |     |     |     |     |    | Ø               | Ø   |     |     | SQUARE        |
| CAR-H 006  | 41   | 100 | 157 | 55  | 223 | 167 | 46 | 70              | 82  | M8  | M8  | 12x12 -17x17  |
| CAR-H 010  | 41   | 100 | 157 | 55  | 223 | 167 | 46 | 70              | 82  | M8  | M8  | 12x12         |
| CAR-H 016  | 57,5 | 180 | 206 | 67  | 261 | 197 | 50 | 82              | 102 | M8  | M10 | 17x17         |
| CAR-H 020  | 57,5 | 180 | 206 | 67  | 261 | 197 | 50 | 82              | 102 | M8  | M10 | 17x17         |
| CAR-H 024  | 57,5 | 180 | 206 | 67  | 261 | 197 | 50 | 70              | 102 | M8  | M10 | 19x19         |
| CAR-H 035  | 60,5 | 180 | 222 | 70  | 315 | 208 | 50 | 102             | 125 | M8  | M10 | 19x19         |
| CAR-H 050  | 60,5 | 180 | 222 | 70  | 315 | 208 | 50 | 102             | 125 | M8  | M10 | 27x27         |
| CAR-H 080  | 70   | 180 | 262 | 81  | 352 | 230 | 50 | 125             | 140 | M12 | M16 | 27x27         |
| CAR-H 110  | 70   | 180 | 262 | 81  | 352 | 230 | 50 | 125             | 140 | M12 | M16 | 27x27         |
| CAR-H S200 | 70   | 180 | 262 | 185 | 456 | 230 | 50 | 140             | 165 | M16 | M20 | 27x27 - 46x46 |
| CAR-H S250 | 70   | 180 | 262 | 185 | 456 | 230 | 50 | 140             | 165 | M16 | M20 | 46x46         |
| CAR-H S400 | 70   | 180 | 262 | 303 | 574 | /   | 50 | 165             | 254 | M16 | M20 | 52x52         |

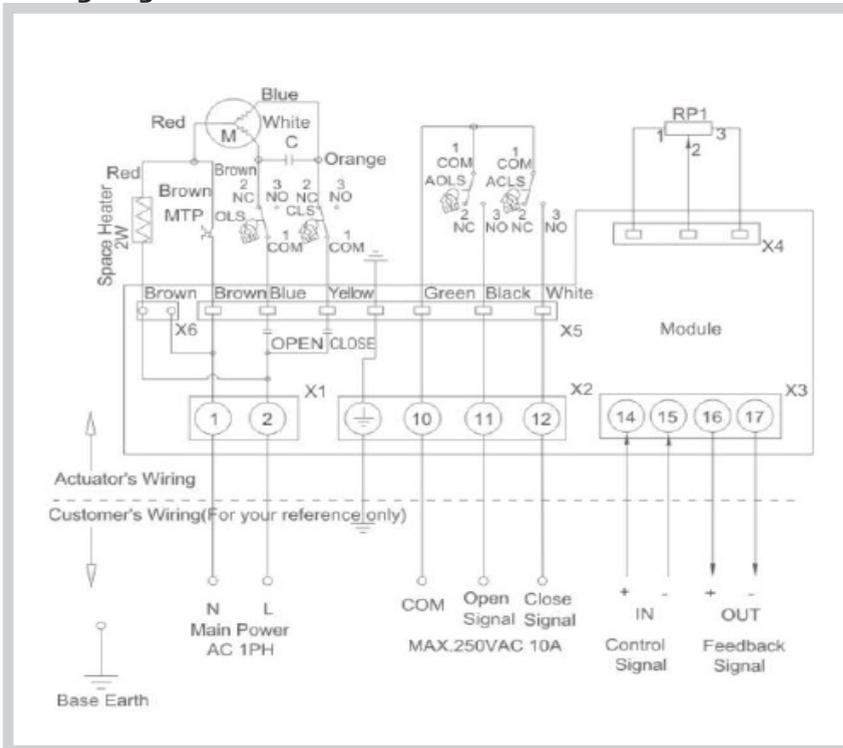
**RECOMMENDED CAR MOUNTING POSITION**



| Actuator type   | H   |
|-----------------|-----|
| CAR-H 006 - 110 | 150 |
| CAR-H S200-S400 | 200 |



**110/230 VAC**  
**Wiring diagram MODULATING/PCU for CAR-H 006-010**

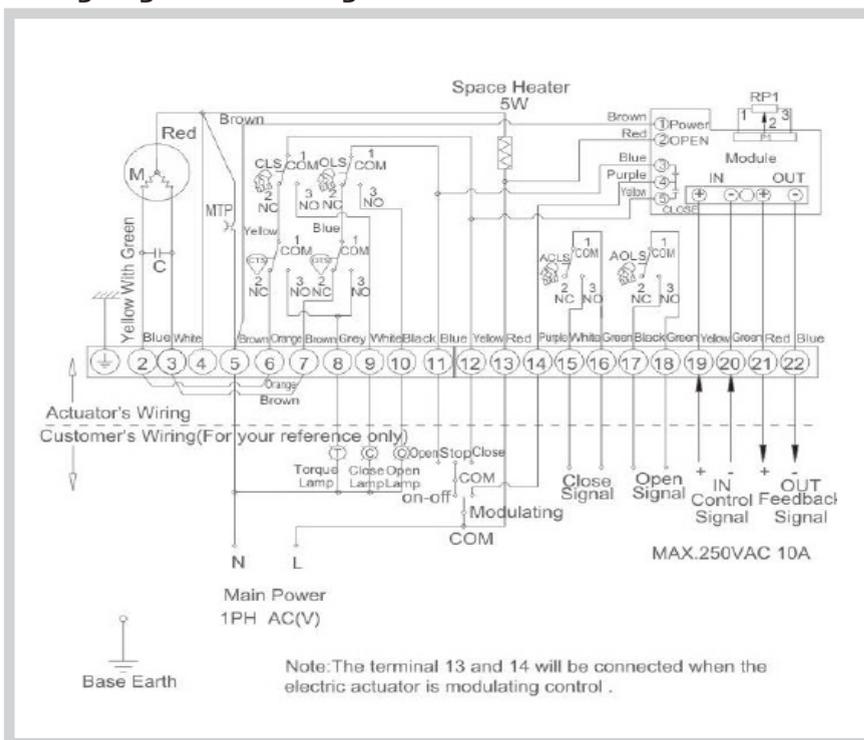


|       |                                      |
|-------|--------------------------------------|
| AOLS: | AUX. Open limit switch (250VAC 10A)  |
| ACLS: | AUX. Close limit switch (250VAC 10A) |
| O:    | Open lamp                            |
| C:    | Close lamp                           |
| T:    | Torque switch                        |
| CLS:  | Close limit                          |
| OLS:  | Open limit switch                    |
| RP1:  | Potentiometer 1KΩ                    |
| KMC:  | Magnetic contactor close             |
| KMO:  | Magnetic contactor open              |
| MTP:  | Motor thermal protector              |
| M:    | Motor                                |

| Switch   | Full Close | Intermediate | Full Open |
|----------|------------|--------------|-----------|
| CLS 1-2  | █          | █            | █         |
| CLS 1-3  | █          | █            | █         |
| OLS 1-2  | █          | █            | █         |
| OLS 1-3  | █          | █            | █         |
| ACLS 1-3 | █          | █            | █         |
| AOLS 1-3 | █          | █            | █         |

3

**110/230 VAC**  
**Wiring diagram Modulating/PCU for CAR-H 016-5400**



|       |                                      |
|-------|--------------------------------------|
| AOLS: | AUX. Open limit switch (250VAC 10A)  |
| ACLS: | AUX. Close limit switch (250VAC 10A) |
| O:    | Open lamp                            |
| C:    | Close lamp                           |
| T:    | Torque switch                        |
| CLS:  | Close limit switch                   |
| OLS:  | Open limit switch                    |
| CTS:  | Close torque switch                  |
| OTS:  | Open torque switch                   |
| RP1:  | Potentiometer 1KΩ                    |
| KMC:  | Magnetic contactor close             |
| KMO:  | Magnetic contactor open              |
| MTP:  | Motor thermal protector              |
| M:    | Motor                                |

| Switch   | Full Close | Intermediate | Full Open |
|----------|------------|--------------|-----------|
| CLS 1-2  | █          | █            | █         |
| CLS 1-3  | █          | █            | █         |
| OLS 1-2  | █          | █            | █         |
| OLS 1-3  | █          | █            | █         |
| ACLS 1-3 | █          | █            | █         |
| ACLS 1-3 | █          | █            | █         |
| ACLS 1-2 | █          | █            | █         |
| ACLS 1-3 | █          | █            | █         |
| CTS 1-3  | █          | █            | █         |
| OTS 1-3  | █          | █            | █         |

CTS 1-3: Closing torque switch interrupts control when mechanical overload occurs during closing cycle

OTS 1-3: Opening torque switch interrupts control when mechanical overload occurs during opening cycle

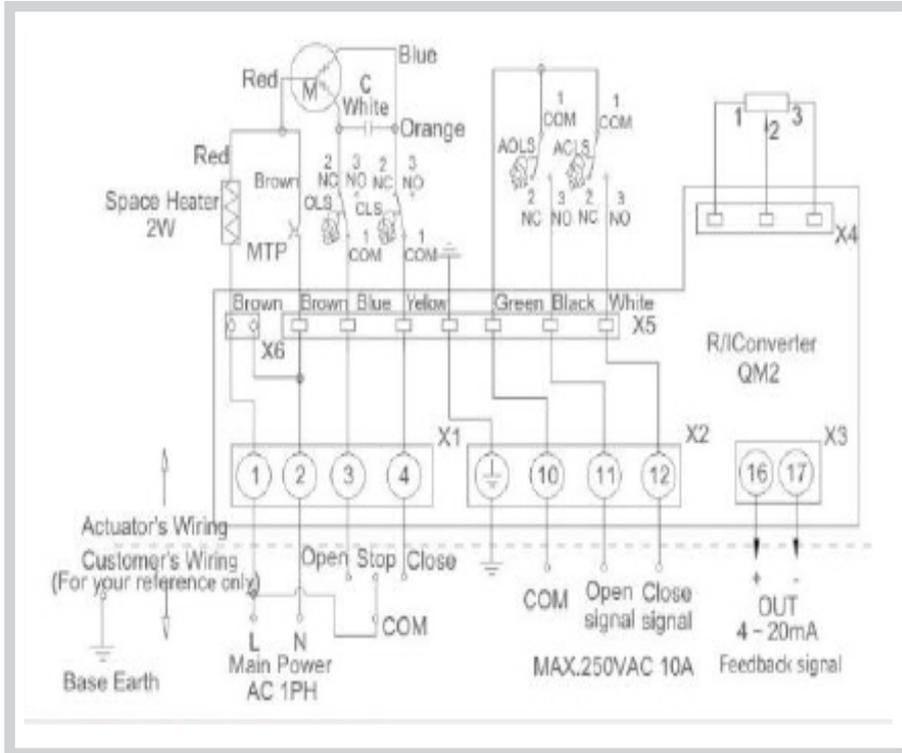
# ELECTRIC VALVE ACTUATOR TYPE CAR-H

For 2 & 3-way valves type G/L/M/S 2FM-T & G/L/M/S 3FM-T

0-4.11.09-D

110/230 VAC

Wiring diagram CPT for CAR-H 006-010

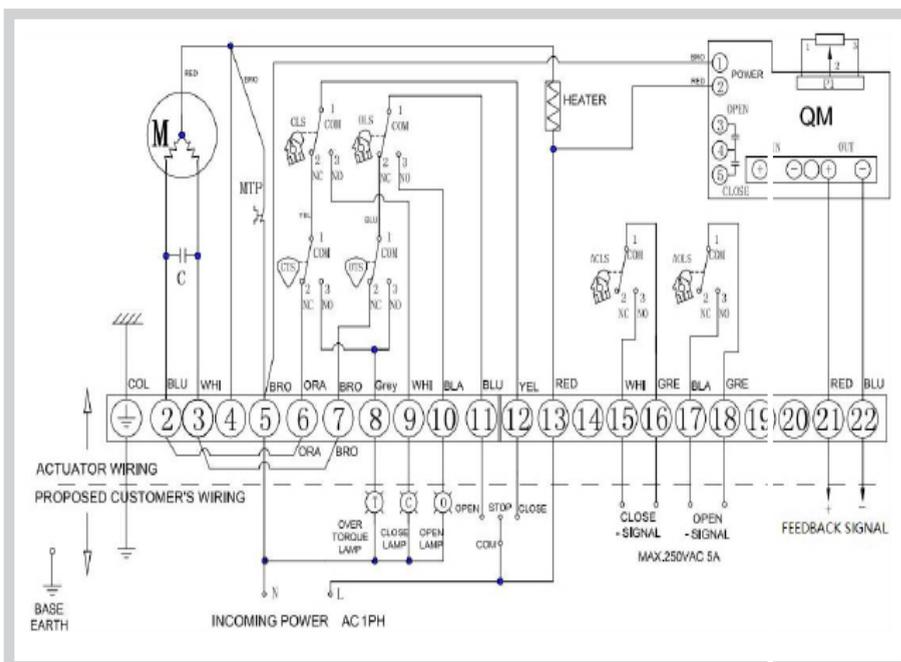


|       |                                      |
|-------|--------------------------------------|
| AOLS: | AUX. Open limit switch (250VAC 10A)  |
| ACLS: | AUX. Close limit switch (250VAC 10A) |
| O:    | Open lamp                            |
| C:    | Close lamp                           |
| CLS:  | Close limit switch                   |
| OLS:  | Open limit switch                    |
| KMC:  | Magnetic contactor close             |
| KMO:  | Magnetic contactor open              |
| MTP:  | Motor thermal protector              |
| M:    | Motor                                |

| Switch   | Full Close | Intermediate | Full Open |
|----------|------------|--------------|-----------|
| CLS 1-2  |            | █            | █         |
| CLS 1-3  | █          |              |           |
| OLS 1-2  |            |              | █         |
| OLS 1-3  | █          |              |           |
| ACLS 1-3 | █          |              |           |
| AOLS 1-3 |            |              | █         |

110/230 VAC

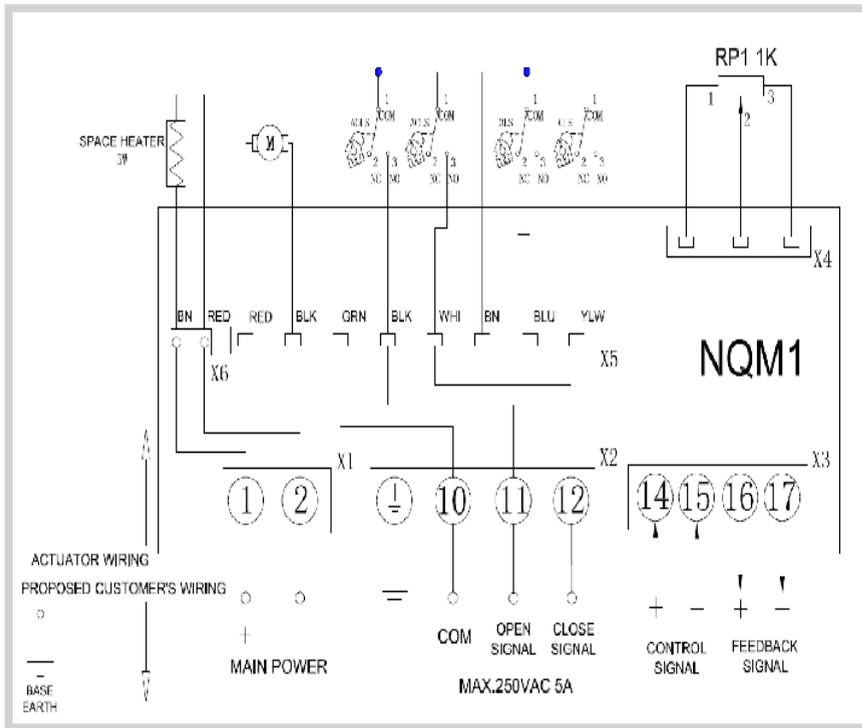
Wiring diagram CPT for CAR-H 016-S400



|       |                                     |
|-------|-------------------------------------|
| AOLS: | AUX. Open limit switch (250VAC 5A)  |
| ACLS: | AUX. Close limit switch (250VAC 5A) |
| O:    | Open lamp                           |
| C:    | Close lamp                          |
| T:    | Torque switch                       |
| CLS:  | Close limit switch                  |
| OLS:  | Open limit switch                   |
| KMC:  | Magnetic contactor close            |
| KMO:  | Magnetic contactor open             |
| MTP:  | Motor thermal protector             |
| M:    | Motor                               |

| Switch   | Full Close | Intermediate | Full Open |
|----------|------------|--------------|-----------|
| CLS 1-2  |            | █            | █         |
| CLS 1-3  | █          |              |           |
| OLS 1-2  |            |              | █         |
| OLS 1-3  | █          |              |           |
| ACLS 1-3 | █          |              |           |
| AOLS 1-2 |            |              | █         |
| AOLS 1-3 |            |              | █         |
| CTS 1-3  |            | █            |           |
| OTS 1-3  |            | █            |           |

**DCV24V**  
**Wiring diagram PCU for CAR-H 006-010**

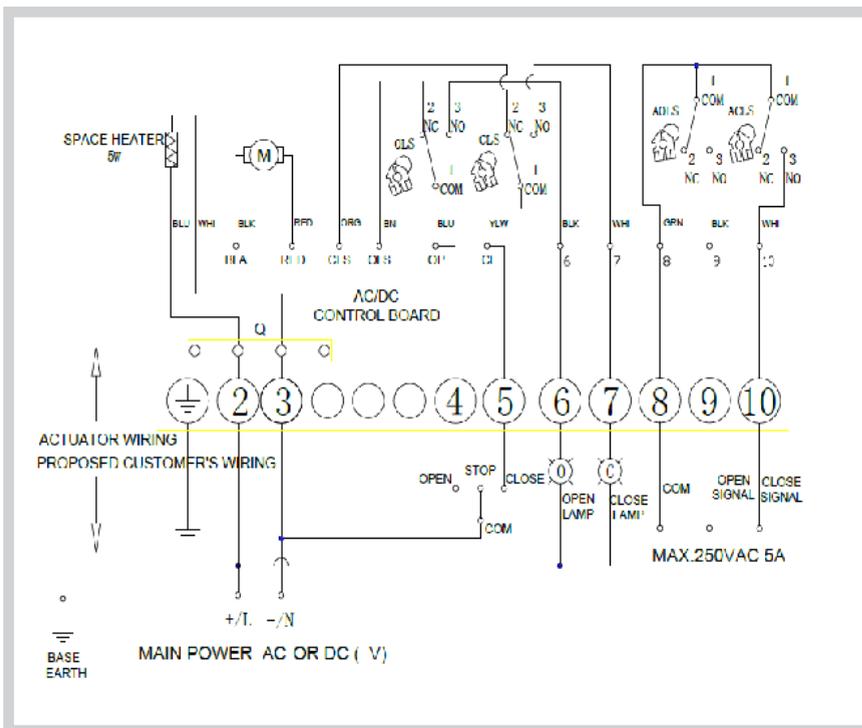


|       |                                     |
|-------|-------------------------------------|
| AOLS: | AUX. Open limit switch (250VAC 5A)  |
| ACLS: | AUX. Closeslimit switch (250VAC 5A) |
| O:    | Open lamp                           |
| C:    | Close lamp                          |
| CLS:  | Close limit switch                  |
| OLS:  | Open limit switch                   |
| 1K:   | Potentiometer feedback 1KΩ          |
| M:    | Motor                               |

| Switch   | Full Close | Middle Position | Full Open |
|----------|------------|-----------------|-----------|
| CLS 1-2  |            |                 |           |
| CLS 1-3  |            |                 |           |
| OLS 1-2  |            |                 |           |
| OLS 1-3  |            |                 |           |
| ACLS 1-2 |            |                 |           |
| AOLS 1-3 |            |                 |           |
| AOLS 1-2 |            |                 |           |
| AOLS 1-3 |            |                 |           |

3

**DCV24V**  
**Wiring diagram ON/OFF for CAR-H 006-010**



|       |                                     |
|-------|-------------------------------------|
| AOLS: | AUX. Open limit switch (250VAC 5A)  |
| ACLS: | AUX. Close limit switch (250VAC 5A) |
| O:    | Open lamp                           |
| C:    | Close lamp                          |
| CLS:  | Close limit switch                  |
| OLS:  | Open limit switch                   |
| M:    | Motor                               |

| Switch   | Full Close | Middle Position | Full Open |
|----------|------------|-----------------|-----------|
| CLS 1-2  |            |                 |           |
| CLS 1-3  |            |                 |           |
| OLS 1-2  |            |                 |           |
| OLS 1-3  |            |                 |           |
| ACLS 1-3 |            |                 |           |
| AOLS 1-3 |            |                 |           |

# ELECTRIC VALVE ACTUATOR TYPE CAR-H

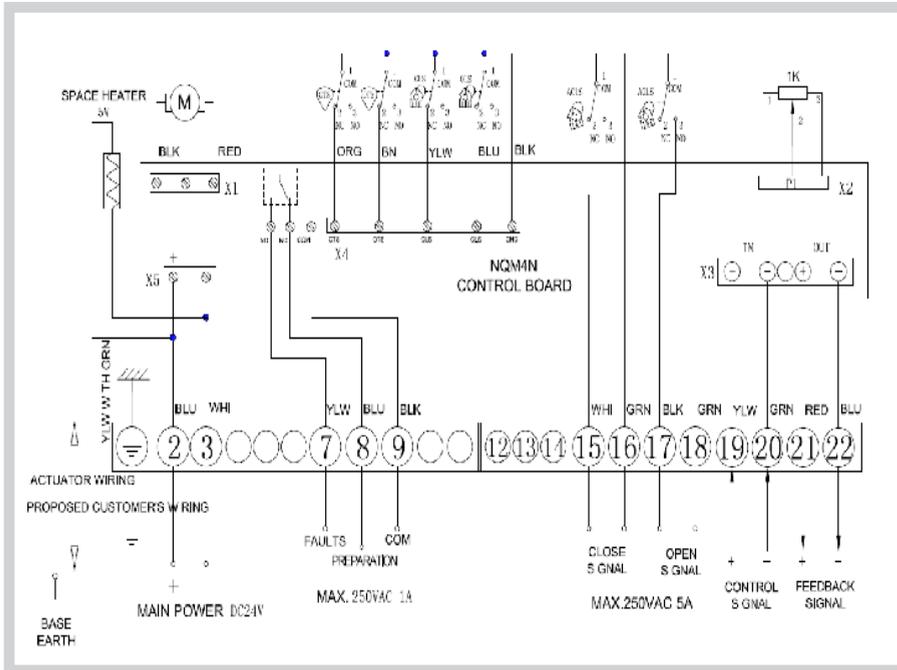
For 2 & 3-way valves type G/L/M/S 2FM-T & G/L/M/S 3FM-T

0-4.11.09-D

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## DCV24

### Wiring diagram PCU for CAR-H 016-035

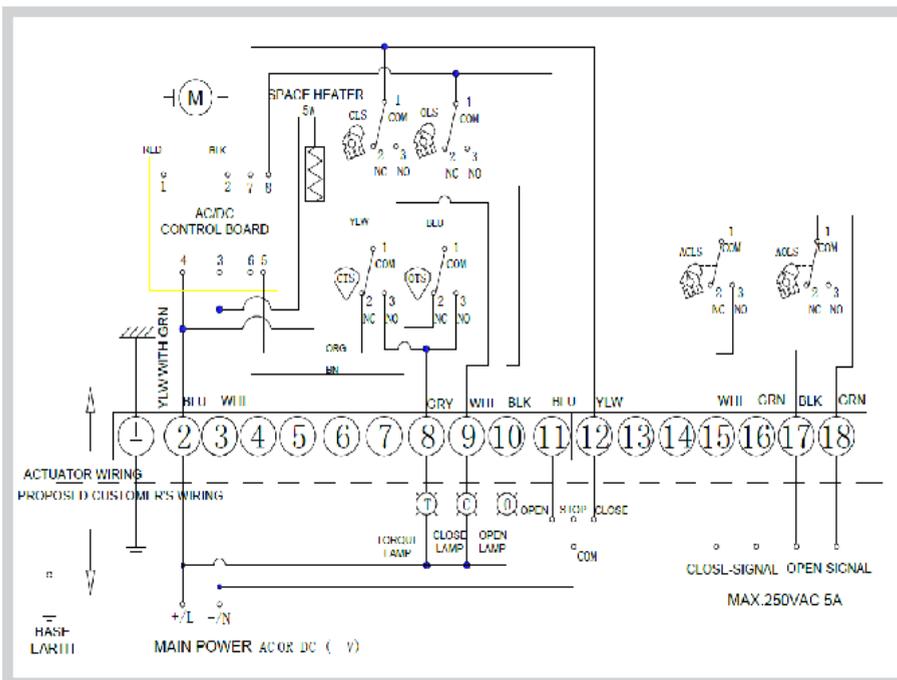


|       |                                     |
|-------|-------------------------------------|
| AOLS: | AUX. Open limit switch (250VAC 5A)  |
| ACLS: | AUX. Close limit switch (250VAC 5A) |
| O:    | Open lamp                           |
| C:    | Close lamp                          |
| CLS:  | Close limit switch                  |
| OLS:  | Open limit switch                   |
| CTC:  | Close torque switch                 |
| OTC:  | Open torque switch                  |
| 1K:   | Potentiometer 1KΩ                   |
| M:    | Motor                               |

| Switch   | Full Close | Middle Position | Full Open |
|----------|------------|-----------------|-----------|
| CLS 1-2  |            |                 |           |
| CLS 1-3  |            |                 |           |
| OLS 1-2  |            |                 |           |
| OLS 1-3  |            |                 |           |
| ACLS 1-2 |            |                 |           |
| AOLS 1-3 |            |                 |           |
| AOLS 1-2 |            |                 |           |
| AOLS 1-3 |            |                 |           |

## DCV24

### Wiring diagram ON/OFF for CAR-H 016-250



|       |                                     |
|-------|-------------------------------------|
| AOLS: | AUX. Open limit switch (250VAC 5A)  |
| ACLS: | AUX. Close limit switch (250VAC 5A) |
| O:    | Open lamp                           |
| C:    | Close lamp                          |
| T:    | Torque lamp                         |
| CLS:  | Close limit switch                  |
| OLS:  | Open limit switch                   |
| CTC:  | Close torque switch                 |
| OTC:  | Open torque switch                  |
| M:    | Motor                               |

| Switch   | Full Close | Middle Position | Full Open |
|----------|------------|-----------------|-----------|
| CLS 1-2  |            |                 |           |
| CLS 1-3  |            |                 |           |
| OLS 1-2  |            |                 |           |
| OLS 1-3  |            |                 |           |
| ACLS 1-2 |            |                 |           |
| AOLS 1-3 |            |                 |           |
| AOLS 1-2 |            |                 |           |
| AOLS 1-3 |            |                 |           |

### Modulating/PCU actuator data

|  |  |            |
|--|--|------------|
| <b>CAR-H 006-010</b><br>Technical data | • Analogue input signal 4-20mA or 0-10V                    | Optional   |
|  | • Analogue feedback signal 4-20mA or 0-10 self-powered     | Optional   |
|  | • Input impedance $\geq 400K\Omega$                        | -          |
|  | • Dead band 1-%  | Adjustable |
|  | • The electronic components are protected dirt and similar | -          |

|   |  |              |
|---|--|--------------|
| <b>CAR-H 016-S250</b><br>Technical data | • Analogue input signal 4-20mA or 0-10V                    | DIP Switches |
|   | • Analogue feedback signal 4-20mA or 0-10V self-powered    | DIP Switches |
|   | • Input impedance $\geq 400K\Omega$                        | -            |
|   | • Dead band 1-%  | Adjustable   |
|   | • The electronic components are protected dirt and similar | -            |

|                      |                                      |                |
|----------------------|--------------------------------------|----------------|
| <b>CLS</b>           | Close limit switch (250VAC 5A)       | -              |
| <b>OLS</b>           | Close limit switch (250VAC 5A)       | -              |
| <b>CLS</b>           | Close Torque switch (250VAC 5A)      | -              |
| <b>OTS</b>           | Close Torque switch (250VAC 5A)      | -              |
| <b>Torque switch</b> | x 2 close/open                       | CAR-H 016-S400 |
| <b>Torque switch</b> | without                              | CAR-H 006-010  |
| <b>TP</b>            | Thermal protector (250VAC 5A)        | -              |
| <b>Header</b>        | CAR-H 006-10: 5W; CAR-H 016-S400: 7W | -              |

3

# AVM234S: 2500N Actuator

(With analog SUT positioner) 2 point or 3 point control and analogue I/O signals

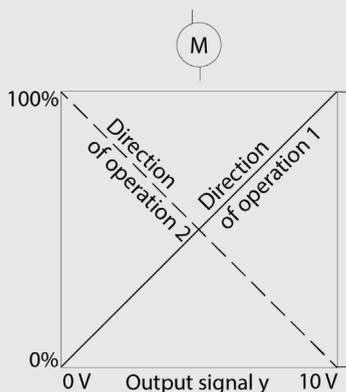
0-99.70.04-B

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## TECHNICAL DESCRIPTION

Power supply 230 V with modules or direct connection for 24 V~ or 24 V=; continuous activation also permissible at 230 V  
 Two-part housing made of fire-retardant yellow plastic and seals to IP66.  
 Maintenance-free gearbox of sintered steel, gearbox plate of steel.  
 Patented actuator-valve coupling.  
 Mounting column made of stainless steel; mounting bracket (for fitting the valve) of aluminium  
 Electrical connections (max. 2.5 mm<sup>2</sup>) with screw terminals.  
 Three pre-scored cable inlets for M20×1.5 (2×) and M16×1.5.  
 Installation position: vertically upright to horizontal, but not upside down unless protected from dripping water.



Subject to change without notice.

## AREAS OF USE

For use with two or three-way control valves. For controllers with continuous output (0...10 V or 4...20 mA) or switching output (2-point or 3-point control).

## HOW ENERGY EFFICIENCY IS IMPROVED

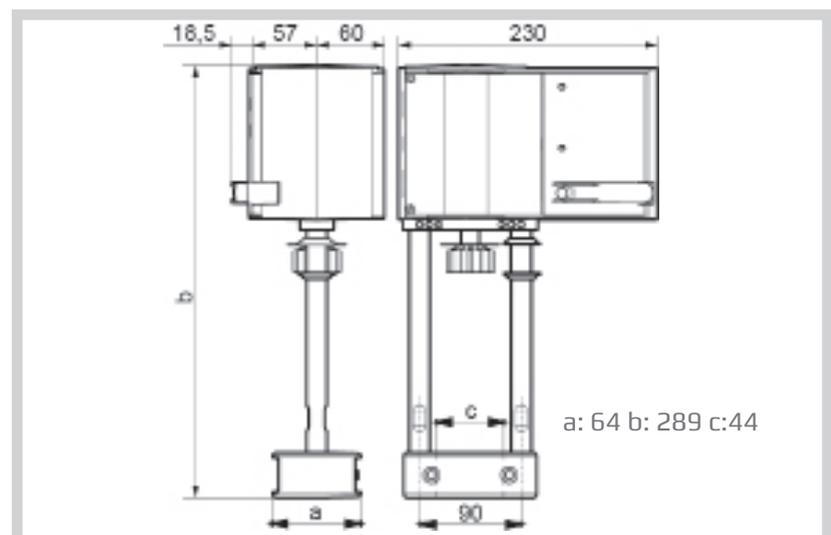
Automatic adaptation to valve, precision control and high energy efficiency with minimal operating noise.

## FEATURES

- Pushing force of at least 2500 N
- Stepping motor with SUT (Superior Universal Technology) electronic control unit and electronic load-dependent cut-off
- Automatic detection of control signal applied (continuous or switching), indicated by two LEDs
- The type of characteristic (linear, quadratic or equal-percentage) can be set on the actuator
- Automatically adapts to valve stroke between 8 and 49 mm; captive even in the event of a power failure
- Direction of travel can be selected via screw terminals when making electrical connection or remotely
- Coding switches for selecting the characteristic and the running time (2, 4 or 6 s/mm)
- Lever for external manual adjustment, with motor cut-off, and for triggering a re-initialisation
- Easy assembly with valve; spindle is connected automatically when control voltage is applied

| Type        | Positioning time (s/mm) | Nominal stroke (mm) |
|-------------|-------------------------|---------------------|
| AVM234SK002 | 2/4/6                   | 49                  |

## DIMENSION DRAWING



## TECHNICAL DATA

| Type                             | Run time<br>s/mm                     | Stroke<br>mm  | Pushing force<br>N            | Power supply <sup>1)</sup> | Weight<br>kg     |
|----------------------------------|--------------------------------------|---------------|-------------------------------|----------------------------|------------------|
| <b>AVM 234S K002</b>             | <b>2/4/2006</b>                      | <b>8...40</b> | <b>2500</b>                   | <b>24 V~/=</b>             | <b>4.1</b>       |
| <b>Positioner:</b> <sup>1)</sup> |                                      |               |                               |                            |                  |
| Control signal 1                 | 0...10 V, R <sub>i</sub> > 100 kΩ    |               | Starting point U <sub>0</sub> |                            | 0 or 10          |
| Control signal 2                 | 4...20 mA, R <sub>i</sub> = 50 kΩ    |               | Control span ΔU               |                            | 10 V             |
| Position feedback signal         | 0...10 V, load > 2.5 kΩ              |               | Switching range Xsh           |                            | 300 mV           |
| Power supply                     | 24 V~ ±20 %, 50...60 Hz              |               | Degree of protection          |                            | IP 66 (EN 60529) |
| with accessories                 | 24 V= ±15%                           |               | Protection class              |                            | III (IEC 60730)  |
|                                  | 230 V~ ±15% 50...60 Hz               |               | Response time for 3-point     |                            | 200 ms           |
| Power consumption                | 10 W 18 VA <sup>2)</sup>             |               | Wiring diagram                |                            | A10357           |
| Stroke                           | 8...49 mm                            |               | Dimension drawing             |                            | M10356           |
| Max temperature of medium        | 130 °C (option 240 °C) <sup>3)</sup> |               | Fitting instructions          |                            | 99.70.01         |
| Permitted ambient temperature    | -10...55 °C                          |               | Material declaration          |                            | MD 51.377        |
| Permitted ambient humidity       | < 95% rh without conversion          |               |                               |                            |                  |

1) Also for 2-point or 3-point depending on the connection for 24 V~

2) Design the transformers for this value, otherwise functional faults may occur.

3) If the temperature of the medium is higher (from 130 °C to 240 °C), an adaptor is required (see accessories)

### CE conformity

EMC Directive 2004/108/EC  
EN 61000-6-2  
EN 61000-6-4

Low-Voltage Directive 2006/95/EC  
EN 60730-1  
EN 60730-2-14

Over-voltage category III

Degree of pollution III

### ACCESSORIES

| Type             | Description   |
|------------------|---|
| <b>1-0152285</b> | <b>Temperature adaptor</b> for media temperature > 130 °C ... 240 °C  |
| <b>1-0152287</b> | <b>Potentiometer 1000 Ω</b> , 1 W, 24 V; installation as per MV 505894  |
| <b>1-0152289</b> | <b>Auxiliary change-over contacts</b> (2 pcs. each) 12...250 V Infinitely variable, min. 100 mA and 12 V, additional load 6(2) A, MV 505866     |
| <b>1-0152281</b> | <b>230 V Module, plug-in type</b> , for 2-/3-point and continuous activation, additional power 2 VA 230 V 15% power supply, MV 505901, 50/60 Hz |
| <b>1-0152287</b> | <b>115 V Module, plug-in type</b> 50/60 Hz  |
| <b>1-0152627</b> | <b>4-20 mA Position feedback signal</b> , for 24VAC/DC, output load resistor max. 600 ohm<br>Accuracy +/- 5% of full range                      |
| <b>1-0147655</b> | <b>Cable gland</b> M20×1.5  |

# AVM321/AVM322: 1000N Actuator

For 2-point or 3-point control

0-99.70.05-B

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## AREAS OF USE

For actuation of 2 and 3-way valves. For controllers with a switching output (2-point or 3-point control)

## IMPROVING ENERGY EFFICIENCY

Automatic adaptation to valve, optimal operator convenience, precision control and high energy efficiency with minimal operating noise.

## FEATURES

- Synchronous motor with electronic control unit and load-dependent cut-off
- Direction of operation and positioning time can be set using coding switches
- Crank handle for external manual adjustment with motor cut-off
- Very low operating noise
- Simple assembly with valve; spindle is automatically connected after nominal voltage is applied
- Electrical parallel operation of 5 actuators

## TECHNICAL DESCRIPTION

Power supply 24 V~/= or 230 V~  
Three-piece housing of flame retardant yellow/black plastic and seals with degree of protection IP54.

Maintenance-free gearbox made of plastic, threaded spindle and gearbox base-plates made of steel.

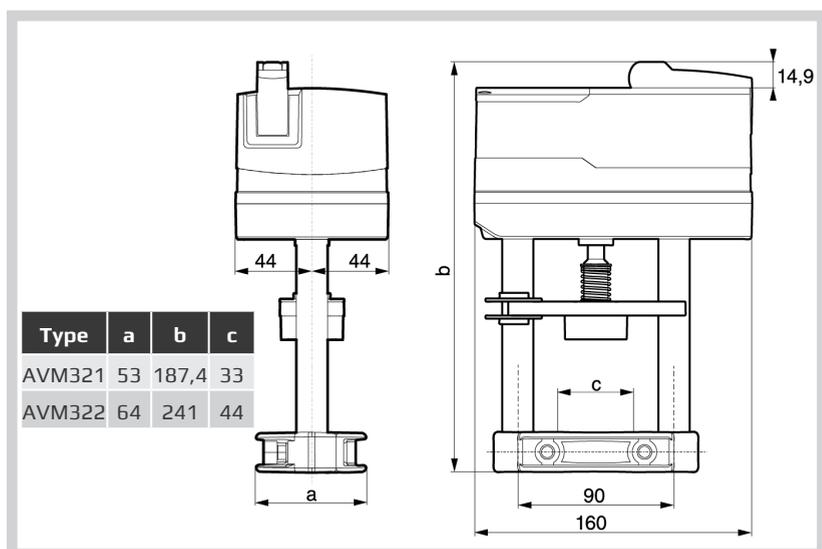
Patented actuator-valve coupling  
Mounting studs made of aluminium.  
Fixing bracket made of aluminium for the valve fitting with 20 mm and made of plastic for the valve fitting with 10 mm stroke.  
Electrical connections (max. 1.5 mm<sup>2</sup>) with screw terminals.  
Two break-out cable inlets for metric screw fitting made of plastic M20×1.5.  
Fitting position, vertically upright to horizontal, not upside down unless protected from dripping water.

## PRODUCTS

| Type                     | Positioning time (s/mm) | Nominal stroke (mm) | Nominal voltage (V) |
|--------------------------|-------------------------|---------------------|---------------------|
| AVM321K001               | 12 (6)                  | 10                  | 230 V~              |
| AVM321K002 <sup>*)</sup> | 12 (6)                  | 10                  | 24 V~/=             |
| AVM322K001               | 6 (12)                  | 20                  | 230 V~              |
| AVM322K002 <sup>*)</sup> | 6 (12)                  | 20                  | 24 V~/=             |

<sup>\*)</sup> CSA-certified actuators on request (only for devices with nominal voltage 24 V~/=)

## DIMENSION DRAWING



Subject to change without notice.

## TECHNICAL DATA

| Power supply   |         |                   |
|--|---------|-------------------|
| Operating voltage  |         |                   |
|  | 24 V~   | ±20 %, 50...60 Hz |
|  | 24 V=   | -10%...+20 %      |
|  | 230 V~  | ±15 %, 50...60 Hz |
| Power consumption<br>(at nominal voltage, with movement) |         |                   |
| AVM * K001   | < 2.0 W | < 3.0 VA          |
| AVM * K002   | < 2.4 W | < 4.0 VA          |

| Parameters                                       |                |
|--|----------------|
| Nominal force <sup>1)</sup>                      | 1000 N         |
| Operating noise <sup>2)</sup> (at nominal force) | < 30 dB(A)     |
| Response time                                    | Approx. 200 ms |
| Max. media temperature <sup>3)</sup>             | 0...100 °C     |

| Admissible ambient conditions     |                 |
|-----------------------------------|-----------------|
| Operating temperature             | -10...55 °C     |
| Storage and transport temperature | -40...80 °C     |
| Humidity                          | 5...85% rh      |
|                                   | No condensation |

1) Actuating power 1000 N under nominal conditions (24 V or 230 V, 25 °C ambient temperature, 50 Hz). With boundary conditions (19.2 V~ / 28.8 V~ / 21.6 V= / 28.8 V=, -10 °C / 55 °C, 60 Hz) and positioning time, the actuating tensile force is minimised to 800 N

2) Operating noise with the slowest positioning time, test distance 1m

3) Use the appropriate accessory when the temperature of the medium is > 100 °C (temperature adaptor).

## POWER CONSUMPTION AT NOMINAL VOLTAGE

| Type       | Positioning time (s/mm) | Status        | Active power P (W) | Apparent power S (VA) |
|------------|-------------------------|---------------|--------------------|-----------------------|
| AVM * K001 | 6 (12)                  | Standstill *) | < 0,35             | ≥ 5,0                 |
|            |                         | Sizing        |                    |                       |
| AVM * K002 | 6 (12)                  | Operation     | < 2,4              | < 4,0                 |
|            |                         | Sizing        |                    |                       |
| AVM * K002 | 6 (12)                  | Standstill *) | < 0,3              | ≥ 4,0                 |
|            |                         | Sizing        |                    |                       |
| AVM * K002 | 12 (6)                  | Operation     | < 2,0              | < 3,0                 |
|            |                         | Sizing        |                    |                       |

\*) Standstill = actuator in the end position, voltage applied to terminal 1 or 2, motor switched off.

## ACCESSORIES

| Type      | Description   |
|-----------|---|
| 1-0152285 | Temperature adaptor for media temperature > 100 °C ... 240 °C |
| 1-0147655 | Cable glands M20×1.5 IP68                                     |

| Installation              |  |
|---------------------------|--|
| Dimensions W x H x D (mm) | AVM321: 60x187x88<br>AVM 322: 160x241x88 |
| Weight (kg)               | AVM321: 1.5<br>AVM322: 1.6               |

| Standards and directives |                           |
|--------------------------|---------------------------|
| Degree of protection     | IP 54 (EN 60529)          |
| Protection class         | II EN60730<br>III EN60730 |

| Additional information                       |             |
|--|-------------|
| Fitting instructions                         | 99.70.03    |
| Declaration on materials and the environment | MD 51.374   |
| Declaration of incorporation                 | P100012470  |
| Manual & electrical connection diagram       | 99.70.05.01 |

## CE CONFORMITY

| EMC Directive 2004/108/EC                                    |
|--|
| EN 61000-6-1   |
| 15/9 H1F   |
| EN 61000-6-2   |
| EN 61000-6-3   |
| EN 61000-6-4   |
| Low-voltage Directive 2006/95/EC                             |
| EN 60730-1   |
| EN 60730-2-14  |
| Over-voltage category III                                    |
| Degree of contamination II                                   |
| Maximum altitude. 2000 m                                     |
| Machinery Directive 2006/42/EC in accordance with Annex II B |
| EN 12100   |

# AVM321S/AVM322S: 1000N Actuator

(With analog SUT positioner)

0-99.70.06-B

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## TECHNICAL DESCRIPTION

Power supply 24 V~ or 24 V= (optional accessory module for 85...265V ac 50/60Hz)

Three-piece housing of flame retardant yellow/black plastic and seals with degree of protection IP54

Maintenance-free gearbox made of plastic, threaded spindle and gearbox base-plates made of steel.

Patented actuator-valve coupling  
Mounting studs made of aluminium.

Fixing bracket made of aluminium for the valve fitting with 20 mm and made of plastic for the valve fitting with 10 mm stroke.

Electrical connections (max. 1.5 mm<sup>2</sup>) with screw terminals.

Two break-out cable inlets for metric screw fitting made of plastic M20×1.5.

Fitting position, vertically upright to horizontal, not upside down unless protected from dripping water.

Subject to change without notice.

## AREAS OF USE

For actuation of 2 and 3-way valves. For controllers with constant output (0...10 V / 4...20 mA).

## IMPROVING ENERGY EFFICIENCY

Automatic adaptation to valve, optimal operator convenience, precision control and high energy efficiency with minimal operating noise.

## FEATURES

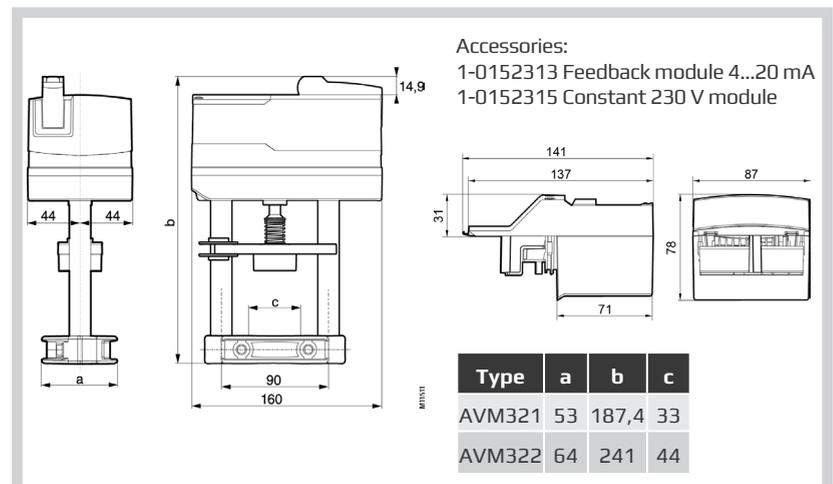
- BLDC motor (brushless DC) with electronic control unit SUT (Superior Universal Technology) of the third generation and electronic load-dependent cut-off
- Automatic recognition of applied control signal (constant or switched), operating display with bi-coloured LED
- Independent adaptation to the stroke of the valve between 8 and 20 mm
- Very low operating noise
- With the built-in absolute distance measurement system, the position is always maintained in case of power failure
- The direction of operation, characteristic (linear / equal percentage), positioning time and control signal (voltage/current) can be adjusted with coding switches
- Integrated forced operation can be set with coding switches (with selectable direction of operation)
- Easy re-initialisation using a coding switch
- Crank handle for external manual adjustment with motor cut-off
- Simple assembly with valve; spindle is automatically connected after control voltage is applied
- Electrical parallel operation of 5 actuators
- Parameterisation option available through bus interface

## PRODUCTS

| Type                      | Positioning time (s/mm) | Nominal stroke (mm) |
|---------------------------|-------------------------|---------------------|
| AVM321SK001 <sup>*)</sup> | 12 (4)                  | 10                  |
| AVM322SK001 <sup>*)</sup> | 6 (4)                   | 20                  |

<sup>\*)</sup>CSA-certified actuators on request

## DIMENSION DRAWING



## TECHNICAL DATA

| Power supply  |                         |
|---|-------------------------|
| Operating voltage                                     | 24 V~ ±20 %, 50...60 Hz |
|   | 24 V= -10%...+20 %      |
|   | 230 V~ ±15 % 50...60 Hz |
| Power consumption (at nominal voltage, with movement) | < 1.7 W, < 3.5 VA       |

| Parameters                                       |                                   |
|--|-----------------------------------|
| Nominal force <sup>1)</sup>                      | 1000 N                            |
| Operating noise <sup>2)</sup> (at nominal force) | < 30 dB(A)                        |
| Response time                                    | > 200 ms                          |
| Media temperature <sup>3)</sup>                  | 0...100 °C Option 240°C           |
| Nominal voltage                                  | 24 V~/=                           |
| Characteristic                                   | Linear / equal percentage         |
| Positioner <sup>4)</sup>                         |                                   |
| Control signal y                                 | 0...10 V, R                       |
| Control signal y                                 | 4...20 mA, R <sub>i</sub> ≤ 50 kΩ |
| Positional feedback signal y <sub>0</sub>        | 0...10 V, load ≥ 5 kΩ             |
| Starting point U <sub>0</sub>                    | 0 or 10 V                         |
| Starting point I <sub>0</sub>                    | 4 or 20 mA                        |
| Control span ΔU                                  | 10 V                              |
| Hysteresis Xsh                                   | 160 mV                            |
| Control span ΔI                                  | 16 mA                             |
| Hysteresis Xsh                                   | 0.22 mA                           |

<sup>1)</sup> Actuating power 1000 N under nominal conditions (24 V, 25 °C ambient temperature, 50 Hz). With boundary conditions (19.2 V~/ 28.8 V~/ 21.6 V= / 28.8 V=, -10 °C / 55 °C, 60 Hz) and positioning time, the actuating tensile force is minimised to 800 N

<sup>2)</sup> Noise level with the slowest positioning time, test distance 1m

<sup>3)</sup> Use the appropriate accessory when the temperature of the medium is > 100 °C (temperature adaptor).

<sup>4)</sup> Also for 2- or 3-point, depending on type of connection

## POWER CONSUMPTION AT NOMINAL VOLTAGE

| Type    | Positioning time (s/mm) | Status       | Active power P (W) | Apparent power S (VA) |
|---------|-------------------------|--------------|--------------------|-----------------------|
| AVM3215 | 12 / (4)                | Operation    | < 1.7              | < 3.5                 |
| AVM3225 | 6 / (4)                 | Standstill * | < 0.45             |                       |
|         |                         | Sizing       |                    | ≥ 4.5                 |

\*) Standstill = actuator in the end position, voltage applied to terminal 1 or 2, motor switched off.

## ACCESSORIES

| Type        | Description   |
|-------------|---|
| 1-0152285   | Temperature adaptor for media temperature > 100 °C ... 240 °C |
| 1-0152313 * | 4...20 mA feedback module, Accuracy +/- 5% of full range      |
| 1-0152315 * | Power supply 85-265V 50/60HZ                                  |
| 1-0147655   | Cable glands M20x1.5 IP68                                     |

\*) Dimension drawing or connection diagram is available under the same number

| Admissible ambient conditions     |                               |
|-----------------------------------|-------------------------------|
| Operating temperature             | -10...55 °C                   |
| Storage and transport temperature | -40...80 °C                   |
| Humidity                          | 5...85% rh<br>No condensation |

| Installation               |  |
|----------------------------|--|
| Dimensions W x H x D (mm)  | AVM3215 160x187x88<br>AVM3225 160x241x88 |
| Degree of protection IP 54 | (EN 60529)                               |
| Weight (kg)                |  |
| AVM3215                    | 1.5                                      |
| AVM3225                    | 1.6                                      |

| Standards and directives                        |  |
|---|--|
| Protection class III (EN 60730-1), EN60730-2-14 |  |

| Additional information                       |             |
|--|-------------|
| Fitting instructions                         | 99.70.03    |
| Declaration on materials and the environment | MD 51.375   |
| Declaration of incorporation                 | P100012470  |
| Manual & connection diagram                  | 99.70.06.01 |

## CE CONFORMITY

| EMC Directive 2004/108/EC                                    |
|--|
| EN 61000-6-1   |
| EN 61000-6-2   |
| EN 61000-6-3   |
| EN 61000-6-4   |
| Low-voltage Directive 2006/95/EC                             |
| EN 60730-1   |
| EN 60730-2-14  |
| Over-voltage category III                                    |
| Degree of contamination II                                   |
| Maximum altitude. 2000 m                                     |
| Machinery Directive 2006/42/EC in accordance with Annex II B |
| EN 12100   |

# AVF234S: 2000N Actuator

With analog SUT positioner (analogue I/O signals) and spring return

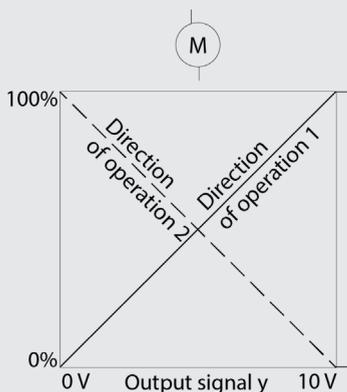
0-99.70.07-B

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## TECHNICAL DESCRIPTION

Power supply 230 V with modules or direct connection for 24 V~ or 24 V=; continuous activation also permissible at 230 V  
 Two-part housing made of fire-retardant yellow plastic and seals to IP66  
 Maintenance-free gearbox of sintered steel, gearbox plate of steel.  
 Patented actuator-valve coupling.  
 Mounting column made of stainless steel; mounting bracket (for fitting the valve) of aluminium  
 Electrical connections (max. 2.5 mm<sup>2</sup>) with screw terminals.  
 Three pre-scored cable inlets for M20×1.5 (2×) and M16×1.5.  
 Installation position: vertically upright to horizontal, but not upside down unless protected from dripping water.



Subject to change without notice.

## AREAS OF USE

For use with two or three-way control valves. For controllers with continuous output (0...10 V or 4...20 mA) or switching output (2-point or 3-point control). For applications where a fail-safe function is required.

## HOW ENERGY EFFICIENCY IS IMPROVED

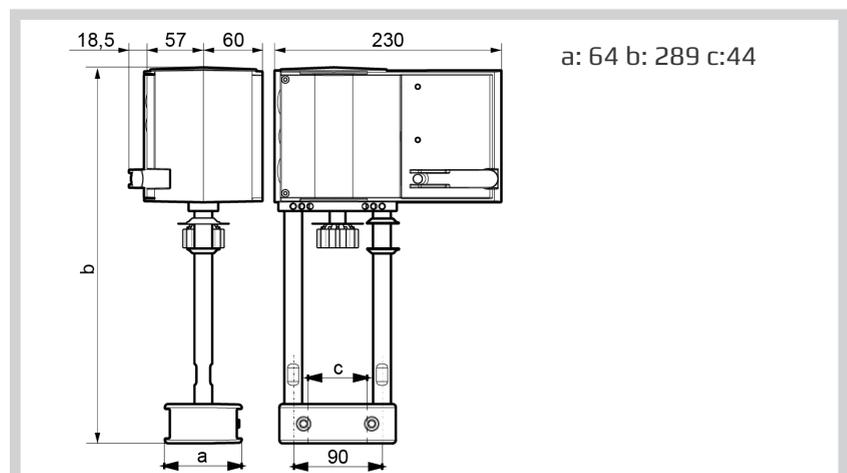
Automatic adaptation to valve, precision control and high energy efficiency with minimal operating noise.

## FEATURES

- Actuator with spring return action and pushing force of at least 2000 N with actuator extending or retracting spindle versions.
- Stepping motor with SUT (Superior Universal Technology) electronic control unit and electronic load-dependent cut-off
- Automatic detection of control signal applied (continuous or switching), indicated by two LEDs
- The type of characteristic (linear, quadratic or equal-percentage) can be set on the actuator
- Automatically adapts to valve stroke between 8 and 49 mm; captive even in the event of a power failure
- Direction of travel can be selected via screw terminals when making electrical connection or remotely
- Coding switches for selecting the characteristic and the running time (2, 4 or 6 s/mm)
- Lever for external manual adjustment, with motor cut-off, and for triggering a re-initialisation
- Easy assembly with valve; spindle is connected automatically when control voltage is applied
- The availability of numerous adaptors enables the actuator to be fitted to third-party valves

| Type  | Positioning time (s/mm) | Nominal stroke (mm) |
|---|-------------------------|---------------------|
| AVF2345K008 Actuator spindle normally retracted | 2/4/6                   | 49                  |
| AVF2345K009 Actuator spindle normally extended  |                         |                     |

## DIMENSION DRAWING



## TECHNICAL DATA

| Type  | Run time<br>s/mm  | Stroke<br>mm  | Pushing force<br>N  | Power supply <sup>1)</sup>          | Weight<br>kg |
|---|---|---------------|---|-------------------------------------|--------------|
| <b>AVM 2345 K002</b><br>AVF 2345 K009   | <b>2/4/2006</b>   | <b>8...49</b> | <b>2000</b>   | <b>24 V~/=</b>                      | <b>5.6</b>   |
| <b>Positioner:</b> <sup>1)</sup><br>Control signal 1<br>Control signal 2<br>Position feedback signal  | 0...10 V, R <sub>i</sub> > 100 kΩ<br>4...20 mA, R <sub>i</sub> = 50 kΩ<br>0...10 V, load > 2.5 kΩ<br>(Optional: 4-20mA) |               | Starting point U <sub>0</sub><br>Control span ΔU<br>Switching range Xsh | 0 or 10<br>10 V<br>300 mV           |              |
| Power supply<br>with accessories  | 24 V~ ±20 %, 50...60 Hz<br>24 V= ±15%<br>230 V~ ±15%, 50...60 Hz  |               | Degree of protection<br>Protection class                                | IP 66 (EN 60529)<br>III (IEC 60730) |              |
| Power consumption<br>Stroke   | 10 W 18 VA <sup>2)</sup><br>8...49 mm   |               | Response time for 3-point<br>Manual and wiring diagram                  | 200 ms<br>99.70.02.02               |              |
| Number of spring returns<br>Spring return time <sup>3)</sup><br>Max. temperature of medium<br>Permitted ambient temperature<br>Permitted ambient humidity | >40.000<br>15...30s<br>130 °C (Option 240°C) <sup>4)</sup><br>-10...55 °C<br>< 95% rh without condensation              |               | Dimension drawing<br>Fitting instructions<br>Material declaration       | M10356<br>99.70.02<br>MD 51.377     |              |

1) Also for 2-point or 3-point depending on the connection for 24 V~

2) Design the transformers for this value, otherwise functional faults may occur.

3) The return time corresponds to a stroke of 14 to 40mm and does not depend on the set run time

4) If the temperature of the medium is higher (from 130 °C to 240 °C), an adaptor is required (see accessories)

### CE conformity

EMC Directive 2004/108/EC

EN 61000-6-2 <sup>1)</sup>

EN 61000-6-4

Low-Voltage Directive 2006/95/EC

EN 60730-1

EN 60730-2-14

Over-voltage category III

Degree of pollution III

### ACCESSORIES

| Type             | Description   |
|------------------|---|
| <b>1-0152285</b> | <b>Temperature adaptor</b> for media temperature > 130 °C ... 240 °C  |
| <b>1-0152287</b> | <b>Potentiometer 1000 Ω</b> , 1 W, 24 V; installation as per MV 505894  |
| <b>1-0152289</b> | <b>Auxiliary change-over contacts</b> (2 pcs. each) 12...250 V Infinitely variable, min. 100 mA and 12 V, additional load 6(2) A, MV 505866 |
| <b>1-0152281</b> | <b>230 V Module, plug-in type</b> , for 2-/3-point and continuous activation, additional power 2 VA 230 V 15% power supply, MV 505901       |
| <b>1-0152627</b> | <b>4-20 mA Position feedback signal</b> , for 24VAC/DC, output load resistor max. 600 ohm<br>Accuracy +/- 0,25% of full range               |
| <b>1-0147655</b> | <b>Cable gland M20×1.5 IP68</b>   |
| <b>1-0145537</b> | <b>Cable gland M16×1.5 IP68</b>   |

# Electric Actuator Linear CAL M301 & M302

with manual override and 2-point or 3-point control and analog I/O signals

0-4.20.01-B

Page 1 of 2



## TECHNICAL DATA

|  |  |
|--|--|
| <b>Material - Body and cover:</b>            | Aluminum/polycarbonate<br>RAL6018 green  |
| <b>Material - Pillar:</b>                    | Steel. 1.4104  |
| <b>Material - Bracket:</b>                   | Galv. steel 1.0037   |
| <b>Weight:</b>                               | 5.6 kg without accessories   |
| <b>Handwheel and positioner:</b>             | Integrated   |
| <b>Stroke:</b>                               | from 5mm - max 40mm  |
| <b>Power supply:</b>                         | 24 VAC/DC, 100 - 240 VAC, $\pm 10\%$   |
| <b>Control signals:</b>                      | 2 and 3-point control signals<br>24 AC/DC, 100 - 230 VAC.<br>Analog I/O signals<br>0-20 mA, 4-20 mA, 0-10V, 2-10 V |
| <b>Duty cycle according to IEC 60034-1.8</b> |  |
| <b>Binary ON/OFF:</b>                        | 52 - 30 min 50% ED   |
| <b>Modulating:</b>                           | 54 - 1200 c/h 50% ED   |
| <b>Valve positioner function:</b>            | Integrated, dead band<br>0.6% of full signal range,<br>shut-off minimum  |
| <b>Manual override:</b>                      | Electrically via 2 push<br>buttons and handwheel   |
| <b>Permitted ambient temp:</b>               | -20 to +60°C   |
| <b>Operating speed:</b>                      | 0.6 / 0.9 / 1.2 mm/s   |
| <b>Enclosure acc. to EN 60529:</b>           | IP65   |
| <b>Overvoltage category:</b>                 | CAT III  |
| <b>Minimum force:</b>                        | 1 kN - Type M301<br>2 kN - Type M302   |
| <b>Power consumption:</b>                    | Type M301 - 9 W<br>Type M302 - 12 W  |

Subject to change without notice.

## APPLICATION

The Electric valve actuator type CAL is specifically designed to meet the demands of the powerful low frequency vibration environments in marine installations as well as in other demanding environments.

The main applications are heating, cooling, ventilation and industrial systems where the medium is water, steam or oil. The actuator is designed to be used with Clorius 2-way and 3-way linear control valves.

## DESIGN

Linear actuator with manual override, power supply with direct connection for 24 VAC/DC.

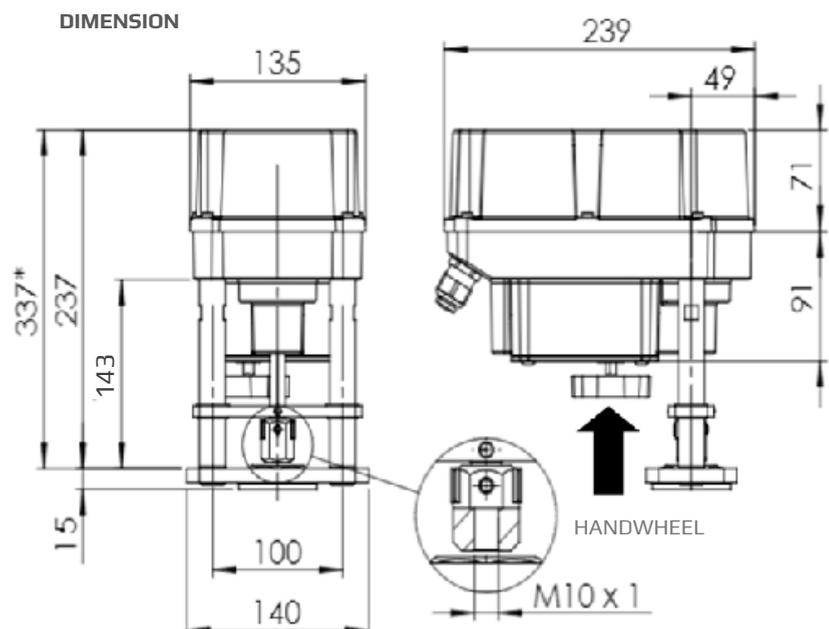
Also available with a wide range power supply module (100 - 240 VAC) Gearbox made of high quality aluminum die casting, powder-coated (60  $\mu\text{m}$  thickness).

## FUNCTION

Brushless DC motor (BLDC) driving the gear system. This turning is converted into an upward and downward motion via the crank mechanism.

## FEATURES

- Robust and compact design
- Low installation height
- Easy valve mounting
- Contactless, non-wearing travel detection with Hall sensor for exact positioning
- Durable aluminum gearbox
- Brushless DC motor
- Manual operation with push buttons and handwheel



\*FOR TEMPERATURES UP TO 240°C

## MOUNTING

Vertically upright to horizontal, but not upside down unless protected against dripping liquids

Delivered with cable glands for correct installation, M20 x 1.5 (x2) and M16 x 1.5 (x1)

Electrical connections (max. 2.5 mm<sup>2</sup> wire) with screw terminals

The instructions supplied with the actuator must be followed carefully for mounting and start-up

TABLE 1

| PRODUCT NO. | TYPE  | FORCE (kN) | STROKE (mm) |
|-------------|---|------------|-------------|
| 1-5231960   | ACTUATOR CAL-M301 24 VAC/DC                     | 1          | 40          |
| 1-5231962   | ACTUATOR CAL-M301 WITH POWER MODULE 100-240 VAC | 1          | 40          |
| 1-5231965   | ACTUATOR CAL-M302 24 VAC/DC                     | 2          | 40          |
| 1-5231967   | ACTUATOR CAL-M302 WITH POWER MODULE 100-240 VAC | 2          | 40          |

TABLE 2

| PRODUCT NO. | ACCESSORIES                           |   |
|-------------|---------------------------------------|---|
| 1-0156919   | MODULE 100-240 VAC FOR M301 AND M302  | Module 100 - 240 VAC  |
| 1-0156955   | TEMPERATURE ADAPTOR CAL M301 AND M302 | Adapter for temperatures up to 240°C  |
| 1-0156957   | POSITION SIGNAL SWITCHES              | 2 potential-free position switches, mechanical, with silver changeover contacts (0.1 A - 5 A switching current)   |
| 1-0156959   | POSITION SIGNAL RELAYS                | Switching points can be adjusted from 0 - 100% of the stroke using potentiometers<br>2 position signal relays with changeover contacts, calibrated automatically to valve stroke<br>24V to 230V AC/DC 0.1 A - 1 A |

**BETTER EFFICIENCY  
IN ENERGY GENERATION**

Our electric controllers ensure a better efficiency in energy generation and energy conversion in marine, industry and HVAC systems.



**CONTROLLER ER 2022**

# ELECTRIC CONTROLLERS

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## OUR ELECTRIC CONTROLLERS PROGRAM INCLUDES:

### CONTROLLER TYPE

ER 2022  
ER 2022 ANALOG

ER 2022 SMART  
ER 2022 SMART  
ANALOG

### USAGE

CONSTANT TEMPERATURE CONTROL  
CONSTANT TEMPERATURE CONTROL

CONSTANT TEMPERATURE CONTROL  
CONSTANT TEMPERATURE CONTROL

# Compact Controller type ER 2022 & ER 2022A

For Electronic Temperature Control

0-4.6.02-D

Page 1 of 4



## APPLICATIONS

The ER 2022 and ER 2022A controller are used for constant temperature control. It is suitable for all heating and cooling control systems. The controller is primarily intended for marine installations and other industrial applications - such as cooling water and lubricating oil installations, flow temperature control etc.

## DESIGN

The device is characterized by a simple, clearly structured operation supported with texts. Process values and parameters are represented by two 18-segment LCD displays. The ER 2022 and ER 2022A type are additionally equipped with a pixel matrix LCD display for displaying text. In addition, the device has individual display elements for the switch positions of the outputs as well as for manual mode. The device is operated using a membrane keyboard with four buttons and can be used under harsh environmental influences thanks to the high IP65 protection.

The ER 2022 and ER 2022A includes, a program controller, manual mode, limit value monitoring functions, digital control signals.

## FUNCTION

The temperature input comes via a Pt100 sensor with a single sensing element. The measured value of the controlled variable is compared with the set point value and adjusted via a PI or a PID control structure.

The ER 2022 & ER 2022A can act as either a heating controller, the actuator closes at rising temperature, or as cooling controller, the actuator opens at rising temperature.

The ER 2022 & ER 2022A permits direct reading of the actual temperature value (PV) and it is secured from failure in the measuring circuit i.e. the controller can be set to give either a closing, an opening or remain in current position command in case of sensor short circuit or sensor break. The error message Err appears in the LED display PV.

## FEATURES

- PI and PID performance
- Easy operation
- For heating and cooling systems in maritime and industrial installations
- Manual and automatic changeover
- Robust self-optimization
- Alarm indicating a deviation from set point, positive or negative
- Only one sensor element Pt 100 required for control and temperature indication
- User-defined operation
- 3 positional output for controlling the actuator

## COMMUNICATION

The controller is equipped with a RS 485 communication module.

## TECHNICAL DATA

### Line voltage

110-240 V AC -15 % /+10 %, 48-63 Hz  
20-30 V AC/DC -15 % /+10 %, 48-63 Hz - optional

### Power consumption

Approx. 6,6 VA  
Measuring rate: -200°C/+850°C or -328°F/+1562°F

### Permissible ambient temperature

Operation -10 to +55°C  
Transport and storage -30 to +70°C

### Degree of protection

Front IP 65 according to DIN 60529  
IP20 on the back

### Design

For control panel installation 96 x 96 x 65 mm  
(W x H x D) panel cut out 92 x 92 mm

### Installation position

Arbitrary

### Set-point values

4 available

### ER 2022

Input: Pt100, 0-10V, 2-10V, 0-20mA, 4-20mA  
Output: 3-point

### ER 2022A

Analog Input: Pt100, 0-10V, 2-10V, 0-20mA, 4-20mA  
Analog output: 0-10V, 2-10V, load resistance >500Ω  
20mA, 4-20mA, load resistance >450Ω

Measuring accuracy 0.1% of the measuring range

Overvoltage Category III

Displays 18-segment LCD displays  
24,8 mm x 12 mm

### Alarm

Alarm functions work with a fixed limit value which corresponds to the limit value entered  
ER 2022 1xAlarm and ER 2022A 2xAlarm

Relay (N/O) 3x switching capacity - 230 V AC/3A

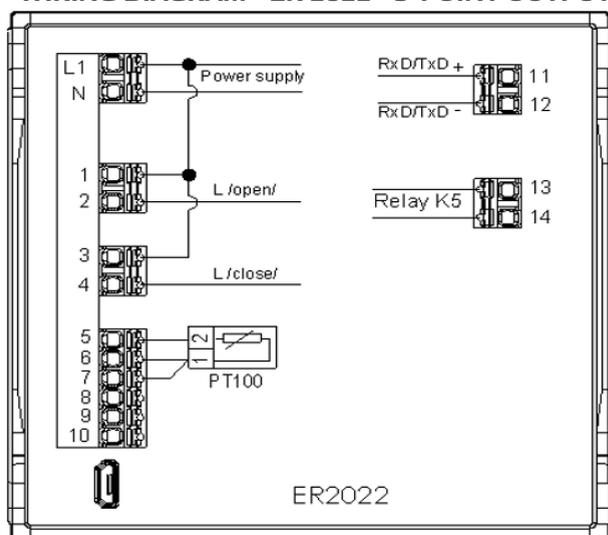
Electric connection Conductor cross section  
wire min.0,2 mm<sup>2</sup>, max 1,5 mm<sup>2</sup>

Data protection Semi - conductor memory

Weight Approx. 0,22 kg

Approvals DNV GL – on request

### WIRING DIAGRAM - ER 2022 - 3-POINT OUTPUT



| ER 2022 TERMINALS | CONNECTION                           |
|-------------------|--------------------------------------|
| L1 (+) - N        | Voltage supply 24VAC/DC - 110-240VAC |
| 1 - 2             | Output 1 (relay)                     |
| 3 - 4             | Output 2 (relay)                     |
| 5 (+) - 6 - 7     | Input/Pt100 - three-wire             |
| 5 - 7             | Input/Pt100-two-wire                 |
| 6(+)- 7(-)        | Input 0-20mA or 4-20mA               |
| 8(+)* 7(-)        | Input 0-10V or 2-10V                 |
| 8 - 9 -10         | Set point SP 1-4 changeover          |
| 11(+)- 12(-)      | RS485                                |
| 13 - 14           | ALARM                                |

### ELECTRICAL CONNECTIONS POWERED 110-240VAC - OPTIONAL EXTERNAL UNITS 3-POINT OUTPUT

| UNIT    | TERMINALS      | CAR | TERMINAL |
|---------|----------------|-----|----------|
| ER 2022 | Voltage supply | L   | -        |
|         |                | N   | 3        |
|         | Output 1       | 2   | 10       |
|         |                | 4   | 11       |

| UNIT    | TERMINALS      | UNIT | TERMINAL |
|---------|----------------|------|----------|
| ER 2022 | Voltage supply | L    | -        |
|         |                | N    | MM/N     |
|         | Output 1       | 2    | .01      |
|         |                | 4    | .02      |

| UNIT    | TERMINALS      | CAR | TERMINAL |
|---------|----------------|-----|----------|
| ER 2022 | Voltage supply | L   | -        |
|         |                | N   | 3        |
|         | Output 1       | 2   | 4        |
|         |                | 4   | 5        |

| UNIT    | TERMINALS      | UNIT | TERMINAL |
|---------|----------------|------|----------|
| ER 2022 | Voltage supply | L    | -        |
|         |                | N    | N        |
|         | Output 1       | 2    | 2a       |
|         |                | 4    | 2b       |

| UNIT    | TERMINALS      | CAR | TERMINAL |
|---------|----------------|-----|----------|
| ER 2022 | Voltage supply | L   | -        |
|         |                | N   | 5        |
|         | Output 1       | 2   | 11       |
|         |                | 4   | 12       |

| UNIT    | TERMINALS      | UNIT | TERMINAL |
|---------|----------------|------|----------|
| ER 2022 | Voltage supply | L    | 21       |
|         |                | N    | N        |
|         | Output 1       | 2    | 2a       |
|         |                | 4    | 2b       |

| UNIT    | TERMINALS      | CAR | TERMINAL      |
|---------|----------------|-----|---------------|
| ER 2022 | Voltage supply | L   | X5-2          |
|         |                | N   | X5-1 AND X1-2 |
|         | Output 1       | 2   | X1-1          |
|         |                | 4   | X1-3          |

\* AVM321/322/3215/3225 and AVM234: Please refer to instruction depending on the type

4

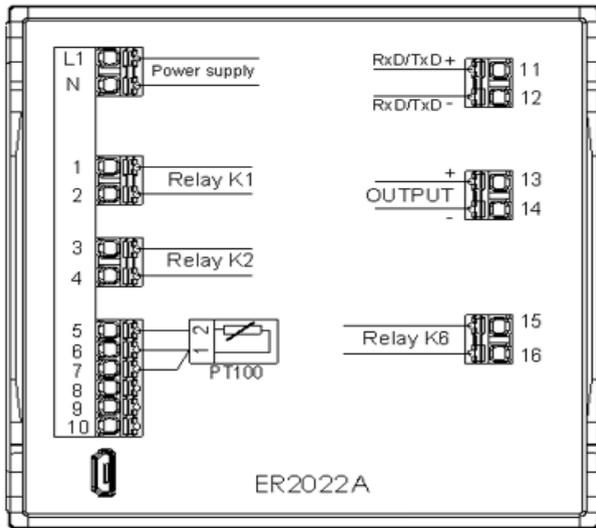
# Compact Controller type ER 2022 & ER 2022A

For Electronic Temperature Control

0-4.6.02-D

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**WIRING DIAGRAM - ER 2022A- ANALOG**



| ER 2022 TERMINALS | CONNECTION                           |
|-------------------|--------------------------------------|
| L1 (+) - N        | Voltage supply 24 VAC/DC -110-240VAC |
| 1 - 2             | Output K1 (relay)                    |
| 3 - 4             | Output K2 (relay)                    |
| 5 (+) - 6 - 7     | Input/Pt100 - three-wire/            |
| 5 - 7             | Input/Pt100-two-wire/                |
| 6(+)- 7(-)        | Input 0-20mA or 4-20mA               |
| 8(+)- 7(-)        | Input 0-10V or 2-10V                 |
| 8 - 9 -10         | Set point SP 1-4 changeover          |
| 11 (+) - 12 (-)   | RS485                                |
| 13(+)- 14(-)      | Output analog signal                 |
| 15-16             | ALARM                                |

**ELECTRICAL CONNECTIONS 110 - 240VAC - OPTIONAL EXTERNAL UNITS**

| UNIT     | TERMINALS             | UNIT | TERMINAL     |
|----------|-----------------------|------|--------------|
| ER 2022A | Voltage supply        | L    | 1            |
|          |                       | N    | 2            |
|          | Control signal 4-20mA | 13   | 5-6 (bridge) |
|          |                       | 14   | Input (-)    |
|          |                       |      | Input (+)    |

| UNIT     | TERMINALS      | UNIT | TERMINAL    |    |
|----------|----------------|------|-------------|----|
| ER 2022A | Voltage supply | L    | L           |    |
|          |                | N    | N           |    |
|          | Control signal | 13   | 3215K/3225K | 03 |
|          |                | 14   |             | MM |

| UNIT     | TERMINALS             | UNIT | TERMINAL |
|----------|-----------------------|------|----------|
| ER 2022A | Voltage supply        | L    | 2        |
|          |                       | N    | 1        |
|          | Control signal 4-20mA | 13   | 14       |
|          |                       | 14   | 15       |

| UNIT     | TERMINALS      | UNIT | TERMINAL      |    |
|----------|----------------|------|---------------|----|
| ER 2022A | Voltage supply | L    | 21 & 2a or 2b |    |
|          |                | N    | N             |    |
|          | Control signal | 13   | AVF2345K      | 3i |
|          |                | 14   |               | 1  |

| UNIT     | TERMINALS             | UNIT | TERMINAL       |
|----------|-----------------------|------|----------------|
| ER 2022A | Voltage supply        | L    | 13             |
|          |                       | N    | 5              |
|          | Control signal 4-20mA | 13   | 13-14 (bridge) |
|          |                       | 14   | 19             |
|          |                       |      | 20             |

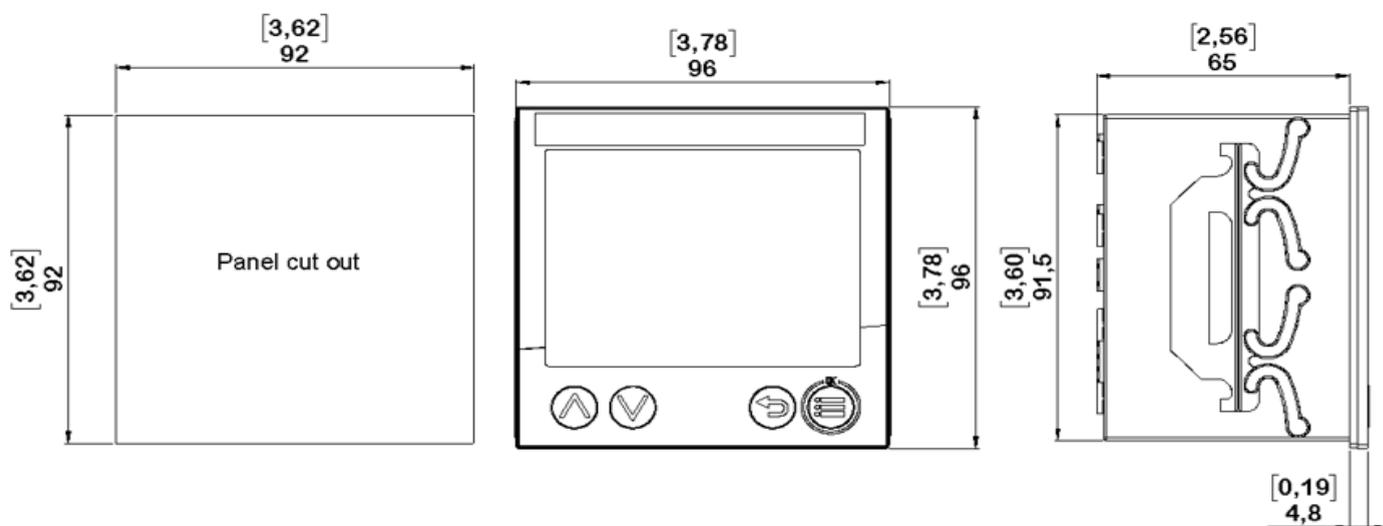
| UNIT     | TERMINALS      | UNIT | TERMINAL |    |
|----------|----------------|------|----------|----|
| ER 2022A | Voltage supply | L    | 2a or 2b |    |
|          |                | N    | N        |    |
|          | Control signal | 13   | AVM2345K | 3i |
|          |                | 14   |          | 1  |

\* AVM321/322/3215/3225 and AVM234: Please refer to instruction depending on the type

| UNIT     | TERMINALS             | UNIT | TERMINAL |      |
|----------|-----------------------|------|----------|------|
| ER 2022A | Voltage supply        | L    | X5-2     |      |
|          |                       | N    | X5-1     |      |
|          | Control signal 4-20mA | 13   | M301/302 | X3-1 |
|          |                       | 14   |          | X2-1 |

Subject to change without notice.

DIMENSIONS IN MM/INCH



# Compact Controller type ER 2022S (Smart) & ER 2022SA (Smart Analog)

For Electronic Temperature Control

0-4.6.03-B

Page 1 of 4



## TECHNICAL DATA

### Line voltage

110-240 V AC -15 % /+10 %, 48-63 Hz  
20-30 V AC/DC -15 % /+10 %, 48-63 Hz - **optional**

### Power consumption

110-240V AC - approx. 8W  
Measuring rate: -200°C/+850°C or -328°F/+1562°F

### Permissible ambient temperature

Ambient 0 to +55°C  
Transport and storage -30 to +70°C

### Degree of protection

Front IP 65 according to DIN 60529  
IP20 on the back

### Design

For control panel installation 96 x 96 x 65 mm  
(W x H x D) panel cut out 92 x 92 mm

### Installation position

Horizontal

### Set-point values

4 available

### Measuring accuracy

0.1 % of the measuring range  
Over voltage cat. III

### Displays

18-segment LCD displays

### Alarm

Alarm functions work with a fixed limit value  
which corresponds to limit value entered

### Relay (N/O contact)

Switching capacity: 230V AC/5A

### ER 2022S

Input: Pt100, 0-10V, 2-10V, 0-20mA, 4-20mA  
Output: 3-point

### ER 2022SA

Analoge Input: Pt100, 0-10V, 2-10V, 0-20mA, 4-20mA  
Analoge output: 0-10V, 2-10V, load resistance >500Ω  
20mA, 4-20mA, load resistance >450Ω

### Electric connection

Conductor cross section  
via screw terminals - max 2.5mm<sup>2</sup>

### Interface

RS485 - **optional**

### Weight

Approx. 0,38 kg

## APPLICATIONS

The ER 2022S and ER 2022SA controller are used for constant temperature control. It is suitable for all heating and cooling control systems. The controller is primarily intended for marine installations and other industrial applications - such as cooling water and lubricating oil installations, flow temperature control and where it is needed to use remote set point function.

## DESIGN

The device is characterized by a simple, clearly structured operation supported with texts. Process values and parameters are represented by two 30-segment LCD displays. The ER 2022S and ER 2022SA types are additionally equipped with a pixel matrix LCD display for displaying text. In addition, the device has individual display elements for the switch positions of the outputs as well as for manual mode. The device is operated using a membrane keyboard with four buttons and can be used under harsh environmental influences thanks to the high IP65 protection.

The ER 2022S and ER 2022SA includes, a program controller, manual mode, limit value monitoring functions, digital control signals.

## FUNCTION

The temperature input comes via a Pt100 sensor with a single sensing element or from other devices/Remote set point. The measured value of the controlled variable is compared with the set point value and adjusted via a PI or a PID control structure.

The ER 2022S & ER 2022SA can act as either heating or cooling controller, the actuator closes at rising temperature, or as a cooling controller, the actuator opens at rising temperature. The controller permits direct reading of the actual temperature value and it is secured from failure in the measuring circuit, i.e. the controller can be set to give either a closing, an opening or remain in current position command in case of sensor short circuit or sensor break. The error message appears in the LED display.

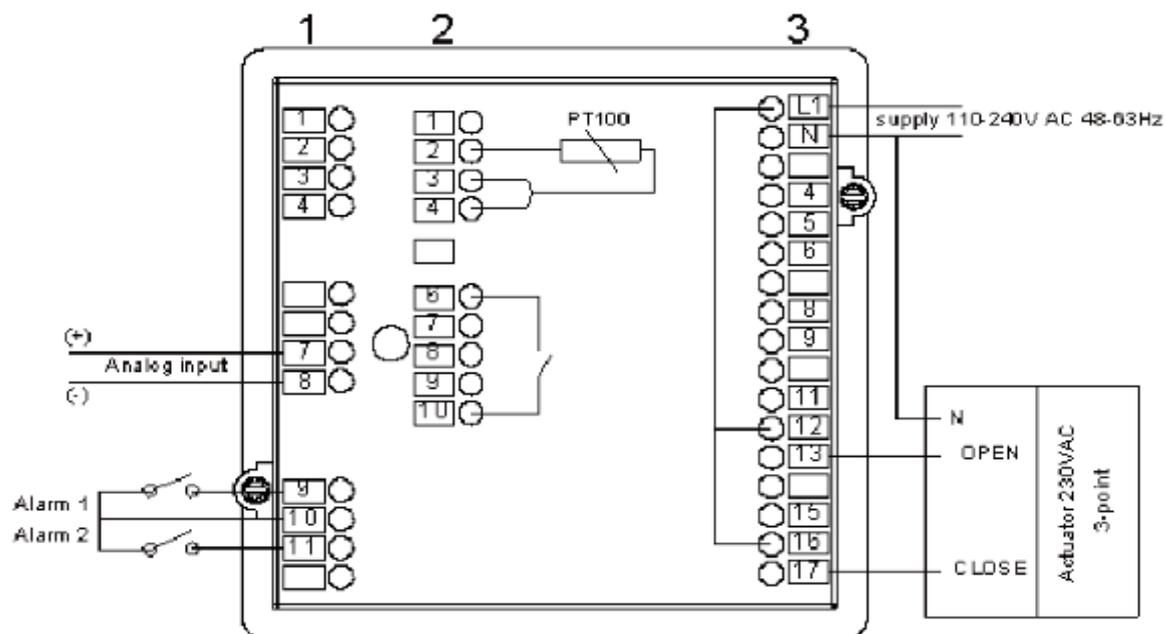
## FEATURES

- PI and PID performance
- Easy operation
- For heating and cooling systems in maritime and industrial installations
- Manual and automatic changeover
- Robust self-optimization
- Changeover from remote analog set point to local set point PT100 and vice versa
- User-defined operation
- 3 positional output for controlling the actuator

## COMMUNICATION

The controller is equipped with a RS 485 communication module.

### WIRING DIAGRAM - ER 2022S - 3-POINT OUTPUT



4

| TERMINAL STRIP 1 | CONNECTION              |                             |
|------------------|-------------------------|-----------------------------|
| 7                | Input signal 4-20mA (+) | Set point controller signal |
| 8                | Input signal 4-20mA (+) |                             |
| 9                | ALARM 1                 | -                           |
| 10               | ALARM common            | -                           |
| 11               | ALARM 2                 | -                           |

| TERMINAL STRIP 2 | CONNECTION                |   |
|------------------|---------------------------|---|
| 2                | Input/PT100- three wire/E |   |
| 3                | Input/PT100 - two wire/S  |   |
| 4                | Input/PT100- two wire/A   |   |
| 6                | Binary PT100/input 4-20mA | - |
| 10               |                           | - |

| TERMINAL STRIP 3 | CONNECTION   |          |
|------------------|--|----------|
| L1(+) and N(-)   | Voltage supply 110-240VAC  | -        |
| 8 (+)            | Supply voltage for 2-wire transmitter (off-load voltage approx. 25V) | 17V/20mA |
| 9 (-)            |  |          |
| 13               | OPEN   | -        |
| 17               | CLOSE  | -        |

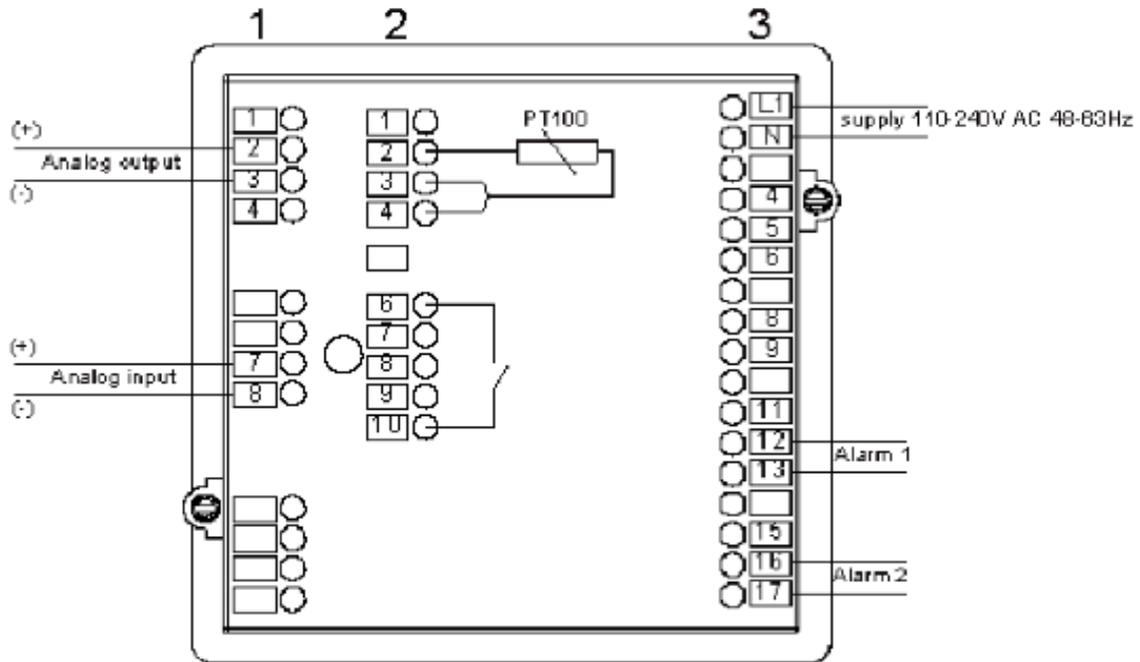
# Compact Controller type ER 2022S (Smart) & ER 2022SA (Smart Analog)

For Electronic Temperature Control

0-4.6.03-B

Page 3 of 4

## WIRING DIAGRAM - ER 2022SA- ANALOG



| TERMINAL STRIP 1 | CONNECTION             |   |
|------------------|------------------------|---|
| 2                | Output signal (+)      | Factory setting<br>4-20mA                     |
| 3                | Output signal (-)      |   |
| 7                | Input signal 4-20mA(+) | Set point signal<br>4mA +65°C/<br>20mA - 95°C |
| 8                | Input signal 4-20mA(-) |   |

| TERMINAL STRIP 2 | CONNECTION                |  |
|------------------|---------------------------|--|
| 2                | Input/PT100- three wire/E |  |
| 3                | Input/PT100 - two wire/S  |  |
| 4                | Input/PT100- two wire/A   |  |
| 6                | Binary PT100/input 4-20mA |  |
| 10               |                           |  |

| TERMINAL STRIP 3 | CONNECTION   |           |
|------------------|--|-----------|
| L1(+) and N(-)   | Voltage supply 110-240 V AC  |           |
| 8 (+)            | Supply voltage for 2-wire transmitter<br>(off-load voltage approx. 25 V) | 17 V/20mA |
| 9 (-)            |  |           |
| 12               | ALARM 1  |           |
| 13               |  |           |
| 16               | ALARM 2  |           |
| 17               |  |           |

### CAUTION:

Use always shielded cables.

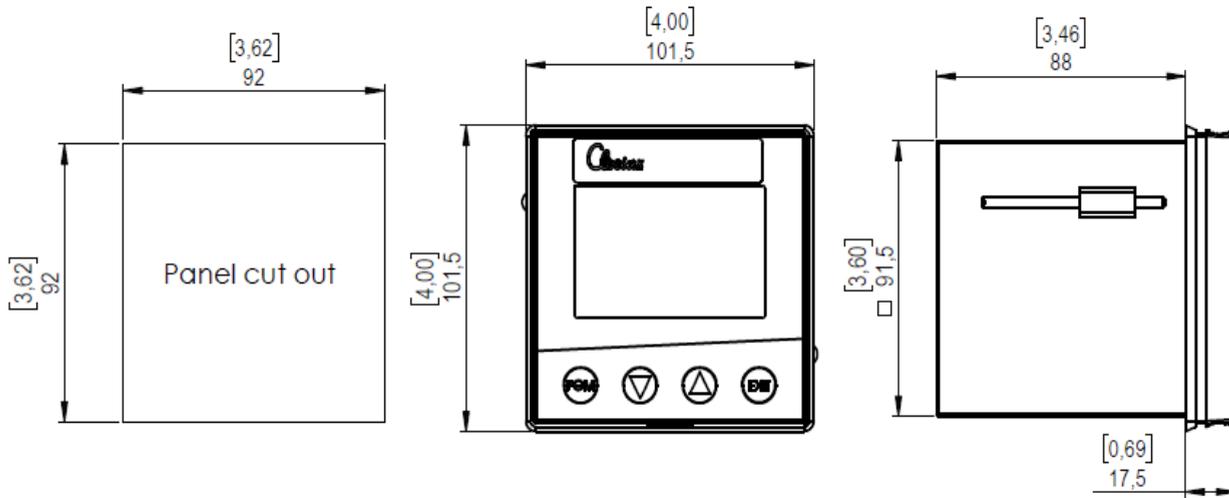
It is recommended to use the cable end clamps when installing wire.

### ELECTRIC CONNECTION:

At the back, via screw terminals, conductor cross-section up to 2.5mm<sup>2</sup> With core ferrules (length: 10mm)

Subject to change without notice.

**DIMENSIONS IN MM/INCH**



**PRECISION PERFORMANCE  
& RELIABILITY**

Reliable and efficient pneumatic actuators for extreme environments and critical applications without compromising performance or safety.



# PNEUMATIC ACTUATORS

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5

## OUR PNEUMATIC ACTUATOR PROGRAM INCLUDES:

### ACTUATOR TYPE

ROTARY PNEUMATIC  
LINEAR PNEUMATIC

### USAGE

VT SINGLE AND DOUBLE ACTING  
516, 525, 534

# Pneumatic Actuator

Series S

0-6.5.01-E

Page 1 of 2



## TECHNICAL DATA

|   |  |
|---|--|
| <b>Material:</b>                        |  |
| - Body                                  | Polyester coated steel                       |
| - Stem                                  | Stainless steel 1.4301                       |
| - Tie rods                              | Stainless steel AISI 316                     |
| - Mounting plate                        | Polyester coated steel                       |
| - O-rings                               | NBR (Nitrile rubber)                         |
| - Diaphragm                             | Neoprene rubber w/terylene support           |
| - Springs                               | Galvanized steel                             |
| <b>Air quality</b>                      | Dry and filtrated air, non aggressive gasses |
| <b>Air supply</b>                       | Max. 6 bar                                   |
| <b>Air supply connect.</b>              | 1/8" RG Female                               |
| <b>Temperature</b>                      | -25°C to +115°C                              |
| <b>Acting mode:</b>                     |  |
| - Type SC: Spring close / Air open (NC) |  |
| - Type SO: Spring open / Air close (NO) |  |
| <b>Data sheet</b>                       | 0-6.5.01-E                                   |

## APPLICATIONS

Pneumatic actuator for actuating and control of Clorius valves in various environments.

Relevant datasheets for accessories to the S actuators:

|                        |                    |
|------------------------|--------------------|
| - Positioners          | 0.6.6.01, 0.6.6.02 |
| - Filter regulators    | 0.6.8.01           |
| - Controller           | ER2000 0.4.6.01    |
| - Sensor               | PT100 0.4.7.01     |
| - Pneumatic controller | 580 0.6.7.01       |

## DESIGN

Compact pneumatic actuator with rolling diaphragm and multiple internal compression springs for operating Clorius valves.

Reinforced rolling diaphragm guarantees long lifetime and reliable, safe operation. Maintenance or change of operating method does not require any special tools.

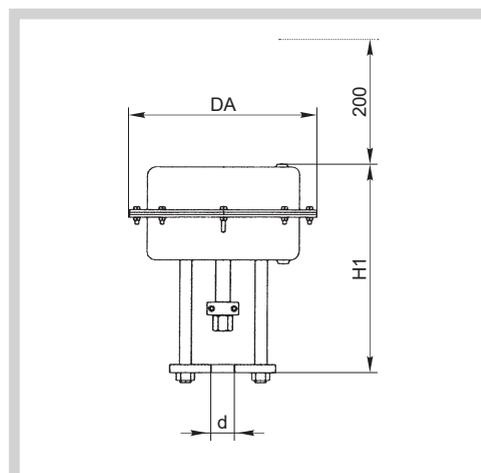
## FUNCTION

The pneumatic actuator is powerful with a high control speed compared to electric actuators. The linear actuator has a simple and light design with a minimum of moving parts. The pneumatic actuator are also low maintenance due to the simple design and the few moving parts. The linear actuator is ideal for on/off and control functions of globe valves. The spring loaded actuator offers the possibility for a fail-safe function, the safety installation is low cost compared to example battery backup. The pneumatic actuator can be used in Eex areas, without extraordinary encapsulation or other precautions.

## FEATURES

- Linear characteristic
- Multispring diaphragm actuator
- Compact design with low weight
- Diaphragm with vulcanised terylene support secures a long and safe life-time

## DIMENSION SKETCH



| Type | d mm | DA mm | H1 mm | Travel mm |
|------|------|-------|-------|-----------|
| S16  | 25   | 160   | 237   | 20        |
| S25  | 35   | 250   | 277,5 | 20        |
| S34  | 32   | 340   | 350   | 33.5      |

Subject to change without notice.

| Actuator | Type | Force   | Travel (max) | Min. pressure to close valve | Min. pressure to open valve |
|----------|------|---------|--------------|------------------------------|-----------------------------|
| S16      | SC   | 1270 N  | 20 mm        | -                            | 1.1 Bar                     |
|          | SO   | 925 N   | 20 mm        | 0.8 Bar                      | -                           |
| S25      | SC   | 9090 N  | 20 mm        | -                            | 2.9 Bar                     |
|          | SO   | 1740 N  | 20 mm        | 0.6 Bar                      | -                           |
| S34      | SC   | 16100 N | 33.5 mm      | -                            | 3.2 Bar                     |
|          | SO   | -       | -            | -                            | -                           |

### SELECTION OF LINEAR PNEUMATIC ACTUATORS

| Valve size DN | Valve type  | MAX P1 Inlet Pressure | Pneumatic actuator type |
|---------------|---|-----------------------|-------------------------|
| 15            | L1S, L1SB, M1F, M1FBN, G1F, G1FBN, H1F, H1FBN             | 16                    | S16                     |
| 20            | L2S, M1FBN, M2F, G1FBN, G2F, H1FBN, H2F                   | 16                    | S16                     |
|               | L1S, L1SB, L3S  | 10                    |                         |
|               | M1F, G1F, H1F   | 7,5                   |                         |
| 25            | L1SB, L2S, M1FBN, M2F, G1FBN, G2F, G1FB, H1FBN, H2F, H1FB | 16                    | S16                     |
|               | M1F, G1F, H1F   | 5                     |                         |
| 32            | L1SB, L2S, G1FBN, G2F, H1FBN, H2F, M1FBN, M2F             | 16                    | S16                     |
|               | L3S, M3F, G3F, H3F  | 10                    |                         |
| 40            | L2S, G2F, M2F, H2F  | 16                    | S16                     |
|               | M1FBN, G1FBN, H1FBN                                       | 10                    |                         |
|               | M3F, G3F, H3F   | 7,5                   |                         |
|               | L3S   | 5                     |                         |
| 50            | L2S, G2F, M2F, H2F  | 16                    | S16                     |
|               | M1FBN, G1FBN, H1FBN                                       | 16                    |                         |
|               | L3S, M3F, G3F, H3F  | 16                    |                         |
| 65            | L3F, M1FBN, M2F, M3F, G1FBN, G2F, G3F, H1FBN, H2F         | 16                    | S25                     |
| 80            | L3F, M1FBN, M2F, M3F, G1FBN, G2F, G3F, H1FBN, H2F         | 16                    | S25                     |
| 100           | L3F, M2F, M3F, G2F, G3F, H2F                              | 16                    | S25                     |
| 125           | L3F, M2F, M3F, G2F, G3F, H2F                              | 16                    | S25                     |
| 150           | L3F, M2F, M3F, G2F, G3F, H2F                              | 16                    | S25                     |
| 200           | L3F, M3F, G3F   | 16                    | S34                     |
| 250           | L3F, M3F, G3F   | 10                    | S34                     |
| 300           | L3F, M3F, G3F   | 10                    | S34 (on request)        |

Where the differential pressure is higher than noted S16 must be replaced with S25.  
Where manual override is needed S16 must be replaced with S25

# Pneumatic actuators type VT Single Acting

For 2 & 3-way valves type G/L/M/S 2FM-T & G/L/M/S 3FM-T

0-6.5.15

Page 1 of 4



## APPLICATIONS

Pneumatic actuators type VT and are the main component of the automatic control system.

It is mainly used for rotary angle 90° to open and close the rotary Clorius valves.

Single-acting cylinders use one air port to allow compressed air to enter the cylinder to move the piston to the desired position, as well as an internal spring to return the piston to the "home" position when the air pressure is removed.

Actuators can work with SPRING OPEN or SPRING CLOSE functions Pneumatic actuators type VT has cooperated with manual override type KH or mounted directly on the valve.

VT actuators are made in accordance with the latest international standards and higher efficiency and reliability

## QUALITY

Products manufactured acc. to ISO9001 standard.

Each individual actuator has been factory inspected and tested and given a serial number for full traceability.

A single compact design utilising identical body and end caps for both - double and single acting.

Full conformance to following latest specifications: ISO 5211, DIN 3337 and VDI/VDE 3845 for products interchangeability and easy mounting of solenoids, limit switches and other accessories.

## TECHNICAL DATA

### Materials:

|                          |                   |
|--------------------------|-------------------|
| Cap                      | Aluminum alloy    |
| Piston                   | Aluminum alloy    |
| Drive shaft              | Alloy Steel       |
| Nut                      | Stainless steel   |
| Washer                   | Stainless steel   |
| Spring clip              | Spring steel      |
| Position indicator       | Nylon             |
| Indicator thrust bearing | Stainless steel   |
| Bearing                  | POM+PTFE          |
| Wear band                | Nylon             |
| Spring seat              | Nylon             |
| "o" ring                 | NBR               |
| Spring                   | High-carbon steel |

## FEATURES

VT series pneumatic actuators have an advantageous characteristic in:

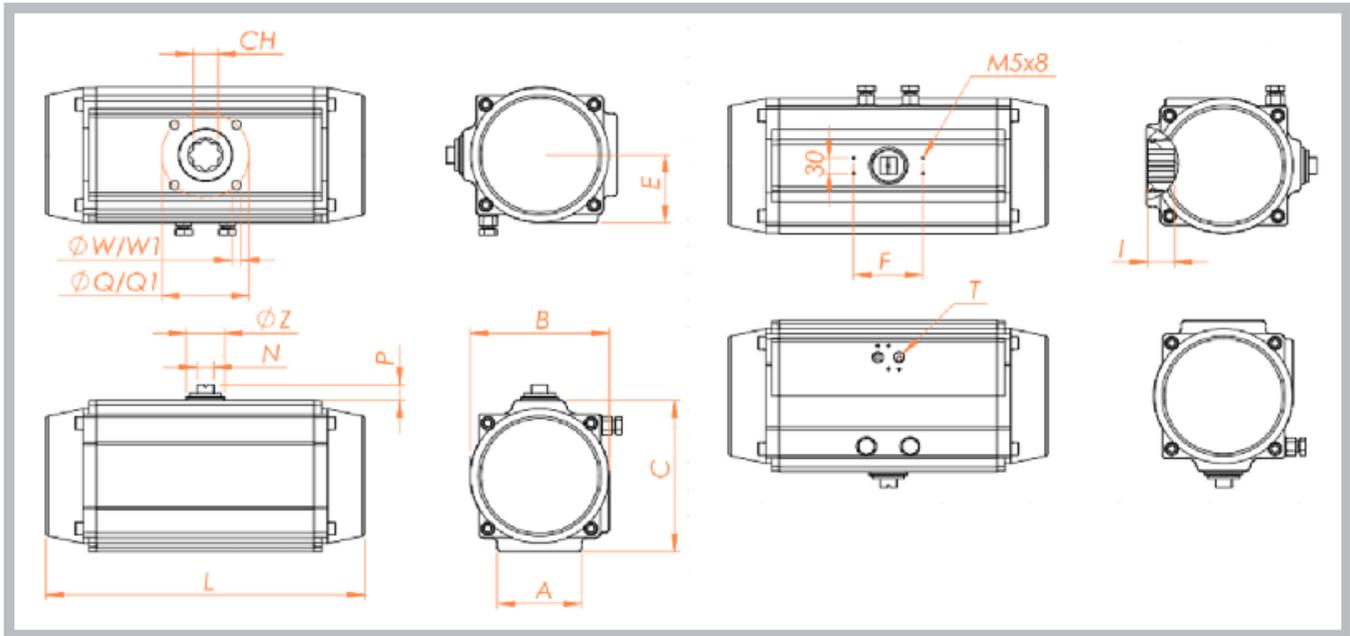
- Reliability
- High performance
- Extensive products range allows the best versatility
- Compact and light
- VT piston rack and pinion design for compact construction, symmetric mounting position, high-cycle life and fast operation.
- Two independent external travel stop adjustments permit easy and precise adjustment of +/- 5° In both directions.
- This adjustment may be made in either the open or closed position and provides for accurate valve.
- Multiple bearings and guides on pistons and racks for precise operation, low friction, high cycle life and a blowout proof pinion shaft.
- Electroless nickel- plated blowout resistant, bearing guided, one-piece pinion shaft for improved safety and maximum cycle life.
- High precision teeth on piston racks and pinion shaft for accurate positioning, low backlash, and maximum engagement resulting in overall efficient operation.
- Extruded aluminium body with both internal and external corrosion protections having a honed cylinder surface for longer life and a lower coefficient of friction.
- Selected high-quality bearings and seals that provide a wide operating temperature range, low friction, and high cycle life.
- Multifunctional position indicator for visual position indication, and a direct, easy, economical way to mount popular sensor.
- Protection class in IP65

Subject to change without notice.

**RECOMMENDED PNEUMATIC ACTUATORS TYPES SINGLE ACTING AND CLORIUS ROTARY VALVES AND DECLUTCH**

| DN  | Type    | Drop pressure (P1 ≤ ...bar) | Pneumatic Actuator for DP 5 bar | DECLUTCH |
|-----|---------|-----------------------------|---------------------------------|----------|
| 65  | G3FM-T  | 25                          | VT125S                          | KH-3     |
| 65  | G3FM-TM | 25                          | VT125S                          | KH-3     |
| 80  | G3FM-T  | 25                          | VT125S                          | KH-3     |
| 80  | G3FM-TM | 25                          | VT140S                          | KH-4     |
| 100 | G3FM-T  | 25                          | VT160S                          | KH-4     |
| 100 | G3FM-TM | 25                          | VT160S                          | KH-4     |
| 125 | G3FM-T  | 25                          | VT190S                          | KH-5     |
| 125 | G3FM-TM | 25                          | VT190S                          | KH-5     |
| 150 | G3FM-T  | 16                          | VT190S                          | KH-5     |
| 150 | G3FM-TM | 16                          | VT190S                          | KH-5     |
| 200 | G3FM-T  | 16                          | VT210S                          | KH-5     |
| 200 | G3FM-TM | 16                          | VT240S                          | KH-6     |
| 250 | G3FM-T  | 16                          | VT240S                          | KH-6     |
| 250 | G3FM-TM | 16                          | VT270S                          | KH-6     |
| 300 | G3FM-T  | 16                          | VT270S                          | KH-6     |
| 300 | G3FM-TM | 16                          | VT300S                          | KH-7     |
| 350 | G3FM-T  | 10                          | VT300S                          | KH-7     |
| 350 | G3FM-TM | 10                          | VT350S                          | KH-8     |
| 400 | G3FM-T  | 10                          | VT350S                          | KH-8     |
| 400 | G3FM-TM | 10                          | VT400S                          | KH-9     |
| 450 | G3FM-T  | 10                          | VT400S                          | KH-9     |
| 450 | G3FM-TM | 10                          | VT400S                          | KH-9     |
| 500 | G3FM-T  | 10                          | VT400S                          | KH-9     |
| 500 | G3FM-TM | 10                          | Available on request            |          |
| 600 | G3FM-T  | 10                          | Available on request            |          |
| 600 | G3FM-TM | 10                          | Available on request            |          |

**DIMENSION SKETCH**



| MODEL  | A   | B     | C   | D   | E     | F   | P  | ØZ | N  | I  | FLANGE  | Q   | Q1  | W      | W1     | Ch    | T     | Weight [kg] |
|--------|-----|-------|-----|-----|-------|-----|----|----|----|----|---------|-----|-----|--------|--------|-------|-------|-------------|
| VT125S | 96  | 157   | 161 | 337 | 85    | 80  | 30 | 56 | 22 | 25 | F07/10  | 70  | 102 | M8x12  | M10x15 | 22x22 | G1/4' | 12.5        |
| VT140S | 110 | 178   | 178 | 377 | 97    | 80  | 30 | 56 | 22 | 31 | F10/12  | 102 | 125 | M10x15 | M12x18 | 27x27 | G1/4' | 15.9        |
| VT160S | 112 | 196   | 200 | 412 | 106   | 130 | 30 | 56 | 22 | 31 | F10/12  | 102 | 125 | M10x15 | M12x18 | 27x27 | G1/4' | 23.8        |
| VT190S | 136 | 216.5 | 232 | 488 | 112   | 130 | 30 | 56 | 22 | 41 | F10/14  | 102 | 140 | M10x15 | M16x24 | 36x36 | G1/4' | 33.8        |
| VT210S | 140 | 235.5 | 255 | 550 | 120   | 130 | 30 | 80 | 32 | 40 | F14     | -   | 140 | -      | M16x24 | 36x36 | G1/4' | 48.4        |
| VT240S | 159 | 262   | 292 | 602 | 131   | 130 | 30 | 80 | 32 | 50 | F16     | -   | 165 | -      | M20x28 | 46x46 | G1/2' | 77.8        |
| VT270S | 159 | 295   | 331 | 672 | 147.5 | 130 | 30 | 80 | 32 | 50 | F16     | -   | 165 | -      | M20x28 | 46x46 | G1/2' | 90.6        |
| VT300S | 180 | 335   | 354 | 784 | 173   | 130 | 30 | 80 | 32 | 50 | F16     | -   | 165 | -      | M20x28 | 46x46 | G1/2' | 135.6       |
| VT350S | 270 | 385   | 410 | 845 | 195   | 130 | 30 | 80 | 32 | 50 | F16/F25 | 165 | 254 | M20x28 | M16x30 | 46x46 | G1/2' | 188.1       |
| VT400S | 290 | 520   | 466 | 956 | 260   | 130 | 30 | 80 | 32 | 60 | F25     | -   | 254 | -      | M16x30 | 55x55 | G1/2' | 283.5       |

Other relevant data sheets for VT actuators:

- 2-way valves
- 3-way valves
- Positioners
- Filter regulators
- Controller
- Sensor PT 100
- Pneumatic controller S80

G2FM-T 0.2.5.05.01  
G3FM-T 0.2.6.02, 0.2.6.03  
0.6.6.01, 0.6.6.02  
0.6.8.01  
ER2000 0.4.6.01  
0.4.7.01  
0.6.7.01

# Pneumatic actuators type VT Double Acting

For 2 & 3-way valves type G/L/M/S 2FM-T & G/L/M/S 3FM-T

0-6.5.16

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## APPLICATIONS

Pneumatic actuators type VT and are the main component of the automatic control system.

It is mainly used for rotary angle 90° to open and close the rotary Clorius valves.

Double-acting cylinders have an air port at each end and move the piston forward and back by alternating the port that receives the high-pressure air.

Pneumatic actuators type VT has cooperated with manual override type KH or mounted directly on the valve.

VT actuators are made in accordance with the latest international standards and higher efficiency and reliability.

## QUALITY

Products manufactured acc. to ISO9001 standard.

Each individual actuator has been factory inspected and tested and given a serial number for full traceability.

A single compact design utilising identical body and end caps for both - double and single acting.

Full conformance to following latest specifications: ISO 5211, DIN 3337 and VDI/VDE 3845 for products interchangeability and easy mounting of solenoids, limit switches and other accessories.

## TECHNICAL DATA

### Materials:

|                          |                 |
|--------------------------|-----------------|
| Body                     | Aluminum alloy  |
| Cap                      | Aluminum alloy  |
| Drive shaft              | Alloy Steel     |
| Nut                      | Stainless steel |
| Washer                   | Stainless steel |
| Position indicator       | Nylon           |
| Indicator thrust bearing | Stainless steel |
| Bearing                  | POM+PTFE        |
| Wear band                | Nylon           |
| Spring seat              | Nylon           |
| "o" ring                 | NBR             |

## FEATURES

VT series pneumatic actuators have an advantageous characteristic in:

- Reliability
- High performance
- Extensive products range allows the best versatility
- Compact and light
- VT piston rack and pinion design for compact construction, symmetric mounting position, high-cycle life and fast operation.
- Two independent external travel stop adjustments permit easy and precise adjustment of +/- 5° In both directions.
- This adjustment may be made in either the open or closed position and provides for accurate valve.
- Multiple bearings and guides on pistons and racks for precise operation, low friction, high cycle life and a blowout proof pinion shaft.
- Electroless nickel- plated blowout resistant, bearing guided, one-piece pinion shaft for improved safety and maximum cycle life.
- High precision teeth on piston racks and pinion shaft for accurate positioning, low backlash, and maximum engagement resulting in overall efficient operation.
- Extruded aluminium body with both internal and external corrosion protections having a honed cylinder surface for longer life and a lower coefficient of friction.
- Selected high-quality bearings and seals that provide a wide operating temperature range, low friction, and high cycle life.
- Multifunctional position indicator for visual position indication, and a direct, easy, economical way to mount popular sensor.
- Protection class in IP65

Subject to change without notice.

## RECOMMENDED PNEUMATIC ACTUATORS TYPES DOUBLE ACTING AND CLORIUS ROTARY VALVES AND DECLUTCH

| DN  | Type    | Drop pressure (P1 ≤ ...bar) | Pneumatic Actuator for DP 5 bar | DECLUTCH |
|-----|---------|-----------------------------|---------------------------------|----------|
| 65  | G3FM-T  | 25                          | VT085D                          | KH-1     |
| 65  | G3FM-TM | 25                          | VT095D                          | KH-2     |
| 80  | G3FM-T  | 25                          | VT095D                          | KH-2     |
| 80  | G3FM-TM | 25                          | VT095D                          | KH-2     |
| 100 | G3FM-T  | 25                          | VT110D                          | KH-2     |
| 100 | G3FM-TM | 25                          | VT125D                          | KH-3     |
| 125 | G3FM-T  | 25                          | VT125D                          | KH-3     |
| 125 | G3FM-TM | 25                          | VT140D                          | KH-3     |
| 150 | G3FM-T  | 16                          | VT125D                          | KH-3     |
| 150 | G3FM-TM | 16                          | VT140D                          | KH-3     |
| 200 | G3FM-T  | 16                          | VT160D                          | KH-4     |
| 200 | G3FM-TM | 16                          | VT190D                          | KH-4     |
| 250 | G3FM-T  | 16                          | VT190D                          | KH-4     |
| 250 | G3FM-TM | 16                          | VT210D                          | KH-5     |
| 300 | G3FM-T  | 16                          | VT210D                          | KH-5     |
| 300 | G3FM-TM | 16                          | VT240D                          | KH-5     |
| 350 | G3FM-T  | 10                          | VT240D                          | KH-5     |
| 350 | G3FM-TM | 10                          | VT240D                          | KH-5     |
| 400 | G3FM-T  | 10                          | VT240D                          | KH-5     |
| 400 | G3FM-TM | 10                          | VT270D                          | KH-6     |
| 450 | G3FM-T  | 10                          | VT270D                          | KH-6     |
| 450 | G3FM-TM | 10                          | VT300D                          | KH-6     |
| 500 | G3FM-T  | 10                          | VT270D                          | KH-6     |
| 500 | G3FM-TM | 10                          | Available on request            |          |
| 600 | G3FM-T  | 10                          | VT350D                          | KH-7     |
| 600 | G3FM-TM | 10                          | Available on request            |          |

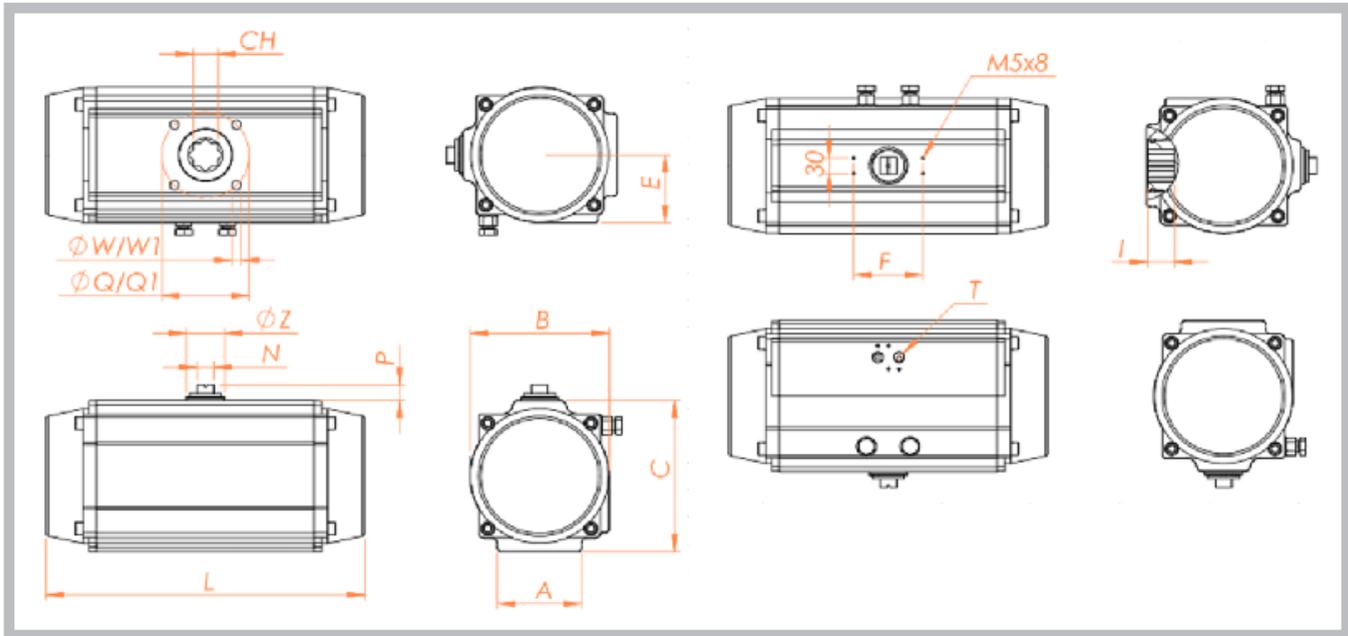
# Pneumatic actuators type VT Double Acting

For 2 & 3-way valves type G/L/M/S 2FM-T & G/L/M/S 3FM-T

0-6.5.16

Page 3 of 4

## DIMENSION SKETCH



| MODEL  | A   | B     | C   | D   | E     | F   | P  | QZ | N  | I  | FLANGE  | Q   | Q1  | W      | W1     | Ch    | T     | Weight [kg] |
|--------|-----|-------|-----|-----|-------|-----|----|----|----|----|---------|-----|-----|--------|--------|-------|-------|-------------|
| VT085D | 68  | 112.5 | 113 | 229 | 63.5  | 80  | 20 | 40 | 14 | 19 | F 05/07 | 50  | 70  | M6x9   | M8x12  | 17x17 | G1/4' | 3.8         |
| VT095D | 92  | 126   | 123 | 264 | 71    | 80  | 20 | 40 | 14 | 19 | F05/07  | 50  | 70  | M6x9   | M8x12  | 17x17 | G1/4' | 5.1         |
| VT110D | 93  | 138.5 | 136 | 266 | 76.5  | 80  | 20 | 40 | 14 | 19 | F07/10  | 70  | 102 | M8x12  | M10x15 | 17x17 | G1/4' | 6.1         |
| VT125D | 96  | 157   | 161 | 337 | 85    | 80  | 30 | 56 | 22 | 25 | F07/10  | 70  | 102 | M8x12  | M10x15 | 22x22 | G1/4' | 10.9        |
| VT140D | 110 | 178   | 178 | 377 | 97    | 80  | 30 | 56 | 22 | 31 | F10/12  | 102 | 125 | M10x15 | M12x18 | 27x27 | G1/4' | 13.8        |
| VT160D | 112 | 196   | 200 | 412 | 106   | 130 | 30 | 56 | 22 | 31 | F10/12  | 102 | 125 | M10x15 | M12x18 | 27x27 | G1/4' | 20.2        |
| VT190D | 136 | 216.5 | 232 | 488 | 112   | 130 | 30 | 56 | 22 | 41 | F10/14  | 102 | 140 | M10x15 | M16x24 | 36x36 | G1/4' | 28.4        |
| VT210D | 140 | 235.5 | 255 | 550 | 120   | 130 | 30 | 80 | 32 | 40 | F14     | -   | 140 | -      | M16x24 | 36x36 | G1/4' | 40.0        |
| VT240D | 159 | 262   | 292 | 602 | 131   | 130 | 30 | 80 | 32 | 50 | F16     | -   | 165 | -      | M20x28 | 46x46 | G1/2' | 52.6        |
| VT270D | 159 | 295   | 331 | 672 | 147.5 | 130 | 30 | 80 | 32 | 50 | F16     | -   | 165 | -      | M20x28 | 46x46 | G1/2' | 73.6        |
| VT300D | 180 | 335   | 354 | 784 | 173   | 130 | 30 | 80 | 32 | 50 | F16     | -   | 165 | -      | M20x28 | 46x46 | G1/2' | 108.0       |
| VT350D | 270 | 385   | 410 | 845 | 195   | 130 | 30 | 80 | 32 | 50 | F16/F25 | 165 | 254 | M20x28 | M16x30 | 46x46 | G1/2' | 146.7       |
| VT400D | 290 | 520   | 466 | 956 | 260   | 130 | 30 | 80 | 32 | 60 | F25     | -   | 254 | -      | M16x30 | 55x55 | G1/2' | 220.5       |

Other relevant data sheets for VT actuators:

- 2-way valves
- 3-way valves
- Positioners
- Filter regulators
- Controller
- Sensor PT 100
- Pneumatic controller S80

- G2FM-T 0.2.5.05.01
- G3FM-T 0.2.6.02, 0.2.6.03
- 0.6.6.01, 0.6.6.02
- 0.6.8.01
- ER2000 0.4.6.01
- 0.4.7.01
- 0.6.7.01

**RUGGET, EASY MAINTENANCE  
& PRECISE CALIBRATION**

Rugged valve control device giving a confidence in reliable performance and outstanding durability under harsh working conditions.



# PNEUMATIC CONTROLLERS & POSITIONERS

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6

## OUR PNEUMATIC CONTROLLERS AND POSITIONER PROGRAM INCLUDES:

### POSITIONER TYPE

PNEUMATIC-PNEUMATIC  
ELECTRO-PNEUMATIC

### CONTROLLER TYPE

PNEUMATIC INDICATING CONTROLLER

### FILTER REGULATOR

FLOAT TYPE WITH AUTO-DRAIN

### POSITIONER MODEL

PPL, PPR  
EPL, EPR

### CONTROLLER MODEL

S80

### REGULATOR MODEL

AW 20K-F02CE-H

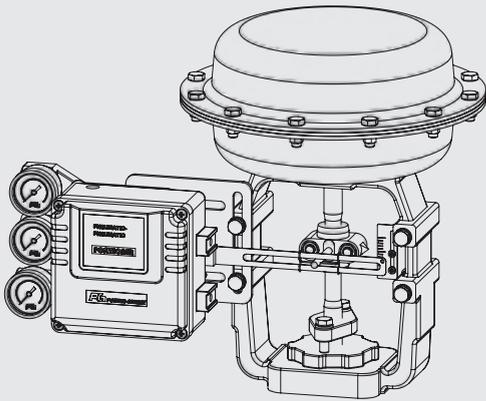
# PPL / PPR

Pneumatic-Pneumatic Positioner

O-6.6.01-C

Page 1 of 4

## PPL



Robust valve control device giving a confidence in reliable performance and outstanding durability under harsh working environments

### FEATURES

- Easy maintenance
- Precise calibration with simple SPAN and ZERO adjustments
- Simple conversion to direct acting or reverse acting
- 1/2 split range available
- Rugged aluminum housing with corrosion-resistant coating
- Vibration resistant design
- Stainless steel gauges standard
- Restricted pilot valve orifice kit for small actuators included

### OPTIONS

- High temperature

### SPECIFICATIONS

|                        | PPL                               |                   |
|------------------------|-----------------------------------|-------------------|
|                        | Linear Type (Lever Feedback)      |                   |
|                        | Single                            | Double            |
| Input Signal           | 0.2-1.0 bar (3-15 psi) (Note 1,2) |                   |
| Supply Air Pressure    | Max 7.0 bar (100 psi)             |                   |
| Standard Stroke        | 10-80 mm (Note.3)                 |                   |
| Pneumatic Connections  | PT(Rc) 1/4 or NPT 1/4             |                   |
| Ambient Temperature    | -20~ +70 °C (Note. 4)             |                   |
| Pressure Gauge         | Stainless steel                   |                   |
| Output Characteristics | Linear                            |                   |
| Linearity              | Within ±1.0% F.S.                 | Within ±1.5% F.S. |
| Sensitivity            | Within ±0.2% F.S.                 | Within ±0.5% F.S. |
| Hysteresis             | Within ±1.0% F.S.                 |                   |
| Repeatability          | Within ±0.5% F.S.                 |                   |
| Air Consumption        | 5 LPM (Sup. 1.4 bar)              |                   |
| Flow Capacity          | 80 LPM (Sup. 1.4 bar)             |                   |
| Body Material          | Aluminium die-cast                |                   |
| Weight                 | 2.1 kg                            |                   |

Note:

- 1) 1/2 split range is available for 3-9 psi input signal or 9-15 psi input signal
- 2) Please contact for 6-30 psi input signal
- 3) Feedback lever can be extended to stroke 80-150mm
- 4) High temperature option: up to +120°C

## HOW TO ORDER

# PPL

Feedback  
Lever

Pressure  
Gauge

Pilot  
Valve  
Orifice

Connection  
Threads

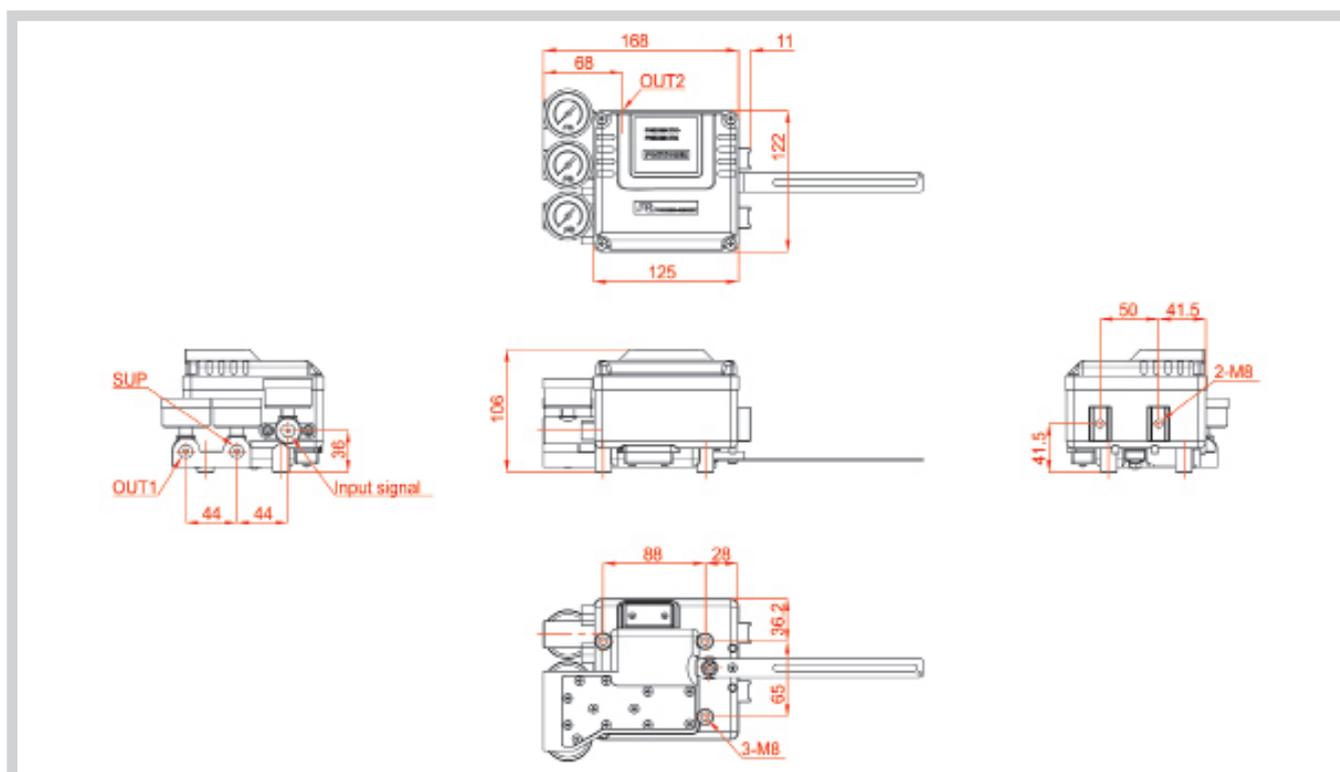
Operating  
Temperature

Mounting  
Bracket

| Description                 | Code   |
|-----------------------------|--|
| <b>Feedback Lever:</b>      | A: Stroke 10 ~ 40mm<br>B: Stroke 10 ~ 80mm<br>C: Stroke 80 ~ 150mm   |
| <b>Pressure Gauge</b>       | 1: 6 bar (90psi)<br>2: 10 bar (150psi)   |
| <b>Pilot Valve Orifice:</b> | S: Standard (Actuator volume over 180 cm <sup>3</sup> )<br>M: Small orifice (Ø 1.0 or Ø0.7) (Actuator volume 90~180cm <sup>3</sup> ) |

| Description                               | Code                                       |
|---|--|
| <b>Connection Threads:</b><br>(pneumatic) | 3: PT(Rc) ¼<br>4: NPT ¼                    |
| <b>Operating Temperature:</b>             | T: 70°C (standard)<br>H: 120°C<br>L: -40°C |
| <b>Mounting Bracket:</b>                  | L: DIN/IEC 60534-6-1                       |

## DIMENSION SKETCH



# 6

## PPR



With Dome Indicator



Robust valve control device giving a confidence in reliable performance and outstanding durability under harsh working environments

### FEATURES

- Easy maintenance
- Precise calibration with simple SPAN and ZERO adjustments
- Simple conversion to direct acting or reverse acting
- 1/2 split range available
- Rugged aluminum housing with corrosion-resistant coating
- Vibration resistant design
- Stainless steel gauges standard
- Restricted pilot valve orifice kit for small actuators included

### OPTIONS

- Position transmitter (4-20mA output signal)
- 2 x SPDT limit switch
- 2 x P&F proximity sensor NJ2-V3-N
- Visual dome indicator
- High temperature

### SPECIFICATIONS

|                               | PPR                               |                   |
|-------------------------------|-----------------------------------|-------------------|
|                               | Linear Type (Lever Feedback)      |                   |
|                               | Single                            | Double            |
| <b>Input Signal</b>           | 0.2-1.0 bar (3-15 psi) (Note 1,2) |                   |
| <b>Supply Air Pressure</b>    | Max 7.0 bar (100 psi)             |                   |
| <b>Standard Stroke</b>        | 60-100° (Note.3)                  |                   |
| <b>Pneumatic Connections</b>  | PT(Rc) 1/4 or NPT 1/4             |                   |
| <b>Ambient Temperature</b>    | -20~ +70 °C (Note. 4)             |                   |
| <b>Pressure Gauge</b>         | Stainless steel                   |                   |
| <b>Output Characteristics</b> | Linear                            |                   |
| <b>Linearity</b>              | Within ±1.0% F.S.                 | Within ±1.5% F.S. |
| <b>Sensitivity</b>            | Within ±0.5% F.S.                 |                   |
| <b>Hysteresis</b>             | Within ±1.0% F.S.                 |                   |
| <b>Repeatability</b>          | Within ±0.5% F.S.                 |                   |
| <b>Air Consumption</b>        | 5 LPM (Sup. 1.4 bar)              |                   |
| <b>Flow Capacity</b>          | 80 LPM (Sup. 1.4 bar)             |                   |
| <b>Body Material</b>          | Aluminium die-cast                |                   |
| <b>Weight</b>                 | 2.5 kg                            |                   |

Note:

- 1) 1/2 split range is available for 3-9 psi input signal or 9-15 psi input signal
- 2) Please contact for 6-30 psi input signal
- 3) Operating angle can be adjusted to 0-60° or 0-100°
- 4) High temperature option: up to +120°C without feedback options  
up to +85°C with feedback options

## HOW TO ORDER

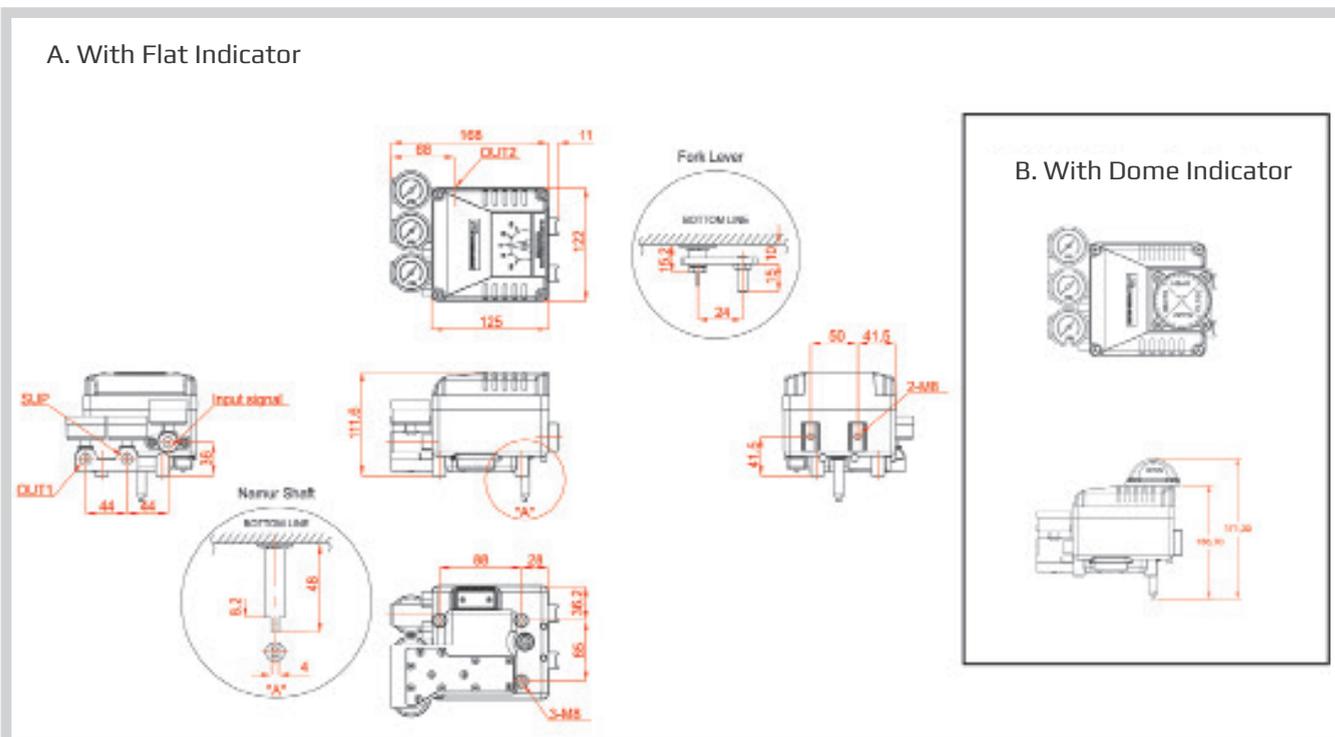
|            |                |                |                     |                   |                    |                |                       |                  |
|------------|----------------|----------------|---------------------|-------------------|--------------------|----------------|-----------------------|------------------|
| <b>PPR</b> | Feedback Lever | Pressure Gauge | Pilot Valve Orifice | Position Feedback | Connection Threads | Dome Indicator | Operating Temperature | Mounting Bracket |
|            |                |                |                     |                   |                    |                |                       |                  |

| Description                 | Code   |
|-----------------------------|--|
| <b>Feedback Lever:</b>      | A: NAMUR shaft (direct mounting)<br>B: Fork lever M6 x 40L<br>C: Fork lever other size on request  |
| <b>Pressure Gauge</b>       | 1: 6 bar (90psi)<br>2: 10 bar (150psi)   |
| <b>Pilot Valve Orifice:</b> | S: Standard (Actuator volume over 180 cm <sup>3</sup> )<br>M: Small orifice (Ø 1.0 or Ø0.7) (Actuator volume 90~180cm <sup>3</sup> )                             |
| <b>Position Feedback:</b>   | N: None (standard)<br>O: Position transmitter (4~20mA output signal)<br>L: 2 x SPDT limit switch<br>P: 2 x proximity sensor P&F NJ2-V3-N<br>M: O + L<br>Q: O + P |

| Description   | Code   |
|---|--|
| <b>Connection Threads:</b><br>(pneumatic)                               | 3: PT(Rc) ¼<br>4: NPT ¼  |
| <b>Dome Indicator:</b>  | N: Flat indicator (standard)<br>D: Dome indicator  |
| <b>Operating Temperature:</b>   | T: 70°C (standard)<br>H: 120°C (without position feedback option)<br>85°C (with position feedback option)<br>L: -40°C (without position feedback option)   |
| <b>Mounting Bracket</b><br>- NAMUR Shaft Type:<br><br>- Fork Lever Type | R: Multi-size NAMUR bracket for DIN VDI/VDE 3845 (130 x 30 x 50 bracket on request)<br><br>F: DHCT bracket 80x30 for fork lever type<br>E: Multi-size NAMUR bracket for Fork lever type (130 x 30 x 50 bracket on request) |

## DIMENSION SKETCH

A. With Flat Indicator



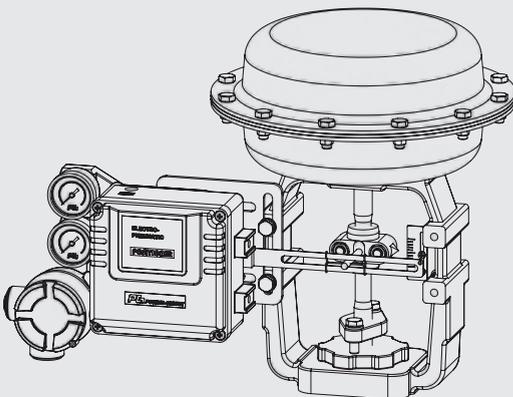
# EPL / EPR

Electro-Pneumatic Positioner

0-6.6.02-E

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## EPL



Robust valve control device giving a confidence in reliable performance and outstanding durability under harsh working environments

### FEATURES for EPL

- Easy maintenance
- Precise calibration with simple SPAN and ZERO adjustments
- Simple conversion to direct acting or reverse acting
- 1/2 split range available
- Rugged aluminum housing with corrosion-resistant coating
- Vibration resistant design
- Stainless steel gauges standard
- Restricted pilot valve orifice kit for small actuators included
- KC-certified flameproof Ex dmb 11B+H<sub>2</sub> T6
- NEPSI-certified flameproof Ex dmb 11B+H<sub>2</sub> T6
- IECEx-certified flameproof Ex dmb IIC T6/T5
- ATEX-certified flameproof Ex dmb IIC T6/T5
- KC-certified flameproof Ex dmb IIC T6/T5
- IECEx-certified intrinsically safe Ex ia IIC T6
- ATEX-certified intrinsically safe Ex ia IIC T6
- KC-certified intrinsically safe Ex ia IIC T6

### OPTIONS

- Position transmitter (4...20 mA output signal)
- High temperature (+120°C)
- Low temperature (-40°C)

### SPECIFICATIONS

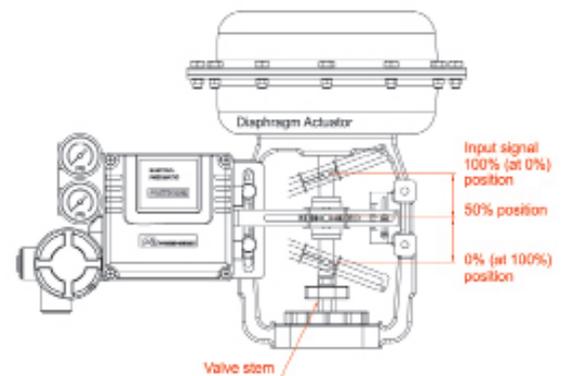
|                               | EPL  |                   |
|-------------------------------|--|-------------------|
|                               | Single   | Double            |
| <b>Input Signal</b>           | 4-20mA DC (Note. 1)  |                   |
| <b>Input Resistance</b>       | 235 ± 15Ω  |                   |
| <b>Air Supply</b>             | Max 7.0 bar (100 psi) free of oil, water and moisture            |                   |
| <b>Standard Stroke</b>        | 10-80 mm (Note. 2)   |                   |
| <b>Pneumatic Connections</b>  | PT(Rc) 1/4 or NPT 1/4  |                   |
| <b>Electrical Connections</b> | PF (G) ½ or NPT ½  |                   |
| <b>Protection Class</b>       | Ex dmb IIB+H <sub>2</sub> T6/ Ex dmb IIC T6/T5 Ex ia IIC T6/IP66 |                   |
| <b>Ambient Temperature</b>    | -20~ +70 °C (Note. 3)  |                   |
| <b>Pressure Gauge</b>         | Stainless steel  |                   |
| <b>Output Characteristics</b> | Linear   |                   |
| <b>Linearity</b>              | Within ±1.0% F.S.  | Within ±1.5% F.S. |
| <b>Sensitivity</b>            | Within ±0.2% F.S.  | Within ±0.5% F.S. |
| <b>Hysteresis</b>             | Within ±1.0% F.S.  |                   |
| <b>Repeatability</b>          | Within ±0.5% F.S.  |                   |
| <b>Air Consumption</b>        | 5 LPM (Sup. 1.4 bar)   |                   |
| <b>Flow Capacity</b>          | 80 LPM (Sup. 1.4 bar)  |                   |
| <b>Body Material</b>          | Aluminium die-cast   |                   |
| <b>Weight</b>                 | 3.3 kg (with terminal box)<br>3.0 kg (without terminal box)      |                   |

Note:

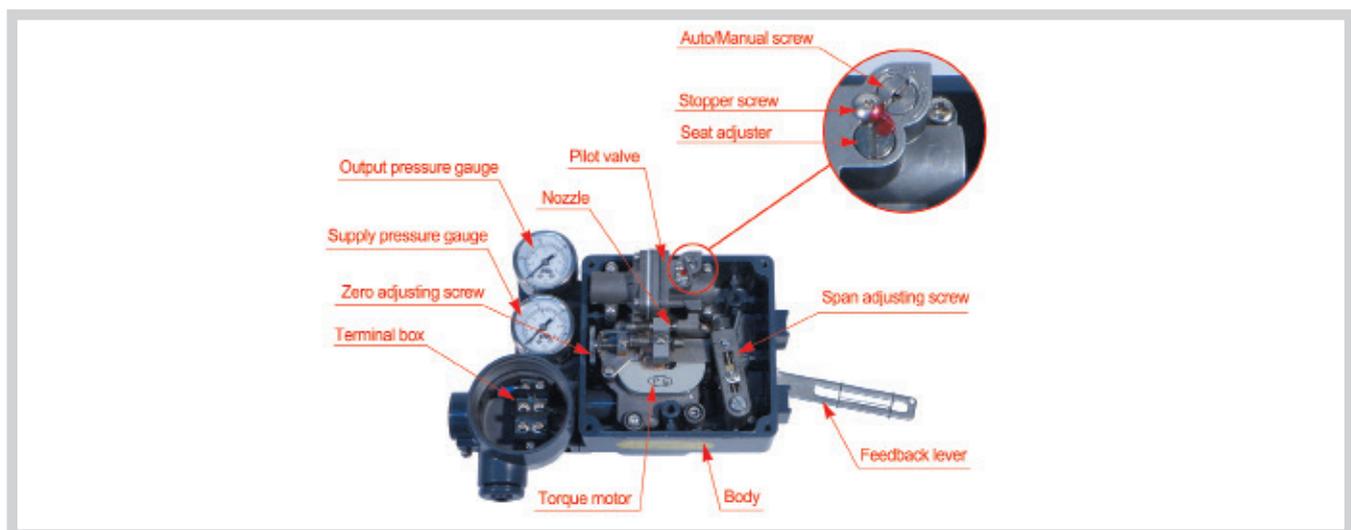
- 1) 1/2 split range is available for 4-12mA input signal or 12-20mA input signal
- 2) Feedback lever can be extended to stroke 80-150mm
- 3) Temperature option: up to +120°C without feedback options  
up to +85°C without feedback options  
up to -40°C without feedback options

## MOUNTING

1. Install the EPL positioner so that the angle between the valve stem and the feedback lever can be  $90^\circ$  at 12 mA input signal (50%) as shown to the right.
2. The operating angle of the EPL feedback lever is minimum  $10^\circ$  to maximum  $30^\circ$ .



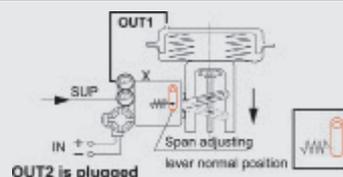
## INTERNAL VIEW



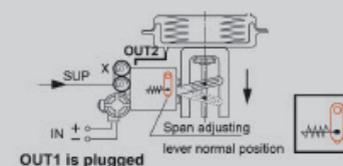
## AIR CONNECTIONS

### Direct Acting (DA)

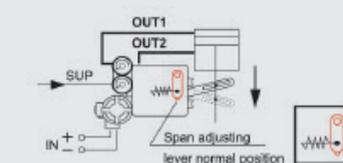
As the input increases,  
Valve stem moves downwards  
Actuator: **DA**  
Connection: out 1



As the input increases,  
Valve stem moves downwards  
Actuator: **DA**  
Connection: out 2

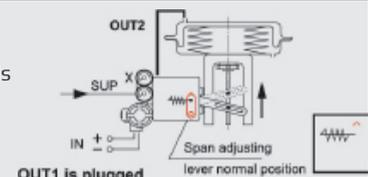


As the input increases,  
Valve stem moves downwards

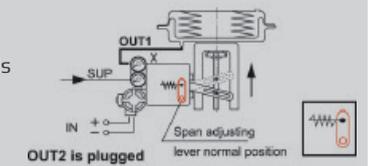


### Reverse Acting (RA)

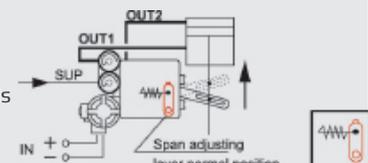
As the input increases,  
Valve stem moves upwards  
Actuator: **RA**  
Connection: out 2



As the input increases,  
Valve stem moves upwards  
Actuator: **RA**  
Connection: out 1

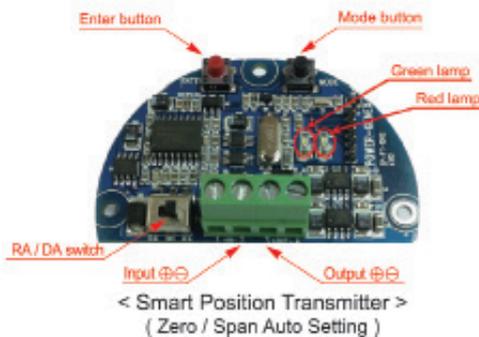
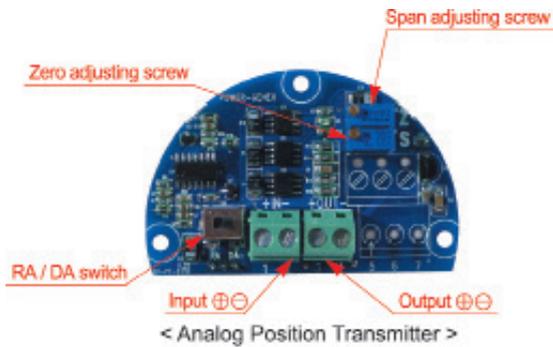


As the input increases,  
Valve stem moves upwards

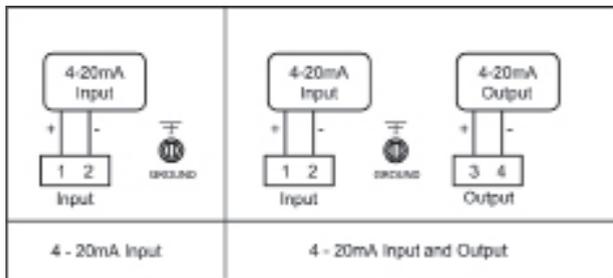


### POSITION TRANSMITTER OPTIONS (BUILT-IN TYPE)

#### 1. Board View



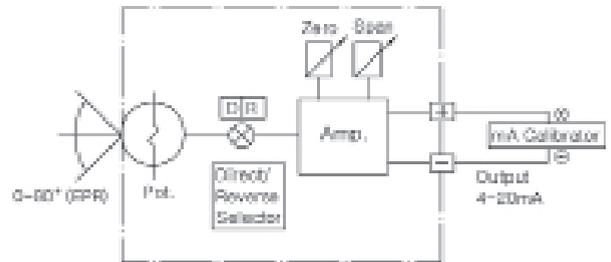
#### 3. Wiring Diagram



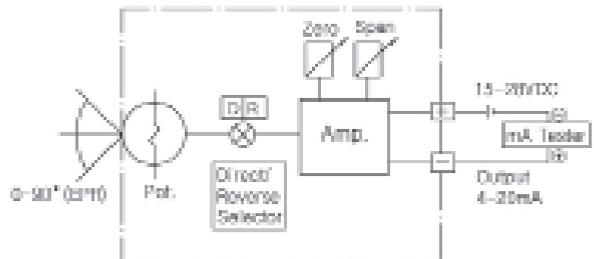
#### 2. Position Transmitter (4-20mA output signal) a. Specifications

|                          |                               |
|--------------------------|-------------------------------|
| Power Supply Rating      | 5.5-30 VDC loop power         |
| Recommended Power Supply | 24 VDC                        |
| Output Signal            | 4-20 mA, 2-wire               |
| Operating Temperature    | -20°C ~ +85°C                 |
| Load Impedance           | 0 ~ 600 ohms                  |
| Max. Output              | 30 mA DC                      |
| Linearity                | ± 1.0 %                       |
| Hysteresis               | 1.0 % of full scale           |
| Repeatability            | ±0.5 % of full scale          |
| Adjustment               | Zero and Span in terminal box |

#### b. with mA calibrator

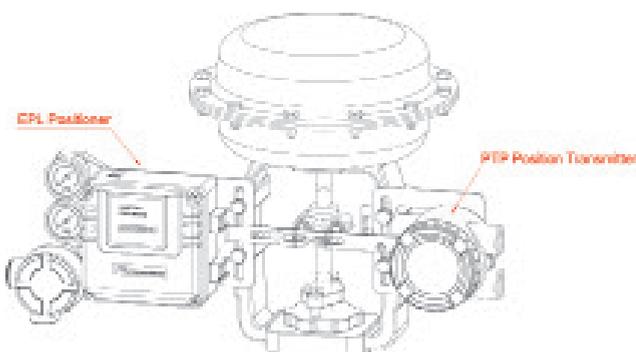


#### c. with multimeter

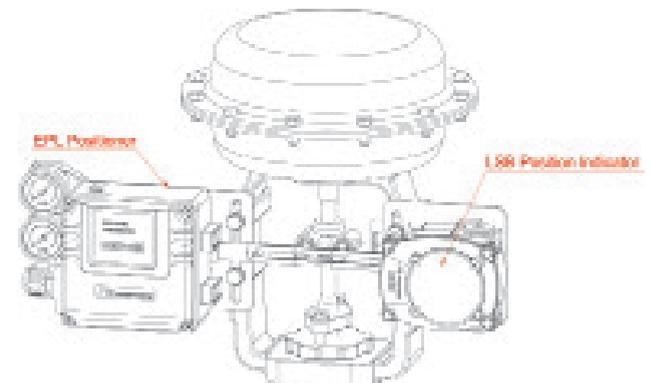


### APPLICATION FOR LIMIT SWITCHES (EXTERNAL TYPE)

#### 1) With explosion proof PTP-L



#### 2) With non-explosion proof LSB-200



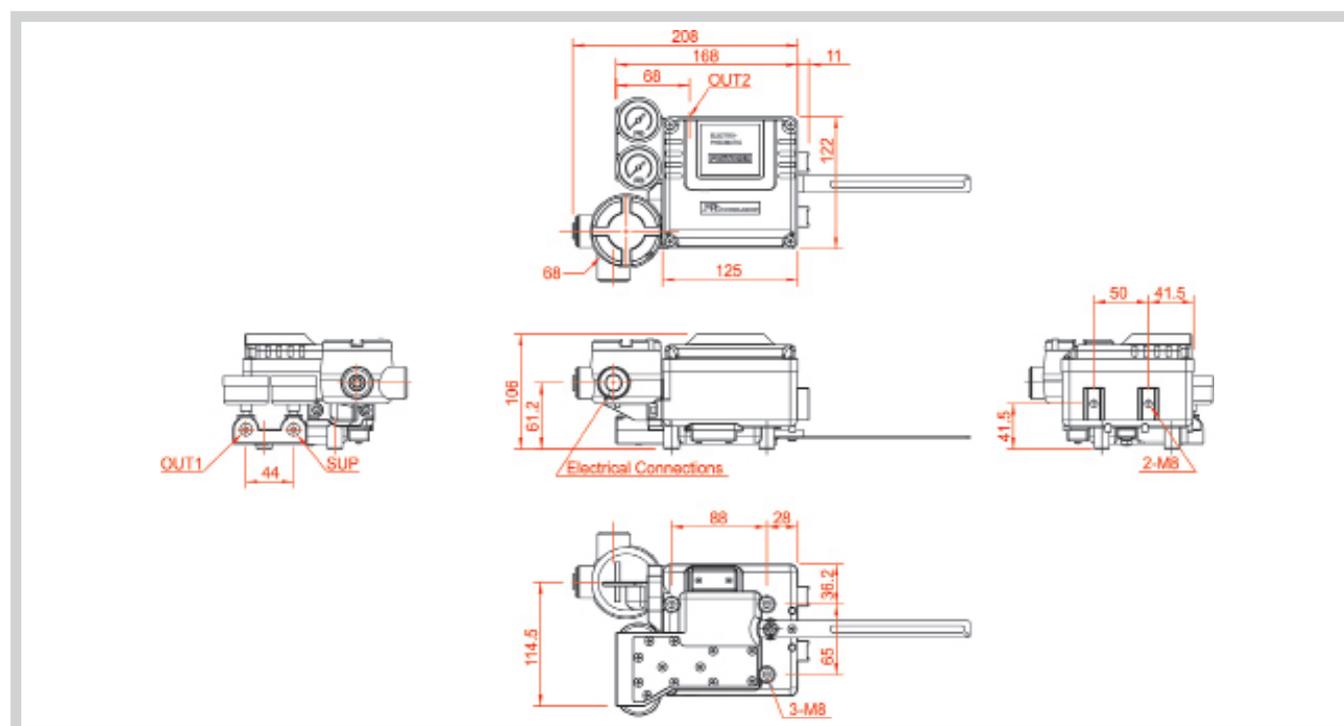
## HOW TO ORDER

# EPL

|                  |                |                           |                     |                   |                    |                 |                  |
|------------------|----------------|---------------------------|---------------------|-------------------|--------------------|-----------------|------------------|
| Protection Class | Feedback Lever | Pressure Gauge (SUP, OUT) | Pilot Valve Orifice | Position Feedback | Connection Threads | Operating Temp. | Mounting Bracket |
|------------------|----------------|---------------------------|---------------------|-------------------|--------------------|-----------------|------------------|

| Description                 | Code  | Description   | Code   |
|-----------------------------|---|---|--|
| <b>Protection Class:</b>    | F: KC flameproof Ex dmb IIB+H <sub>2</sub> T6<br>NEPSI flameproof Ex dmb IIB+H <sub>2</sub> T6<br>A: KC flameproof Ex dmb IIC T6/T5<br>D: IECEX flameproof Ex dmb IIC T6<br>I: IECEX intrinsically safe Ex ia IIC T6<br>ATEX intrinsically safe Ex ia IIC T6<br>KC intrinsically safe Ex ia IIC T6<br>W: Weatherproof to IP66 | <b>Position Feedback:</b><br>(only for waterproof type)     | N: None (standard)<br>O: Analog position transmitter (4~20mA output signal)<br>S: Smart position transmitter (4~20mA output signal)                      |
| <b>Feedback Lever:</b>      | A: Stroke 10~40 mm<br>B: Stroke 10~80 mm<br>C: Stroke 80~150 mm   | <b>Connection Threads:</b><br>(pneumatic - electrical)      | 3: PT(Rc) ¼ - PF(G) ½ (standard)<br>4: NPT ¼ - NPT ½<br>5: PT(Rc) ¼ - M20 x 1.5  |
| <b>Pressure Gauge:</b>      | 1: 6 bar (90 psi)<br>2: 10 bar (150 psi)  | <b>Operating Temperature:</b><br>(only for waterproof type) | T: 70°C (standard)<br>H: 120°C (without position feedback option)<br>85°C (with position feedback option)<br>L: -40°C (without position feedback option) |
| <b>Pilot Valve Orifice:</b> | S: Standard (Actuator volume over 180 cm <sup>3</sup> )<br>M: Small orifice (Ø1.0 or Ø0.7) (Actuator volume over 90~180 cm <sup>3</sup> )   | <b>Mounting Bracket:</b>                                    | N: None<br>L: IEC 60534-6-1  |

## DIMENSION SKETCH



# 6

# EPL / EPR

Electro-Pneumatic Positioner

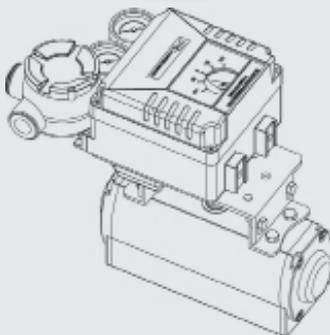
0-6.6.02-E

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## EPR



With Dome Indicator



Robust valve control device giving a confidence in reliable performance and outstanding durability under harsh working environments.

## OPTIONS

- Position transmitter (4...20 mA output signal)
- 2 x SPDT limit switch
- 2 x P&F proximity sensor NJ2-V3-N
- Visual dome indicator
  - High temperature (+120 °C)
  - Low temperature (-40 °C)

## FEATURES for EPR

- Easy maintenance
- Precise calibration with simple SPAN and ZERO adjustments
- Simple conversion to direct acting or reverse acting
- 1/2 split range available
- Rugged aluminum housing with corrosion-resistant coating
- Vibration resistant design
- Stainless steel gauges standard
- Restricted pilot valve orifice kit for small actuators included
-  KC-certified flameproof Ex dmb 11B+H<sub>2</sub> T6
-  NEPSI-certified flameproof Ex dmb 11B+H<sub>2</sub> T6
-  IECEx/ KC-certified flameproof Ex dmb IIC T6/T5
-   ATEX/TR-CU-certified flameproof Ex dmb IIC T6/T5
-  IECEx/ KC-certified intrinsically safe Ex ia IIC T6
-   ATEX/TR-CU-certified intrinsically safe Ex ia IIC T6

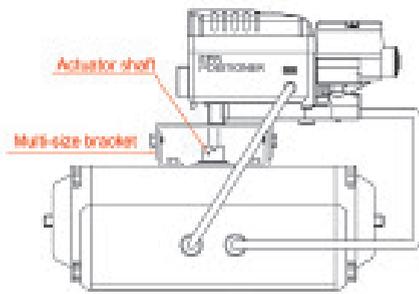
## SPECIFICATIONS

|                               | EPR   |                   |
|-------------------------------|---|-------------------|
|                               | Single  | Double            |
| <b>Input Signal</b>           | 4-20mA DC (Note. 1)   |                   |
| <b>Input Resistance</b>       | 235 ± 15Ω   |                   |
| <b>Air Supply</b>             | Max 7.0 bar (100 psi) free of oil, water and moisture             |                   |
| <b>Operating Angle</b>        | 60~100° (Note. 2)   |                   |
| <b>Pneumatic Connections</b>  | PT(Rc) 1/4 or NPT 1/4   |                   |
| <b>Electrical Connections</b> | PF (G) ½ or NPT ½   |                   |
| <b>Protection Class</b>       | Ex dmb IIB+H <sub>2</sub> T6/ Ex dmb IIC T6/T5 Ex ia IIC T6/ IP66 |                   |
| <b>Ambient Temperature</b>    | -20~ +70 °C (Note. 3)   |                   |
| <b>Pressure Gauge</b>         | Stainless steel   |                   |
| <b>Output Characteristics</b> | Linear  |                   |
| <b>Linearity</b>              | Within ±1.0% F.S.   | Within ±1.5% F.S. |
| <b>Sensitivity</b>            | Within ±0.5% F.S.   |                   |
| <b>Hysteresis</b>             | Within ±1.0% F.S.   |                   |
| <b>Repeatability</b>          | Within ±0.5% F.S.   |                   |
| <b>Air Consumption</b>        | 5 LPM (Sup. 1.4 bar)  |                   |
| <b>Flow Capacity</b>          | 80 LPM (Sup. 1.4 bar)   |                   |
| <b>Body Material</b>          | Aluminium die-cast  |                   |
| <b>Weight</b>                 | 3.5 kg (with terminal box)<br>3.2 kg (without terminal box)       |                   |

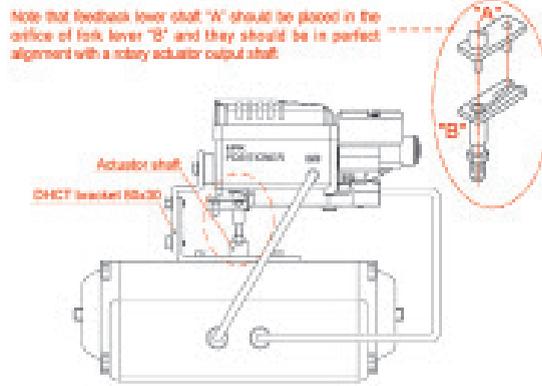
Note:

- 1) 1/2 split range is available for 4-12mA input signal or 12-20mA input signal
- 2) Operating angle can be adjusted to 0~60° or 0~100°
- 3) Temperature option: up to +120°C without feedback options  
up to +85°C without feedback options  
up to -40°C without feedback options

**MOUNTING**

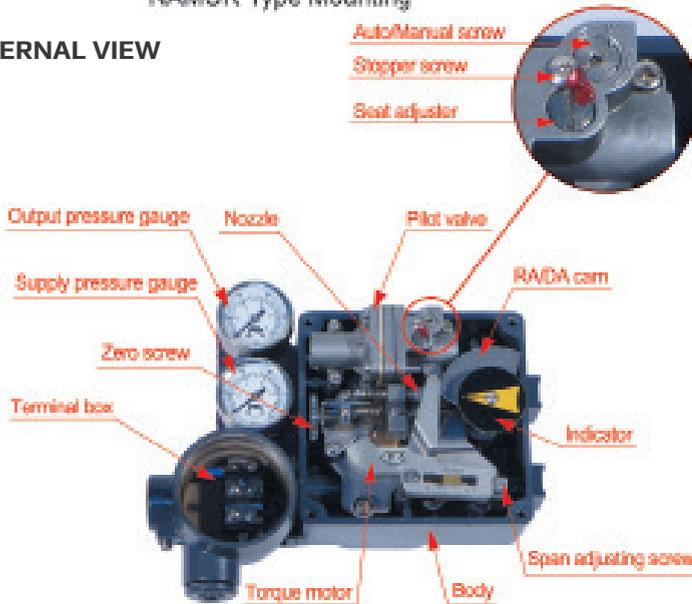


**NAMUR Type Mounting**



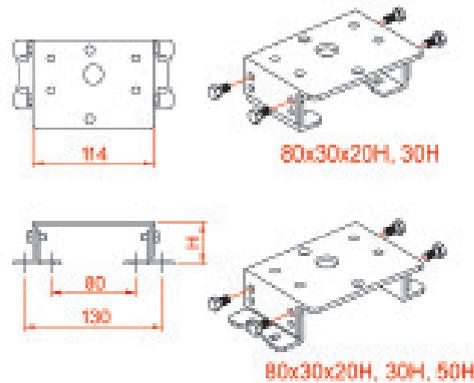
**Fork Lever Type Mounting**

**INTERNAL VIEW**



**MULTI-SIZE BRACKET**

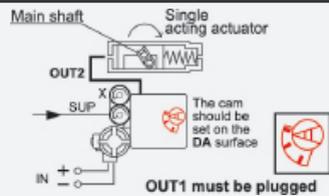
| Type           | H  |
|----------------|----|
| 80 x 30 x 20H  | 41 |
| 80 x 30 x 30H  | 51 |
| 130 x 30 x 20H | 41 |
| 130 x 30 x 30H | 51 |
| 130 x 30 x 50H | 71 |



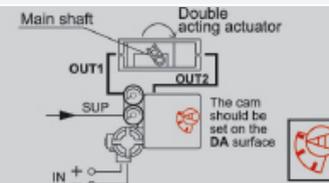
**AIR CONNECTIONS**

**Direct Acting (DA)**

As the input increases, Actuator stem rotates clockwise.

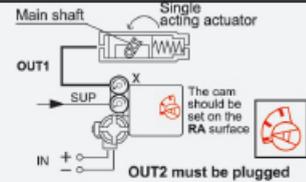


As the input increases, Actuator stem rotates clockwise.

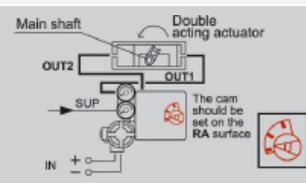


**Reverse Acting (RA)**

As the input signal increases, Actuator stem rotates counter clockwise.

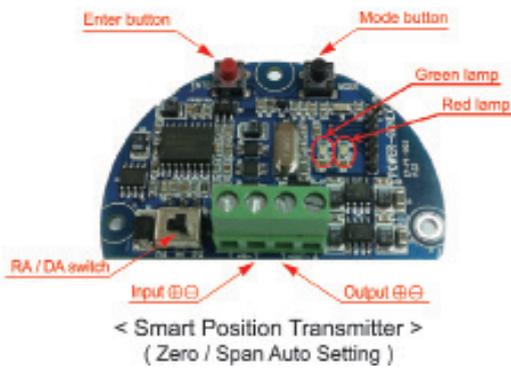
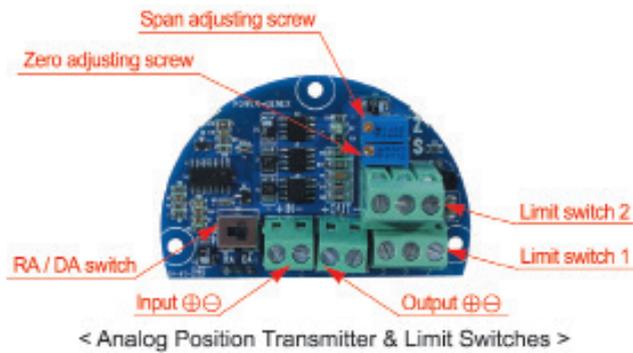


As the input signal increases, Actuator stem rotates counter clockwise.

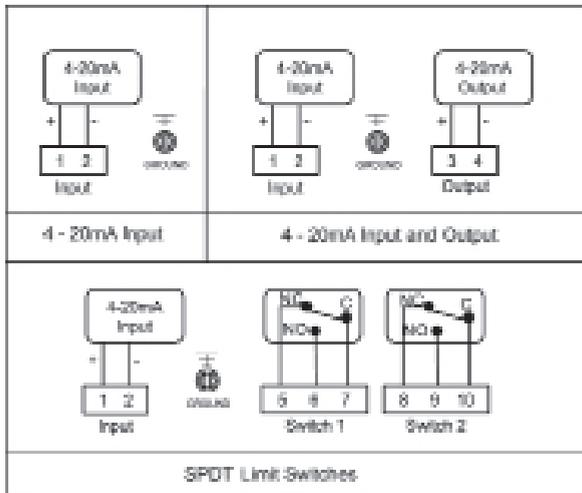


### POSITION TRANSMITTER OPTIONS (BUILT-IN TYPE)

#### 1. Board View



#### 3. Wiring Diagram



#### 4. SPDT Limit Switches

##### a. Specifications

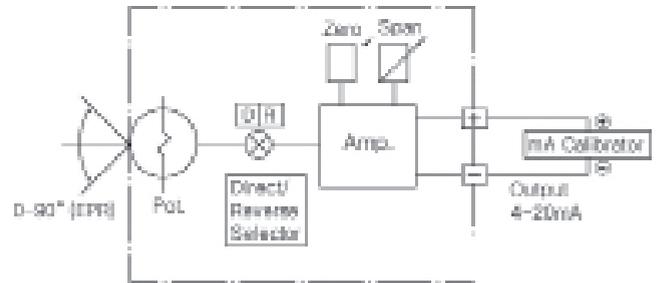
| Contacts   | SPDT Form C   |
|------------|---|
| AC Rating  | 16 A ½ HP 125/250 VAC                                   |
| DC Rating  | 0.6 A 125 VDC / 0.3 A 250 VDC                           |
| Adjustment | Cams with set screws<br>(L-wrench included for setting) |

#### 2. Position Transmitter (4-20mA output signal)

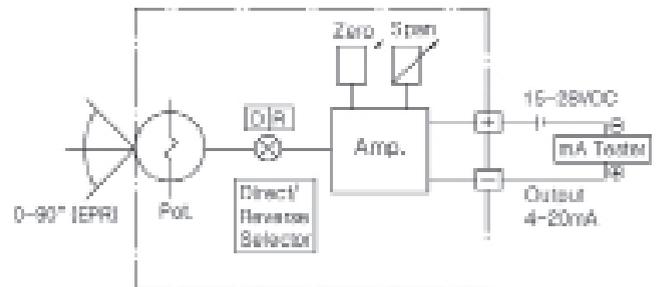
##### a. Specifications

| Power Supply Rating      | 5.5-30 VDC loop power         |
|--------------------------|-------------------------------|
| Recommended Power Supply | 24 VDC                        |
| Output Signal            | 4-20 mA, 2-wire               |
| Operating Temperature    | -20°C ~ +85°C                 |
| Load Impedance           | 0 ~ 600 ohms                  |
| Max. Output              | 30 mA DC                      |
| Linearity                | ± 1.0 %                       |
| Hysteresis               | 1.0 % of full scale           |
| Repeatability            | ±0.5 % of full scale          |
| Adjustment               | Zero and Span in terminal box |

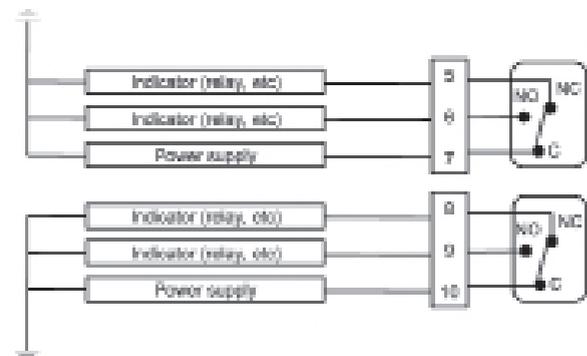
##### b. with mA calibrator



##### c. with multimeter



##### b) Wiring and Application



## HOW TO ORDER

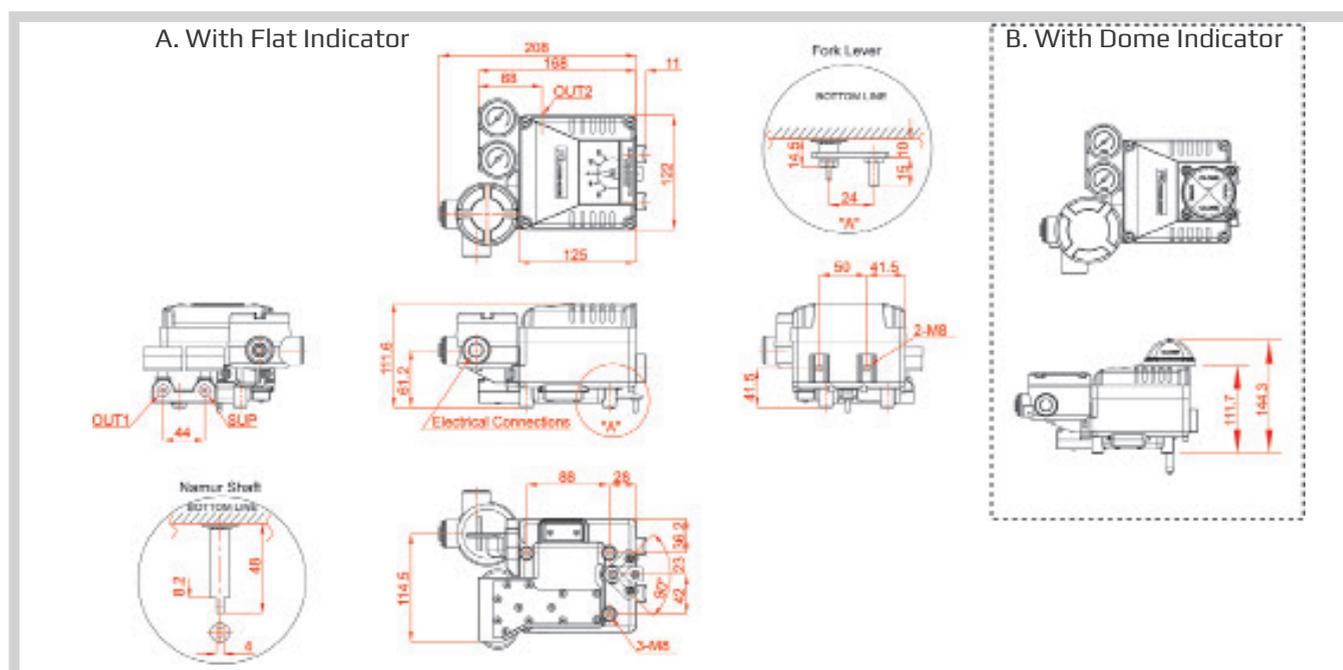
# EPR

|                  |                |                           |                     |                   |                    |                |                 |                  |
|------------------|----------------|---------------------------|---------------------|-------------------|--------------------|----------------|-----------------|------------------|
| Protection Class | Feedback Shaft | Pressure Gauge (SUP, OUT) | Pilot Valve Orifice | Position Feedback | Connection Threads | Dome Indicator | Operating Temp. | Mounting Bracket |
|------------------|----------------|---------------------------|---------------------|-------------------|--------------------|----------------|-----------------|------------------|

| Description   | Code  |
|---|---|
| <b>Protection Class:</b>                                  | F: KC flameproof Ex dmb IIB+H2 T6<br>NEPSI flameproof Ex dmb IIB+H2 T6<br>A: KC flameproof Ex dmb IIC T6/T5<br>D: IECEX flameproof Ex dmb IIC T6<br>I: IECEX intrinsically safe Ex ia IIC T6<br>ATEX intrinsically safe Ex ia IIC T6<br>KC intrinsically safe Ex ia IIC T6<br>W: Weatherproof to IP66 |
| <b>Feedback Shaft:</b>                                    | N: NAMUR shaft (direct mounting)<br>A: Fork lever M6 x 40L<br>B: Fork lever other size on request   |
| <b>Pressure Gauge</b>                                     | 1: 6 bar (90psi)<br>2: 10 bar (150psi)  |
| <b>Pilot Valve Orifice:</b>                               | S: Standard (Actuator volume over 180 cm <sup>3</sup> )<br>M: Small orifice (Ø 1.0 or Ø0.7) (Actuator volume 90~180cm <sup>3</sup> )  |
| <b>Position Feedback:</b><br>(only for weatherproof type) | N:None (standard)<br>O: Analog position transmitter (4~20mA output signal)<br>S: Smart position transmitter (4~20mA output signal)<br>L: 2 x SPDT limit switch<br>P: 2 x proximity sensor P&F NJ2-V3-N<br>M: O + L<br>Q: O + P  |

| Description   | Code   |
|---|--|
| <b>Connection Threads:</b><br>(pneumatic)                     | 3: PT(Rc) ¼<br>4: NPT ¼<br>5: PR(Rc) ¼ - M20 x 1.5   |
| <b>Dome Indicator:</b>  | N: Flat indicator (standard)<br>D: Dome indicator  |
| <b>Operating Temperature:</b><br>(only for weatherproof type) | T: 70°C (standard)<br>H: 120°C (without position feedback option)<br>85°C (with position feedback option)<br>L: -40°C (without position feedback option) |
| <b>Mounting Bracket - NAMUR Shaft Type:</b>                   | N: None<br>R: Multi-size NAMUR bracket for IEC 60534-6-2/VDI/VDE 3845 (130 x 30 x 50 bracket on request)   |
| <b>- Fork Lever Type:</b>                                     | F: PG bracket 80x30 for fork lever type<br>E: Multi-size NAMUR bracket for Fork lever type (130 x 30 x 50 bracket on request)                            |

## DIMENSION SKETCH



# 6

# Pneumatic indicating controllers and transmitters

Series 80

0-6.7.01-C

Page 1 of 2



## APPLICATIONS

For the control of temperature and pressure in industrial or process plants. The indicating controller is used for control of liquid, gaseous or vaporous media. The instrument senses the temperature/pressure of the measured medium directly, displays the operating value, compares the measured variable with the set point and puts out a pneumatic signal in the standard range of 0.2 to 1 bar or 3 to 15 psi. This output pressure actuates the final control element. Four control forms are available: ON-OFF, P, P+I, P+I+D. The units can also be used for remote control of processes operating whether with a pneumatic transmitter (output 0.2-1 bar or 3-15 psi) or as a receiver controller (input 0.2-1 bar, 3-15 psi).

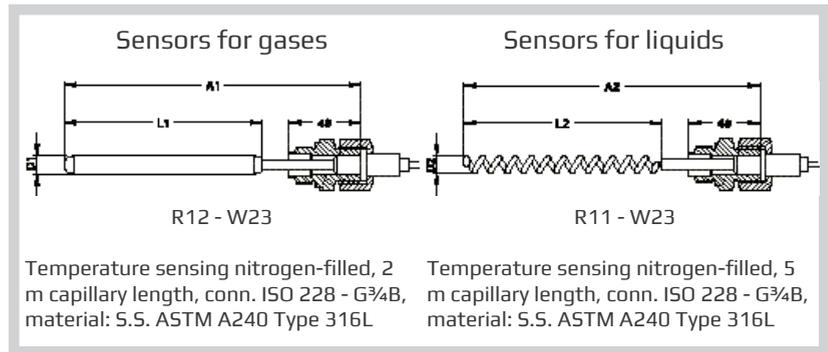
## FEATURES

- Robust design.
- Maintenance free.
- Easy installation.
- User friendly.
- Can be used for remote control of processes.

## TECHNICAL DATA

|  |  |
|--|--|
| <b>Body</b>                            | Die cast aluminium with anti corrosive paint |
| <b>Cover</b>                           | ABS  |
| <b>Degree of protection</b>            | IP55   |
| <b>Mounting</b>                        | Wall or panel                                |
| <b>Pneumatic connections</b>           | ¼" NPT                                       |
| <b>Supply air pressure</b>             | 20±1.5 psi / 1.4 ± 0.1 bar                   |
| <b>Output</b>                          | 3-15 psi / 0.2-1 bar                         |
| <b>Proportional action</b>             | Proportional band ∞...200%                   |
| <b>Integral action</b>                 | >0...>10 rep. /min.                          |
| <b>Derivative action</b>               | 0...>5 min. rep                              |
| <b>Steady state air consumption</b>    | Air supply 20 psi/1,4 bar<br>0,13 Nm³/h      |
| <b>Max. air delivery</b>               | Air supply 20 psi / 1,4 bar<br>2,6 Nm³/h     |
| <b>Accuracy</b>                        | ≤ 1% deviation                               |
| <b>Hysteresis</b>                      | ≤ 0.5%                                       |
| <b>Non linearity</b>                   | ≤ 0.5%                                       |
| <b>Repeatability</b>                   | ≤ 0.5%                                       |
| <b>Control range</b>                   | 0...150 °C                                   |
| <b>Permissible ambient temperature</b> | -20...+ 80 °C                                |
| <b>Weight</b>                          | ~3 kg  |

## TEMPERATURE ELEMENT



| SPAN      | 25 °C | 30 °C | 40 °C | 50 °C | 60 °C | 70 °C | 80 °C | 100 °C | 120 °C | 130 °C | 150 °C | 200 °C | 250 °C | 300 °C | 400 °C | 500 °C |
|-----------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>A1</b> | 250   | 250   | 250   | 200   | 200   | 200   | 200   | 200    | 200    | 200    | 200    | 200    | 200    | 200    | 200    | 200    |
| <b>L1</b> | 170   | 170   | 170   | 120   | 120   | 120   | 120   | 120    | 120    | 120    | 120    | 120    | 120    | 120    | 120    | 120    |
| <b>D1</b> | 13    | 13    | 13    | 13    | 13    | 13    | 13    | 13     | 13     | 13     | 13     | 13     | 13     | 13     | 13     | 13     |
| <b>A2</b> | 250   | 250   | 250   | 200   | 200   | 200   | 200   | 200    | 200    | 200    | 200    | 200    | 200    | 200    | 200    | 200    |
| <b>L2</b> | 170   | 170   | 170   | 130   | 130   | 120   | 120   | 120    | 120    | 120    | 120    | 120    | 120    | 120    | 120    | 120    |
| <b>D2</b> | 16    | 16    | 16    | 16    | 16    | 16    | 14    | 14     | 14     | 14     | 14     | 14     | 14     | 14     | 14     | 14     |

## OPTIONS

- External set point knob
- Box for tropical conditions
- Output signal 6 to 30 psi / 0.4 to 2 bar

Subject to change without notice.



# AW 20K-FO2CE-H

Filter Regulator AW20K

0-6.8.01-C



## DESIGN

Integrated filter and regulator units save space and require less piping. With the backflow function it incorporates a mechanism to exhaust the air pressure in the outlet side reliably and quickly.

## FEATURES

- Space saving and requires less piping
- No manual draining due to auto drain function

## TECHNICAL DATA

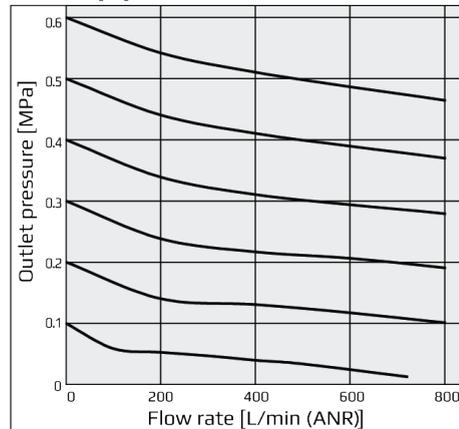
|  |  |                 |
|--|--|-----------------|
| <b>With backflow function</b>          | YES  |                 |
| <b>Thread type</b>                     | G 1/8  |                 |
| <b>Port Size</b>                       | 1/4  |                 |
| <b>Float type auto drain</b>           | Float type auto drain<br>N.C. type-0.1 MPa (AD27)                |                 |
| <b>Pressure gauge</b>                  | Square embedded type<br>pressure gauge (with<br>limit indicator) |                 |
| <b>Body</b>                            | <b>Material</b>  | <b>Color</b>    |
| <b>Bonnet</b>                          | Zinc die-cast  | Platinum Silver |
|  | Polyacetal   | Black           |
| <b>Port Size</b>                       | 1/4  |                 |
| <b>Pressure gauge port size</b>        | 1/8  |                 |
| <b>Fluid</b>                           | Air  |                 |
| <b>Ambient and fluid temperature</b>   | -5 to 60°C   |                 |
| <b>Proof pressure</b>                  | 1.5 MPa  |                 |
| <b>Maximum operating pressure</b>      | 1.0 MPa  |                 |
| <b>Set pressure range</b>              | 0.05 to 0.85 MPa   |                 |
| <b>Relief pressure</b>                 | Set pressure + 0.05 MPa<br>at relief flow rate of 0.1            |                 |
| <b>Nominal filtration rating</b>       |  |                 |
| <b>Drain capacity (cm<sup>3</sup>)</b> | 8  |                 |
| <b>Bowl material</b>                   | Polycarbonate  |                 |
| <b>Optional</b>                        | Replaceable with Nylon bowl part no.<br>AD27-6                   |                 |
| <b>Bowl guard</b>                      | Semi-standard  |                 |
| <b>Construction</b>                    | Relieving type   |                 |
| <b>Mass (kg)</b>                       | 0.32   |                 |
|  | Resistan to oil mist.<br>(AW20K-FO2CEH-6-B)                      |                 |

Subject to change without notice.

## FLOW CHARACTERISTICS

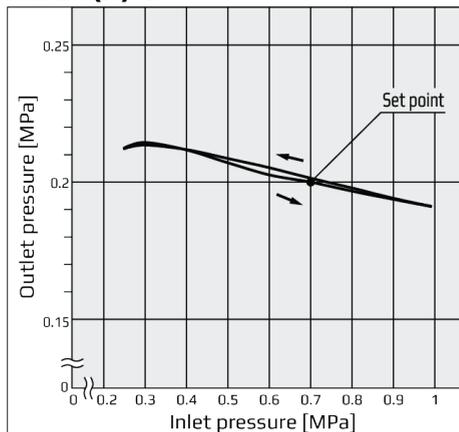
### AW20(K)-B

Rc1/4



## PRESSURE CHARACTERISTICS

### AW20(K)-B



## OPTIONS/PART NO.

Float type auto drain <sup>1,2</sup>

AD27

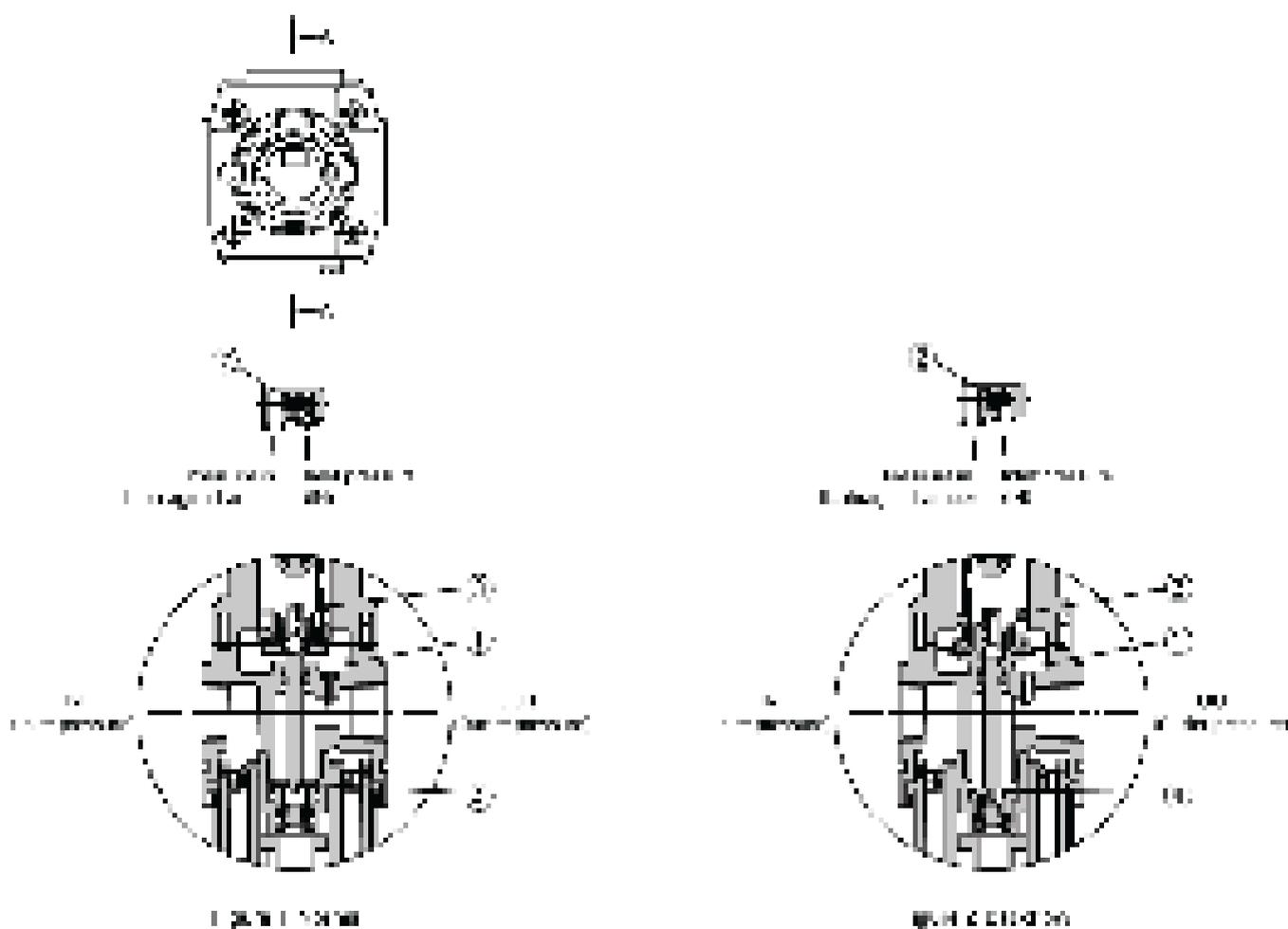
<sup>1</sup> Minimum operating pressure: N.O. type-0.1 MPa; (AD27)

<sup>2</sup> Please consult Clorius Controls for details on drain piping to fit NPT or G port sizes

## WORKING PRINCIPLE

When the inlet pressure is higher than the regulating pressure, check valve (2) closes and operates as a normal regulator (**Figure 1**). When the inlet pressure is shut off and released, check valve (2) opens and the pressure in the diaphragm chamber (1) is released in the inlet side.

This lowers the pressure in diaphragm chamber (1) and the force generated by pressure regulator spring (3) lifts the diaphragm. Valve (4) opens through the stem, and the outlet pressure is released to the inlet side.

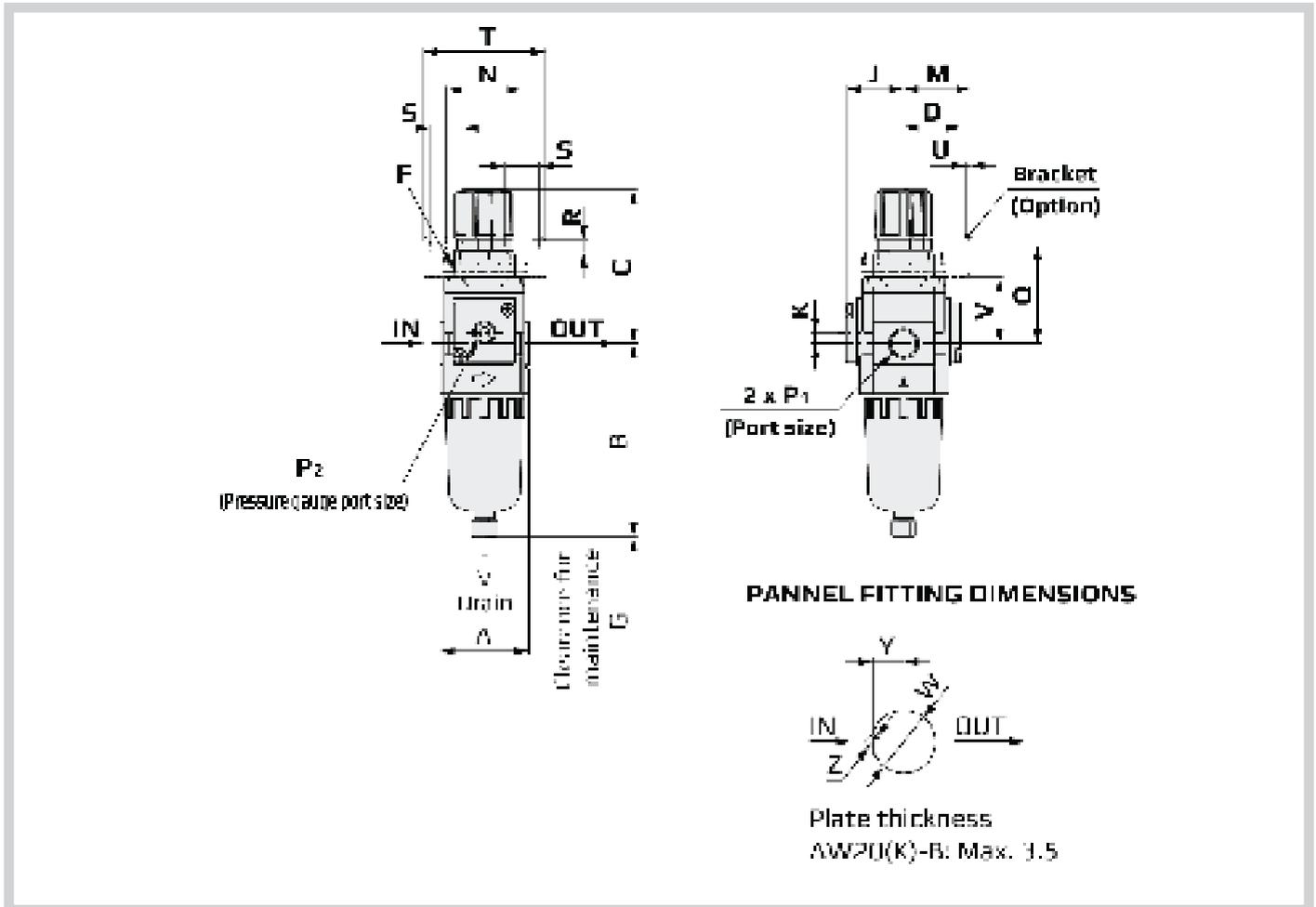


# AW 20K-FO2CE-H

Filter Regulator AW20K

0-6.8.01-C

## DIMENSION SKETCH



| Model | Standard specifications |     |    |         |    |    |   |       |    |    |   |
|-------|-------------------------|-----|----|---------|----|----|---|-------|----|----|---|
|       | P1                      | P2  | A  | B(note) | C  | D  | E | F     | G  | J  | K |
| AW20K | 1/8                     | 1/8 | 40 | 160     | 73 | 26 | - | M28x1 | 40 | 26 | S |

| Model | Standard specifications |    |    |     |      |    |     |             |      |    |   |                     |
|-------|-------------------------|----|----|-----|------|----|-----|-------------|------|----|---|---------------------|
|       | Bracket mount           |    |    |     |      |    |     | Panel Mount |      |    |   | With auto drain     |
|       | M                       | N  | Q  | R   | S    | T  | U   | V           | W    | Y  | Z | B <sup>(note)</sup> |
| AW20K | 30                      | 34 | 44 | 5.4 | 15-4 | 55 | 2.3 | 30          | 28.5 | 14 | 6 | 177                 |

Note) The total length of B dimension is the length when the filter regulator knob is unlocked.

## SPECIFIC PRODUCT PRECAUTIONS

### Maintenance

#### WARNING

1. Replace the regulator when the pressure drop becomes 0.1 MPa

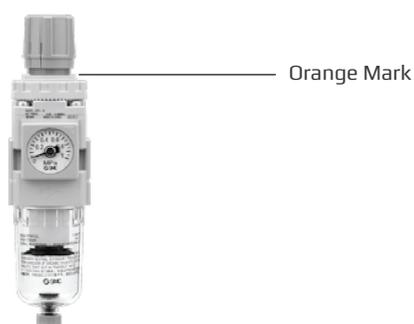
### Mounting and adjusting

#### WARNING

1. Set the regulator while verifying the displayed values of the inlet and outlet pressure gauges. Turning the regulator knob excessively can cause damage to the internal parts.
2. The pressure gauge included with regulators for 0.02 to 0.2 MPa setting is for up to 0.2 MPa use only. Exceeding 0.2 MPa of pressure can damage the gauge.
3. Do not use tools on the pressure regulator knob as this may cause damage. It must be operated manually.

#### CAUTION

1. Be sure to unlock the knob before adjusting the pressure and lock it after setting the pressure. Failure to follow this procedure can cause damage to the knob and the outlet pressure may fluctuate.
  - Pull the pressure regulator knob to unlock. (You can visually verify this with the “orange mark” that appears in the gap.)
  - Push the pressure regulator knob to lock. When the knob is not easily locked, turn it left and right a little and then push it (when the knob is locked, the “orange mark”, i.e. the gap will disappear).



2. A knob cover is available to prevent careless operation of the knob. Refer to page 90 for details.



**UNRIVALED ACCURACY  
& STABILITY**

High-performing and self-acting differential pressure controller which allows for fast installation and easy maintenance. Optimized for flow stability.

# DIFFERENTIAL PRESSURE CONTROLS

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7

**OUR DIFFERENTIAL PRESSURE CONTROLS PROGRAM INCLUDES:**

**TYPE**

TDS  
TD66  
TD56-2  
TDL

# Pressure Differential Controls

Type TD

0-3.9.01-J

Page 1 of 2



TDS



TD66

TD56-2

**Pressure differential controls**, type TD, comprise a control valve, a diaphragm unit and 2 connecting capillaries.

Type TDS is supplied fitted to a brass valve and is available in four size/ range combinations. For further information, see separate data sheet no. 0.3.9.02.

The large controls type TD56-2, TD66-4 and TD66-8 can be used with our wide range of 2-way control valves, in sizes from 4 mm up to 80 mm (type TD56-2M up to DN 150 mm). For quick and accurate valve selection and valve sizing, we advise you to visit our website [www.cloriuscontrols.com](http://www.cloriuscontrols.com) and select our sizing software Quick Choice. TD56-2 is delivered complete with actuator and valve - please see datasheet 0.3.9.06.01.

The diaphragm housings are made of cast iron and the diaphragms of synthetic rubber clamped between 2 steel discs. To prevent the diaphragm from being ruptured, a safety overload spring is fitted between the diaphragm and the valve to prevent damage when subjected to excess pressure, forcing the diaphragm against the housing.

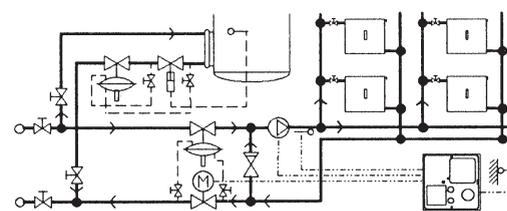
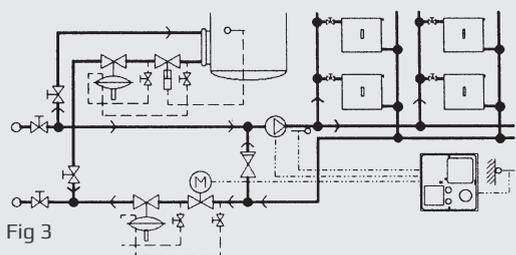
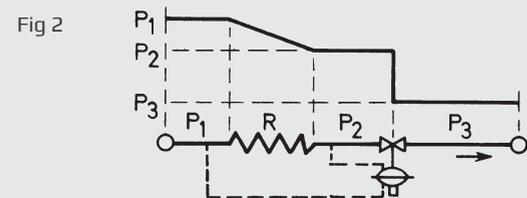
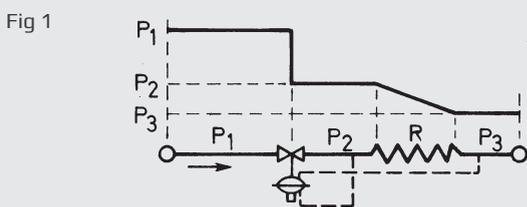
The controls are proportional controls. The proportional band is given as a percentage of set pressure value.

The TD-controls are primarily for use in water systems where they maintain a constant differential pressure across 2 points and ensure stable flow conditions.

With the lower pressure connected to the valve side of the diaphragm and the higher pressure to the other side; the differential pressure across the diaphragm will be balanced by the force exerted by the spring. Any change in the differential pressure will cause the diaphragm and the valve mechanism to move up or down to restore the set condition.

## WORKING PRINCIPLE OF THE TD-CONTROLS

**Fig. 1.** In the control valve the pressure is reduced from P1 to P2, and the control keeps (P2-P3) constant at a set value, although the external pressures "P1" and "P3" or the resistance "R" may be fluctuating. Sizing of the valve is based on the smallest value of (P1-P2) with the maximum flow. For quick and accurate valve selection and valve sizing, we advise you to visit our website [www.cloriuscontrols.com](http://www.cloriuscontrols.com) and select our sizing software Quick Choice. Similarly, **fig. 2** shows the TD-control installed after the resistance "R" (in the return flow). In this case, (P2-P3) forms the basis for sizing the valve.



## APPLICATIONS

### District Heating - in Housing Circuits without by-passes

The function of the TD-controls is to reduce the high and fluctuating pump head in the district heating system to a suitable and, under all circumstances, a constant differential pressure. It is very important that the TD-controls reduce the water flow as much as possible, to satisfy the design temperature drop across radiators and maintain heat output without excessive water flow.

An inexpensive arrangement for a district heating scheme is to use the TD-control instead of a return by-pass to reduce the flow rate to a minimum. This results in small bore pipework and reduces the need for additional pumps or electrically operated controls.

Depending on the circumstances, the TD-controls may be installed in the return main (**fig. 3**) or the flow main (**fig. 4**). Installation in the return main is preferable where there is a risk of air in the system, and in high buildings where the pressure in the return main does not considerably exceed the static head. For low buildings, and high flow pressures, it is normally preferable to install the TD in the flow main to reduce the pressure in the radiators to a level almost equivalent to the static head in the return main. Please also note the TD-control in the district heating circuit of the hot water tank (H.W.T), and that the capillaries are connected across the control valves, maintaining a constant differential pressure across the valves and an optimum control. The H.W.T's control valve should be as

small as possible ensuring a slow heating and a good cooling of the district heating water.

### Pressure Stabilization for Temperature Control

The TD-controls also apply for heating systems with heat exchangers see **fig. 5**. When temperatures have to be kept within close limits e.g. in ventilating plants, control may be difficult if the differential pressure in the system is not constant or is very high. This can be overcome by installing a TD-control in front of one or more places to be controlled. Examples are shown in **fig. 6**, and **7**.

**Fig. 6** is for district heating, direct supply, whereas **fig. 7** is for boiler supply. Note that a by-pass is established by a 3-way valve and a TD control.

The TD-controls can be used with our range of reverse acting valves in by-pass around pumps or across the flow and return pipes of a circuit - see **fig. 8** (boiler supply). This avoids the pump working against a dead head when all the sub-circuits are closed down and stops any bypassing on motorised valves or thermostatic radiator valves.

### Noise Prevention

Noise from central heating installations can often be overcome by TD-controls. The noise arising from a control valve is normally related to the pressure drop across it. Experts recommend that the pressure drop across radiator valves should not exceed 0,08 bar, especially in the case of living room applications. In blocks of buildings with a common district heating station, there has, in recent years, been a tendency to increase the main pump head and this often results in valve noise.

**Fig. 9** shows an example of the circuit to a block of buildings. The TD-control on the take off from the distribution main reduces the high pump head to suit the local pump head. The pressure differential across the TD-controls itself may exceed 2 bar if the distribution pump head is high. In such cases, to avoid noise problems, the TD-controls should be installed well away from living quarters and the immediate pipework should be well muffled.

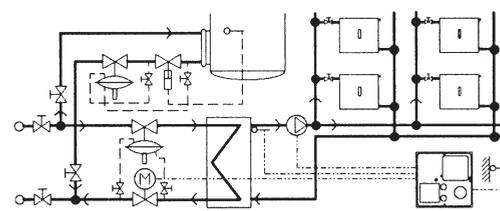


Fig 5

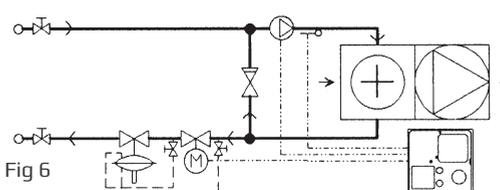


Fig 6

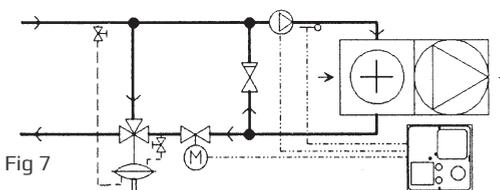


Fig 7

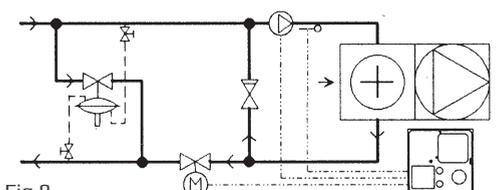


Fig 8

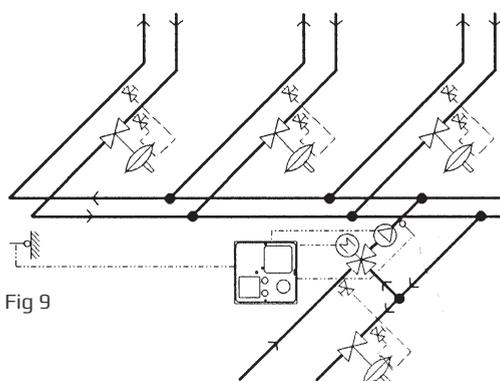


Fig 9

7

# Pressure Differential Controls

Type TDS

0-3.9.02-E

Page 1 of 2



## TECHNICAL DATA

|                     |  |
|---------------------|--|
| <b>Materials:</b>   |  |
| - Valve body        | Hot-pressed brass<br>(W. no. 2.0400-ASTM B283)                   |
| - Seat and cone     | Stainless steel<br>(W. no. 1.4305-AISI 303)                      |
| - Diaphragm housing | Nodular cast iron<br>EN-GJS-400-15<br>(W. no. 0.7040 -ASTM A395) |
| - Diaphragm         | EPDM rubber with<br>web reinforcement<br>(ASTM D2000)            |
| - Capillary         | Copper (ASTM B42) 2x1 m  |
| Type of valve       | Single seated  |
| Flow characteristic | Linear (approx.)   |
| Weight, incl. valve | 2.5 kg   |

## APPLICATIONS

The TDS controllers, which are made in four variants, have the following major applications:

Control of differential pressure, noise and dynamic balance. In individual users circuits and sub-mains within a large distribution network. For example in District Heating or Group Heating networks. Control of by-pass between flow and return where 3-way valves or 2-way zone control valves are installed. To limit volume variations and maximum  $\Delta p$ . Similarly for low water content boilers and devices requiring a minimum circulation irrespective of load conditions. With the addition of a miniature solenoid valve in the impulse connection the valve can also be used to isolate a circuit with respect to time or temperature.

## FUNCTION

The TDS controller can be installed in either the flow or return of the sub-circuits.

The high pressure line is connected to the adjustment side of the diaphragm housing and the low pressure line to the valve body side of the diaphragm. Any change of differential pressure across the diaphragm - which is connected to the valve mechanism - above or below the set point will cause the diaphragm to change its position. If higher than set pressure the valve will move to close, if lower than set pressure the valve will move to open, until the system is once again in balance. Adjustment of the differential pressure setting is made by rotating the adjusting handle clockwise or anticlockwise until the desired set point is reached (see diagram). The upper edge of the adjustment cap in conjunction with the scale marked on the spring guide tube is an indication of the actual setting. The scale moves into or out of the handle loading the valve and diaphragm. The set pressure is shown on a percentage scale in 10% increments.

## DESIGN

The TDS controller is a spring loaded self-acting proportional controller consisting of a valve, a diaphragm and housing and two capillary tubes on either side of the diaphragm.

The valve body, available in DN15 and DN20, is made of hot-pressed brass, and the seat and cone of stainless steel. The diaphragm housing is made of nodular cast iron, and the diaphragm itself is made of EPDM rubber with web reinforcement. If required, the TDS controller adjustment handle can be sealed, preventing unauthorised persons from altering the set point.

## FEATURES

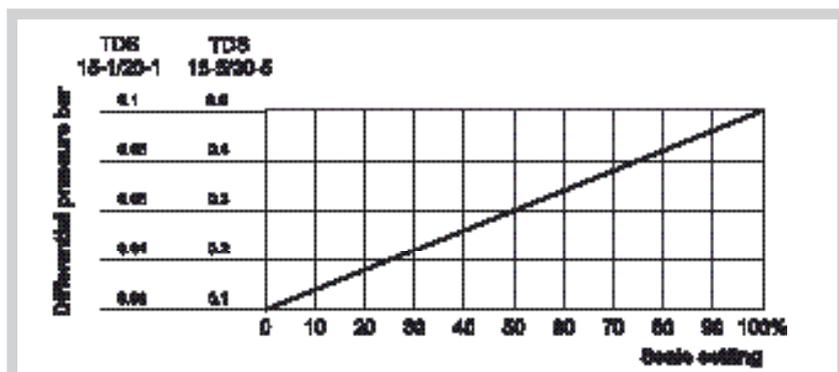
- Good regulating accuracy
- Nominal pressure PN 16
- Max. temperature 150°C
- Self-acting
- Low-noise control.

Subject to change without notice.

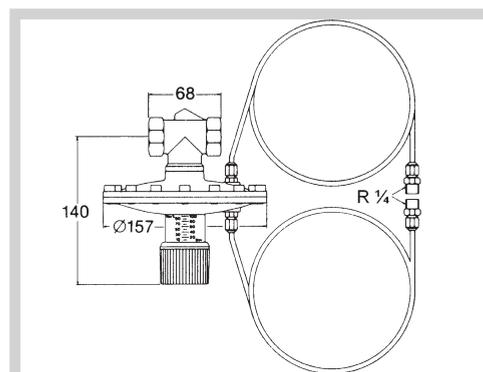
## INSTALLATION

According to the conditions, the TDS controller can be built into either the return pipe or the flow pipe in a suitable position. The diaphragm area is large enough to give a sensitive response to small pressure variations; it is designed to be a compact controller without sacrificing performance.

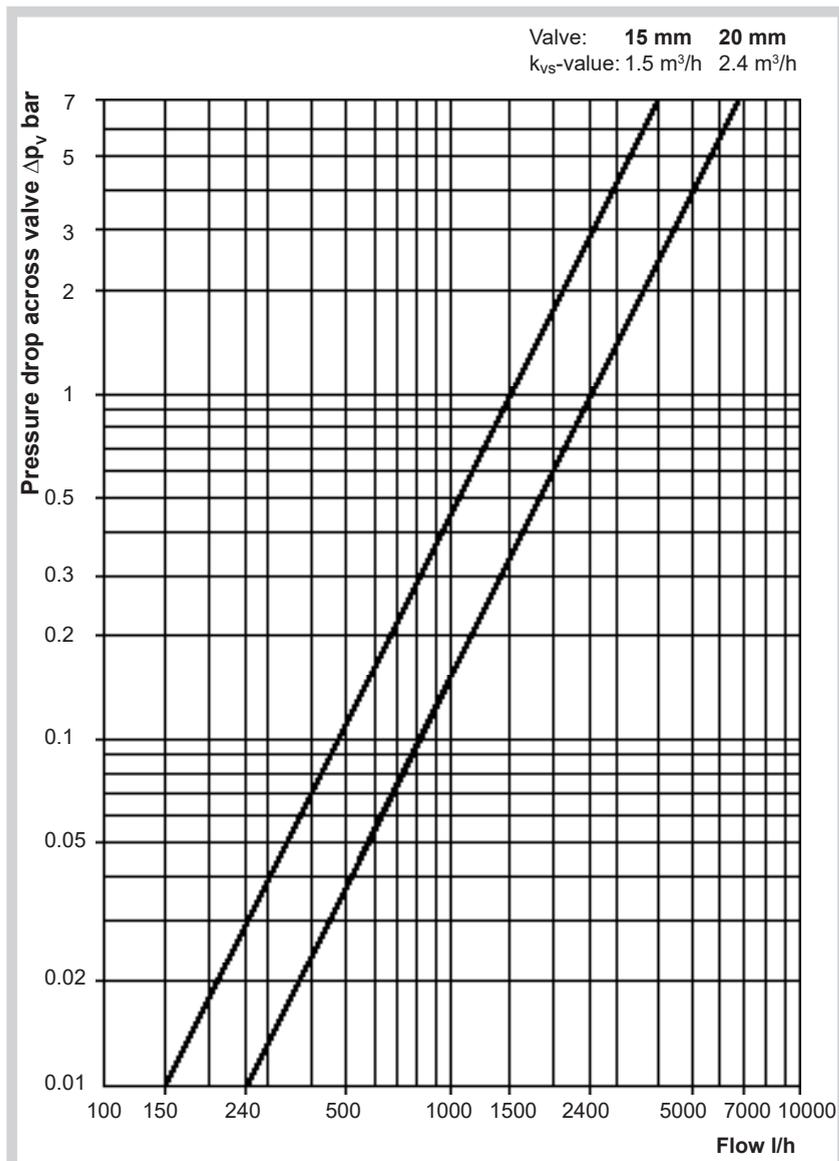
## RELATION BETWEEN SCALE SETTING AND DIFFERENTIAL PRESSURE



## DIMENSION SKETCH



## SIZING CHART



| Type                    | TDS   |                    |   |                    |
|-------------------------|---|--------------------|---|--------------------|
| Setting range bar       | TDS15-1<br>0.02-0.1   | TDS15-5<br>0.1-0.5 | TDS20-1<br>0.02-0.1   | TDS20-5<br>0.1-0.5 |
| Proportional band mbar  | 16  | 80                 | 16  | 80                 |
| Max. thrust on stem N   | 200   |                    | 200   |                    |
| Nom. pressure PN bar    | 16  |                    | 16  |                    |
| Max. rated travel mm    | 7   |                    | 7   |                    |
| Max. temp. of liquid °C | 130 (150) <sup>1)</sup>   |                    | 131 (150) <sup>1)</sup>   |                    |
| Note                    | Incl. hot pressed brass valve, Rp 1/2<br>k vs =1.5, Δp L =7 bar |                    | Incl. hot pressed brass valve, Rp 3/4<br>k vs =2.4, Δp L =7 bar |                    |

The max. pressure against which the controls can close  $\Delta p_L$  depends on the valves and it is stated above. To avoid noise problems it is recommended that the pressure drop across valve  $\Delta p_v$  does not exceed 1 bar in living quarters.

<sup>1)</sup> 150°C - Only if TD controller is installed below the valve.

# Pressure Differential Controller

Type TDL, PN 16, DN 20 – 32 mm

0-3.9.03-E

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                              |   |
|------------------------------|---|
| -Valve body                  | RG5 CuSn5Zn5Pb5-C   |
| -Cone                        | Stainless steel<br>(W.no. 1.4305 – AISI 303)                    |
| -Diaphragm housing           | Nodular cast iron<br>EN-GJS-400-15<br>(W.no.0.7040 – ASTM A395) |
| -Diaphragm                   | EPDM rubber with<br>web reinforcement<br>(ASTM D2000)           |
| -Capillary<br>Pressure stage | 2 pieces of 1 m, Cu<br>PN 16                                    |

## APPLICATIONS

The TDL controllers which are made in 6 variants have the following major applications:

Control of differential pressure, noise and dynamic balance. In individual users circuits and sub-mains within a large distribution network. For example in District Heating or Group Heating networks. Control of by-pass between flow and return where 3 port valves or 2 port zone control valves are installed. To limit volume variations and maximum  $\Delta p$ . Similarly for low water content boilers and devices requiring a minimum circulation irrespective of load conditions. With the addition of a miniature solenoid valve in the impulse connection the valve can also be used to isolate a circuit with respect to time or temperature.

## FUNCTION

The TDL controller can be installed in either the flow or return of the sub-circuits.

The high pressure line is connected to the adjustment side of the diaphragm housing and the low pressure line to the valve body side of the diaphragm.

Any change of differential pressure across the diaphragm – which is connected to the valve mechanism – above or below the set point will cause the diaphragm to change its position. If higher than set pressure the valve will move to close, if lower than set pressure the valve will move to open, until the system is once again in balance.

Adjustment of the differential pressure setting is made by rotating the adjusting handle clockwise or anticlockwise until the desired set point is reached (see diagram). The upper edge of the adjustment cap in conjunction with the scale marked on the spring guide tube is an indication of the actual setting. The scale moves into or out of the handle loading the valve and diaphragm. The set pressure is shown on a percentage scale in 10 % increments.

## FEATURES

- Good regulating accuracy
- Nominal pressure PN 16
- Max. temperature 150°C
- Self-acting

## DESIGN

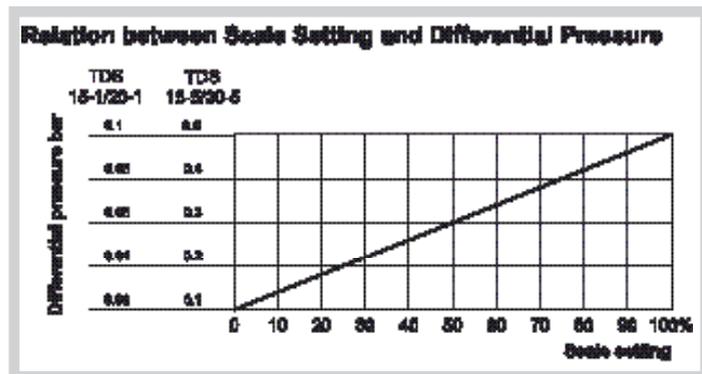
The TDL controller is a self-acting proportional controller consisting of a valve, a diaphragm and housing and two capillary tubes on either side of the diaphragm. The valve body is made of gun metal, and the seat and cone of stainless steel. The diaphragm housing is made of nodular cast iron, and the diaphragm itself is made of EPDM rubber with web reinforcement. If required, the TDL controller adjustment handle can be sealed, preventing unauthorised persons from altering the set point.

Subject to change without notice.

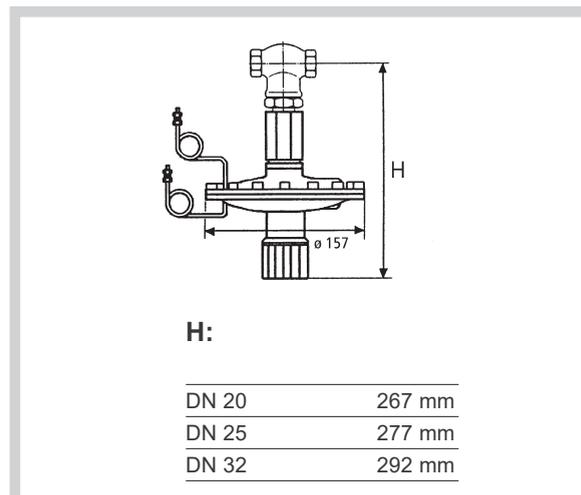
## INSTALLATION

According to the conditions, the TDL controller can be built into either the return pipe or the flow pipe in a suitable position. The diaphragm area is large enough to give a sensitive response to small pressure variations; it is designed to be a compact controller without sacrificing performance.

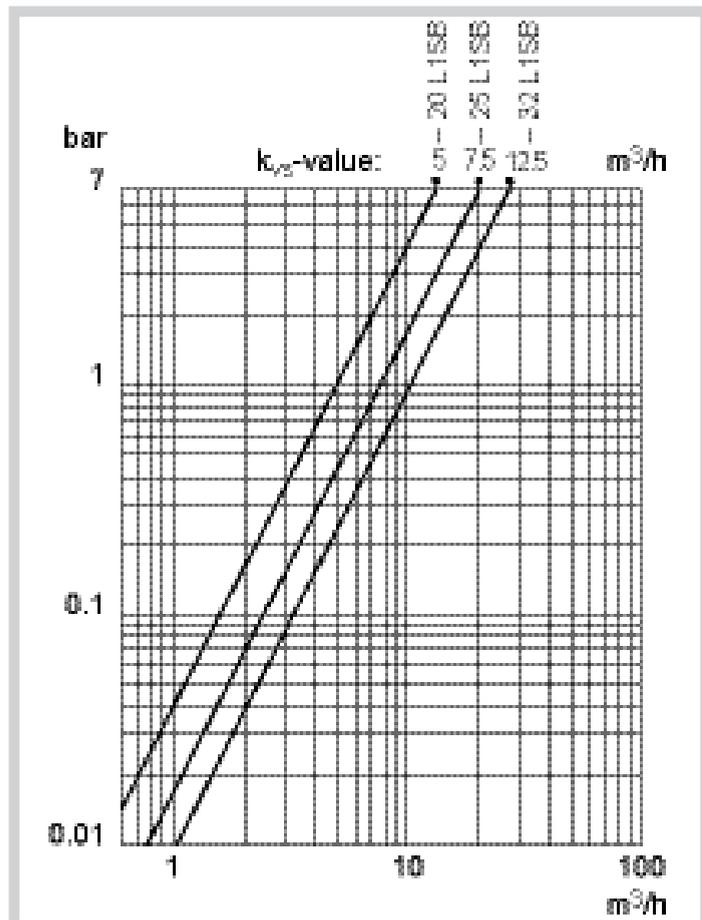
## RELATION BETWEEN SCALE SETTING AND DIFFERENTIAL PRESSURE



## DIMENSION SKETCH



## SIZING CHART



| Type designation  | TDL 1-20-1 | TDL 1-20-5 | TDL 1-25-1 | TDL 1-25-5 | TDL 1-32-1 | TDL 1-32-5 |
|---|------------|------------|------------|------------|------------|------------|
| Valve type  | 20 L15B    | 20 L15B    | 25 L15B    | 25 L15B    | 32 L15B    | 32 L15B    |
| Pressure stage PN 16  | •          | •          | •          | •          | •          | •          |
| Max. temperature 150°C  | •          | •          | •          | •          | •          | •          |
| Max. diff. pressure, $\Delta p$ , across the valve in bar             | 7          | 7          | 7          | 7          | 7          | 7          |
| Overall valve length in mm  | 95         | 95         | 105        | 105        | 138        | 138        |
| $k_{vs}$ -value   | 5          | 5          | 7.5        | 7.5        | 12.5       | 12.5       |
| Setting range in bar  | 0.02-0.1   | 0.1-0.5    | 0.02-0.1   | 0.1-0.5    | 0.02-0.1   | 0.1-0.5    |
| Proportional band 10%   | •          | •          | •          | •          | •          | •          |
| Weight in kg, incl. Valve   | 3.7        | 3.7        | 4          | 4          | 5.3        | 5.3        |
| 2 pcs capillary each 1 m enclosed, connection ISO 7 - R $\frac{1}{4}$ | •          | •          | •          | •          | •          | •          |

# Pressure Differential Controls

Type TD66

0-3.9.04-D

Page 1 of 2



## TECHNICAL DATA

Materials:  
-Diaphragm

EPDM rubber with  
web reinforcement  
(ASTM D2000)

-Capillary  
Pressure stage

2 pieces Cu  
PN 16

**Pressure differential controls**, type TD66, comprise a control valve, a diaphragm unit and 2 connecting capillaries.

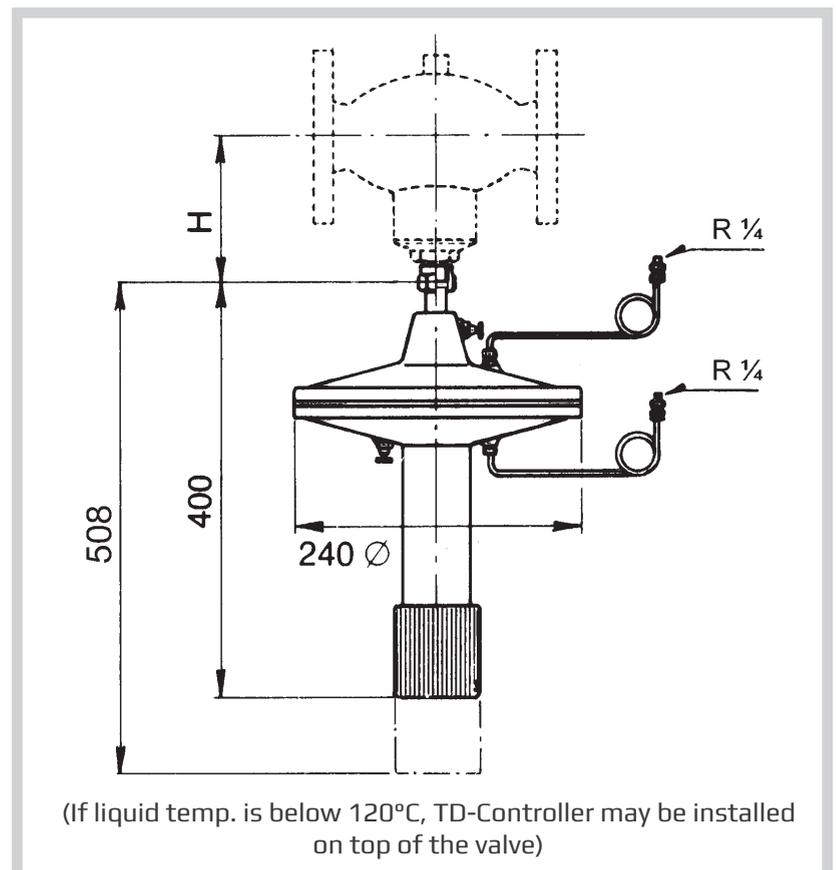
The controls type TD66-4 and TD66-8 can be used with our wide range of 2-way control valves, in sizes from 4 mm up to 80 mm. For further information see technical data and data sheets on individual valves. For quick and accurate valve selection and valve sizing, we advise you to visit our website [www.cloriuscontrols.com](http://www.cloriuscontrols.com) and select our sizing software Quick Choice.

Type TD66 (TD66-4 and -8) is spring loaded and is available in several setting ranges. The differential pressure required is set by turning the handle, the upper edge of which acts as a pointer on the scale.

## FEATURES

- Good regulating accuracy
- Nominal pressure PN 16
- Max. temperature 120°C (150° C dependant on the installation)
- Self-acting

## DIMENSION SKETCH



## TECHNICAL DATA

| Type                 |   | TD66-4                  | TD66-8                  |         |         |          |
|----------------------|---|-------------------------|-------------------------|---------|---------|----------|
| Setting range        | bar   | 0.15-0.3                | 0.15-0.3                | 0.2-0.8 | 0.7-1.3 | 1.35-1.5 |
| Proportional band    |   | 10%                     | 10%                     | 30%     | 30%     | 20%      |
| Max. thrust on stem  | N   | 400                     | 800                     |         |         |          |
| Nom. pressure PN     | bar   | 16 <sup>1)</sup>        | 161)                    |         |         |          |
| Max. rated travel    | mm  | 14                      | 14                      |         |         |          |
| Max. temp. of liquid | °C  | 120 (150) <sup>2)</sup> | 120 (150) <sup>2)</sup> |         |         |          |
| Weight               | kg  | 13                      |                         |         |         |          |
| Note                 | Primarily in connection with double seated valves up to DN 80 mm<br>(Single seated valves only up to DN 25 mm, and not balanced valves - type M1FB, G1FB, H1FB) <sup>3)</sup> |                         |                         |         |         |          |

1) PN is only valid for the diaphragm housing. See also data sheets for the valves.

2) 150°C - Only if TD controller is installed below the valve.

3) Balanced and larger single seated valves only to be selected if an increased variation of the desired diff. pressure  $\Delta p$  is allowable.  
(An increase of the inlet pressure may result in a substantial increase of  $\Delta p$ ).

# Self-acting Differential Pressure Controls

Type TD56-2G (PN 25) and TD56-2M (PN 16), DN 15 – 80 mm

0-3.9.06.01-H

Page 1 of 2



## APPLICATIONS

This unit is designed for controlling of differential pressure in individual users circuits and sub-mains within a large distribution network. For instance in district heating or group heating networks. Control of by-pass between flow and return where 3 way valves or 2 way zone control valves are installed to limit volume variations and maximum  $\Delta p$ . Similarly for low water content boilers and devices requiring a minimum circulation irrespective of load conditions.

## FUNCTION

The medium flows through the free area between the seat and cone in the direction indicated by the arrow on the body.

The high pressure line is connected to the diaphragm housing via **C1** and the low pressure line to the diaphragm housing via **C2**. Any change of differential pressure across the diaphragm which is connected to the valve mechanism – above or below the set point will cause the diaphragm to change its position.

If higher than set pressure the valve will move to close, if lower than set pressure the valve will move to open, until the system is once again in balance. Adjustment of the differential pressure setting is made by rotating the setpoint adjuster clockwise or anticlockwise until the desired set point is reached. The valve cone is pressure balanced. The pressure acts onto the bottom and top surface of the cone at the same time. In this way, the forces produced by the media are compensated.

## DESIGN

The differential pressure control valve is a self-acting unit consisting of a valve, springs, an actuator and two capillary tube connected on the upper and lower side of the actuator. The valve body is made of nodular cast iron. The seat and cone are made of stainless steel. The diaphragm is made of EPDM or NBR rubber, depending on the medium to be controlled.

## FEATURES

- Exact regulating
- Nominal pressure PN 25 / PN 16
- Self-acting
- Easy to install and use

## INSTALLATION

According to the conditions, the TD56-2 can be built into either the return pipe or the flow pipe in a suitable positions. The diaphragm area is large enough to give a sensitive response to small pressure variations.

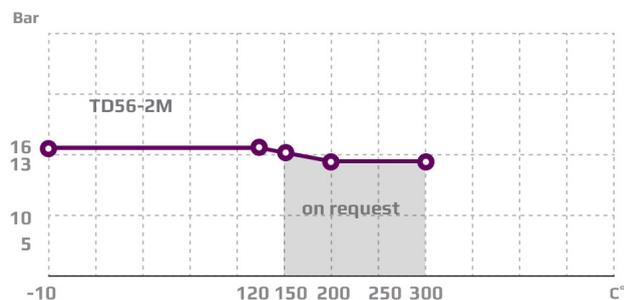
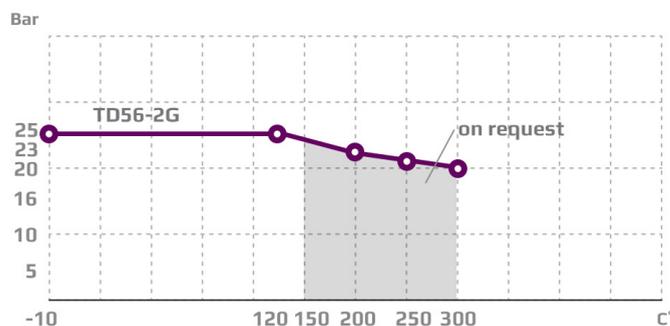
## TECHNICAL DATA

### Materials:

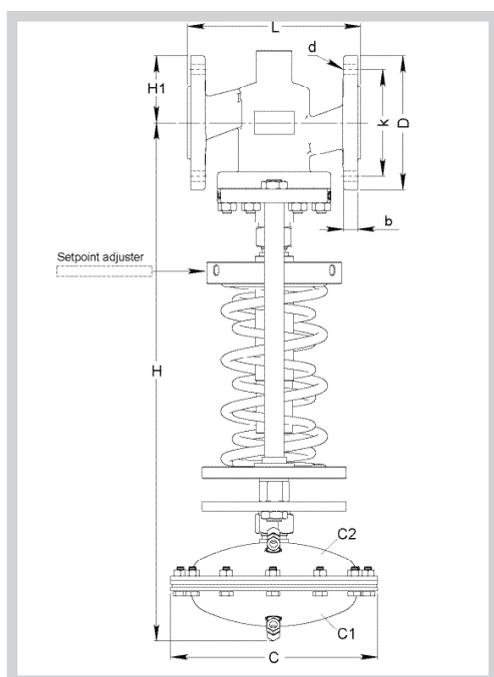
|                                 |                                      |
|---------------------------------|--------------------------------------|
| - TD56-2M valve body            | Nodular cast iron<br>EN-GJS-400-15   |
| - TD56-2G valve body            | Nodular cast iron<br>EN-GJS-400-15   |
| - Cone, Seat                    | Stainless steel                      |
| - O-ring                        | A70H FEPM                            |
| - Bolts, nuts                   | 24 CrMo 4/A4                         |
| - Stag bolt, Set point adjuster | St. 42, 1.0503<br>Electroplated      |
| - Spindle housing               | St. 42, 1.0503<br>Electroplated      |
| - Spring                        | W. Nr. 1.4568 powder coated          |
| - Diaphragm housing             | Steel 1.0122                         |
| - Diaphragm                     | NBR / EPDM                           |
| Nominal pressure                | TD56-2G - 25 bar<br>TD56-2M - 16 bar |
| Seating                         | Single-seated                        |
| Flow characteristic             | Quadratic                            |
| Leakage rate                    | $\leq 0.05\%$ of Kvs                 |
| Flanges drilled according to:   |                                      |
| - TD56-2G                       | EN 1092-2 PN 25                      |
| - TD56-2M                       | EN 1092-2 PN 16                      |
| Counter flanges                 | DIN 2634                             |
| Colour (valve body, cover):     |                                      |
| - TD56-2G                       | Gray                                 |
| - TD56-2M                       | Grey                                 |

Subject to change without notice.

## PRESSURE/TEMPERATURE DIAGRAM



## DIMENSION SKETCH



| Type         | L mm | H mm | H1 mm | C mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) |
|--------------|------|------|-------|------|------|-------------|-------------|--------------------|
| 15 TD56-2G/M | 130  | 582  | 60    | 220  | 14   | 95          | 65          | 14x(4)             |
| 20 TD56-2G/M | 150  | 595  | 65    | 220  | 16   | 105         | 75          | 14x(4)             |
| 25 TD56-2G/M | 160  | 601  | 70    | 220  | 16   | 115         | 85          | 14x(4)             |
| 32 TD56-2G/M | 180  | 618  | 75    | 220  | 18   | 140         | 100         | 19x(4)             |
| 40 TD56-2G/M | 200  | 630  | 85    | 220  | 19   | 150         | 110         | 19x(4)             |
| 50 TD56-2G/M | 230  | 660  | 95    | 220  | 19   | 165         | 125         | 19x(4)             |
| 65 TD56-2G/M | 290  | 685  | 110   | 220  | 20   | 185         | 145         | 19x(8)             |
| 80 TD56-2G/M | 310  | 708  | 155   | 220  | 20   | 200         | 160         | 19x(8)             |

## SPECIFICATIONS

| Type                 | Flange connection DN in mm | $k_{vs}$ -value $m^3/h$ | Lifting height mm | Weight kg |
|----------------------|----------------------------|-------------------------|-------------------|-----------|
| 15 TD56-2G/M         | 15                         | 4                       | 7.5               | 21        |
| 20 TD56-2G/M         | 20                         | 6,3                     | 7.5               | 23        |
| 25 TD56-2G/M         | 25                         | 10                      | 9                 | 24        |
| 32 TD56-2G/M         | 32                         | 16                      | 10                | 27        |
| 40 TD56-2G/M         | 40                         | 25                      | 11                | 29        |
| 50 TD56-2G/M         | 50                         | 35                      | 11.5              | 33        |
| 65 TD56-2G/M         | 65                         | 58                      | 14.5              | 38        |
| 80 TD56-2G/M         | 80                         | 80                      | 16                | 55        |
| <b>Set point</b> bar | 0.4-0.8                    | 0.6-1.5                 | 1-2.5             | 2-5       |



**RUGGET DEPENDABILITY  
& SUPERIOR PERFORMANCE**

Premium and self-acting pressure reducing valve, ideal for maintaining accurate downstream pressure while responding quickly and effectively.



# PRESSURE REDUCING VALVES

---

**OUR PRESSURE REDUCING VALVE PROGRAM INCLUDES:**

**TYPE**

G1PR  
H1PR

# Pressure Reducing Valves

Type G1PR (PN 25) and H1PR (PN 40), DN 15 – 80 mm

0-3.9.08-K

Page 1 of 2



## TECHNICAL DATA

### Materials:

|                                 |                                    |
|---------------------------------|------------------------------------|
| - H1PR valve body               | Cast steel<br>GP240GH (GS-C25)     |
| - G1PR valve body               | Nodular cast iron<br>EN-GJS-400-15 |
| - Cone, Seat                    | Stainless steel                    |
| - O-ring                        | A70H FEPM                          |
| - Bolts, nuts                   | 24 CrMo 4/A4                       |
| - Stag bolt, Set point adjuster | St. 42, 1.0503<br>Electroplated    |
| - Spindle housing               | St. 42, 1.0503<br>Electroplated    |
| - Spring                        | W. Nr. 1.4568 powder coated        |
| - Diaphragm housing             | Steel 1.0122                       |
| - Diaphragm                     | NBR / EPDM                         |
| Nominal pressure                | PN 25 - G1PR<br>PN 40 - H1PR       |
| Seating                         | Single-seated                      |
| Flow characteristic             | Quadratic                          |
| Leakage rate                    | $\leq 0.05\%$ of Kvs               |
| Flanges drilled according to:   |                                    |
| - H1PR                          | EN 1092-1 PN 40                    |
| - G1PR                          | EN 1092-2 PN 25                    |
| Counter flanges                 | "G" DIN 2634<br>"H" DIN 2635       |
| Colour (valve body, cover):     |                                    |
| - H1PR                          | Gray                               |
| - G1PR                          | Gray                               |

## APPLICATIONS

This unit is designed for maintaining the pressure downstream of the valve to an adjusted set point value.

## FUNCTION

The medium flows through the free area between the seat and cone in the direction indicated by the arrow on the body.

The position of the valve cone determines the flow rate and consequently the pressure ratio across the valve. The downstream pressure is transmitted through the compensation chamber and the capillary to the diaphragm, where it is converted into a positioning force. This positioning force is adjusting the cone with dependence on the force of the operating springs. The spring force can be adjusted by using the setpoint adjuster. The valve cone is pressure balanced. The pressure acts onto the bottom and top surface of the cone at the same time. In this way, the forces produced by the media are compensated.

## DESIGN

The pressure reducing valve is a self-acting unit consisting of a valve, springs, an actuator and one capillary tube connected on the upper side of the actuator. The valve body is made of nodular cast iron or cast steel. The seat and cone are made of stainless steel. The diaphragm is made of EPDM or NBR rubber, depending on the medium to be controlled.

## FEATURES

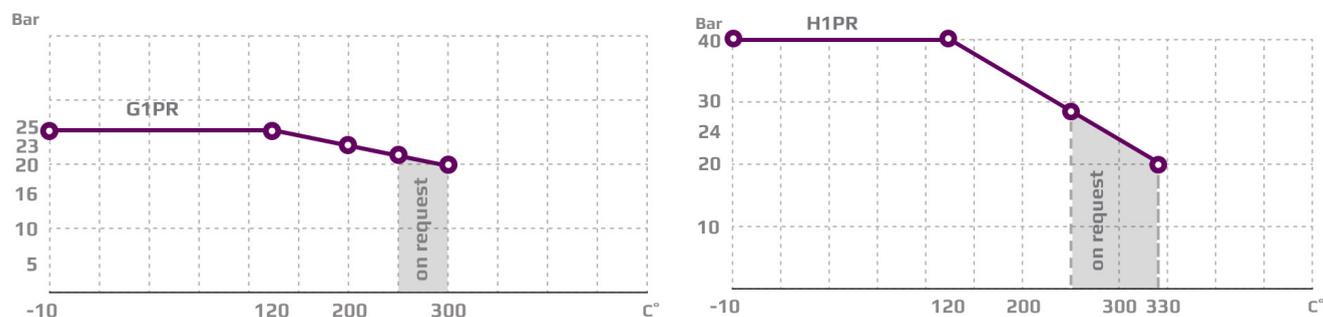
- Exact regulating
- Nominal pressure PN 25 / PN 40
- Self-acting
- Easy to install and use

## INSTALLATION

The pressure reducing valve must be installed in a horizontal pipe with the actuator directed downwards. The flow through the valve must coincide with the arrow on the valve body.

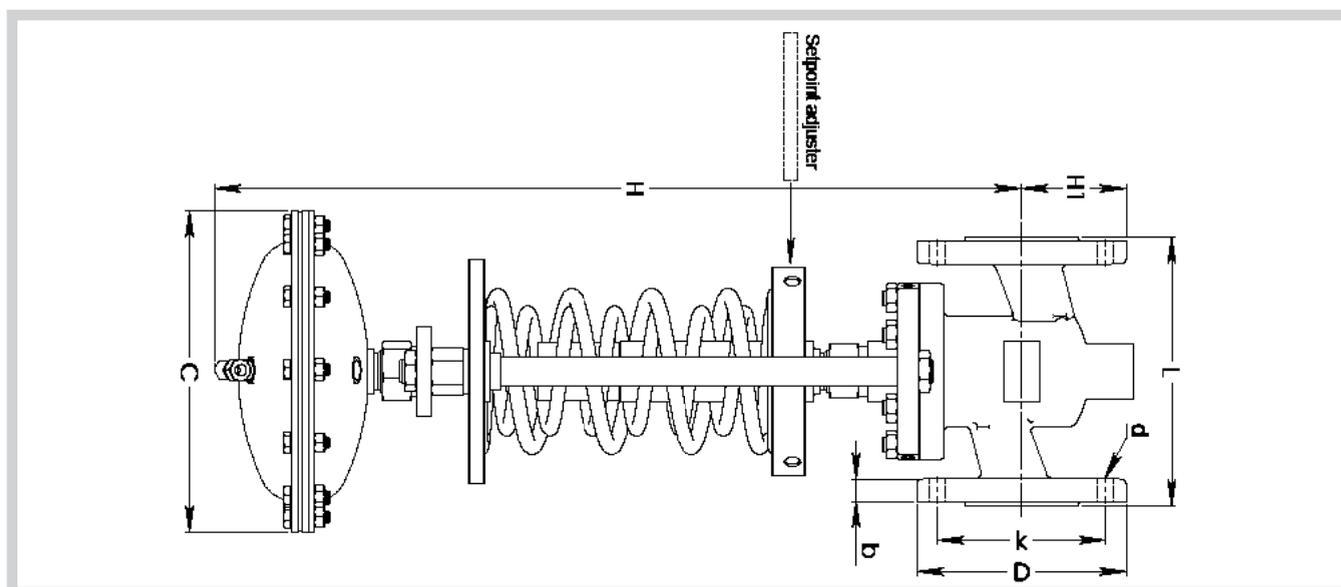
Subject to change without notice.

## PRESSURE/TEMPERATURE DIAGRAM



\*For temperature above 100°C a compensation chamber is needed.

## DIMENSION SKETCH



## SPECIFICATIONS

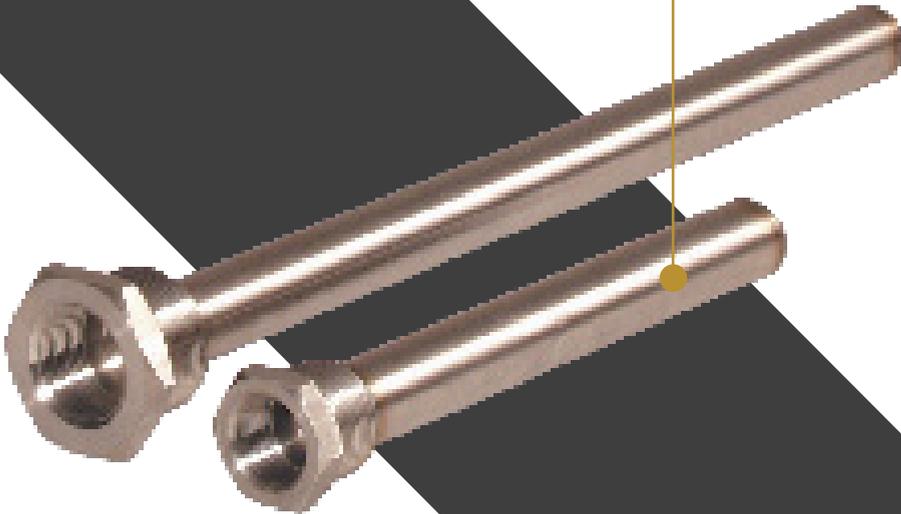
| Type      | L mm | H1 mm | H mm | C mm | b mm | D (dia.) mm | k (dia.) mm | d mm dia. (number) | Flange connection DN in mm | k <sub>vs</sub> -value m <sup>3</sup> /h | Lifting height mm | Weight kg |
|-----------|------|-------|------|------|------|-------------|-------------|--------------------|----------------------------|--|-------------------|-----------|
| 15 G/H1PR | 130  | 60    | 582  | 220  | 14   | 95          | 65          | 14x(4)             | 15                         | 4  | 7,5               | 21        |
| 20 G/H1PR | 150  | 65    | 595  | 220  | 16   | 105         | 75          | 14x(4)             | 20                         | 6,3                                      | 7,5               | 23        |
| 25 G/H1PR | 160  | 70    | 601  | 220  | 16   | 115         | 85          | 14x(4)             | 25                         | 10                                       | 9                 | 24        |
| 32 G/H1PR | 180  | 75    | 618  | 220  | 18   | 140         | 100         | 19x(4)             | 32                         | 16                                       | 10                | 27        |
| 40 G/H1PR | 200  | 85    | 630  | 220  | 19   | 150         | 110         | 19x(4)             | 40                         | 25                                       | 11                | 29        |
| 50 G/H1PR | 230  | 95    | 660  | 220  | 19   | 165         | 125         | 19x(4)             | 50                         | 35                                       | 11,5              | 33        |
| 65 G/H1PR | 290  | 110   | 685  | 220  | 20   | 185         | 145         | 19x(8)             | 65                         | 58                                       | 14,5              | 38        |
| 80 G/H1PR | 310  | 155   | 708  | 220  | 20   | 200         | 160         | 19x(8)             | 80                         | 80                                       | 16                | 55        |

| SET POINT | bar | 0.4-1.2 | 1-2.5 | 2,5 | 4-10 |
|-----------|-----|---------|-------|-----|------|
|-----------|-----|---------|-------|-----|------|

Maximum allowable differential pressure is 25 bar.

**VALVE ACCESSORIES**  
FOR A WIDE VARIETY OF REQUIREMENTS

High quality accessories for a variety of Clorius Controls products



# ACCESSORIES

## OUR ACCESSORIES PROGRAM INCLUDES:

### MODEL

TEMPERATURE SENSORS  
TYPE M-F821A, G-F821C, H-F821F  
SENSOR POCKETS  
SAFETY SETS  
COOLING UNITS  
MANUAL ADJUSTING DEVICE  
SPACER CONCEPT

### TYPE

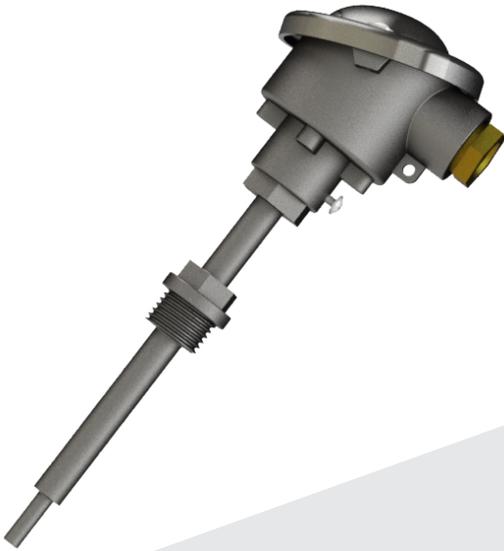
1XPT100, 2XPT100  
EPL, EPR  
FOR CLORIUS V-THERMOSTATS  
SM6  
KS-4, KS-5  
FOR CLORIUS V-THERMOSTATS  
FOR CLORIUS CONTROL VALVES

# Temperature sensors

Type FF12-2, FF12 - 4 -20mA and FF15-2, FF15-2 -4-20mA for electronic temperature regulation

0-4.25.01-C

Page 1 of 3



## TECHNICAL DATA

### DATA FOR POCKETS

According to PN-EN 60751

Material: 1.4404-316L

|                                    |                            |
|------------------------------------|----------------------------|
| Connection thread G:               | ½" BSP, ½" NPT             |
| Permissible torque moment:         | 50 Nm                      |
| Permissible flow velocities:       |                            |
| -Air:                              | 25 m/s                     |
| -Hot steam:                        | 25 m/s                     |
| -Water:                            | 3 m/s                      |
| Reaction times at liquid velocity: |                            |
| -0.4 m/sec:                        | t 1/2: 7,5s                |
|                                    | t 9/10: 21s                |
|                                    | t = total temperature step |

|                   |        |
|-------------------|--------|
| Max. pressure:    | 50 bar |
| Max. temperature: | 260°C  |

|                      |      |
|----------------------|------|
| Weight incl. insert: | 1 kg |
|----------------------|------|

### DATA FOR MEASURING INSERT

According to PN-EN 60751

|                       |                              |
|-----------------------|------------------------------|
| Measuring range:      | -50°C to + 260°C             |
| Measuring resistance: | 1 x Pt 100 Ω or 2 x Pt 100 Ω |
| Max. temperature:     | 260°C                        |

Insulation resistance between measuring resistance and insert tube is over 1000 MΩ at room temperature. The insert is made of stainless steel.

|                |      |
|----------------|------|
| Spring travel: | 8 mm |
|----------------|------|

|   |            |
|---|------------|
| Two-core coupling<br>Resistance of inner cables for supply and return line of the measuring insert: | < 0.07 Ω/m |
|---|------------|

|                         |         |
|-------------------------|---------|
| Weight of loose insert: | 0.06 kg |
|-------------------------|---------|

### DATA FOR CONNECTION HEAD

|                                  |                   |
|----------------------------------|-------------------|
| According to PN-EN 60751, form B |                   |
| Material:                        | Light-alloy metal |
| Seal:                            | IP 65             |
| Ambient temperature:             | max. 100°C        |
| Cable Gland:                     | M20x1,5           |

## APPLICATIONS

The temperature sensors are used for registration of temperatures in tubes, tanks and piping. The output signal of the sensor is used as reference for our ER2022 and ER3000 regulators.

The FF12-2 and FF15-2 with 4-20mA is equipped with a built-in 2-wire transmitter with 4-20 mA output signals.

Due to small installation dimensions and internationally widespread measuring element the sensor is especially fitted for marine purposes, just as the applications on land are innumerable.

## DESIGN

The sensor consists of a pocket, a connection head and a measuring insert. The pocket is constructed of acid proof steel and can stand temperature/pressure as stated in the diagram. The connection head is made of light-alloy metal and complies with IP 65. The measuring insert contains one or two measuring windings and are exchangeable. The supply lines of the measuring insert are insulated from each other and from the insert tube with a ceramic insulator. Exchangeable measuring insert is mounted in the connection head by means of two spring loaded screws. This means that the measuring insert is always pressed towards the bottom of the pocket, and vibrations from the surroundings will not be transferred to the measuring insert, just like different heat evolutions of pocket and measuring insert are adjusted. Our standard types are shown in the below diagram.

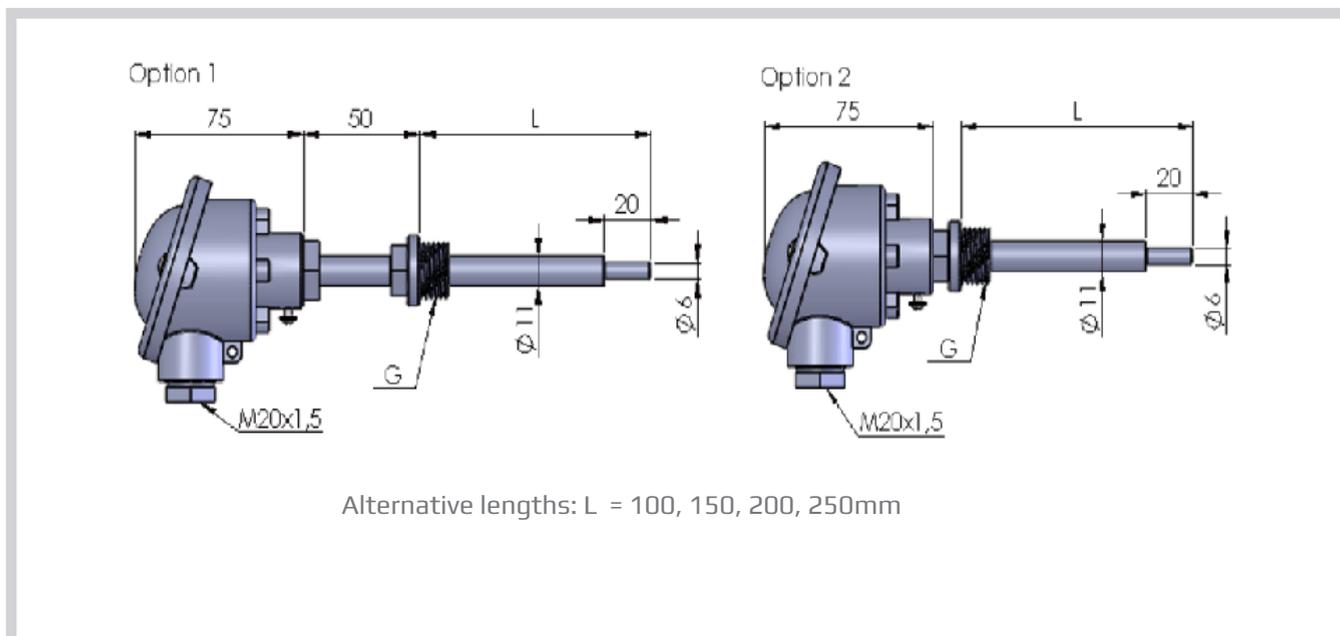
## FEATURES

- Resistance sensor Pt 100 Ω/0°C.
- Standardized design according to PN-EN 60751
- Robust and reliable sensor for use in gaseous and liquid media,
- For medium temperature up to 260°C.
- For pressures up to 50 bar.
- Internationally recognized for marine purposes
- To be used together with ER regulators type ER2022.  
See [www.cloriuscontrols.com](http://www.cloriuscontrols.com) for further information.

## STANDARD TYPES

| Type            | Measuring | Comments                           |
|-----------------|-----------|------------------------------------|
| FF12-2          | 1 x Pt100 | With exchangeable measuring insert |
| FF12-R          |           | Measuring insert for FF 12-2       |
| FF15-2          | 2 x Pt100 | With exchangeable measuring insert |
| FF15-R          |           | Measuring insert for FF 12-2       |
| FF 12-2, 4-20mA | 4-20mA    | With exchangeable measuring insert |

**DIMENSION SKETCH**

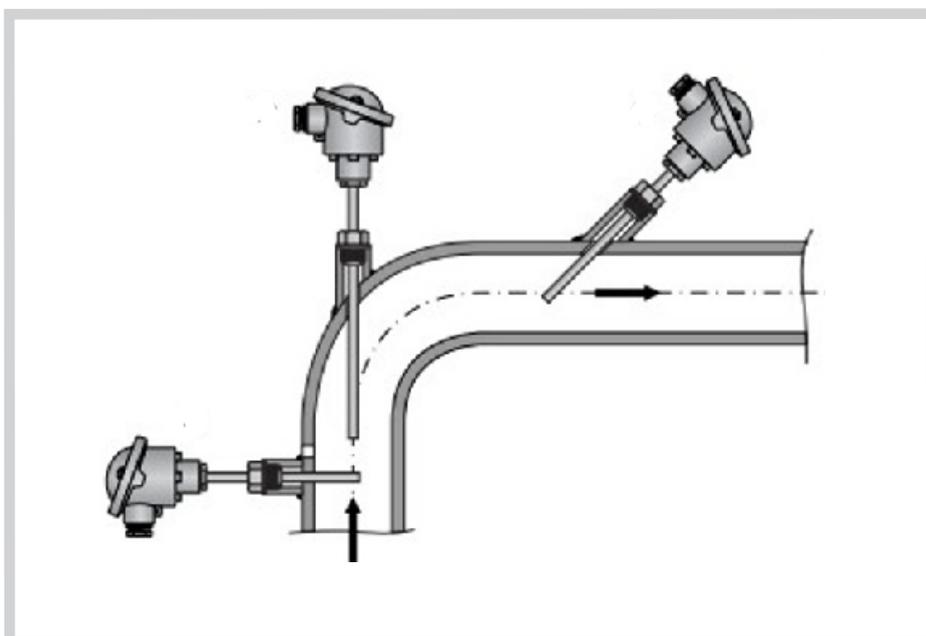


**RECOMMENDATIONS REGARDING INSTALLATION OF TEMPERATURE SENSORS IN WATER SYSTEMS**

We recommend that the temperature sensors should be installed after a straight pipe. Pipe length should be 3 to 5 times the pipe diameter, especially after pump installation.

When installing the Temperatures sensors please always follow the instruction given in the Clorius installation instruction no. 99.209.01.

**EXAMPLES OF MOUNTING POSITIONS**



# Temperature sensors

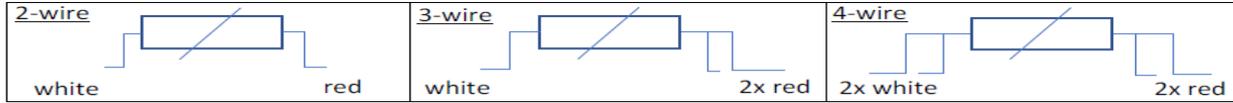
Type FF12-2, FF12 - 4 -20mA and FF15-2, FF15-2 -4-20mA for electronic temperature regulation

0-4.25.01-C

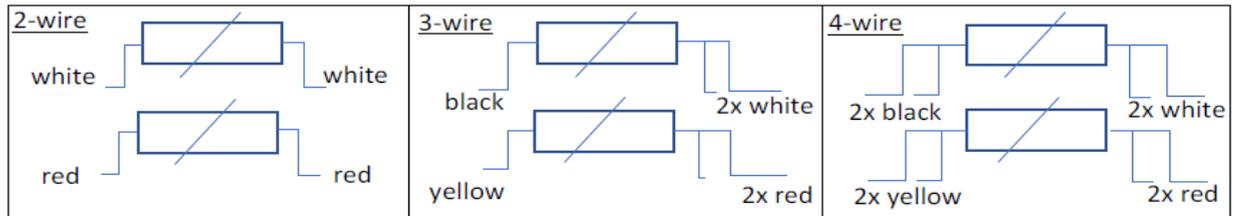
Page 3 of 3

## PT100 - WIRING DIAGRAM

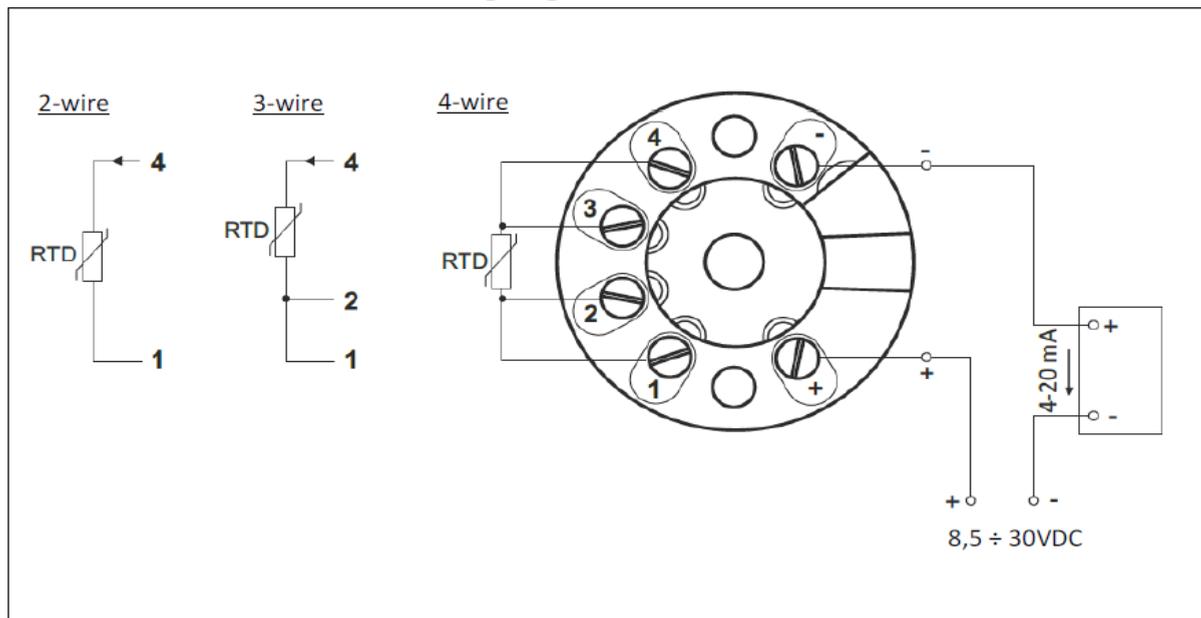
### 1 x PT100



### 2 x PT100



### PT100 with transmitter 4-20mA - wiring diagram



Subject to change without notice.



# Y strainers

Type M-F821A, G-F821C and H-F821F

O-8.1.11-E

Page 1 of 2



## TECHNICAL DATA

Face-to-face dimension according to EN 558-1 series 1  
Flanges drilled according to EN 1092-1 for body material F (H-F821F)  
Flanges drilled according to EN 1092-2 for body material A (M-F821A), C (G-F821C)  
Closing tightness acc. EN 12266-1

## APPLICATIONS

Saturated steam, water, oil, air and other compatible fluids.

## DESCRIPTION

The Y strainers are applicable to all types of steam, water, oil and air systems. Their purpose is to protect traps, regulating valves, piping, etc. from dirt which often cause damage and consequently energy loss in fluid systems. Connections are flanged.

## INSTALLATION

Horizontal or vertical downstream installation.

## FEATURES

- Screen made of stainless steel
- Compact settlement
- Environment-friendly
- Cleaning of screen without disassembling

## SPECIFICATIONS

| Type    | Body material        | Nominal pressure PN bar | Nominal diameter DN mm | Max temperature °C |
|---------|----------------------|-------------------------|------------------------|--------------------|
| M-F821A | A: Grey cast iron    | 16                      | 15-200                 | 300                |
| G-F821C | C: Nodular cast iron | 25                      |                        | 350                |
| H-F821F | F: Cast steel        | 40                      |                        | 400                |

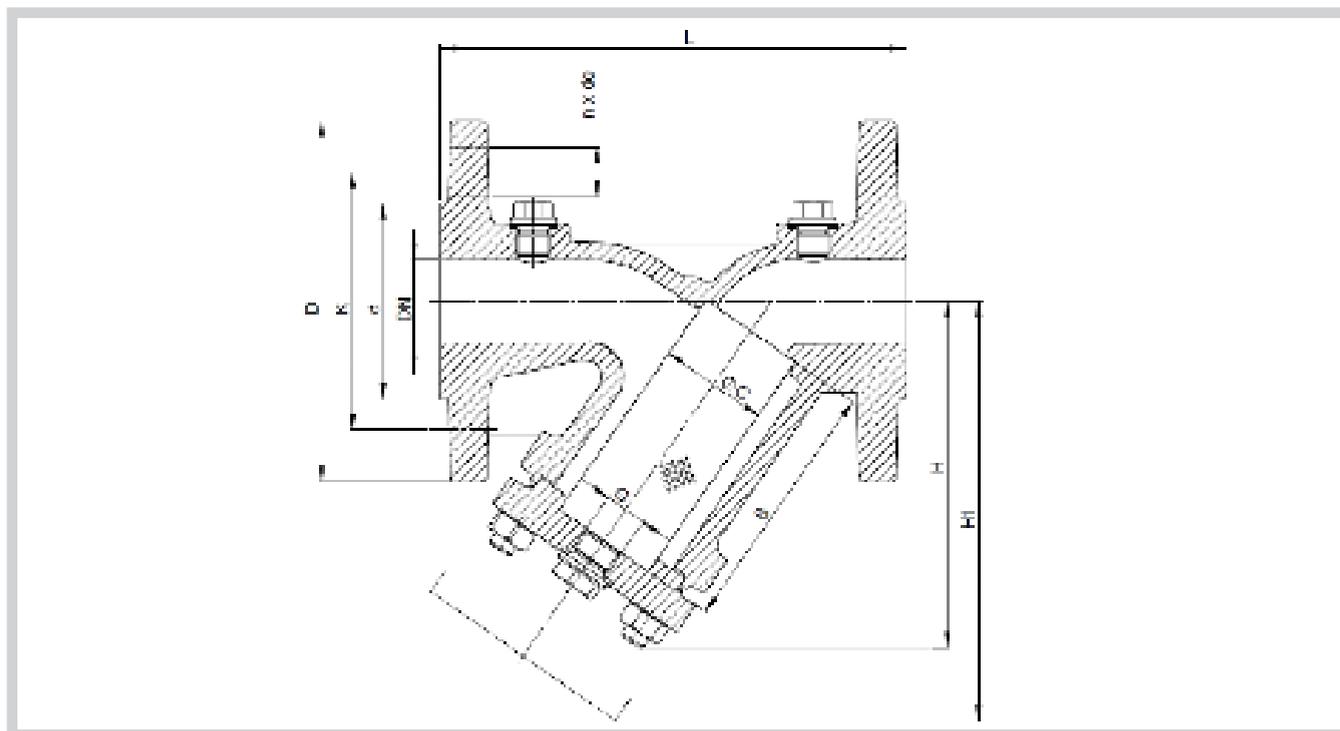
## SCREENS

| Type               | Mesh (mm)  |      |
|--------------------|------------|------|
| M-F821A            | DN 15-50   | 1    |
|                    | DN 65-150  | 1.25 |
|                    | DN 200     | 1.6  |
| G-F821C<br>H-F821F | DN 15-50   | 1    |
|                    | DN 65-80   | 1.25 |
|                    | DN 100-200 | 1.6  |

Meshes in 0.6, 0.5, 0.4, 0.32 and 0.2 mm are available on request.

Subject to change without notice.

## DIMENSION SKETCH



|     |     |     |     |       |       |     |                   | Type M-F821A, PN 16 |     |     |        |        | Type G-F821C, PN 25 |     |     |        |        | Type H-F821F, PN 40 |     |     |        |        |    |
|-----|-----|-----|-----|-------|-------|-----|-------------------|---------------------|-----|-----|--------|--------|---------------------|-----|-----|--------|--------|---------------------|-----|-----|--------|--------|----|
| DN  | L   | H   | H1  | G     | C     | B   | K <sub>v</sub>    | D                   | d   | K   | n x do | Weight | D                   | d   | K   | n x do | Weight | D                   | d   | K   | n x do | Weight |    |
| mm  | mm  | mm  | mm  | mm    | mm    | mm  | m <sup>3</sup> /h | mm                  | mm  | mm  | mm     | kg     | mm                  | mm  | mm  | mm     | kg     | mm                  | mm  | mm  | mm     | mm     | kg |
| 15  | 130 | 90  | 135 | 3/8   | 23    | 56  | 5,7               | 95                  | 46  | 65  | 4x14   | 2,6    | 95                  | 46  | 65  | 4x14   | 2,6    | 95                  | 45  | 65  | 4x14   | 2,7    |    |
| 20  | 150 | 100 | 150 | 3/8   | 28    | 68  | 10,4              | 105                 | 56  | 75  | 4x14   | 3      | 105                 | 56  | 75  | 4x14   | 3      | 105                 | 58  | 75  | 4x14   | 3,6    |    |
| 25  | 160 | 115 | 180 | 3/4   | 36    | 82  | 16,4              | 115                 | 65  | 85  | 4x14   | 4,3    | 115                 | 65  | 85  | 4x14   | 4,3    | 115                 | 68  | 85  | 4x14   | 4,5    |    |
| 32  | 180 | 135 | 215 | 3/4   | 42    | 98  | 27,3              | 140                 | 76  | 100 | 4x19   | 6,8    | 140                 | 76  | 100 | 4x19   | 6,8    | 140                 | 78  | 100 | 4x18   | 6,3    |    |
| 40  | 200 | 150 | 240 | 1     | 50    | 114 | 42                | 150                 | 84  | 110 | 4x19   | 8,8    | 150                 | 84  | 110 | 4x19   | 8,8    | 150                 | 88  | 110 | 4x18   | 8,7    |    |
| 50  | 230 | 160 | 250 | 1     | 61.5  | 119 | 64,7              | 165                 | 99  | 125 | 4x19   | 11     | 165                 | 99  | 125 | 4x19   | 11     | 165                 | 102 | 125 | 4x18   | 11     |    |
| 65  | 290 | 180 | 285 | 1     | 78.5  | 134 | 98                | 185                 | 118 | 145 | 4x19   | 14,6   | 185                 | 118 | 145 | 8x19   | 14,6   | 185                 | 122 | 145 | 8x18   | 18,5   |    |
| 80  | 310 | 215 | 330 | 1     | 89.5  | 149 | 149               | 200                 | 132 | 160 | 8x19   | 18,6   | 200                 | 200 | 160 | 8x19   | 18,6   | 200                 | 138 | 160 | 8x18   | 23,5   |    |
| 100 | 350 | 235 | 365 | 1 1/2 | 109.5 | 169 | 234               | 220                 | 156 | 180 | 8x19   | 27     | 235                 | 235 | 190 | 8x23   | 27     | 235                 | 162 | 190 | 8x22   | 33     |    |
| 125 | 400 | 280 | 425 | 1 1/2 | 137.5 | 199 | 376               | 250                 | 184 | 210 | 8x19   | 38,5   | 270                 | 270 | 220 | 8x28   | 38,5   | 270                 | 188 | 220 | 8x26   | 54     |    |
| 150 | 480 | 320 | 480 | 1 1/2 | 160   | 224 | 454               | 285                 | 211 | 240 | 8x23   | 54,5   | 300                 | 300 | 250 | 8x28   | 54,5   | 300                 | 218 | 250 | 8x26   | 75     |    |
| 200 | 600 | 405 | 610 | 1 1/2 | 210   | 284 | 853               | 340                 | 266 | 295 | 12x23  | 110    | 360                 | 360 | 310 | 12x28  | 110    | 375                 | 285 | 320 | 12x30  | 137    |    |

# Sensor pockets

For Clorius V-thermostats

0-8.3.41-E

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## APPLICATIONS

Sensor pockets of stainless steel can be supplied to all Clorius self-acting thermostats with rod sensors. They are used where it is impossible to empty the system or the tank. Use of sensor pockets imply delay of heat transfer to the rod sensors and thus a longer reaction time for the controllers. This is to some extent counteracted by filling up the sensor pockets with paste or oil.

## MOUNTING

The installation site for the sensor pocket is arbitrary when paste is applied. When using oil the sensor pocket must point somewhat downwards.

## FEATURES

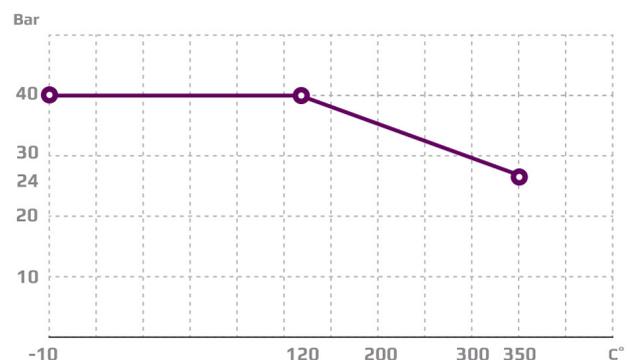
- Secures quick heat transfer from media to the thermostat sensor
- Can be delivered with various flange connections as an option
- Protects the sensor
- Makes change of sensor easy

## TECHNICAL DATA

|                      |   |
|----------------------|---|
| <b>Material</b>      | High alloy stainless steel<br>Werkstoff No. 1.4436.                         |
| <b>Outer threads</b> | BSP for all standard sensor<br>pockets                                      |
| <b>Optional</b>      | Sensor pockets with NPT threads are<br>only available for V.2.05 and V.4.05 |

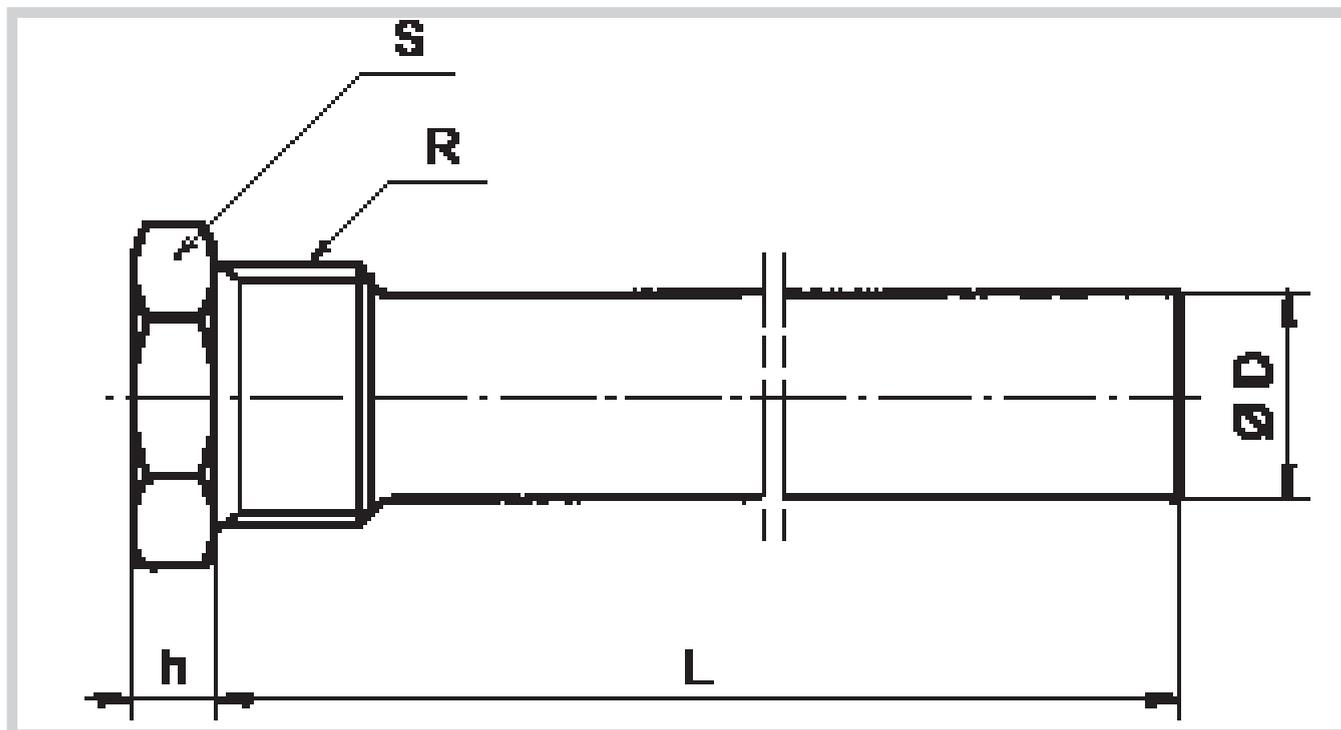
## PRESSURE/TEMPERATURE DIAGRAM

According to DIN 2401



Subject to change without notice.

### DIMENSION SKETCH



| For thermostat type | Clorius product number | Dimensions in mm |     |    |    | ISO 7/1 (tapered) |
|---------------------|------------------------|------------------|-----|----|----|-------------------|
|                     |                        | Ø D              | L   | h  | S  |                   |
| V 2.05              | 3290069                | 25               | 215 | 9  | 36 | R 1               |
| V 4.03              | 3290182                |                  |     | 10 | 50 | R 1¼              |
| V 4.05              | 3290077                | 25               | 390 | 10 | 50 | R 1¼              |
| V 4.10              | 3290085                | 34               | 512 | 10 | 50 | R 1¼              |
| V 8.09              | 3290093                | 34               | 740 | 12 | 80 | R 2½              |
| V 8.18              | 3290204                | 38               | 805 | 12 | 80 | R 2½              |



## TECHNICAL DATA

|                        |   |
|------------------------|---|
| <b>Valve motor</b>     |   |
| - Power supply         | 24 V AC<br>+10/-15%,<br>50/60 Hz                  |
| - Consumption approx.  | 24 VA   |
| - Casing               | IP66  |
| - Cable union          | 2xM20 1xM16                                       |
| - Closing speed        | 15....30 sec.                                     |
| - Ambient temp.        | -10 to +55 °C                                     |
| - Closing force        | 1100 N  |
| - Stroke               | 0 – 40 mm   |
| - Weight               | 5.6 kg  |
| <b>Control box</b>     |   |
| - Transformer          | 230/24 V AC,<br>10 VA, 50/60 Hz                   |
| - Timer                | 10 sec.   |
| - External alarm       | Potential free switch                             |
| - Fuse                 | T 0.5 A / 250 V                                   |
| <b>Dual thermostat</b> |   |
| - Adjustable           | 35 – 95 °C  |
| - Overheat protection  | 95 – 110 °C,<br>Sealed at 105 °C,<br>Manual reset |
| - Thread               | ½ RG  |
| - Immersion-tube       | 110 mm  |

Subject to change without notice.

## APPLICATIONS

Safety Set SM6 is developed for all Clorius valves up to 150 mm, but may be used for some other valve brands of corresponding size and function, too. It is consequently well suited for modernisation of existing systems.

## FUNCTION

Safety Set SM6 is used for heating, cooling, ventilation and industrial systems, no matter whether the medium is water, steam or oil.

## DESIGN

Safety Set SM6 consists of a valve motor, a control box and a dual thermostat. The valve motor is driven by a gear motor. Stepping motor with SUT (Superior Universal Technology) electronic control unit and electronic load-dependant cut-off.

The valve motor is delivered for 24 V AC/DC. The build-in spring return ensures a closing time of max. 4 sec. By temperatures higher than 130°C, a cooling unit (1-0152285) is to be mounted between valve and motor.

All gear wheels and bearings are life-time lubricated. Maintenance-free gear unit made of sintered steel; gearbox base-plate made of steel. The spring return is released when the power disappears from the holding coil, closing the valve completely. A timer in the control box ensures that the motor is not turned on again before 10 sec. after a spring return release. This function protects against starting the motor before the spring return function has terminated.

## FEATURES

- IP66 (EN60529)
- Valve actuator with safety function (as per DIN EN 14597) and pushing force of 1100 N
- Easy to fit and self adjustable
- Spring return
- Simple assembly with valve; spindle is automatically connected after control voltage is applied (patented system)
- Lifetime lubricated gearbox
- 2-4 safety functions
- Direction of operation can be selected via screw terminals when making the electrical connection

## THE CONTROL BOX CONTAINS:

- a 230/24 V AC transformer for the valve motor
- the 10 sec. timer for the spring return
- a potential free alarm switch
- terminal blocks for connections to the valve motor, the dual thermostat, other safety equipment, an alarm, and power
- a build-in fuse protecting against over-load and short-circuiting

The dual thermostat is set to the normal close-down temperature, e.g., 90°C, where the valve is to be closed. It further includes an overheating thermostat for spring return emergency close-down at 105°C. This ensures correct function, even if, e.g., the normal thermostat should fail. For additional safety, the overheating thermostat has to be reset manually after a break.

## BUILD-IN SAFETY FUNCTIONS

### Power failure

The build-in spring return closes the valve. When the power returns, the motor starts again after 10 sec. and moves the valve back to its original position.

### Overheating protection

The spring return of the motor closes the valve on a signal from the 105°C overheating thermostat or other safety devices. The overheating thermostat has manual reset.

Other protections possibilities:

### Against circulation failure

The motor closes the valve when a flow switch placed in the secondary circuit releases the spring return, e.g. by a pump failure. When circulation returns, the valve reopens automatically after 10 sec.

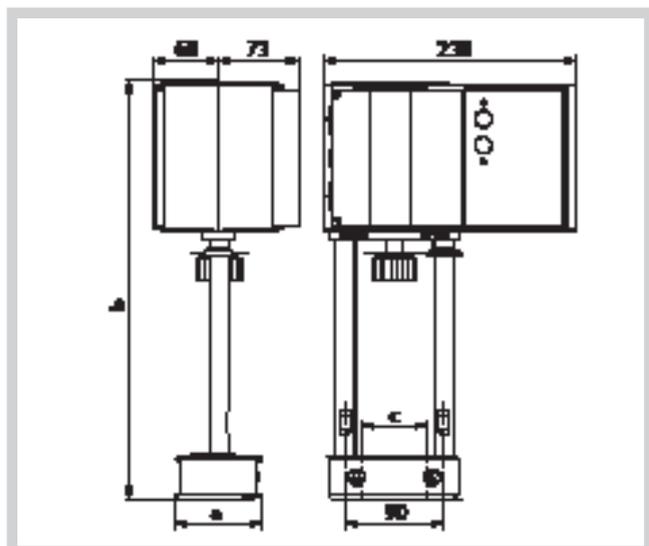
### Against pressure failure

By means of a pressure switch the motor will release the spring return if the water pressure in the secondary circuit is reduced (static pressure).

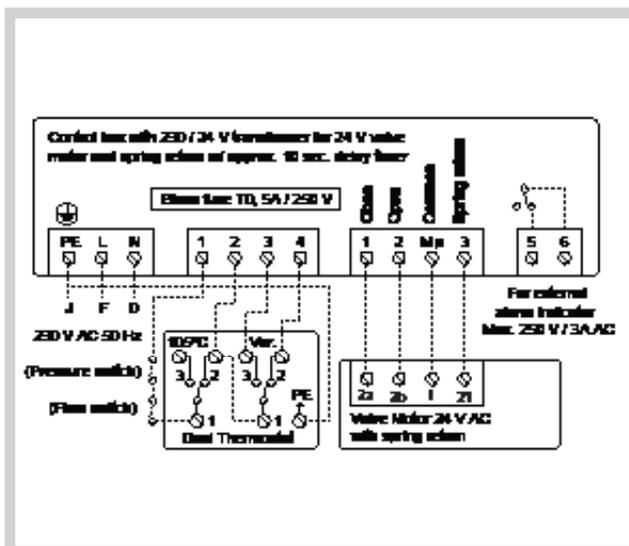
## ALARM FUNCTION

The build-in potential free alarm relay is activated at emergency close down (spring return).

## DIMENSION SKETCH

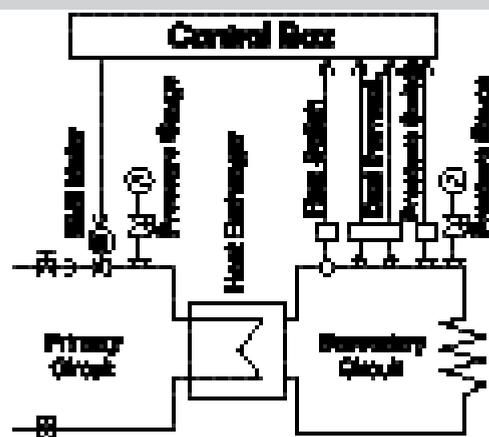


## WIRING DIAGRAM, SAFETY SET SM6



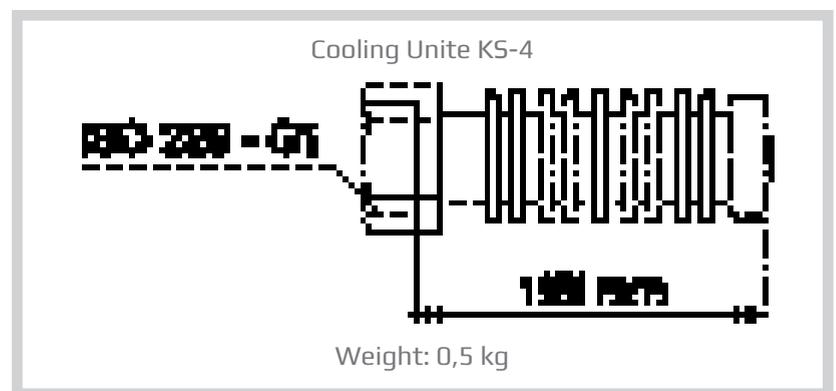
## EQUIPMENT DIAGRAM

For steam/hot water heating systems, where the primary circuit is dimensioned for the maximum pressure of the steam/hot-water.



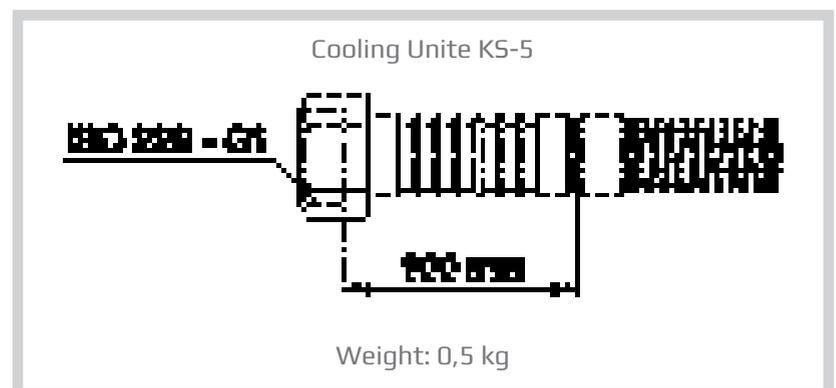
## TYPE KS-4

Cooling unit protecting the stuffing box of the thermostat. To be applied at valve temperatures between 170°C and 250°C. For higher temperatures please see type KS-5.



## TYPE KS-5

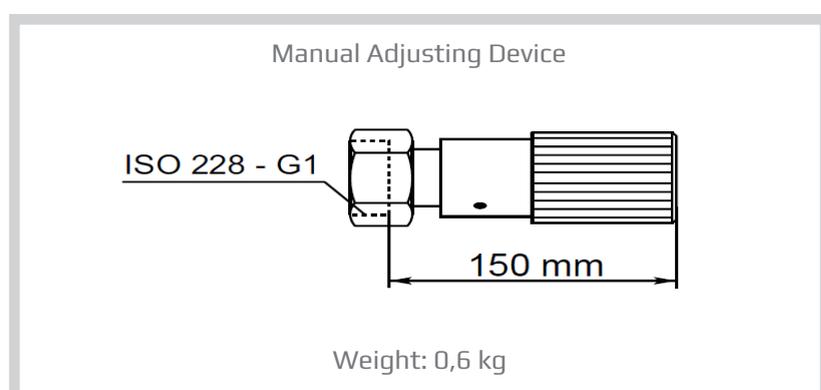
Cooling unit with a built-in bellow gland, replacing the stuffing box of the thermostat. To be applied at valve temperatures between 250°C and 350°C.



Subject to change without notice.

### MANUAL ADJUSTING DEVICE

The device has a built-in thermostat stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).



# Spacer Concept (Machined and welded)

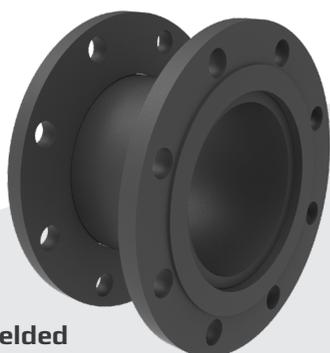
2 & 3 way control valves, DN 100, 125, 150, 200, 250 & 300

0-8.06.11-A

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Machined



Welded

## TECHNICAL DATA

|                                     |  |
|-------------------------------------|--|
| <b>Material:</b>                    |  |
| - Spacer                            | Steel 1.0570 (S355J2G3)                          |
| - Colour                            | Anthracite grey RAL 7016                         |
| <b>Flange drilled according to:</b> |  |
| - Option                            | EN 1092-2<br>JIS B 2210 5K/10K<br>ANSI class 150 |
| <b>Available types:</b>             | Machined spacers<br>Welded spacers               |
| <b>Available sizes:</b>             | DN 100 - DN300<br>DN 350, 400, 450 on request    |
| <b>Used for:</b>                    | 2 & 3 way control valves                         |

## APPLICATIONS

Spacer concept is designed for use together with all types of 2 & 3 way Clorius control valves.

## FUNCTION

Spacers are available in both machined and welded types. Spacers are used to avoid changing the existing pipework when replacing old control valves with new control valves.

## DESIGN

Spacers are available in machined design with a length from: <100mm for DN100 to DN300

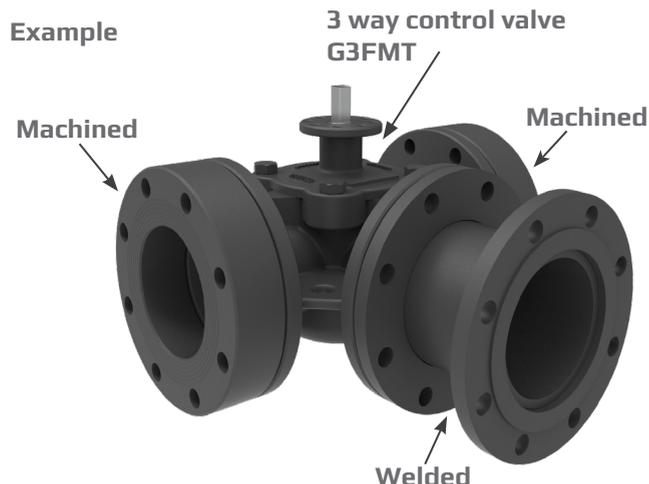
Spacers are available in welded design with a length from: >100mm for DN100 to DN300

Spacers will be produced after piping & installation specifications.

Flanges are drilled according to the different flange standards: EN 1092-2, JIS 5K/10K & ANSI Class 150

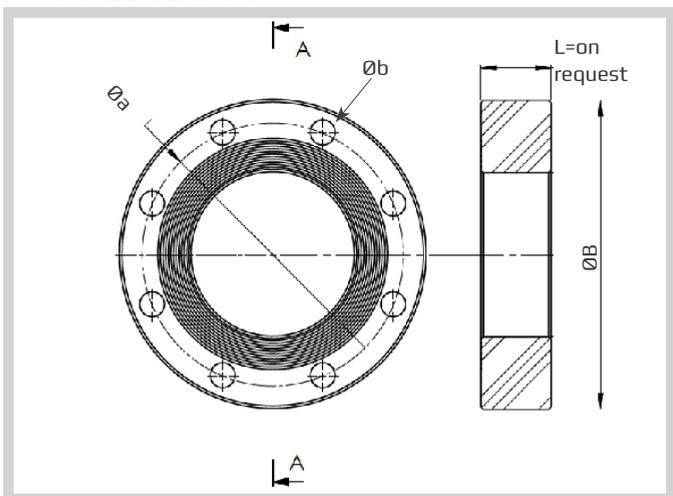
## FEATURES

- Spacers can be used in combination with all types of 2 & 3 way control valves.
- Simple design manufactured according to the required flange standards.
- Easy Installation - no modifications required to the existing installation.

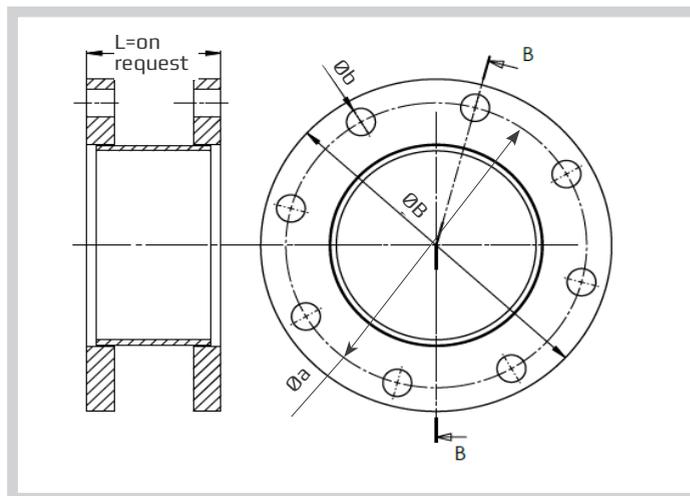


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### MACHINED VERSION



### WELDED VERSION



| Flange connections | EN 1092-2     |               |                    | ANSI Class 150 |               |                    | JIS B 2210 5K |               |                    | JIS B 2210 10K |               |                    |
|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|---------------|---------------|--------------------|----------------|---------------|--------------------|
|                    | B (dia.) (mm) | a (dia.) (mm) | b mm dia. (number) | B (dia.) (mm)  | a (dia.) (mm) | b mm dia. (number) | B (dia.) (mm) | a (dia.) (mm) | b mm dia. (number) | B (dia.) (mm)  | a (dia.) (mm) | b mm dia. (number) |
| DN100              | 220           | 180           | 19x(8)             | 230            | 191           | 19x(8)             | 200           | 165           | 19x(8)             | 210            | 175           | 19x(8)             |
| DN125              | 250           | 210           | 19x(8)             | 255            | 216           | 22x(8)             | 235           | 200           | 19x(8)             | 250            | 210           | 23x(8)             |
| DN150              | 285           | 240           | 23x(8)             | 280            | 241           | 22x(8)             | 265           | 230           | 19x(8)             | 280            | 240           | 23x(8)             |
| DN200              | 343           | 295           | 22x(8)             | 343            | 298           | 22x(8)             | 320           | 280           | 23x(8)             | 330            | 290           | 23x(12)            |
| DN250              | 405           | 350           | 23x(12)            | 405            | 362           | 25x(12)            | 385           | 345           | 23x(12)            | 400            | 355           | 25x(12)            |
| DN300              | 455           | 400           | 23x(12)            | 483            | 432           | 25x(12)            | 430           | 390           | 23x(12)            | 445            | 400           | 25x(16)            |
| *DN350             | 505           | 460           | 23x(16)            | 533            | 476           | 29x(12)            | 480           | 435           | 25x(12)            | 490            | 445           | 25x(16)            |
| *DN400             | 565           | 515           | 28x(16)            | 597            | 540           | 29x(16)            | 540           | 495           | 25x(16)            | 560            | 510           | 27x(16)            |
| *DN450             | 620           | 565           | 28x(20)            | 620            | 578           | 32x(16)            | 620           | 555           | 25x(16)            | 620            | 565           | 27x(20)            |

Spacers for DN350, 400, 450 are available on request.

### Example



Installation of 3 way control valve GFMT with machined spacers and CAR-H actuator.



# TERM & CONDITIONS

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## 1. General

These terms of sale are binding unless otherwise agreed and require no confirmation. Any amendments to these terms must be made in writing by Clorius Controls A/S (hereinafter called Clorius) and shall apply only to the transaction contemplated.

## 2. Delivery

Times of delivery are approximate and subject to strikes, breakdowns of machinery, accidents, lock-outs, interruptions of work or business, war, force majeure or other causes beyond Clorius' control. Clorius shall assume no liability for any delay or for expenses or penalties incurred by any delay.

## 3. Prices

- 3.1 Unless otherwise agreed in writing all prices are ex. works Copenhagen (according to latest edition of Incoterms).
- 3.2 In the event of fluctuations in costs of raw materials and labour during the period between confirmation and delivery of goods, Clorius reserves the right to adjust prices accordingly.
- 3.3 The smallest order amount not subject to an additional administrative charge is EURO 270. Back orders caused by Clorius' inability to supply are not subject to administrative charges.

## 4. Shipping

- 4.1 All risks in respect of the goods shall pass to the Buyer as soon as the products have left Clorius' premises, or as soon as Clorius has otherwise placed the products at the disposal of the Buyer according to agreement in writing.
- 4.2 If the Buyer has given no definite shipping instructions Clorius shall effect shipment according to its best judgement. However, Clorius is not obliged to select the cheapest method of transportation.

## 5. Insurance

If as per written agreement Clorius shall take out insurance for the Buyer's account, Clorius shall assume no liability whatsoever for the selection of insurance company or its adjustment of claims subsequent to delivery.

## 6. Complaints

- 6.1 In case of complaints in respect of goods in non-contractual conditions, short delivery or shipment, written notice shall be given to Clorius immediately upon receipt of the goods. Clorius shall assume no liability whatsoever for loss or damage arising or resulting from failure on the part of the Buyer to comply with this provision.
- 6.2 In the event of a justified warranty claim Clorius may at its discretion replace or repair the goods or issue a credit note for the amount paid or debited, provided the goods be returned to Clorius' warehouse, free of charge

## 7. Product Liability

- 7.1 Clorius shall only be liable for personal injury, if it can be established that the injury is attributable to faults or negligence committed by Clorius or by others for whom Clorius is responsible.
- 7.2 Clorius shall not be liable for damage to immovables or movables, which occurs when the goods are in the Buyer's possession. Otherwise Clorius shall only be liable for damage to immovables or movables as stipulated in 7.1 (personal injury)
- 7.3 Any compensation payable by Clorius shall in no circumstances exceed EURO 674000.
- 7.4 The Buyer agrees to indemnify and hold harmless Clorius against any claims, liabilities, costs or expenses incurred by Clorius in relation to personal injury or property damage suffered by the Buyer's customers or other third parties resulting or arising from defective goods, unless it is established that such injury or damage is solely attributable to defective design or manufacture of goods.
- 7.5 Clorius shall, however, at no time be liable for consequential or incidental loss, loss of income or revenue or any other indirect loss.

## **8. Warranty**

- 8.1 Unless otherwise provided, the warranty period is 12 months covering any defects in material or craftsmanship found and notified to Clorius in writing without delay. This warranty shall, at Clorius' discretion, cover repairs, replacement, service replacement or crediting of the goods in question.
- 8.2 The warranty shall be void if the goods are in bad repair or maintenance or if attempts have been made to repair them or if they have been modified without Clorius' written consent.
- 8.3 The warranty shall also be void if the goods are used for purposes for which they were not designed or intended or if they are installed and used in contravention of the directions given by Clorius.
- 8.4 Clorius shall, however, at no time be liable for consequential or incidental loss, loss of income or revenue or any other indirect loss.

## **9. Terms of Payment**

- 9.1 All goods are sold on the terms of payment stated in Clorius invoices. Any default in payment shall entitle Clorius to suspend shipment or to cancel unexecuted orders. If payment is overdue, interest will be charged.
- 9.2 The rate of interest will be stated in the order confirmation and in the invoice.
- 9.3 The Buyer shall not be entitled to withhold payment or to set off counterclaims against goods or services supplied.

## **10. Retention of Title**

- 10.1 The legal property in the goods shall not pass to the Buyer until the purchase price including interest and expenses have been fully paid.
- 10.2 Until the purchase price has been fully paid the Buyer shall:
  - a. not pledge the goods or documents of title thereto,
  - b. not allow any lien to be created on the good, and
  - c. secure that the goods are or remain fully insured.

## **11. Patents, Trademarks, etc.**

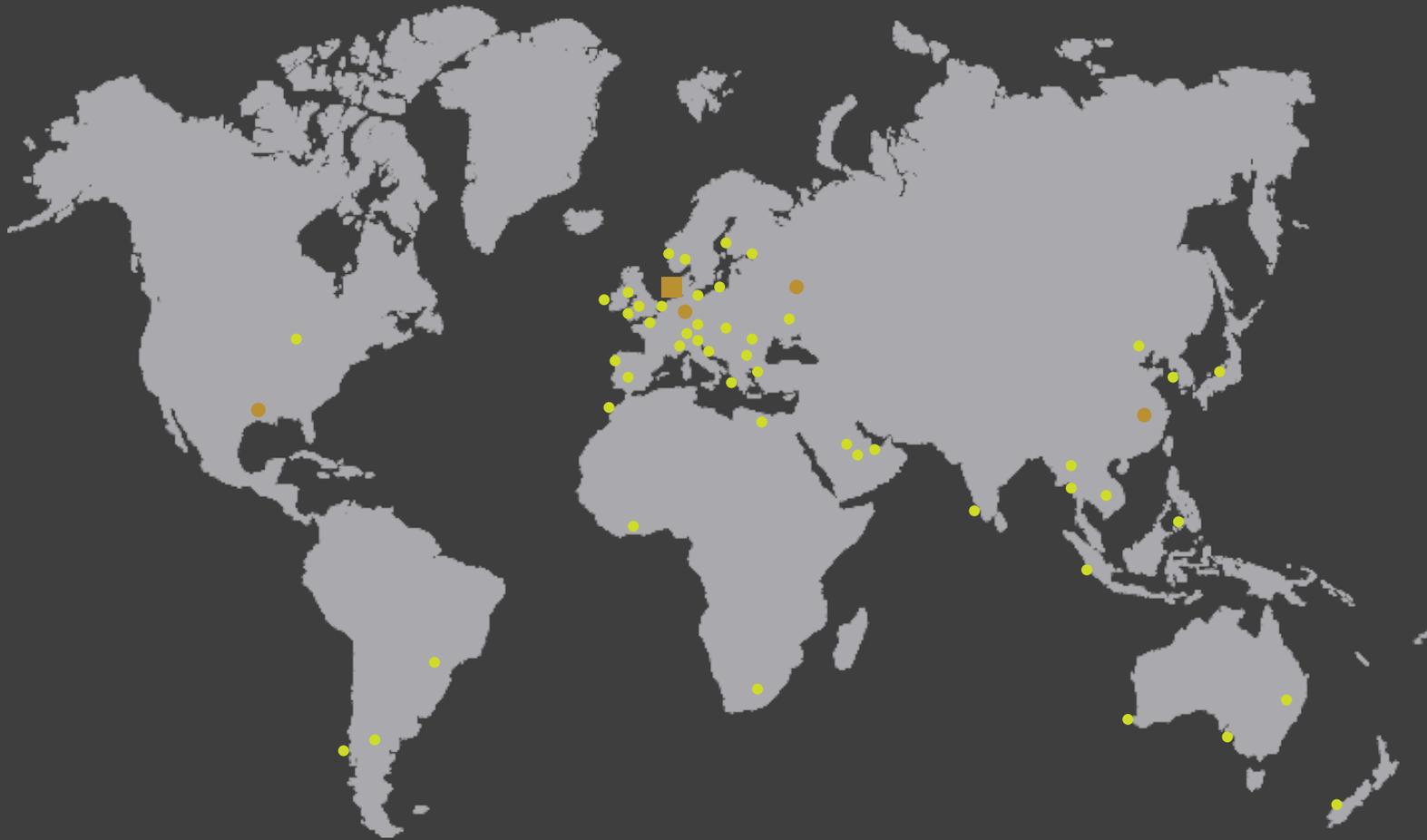
Clorius shall warrant that the goods manufactured and supplied by Clorius do not infringe any third party's proprietary rights, patents, copyrights or trademarks in Denmark, but shall not provide any express or implied warranty that the goods do not infringe any such rights of a third party outside Denmark, in particular in the Buyer's country, and Clorius shall not be liable to defend any alleged infringement suit or to pay any costs, damages or royalties arising from such infringement.

## **12. Return of products**

- 12.1 Return of products can only take place if agreed with Clorius and return will only be possible for saleable products returned in undamaged Clorius packing. Invoice number for the returned products must be stated. If the invoice number is not stated, Clorius reserves the rights to charge extra costs in addition to the costs stated in 12.4.
- 12.2 Return of the goods at consignors account and risk.
- 12.3 Products at a value less than EURO 55 are not taken back.
- 12.4 For returned products an administration charge of min. 20% - minimum EURO 35 - will be charged.

## **13. Venue**

Any dispute which may arise between the Buyer and Clorius shall be governed by Danish Law and settled by the Maritime and Commercial Court in Copenhagen, which has been accepted as venue by both parties.



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