ACTUATOR CAR-H SERIES
INSTALLATION & MAINTENANCE MANUAL



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1. Introduction

1.1 Safety information

General

This manual contains information that must be observed in the interest of your own safety and to avoid material damage. This information is supported by symbols which are used in this manual as indicated.
Please read this manual before starting up the device. Store this manual in a place that is always accessible to all users.

If difficulties occur during startup, please do not intervene in any way that could jeopardize your warranty rights.

Warning symbols



WARNING!

This symbol in connection with the signal word indicates that **personal injury** may occur if the respectiveprecautionary measures are not carried out.



CAUTION!

This symbol in connection with the signal word indicates that **material damage or data loss** will occurif the respective precautionary measures are not taken.



At the end of its service life, the device and any batteries present do not belong in the trash! Please ensure that they are **disposed of** properly and in an **environmentally friendly** manner.

1. Introduction

1.2 Intended use

The device is designed for use in an industrial environment as specified in the technical data section. Other uses beyond those defined are not viewed as intended uses.
The device has been manufactured in compliance with applicable standards and directives as well as the applicable safety regulations. Nevertheless, improper use may lead to personal injury or material damage.

To avoid danger, only use the device:
For the intended use
When in good order and condition
When taking the technical documentation provided into account
Risks resulting from the application may arise, e.g. as the result of missing safety provisions or wrongsettings, even when the device is used properly and as intended.

1.3 Qualification of personnel

This document contains the necessary information for the intended use of the device to which it relates.
It is intended for staff with technical qualifications who have been specially trained and have the appropriate knowledge in the field of automation technology.
The appropriate level of knowledge and the technically fault-free implementation of the safety information sites for risk-free mounting, installation, and startup as well as for ensuring safety when operating the described modules.Only qualified personnel have the required specialist knowledge to correctly interpret and implement thesafety information and warnings contained in this document in specific situations.

1.4 Acceptance of goods, storage, and transport

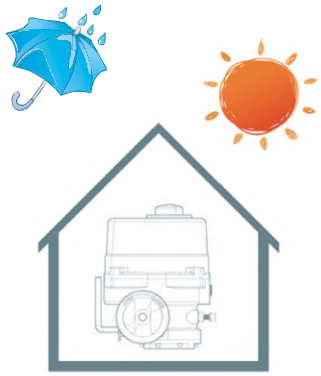
1.4.1 Checking the delivery

- Ensure that the packaging and its contents are undamaged
- Check the delivery for completeness against the packing slip and order details
- Inform the supplier immediately if there is any damage
- Store damaged parts until clarification is received from the supplier

1.4.2 Important information about storage and transport

- Store the device in a dry, clean environment. Observe the admissible ambient conditions (see "Technical data section")
- Protect the device from shock during transport
- The original packaging provides optimum protection for storage and transport

The Actuator must be stored in a clean, dry, temperature-controlled area. The unit shall be stored with the cover installed and with the conduit openings sealed. Storage must be off the floor. Care must be taken to guard the Actuator from condensation in extreme temperature variations. Heaters should be energized as soon as actuators are installed.



Temperature	**-20°C + 60°C**
Protection class	**IP67**

The actuator enclosure is made from anodized aluminum alloy which is also dry powder poxy painted to help protect oxidation

Improper storage of the Actuator will VOID WARRANTY.

1.4.3 Returning goods

In the event of repair, return the complete device in clean condition.
Use the original packaging to return goods.

Accompanying letter for repair

Please include the completed accompanying letter for repair when returning goods.

Do not forget to state the following:

- Description of the application and
- Description of the error that has occurred
- Actuator data from Nameplate

1.4.4 Disposal

Disposing of the device

DISPOSAL!

Devices and/or replaced parts should not be placed in the refuse bin at the end of their service life asthey consist of materials that can be recycled by specialist recycling plants.

Dispose of the device and the packaging material in a proper and environmentally friendly manner. For this purpose, observe the country-specific laws and regulations for waste treatment and disposal.

Disposing of the packaging material

The entire packaging material (cardboard packaging, inserts, plastic film, and plastic bags) is fully recyclable.

1. Introduction

1.5 Identify the device version

1.5.1 Name plate

The name plate is added on the housing.

Name plate content:

The nameplate content important information as shown in the table below.

Description	Designation on the nameplate	Example
Actuator type	Type CAR-H	CAR-H 010
Part no.	Item no.	1-5231000
Serial number	Serial no.	0001
Voltage supply	Supply 1 Ph	230 AC
Actuator Torque value /Nm/	Torque	100 Nm
Rated Current	Motor	0,5 A
Control signal	option	PCU

1.5.2 Spare parts

Description	Part no.
Gaskets, Hand wheel, motor, internal parts	On request

1.6 Brief description

CAR-H series quarter-turn valve electric actuator is the new generation of our company, which can be used for driving and controlling the Clorius rotary valves, butterfly valve, ball valve and plug valve (quarter-turn valves with 90°movement), available for open, close or adjusting the valve with the functions of remote control and local control both, they are widely used in the fields such as oil, chemistry, power generation, water treatment, paper making, etc. lP67 protection class, dllCT6 (CAR-H 006-024) and dllBT6 (CAR-H 050-S250) option (with symbol of "Ex")

Mechanical Characteristic

- **Housing:** Hard anodized aluminum casting and external epoxy power coated against severe industrial environment

- **Gearing:** Precisely machined double worm gear C/V minimum black-lash, low noise, high output torque.

- **Self-locking:** Provided by double worm gearing to keep position of valve unchanged against reverse torque from valve.

- **Motor:** Specially designed and induction motor to generate high starting to torque and high efficiency equipped with thermal protector to prevent damage from overheating. insulation class: F

Mechanical Characteristic (continued)

- **External mechanical stopper:** Prevents over run of travel angle when limit switch fails

- **Torque switches:** Protect actuator from damage caused by overload from the driven valve over the whole travel,1 each for open/close.

- **Limit switches:** Directly engaged with driving shaft to set accurate position of valve supplying a dry contact signal.

-**Terminal:** Spring loaded push type terminal for tight wiring connection under severe vibration.

- **Space heater:** Anti-condensation

- **Manual override:** Auto/Manual switchable lever and handwheel engagement for emergency manual operation.
  Drive force automatically resorted by motor start, unless lever padlocked to prevent this occurring.

- **Handwheel:** Manual operated, turn on-off valve directly when power off.

2. Performance

2.1 Technical data

Protection class:	IP67/IP68 Option
Ambient temperature:	-20°C to +60°C
Power supply:	110/230VAC ±10% (50-60Hz) 24V AC/DC ±10%/ CAR-H 020-S250 – ON/OFF 24V AC/DC ±10%/ CAR-H 006-035 – PCU or CPT
Torque switches:	Open/Close
Limit switches:	2 x 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°
Indication:	Continuous position indicator
Manual override:	AUTO Declutching mechanism
Worm gear:	Permanently adjustable and self-locking
Mechanical stops:	External adjustable limit stops
Space heater:	5W (Anti-condensation)
Cable glands:	2xM20x1,5
Lubrication:	Grease NLGI grade 2 (EP-type)
Materials:	Steel, aluminum Alloy, Al. bronze
External coating:	Anodizing and dry powder epoxy Painted RAL 6018 - green
Duty cycle:	ON/OFF AC230V:10min.
Modulating:	S4: 30%, 1200 start/hour
Anti-vibration:	XYZ 10g. 02~34Hz, 30 min.
Overvoltage:	CAT. III
Available actuator type:	
Standard:	ON/OFF - 3-Point
PCU Modulating:	
Command signal:	4-20mA or 0-10V
Analogue feedback signal:	4-20mA or 0-10V Self-powered
Dead band:	1,0% adjustable
CPT:	Feedback signal 4-20mA

2. Performance

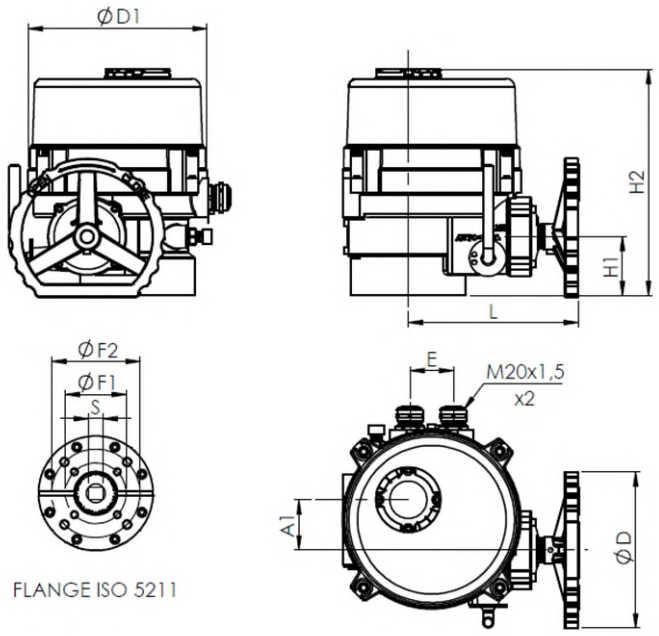
2.2 Specification

Actuator type	Torque (Nm)	Open/Close time (Sec/90°) Single phase 50/60 Hz	RATED CURRENT (A) 230V AC	RATED CURRENT (A) 110V AC	RATED CURRENT (A) 24V 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	1,5	2,2	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

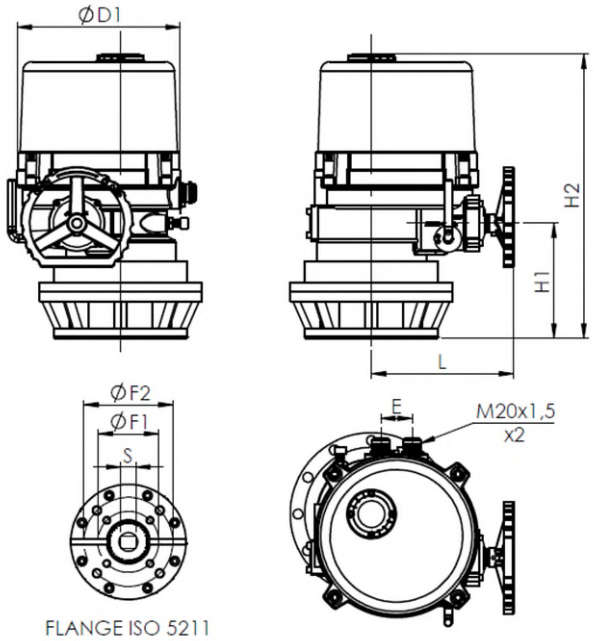
2. Performance

2.3 Dimensions

CAR-H 006–110



CAR-H S200–S400



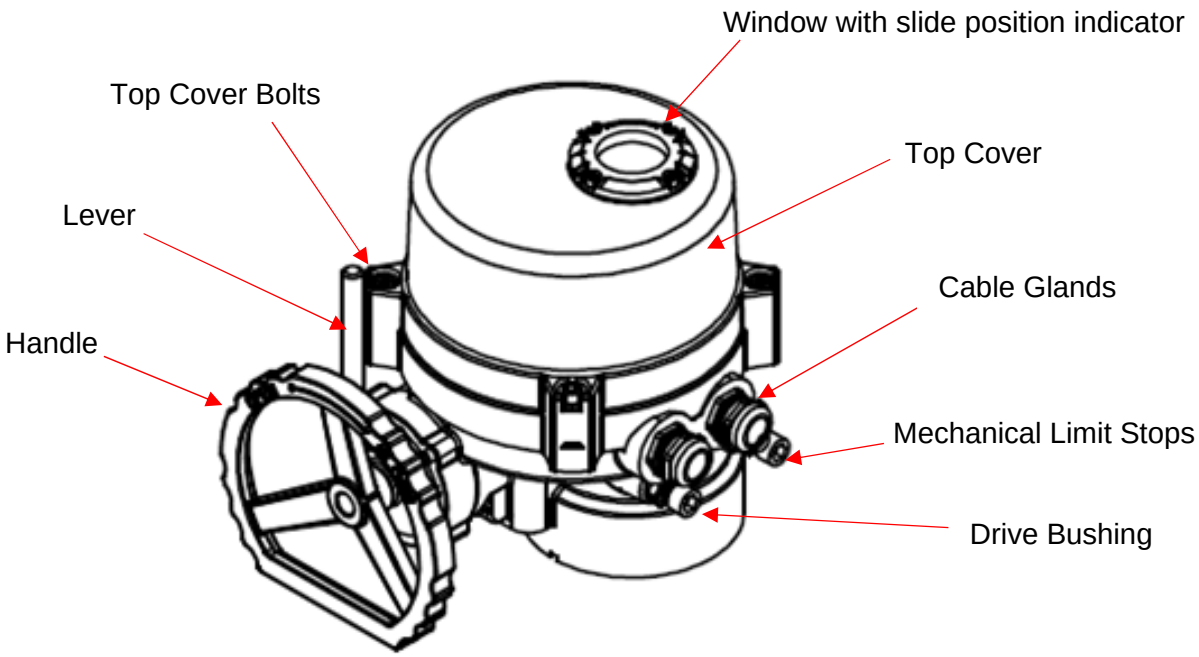
Actuator type	A1	ØD	ØD1	H1	H2	L	E	ISO FLANGE 5211				
								F1	F2	M1	M2	S
								Ø	Ø			SQUARE
CAR-H 006	41	100	157	55	223	167	46	70	82	M8	M8	12x12 / 17x17
CAR-H 010	41	100	157	55	223	167	46	70	82	M8	M8	12x12
CAR-H 016	57,5	180	206	67	261	197	50	70	-	M8	-	17X17
CAR-H 020	57,5	180	206	67	261	197	50	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

* All measurements are in mm

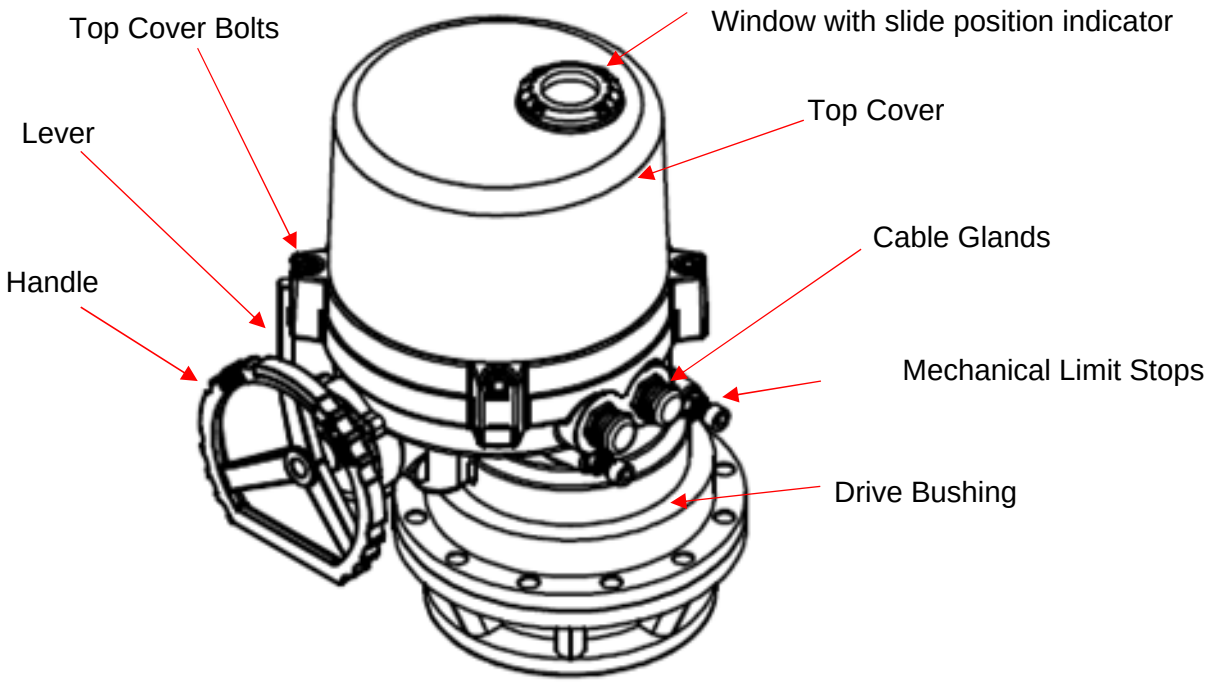
2. Performance

2.4 Parts identification

External for CAR-H 006-110



External for CAR-H S200-S250



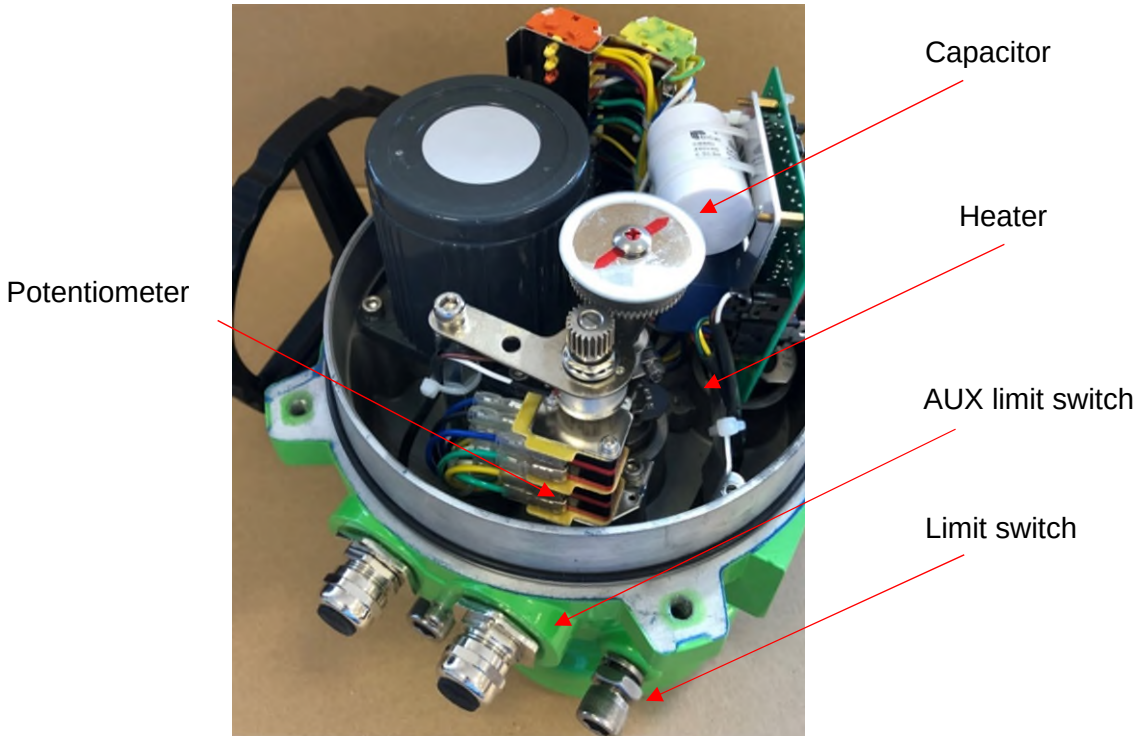
2. Performance

2.4 Parts identification

Internal parts for CAR-H 006-110



Internal parts for CAR-H S200-S250



2. Performance

2.5 Installation instruction

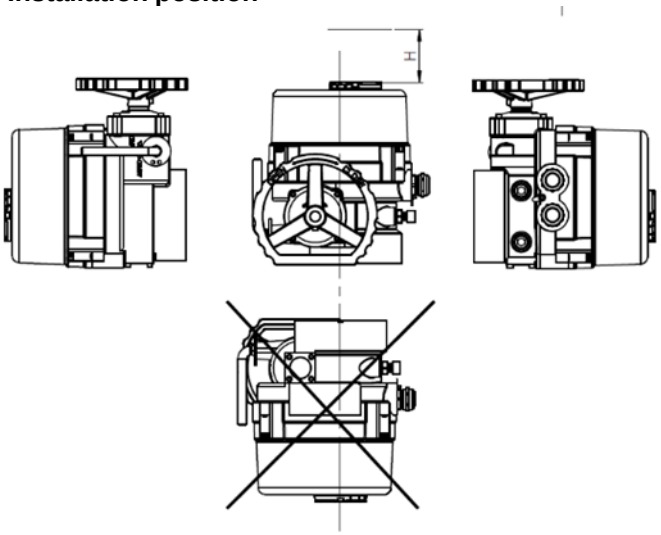
WARNING!

The device is not designed for use in potentially explosive areas.

Explosion hazard.

▶ Only deploy the device outside of potentially explosive areas.

Installation position



Actuator Type	H
CAR-H 006 -110	150
CAR-H S200-400	200

The actuator can be mounted on the valve with positions like a sketch.

2.6 Installation notes

Requirements for personnel

- Work on the device must only be carried out to the extent described and, like the electrical connection only by qualified personnel.
- Before plugging and unplugging connecting cables, it must be ensured that the acting person is electrostatically discharged (by touching ground metallic parts, for example).

Cables, shielding, and grounding

- When selecting the electrical wiring material as well as when installing and connecting the device electrically, comply with the requirements of DIN VDE 0100 "Low-voltage electrical installations" andthe applicable country-specific regulations (for example, based on IEC 60364).
- Route input, output, and supply lines separately and not parallel to one another.
- Only use shielded and twisted probe and interface cables. Do not route the lines close to current-carrying components or cables.
- Do not perform loop throughs on the grounding cables but instead route the cables individually to ashared grounding point in the control cabinet; in doing so, ensure that the cables are as short as possible. Ensure that the potential equalization is correct.

References for other information

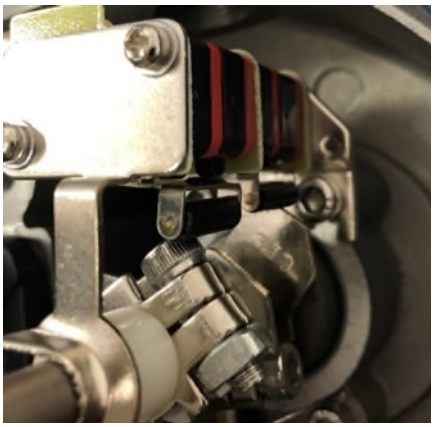
- In general, please observe the specifications regarding electrical isolation

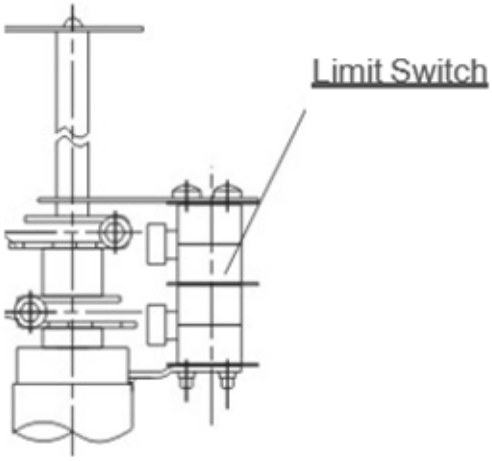
3. Connection

3.1 Mechanical adjustment

- **Travel limit switches**
  After depressing the Manual-override to MANU position, please rotate the handwheel in clockwise to reach fully close position.
  Use 4mm Hex wrench to lose the hex socket screws on CLS CAM
  Adjust the cam to make it touch with the close limit switch (the rattle sound heard), then tighten the hex socket screws.
  After the power is supplied, push the open direction button to make a reverse movement first (the manual-override can return to the "Auto" position automatically), then move to close direction to check if the close direction limit is correct.
  If the position is not correct, please repeat the operation to reach the satisfied position, vice versa.

  Limit switches



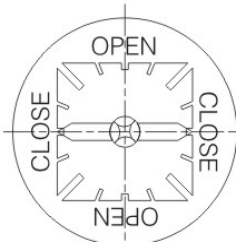


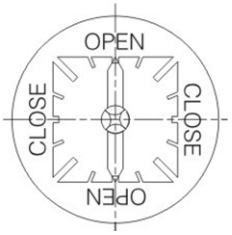
1: The upper OLS CAM is for open limit switch.
2: The lower CLS CAM is for close limit switch.
3: The upper OTS CAM is for open torque switch.
4: The Lower CTS CAM is for close torque switch

CAUTION!

Confirm that the power is off.

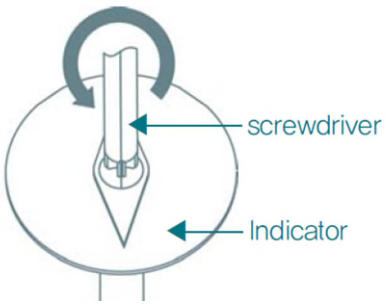
- **Position indication (Shown as below)**
  The pointer and top scale window show the "OPEN" and " CLOSE".
  Due to re-adjusting travel limit, the indicator might have discrepancies, you can direct adjust the pointer manually, there is no need to lose the fastening screws of pointer plate.





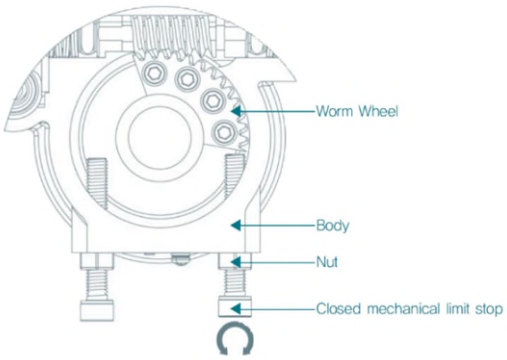
3. Connection

Confirm that the arrow on the indicator follows the valve slide position.
If the position shown on the indicator is incorrect, simply loosen the set screw and rotate the indicator to the correct position and retighten the set screw.



- **Mechanical Position Limit**
  Two mechanicals and stoppers on the device have been adjusted and tightened in factory, if no special requirements, users do not have to lose them.
  In case of adjusting the mechanical stoppers, please confirm the valve position fixed by the stoppers first, when the top scale window is upward, you face the stoppers, the right one is for close, the left one is for open.
  When adjusting is required (any positions required), please loose the nut and rotate inward the stoppers to touch the surface of fan-shaped worm wheel, then please return back 0.5-1 circle for the purpose of protecting the travel limit. Finally, tighten up screw nut reliably, then the position limit adjustment is completed.
  Note: The mechanical stoppers of CAR-H 006-110 are at the bottom of cable entries. The mechanical stoppers of CAR-H S200-250 are at the side of worm gear box.

  As shown below, turn the mechanical limit stop into the body until contact is made between the limit stop and worm wheel



CAUTION!

If the mechanical stops are improperly set, motor and gear damage may occur.

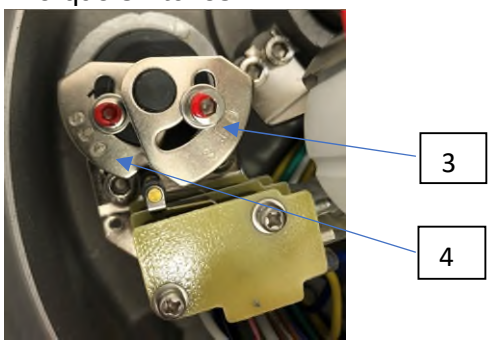
After setting the limit stops, check for proper function by operating the actuator both manually and electrically. Confirm that the end of travel limit switches shut off power to the motor in both the open and closed positions, and that the motor is not stalled or in an over-torque condition.

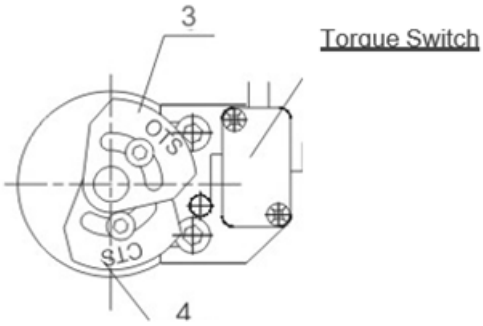
3. Connection

- **Open-close checking**
  After the travel limit and mechanical position limit finished, please push the open/close If button on the control equipment to check the valve's open-----close or close----open operation, also check the indicator and open/close lamp at the same time.

- **Torque switch (CAR-H 006-10 Without torque switch)**
  Normally, due to the setting reaches the rated torque before leaving factory, there is no need to re-set or adjust the torque switch, please operate it by professional if necessary. The actuators of CAR-H-020-S250 have two torque switches, each for close/open direction, you can use 3mm Hex wrench to lose screws on cam to change the torque value by rotating the cam.

Torque switches





3: The upper OTS CAM is for open torque switch.
4: The lower CTS CAM is for close torque switch.

CAUTION!

The factory testing standard of the actuator sets its over-torque protection torque value, which ranges from 1.1 to 1.15 times the nameplate torque. The testing is repeated twice and the deviation between the measured torque and the set value is required to be within ±10%.
The over torque switches are factory set.
Tampering with the over torque switch settings may damage the ACTUATOR and VOID the warranty.

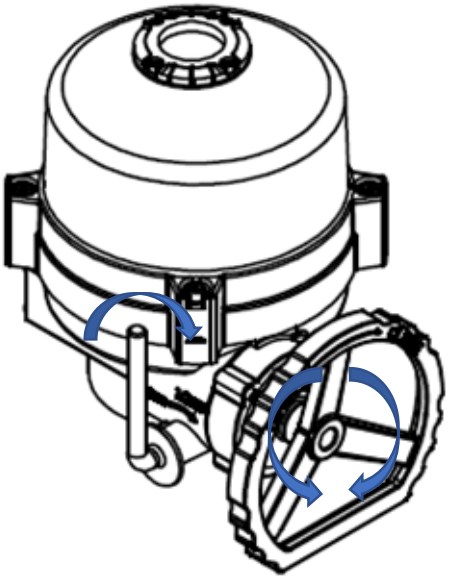
Manual – Override

The electric actuator has hand wheel which can be operated manually in case of emergency operation.
Manual operation:
After depressing the manual-override to the direction of handle wheel, the manual position will be locked by itself (motor doesn't work), rotation in clockwise is for close by rolling the handwheel.
Note: The design of the Manual-override is semi-automation, when the motor works, Manual-override will return to Auto position automatically.

CAUTION!

Do not depress the Manual-override to Auto position when it stays at Manual position, Otherwise, the actuator will be damaged.

3. Connection

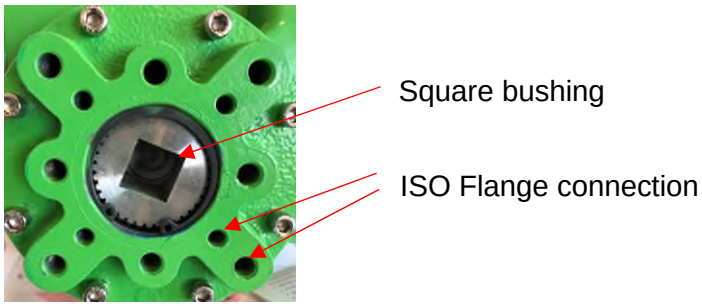


- Turn the hand wheel clockwise for CLOSE
- Turn the hand wheel counter clockwise for OPEN

After manual operation, leave the lever as is. When power is re-applied to the Actuator, the lever will disengage and declutch the manual override. The Actuator motor will then rotate
the valve to the powered position.

If the Lever does not “lock” in the manual position while trying to manually operate the Actuator, then the Actuator gearing may be jammed and needs to be checked.

- **Mounting base dimension**
  Toothed coupling:
  Design of coupling allows to mounted actuator on the valves directly.
  Dimension of ISO flanges and square size depends of valves size and are descripted on page 9 this manual.



3. Connection

3.2 Electric connection

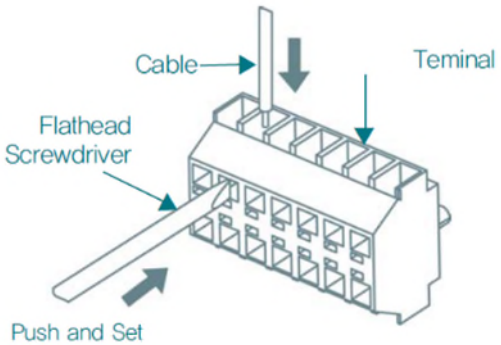
- **Remove the electrical cover:**
  Use Hex wrench to lose the hex socket screws of the electrical cover (Please jus! lose them in case of loss), then you can find the wiring drawing from the inside of cover removed.

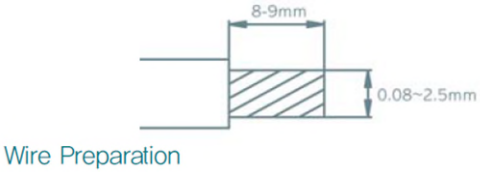
- **Wiring:**
  According to the wiring drawing, please make the power cable and control cable go through the cable entries to be connected with terminal block, as the spring-loaded push type terminal adopted, please push the spring by the slotted screwdriver to insert the exposed wires into the terminal hole, release the spring to light wires.
  Electric actuator has two grounding lugs for base earth, one is at terminal block, the other one is at the between of cable entries, the earth connection should be reliable and light.
  The cable jacket must be stayed inside of the cable entries, locked by rotating the gland.
  The power supply must be consistent with the technical data section on the name plate!
  Must tighten the hex socket screws to ensure the good seal after completed.

- **ON-OFF type wiring notices:**
  If there is 1PH power supply, two or more electric actuators will not be connected in parallel, and the same joint will not be used to control several electric actuators, otherwise it will cause the actuator uncontrolled and motor overheating.

- **Cable entries seal:**
  In any working condition, the inner rubber of cable entries must be with the good seal performance even the product is not used, very strict inspection has been taken before shipment, the device should be stored at the dry location if il is unable to be installed on time, please do not take away the cable gland which will be used to avoid the corrosion.

- **Electric wiring:**
  1. Separate the cover of the Actuator by loosening the four cover bolts.
  2. Confirm that the wiring diagram located in the Actuator and Wiring No. on the name plate match each other.
  3. Confirm that the main power and power supply are described on the name plate of Actuator match with each other.
  4. CAR-H - Series uses a spring terminal strip to allow easy wiring and to protect against vibration.



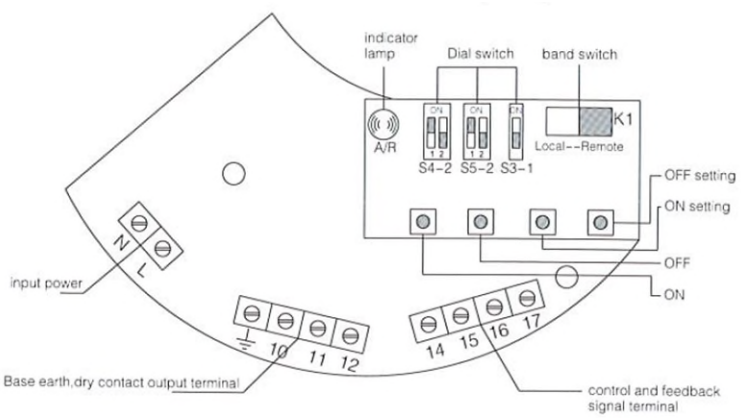


3. Connection

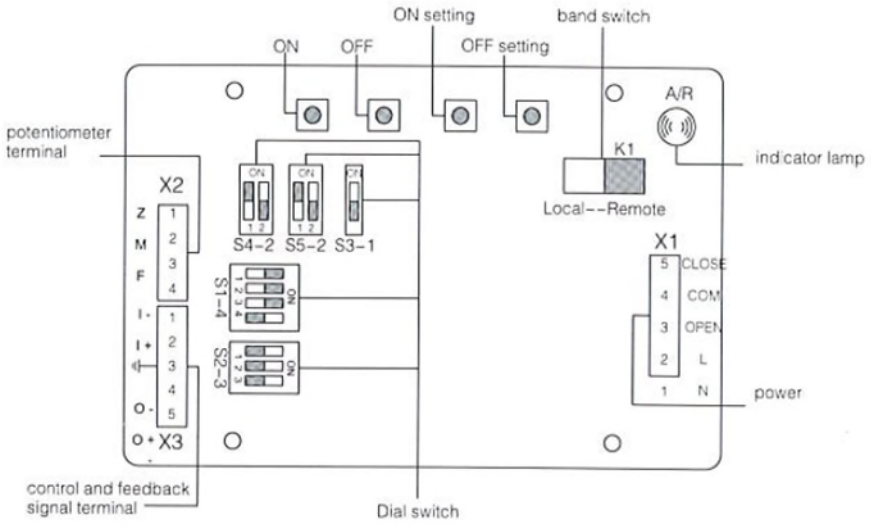
3.3 Modulating/ PCU operation

Main technical parameter and performance of PCU control module
input control signal loss protection.
Local manual operation.
Potentiometer intermediate position identification, failure alarm.
Dead band and Polarity setting according to the real situation.
input and output signal available:4-20mA or 0-1 0V (DIP switch)
input resistance: 150Ω (current); ≥ 400K Ω (voltage)
Load resistance ≤750 Ω

Panel of PCU control module for CAR-H-006-010



Panel of PCU control module for CAR-H-020-S250



3. Connection

3.3 Modulating/ PCU operation

- **Operation instruction of PCU control module**

1. DIP switch status and content (DIP switch must be set in "Local "status.)
   Dead band set (S4-2)
   Set by DIP switch S4-2, including 1%,2%,3%.
   Relation between switch status and dead band as below:



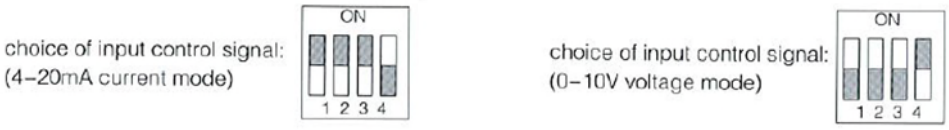
2. Valve position action after Control signal loss(S5-2)
   Control signal fail below 2.5mA or above 21.5mA, voltage signal above 11V, actuator moves as signal loss, three options: Stop, full open; full close.
   Set by DIP switch S5-2. Relation between switch status and valve position as below:



3. Set of automatically control of positive and negative action (S3-1)



4. Control signal selection(S1-4) – for CAR-H 020-S250
   Set by DIP switch S1-4, two options: voltage mode, current mode. Relation between switch status and control signal as below:



CAUTION!

Set by DIP switches of 4-20 mA and 0-10V available for type actuators CAR-H-020-S250
For CAR-H-006-010 actuators, these parameters must be specified when placing the order.

3. Connection

3.3 Modulating/ PCU operation

5. Feedback signal selection(S2-3) – for CAR-H 020-S250
   Set by DIP switch S2-3, two options: voltage, mode, current mode, Relation between switch status and feedback signal as below:



CAUTION!

Set by DIP switches of 4-20 mA and 0-10V available for type actuators CAR-H-020-S250 For the actuators type CAR-H-006-010 those parameters must be selected when you make the order.

- **Operation method**
  PCU series control module includes two statuses, "Local" and "Remote", switched by K1. If the switch K1 place at "Remote", valve actuator will input the remote analogue signal to control.
  If the switch K1 place at "Local", the indicator lamp will be green, valve actuator can be operated as below:

- **Manual operation**
  Actuator moves toward opening after pressing the ON key on PCU panel, but it stops moving after the key released; likewise, Actuator moves toward closing after pressing the OFF key on PCU panel, but it stops moving after the key released.
  Note:
  When the actuator moves, the indicator lamp will be green, but il will go out at once, after reaching a certain position il means the potentiometer is at the intermediate position. This is a normal situation; user can reset the potentiometer according to this situation.

- **Full open, full close calibration**
  The travel switch should be set before calibration.

- **Full open calibration**
  Actuator reaches the fully open position after pressing the ON key on PCU panel, then press and hold the "ON calibration" key in 5 seconds, please release the key when the indicator lamp tum red, full open calibration is finished when the lamp tum green.

- **Full close calibration**
  Actuator reaches the full close position after pressing the OFF key on PCU panel, then press and hold the "OFF calibration" key in 5 seconds, please release the key when the indicator lamp tum red, full close calibration is finished when the lamp tum green.

3. Connection

3.3 Modulating/ PCU operation

- **Control signal and feedback signal correction**

  PCU control module has already passed the standard signal correction before delivery, there is
  no need to correct again. If the user needs to re- calibrate it on site, please do il as follows: control signal correction
  Control signal calibration adopts linearization self-processing, collecting the high reference only,
  do it as following steps to adjust the control signal:

  a. Access signal source through the input terminal of control signal, pay attention to positive and negative, then access 20mA or 10V high reference based on the position of DIP switch" S1-4".

  b. Place the switch K1 at "Local" position.

  c. Press and hold "ON calibration" key for 2 seconds, then press the "OFF calibration" key at the same time, after releasing all keys, the lamp tum red to access the process of control signal calibration. Press "OFF" key and hold il in 5 seconds, after the lamp tum green, release the key, calibration is finished.

- **Feedback signal correction**

  Do il as following steps to adjust the feedback signal:

  a. According to the position of DIP switch"S1-4", access the current or voltage instrument through feedback output terminal.

  b. Place the switch K1 at "Local" position.

  c. Press and hold "OFF calibration" key in 2 seconds, then press the "ON calibration" key at the same time, after releasing all keys, the lamp tum red to access the process of feedback signal calibration.

  Watching the instrument, press "ON calibration" key to increase the output signal, press "OFF calibration" key to decrease the output signal, after adjusting the output as the low reference required, press and hold the "ON" key in 2 seconds, the indicator lamp tum red, release the key to exit the low reference correction and access the high reference correction. Same as the steps of low reference correction, after adjusting the output as the high reference required, press "OFF" key, the indicator lamp tum green. It means the correction is finished.

3. Connection

3.3 Modulating/ PCU operation

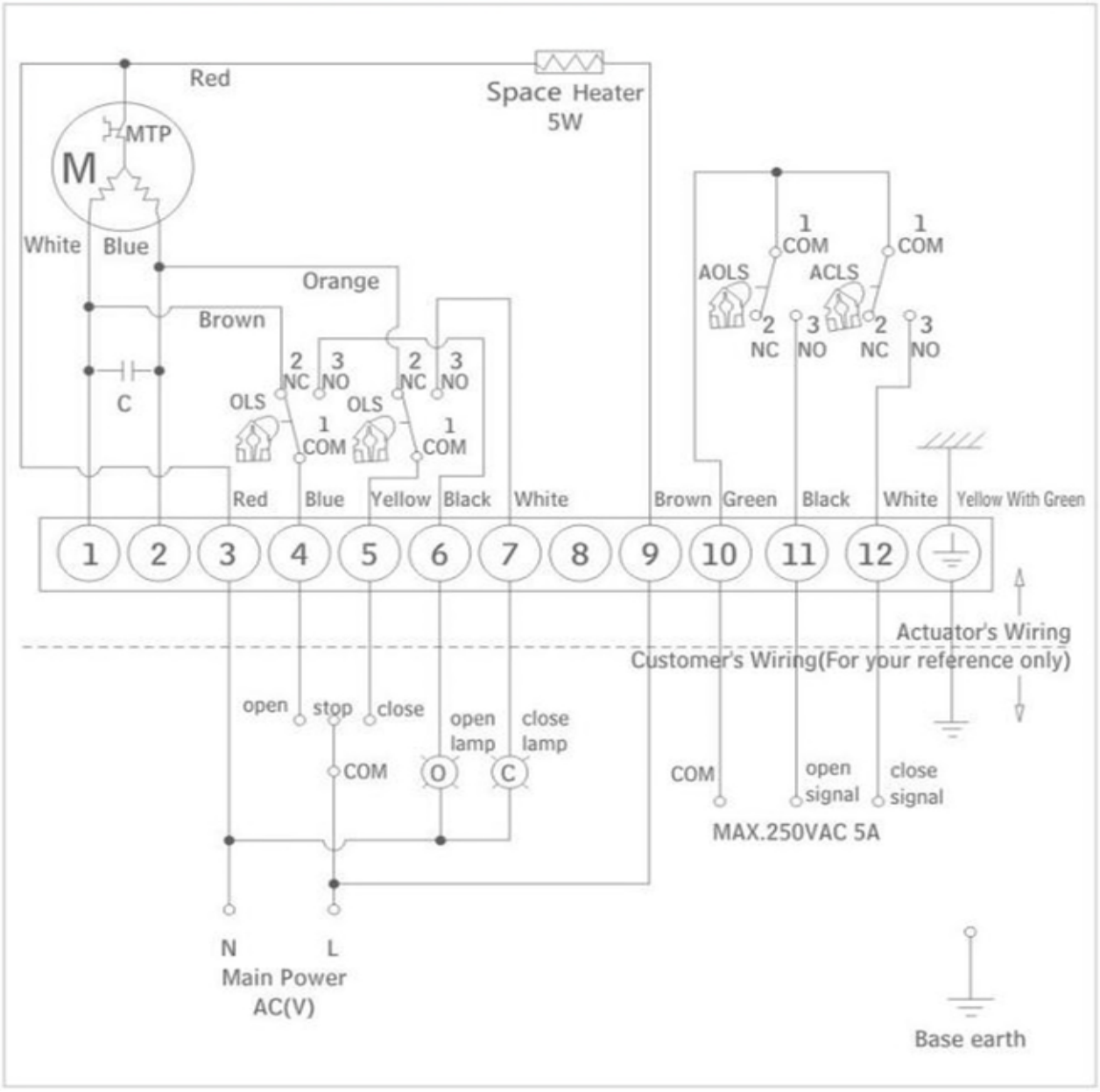
PCU troubleshooting

Status	Troubles	Reasons	Shooting
Local	**Indicator lamp does not work**	Without power supply, control module failure	Provide power supply, exchange control module
	Keys no responses	Overheating or motor damage	Cooling motor, exchange motor
		Limit switch or torque switch action damage	Check the cam; the jammed valve and actuator. Exchange switches
	Red lamp always	Control signal failure Incorrect signal input or incorrect control signal correction	Check input signal, positive and negative line Recalibrate the control signal
Remote	**Indicator lamp blink red**	Feedback signal failure (Refers to control signal value)	Fully open position and full close position recalibration
		Potentiometer is at dead band	Re-adjusting potentiometer travel and recalibrate full open close position
	Indicator lamp blink red	Potentiometer is at dead band	Re-adjusting potentiometer travel and re-calibrate full open /full close position
		Potentiometer cable damaged	Check potentiometer cable or exchange potentiometer

3. Connection

3.4 Wiring diagram

Actuators CAR-H 006-010 type ON-OFF power 110 or 230VAC



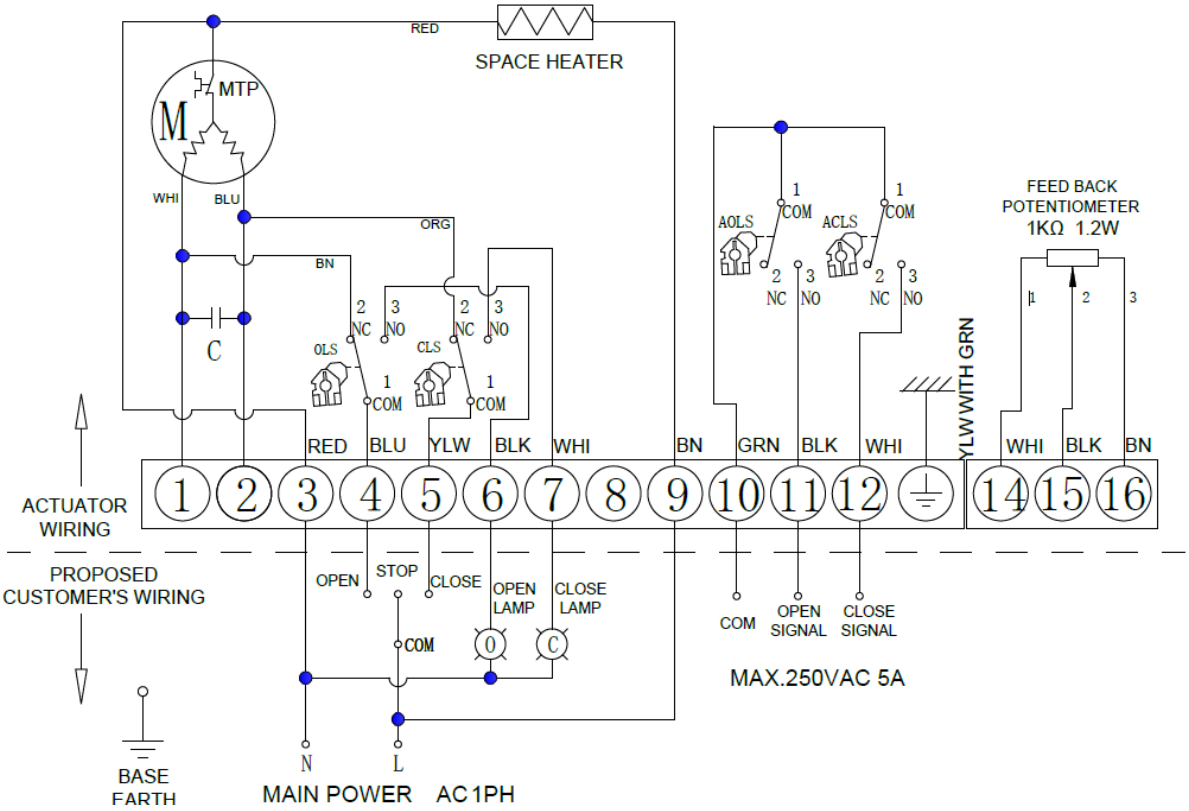
AOLS:	AUX. Open Limit Switch (250VAC 5A)
ACLS:	AUX. Close Limit Switch (250VAC 5A)
O:	Open lamp
C:	Close lamp
CLS:	Close limit switch
OLS:	Open limit switch
KMC:	Magnetic Contactor Close
KMO:	Magnetic Contactor Open
MTP:	Motor Thermal Protector
M:	Motor

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. Connection

3.4 Wiring diagram

Actuators CAR-H 006-010 R type ON-OFF power 110 or 230VAC

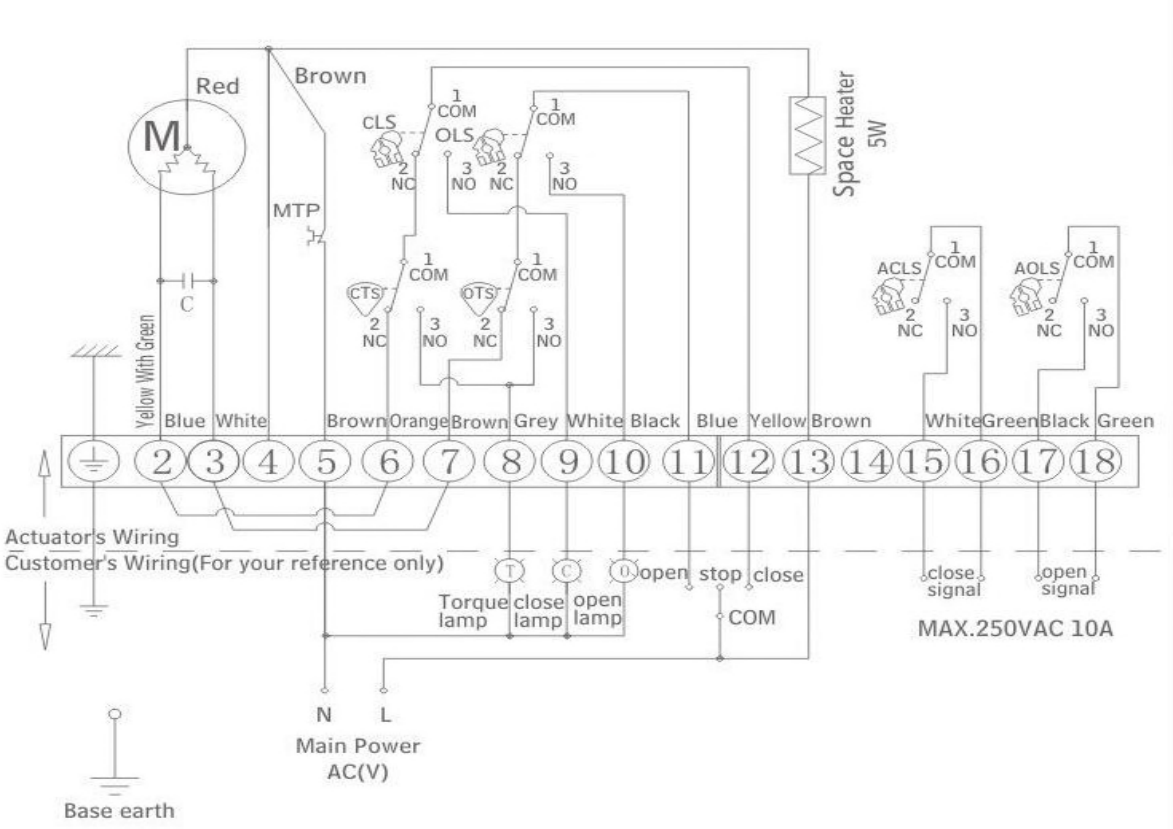


AOLS:	Close Limit Switch (250VAC 5A)
ACLS:	Open Limit Switch (250VAC 5A)
O:	Open lamp
C:	Close lamp
CLS:	Close limit switch
OLS:	Open limit switch
MTP	Motor thermal Protector
M	Motor
RP1	Potentiometer 1KΩ

3. Connection

3.4 Wiring diagram

Actuators CAR-H 016-S400 type ON-OFF -power 110 or 230VAC



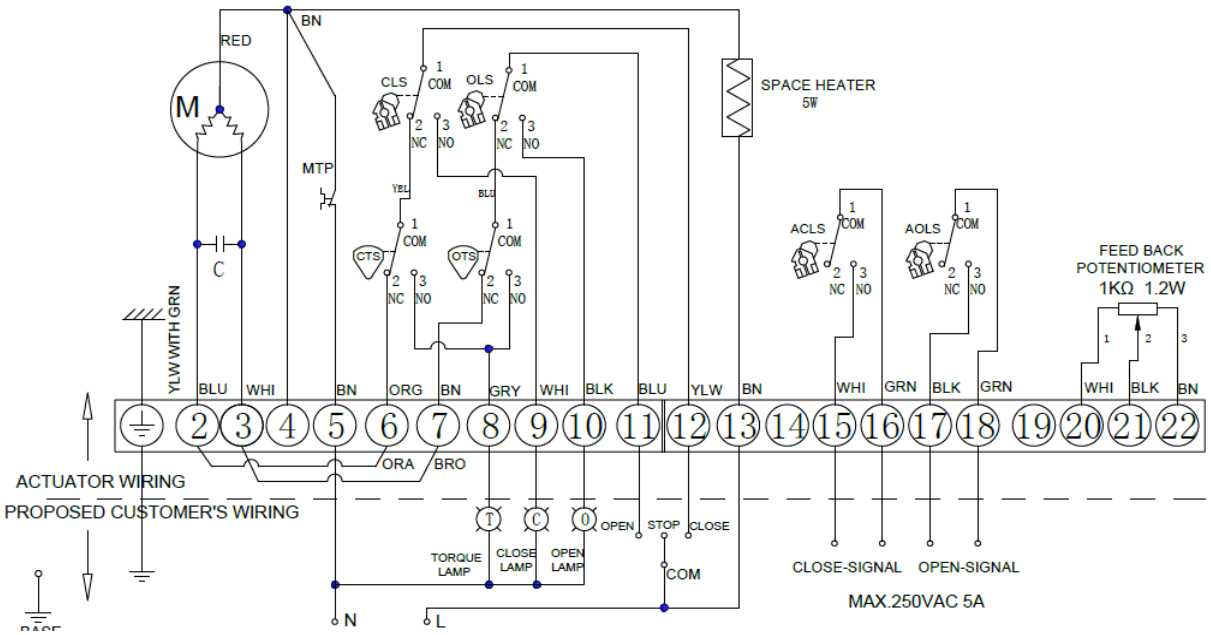
AOLS:	AUX. Open Limit Switch (250VAC 10A)
ACLS:	AUX. Close Limit Switch (250VAC 10A)
O:	Open lamp
C:	Close lamp
T:	Torque switch
CLS:	Close limit switch
OLS:	Open limit switch
CTS:	Close torque switch
OTS:	Open torque switch
RP1:	Potentiometer 1KΩ
KMC:	Magnetic Contactor Close
KMO:	Magnetic Contactor 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	
AOLS 1-2	
AOLS 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

3. Connection

3.4 Wiring diagram

Actuators CAR-H 016-S400 R type ON-OFF -power 110 or 230VAC

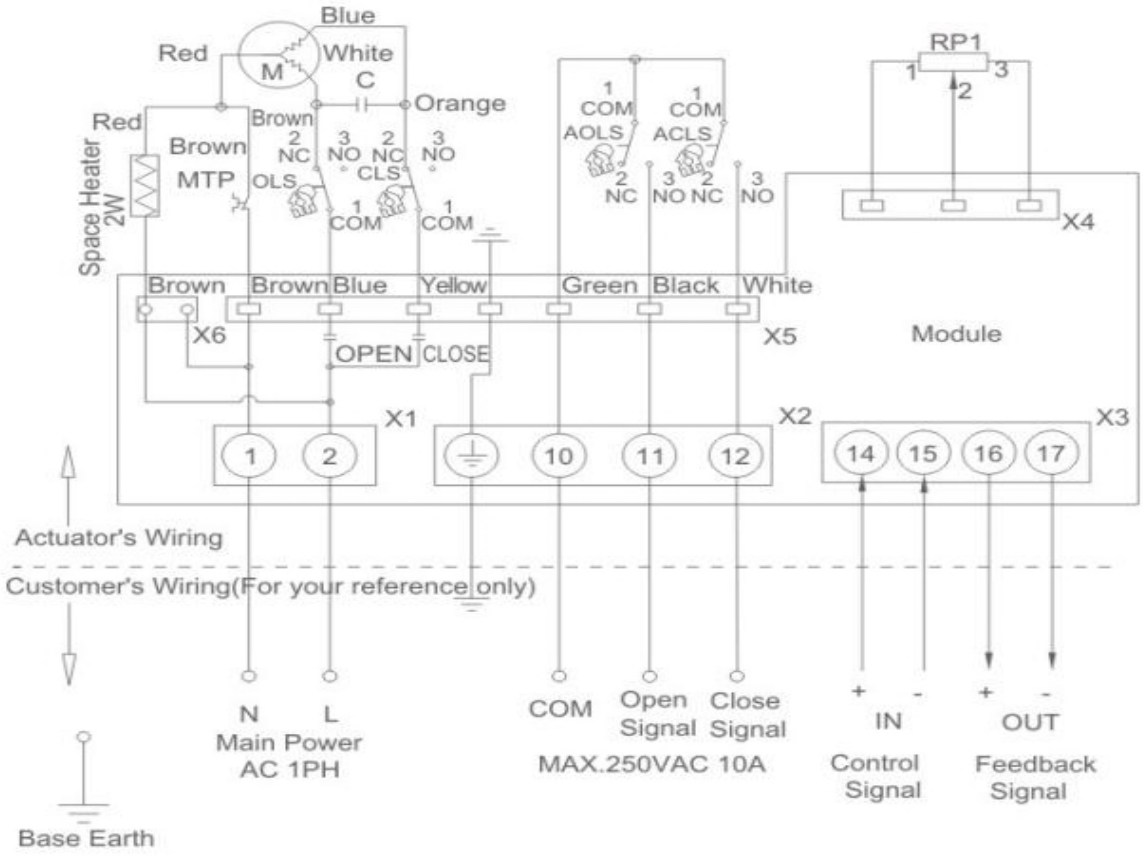


AOLS:	Close Limit Switch (250VAC 5A)
ACLS:	Open Limit Switch (250VAC 5A)
O:	Open lamp
C:	Close lamp
CLS:	Close limit switch
OLS:	Open limit switch
CTS:	Close torque switch
OTS:	Open torque switch
MTP	Motor thermal Protector
M	Motor
RP1	Potentiometer 1KΩ

3. Connection

3.4 Wiring diagram

Actuators CAR-H 016-010 type Modulating /PCU/ power 110 or 230VAC



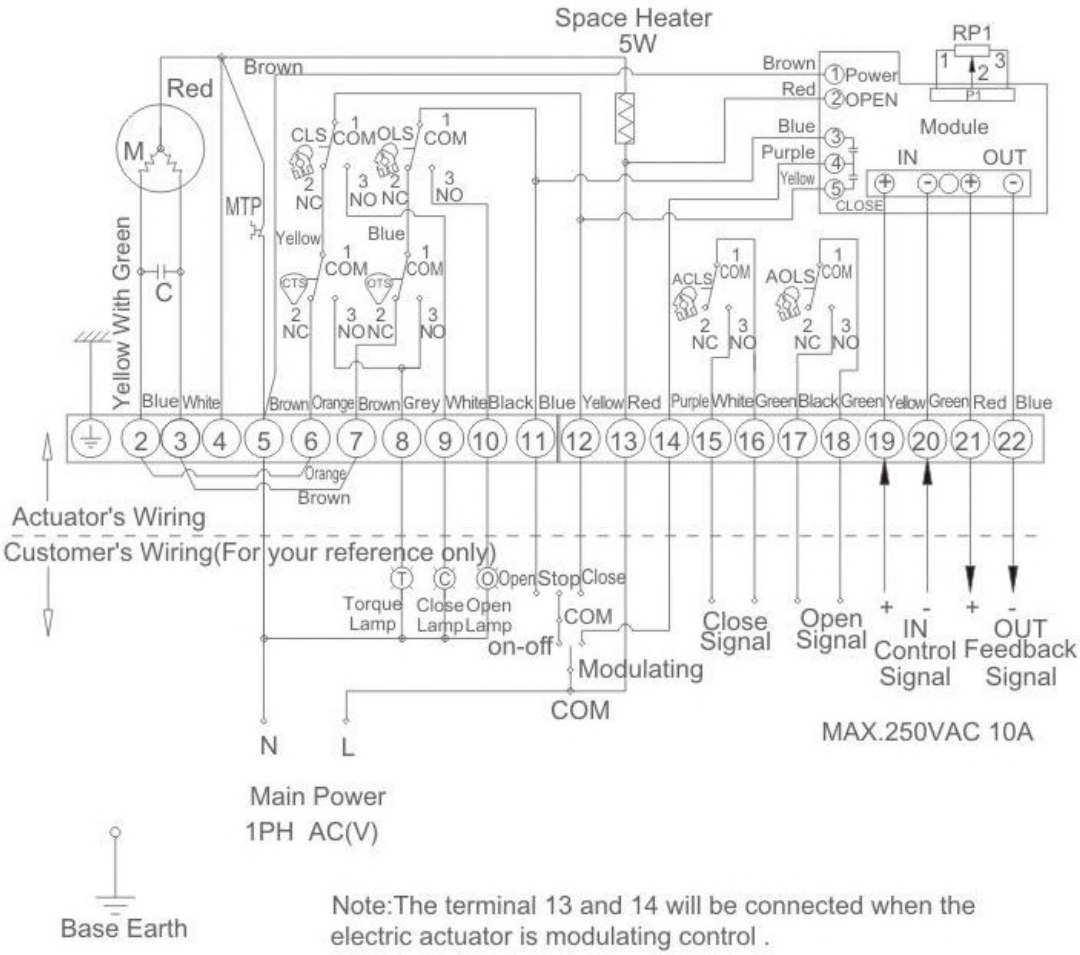
AOLS:	AUX. Open Limit Switch (250VAC 10A)
ACLS:	AUX. Close Limit Switch (250VAC 10A)
O:	Open lamp
C:	Close lamp
T:	Torque switch
CLS:	Close limit switch
OLS:	Open limit switch
RP1:	Potentiometer 1KΩ
KMC:	Magnetic Contactor Close
KMO:	Magnetic Contactor Open
MTP:	Motor Thermal Protector
M:	Motor



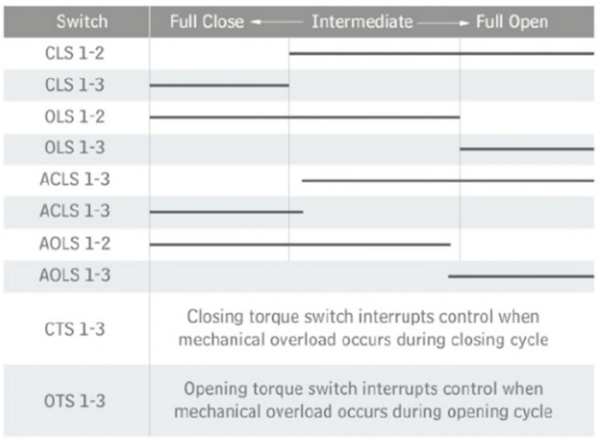
3. Connection

3.4 Wiring diagram

Actuators CAR-H 016-S400 type Modulating /PCU/ powered 110-230VAC



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

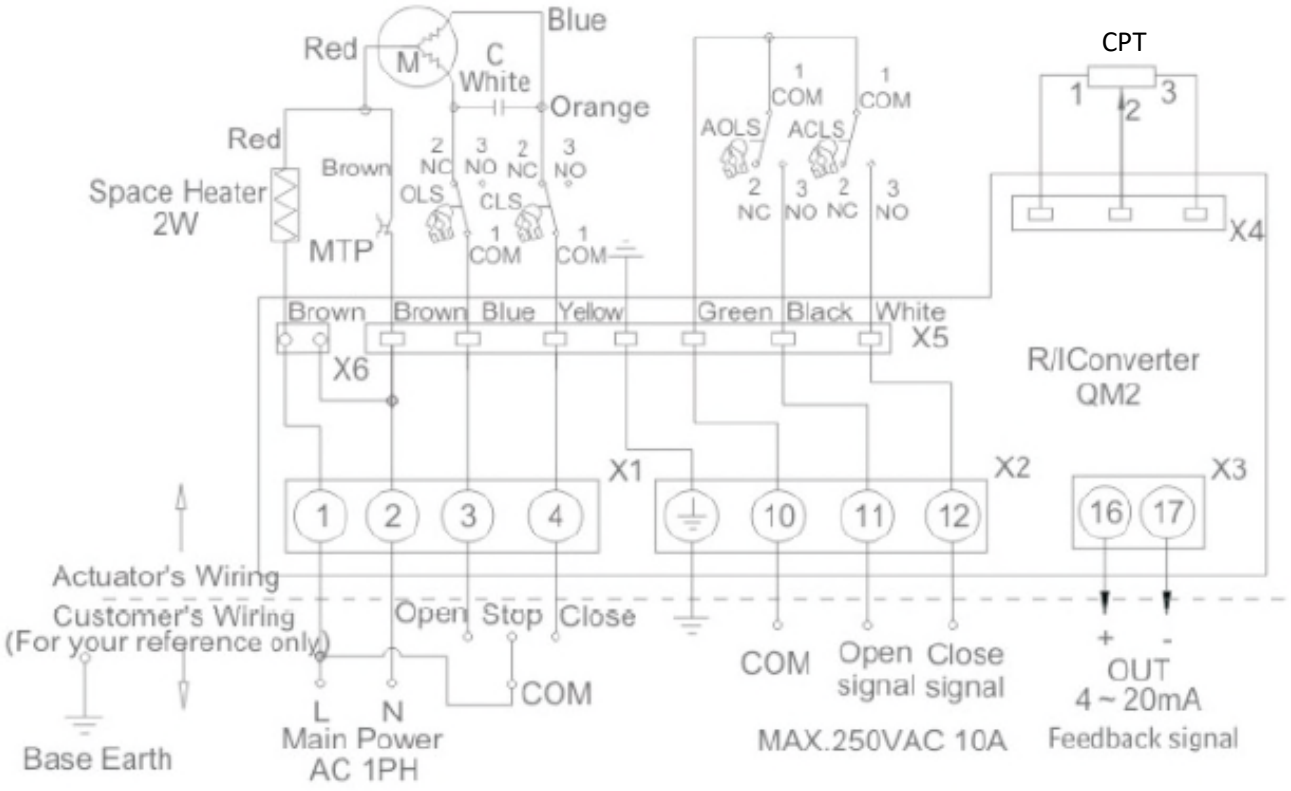


3. Connection

3.4 Wiring diagram

Actuators CAR-H 006-010 type CPT - power 110 or 230VAC

- Analog feedback signal 4-20mA
- Dead band 1%
- Self-powered



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

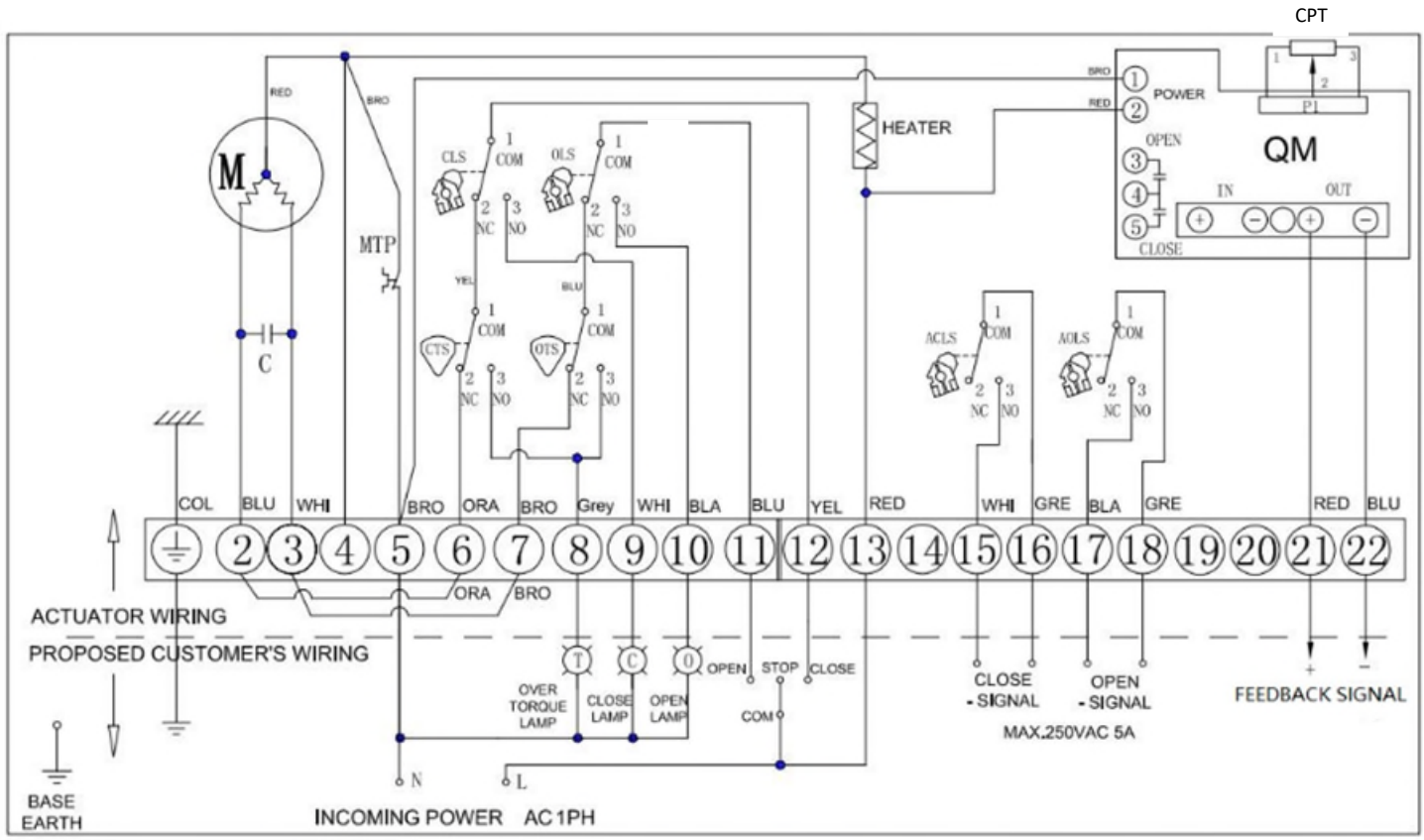


3. Connection

3.4 Wiring diagram

Actuators CAR-H 016-S400 type CPT / powered 110 or 230VAC

- Analog feedback signal 4-20mA
- Dead band 1%
- Self-powered



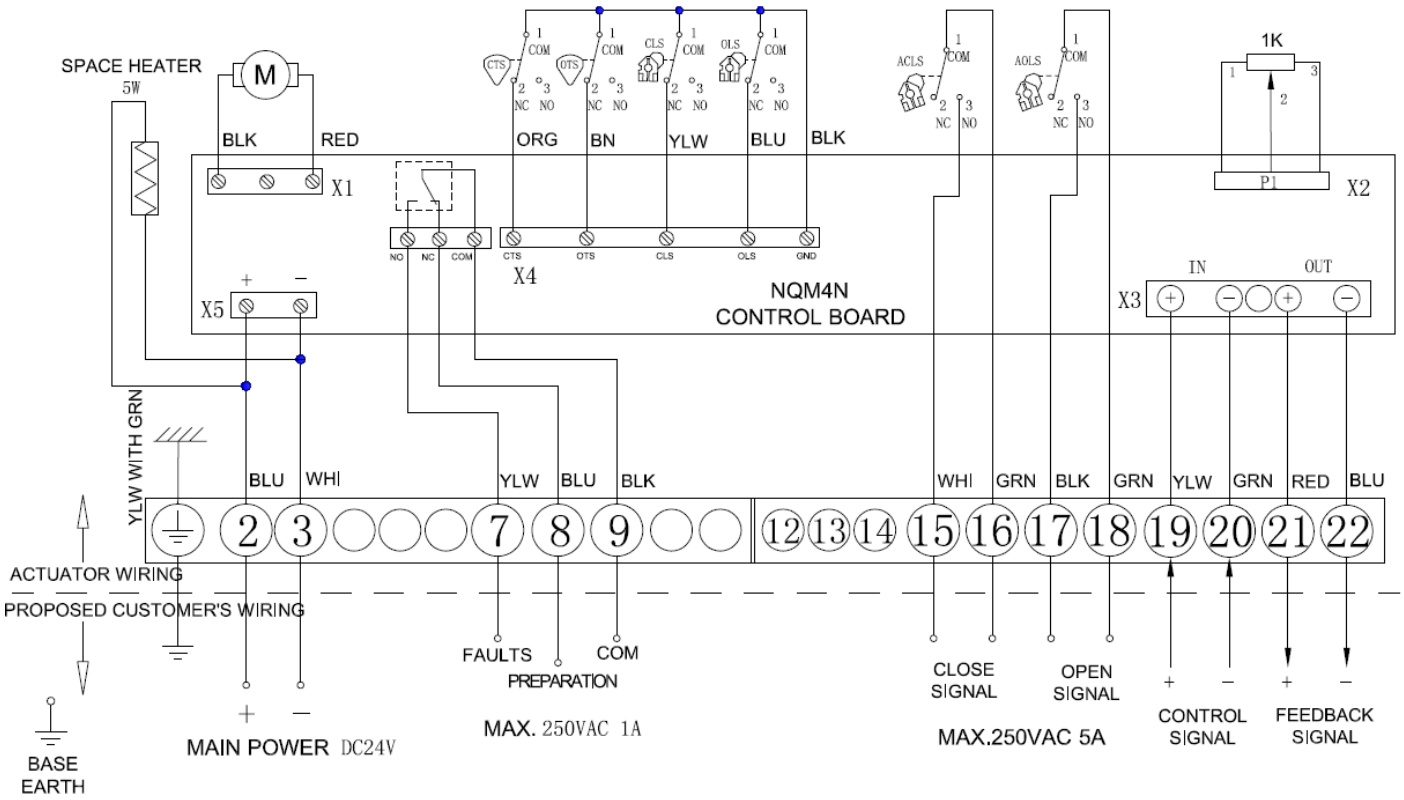
AOLS:	AUX. Open Limit Switch (250VAC 5A)
ACLS:	AUX. Close Limit Switch (250VAC 5A)
O:	Open lamp
C:	Close lamp
T:	Torque switch
CLS:	Close limit switch
OLS:	Open limit switch
RP1:	Potentiometer 1KΩ
KMC:	Magnetic Contactor Close
KMO:	Magnetic Contactor Open
MTP:	Motor Thermal Protector
M:	Motor

Switch	Full Close ← Intermediate → Full Open
CLS 1-2	
CLS 1-3	
OLS 1-2	
OLS 1-3	
ACLS 1-3	
ACLS 1-3	
AOLS 1-2	
AOLS 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

3. Connection

3.4 Wiring diagram

Actuators CAR-H 016-035 PCU / powered DCV24



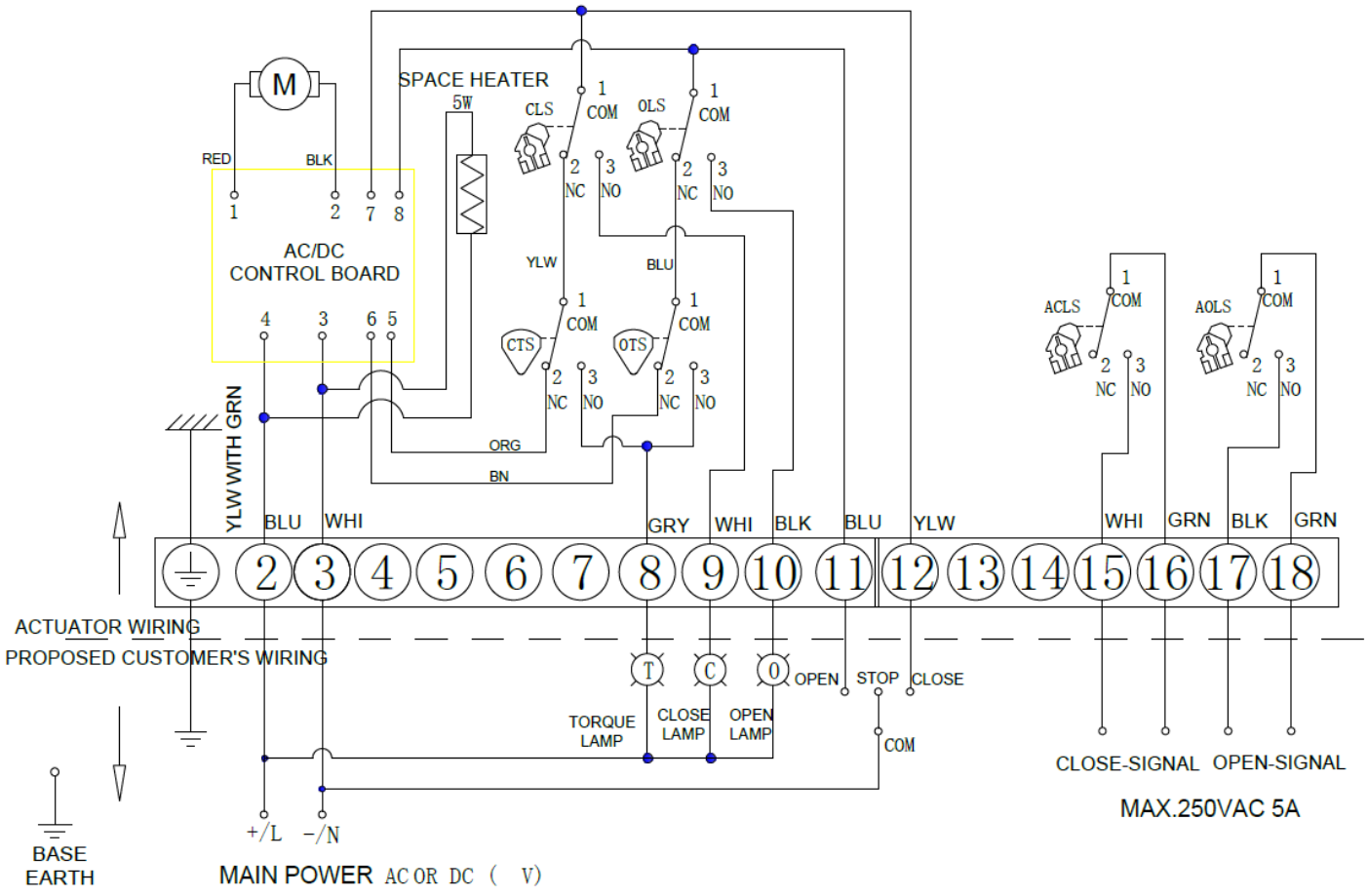
AOLS:	AUX. Open limit switch (250VAC 5A)
ACLS:	AUX. Close limit switch (250VAC 5A)
O:	Open lamp
C:	Close lamp
CLS:	Close limit switch
OLS:	Open limit switch
CTC:	Close torque switch
OTC:	Open torque switch
1K:	Potentiometer 1KΩ
M:	Motor



3. Connection

3.4 Wiring diagram

Actuators CAR-H 016-250 ON/OFF/ powered DCV24



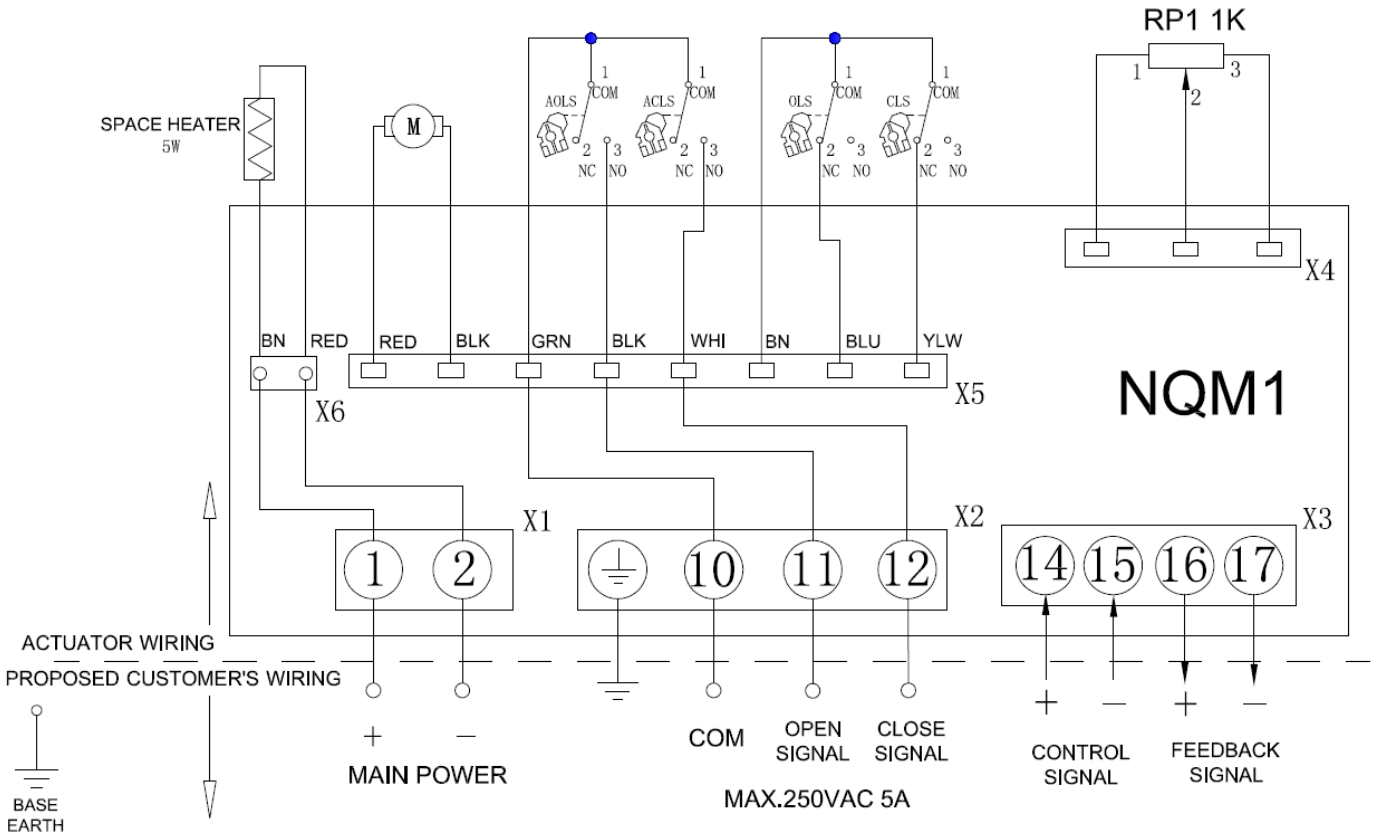
AOLS:	AUX. Open Limit Switch (250VAC 5A)
ACLS:	AUX. Close Limit Switch (250VAC 5A)
O:	Open Lamp
C:	Close Lamp
T:	Torgue Lamp
CLS:	Close limit switch
OLS:	Open limit switch
CTC:	Close torque switch
OTC:	Open torque switch
M:	Motor

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			

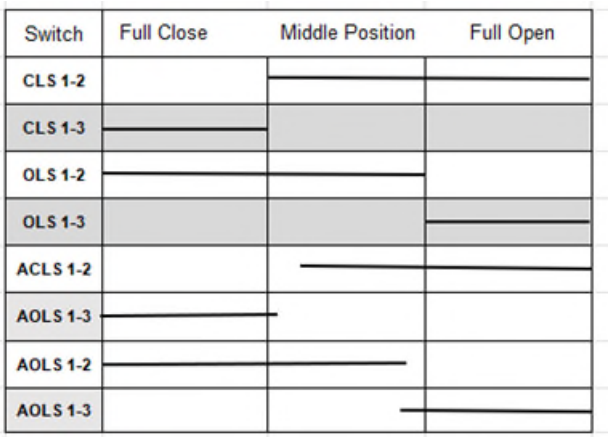
3. Connection

3.4 Wiring diagram

Actuators CAR-H 006-010 PCU / powered DCV24



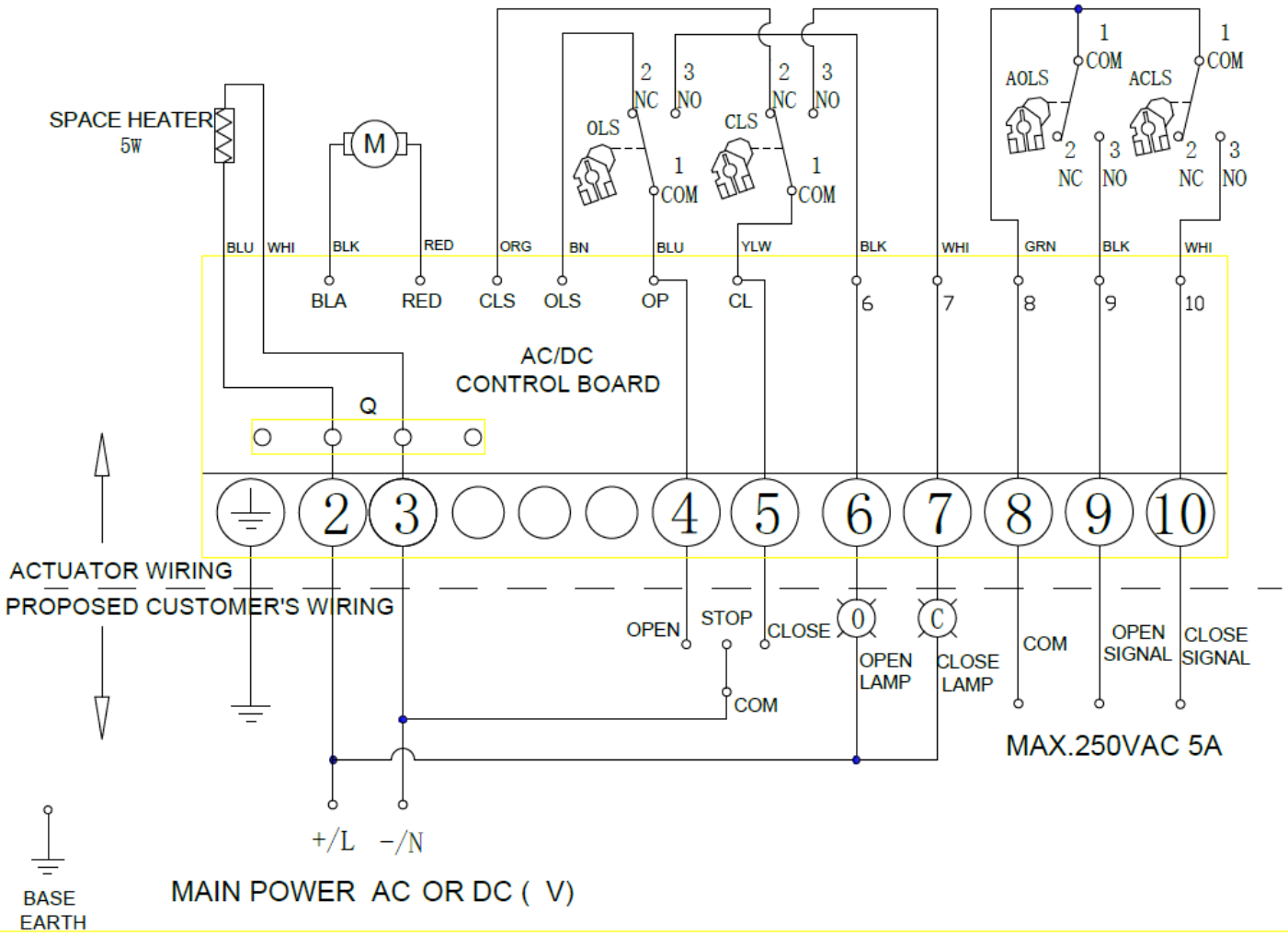
AOLS:	AUX. Open Limit Switch (250VAC 5A)
ACLS:	AUX. Close Limit Switch (250VAC 5A)
O:	Open Lamp
C:	Close Lamp
CLS:	Close limit switch
OLS:	Open limit switch
1K	Potentiometer feedback 1 KΩ
M:	Motor



3. Connection

3.4 Wiring diagram

Actuators CAR-H 006-010 ON/OFF / powered DCV24



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			—

3. Connection

3.5 Failures checking and maintenance

Mechanical failures

1. After depressing the manual override, please drive valve with hand wheel to check If the manual override is reliable and sensitive.
2. Check if the action and indication of indicator windows is correct.
3. Disassemble the valve due to motionless handwheel and jammed valve. If the valve can be driven by handwheel, please check electrical.
4. Hand wheel works normally without any jams. but valve stem doesn't move any more, please check if adaptor is reliable or not.

Electrical failures (checking external control equipment first, then checking the electric actuator)

5. Check if the power supply, control power, relay, fuse, all lamps, and switches are normal.
6. Check if the motor is normal, please exchange it if there are any problems.
7. Check if the microswitch is normal, it can be solved by exchanging related components.

Maintenance

8. Suggestion of twice regular maintenances one year or periodical inspection

3.6 Warm Warning

To ensure the enclosure protection, user must operate the electric actuator in accordance with "User Manual" and" Warm Warming"! Users take responsibility for incorrect operations or any operations without referring to "User Manual" and "Warm Warming" causing enclosure protection failure.

AII related spare parts with enclosure protection have been tested strictly to guarantee its good sealing before delivery. Users must ensure the following notices if any adjustments, maintenance or other needs:

1. The electric actuator doesn't have the enclosure protection function when it is adjusted or operated; users must protect it away from rain, snow, hail, tidal air, dust.

2. After adjusting or maintenance, users should ensure there are no negative factors left inside of actuator like water, dust, and serious tidal air to affect the enclosure protection performance.

3. After adjusting and maintenance, user must make sure all screws light and O-ring without damage.

4. User should ensure the good sealing of cable entries and gland.

5. User should ensure the good sealing of actuator after opening and resetting the indicator window or selector.

Contact

write to Clorius Controls**: clorius@vexve.com**

More information can be explored in https://www.cloriuscontrols.com/

End of manual