

Clorius KF 20-series LON Interface



KF 2010-2040 version 1.1

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2 LON Interface tables

2.1 KF 2010

2.1.1 Input Network Variables

NV#	Name	SNVT Type	Description
0.	nviFrostStop	SNVT_switch	Stops fans and gives Frost alarm
1.	nviExchgStatus	SNVT_switch	DI4 Exchanger alarm.
2.	nviFireAlarm	SNVT_switch	DI5 Fire alarm.
3.	nviExhAirTemp	SNVT_temp_p	AI3 Exhaust air temperature.
4.	nviAI4	SNVT_temp_p	AI4 Extract air/ Exchanger return air temperature/External set point
5.	nviOutdoorTemp	SNVT_temp_p	AI5 Outdoor air temperature.
6.	nviSupplyAirTemp	SNVT_temp_p	AI6 Supply air temperature.
7.	nviSpaceTemp	SNVT_temp_p	AI7 Space temperature.
8.	nviY1	SNVT_lev_percent	Valve override.
9.	nviY2	SNVT_lev_percent	Valve override.
10.	nviY3	SNVT_lev_percent	Valve override.
11.	nviFanSpeedCmd	SNVT_lev_percent	Commands Fans into requested speed
12.	nviSetPoint	SNVT_temp_p	Temp control set point
13.	nviSetptoffset	SNVT_temp_p	Temp control set point offset
14.	nciTempCtrlSets	UNVT_temp_sets	Configuration Temp Control
15.	nciTempCtrlParams	UNVT_temp_parms	PID Loop Configuration
16.	nciSettings	UNVT_corr_sets	Various settings
17.	nciAlarmSettings	UNVT_alarm_sets	Alarm settings.
18.	nciSndHrtBt	SNVT_time_sec	Network var. update rate, i.e. heartbeat.
19.	nciRcvHrtBt	SNVT_time_sec	Receive heartbeat / input network variable update rate.
20.	nciTimeChan	SNVT_str_asc	Time channel settings
21.	nciHolidays	SNVT_str_asc	Holiday settings
22.	nciHolidayPds	SNVT_str_asc	Holiday periods setting
23.	nciConfigCode	SNVT_str_asc	Configuration code input variable.
24.	nviAIObserve	SNVT_state	Alarm observed input.

2.1.2 Node Object Mandatory and Optional Variables (IN/OUT)

NV#	Name	SNVT Type	Description
24.	nviRequest	SNVT_obj_request	Object status request.
25.	nviTimeSet	SNVT_time_stamp	Sets real-time clock.
26.	nvoStatus	SNVT_obj_status	Object status request response variable.
27.	nvoAlarm	SNVT_alarm	NOT IMPLEMENTED ;LonMark standard alarm SNVT.

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2.1.3 Output Network Variables

NV#	Name	SNVT Type	Description
28.	nvoUnitStatus	SNVT_hvac_status	Control status (Setpoint and outputs).
29.	nvoAlarm1	SNVT_state	Alarm output 1.
30.	nvoAlarm2	SNVT_state	Alarm output 2.
31.	nvoDIStatus	SNVT_state	DI 1-8 status.
32.	nvoFilterStatus	SNVT_switch	DI1 Filterguard, Supply and Exhaust Fan.
33.	nvoPumpStatus	SNVT_switch	DI2 Indicator, pump.
34.	nvoCoolerAlarm	SNVT_switch	DI3 Cooler alarm.
35.	nvoExchgStatus	SNVT_switch	DI4 Exchanger alarm or freeze-up.
36.	nvoFireAlarm	SNVT_switch	DI5 Fire alarm.
37.	nvoSupFanStatus	SNVT_switch	AI1 Supply fan status.
38.	nvoExhFanStatus	SNVT_switch	AI2 Exhaust fan status.
39.	nvoExhAirTemp	SNVT_temp_p	AI3 Exhaust air temperature.
40.	nvoAI4	SNVT_temp_p	AI4 Extract air / Exchanger return air temperature.
41.	nvoOutdoorTemp	SNVT_temp_p	AI5 Outdoor temperature.
42.	nvoSupplyAirTemp	SNVT_temp_p	AI6 Supply air temperature.
43.	nvoSpaceTemp	SNVT_temp_p	AI7 Space temperature.
44.	nvoFrostTemp	SNVT_temp_p	AI8 Overheat/Frost protection indicator.
45.	nvoEfficiency	SNVT_lev_percent	Heat exchanger efficiency output.
46.	nvoPumpCmd	SNVT_switch	DU3 Pump control.
47.	nvoY1	SNVT_lev_percent	Heating/cooling sequence Y1.
48.	nvoY2	SNVT_lev_percent	Heating/cooling sequence Y2.
49.	nvoY3	SNVT_lev_percent	Heating/cooling sequence Y3.
50.	nvoTime	SNVT_time_stamp	Real-time clock output.
51.	nvoFanSpeed	SNVT_switch	Fan Speed / Running Mode.
52.	nvoSupFanSpeed	SNVT_switch	Supply fan speed indicator.
53.	nvoExhFanSpeed	SNVT_switch	Exhaust fan speed indicator.
54.	nvoEffectSetpt	SNVT_temp_p	Calculated (effective) set point.
55.	nvoConfigCode	SNVT_str_asc	Configuration code output.

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2.2 KF 2020

2.2.1 Input Network Variables

NV#	Name	SNVT Type	Description
0.	nviFrostStop	SNVT_switch	Stops fans and gives Frost alarm
1.	nviExchgStatus	SNVT_switch	DI4 Exchanger alarm.
2.	nviFireAlarm	SNVT_switch	DI5 Fire alarm.
3.	nviExhAirTemp	SNVT_temp_p	AI3 Exhaust air temperature.
4.	nviAI4	SNVT_temp_p	AI4 Extract air/ Exchanger return air temperature/External set point
5.	nviOutdoorTemp	SNVT_temp_p	AI5 Outdoor air temperature.
6.	nviSupplyAirTemp	SNVT_temp_p	AI6 Supply air temperature.
7.	nviSpaceTemp	SNVT_temp_p	AI7 Space temperature.
8.	nviY1	SNVT_lev_percent	Valve override.
9.	nviY2	SNVT_lev_percent	Valve override.
10.	nviY3	SNVT_lev_percent	Valve override.
11.	nviFanSpeedCmd	SNVT_lev_percent	Commands Fans into requested speed
12.	nviSetPoint	SNVT_temp_p	Temp control set point
13.	nviSetpointSF	SNVT_press_p	Supply fan pressure set point.
14.	nviSetpointEF	SNVT_press_p	Exhaust fan pressure set point.
15.	nviSetptoffset	SNVT_temp_p	Temp control set point offset
16.	nciTempCtrlSets	UNVT_temp_sets	Configuration Temp Control
17.	nciTempCtrlParams	UNVT_temp_parms	PID Loop Configuration
18.	nciPressCtrlSets	UNVT_press_sets	Pressure control settings.
19.	nciSettings	UNVT_corr_sets	Various settings
20.	nciAlarmsettings	UNVT_alarm_sets	Alarm settings.
21.	nciSndHrtBt	SNVT_time_sec	Network var. update rate, i.e. heartbeat.
22.	nciRcvHrtBt	SNVT_time_sec	Receive heartbeat / input network variable update rate.
23.	nciTimeChan	SNVT_str_asc	Time channel settings
24.	nciHolidays	SNVT_str_asc	Holiday settings
25.	nciHolidayPds	SNVT_str_asc	Holiday periods setting
26.	nciConfigCode	SNVT_str_asc	Configuration code input variable.
27.	nviAIObserve	SNVT_state	Alarm observed input.

2.2.2 Node Object Mandatory and Optional Variables (IN/OUT)

NV#	Name	SNVT Type	Description
28.	nviRequest	SNVT_obj_request	Object status request.
29.	nviTimeSet	SNVT_time_stamp	Sets real-time clock.
30.	nvoStatus	SNVT_obj_status	Object status request response variable.
31.	nvoAlarm	SNVT_alarm	NOT IMPLEMENTED ;LonMark standard alarm SNVT.

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2.2.3 Output Network Variables

NV#	Name	SNVT Type	Description
32.	nvoUnitStatus	SNVT_hvac_status	Control status (Setpoint and outputs).
33.	nvoAlarm1	SNVT_state	Alarm output 1.
34.	nvoAlarm2	SNVT_state	Alarm output 2.
35.	nvoDIStatus	SNVT_state	DI 1-8 status.
36.	nvoFilterStatus	SNVT_switch	DI1 Filterguard, Supply and Exhaust Fan.
37.	nvoPumpStatus	SNVT_switch	DI2 Indicator, pump.
38.	nvoCoolerAlarm	SNVT_switch	DI3 Cooler alarm.
39.	nvoExchgStatus	SNVT_switch	DI4 Exchanger alarm or freeze-up.
40.	nvoFireAlarm	SNVT_switch	DI5 Fire alarm.
41.	nvoSFPressure	SNVT_press_p	AI1 Supply fan pressure.
42.	nvoEFPressure	SNVT_press_p	AI2 Exhaust fan pressure.
43.	nvoExhAirTemp	SNVT_temp_p	AI3 Exhaust air temperature.
44.	nvoAI4	SNVT_temp_p	AI4 Extract air / Exchanger return air temperature.
45.	nvoOutdoorTemp	SNVT_temp_p	AI5 Outdoor temperature.
46.	nvoSupplyAirTemp	SNVT_temp_p	AI6 Supply air temperature.
47.	nvoSpaceTemp	SNVT_temp_p	AI7 Space temperature.
48.	nvoFrostTemp	SNVT_temp_p	AI8 Overheat/Frost protection indicator.
49.	nvoEfficiency	SNVT_lev_percent	Heat exchanger efficiency output.
50.	nvoPumpCmd	SNVT_switch	DU3 Pump control.
51.	nvoY1	SNVT_lev_percent	Heating/cooling sequence Y1.
52.	nvoY2	SNVT_lev_percent	Heating/cooling sequence Y2.
53.	nvoY3	SNVT_lev_percent	Heating/cooling sequence Y3.
54.	nvoTime	SNVT_time_stamp	Real-time clock output.
55.	nvoFanSpeed	SNVT_switch	Fan Speed / Running Mode.
56.	nvoSupFanSpeed	SNVT_switch	Supply fan speed indicator.
57.	nvoExhFanSpeed	SNVT_switch	Exhaust fan speed indicator.
58.	nvoEffectSetpt	SNVT_temp_p	Calculated (effective) set point.
59.	nvoEffectsetptSF	SNVT_press_p	Calculated (effective) supply air set point.
60.	nvoEffectsetptEF	SNVT_press_p	Calculated (effective) exhaust air set point.
61.	nvoConfigCode	SNVT_str_asc	Configuration code output.

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2.3 KF 2030

2.3.1 Input Network Variables

NV#	Name	SNVT Type	Description
0.	nviFrostStop	SNVT_switch	Stops fans and gives Frost alarm
1.	nviExchgStatus	SNVT_switch	DI4 Exchanger alarm.
2.	nviFireAlarm	SNVT_switch	DI5 Fire alarm.
3.	nviSpaceHumid	SNVT_lev_percent	AI3 Space humidity.
4.	nviDuctHumid	SNVT_lev_percent	AI4 Duct humidity.
5.	nviOutdoorTemp	SNVT_temp_p	AI5 Outdoor air temperature.
6.	nviSupplyAirTemp	SNVT_temp_p	AI6 Supply air temperature.
7.	nviSpaceTemp	SNVT_temp_p	AI7 Space temperature.
8.	nviY1	SNVT_lev_percent	Valve override.
9.	nviY2	SNVT_lev_percent	Valve override.
10.	nviY3	SNVT_lev_percent	Valve override.
11.	nviFanSpeedCmd	SNVT_switch	Commands Fans into requested speed.
12.	nviSetPoint	SNVT_temp_p	Temp control setpoint.
13.	nviSetpointH	SNVT_lev_percent	Humidity control setpoint.
14.	nviSetptoffset	SNVT_temp_p	Temp control setpoint offset.
15.	nciTempCtrlSets	UNVT_temp_sets	Configuration Temp Control.
16.	nciTempCtrlParms	UNVT_temp_parms	PID Loop Configuration.
17.	nciHumidCtrlSets	UNVT_humid_sets	Humidity control settings.
18.	nciSettings	UNVT_corr_sets	Various settings.
19.	nciAlarmSettings	UNVT_alarm_sets	
20.	nciRcvHrtBt	SNVT_time_sec	Receive heartbeat / input network variable update rate.
21.	nciSndHrtBt	SNVT_time_sec	Network var update rate, i.e. heartbeat.
22.	nciTimeChan	UNVT_scheduler	Time channel settings.
23.	nciHolidays	UNVT_holidays	Holiday settings.
24.	nciHolidayPds	UNVT_holiday_pds	Holiday periods setting.
25.	nciConfigCode	SNVT_str_asc	Configuration code input variable.
26.	nviAIObserve	SNVT_state	Alarm observed input.

2.3.2 Node Object Mandatory and Optional Variables (IN/OUT)

NV#	Name	SNVT Type	Description
26.	nviRequest	SNVT_obj_request	Object status request.
27.	nviTimeSet	SNVT_time_stamp	Sets real-time clock.
28.	nvoStatus	SNVT_obj_status	Object status request response variable.
29.	nvoAlarm	SNVT_alarm	NOT IMPLEMENTED ;LonMark standard alarm SNVT.

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2.3.3 Output Network Variables

NV#	Name	SNVT Type	Description
30.	nvoUnitStatus	SNVT_hvac_status	Control status (Setpoint and outputs).
31.	nvoAlarm1	SNVT_state	Alarm output 1.
32.	nvoAlarm2	SNVT_state	Alarm output 2.
33.	nvoDIStatus	SNVT_state	DI 1-8 status.
34.	nvoFilterStatus	SNVT_switch	DI1 Filterguard, Supply and Exhaust Fan.
35.	nvoPumpStatus	SNVT_switch	DI2 Indicator, pump.
36.	nvoExchgStatus	SNVT_switch	DI4 Exchanger alarm or freeze-up.
37.	nvoCoolerAlarm	SNVT_switch	DI3 Cooler alarm.
38.	nvoFireAlarm	SNVT_switch	DI5 Fire alarm.
39.	nvoSupFanStatus	SNVT_switch	AI1 Supply fan status.
40.	nvoExhFanStatus	SNVT_switch	AI2 Exhaust fan status.
41.	nvoSpaceHumid	SNVT_lev_percent	AI3 Space humidity.
42.	nvoDuctHumid	SNVT_lev_percent	AI4 Duct humidity.
43.	nvoOutdoorTemp	SNVT_temp_p	AI5 Outdoor temperature.
44.	nvoSupplyAirTemp	SNVT_temp_p	AI6 Supply air temperature.
45.	nvoSpaceTemp	SNVT_temp_p	AI7 Space temperature.
46.	nvoFrostTemp	SNVT_temp_p	AI8 Overheat/Frost protection indicator.
47.	nvoEfficiency	SNVT_lev_percent	Heat exchanger efficiency output.
48.	nvoPumpCmd	SNVT_switch	DU3 Pump control.
49.	nvoY1	SNVT_lev_percent	Heating/cooling sequence Y1.
50.	nvoY2	SNVT_lev_percent	Heating/cooling sequence Y2.
51.	nvoY3	SNVT_lev_percent	Heating/cooling sequence Y3.
52.	nvoTime	SNVT_time_stamp	Real-time clock output.
53.	nvoFanSpeed	SNVT_switch	Fan Speed / Running Mode.
54.	nvoSupFanSpeed	SNVT_switch	Supply fan speed indicator.
55.	nvoExhFanSpeed	SNVT_switch	Exhaust fan speed indicator.
56.	nvoEffectSetpt	SNVT_temp_p	Calculated (effective) set point.
57.	nvoEffectSetptH	SNVT_lev_percent	Calculated (effective) humidity set point.
58.	nvoConfigCode	SNVT_str_asc	Configuration code output.

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2.4 KF 2040

2.4.1 Input Network Variables

NV#	Name	SNVT Type	Description
0.	nviFireAlarm	SNVT_switch	DI5 Fire alarm.
1.	nviSpaceHumid	SNVT_lev_percent	AI3 Space humidity.
2.	nviDuctHumid	SNVT_lev_percent	AI4 Duct humidity.
3.	nviOutdoorTemp	SNVT_temp_p	AI5 Outdoor air temperature.
4.	nviSupplyAirTemp	SNVT_temp_p	AI6 Supply air temperature.
5.	nviSpaceTemp	SNVT_temp_p	AI7 Space temperature.
6.	nviY1	SNVT_lev_percent	Valve override.
7.	nviY2	SNVT_lev_percent	Valve override.
8.	nviY3	SNVT_lev_percent	Valve override.
9.	nviFanSpeedCmd	SNVT_lev_percent	Commands Fans into requested speed
10.	nviSetPoint	SNVT_temp_p	Temp control set point
11.	nviSetpointSF	SNVT_press_p	Supply fan pressure set point.
12.	nviSetpointEF	SNVT_press_p	Exhaust fan pressure set point.
13.	nviSetpointH	SNVT_lev_percent	Humidity control setpoint.
14.	nviSetptoffset	SNVT_temp_p	Temp control set point offset
15.	nciTempCtrlSets	UNVT_temp_sets	Configuration Temp Control
16.	nciTempCtrlParams	UNVT_temp_parms	PID Loop Configuration
17.	nciPressCtrlSets	UNVT_press_sets	Pressure control settings.
18.	nciHumidCtrlSets	UNVT_humid_sets	Humidity control settings.
19.	nciSettings	UNVT_corr_sets	Various settings
20.	nciAlarmSettings	UNVT_alarm_sets	Alarm settings.
21.	nciSndHrtBt	SNVT_time_sec	Network var. update rate, i.e. heartbeat.
22.	nciRcvHrtBt	SNVT_time_sec	Receive heartbeat / input network variable update rate.
23.	nciTimeChan	SNVT_str_asc	Time channel settings
24.	nciHolidays	SNVT_str_asc	Holiday settings
25.	nciHolidayPds	SNVT_str_asc	Holiday periods setting
26.	nciConfigCode	SNVT_str_asc	Configuration code input variable.
27.	nviAIObserve	SNVT_state	Alarm observed input.

2.4.2 Node Object Mandatory and Optional Variables (IN/OUT)

NV#	Name	SNVT Type	Description
28.	nviRequest	SNVT_obj_request	Object status request.
29.	nviTimeSet	SNVT_time_stamp	Sets real-time clock.
30.	nvoStatus	SNVT_obj_status	Object status request response variable.
31.	nvoAlarm	SNVT_alarm	NOT IMPLEMENTED ; LonMark standard alarm SNVT.

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2.4.3 Output Network Variables

NV#	Name	SNVT Type	Description
32.	nvoUnitStatus	SNVT_hvac_status	Control status (Setpoint and outputs).
33.	nvoAlarm1	SNVT_state	Alarm output 1.
34.	nvoAlarm2	SNVT_state	Alarm output 2.
35.	nvoDIStatus	SNVT_state	DI 1-8 status.
36.	nvoFilterStatus	SNVT_switch	DI1 Filterguard, Supply and Exhaust Fan.
37.	nvoPumpStatus	SNVT_switch	DI2 Indicator, pump.
38.	nvoCoolerAlarm	SNVT_switch	DI3 Cooler alarm.
39.	nvoExchgStatus	SNVT_switch	DI4 Exchanger alarm or freeze-up.
40.	nvoFireAlarm	SNVT_switch	DI5 Fire alarm.
41.	nvoSFPressure	SNVT_press_p	AI1 Supply fan pressure.
42.	nvoEFPressure	SNVT_press_p	AI2 Exhaust fan pressure.
43.	nvoSpaceHumid	SNVT_lev_percent	AI3 Space humidity.
44.	nvoDuctHumid	SNVT_lev_percent	AI4 Duct humidity.
45.	nvoOutdoorTemp	SNVT_temp_p	AI5 Outdoor temperature.
46.	nvoSupplyAirTemp	SNVT_temp_p	AI6 Supply air temperature.
47.	nvoSpaceTemp	SNVT_temp_p	AI7 Space temperature.
48.	nvoFrostTemp	SNVT_temp_p	AI8 Overheat/Frost protection indicator.
49.	nvoPumpCmd	SNVT_switch	DU3 Pump control.
50.	nvoY1	SNVT_lev_percent	Heating/cooling sequence Y1.
51.	nvoY2	SNVT_lev_percent	Heating/cooling sequence Y2.
52.	nvoY3	SNVT_lev_percent	Heating/cooling sequence Y3.
53.	nvoTime	SNVT_time_stamp	Real-time clock output.
54.	nvoFanSpeed	SNVT_switch	Fan Speed / Running Mode.
55.	nvoSupFanSpeed	SNVT_switch	Supply fan speed indicator.
56.	nvoExhFanSpeed	SNVT_switch	Exhaust fan speed indicator.
57.	nvoEffectSetpt	SNVT_temp_p	Calculated (effective) set point.
58.	nvoEffectsetptSF	SNVT_press_p	Calculated (effective) supply air set point.
59.	nvoEffectsetptEF	SNVT_press_p	Calculated (effective) exhaust air set point.
60.	nvoEffectSetptH	SNVT_lev_percent	Calculated (effective) humidity set point.
61.	nvoConfigCode	SNVT_str_asc	Configuration code output.

3 Network input variables

3.1 Digital input override

3.1.1 Common

This input network variables is used to override internal digital inputs in KF 20xx. If a value is received it overrides local value. If no new value has been received in time specified by **nciRcvHrtBt** then the variable returns to the undefined – not used state.

3.1.2 nviFrostStop

network input SNVT_switch *nviFrostStop*

This input network variable is used to allow for external stop of fans, when a frost condition is detected by another node then KF 20xx. When a boolean True value is received on this input it will stop the fans and issue an alarm "frost detector" in the same way as if the AI8 sensor on KF 20xx detects frost condition. The alarm is transmitted on variable **nvoAlarm1**.

Used in configurations

When water heating is activated and ONLY in KF 2010 - KF 2030.

Valid Range

nviFrostStop = Normal state State = FALSE and Value = 0.
nviFrostStop = Frost Stop State = TRUE and Value = 200 (= 100%)
nviFrostStop = NOT USED State = 0xFF

3.1.3 nviExchgStatus

network input SNVT_switch *nviExchgStatus*

This input network variable is used to indicate **either** an alarm condition on a rotating heat exchanger **or** a freeze-up condition on a plate-exchanger. (Depending on configuration). When a value is received on this input it will override the internal input DI4, and also be transmitted on output variable **nvoExchgStatus**.

Used in configurations

When Y2 is configured as Plate or rotating exchanger.

Valid Range

nviExchgStatus = No alarm/Normal state State = FALSE and Value = 0.
nviExchgStatus = Alarm/Freeze-up State = TRUE and Value = 200
nviExchgStatus = NOT USED State = 0xFF

3.1.4 nviFireAlarm

network input SNVT_switch *nviFireAlarm*

KF 20-series LON Interface

This input network variable is used to indicate a fire alarm condition. When a value is received on this input it will override the internal input DI5, and also be transmitted on output variable **nvoFireAlarm**. According to configuration it will also cause fans to stop.

Used in configurations

ALL

Valid Range

Normal state
Alarm

State = FALSE and Value = 0.
State = TRUE and Value = 200

3.2 Temperature sensor inputs

3.2.1 Common

This input network variables is used to override internal analogue inputs in KF 20xx. If a value is received it overrides local value. If no new value has been received in time specified by **nciRcvHrtBt** then the variable returns to undefined – not used state, and internal input is activated.

3.2.2 nvoExhAirTemp

network input SNVT_temp_p

nviExhAirTemp

When a values is received to this variable it will override the internal input AI3. It is used in control algorithm or to calculate exchanger efficiency. Effective Exhaust air temp is transmitted on **nvoExhAirTemp**.

Used in configurations

Temperature Control = Exhaust air temperature control *or*
Calculating Efficiency = YES *or*
Coolrecycle = YES

Typical Range

10°C - + 50°C . The Value 0x7FF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

3.2.3 nviSpaceHumid

network input SNVT_lev_percent

nviSpaceHumid

When a value is received to this variable it will override the internal input AI3. It is used in the control algorithm.. Effective space humidity is transmitted on **nvoSpaceHumid**.

Used in configurations

Humidity control.

Valid Range

0 to 100% RH. The Value 0x7FFF = 163,835% is used to indicate invalid value (Sensor failure/not used).

3.2.4 nviAI4

network input SNVT_temp_p

nviAI4

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Depending on controller configuration this variable either receives Extract Air temperature OR Exchanger return temp OR Set point offset from External. When a value is received it overrides the function of the internal input AI4, and is transmitted to output **nvoAI4**.

Used in configurations

Y2 = Liquid Exchanger *or*
Calculating Efficiency = YES *or*
External set point = YES

Valid Range

40°C - + 40°C . The Value 0x7FFF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

3.2.5 nviDuctHumid

network input SNVT_lev_percent **nviDuctHumid**

This variable replaces the onboard sensor for duct humidity. A valid input on this variable will override the internal AI4 input. Effective duct humidity is transmitted to the variable **nvoDuctHumid**.

Used in configurations

Humidity control.

Valid Range

0 to 100% RH. The Value 0x7FFF = 163,835% is used to indicate invalid value (Sensor failure/not used).

3.2.6 nviOutdoorTemp

network input SNVT_temp_p **nviOutdoorTemp**

This variable receives the outdoor temperature. When a value is received it overrides the internal input AI5. It is used in control algorithms and transmitted to the variable **nvoOutdoorTemp**.

Used in configurations

Temperature control uses Outdoor compensation *or*
Pressure control uses Outdoor compensation (only KF 2020 and KF 2040) *or*
Pumpstop = YES *or*
NightCooling = YES *or*
CoolRecycling = YES *or*
Calc Efficiency = YES *or*
Standby mode = YES (Keeping heating battery warm when fans stopped when “cold” outside)

Valid Range

-50°C - + 50°C . The Value 0x7FF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

3.2.7 nviSupplyAirTemp

network input SNVT_temp_p **nviSupplyAirTemp**

This variable receives supply air temperature. When a value is received it overrides the internal input AI6. It is used in the control algorithms and transmitted to the variable **nvoSupplyAirTemp**.

Used in configurations

All configurations **except** Temperature control = Room Control

Typical Range

-40°C - + 40°C . The Value 0x7FF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

3.2.8 nviSpaceTemp

network input *SNVT_temp_p* **nviSpaceTemp**

This variable receives space temperature. When a value is received it overrides the internal input AI7. It is used in the control algorithms and transmitted to the variable **nvoSpaceTemp**.

Used in configurations

NightCooling, CoolingRecycle,
Temp Control = Room Control or Supply air/Room Control or Cascade Control

Valid Range

-40°C - + 40°C . The Value 0x7FF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

3.3 Sequence output override

3.3.1 Common

This input network variables is used to override the actuator outputs in the KF 20xx. If a value is received it overrides the local value. If no new value has been received in time specified by **nciRcvHrtBt** then the variable returns to undefined – not used state, and the internal input is activated.

3.3.2 nviY1

network input *SNVT_lev_percent* **nviY1**

This variable receives the requested value for sequence output Y1 in the control loop. When a value is received it overrides the internal signal Y1. It is used in the control algorithms and transmitted to the variable **nvoY1**. If output limiting is used or the exchanger freeze-up is triggered nviY1 will not override this.

Used in configurations

If Y1Sequence is used

Valid Range

0-100% . The Value 0x7FF is used to indicate invalid value (input not used).

3.3.3 nviY2

network input *SNVT_lev_percent* **nviY2**

Similar to nviY1

3.3.4 nviY3

network input *SNVT_lev_percent* **nviY2**

Similar to nviY1

3.4 Set points and commands

3.4.1 nviFanSpeedCmd

network input *SNVT_switch*

nviFanSpeedCmd

This variable receives the requested Running mode / Fan speed from network. The Running mode can be OFF-ON-LOW-HIGH. (This variable will be complemented later with the variable *SNVT_hvac_mode*). When a value is received it overrides the local scheduler. The Running mode is determined by :

- a) Local manual mode setting
- b) **nviFanSpeedCmd** (if valid value)
- c) Local DI7 and DI8 (DI7 forces high speed, DI8 forces reduced speed)
- d) Local scheduler

Highest priority a) and lowest d).

Used in configurations

ALL

Valid Range

OFF	State = FALSE and Value = 0.
ON	State = TRUE and Value = 100
When 2-speed,LOW	State = TRUE and Value = 50
When 2-speed,HIGH	State = TRUE and Value = 100
Invalid	State = 0xFF and Value = 0xFF

3.4.2 nviSetPoint

network input

SNVT_temp_p

nviSetPoint

This variable receives requested temperature setpoint for KF 20xx. It overrides the internal setpoint setting for KF 20xx. Depending on configuration the variable has different meaning.

Supply Air Control :

Setpoint is Supply air setpoint.

Supply Air Control with outdoor compensation :

Setpoint is Supply air setpoint. Outdoor compensation is set using **nciTempCtrlSets**.

Space temp control with cascade control:

Setpoint is Space temp setpoint. Supply air setpoint and cascade factor is set using **nciTempCtrlSets**.

Space temp control with min/max supply air :

Setpoint is Space temp setpoint. Min max limits is set using **nciTempCtrlSets**.

Space temp control:

Setpoint is Space temp setpoint.

Supply air / Space temp control:

Setpoint is Supply air setpoint. Room setpoint, Outdoor room control temp limit and other parameters is set using **nciTempCtrlSets**.

Exhaust air temp control with min/max supply air :

Setpoint is Exhaust air temp setpoint. Min max limits is set using **nciTempCtrlSets**.

Used in configurations

ALL

3.4.3 nviSetpointSF

network input *SNVT_press_p*

nviSetpointSF

This variable receives requested supply fan pressure set point for KF 20xx. It overrides the internal SF pressure set point setting for KF 20xx.

Used in configurations

KF 2020/KF 2040

3.4.4 nviSetpointEF

network input SNVT_press_p

nviSetpointEF

This variable receives requested exhaust fan pressure set point for KF 20xx. It overrides the internal EF pressure set point setting for KF 20xx.

Used in configurations

KF 2020/KF 2040

3.4.5 nviSetPointH

network input SNVT_lev_percent

nviSetPoint

This variable receives requested humidity setpoint for KF 20xx. It overrides the internal setpoint setting for KF 20xx.

Used in configurations

KF 2030/KF 2040

Valid range

0 to 100% RH. The Value 0x7FFF = 163,835% is used to indicate invalid value (Sensor failure/not used).

3.4.6 nviSetPtOffset

network input SNVT_temp_p

nviSetPtOffset

This variable receives requested temperature setpoint offset for KF 20xx. If a value is received, it is added to the Current effective setpoint. All internal functions for the Setpoint offset is still in effect. This variable does **not** override the internal function. Depending on the configuration different set points are affected – see **nviSetPoint**.

Used in configurations

ALL except Control Type == CASCADE

Valid range and Default values

-10°C to 10°C. Default value is 0°C which will be set at power-up and in case no value is received within the specified amount of time.

3.5 Configuration

3.5.1 Common

If an erroneous entry is made to either of the configuration network variables this attempt will be disregarded and the value will not be changed. This behaviour is not reflected on the network variable and will therefore have to be checked in another way.

3.5.2 nciTempCtrlSets

This variable receives a number of settings for the temperature control loop. It is used to configure a number of KF 20xx parameters.

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Type	Name	Default	Descr.
SNVT_temp_p	Set point	21°C	Supply air setpoint (OR Exhaust air temp)
SNVT_temp_p	SpaceTempSetpt	21°C	Space temp. set point
SNVT_temp_p	SupplyAirMin	10°C	Supply air min.limit
SNVT_temp_p	SupplyAirMax	30°C	Supply air max.limit
SNVT_temp_p	NCSetPoint		Free cooling. Space Temp setpoint.
SNVT_temp_p	NCMinOutTemp		Free cooling. Minimum outdoor temp.
SNVT_temp_p	NCMinOutDiff		Free cooling. Minimum diff. Space tmp - outdoor tmp
SNVT_temp_p	CVOutDoor[4]	-20,20,25,30	Compensation Curve, outdoor temp co-ordinates.
SNVT_temp_p	CVOffset[4]	0,0,0,0	Compensation Curve, Setpoint offset coordinates.

Used in configurations

ALL

3.5.3 nciTempCtrlParms

This variable receives PID settings for the temperature control loop.

Type	Name	Default	Descr.
SNVT_temp_p	Pband1	20°C	Pband Sequence Y1
SNVT_temp_p	Pband2	20°C	Pband Sequence Y2
SNVT_temp_p	Pband3	20°C	Pband Sequence Y3
SNVT_time_sec	Itime	60 sec.	Integration time Temp control
SNVT_temp_p	Dzone	20°C	Deadzone between Heating and Cooling sequence
SNVT_muldiv	SpacePFactor	2	Relation between Pband Supply air and Spacetemp. Only used in Control Type Space/Supply control
SNVT_muldiv	SpaceIFactor	2	Relation between ITime Supply air and Spacetemp. Only used in Control Type Space/Supply control
SNVT_muldiv	CascFactor	2	Relation between Space set point and Supply air Setpoint. Only used in Control Type Cascade control.
SNVT_time_sec	CascITime	0	Itime for cascade control (Space temp control).
SNVT_lev_percent	MinOutdoorAir	30%	Minimum outdoor air when using damper to recirculate air.

Used in configurations

ALL

3.5.4 nciPressCtrlSets

This variable receives PID settings for the pressure control loop in KF 2020/KF 2040.

Type	Name	Default	Descr.
SNVT_press_p	SetpointSF		Supply fan pressure set point
SNVT_press_p	SetpointEF		Exhaust fan pressure set point
SNVT_press_p	RedSetpointSF		Supply fan pressure set point
SNVT_press_p	RedSetpointEF		Exhaust fan pressure set point
SNVT_press_p	PressMaxDev		Pressure control max. deviation.
SNVT_press_p	AI1RangeHigh		AI1 range upper limit.
SNVT_press_p	AI2RangeHigh		AI2 range upper limit.
SNVT_press_p	RC2Pband		Supply fan pressure control Pband
SNVT_press_p	RC3Pband		Exhaust fan pressure control Pband.
SNVT_multiplier	RC2Dfact		Supply fan pressure control deriving factor.
SNVT_multiplier	RC3Dfact		Exhaust fan pressure control deriving factor.
SNVT_multiplier	DampingFactor		Damping filter factor.
SNVT_time_sec	RC2Itime		Supply fan pressure control integrating time.
SNVT_time_sec	RC3Itime		Exhaust fan pressure control integrating time.

Used in configurations

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KF 2020/KF 2040

3.5.5 nciHumidCtrlSets

This variable receives PID settings for the humidity control loop in KF 2030/KF 2040.

Type	Name	Default	Descr.
SNVT_lev_percent	SetpointH		Humidity setpoint
SNVT_muldiv	RC4MaxLimit		Humidity max limit.
SNVT_muldiv	RC4Pband		Humidity control Pband.
SNVT_time_sec	RC4Itime		Humidity control integrating time.

Used in configurations

KF 2030/KF 2040

3.5.6 nciSettings

This variable receives various settings for KF 20xx.

Type	Name	Default	Descr.
SNVT_time_sec	SupFanStartDly	60 sec	Delay between starting exhaust fan and Supply Fan
SNVT_time_sec	FullSignalDly	90 sec	Start-up time when output signal to exchanger is kept at maximum
SNVT_time_sec	CoolOffTime	120 sec	Cool off time, Time after stop that fans are kept running. Only used with Electrical heating.
SNVT_time_sec	ExtendTime	1800 sec	When using external pushbutton at DI7 or DI8. This variable sets extended running time when pushing this button.
SNVT_temp_p	HighSpeedBlock	-10°C	Lowest outdoor temp when fans are allowed to run in high speed. It only controls the limit and does not allow disabling of the function.
SNVT_time_sec	DXOnDelay	300 sec	Delay start DX Step
SNVT_time_sec	DXOffDelay	300 sec	Delay stop DX Step
SNVT_temp_p	DxMinLimDiff	5K	When DX step is started min limit on supply air is lowered with this value. Used when min/max limits on Supply air is activated.
SNVT_temp_p	CoolRecMinDiff	2K	Cool recycle. Minimum diff Outdoor temp/Exhaust air temp for cool recycling.
SNVT_temp_p	SpaceCtrlOutTmp	12°C	Outdoor temperature when unit switches from Supply air control to Room Control. Only used when Control Type = Space temp/Supply air control
SNVT_temp_p	FrostSetpt	8°C	Frost guard setpoint. When Frost temp is lower then setpoint all fans is stopped
SNVT_temp_p	ShutdownSetpt	25°C	Shutdown setpoint. When fans are stopped and outdoor temp over 11°C heating battery is kept at this temperature.
SNVT_temp_p	PumpStpSetpt	6°C	When outdoor temp is below this setpoint pump is stopped. (Only used when function is activated in config)
SNVT_time_sec	PumpStpDelay	900 sec	Delay before pump is stopped.

3.5.7 nciAlarmSettings

This variable receives the alarm settings for KF 20xx.

Type	Name	Default	Descr.
SNVT_temp_p	TempMaxDev	5°C	Temperature control max deviation.
SNVT_temp_p	MaxOutTemp	25°C	Max outdoor temperature.

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SNVT_temp_p	MinOutTemp	-25°C	Min outdoor temperature.
SNVT_time_sec	TempAlDelay	120 sec	Delay for temperature control max deviation alarm.
SNVT_press_p	PressMaxDev	50Pa	Pressure control max deviation.
SNVT_time_sec	PressAlDelay	120 sec	Delay for pressure control max deviation alarm.
SNVT_lev_percent	EfficiencyMinLim	20 %	Low exchanger efficiency alarm.
SNVT_time_sec	EfficiencyAlDly	120 sec	Delay for low efficiency alarm.
SNVT_time_sec	SupFanAlDly	30 sec	Supply fan alarm delay.
SNVT_time_sec	ExhFanAlDly	30 sec	Exhaust fan alarm delay.
UNVT_sched_event	GeneralAlarm	N/A	General alarm schedule. See information about UNVT_sched_event under nciTimeChan.

3.5.8 nciSndHrtBt

SNVT_time_sec **nciSndHrtBt**

This configuration property sets whether KF 20xx will send network variable outputs as a heartbeat at least with this time period. KF 20xx normally sends variables as soon as they have changed (significantly).

Default value 0 secs, i.e. a value received is regarded as valid infinitely.

Typical Range 0-65556 seconds

3.5.9 nciRcvHrtBt

SNVT_time_sec **nciRcvHrtBt**

This configuration property sets whether KF 20xx will regard input network variables as invalid after a specified amount of time.

Default value 0 secs, i.e. a value received is regarded as valid infinitely

Typical Range 0-65556 seconds

3.5.10 nciTimeChan

network input UNVT_scheduler **nciTimeChan**

This variable receives time channel information via a UNVT_scheduler. The coding is based on the use of the decimal format for times and a bit-mask describing the active days. The decimal times are not ASCII-encoded, i.e. a starting time of 10:00 is coded as 10, 0 without any separator. This would become a sequence of control characters if it was to be interpreted as an ASCII-string. The bit-mask is simply a mask describing the seven days of a week and a general holiday. Encode MTWTFSSH from LSB to MSB, i.e. M__T__H = 10001001 = 0x89.

Used in configurations

ALL

3.5.11 nciHolidays

network input UNVT_holidays **nciHolidays**

This variable receives holiday settings for KF 20xx via a UNVT_holidays. The coding is based on the use of the decimal format for the dates using only one byte for each entry (year,month,day = 3 bytes). The decimal dates are not ASCII-encoded, i.e. a holiday on the 5th of January 1999 is coded as 99,1,5 without any separator. This would become a sequence of control characters if they were to be interpreted as an ASCII-string.

Used in configurations

ALL

3.5.12 nciHolidayPds

network input UNVT_holiday_pds **nciHolidayPds**

This variable receives holiday period settings for KF 20xx via a UNVT_holiday_pds. The coding is based on the use of the decimal format for the dates using only one byte for each entry (year,month,day = 3 bytes). The decimal dates are not ASCII-encoded, i.e. a holiday period starting on the 5th of January 1999 and ending on the 7th of February is coded as 99,01,05,99,02,07 without any separator. This would become a sequence of control characters if they were to be interpreted as an ASCII-string.

Used in configurations

ALL

3.5.13 nciConfigCode

network input SNVT_str_asc **nciConfigCode**

This variable receives an updated configuration code for KF 20xx. Extensive description of configuration code is in KF 20xx Manual. Format of Configuration code is “****.****.****.****.****” where * can be a number from “0” to “9”. Example value “0100.3000.0100.2222.0000”. After nciConfigCode is updated KF 20xx is restarted.

Used in configurations

ALL

3.5.14 nviAIObserve

network input SNVT_switch **nviAIObserve**

This variable receives an alarm observed signal. This variable do not need to be changed to signal that an alarm state has been observed, a singel write signal is sufficient. The procedure triggers on the actual write signal.

Used in configurations

ALL

4 Node Object Mandatory and Optional network variables

4.1 Status variables

4.1.1 Common

When transmitted

Information is exchanged when the network variable nviRequest is updated. The request is immediately followed by a response according to the by LonMark standardised behaviour. No heartbeats apply to the Node Object variables.

Update rate

No specified update rate.

4.1.2 nviRequest

network input SNVT_obj_request *nviRequest*

This input variable is used to request a state that the Node Object or any other specified object within the node's network interface, should enter. The states are: Normal, Enabled, Disabled, Update Status.

RQ_NORMAL: Resume normal operation.

RQ_ENABLED: Same as RQ_NORMAL.

RQ_DISABLED: Stops KF 20xx-LON execution while still responding to requests.

RQ_UPDATE_STATUS: Send a status update via **nvoStatus**.

Used in configurations

ALL

4.1.3 nviTimeSet

network output SNVT_time_stamp *nviTimeSet*

This *input* network variable is used to synchronise the on-board real-time clock with a network clock.

Used in configurations

ALL

Valid range

See SNVT_time_stamp in the SNVT master list.

4.1.4 nvoStatus

network output SNVT_obj_status *nvoStatus*

This output variable is used to transmit the status of a request by **nviRequest** for KF 20xx-LON to enter a specified state; DISABLED or NORMAL or just report status. The scheduler mode is reported via the variable **nvoStatus.manual_control**.

Used in configurations

ALL

4.1.5 nvoAlarm – not implemented

network output SNVT_Alarm *nvoAlarm*

Output network variable that propagates alarm states reported from the LonMark objects within the node. This network variable is included for future use, meanwhile use the **nvoAlarm1** and **nvoAlarm2** bit-coded network variables described later in this document.

Used in configurations

ALL

Valid range

See SNVT_Alarm in the SNVT master list.

5 Output Network variables

5.1 General outputs

5.1.1 nvoUnitStatus

network output SNVT_hvac_status **nvoUnitStatus**

This output network variable is available to report KF 20xx control status. It combines operating mode, cooling and heating outputs, fan speed and an indication if any alarms is present (fan speed and alarm status currently not available). SNVT_hvac_status allows all this information into one single network variable.

Used in configurations

ALL

Valid range

<i>Mode:</i>	HVAC_AUTO	(KF 20xx controlling outputs)
	HVAC_OFF	(KF 20xx not controlling outputs)
	HVAC_HEAT	(KF 20xx is in heating sequence – currently not used)
	HVAC_MRNG_WARMUP	(KF 20xx is morning warm-up – currently not used)
	HVAC_COOL	(KF 20xx is cooling sequence – currently not used)
	HVAC_NIGHT_PURGE	(Free cooling is activated – currently not used)
	(HVAC_PRE_COOL)	(Morning Cooldown – not available in KF 20xx)
	(HVAC_TEST)	(Test mode – not available in KF 20xx)
	(HVAC_EMERG_HEAT)	(Emergency heat – currently not used)
	(HVAC_FAN_ONLY)	(currently not used)

heat_output_primary 0-100%, 0x7fff invalid. Value of output sequence Y1

heat_output_secondary 0-100%, 0x7fff invalid. Value of output sequence Y2

cool_output 0-100%, 0x7fff invalid. Value of output sequence Y3

econ_output: NOT USED, 0-100%, 0x7fff invalid.

fan_output: 0-100%, 0x7fff invalid. This variable is the same as **nvoFanSpeed**.

in_alarm: 0 NO Alarm, >0 Alarm, 0xFF Alarming is disabled.

When transmitted

If *mode* or *in_alarm* has changed. If any output changed at least 1%. This variable will also be sent as a heartbeat output.

5.1.2 nvoAlarm1, nvoAlarm2

network output SNVT_state **nvoAlarm1,2**

These output variables sends the current alarm state. They are bitwise encoded according to the table below.

nvoAlarm1

Bit #	Alarm	Bit #	Alarm
0	Fire	8	Exhaust fan pressure control deviation
1	Exchanger	9	AI1
2	Cooler	10	AI2

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3	Supply fan	11	AI3
4	Exhaust fan	12	AI4
5	Freeze-up	13	AI5
6	Temp control deviation	14	AI6
7	Supply fan pressure control deviation	15	AI7

nvoAlarm2

Bit #	Alarm	Bit #	Alarm
0	AI8	8	Manual running mode
1	Circulation pump	9	AO in manual mode
2	Exchanger efficiency	10	N/A
3	Filterguard	11	N/A
4	Heat protection	12	N/A
5	Smoke damper	13	N/A
6	DO in manual	14	N/A
7	External	15	N/A

Used in configurations

ALL

Valid range

Each variable is bitwise encoded and every bit can hold the states 0 and 1, where 1 indicates an alarm state.

When transmitted

When the internal alarmhandler changes to an alarming state these variables are updated. They will also be sent as heartbeat outputs.

5.2 Digital status

5.2.1 Common

When Transmitted

Data is transmitted when value is changing, and also as a heartbeat output as dictated by the configuration property `nciSndHrtBt.` Default heartbeat output is 0 seconds. i.e. deactivated.

5.2.2 nvoDIStatus

network output SNVT_state nvoDIStatus

This output network variable transmits the current status of all digital inputs as a SNVT_state variable. Value is directly linked to the digital inputs on KF 20xx.

Bit #	Digital input
0	DI1, Filterguard.
1	DI2, Pumpindicator.
2	DI3, Cooler alarm.
3	DI4, Exchanger status.
4	DI5, Fire alarm.
5	DI6, Smoke damper indicator/alarm.
6	DI7, Extended drive normal speed.
7	DI8, Extended drive reduced drive.

Used in configurations

ALL

Valid Range

FilterStatus = OFF (Normal state):
FilterStatus = ON (Alarm state):

State = FALSE and Value = 0.
State = TRUE and Value = 200

5.2.3 nvoFilterStatus

network output SNVT_switch nvoFilterStatus

This output network variable transmits the current status of filterguard for supply and/or exhaust fans. Value is directly linked to digital input on KF 20xx.

Used in configurations

ALL

Valid Range

FilterStatus = OFF (Normal state):
FilterStatus = ON (Alarm state):

State = FALSE and Value = 0.
State = TRUE and Value = 200

5.2.4 nvoPumpStatus

network output SNVT_switch

nvoPumpStatus

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This output network variable transmits current status of water pump. This output networks variable reflects the status of DI2.

Used in configurations

Configuration Heating battery = Water.

Valid Range

OFF	State = FALSE and Value = 0.
ON	State = TRUE and Value = 200
NOT USED	State = 0xFF and Value = 0xFF.

5.2.5 nvoCoolerAlarm

network output SNVT_switch

nvoCoolerAlarm

This output network variable transmits current status the cooler alarm. This output network variable reflects the status of DI3.

Used in configurations

ALL

Valid Range

nvoCoolerAlarm = No alarm	State = FALSE and Value = 0.
nvoCoolerAlarm = Alarm	State = TRUE and Value = 200.
nvoCoolerAlarm = NOT USED	State = 0xFF and Value = 0xFF.

5.2.6 nvoExchgStatus

network output SNVT_switch

nvoExchgStatus

This output network variable can transmit two different values depending on configuration. If a rotating exchanger is connected to KF 20xx this transmits that an alarm condition exists on the heat exchanger. If a plate exchanger is used this variable transmits exchanger freeze-up.

Value is either from digital input DI4 on KF 20xx, or from input network variable **nviExchgStatus**.

Used in configurations

When Y2 is configured as Plate or rotating exchanger.

Valid Range

nvoExchgStatus = No alarm/Normal state	State = FALSE and Value = 0.
nvoExchgStatus = Alarm/Freeze-up	State = TRUE and Value = 200.
nvoExchgStatus = NOT USED	State = 0xFF and Value = 0xFF.

5.2.7 nvoFireAlarm

network output SNVT_switch

nvoFireAlarm

This output network variable transmits an fire alarm condition. Value is either from digital input on KF 20xx, or from input network variable **nviFireAlarm**.

Used in configurations

ALL (if the input is not connected this variable will always report NOT VALID).

Valid Range

Normal state	State = FALSE and Value = 0.
Alarm	State = TRUE and Value = 200.
NOT VALID	State = 0xFF and Value = 0xFF.

5.2.8 nvoSFPressure

network output *SNVT_press_p*

nvoSFPressure

This output network variable transmits the supply fan pressure. This variable indicates pressure as given from a pressure sensor on KF 20xx AI1.

Used in configurations

KF 2020, KF 2040

Valid Range

0-1000Pa

5.2.9 nvoSupFanStatus

network output *SNVT_switch*

nvoSupFanStatus

This output network variable transmits status of Supply Fan. This variable indicates status as given from a pressure switch or electrical contact on KF 20xx AI1. If a pressure sensor is used, (KF 2020 and KF 2040) the pressure will be indicated in **nvoSFPressure**.

Used in configurations

ALL

Valid Range

OFF	State = FALSE and Value = 0.
ON	State = TRUE and Value = 100
When 2-speed, LOW	State = TRUE and Value = 50
When 2-speed, HIGH	State = TRUE and Value = 100

5.2.10 nvoEFPPressure

network output *SNVT_press_p*

nvoEFPPressure

This output network variable transmits the exhaust fan pressure. This variable indicates pressure as given from a pressure sensor on KF 20xx AI2.

Used in configurations

KF 2020 and KF 2040

Valid Range

0-1000 Pa

5.2.11 nvoExhFanStatus

network output *SNVT_switch*

nvoExhFanStatus

This output network variable transmits status of Supply Fan. This variable indicates status as given from either a pressure sensor/pressure switch or electrical contact (on KF 20xx AI1). If a pressure sensor is used, (KF 2020 and KF 2040) the pressure will be indicated in **nvoEFPPressure**.

Used in configurations

KF 2010 and KF 2030

Valid Range

OFF	State = FALSE and Value = 0.
ON	State = TRUE and Value = 100

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When 2-speed,LOW
When 2-speed,HIGH

State = TRUE and Value = 50
State = TRUE and Value = 100

5.3 Temperature Outputs

5.3.1 Common

When Transmitted

Data is transmitted when value has changed significantly °C and also as a heartbeat output as dictated by the configuration property **nciSndHrtBt**. Default is **hrtbt = 0**, that is no heartbeat output., and when value has changed 0.2°C.

5.3.2 nvoExhAirTemp

network output SNVT_temp_p

nvoExhAirTemp

This output network variable is used to monitor the effective Exhaust air temperature that KF 20xx is using for control. If the input **nviExhAirTemp** has a valid value, this output will echo the value of the input, if not the value from KF 20xx input AI3 will be used. If KF 20xx is not configured to use Exhaust air temp, or no valid value exists, then this output will send invalid value.

Used in configurations

Temperature Control = Exhaust air temperature control *or*

Calculating Efficiency = YES *or*

Coolrecycle = YES

Typical Range

10°C - + 50°C . The Value 0x7FF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

5.3.3 nvoSpaceHumid

network output SNVT_lev_percent

nvoSpaceHumid

This output network variable is used to monitor the effective space humidity that KF 20xx is using for humidity control. If the input **nviSpaceHumid** has a valid value, this output will echo the value of the input, if not the value from KF 20xx input AI3 will be used.

Used in configurations

KF 2030 and KF 2040

Valid Range

0 to 100% RH. The Value 0x7FF = 163.835% is used to indicate invalid value (Sensor failure/not used).

5.3.4 nvoAI4

network output SNVT_temp_p

nvoAI4

Depending on controller configuration this variable either transmits Extract Air temperature OR Exchanger return temp OR Set point offset from External. If the input **nviAI4** has a valid value, the output will echo the value of the input, if not the value from KF 20xx input AI4 will be used. If KF 20xx is not configured to use AI4, or no valid value exists, then this output will send invalid value.

Used in configurations

Y2 = Liquid Exchanger *or*

Calculating Efficiency = YES *or*

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External set point = YES

Typical Range

40°C - + 40°C . The Value 0x7FF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

5.3.5 nvoDuctHumid

network output SNVT_lev_percent **nvoDuctHumid**

This output network variable is used to monitor the effective duct humidity that KF 20xx is using for humidity control. If the input **nviDuctHumid** has a valid value, this output will echo the value of the input, if not the value from KF 20xx input AI4 will be used.

Used in configurations

KF 2030 and KF 2040

Typical Range

0 to 100% RH. The Value 0x7FF = 163.835% is used to indicate invalid value (Sensor failure/not used).

5.3.6 nvoOutdoorTemp

network output SNVT_temp_p **nvoOutdoorTemp**

This variable transmits outdoor temperature. If the input **nviOutdoorTemp** has a valid value, the output will echo the value of this input, if not the value from KF 20xx input AI5 will be used. If KF 20xx is not configured to use Outdoor temp., or no valid value exists, then this output will send invalid value.

Used in configurations

Temperature control uses Outdoor compensation *or*
Pressure control uses Outdoor compensation (only KF 2020 and KF 2040) *or*
Pumpstop = YES *or*
NightCooling = YES *or*
CoolRecycling = YES *or*
Calc Efficiency = YES *or*
Standby mode = YES (Keeping heating battery warm when fans stopped when “cold” outside)

Typical Range

-50°C - + 50°C . The Value 0x7FF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

5.3.7 nvoSupplyAirTemp

network output SNVT_temp_p **nvoSupplyAirTemp**

This variable transmits effective supply air temperature. If the input **nviSupplyAirTemp** has a valid value, the output will echo the value of this input, if not the value from KF 20xx input AI6 will be used. If KF 20xx is not configured to use Supply Air temp., or no valid value exists, then this output will send invalid value.

Used in configurations

All configurations **except** Temperature control = Room Control

Typical Range

-40°C - + 40°C . The Value 0x7FFF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

5.3.8 nvoSpaceTemp

network output SNVT_temp_p *nvoSpaceTemp*

This variable transmits effective supply air temperature. If the input **nviSpaceTemp** has a valid value, the output will echo the value of this input, if not the value from KF 20xx input AI6 will be used. If KF 20xx is not configured to use Space temp., or no valid value exists, then this output will send invalid value.

Used in configurations

NightCooling, CoolingRecycle,
Temp Control = Room Control or Supply air/Room Control or Cascade Control

Typical Range

-40°C - + 40°C . The Value 0x7FF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

5.3.9 nvoFrostTemp

network output SNVT_temp_p *nvoFrostTemp*

This variable transmits effective frost detector temperature, as read from input AI8. If KF 20xx is configured not to use FrostDetection, or no valid value exists, then this output will send invalid value.

Used in configurations

Frost protection = Y1 or Y2

Typical Range

-40°C - + 40°C . The Value 0x7FF = +327.67°C is used to indicate invalid value (Sensor failure/not used).

5.4 Other analogue values

5.4.1 nvoEfficiency

network output SNVT_lev_percent *nvoEfficiency*

This variable transmits current efficiency of Heat exchanger. If KF 20xx is not configured to calculate exchanger efficiency, or one or more of the sensor involved in the calculation is invalid then this output will send invalid value.

Used in configurations

KF 2010 and KF 2020 when Calc Efficiency = YES

Typical Range

0% - 100%. The Value 0x7FF = +163.835 is used to indicate invalid value (Sensor failure/not used).

When Transmitted

Data is transmitted when value has changed at least 1% and also as a heartbeat output as dictated by the configuration property **nciSndHrtBt**. Default is hrtbt = 0, that is no heartbeat output..

5.5 Digital Outputs

5.5.1 nvoPumpCmd

network output SNVT_switch *nvoPumpCmd*

This variable transmits current effective command from KF 20xx for Pump Control. Actual status is transmitted on variable nvoPumpStatus.

Used in configurations

Heater Type = Water.

Valid Range

OFF	State = FALSE and Value = 0.
ON	State = TRUE and Value = 200
NOT USED	Value = 0xFF

When Transmitted

Data is transmitted when value has changed also as a heartbeat output as dictated by the configuration property nciSndHrtBt.

5.6 Analogue outputs

5.6.1 Common

Valid Range

0% - 100%. The Value 0x7FF = +163.835 is used to indicate invalid value (Sensor failure/not used).

When Transmitted

Data is transmitted when value has changed also as a heartbeat output as dictated by the configuration property nciSndHrtBt.

5.6.2 nvoY1

network output SNVT_lev_percent *nvoY1*

This variable transmits output value for first sequence in temperature control. Depending on configuration this might be heating or cooling. The output can be bound to output actuator.

Used in configurations

If Y1Sequenze is enabled

5.6.3 nvoY2

network output SNVT_lev_percent *nvoY2*

This variable transmits output value for second sequence in temperature control. Depending on configuration this might be heating or cooling or heat exchanger. The output can be bound to output actuator.

Used in configurations

5.7.3 nvoSupFanSpeed

network output SNVT_switch

nvoSupFanSpeed

This variable transmits current Effective command from KF 20xx for Supply Fan Speed. Depending on configuration and model this variable can transmit ON/OFF ON/LOW/HIGH or 0-100%
Actual status is transmitted on variable nvoSFStatus. (In KF 2010 can not determine speed of Fan, only OFF/ON)

Used in configurations

ALL

Valid Range

OFF	State = FALSE and Value = 0.
ON	State = TRUE and Value = 100
When 2-speed,LOW	State = TRUE and Value = 50
When 2-speed,HIGH	State = TRUE and Value = 100
When Press Control	Value = 0-200 where 200 = 100%

When Transmitted

Data is transmitted when value has changed also as a heartbeat output as dictated by the configuration property **nciSndHrtBt**.

5.7.4 nvoExhFanSpeed

network output SNVT_switch

nvoExhFanSpeed

Works exactly as nvoSupFanSpeed but for Exhaust Fan.

5.7.5 nvoEffectSetpt

network output SNVT_temp_p

nvoEffectSetpt

This variable transmits current effective setpoint. Depending on configuration and mode of operation the variable has different meaning.

Supply Air Control :

Supply air setpoint with offset from **nviSetptoffset**.

Supply Air Control with outdoor compensation :

Supply air setpoint with offset from Outdoor compensation and **nviSetptoffset**.

Space temp control with cascade control:

Space temp setpoint with offset from **nviSetptoffset**. Supply air setpoint is transmitted in **nvoEffectSetpt**;

Space temp control with min/max supply air :

Space temp setpoint with offset from **nviSetptoffset**.

Space temp control:

Space temp setpoint with offset from **nviSetptoffset**.

Supply air / Space temp control:

Depending on control mode either Space temp setpoint or Supply air setpoint is transmitted.
(with offset from **nviSetptoffset**).

Exhaust air temp control with min/max supply air :

Exhaust air temp setpoint with offset from **nviSetptoffset**.

Used in configurations

ALL

Typical range

10°C to 35°C.

When Transmitted

Data is transmitted when value has changed also as a heartbeat output as dictated by the configuration property **nciSndHrtBt**.

5.7.6 nvoEffectsetptSF

network output SNVT_press_p *nvoEffectsetptSF*

This variable transmits current effective supply air set point.

Used in configurations

ALL

Typical range

When Transmitted

Data is transmitted when value has changed also as a heartbeat output as dictated by the configuration property **nciSndHrtBt**.

5.7.7 nvoEffectsetptEF

network output SNVT_press_p *nvoEffectsetptEF*

This variable transmits current effective supply air set point.

Used in configurations

ALL

Typical range

When Transmitted

Data is transmitted when value has changed also as a heartbeat output as dictated by the configuration property **nciSndHrtBt**.

5.7.8 nvoEffectSetptH

network output SNVT_lev_percent *nvoEffectSetptH*

This variable transmits current effective humidity setpoint.

Used in configurations

ALL

Valid range

0 to 100% RH. The Value 0x7FF = 163.835% is used to indicate invalid value (Sensor failure/not used).

5.7.9 nvoConfigCode

network output SNVT_str_asc *nvoConfigCode*

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This variable transmits current configuration code for KF 20xx. Extensive description of configuration code is in KF 20xx Manual. Format of Configuration code is “****.****.****.****.****” where * can be a number from “0” to “9”. Example value “0100.3000.0100.2222.0000”

Used in configurations

ALL

6 The device resource files collection & other important files

6.1 Device resource files handling in LNS-based applications

The device resource files are used to identify new (user-defined) network variable types. They describe the binary interpretation as well as the format they are presented to the user in. Most of these files are not meant to be edited by anyone other than the developer responsible for the LonWorks interface of the product. KF 20xx comes with a pre-defined set of device resource files. This chapter describes which they are and briefly what they do but the focus will be on how to use them.

6.1.1 Type, format, language and prototype files

The files that make up the device resource files collection consist of:

Clorius.enu, the **language** file:

This file is used to translate language-dependent information such as units, descriptive texts and so on. There must exist at least one language file and then one for every new language that is used. Normally only the English language file is available. Usually this file is not edited but generated by a compilation tool.

Clorius.typ, the **type** file:

The type file is the binary interpretation of the user defined types used in the device. This file is not editable and is constructed using a compilation tool.

Clorius.fpt, the **functional profile** file:

To be able to equip devices with identical sets of network variables and hence gain a unified interface in all devices of the same type, functional profiles have been introduced. They simply define which network variables should be included in the device to gain status as a certain device-type. This is used only in applications requiring the use of LonMark®-compliant devices. Usually this file is not edited but generated by a compilation tool.

Clorius.fmt, the **format** file:

Formatting the network variable so that the user easily can understand it's use is handled by the format file. This file describes how the user-defined type should look when such a variable is browsed by a network-tool. The only supported network tools are the LNS-based ones, for example LonMaker for Windows.

6.1.2 Handling instructions

Updating the LNS's device resource file catalogue

1. Create a sub-directory to the path\LonWorks-dir\types directory.
2. Copy the DRFs to the new directory.
3. Run the Device Resource Files Catalogue utility: path\LonWorks-dir\bin\ldrfeat.exe
4. Browse to the \types directory and click OK.

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5. Click on the "Add new directory" button and browse to the location where you copied the DRFs in step 2. Then click OK.
6. Click on the "Refresh" button and then close the Device Resource File Catalogue utility.
7. You are now set to use the new DRFs with KF 20xx LON.

Usage in the LonMaker environment:

8. Start LonMaker and then the LonMaker Browser.
9. Right-click on the "nviTempCtrlParms" variable and choose "Change format...".
10. Click on Clorius.fmt and choose UNVT_temp_params.
11. Repeat the procedure for the following variables:

```
nciTempCtrlSets : UNVT_temp_sets
nciSettings : UNVT_corr_sets
nciTimeChan : UNVT_scheduler
nciHumidCtrlSets : UNVT_humid_sets
nciPressCtrlsets : UNVT_press_sets
nciHolidays : UNVT_holidays
nciHolidayPds : UNVT_hol_pds
```

12. You should now be able to use the new types in the LonMaker environment.

6.2 The XIF, NXE and APB files

6.2.1 The eXternal Interface File

The XIF describes how the device's external interface is made up. It specifies the LonMaker standard ID that this particular XIF should apply to. This functionality is incorporated so that it will be easy to separate the external interface of different devices. However, the XIF could be designed to work for a number of different devices by the use of a selector. The selector specifies if the file should be applied to a single device-type, class or perhaps the manufacturers entire range of products. The KF 20xx XIFs are designed to work for a specified device-type, for example the KF 2010 uses the KF2010.xif and the KF 2020, the KF2020.xif and so on.

Instructions on how to use the XIFs are available in your network management tool. In LonMaker the XIF is named during the adding of a new device. In LonMaker a XIF is also referenced as a *Device Template*.

6.2.2 The Neuron eXecutable file & the APplication Binary file

The KF 20xx's application may be updated with files of these types. They consist of the application image in a binary format and can be downloaded to the device via a network tool such as LonMaker. The APB includes both the application and the XIF whereas the NXE only includes the application and hence needs the XIF to fully function. Caution is necessary when it comes to using the NXE and the XIF since you must be absolutely certain that they match each other. Normally the network tool does this kind of checking but there might be some that do not support this feature. We prohibit the downloading of an application different from the one originally programmed. This will leave the device out of order until the correct application is downloaded to the device.

6.3 LonMark program ID

Each LonMark-certified device hold a unique program-ID. This ID is used to identify XIFs and DRFs to be used with the unit. The program ID is also used by network tools for various reasons, one is to check interface and application changes (NXE, APB and XIF changes). The following program IDs have been assigned to the KF 20xx products. Even though they are not LonMark certified yet, the program ID is still necessary.

KF 2010 – LON: 90:FF:00:00:01:00:11:10

KF 2020 – LON: 90:FF:00:00:01:00:11:20

KF 2030 – LON: 90:FF:00:00:01:00:11:30

KF 2040 – LON: 90:FF:00:00:01:00:11:40



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