Application software

4 Input analog- 4 Input analog extension

Electrical / Mechanical characteristics : see product information

	Order number	Product designation	Application software ref.	TP device RF devices
	TYF784	4 Input analog	STYF784	
	TYF784E	4 Input analog extension	STYF784	

Summary

1. Scope of application

The analog input 4gang RMD processes measured-value data supplied by analog sensors. Four analog transducers in any combination can be connected to the input. The analog input 4gang RMD evaluates voltage and current signals.

Voltage signals:	0 … 1 V DC	0 … 10 V DC
Current signals:	0 … 20 mA DC	4 … 20 mA DC

The 4...20mA current inputs can be monitored for open-circuit conditions.

An optional analog input module, Order no. TYF784E connected to a 6-pole system connector adds four more analog sensors to the device.

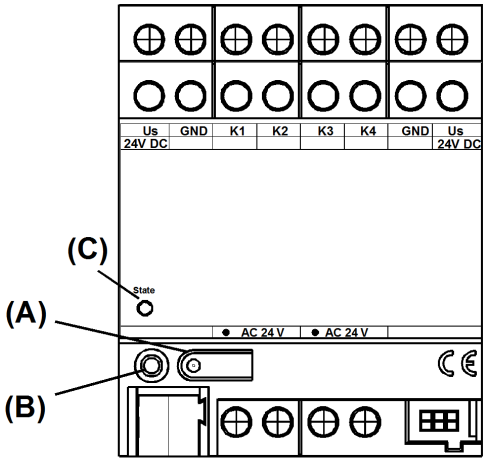
The measured values are encoded by the analog input 4gang RMD in the form of value telegrams (DPT 9.0xx, 2 byte oder DPT 5.001, 1 byte) so that other bus subscribers (e.g. visualization software, Info Display, …) can display these measured values, generate messages or intervene in automatic control processes.

Each measured value has two presettable limit values. As soon as a measured value rises above or drops below these limits, the analog input 4gang RMD can display the corresponding messages. The limit values can also be modified in operation by other devices as, for instance, a push button serving as a value transmitter.

The analog input 4gang RMD needs 24 V AC for operation. This voltage can be supplied, for instance, by the power supply unit, Order no. ST312. This power supply unit can at the same also supply the power for wind sensor heating or the power for a connected analog input module.

The terminals U_S and GND supply 24 V DC (max. 100 mA altogether) to external analog sensors. In the event of short-circuits or overload between U_S and GND, the power is shut off.

Layout



Dimensions

Width: 4 mod, 72 mm
Height: 90 mm
Depth: 58 mm

Controls:

A: Programming button
B: Programming LED
C: Status LED, three-colour (red, orange, green)

Status LED functions:

LED off	no power supply
LED orange/on	modul scan by analog input
LED orange/flashing fast	parameterization of analog extension module
LED red/flashing slowly	fault: low voltage at module connection / Us short-circuited
LED red/flashing fast	fault: no project, parameterization error
LED green/flashing slowly	module scan terminated, projecting OK parameter download into modules
LED green/flashing fast	initialization process terminated,
LED green/on	everthing OK

slow flashing:approx. 1 Hz
fast flashing:approx. 2 Hz

2. Technical data

Degree of protection:	IP 20
Mark of approval:	KNX
Ambient temperature:	-5 °C bis +45 °C
Storage / transport temperature:	- 25 °C ... +70 °C, reduced lifetime when stored above +45°C
Max. housing temperature	T_c = 75 °C
Relative humidity:	Max. 93% r. h., no condensation
Fitting position:	any
Minimum distances:	none
Type of fixing:	snap-fastenening on DIN rail 35 x 7,5 mm

KNX supply

Voltage:	21 … 32 V DC, SELV	
Power consumption:	Typ. 150 mW	
Connection:	bus connection terminal KNX type 1	

External supply

Voltage:	24 V AC +- 10 %, SELV	
Current:	max. 250 mA	
Terminals:	screw terminals	0.5mm^2 to 4mm^2 single wire
	screw terminals	0.34mm^2 to 4mm^2 stranded wire (without ferrule)
	screw terminals	0.14mm^2 to 2.5mm^2 stranded wire (with ferrule)

Response to voltage failure

Bus voltage only:	no communication with KNX
Operating voltage only:	no communication with KNX, sensors without power supply
Bus and operating voltage:	no communication with KNX, sensors without power supply

Response on reactivation:

Bus voltage only:	no communication with KNX, sensors without power supply
Operating voltage only:	no communication with KNX
Bus and operating voltage:	communication with KNX as per initialization parameters

Module connection

Number:	1
Connection:	6-pole system connector for analog input module

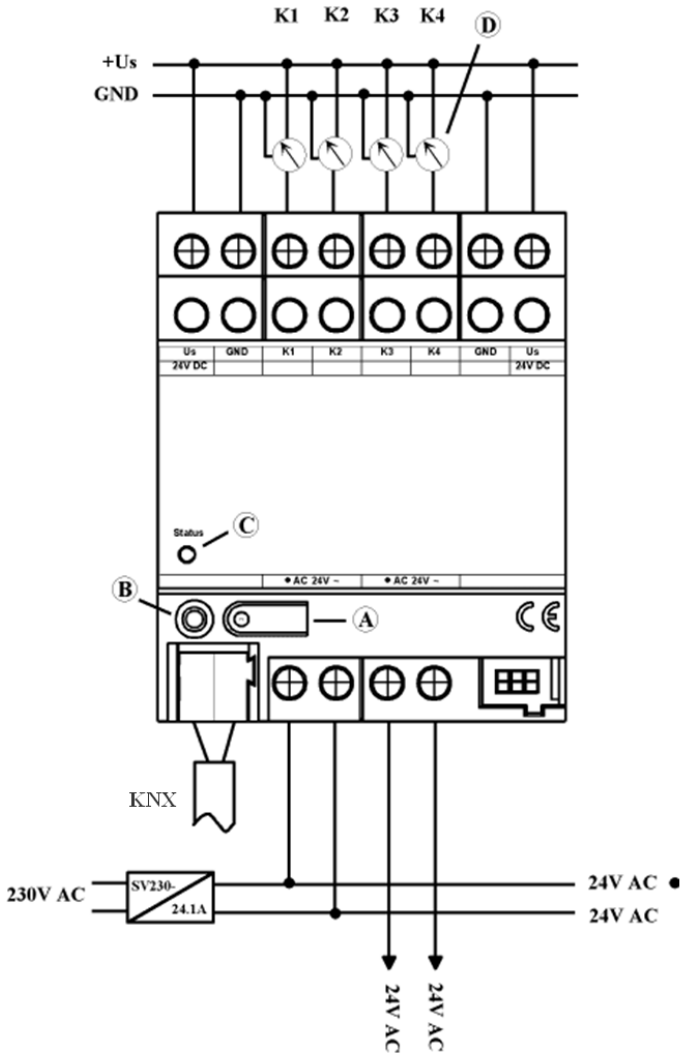
Analog inputs

Number:	4	
Signal voltages / currents:	0...1V DC, 0...10V DC, 0...20mA DC or 4...20mA DC, depending on parametrization	
Input resistance	voltage input:	approx. 18 kΩ
	current input:	approx. 100 Ω
Terminals:	screw terminals	0.5mm^2 to 4mm^2 single wire
	screw terminals	0.34mm^2 to 4mm^2 stranded wire (without ferrule)
	screw terminals	0.14mm^2 to 2.5mm^2 stranded wire (with ferrule)

Outputs for the supply of sensors

Number:	2	
Nominal voltage:	24 V DC ± 10 %	
Nominal current:	100 mA DC (total)	
Terminals:	screw terminals	0.5mm^2 to 4mm^2 single wire
	screw terminals	0.34mm^2 to 4mm^2 stranded wire (without ferrule)
	screw terminals	0.14mm^2 to 2.5mm^2 stranded wire (with ferrule)

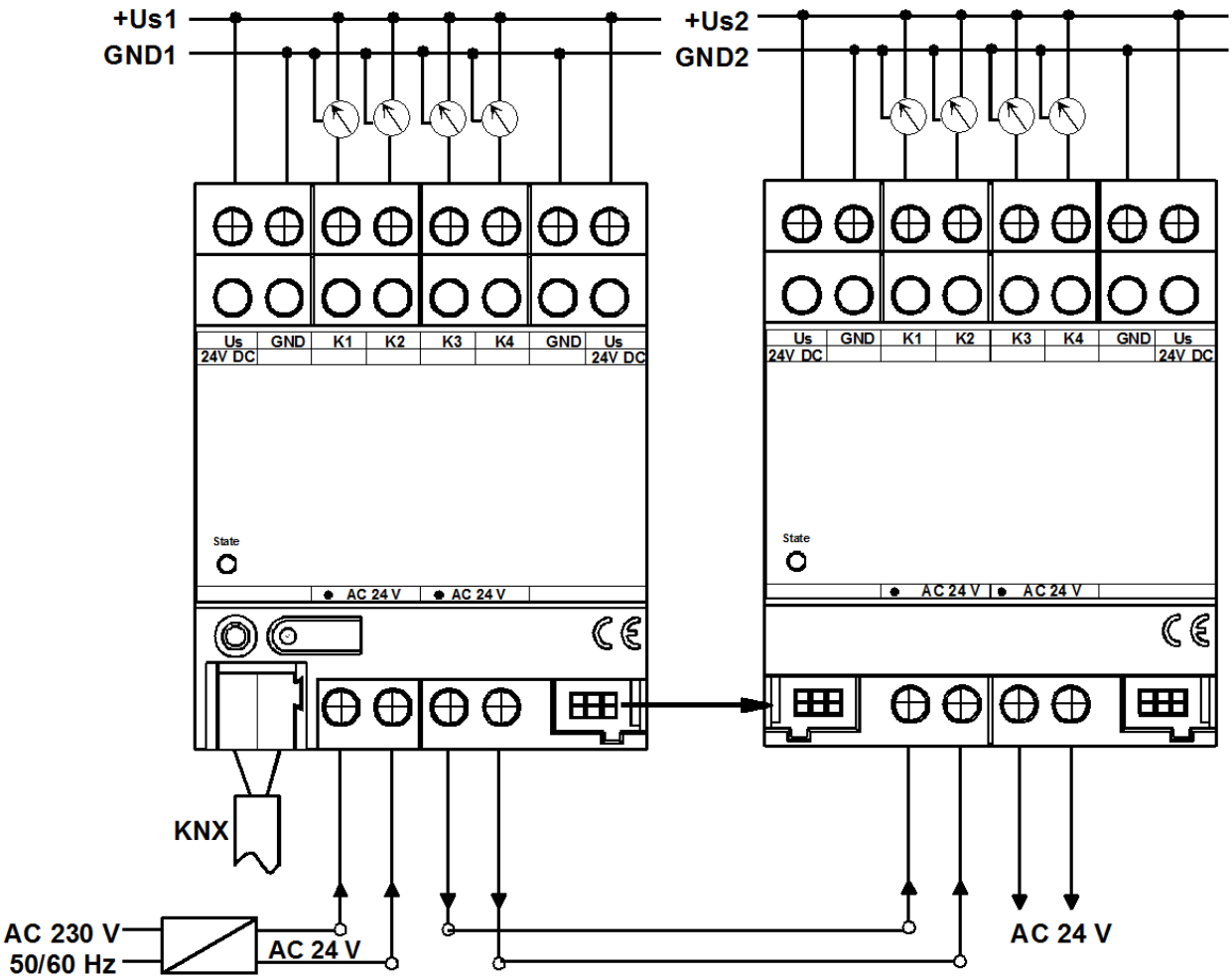
3. Wiring diagram and terminals



Terminals:

+U_S:	supply of external sensors	A:	programming button
GND:	reference potential for +U_S and inputs	B:	programming LED
		C:	status LED, three-colour (red, orange, green)
K1..K4	sensor inputs	D:	sensors
KNX:	KNX terminal		
24V AC:	external supply voltage		
6-pole connector:	extension module connection for future extensions		

Wiring diagram for connection of an analog input module



Hardware information

- Connected sensors can be supplied with power from terminals +U_S and GND (see wiring diagram). The device is equipped with two pairs of these terminals which are internally connected. The total current requirements of all sensors supplied from these terminals must not exceed 100 mA.
- In case of overload or short-circuit between +U_S and GND, the supply voltage is shut off. After removal of the fault, the supply is restored automatically.
- Connected sensors can also be supplied from external sources (SELV) e.g. if their current requirement exceeds 100 mA. The sensors are connected between terminals K1 … K4 and GND.
- U_S and GND must not be connected with the corresponding terminals of another device. **Supplying the sensors with power from an analog input module connected to the device is not permitted (risk of irreparable damage!).**

The following basic rules must be observed when installing the analog input module:

- The analog input module is connected to the analog input 4gang RMD only with the 6-pole system connector (supplied with the analog input module). Only one analog input module can be connected to the device.
- The analog input 4gang RMD and the analog input module can be connected to the same 24 V AC power supply. The connecting terminals are double terminals for easy wiring. Corresponding terminals are marked with dots.
- The U_S and GND terminals of the analog input module must not be connected to the corresponding terminals of another device, e.g. of the analog input, to prevent problems caused by ground loops.
- Sensors connected to the inputs of the analog input module must not get their power supply from the analog input 4gang RMD. Sensors connected to the inputs of the analog input 4gang RMD must not get their power supply from the analog input module.
- If defective, an analog input module can be replaced by one of the same type while the system is in operation (disconnect voltage supply from module!). After the replacement, the analog input 4gang RMD makes a reset after abt. 25 s. This action re-initializes all inputs and outputs of the analog input 4gang RMD and of the module connected and and resets them to their original state.
- Removal or addition of modules without adapting the project and subsequent downloading into the analog input 4gang RMD is not permitted as this will result in system malfunctions.
- After first activation, the analog input 4gang RMD performs a module scan (status LED: "Orange / On"). As a new decive is not projected from the start, the status LED thereafter switches to "Red / Flashing fast"
- A connected analog input module signals its ready-for-operation status by switching its status LED to "Flashing fast".
- After loading a project into the analog input 4gang RMD, the status LED switches to "Green / On"; and the module switches its status LED off.

4. Applications

Number of addresses (max):	200	**dynamic table handling**	Yes ☒ No ☐
Number of assignments (max):	200	**maximum number of assignments**	200

Communication objects 50

Object no.	Function	Name	DP type	Format	Flags
0	Analog input	Alarm object [1]	1.001	1 bit	C, T
1 … 4	Analog input	Measuring value input 1 … 4 [3]	9.0xx	2 bytes	C, T
1 … 4	Analog input	Measuring value input 1 … 4 [3]	5.001	1 byte	C, T
5 … 12	Analog input	Limit value 1 / 2 input 1 … 4	1.001	1 bit	C, T
13 … 20	Analog input	External limit value 1 / 2 Input 1 … 4 [4]	9.0xx	2 bytes	C, W
13 … 20	Analog input	External limit value 1 / 2 Input 1 … 4 [4]	5.001	1 byte	C, W
21 … 24	Analog input	Open-circuit monitoring input 1 … 4 [2]	1.001	1 bit	C, T
25	Extension module	Alarm object [1] [5]	1.001	1 bit	C, T
26 … 29	Extension module	Measuring value input 5 [3] [5]	9.0xx	2 bytes	C, T
26 … 29	Extension module	Measuring value input 5 [3] [5]	5.001	1 byte	C, T
30 … 37	Extension module	Limit value 1 input 1 [5]	1.001	1 bit	C, T
38 … 45	Extension module	External limit value 1 / 2 Input 5 … 8 4) 5)	9.0xx	2 bytes	C, W
38 … 45	Extension module	External limit value 1 / 2 Input 5 … 8 [4] [5]	5.001	1 byte	C, W
46 … 49	Extension module	Open-circuit monitoring input 5 … 8 [2] [5]	1.001	1 bit	C, T

[1] Objects 0 or 25 are visible only if the "Alarm analog input" or "Alarm extension module" parameter is set to "Transmit alarm bit".

[2] Objects 21 … 25 and 46 … 49 "Open-circuit monitoring input…" are visible only if open-circuit monitoring is active for an input with a 4 … 20 mA signal.

[3] Objects 1 … 4 and 26 … 29 can optionally transmit 8-bit values or 16-bit values depending on the setting of the "Transmit format …" parameter.

[4] Objects 13 … 20 and 38 … 45 can optionally receive 8-bit values or 16-bit values depending on the setting of the "Format of external limit-value object …" parameter.

[5] Objects 25 … 49 are visible only if the "Extension module available" parameter is set to "Yes".

Object description

	0, 25	Alarm object	1-bit object to indicate when on one of the inputs an overvoltage has been detected or when the voltage supply for external sensors has been overloaded. Object value = "0": no alarm Object value = "1": alarm
	1 … 4 26 … 29	Measuring value input...	1-byte object or 2-byte object for output of current measuring value.
	5 … 12 30 … 37	Limit value …	1-bit object to indicate when the limit values are exceeded or underrun.
	13 … 20 38 … 45	External limit value …	1-byte or 2-byte objects for limit value correction by other bus devices (e.g. push buttons as value transmitter, visualization) These values overwrite the parameterized values.
	21 …25 46 … 49	Open-circuit monitoring..	1-bit object for reporting whether a fault has occurred in the electrical connection of a sensor with 4 … 20 mA signal. The value of the object for open-circuit monitoring is presettable.

Scope of functions

- Up to four analog sensors with output signals of 0 … 1 V DC, 0 … 10 V DC, 0 … 20 mA DC, 4 … 20 mA DC can be connected directly to the analog input 4gang RMD.
- The connecting lines of the sensors with 4 … 20 mA outputs can be monitored for open-circuit conditions.
- An analog input module permits the connection of up to four more analog sensors.
- The values measured by the analog sensors can be transmitted in the form of 16-bit or 8-bit values.
- The measuring values can be transmitted after value changes and/or cyclically.
- For analog sensors, two limit values with definable hysteresis characteristics can be used.
- The limit values can be can preset from with external devices as 8-bit values or as 16-bit values.

5. Basic settings in the projecting phase

The analog input 4gang RMD is primarily designed to receive and to transmit analog signals. For this purpose, different sensors can be used:

- Basically, any type of sensor with the following output signal characteristics can be connected to the device:
  - 0 … 1 V DC,
  - 0 … 10 V DC
  - 0 … 20 mA DC
  - 4 … 20 mA DC.

  Up to four of these sensors can be connected in a freely chosen combination directly to the analog input 4gang RMD.

- Special analog weather sensors permit detecting specific climatic conditions

- These sensors operate within the signal range of 0 … 10 V.

- In combination with an analog input module, up to four more analog sensors can be connected to the device.

5.1 Selecting the sensor type

Up to four sensors of any type with voltage or current output signals of 0 … 1 V, 0 … 10 V, 0 … 20 mA or 4 … 20 mA can be connected to an analog input 4gang RMD (without analog input module).

In a first step, the type of input signal compatible with the sensor used must be preset. Further dependent parameters are displayed on the parameter filecards "Measuring value …" and "Input …".

For sensors with 4 … 20 mA signals, the function for detecting open-circuit conditions can be activated in addition. If the open-circuit monitoring function is activated, the device generates an additional 1-bit communication object which transmits a telegram with a presettable value in the event of faults.

5.2 Measuring value settings

Among the most important settings is the decision, whether the measuring values are to be transmitted as 8-bit or as 16-bit values. The choice is basically dependent on the other devices working with the data. 8-bit values can be processed by many devices, although with limited resolution. 16-bit values are perfectly suited for display purposes, e.g. in visualization software. They have a significantly higher resolution.

These settings are made on the "Measuring value …" parameter filecard

5.2.1 Measuring value output in 16-bit format

When 16-bit values are used, the following parameters are available: "Measuring value for 0% of measuring signal", "Measuring value for 100% of measuring signal" and "Measuring range scaling factor".

The two basic values must then be chosen together with the common scaling factor in such a way that the measuring range of the sensor is fully covered.

In order to achieve a good resolution, a low factor should be chosen. On the other hand, the resolution should not be so as to suggest an unrealistic precision as, for instance, a room temperature precise to 2 places after the decimal point.

Example:
A pressure transmitter has a measuring range of –50 Pa … +150 Pa.
Its output signal is 0 … 10 V.

The combination
measuring value for 0% of the measuring signal: –5000
measuring value for 100% of the measuring signal: +15000
Measuring range scaling factor: 0.01
then covers the range between –50.00 Pa … +150.00 Pa with two places after the decimal point.

The combination
measuring value for 0% of the measuring signal: –50
measuring value for 100% of the measuring signal: +150
Measuring range scaling factor: 1
then covers the range between –50 Pa … +150 Pa without any places after the decimal point.

As far as the use in combination with other devices is concerned, attention must be paid to the fact that only numerical values are transmitted in bus telegrams. The physical quantities and the corresponding units are defined in the KNX standard and must be the same for different devices. For 2-byte floating point values, the following data points are defined:

Type	Physical quantity	Range of values	Resolution/unit
9.001	Temperature	-273 … 670760	1 °C
9.002	Temperature differential	-670760 … 670760	1 K
9.003	Temperature change	-670760 … 670760	1 K/h
9.004	Lighting intensity	0 …670760	1 lux
9.005	Wind speed	0 …670760	1 m/s
9.006	Pressure	0 …670760	1 Pa
9.007	Relative humidity	0 …670760	1 %
9.008	Air quality	0 …670760	1 ppm
9.010	Time 1	-670760 … 670760	1 s
9.011	Time 2	-670760 … 670760	1 ms
9.020	Voltage	-670760 … 670760	1 mV
9.021	Current	-670760 … 670760	1 mA

5.2.2 Measuring value output in 8-bit format

When 8-bit values are used, the following parameters are available: "Measuring value for 0% of measuring signal" and "Measuring value for 100% of measuring signal".

If the measuring values are to be transmitted as 8-bit values, an ouput value between 0 and 255 can be selected for the minimimum and the maximum value of the analog input range respectively. The minimum output value must be less than the maximum output value

5.3 Transmission criteria

The values measured can be transmitted automatically after a value has changed or after a certain period has elapsed since the last telegram.

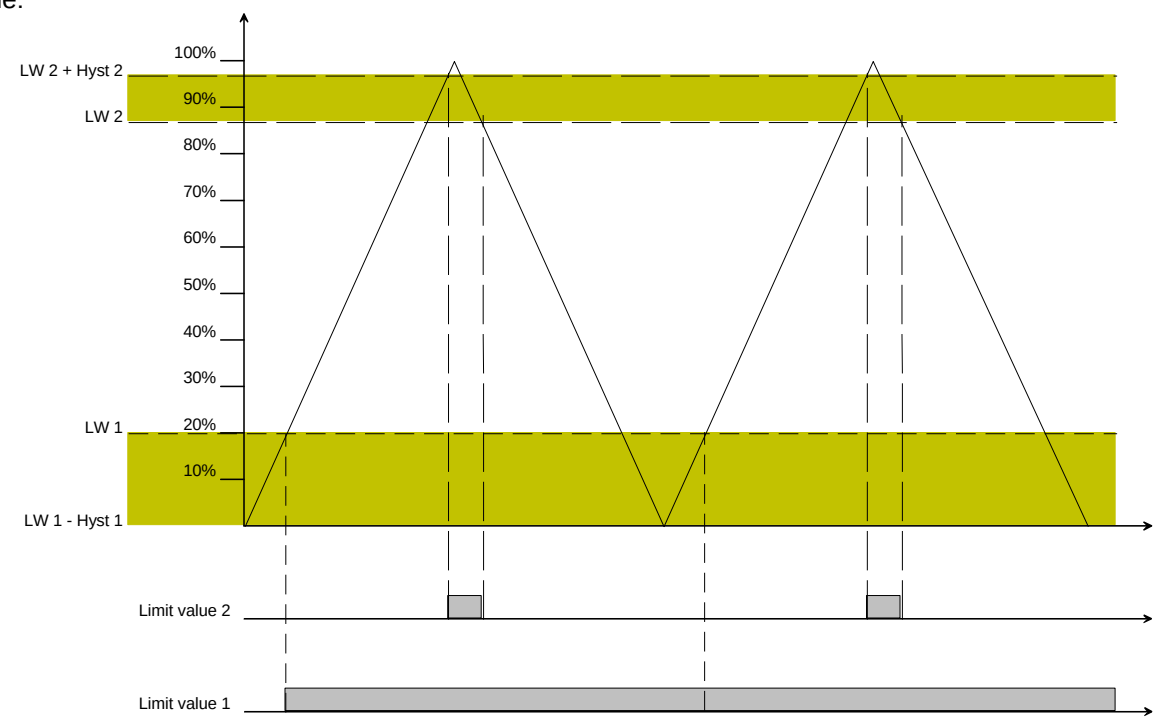
To prevent unnecessary loading of the bus, the parameter "Transmit measured value after a change by..." can be used to define how big the change must be for a telegram to be transmitted. The selection offered is "0.5%", "1%", "3%", "10%" and "no transmission".

If the measured values are to be transmitted cyclically, the cycle time is preset with the parameter "Cyclical transmission factor". In conjunction with the fixed base of 10 seconds, factors from 0 to 255 permit the selection of cycling times up to 42.5 minutes. Factor 0 means no cyclical transmission of measured values.

5.4 Limit values and hysteresis

For each analog measuring value, the analog input 4gang RMD has two limit values which can be preset on the parameter filecard "Input …". For each limit value there is a parametrizable hysteresis with the possibility of fixing the response when the value is exceeded or not reached.

Example:



The limit values and the hysteresis characteristics are specified as a percentage of the full measuring range. When setting the limit values and the pertaining hysteresis, a safety margin of about 1% from the minimum value (0%) and from the maximum value (100%) should be observed. Or else the signals cannot underrun or exceed the respective thresholds. In this case, the limit-value object can transmit at maximum one telegram as shown for limit value 1.

5.5 External limit values

If the parameter "External limit-value object …" is set to "Yes", the ETS shows an additional communication object that can be used for changing the preset limit value during operation. The following parameter "External limit-value format …" determines whether 16-bit floating point values or 8-bit percentage values are to be transmitted to this communication object.

In both cases, it is necessary to limit the predefined values in the devices used as limit-value transmitters in such a way that in consideration of the hysteresis a corresponding safety margin is always ensured.

Attention: An external value overwrites the internal value. Only after a new download of the project will the internal value be reactivated. A readout of the object values yields correct results only after data have been written into the objects at least once via the bus after a reset.

5.6 Alarm in case of overvoltage or overload

A common alarm object can be activated for the four inputs of the analog input 4gang RMD in case of an overvoltage at an input or if an overload occurs at the terminal for the supply of the sensors. This communication object does not permit drawing conclusions on the direct cause of the fault.

If the analog input 4gang RMD is connected to an analog input module, a separate alarm object is available for this extension module.

6. Connection of analog weather sensors

The analog input 4gang RMD can also be connected to weather sensors sensing each a separate physical quantitiy. For these analog weather sensors, the following data point types of the communication objects are defined in the KNX standard:

Sensor	Unit	Data point type
Brightness	lux	9.004
Twilight	lux	9.004
Wind	m/s	9.005
Temperature	°C	9.001
Humidity	% r.h.	9.007
Air pressure	Pa	9.006

The parameter settings described in the following sections permit a simple adaptation to the respective measuring ranges. The limit and hysteresis values indicated are to be considered as typical examples which can be easily adapted to the special situation in the building.

6.1 Wind speed

For determination of the wind force, the wind sensor is equipped with a vane which is heated as a protection against icing. The measuring range of the sensor covers 0 … 40 m/s. For use with the analog input 4gang RMD, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	0 m/s
Measuring value for 100% of the measuring signal:	4000	40 m/s
Measuring range factor:	0.01	
Limit value 1:	25 %	10 m/s
Hysteresis 1:	8 %	3.2 m/s
Limit value 2:	30 %	12 m/s
Hysteresis 2:	8 %	3.2 m/s

6.2 Brightness

The brightness sensor is equipped with a probe which is normally installed in vertical position in front of the building wall. The measuring range of the sensors covers 0 … 60,000 lux. For use with the analog input 4gang RMD, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	0 lux
Measuring value for 100% of the measuring signal:	+6000	60000 lux
Measuring range factor:	10	
Limit value 1:	33%	20000 lux
Hysteresis 1:	5%	3000 lux
Limit value 2:	83%	50000 lux
Hysteresis 2:	5%	3000 lux

6.3 Twilight

The twilight sensor is equipped with a probe which is normally installed in vertical position in front of the building wall. The measuring range of the sensors covers 0 … 255 lux. For use with the analog input 4gang RMD, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	0 lux
Measuring value for 100% of the measuring signal:	+25500	255 lux
Measuring range factor:	0,01	
Limit value 1:	40 %	100 lux
Hysteresis 1:	10 %	25 lux
Limit value 2:	80 %	200 lux
Hysteresis 2:	10 %	25 lux

6.4 Temperature

The temperature sensor senses the temperature of the ambient air. The measuring range of the sensor extends from –30 to +70 °C. For use with the analog input 4gang RMD, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	–3000	–30°C
Measuring value for 100% of the measuring signal:	+7000	+70°C
Measuring range factor:	0,01	
Limit value 1:	30 %	0 °C
Hysteresis 1:	2 %	2 K
Limit value 2:	35 %	5 °C
Hysteresis 2:	2 %	2 K

6.5 Rain

The rain sensor is equipped with a meandering conductor track and evaluates the conductivity of rain water. For use with the analog input 4gang RMD, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	
Measuring value for 100% of the measuring signal:	+1000	
Measuring range factor:	0,01	
Limit value 1:	60 %	Regen
Hysteresis 1:	20 %	Kein Regen
Limit value 2:		
Hysteresis 2:		

Contrary to the other weather sensors, the rain detector does not supply analog measuring values but toggles between 0 volt and 10 volts so that displaying an analog value makes no sense. For this reason, the object "Measuring value" should not transmit neither in case of a change at the input nor cyclically.

The settings for 0% of the measuring range, 100% of the measuring range and the measuring range factor are necessary for the limit value detection to function properly. The suggested parameters for the limit value ensure that the switching threshold is always safely detected.

6.6 Humidity

The humidity sensor senses the relative humidity of the air and the room temperature. Both measuring values are made available in the form of analog voltages. The measuring ranges of the sensor extend from 0 to 100 % of relative humidity and from –30 to +70 °C. For use with the analog input 4gang RMD, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	0 % r. h.
Measuring value for 100% of the measuring signal:	10000	100 % r. h.
Measuring range factor:	0,01	
Limit value 1:	40 %	40 % r. h.
Hysteresis 1:	5 %	5 % r. h.
Limit value 2:	70 %	70 % r. h.
Hysteresis 2:	5 %	5 % r. h.
Measuring value for 0% of the measuring signal:	–3000	–30°C
Measuring value for 100% of the measuring signal:	+7000	+70°C
Measuring range factor:	0,01	
Limit value 1:	50 %	20 °C
Hysteresis 1:	2 %	2 K
Limit value 2:	55 %	25 °C
Hysteresis 2:	2 %	2 K

6.7 Air pressure

For an air pressure sensor with an input range of 70.000 … 120.000 Pa which is converted to 0 … 10 volts, the following parameters are recommended for use with the analog input 4gang RMD:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	7000	700 hPa
Measuring value for 100% of the measuring signal:	12000	1200 hPa
Measuring range factor:	10	
Limit value 1:	60 %	1000 hPa
Hysteresis 1:	2 %	10 hPa
Limit value 2:	64 %	1020 hPa
Hysteresis 2:	4 %	20 hPa

7. Connection of an analog input module

An analog input module permits enlarging the number of analog sensors from four to eight.

7.1 Settings of the analog input module

The device software offers the same settings for the four channels of the analog input module as for the four inputs of the analog input.

A common alarm object can be activated for all inputs of the analog input module. This object is activated, for instance, in case of an overvoltage at one of inputs or if an overload occurs at the terminal for the supply of the sensors. This communication object does not permit drawing conclusions on the direct cause of the fault.

7.2 Electrical connection

During the installation of an analog input module, the following points must be observed:

- Only one analog input module can be connected to the device.
- If defective, an analog input module can be replaced by one of the same type while the system is in operation (disconnect voltage supply from module!). After the replacement, the analog input makes a reset after abt. 25 s.. This action re-initializes all inputs and outputs and resets them to their original state.
- Removal or addition of modules without adapting the project and subsequent downloading into the analog input is not permitted as this will result in system malfunctions.
- The U_S and GND terminals of the analog input module must not be connected to the corresponding terminals of another device, e.g. of the analog input, to prevent problems caused by ground loops.
- Sensors connected to the inputs of the analog input module must not get their power supply from the analog input. Sensors connected to the inputs of the analog input must not get their power supply from the analog input module.

8. Commissioning

The analog input 4gang RMD is programmed with the help of the ETS.

8.1 Initialization / status indication

After switching on the device for the first time the analog input 4gang RMD starts a module scan (status LED: "Orange / on"). As a new device comes by default without configuration, the status LED switches thereafter to "Red / flashing fast".

A connected analog input module shows that it is ready for operation by setting its own status LED to "Flashing fast".

After downloading a project into the analog input 4gang RMD, the status LED shows “Green / on”. The module switches ist own status LED off.

9. Parameters

Description	Values	Remarks
General parameters		
Signal input	No sensor Sensor 0 … 10V Sensor 0 … 1V Sensor 0 … 20mA Sensor 4 … 20mA	This parameter determines whether a sensor and which sensor is connected to one of the inputs. The format and the scaling factor of the measuring values for the sensor types can be set on a special parameter filecard. On another filecard, two limit values per input and the response when exceeded or underrun can be adjusted.
Open-circuit detection	**No detection** continuity = 0, open-circuit = 1 continuity = 1, open-circuit = 0	When a sensor with 4 … 20mA ouput is used, this parameter permits reporting if the electrical connection is interrupted. This is done by enabling a 1-bit communication object.
Alarm analog input	**No transmission** Transmit alarm bit	An alarm message can be transmitted if the device detects a fault in one of the analog inputs or in the sensor supply. When the parameter is set to “Transmit alarm bit”, the “Alarm object” is activated.
Extension module	**No** Yes	This parameter determines whether an analog input module is used in addition. In this case, further parameter cards and communication objects for the four inputs of the extension module are activated.
Extension module		
Signal input	**No sensor** Sensor 0 … 10V Sensor 0 … 1V Sensor 0 … 20mA Sensor 4 … 20mA	The parameter determines whether a sensor is connected to one of the inputs and what type of sensor. The format and scaling of the measuring values for the sensor types can be adjusted on a special parameter filecard. Two limit values per input can be fixed and the reactions when exceeded and when not reached be defined on another card.
Alarm extension module	**No transmission** Transmit alarm bit	An alarm can be transmitted, if the device detects a fault in one of the four analog inputs or in the supply of the sensors. If the parameter is set to "Transmit alarm bit" the "alarm object" is activated.

Measuring value X		
Measuring value transmission format	**16-bit value EIS5** 8-bit value EIS6	The parameter defines whether the measuring values of this input are transmitted in the form of signed floating point numbers or as unsigned relative values. Depending on this parameter, further parameters for the adaptation and scaling of measuring values are shown.
Measuring value format = 16-bit value		
Measuring value for 0% of measuring signal Measuring value for 100% of measuring signal Measuring range scaling factor	-32768 … (**0**) … 32767 -32768 … (**1000**) … 32767 **x 0.01** x 0.1 x 1 x 10 x 100	With the three parameters "Measuring value for 0%", " Measuring value for 100%" and "Factor" of measuring range, the analog input 4gang RMD can adapt itself to the actual measuring range of the sensor used. To achieve a high resolution, the two base values should be selected in such a way that a good coverage of the measuring range of the sensor is obtained with a scaling factor as low as posssible
Measuring value format = 8-bit value		
Base value 0% of measuring value Base value 100% of measuring value	**0** … 255 0 … **255**	With these two parameters, the analog input 4gang RMD can convert the analog input signal to value range of the 1-byte communication object.
Transmit measuring value in the event of a change by	No transmission 0.5% 1% **3%** 10%	The parameter defines the percentage of change required with respect to the previous object value for the new value to be transmitted. In a sensor with a measuring range extending from 0 … 10V, a measuring value difference of 3% corresponds to 0.3V. When the last telegram had a value of 4V, a new telegram will be transmitted when the actual measuring value is below 3.7V or above 4.3V. If "No transmission" is selected, the measuring value is transmitted only cyclically or after a WRITE request.
Measuring value cyclical transmission factor (base 10s, 0 = no cyclical transmission)	**0** … 120	The parameter fixes the time after which the actual measuring value is being transmitted, even if the difference with the respect to the previous value has not yet been reached. In the "0" standard setting, the measuring value is not transmitted cyclically.

Input X		
Limit value … (in % of measuring range)	0 … 100%	These three parameters define the thresholds which – when exceeded or underrun – generate the corresponding switching telegrams.
Limit value hysteresis X	0 … 100%	To make sure the thresholds can be safely execceded or underrun it is necessary to respect a reasonable safety margin from the extreme values of 0% and 100% when selecting the limit values and the hysteresis.
Limit value (LV) activation X	above LV = ON, below LV-hysteresis = OFF above LV = OFF, below LV-hysteresis = ON below LV = ON, above LV+hysteresis = OFF below LV = OFF above LV+hysteresis = ON	
External limit value object LV X	Yes **No**	The parameter defines whether an object for external change of the limit value is to be activated.
Format of external limit value object LV X	**16-bit value EIS5** 8-bit value EIS6	The parameter enables either a 2-byte or a 1-byte object which permits changing the limit value while in operation.