

Climatix™

## Climatix Controller

## POL422.50/ATL

For controlling, switching and monitoring functions

The Climatix 422.50/ATL controller is HVAC controller optimized for air handling units, rooftop units, chillers and heat pumps.

### Main features

The controller offers the following features:

- Power supply AC 24 V or DC 24 V
- DC 24 V and DC 5 V power supplies for active sensors on board
- 3 analog inputs for temperature sensor
- 2 configurable inputs as digital input/DC 0...10 V input/temperature sensor
- 3 configurable outputs as DC 0...10 V analog output/digital output for off-board load
- 4 digital inputs for potential-free contacts
- 1 digital input for potential-free contact or fan speed measurement
- 1 digital input galvanically isolated (AC 115...230 V)
- 5 relay outputs (4 NO contacts, 1 changeover switching type)
- 2 triac outputs (AC 24/115/230 V)
- RS-485 in Modbus RTU for third-party bus communication
- Process bus for network functionalities
- Local service connector for user interface and PC tools (supporting USB)
- SD card interface for application and operating system upgrade
- Operating temperature range is -40...70 °C

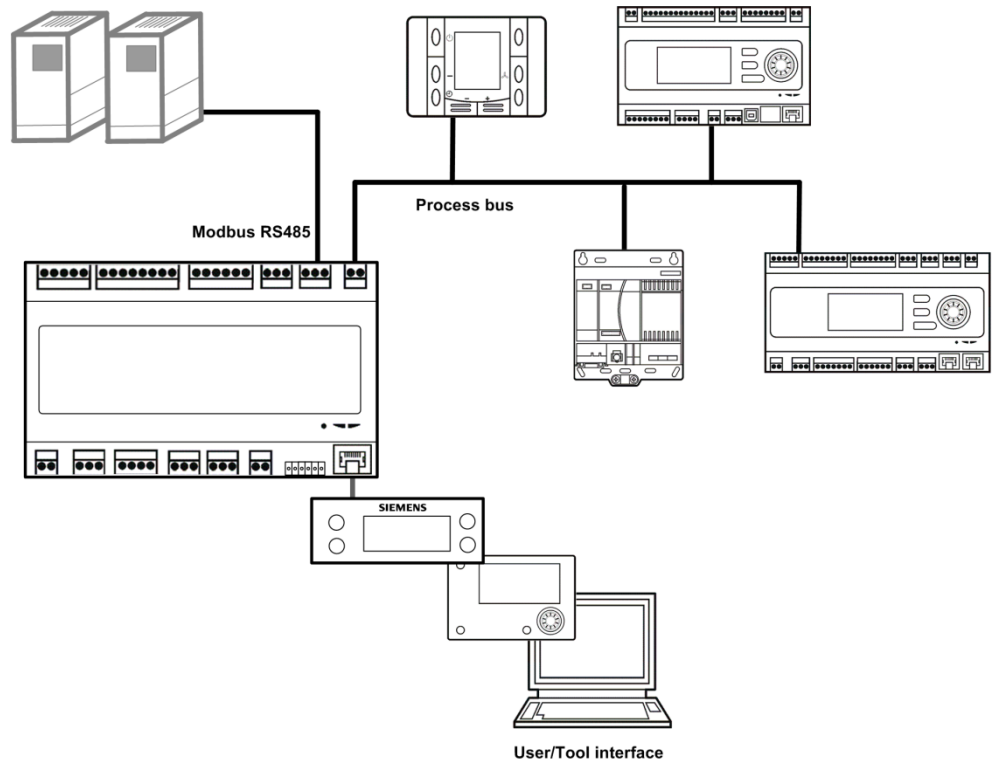
Powerful service tools are available to facilitate commissioning.

### Note

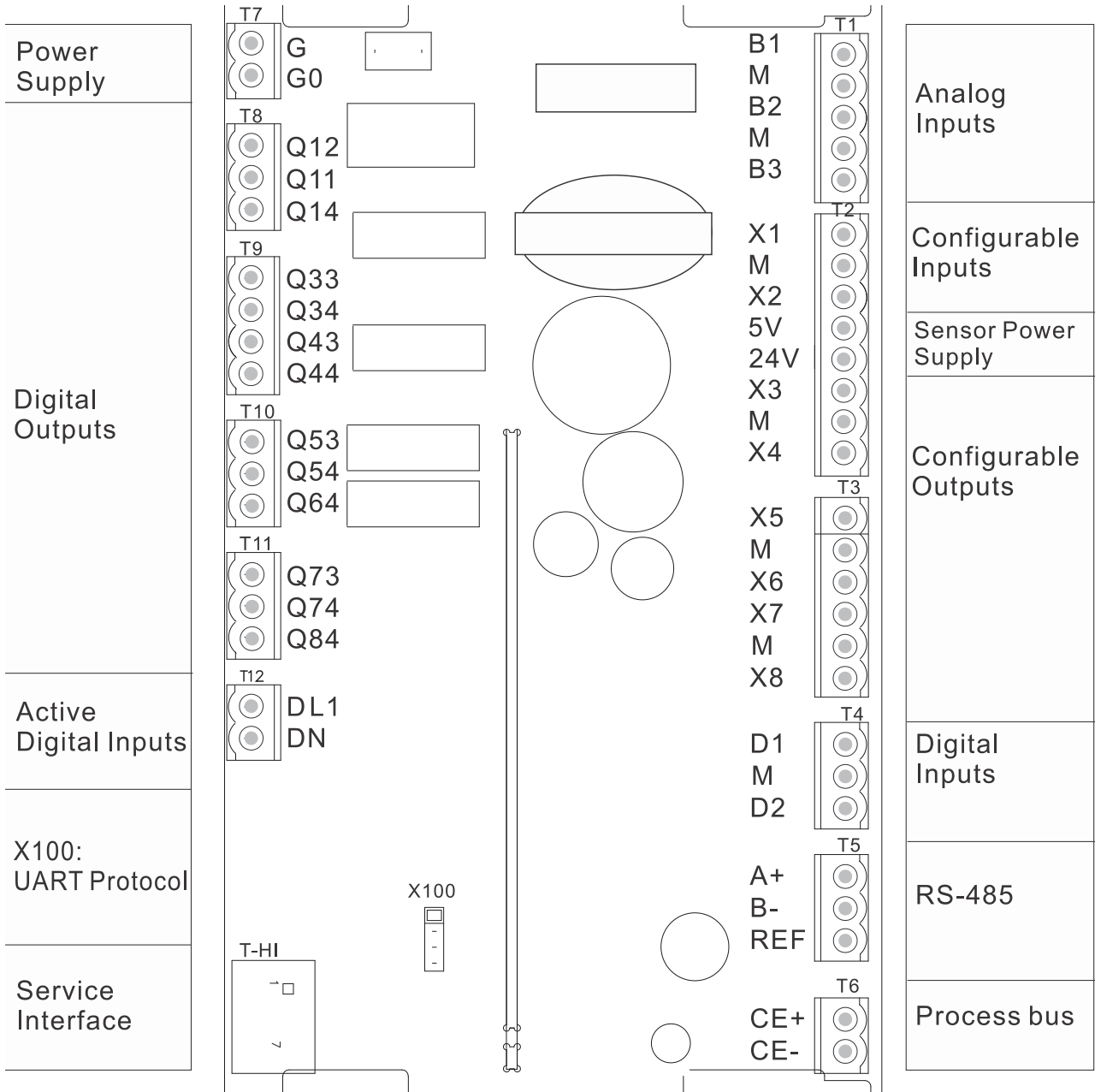


POL422.50/ATL is programmable controller with programmability.

# Communication concept



Overview



## Disposal



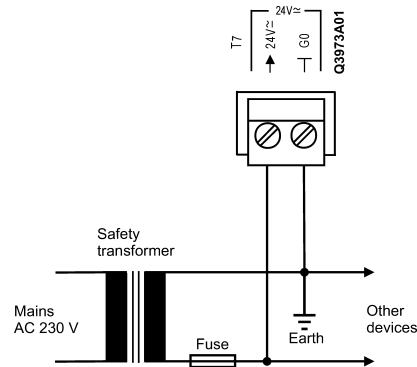
The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

## Technical data

### Power supply G, G0 (T7)

Operating voltage	AC 24 V $\pm$ 20% / DC 24 V $\pm$ 10%
Frequency	45...65 Hz @ AC 24 V
Max. AC current	1.6 A @ AC 24 V
Max. DC current	1.5 A @ DC 24 V
Max. external supply line fusing	6.3 A slow wire fuse or circuit breaker



### Relay output Q1(Q11,Q12) (T8)

#### Relay

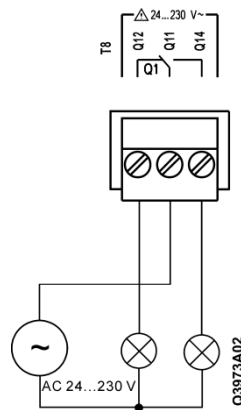
Contact	Monostable, NO/NC contact, SPDT
Switching voltage	AC 24...230 V (-20%, +10%) DC 18...30 V
Rated current (res./ind.)	AC 3 A (res.)/2 A (ind. $\cos\phi$ 0.6) DC 3 A (res.)
Min. switching current at AC 19 V	30 mA
Endurance	100,000 cycles @ AC 230 V, 3.0 A (res.)
Max. external supply line fusing	6.3 A slow wire fuse or circuit breaker



### Warning

Do **not** mix SELV / PELV and line voltage on the same terminal.

Use external protection for inductive load.



### Relay outputs

Q3(Q33,Q34) (T9)  
 Q4(Q43,Q44) (T9);  
 Q5(Q53,Q54) (T10)  
 Q6(Q54,Q64) (T10)

### Relay

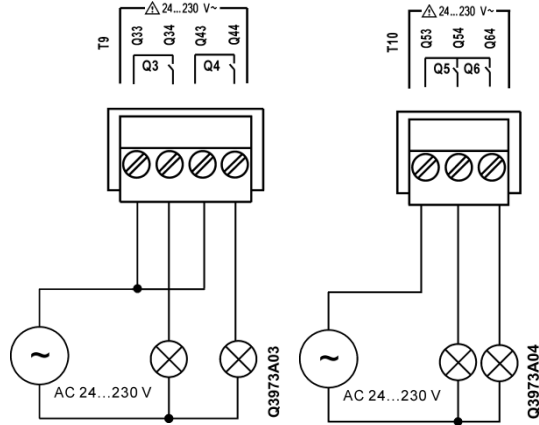
Contact	Monostable, NO contact, SPST
Switching voltage	AC 24...230 V (-20%, +10%) DC 18...30 V
Rated current (res./ind.)	AC 3 A (res.)/2 A (ind. cosφ 0.6) DC 3 A (res.)
Min. switching current at AC 19 V	30 mA
Endurance	100,000 cycles @ AC 230 V, 3.0 A (res.)
Max. external supply line fusing	6.3 A slow wire fuse or circuit breaker



**Warning**

Do **not** mix SELV / PELV and line voltage on the same terminal.

Use external protection for inductive load.



### Triac outputs

Q74, Q84 (T11)

### Triac data

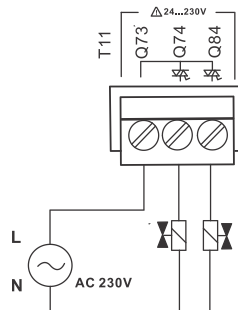
Switching voltage	AC 24...230 V (-20%, +10%)
Switching capacity	Max. 500 mA/Min. 30 mA
Max. external supply line fusing	2.0 A slow wire fuse or circuit breaker



**Warning**

Do **not** mix SELV / PELV and line voltage on the same terminal.

Use external protection for inductive load.

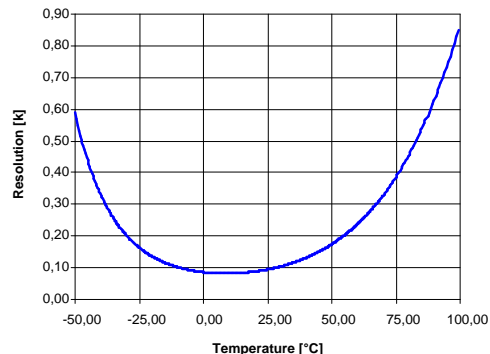
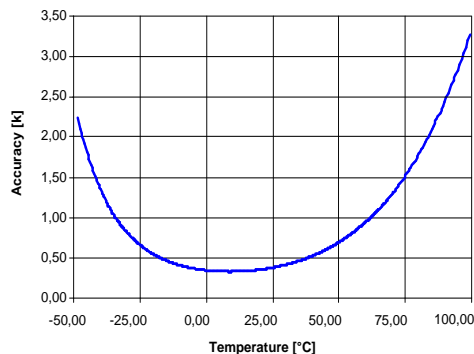


### Analog inputs

B1...B3 (T1)

### NTC 10k (B<sub>25/85</sub>=3977 K)

Sensor current	120 μA @ 25 °C	
Temperature range	-50...100 °C	
Accuracy and resolution of input Temperature	See diagram below	
	Accuracy	Resolution
-50 °C	2.5 K	0.6 K
-40 °C	1.4 K	0.4 K
-30 °C	0.9 K	0.2 K
-10 °C	0.5 K	0.1 K
50 °C	0.7 K	0.2 K
70 °C	1.3 K	0.4 K
90 °C	2.5 K	0.7 K
100 °C	3.4 K	0.9 K



**Configurable inputs**  
X1, X2 (T2)

Configurable  
Reference potential  
By software  
Terminals ⊥

**NTC 10k** ( $B_{25/85}=3977$  K)

Accuracy  
Please refer to B1...B3

**DC 0...5/0...10 V ratiometric sensor**

Resolution 50 mV  
Accuracy 100 mV  
Input resistance 100 kΩ

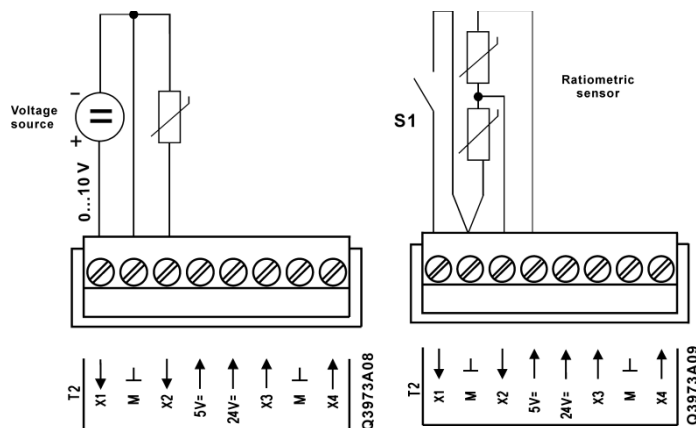
**Digital input**

0/1 digital signal (binary)  
Sampling voltage/current For potential free contacts  
DC 24 V, 8 mA  
Contact resistance Max. 200 Ω (closed)  
Min. 50 kΩ (open)  
Delay 10 ms  
Pulse frequency Max. 20 Hz



**Warning**

**Avoid negative voltages at the analog inputs because the conversion leads to indetermined results.**

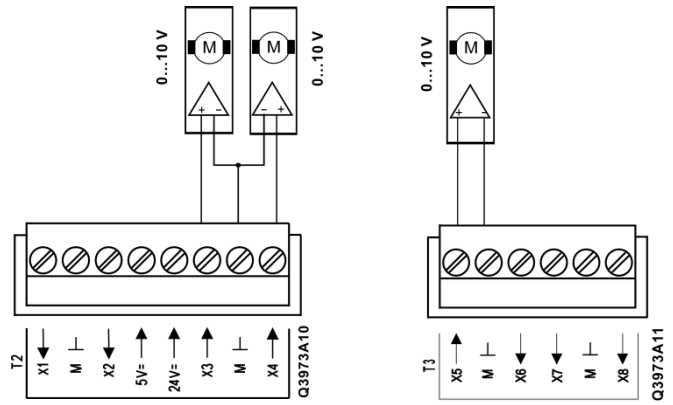


**Configurable outputs**  
X3, X4 (T2), X5 (T3)

Configurable  
Reference potential  
By software  
Terminals ⊥

**DC 0...10 V output**

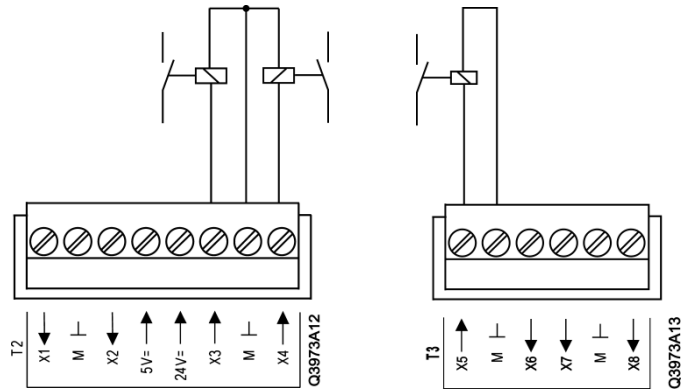
Resolution 30 mV  
Accuracy 100 mV  
Output current Max. 1 mA



**DC output for off-board load**

Switching voltage  
Switching capacity

DC 24 V  
Max. 25 mA



**Note**



Use free wheel diode for inductive load.

### Digital inputs

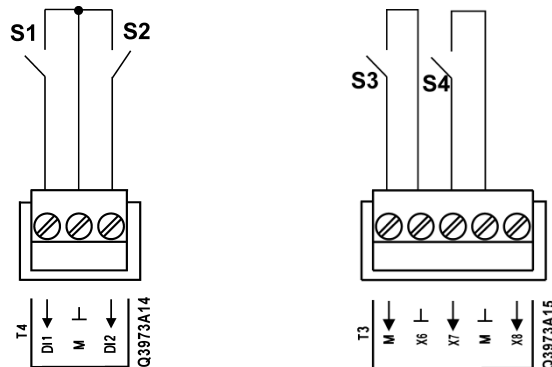
X6, X7 (T3)

DI1, DI2 (T4)

0/1 digital signal (binary)  
Sampling voltage/current  
Contact resistance

Delay  
Pulse frequency

For potential free contacts  
DC 24 V, 8 mA  
Max. 200 Ω (closed)  
Min. 50 kΩ (open)  
10 ms  
Max. 20 Hz



### Digital input

X8 (T3)

Configurable

By software

#### 0/1 digital signal (binary)

Sampling voltage/current  
Contact resistance

Delay  
Pulse frequency

For potential free contacts  
DC 24 V, 8 mA  
Max. 200 Ω (closed)  
Min. 50 kΩ (open)  
10 ms  
Max. 20 Hz

#### Pulse measurement

Sensor  
Sampling voltage  
Max. speed  
Min. ON/OFF time

Open-collector  
DC 24 V, Max. 8 mA  
30,000 RPM  
500 μs

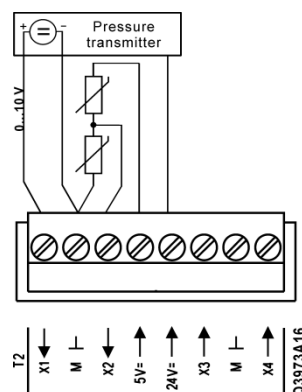
### Powering sensors

Active/ratiometric

DC 5 V, DC 24 V (T2)

Voltage/current  
Voltage/current  
Reference potential  
Connection

DC 5 V ±2.5%, 20 mA  
DC 24 V (-25%, +10%), 40 mA  
Terminals ⊥  
Short circuit protected



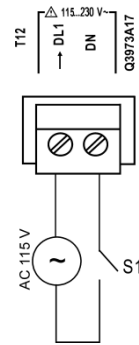


**Active digital input**  
DL1 (T12)

**Digital input (0/1 binary)**

Nominal voltage  
Frequency range  
Input current  
Delay  
Pulse frequency

Galvanically isolated voltage input  
AC 115...230 V (-15%, +10%)  
45...65 Hz  
3 mA @ AC 230 V  
100 ms  
Max. 5 Hz

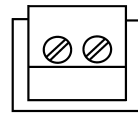


**Interfaces**

**Process bus**  
CE+, CE- (T6)

**Based on KNX TP1**

Bus connection	CE+, CE-, <u>not</u> interchangeable
Bus electronics	Galvanically isolated
Bus load	Max. 5 mA
Bus cable	Must be shielded; Please refer to KNX manual "System Specifications"
Bus cable length between 2 nodes	Max. 350 m
Total length of bus cable	Max. 700 m
DPSU	40 mA rated current



**Third party bus (RS-485 Modbus RTU)**  
A+, B-, REF (T5)

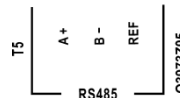
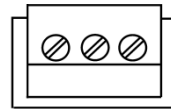
**RS-485 (EIA-485)**

Bus connection	Modbus RTU mode
Bus electronics	A+, B-, REF
Bus cable	<u>Not</u> galvanically isolated
Bus polarization	Shielded if length>3 m, twisted pair
Bus termination	Configurable by software
	None*

**Note**



\*On RS485 network, it is essential to use termination resistors that match the cable's characteristic impedance to prevent signal echoes from corrupting the data on the line.



**Tools/HMI Local service interface (T-HI)**

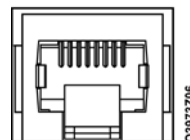
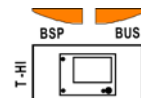
Cable connection RJ45 jack, 8 pins, length of cable<3 m

**Local-HMI**


RS-485 (EIA-485)	<u>Not</u> galvanically isolated
Bus polarization	680 Ω/680 Ω
Bus termination	120 Ω/1 nF
Supply voltage	DC 24 V, Max. 100 mA (short circuit protected)

**Tool**

USB Use PC service cable POL0C2 for tools



<b>LED for BSP run/stop</b>	<b>Mode</b>	<b>LED status</b>
	SW update mode (download active on a new BSP, application)	Alternating between red and green every second
	Application running	Green on
	Application loaded but not running	Yellow on
	Application not loaded	Yellow on
	BSP error (software error)	Red flashing at 2 Hz
	Hardware error	Red on

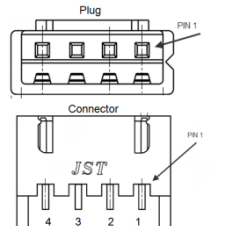
**Note**  LED for bus only indicates the status of the integrated modem communication. POL422.50/ATL does not provide this modem communication.

<b>Connection terminals</b>	Possible plugs for I/O signals and communication (available on request)	Phoenix FKCVW 2,5/x-ST Phoenix FKCT 2,5/x-ST Phoenix MVSTBW 2,5/x-ST
	Possible plugs for power supply (available on request)	Phoenix FKCVW 2,5/2-ST OG Phoenix FKCT 2,5/2-ST OG Phoenix MVSTBW 2,5/2-ST OG
	Solid wire	0.5...2.5 mm <sup>2</sup>
	Stranded wire (twisted or with ferrule)	0.5...1.5 mm <sup>2</sup>
	Cable length	In compliance with the load, local regulations and installation documents

<b>Real-time clock</b>	Buffering with internal Gold Cap	Min. 4 hours
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<b>SD card</b>	Card-Type	SD, SDHC
	Formation	FAT16, FAT32

**X100 connector** POL422.50/ATL controller has a X100 connector for local devices (UART protocol).  
Plug type: JST XHP-4

Plug and Connector	Pin	Description
	1	Output, Tx D
	2	Input, Rx D
	3	
	4	Ground

<b>Environment</b>	<b>Operation</b>	IEC 60721-3-3
	Temperature	-40...70 °C
	Restriction process bus	-25...70 °C
	Humidity	<90% r.h. (no condensation)
	Air pressure	Min. 700 hPa, corresponding to Max. 3,000 m above sea level
	<b>Transport</b>	IEC 60721-3-2
	Temperature	-40...70 °C
	Humidity	<95% r.h. (no condensation)
	Air pressure	Min. 260 hPa, corresponding to Max. 10,000 m above sea level
	Mechanical conditions	IEC 60721-3-2 Class 2M2

<b>Protection</b>	Safety class	Suitable for use in plants with safety class II
<b>Standards</b>	EU Conformity (CE)	CE1T3973xx
<b>General data</b>	Dimensions	174x 105x 52 mm
	Weight excl. packaging	232g
<b>Accessory parts</b>	PC service cable 1.5 m	POL 0C2.40/STD
	<b>Connector set (screw, cable side entry)</b>	POL042.25/STD
	1 x Phoenix MVSTBW 2,5/2-ST OG	
	2 x Phoenix MVSTBW 2,5/2-ST GY7035	
	7 x Phoenix MVSTBW 2,5/3-ST GY7035	
	1 x Phoenix MVSTBW 2,5/4-ST GY7035	
	1 x Phoenix MVSTBW 2,5/5-ST GY7035	
	1 x Phoenix MVSTBW 2,5/8-ST GY7035	

## Types and features

Hardware I/Os	
<b>Analog inputs</b>	B1, B2, B3 (NTC 10k)
<b>Configurable inputs</b>	X1, X2 (NTC 10k / 0...10 V / DI)
<b>Digital inputs</b>	X6, X7 (binary)
	X8 (binary/fan speed)
	D1, D2 (binary)
	DL1 (active AC 115...230 V)
<b>Configurable outputs</b>	X3, X4, X5 (0...10 V analog output /off-board digital output)
<b>Digital outputs</b>	Q1, Q3, Q4, Q5, Q6 (relay output)
	DO1, DO2 (triac output)
<b>Interfaces</b>	Process bus interface
	Modbus RTU interface
	SD card interface

## Engineering notes



### Warning

In order to protect against accidental contact with relay connections at voltages above  $42 V_{\text{eff}}$ , the device must be installed in an enclosure (preferably a control panel). It must be impossible to open the enclosure without the aid of a key or tool.

AC 230 V cables must be double-insulated against safety extra-low voltage (SELV) cables.

Do not mix SELV / PELV and line voltage on the same terminal.

Use external protection for inductive load of relay outputs.

Use external fuse for over current protection of relay and triac outputs.

Avoid negative voltage on analog inputs, because the measured ADC values are undefined. The accuracy of the 10 V analog inputs is valid for values above 100 mV.

Dimensions (mm)

