



Climatix™

Climatix controller

POL423.50/XXX

POL425.50/XXX

POL426.50/XXX

For controlling, switching and monitoring functions

The Climatix controllers are HVAC controllers optimized for district heating substation (POL425.50/XXX and POL426.50/XXX), heat pump (POL423.50/XXX) and wood boiler (POL425.50/XXX) applications.

Controller types



POL425.50/XXX



POL423.50/XXX



POL426.50/XXX

Main features

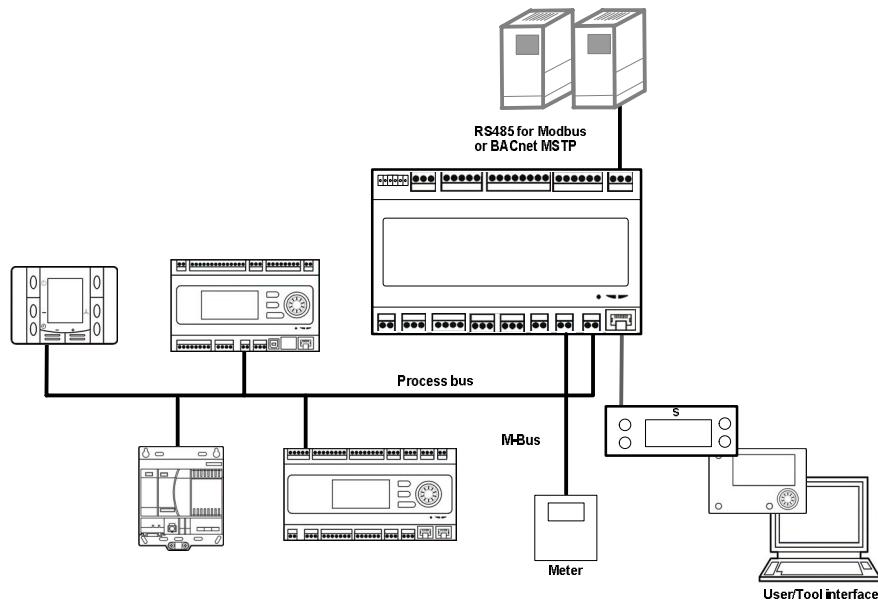
The Climatix POL42X.50/XXX controllers provide the following features:

- Power supply AC 24 V or DC 24 V
- DC 5 V on-board power supply for ratiometric sensor for POL423.50/XXX
- DC 24 V on-board power supply for active sensors
- 3 analog inputs for NTC10k or NTC1k temperature sensor
- 3 configurable inputs for digital inputs or DC 0...10 V signals or temperature sensors for POL425.50/XXX
- 4 configurable inputs for digital inputs or DC 0...10 V signals or temperature sensors for POL423.50/XXX and POL426.50/XXX
- 3 configurable outputs for DC 0...10 V analog output or PWM outputs
- 2 digital inputs for potential-free contacts
- 1 digital input for potential-free contact with fast pulses for flow sensor/switch
- 1 digital input galvanically isolated (AC 115...230 V) for POL423.50/XXX and POL426.50/XXX
- 5 relay outputs (4 NO contacts, 1 changeover switching type)
- 2 triac outputs (AC 24/115/230 V)
- 1 stepper motor drive for electronic expansion valve for POL423.50/XXX
- On-board Modbus RTU or BACnet MSTP over RS485 for third-party bus communication
- Process bus for network functionalities
- SD card interface for application and operating system upgrade
- Local service connector for user interface or PC tools
- Operating temperature range is -40...70 °C
- M-Bus Master interface for up to 3 M-Bus slaves for POL 426.50/XXX
- Powerful service tools are available to facilitate commissioning

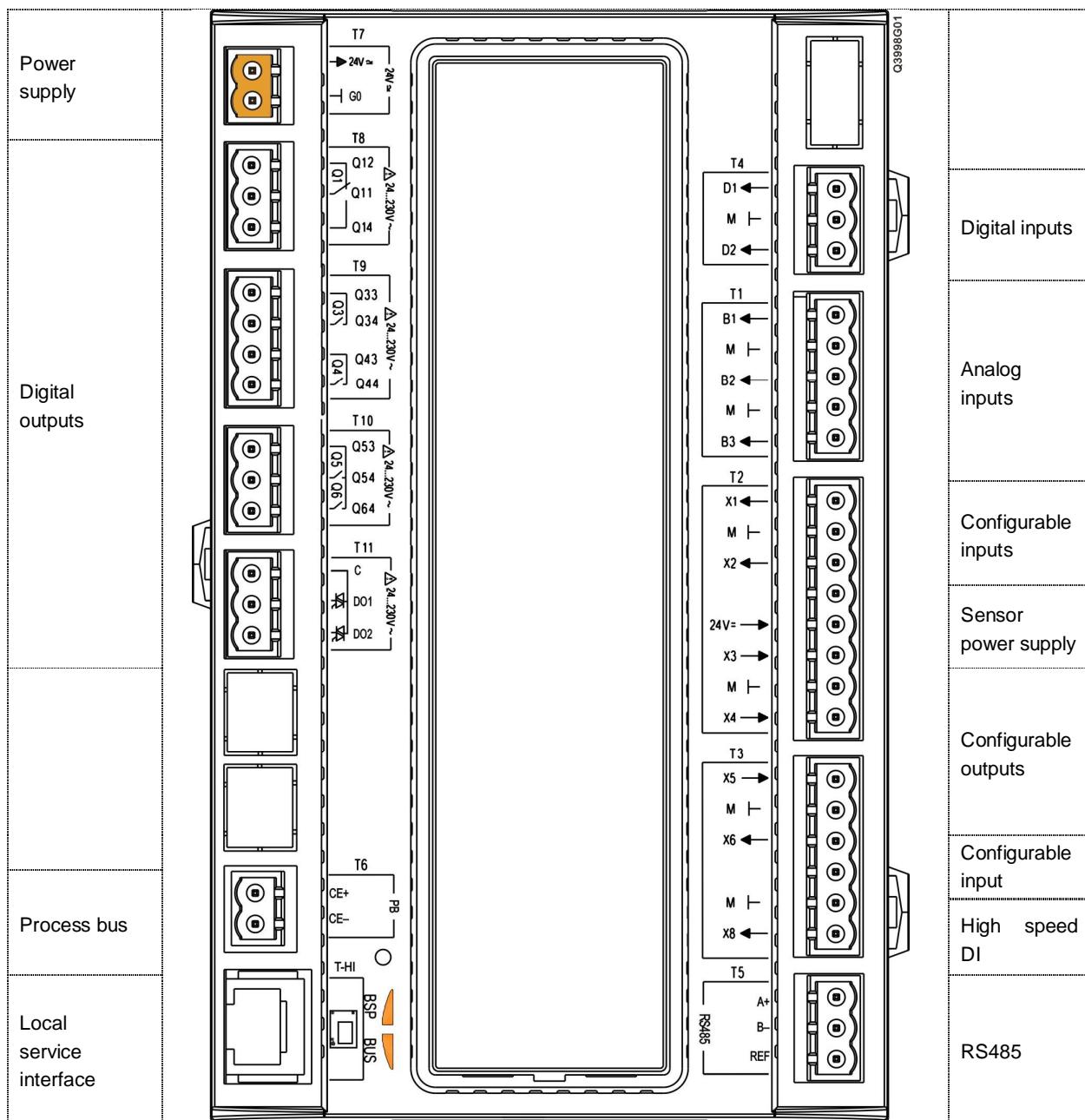
Note:

All devices are programmable controllers.

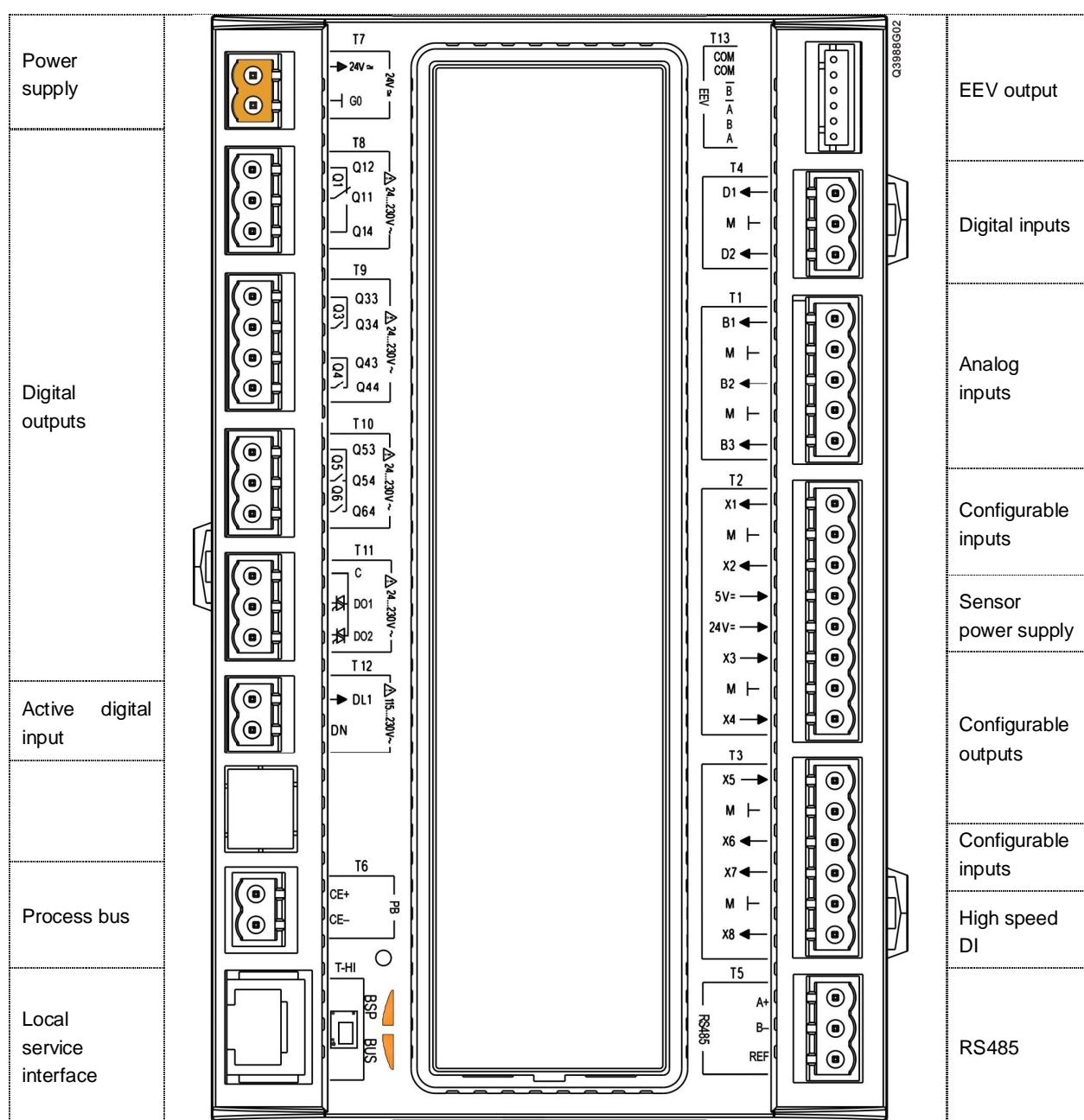
Communication concept



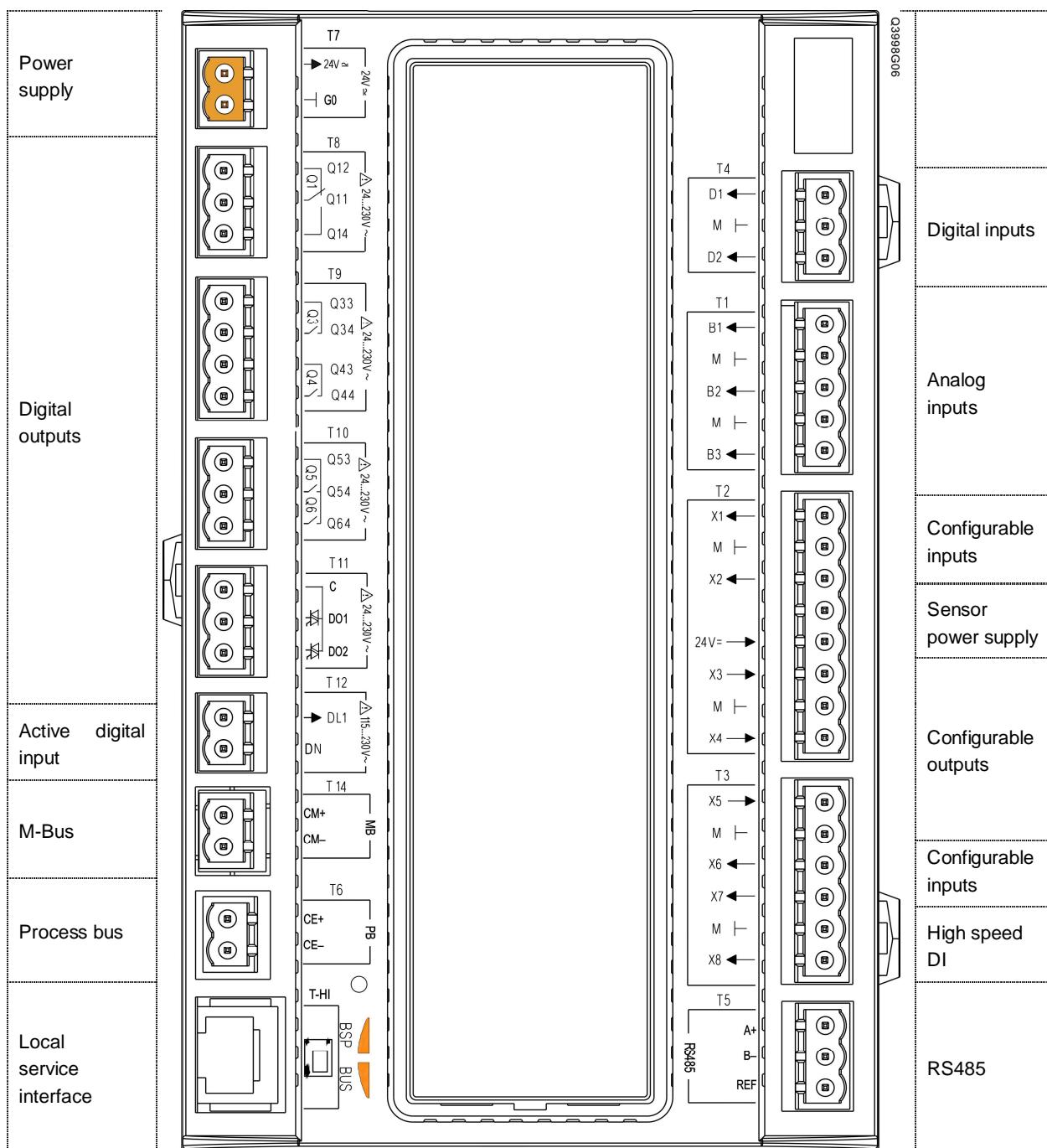
Overview (POL425.50/XXX)



Overview (POL423.50/XXX)

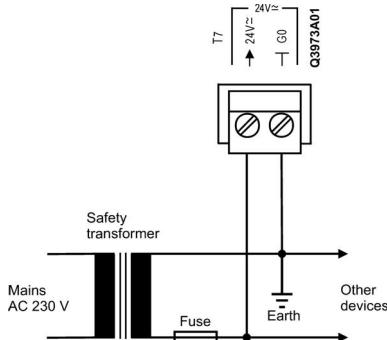


Overview (POL426.50/XXX)



Technical data

Power supply	Operating voltage	AC 24 V $\pm 20\%$ / DC 24 V $\pm 10\%$
AC 24 V, G0 (T7)	Frequency	45..65 Hz at AC 24 V
	Max. AC current	1.6 A at AC 24 V
	Max. DC current	1.5 A at DC 24 V
	Max. external supply line fusing	3 A slow wire fuse or circuit breaker



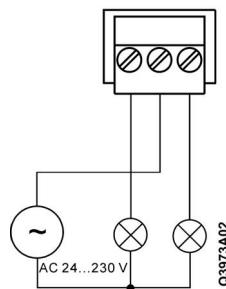
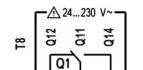
Relay output Q1 (T8)

Relay		
Contact	Monostable, NO/NC contact, SPDT	
Switching voltage	AC 24...230 V (-20%, +10%)	
Rated current (res./ind.)	DC 18...30 V	
Min. switching current at AC 19 V	AC 3 A (res.)/2 A (ind. cos ϕ 0.6)	
Endurance	DC 3 A (res.)	
Max. external supply line fusing	30 mA	
	100,000 cycles at AC 230 V, 3.0 A (res.)	
	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, Q4 (T9)
Q5, Q6 (T10)

Relay

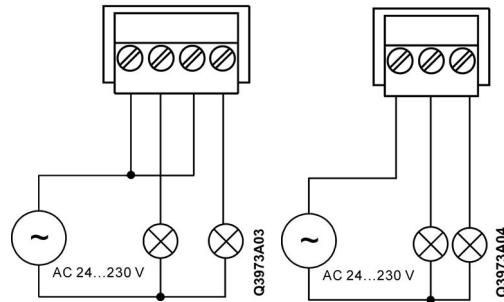
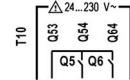
Contact	Monostable, NO contact, SPST
Switching voltage	AC 24...230 V (-20%, +10%) DC 18...30 V
Rated current (res./ind.)	AC 3 A (res.)/2 A (ind. cosφ 0.6) DC 3 A (res.)
Min. switching current at AC 19 V	30 mA
Endurance	100,000 cycles at AC 230 V, 3.0 A (res.)
Max. external supply line fusing	6.3 A slow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

DO1, DO2 (T11)

Triac

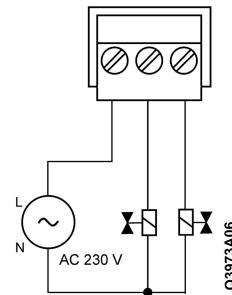
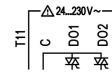
Switching voltage	AC 24...230 V (-20%, +10%)
Switching capacity	Max. 500 mA Min. 10 mA
Max. external supply line fusing	2.0 A slow wire fuse or circuit breaker



Warning

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

Use external protection
for inductive load.

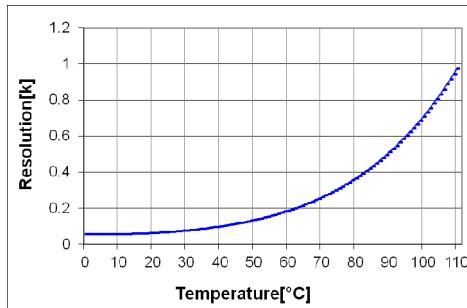
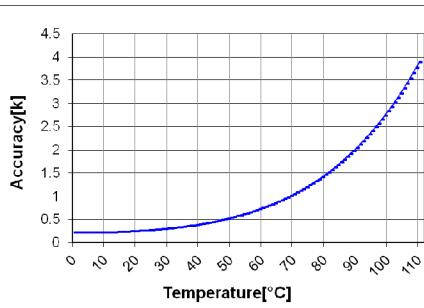


Analog inputs

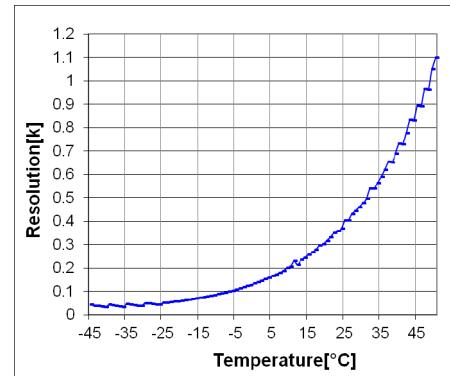
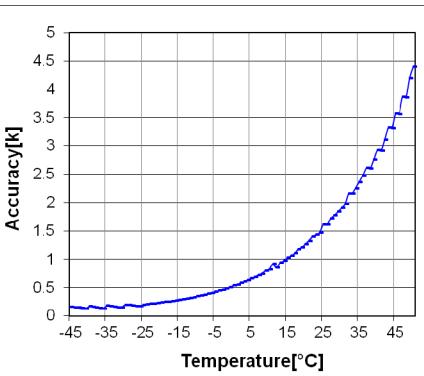
B1..B3 (T1)

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

Sensor current	530 μ A at 25 °C (pulse sampling)	
Temperature range	0...110 °C	
Accuracy and resolution of input	See diagram below	
Temperature	Accuracy	Resolution
0 °C	0.3 K	0.1 K
50 °C	0.6 K	0.2 K
70 °C	1.1 K	0.3 K
90 °C	2.1 K	0.6 K
100 °C	2.9 K	0.8 K
110 °C	3.9 K	1.0 K

**NTC 1k ($B=3528$ K)**

Sensor current	680 μ A at 25 °C (pulse sampling)	
Temperature range	-45...+50 °C	
Accuracy and resolution of input	See diagram below	
Temperature	Accuracy	Resolution
-45 °C	0.2 K	0.05 K
-30 °C	0.2 K	0.05 K
-20 °C	0.3 K	0.1 K
-10 °C	0.4 K	0.1 K
50 °C	4.4 K	1.1 K

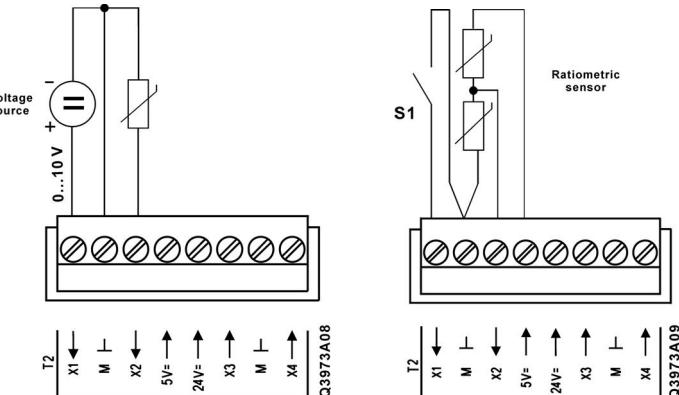


Configurable inputs	Configurable Reference potential	By software Terminals \perp
X1, X2 (T2) X6, X7 (T3)		
NTC 10k ($B_{25/85}=3977\text{ K}$)		Please refer to B1...B3
	Accuracy	
LG-Ni1000 / Pt1000		
	Accuracy for LG-Ni1000	$<\pm 1\text{ K}$
	Accuracy for Pt1000	$<\pm 1.5\text{ K}$ (from $-50\text{...}50^\circ\text{C}$)
		$<\pm 2\text{ K}$ (from $50\text{...}200^\circ\text{C}$)
		$<\pm 3\text{ K}$ (from $200\text{...}400^\circ\text{C}$)
DC 0...5/0...10 V ratiometric sensor		
Resolution	10 mV	
Accuracy	100 mV	
Input resistance	100 k Ω	
Digital input		
0/1 digital signal (binary)	For potential-free contacts	
Sampling voltage/current	DC 21.2 V, 7.8 mA	
Contact resistance	Max. 200 Ω (closed)	
	Min. 50 k Ω (open)	
Delay	10 ms	
Pulse frequency	Max. 20 Hz	



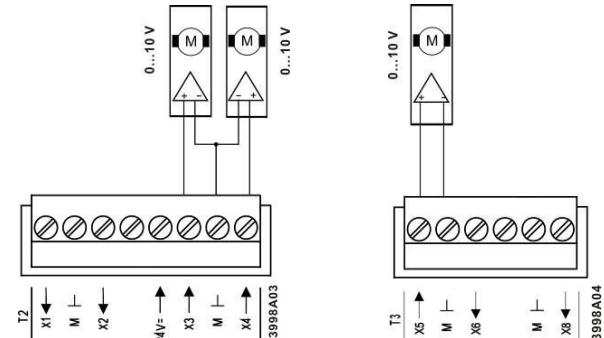
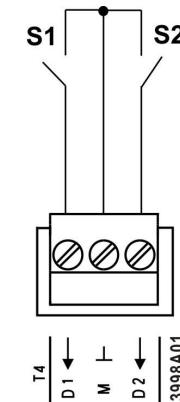
Warning

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



Note:

- Configurable input X7 is only available on POL423.50/XXX and POL426.50/XXX.

Configurable outputs X3, X4 (T2) X5 (T3)	Configurable Reference potential	By software Terminals ⊥
	DC 0...10 V output Resolution Accuracy Output current	30 mV 100 mV Max. 10 mA
		
PWM outputs	Frequency Duty cycle Max. current Signal amplitude	2.5 kHz 0...100% (at an increment of 0.5%) 10 mA 10 V
Digital inputs D1, D2 (T4)	0/1 digital signal (binary) Sampling voltage/current Contact resistance Delay Pulse frequency	For potential-free contacts DC 24 V, Max. 12 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 21.2 V, 8 mA Max. 200 Ω (closed) Min. 50 kΩ (open) 10 ms Max. 300 Hz

Pulse measurement

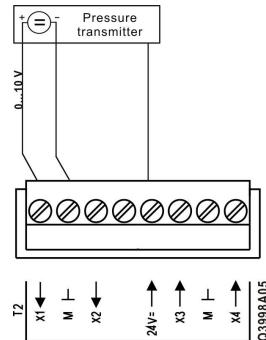
Sensor	Open-collector
Sampling voltage	DC 21.2 V, Max. 8 mA
Max. speed	18000 RPM
Min. ON/OFF time	500 µs

**Power supply for
sensors**

Active
DC 24 V (T2)

POL425.50 and POL426.50

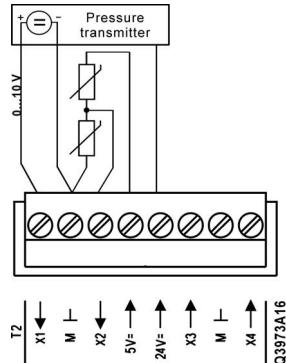
Voltage/current	DC 24 V ($\pm 10\%$), 40 mA
Reference potential	Terminals \perp
Connection	Short-circuit protected

**Power supply for
sensors**

Active/ratiometric
DC 5 V, DC 24 V (T2)

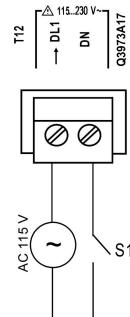
POL423.50

Voltage/current	DC 5 V $\pm 2.5\%$, 20 mA
Voltage/current	DC 24 V ($\pm 10\%$), 40 mA
Reference potential	Terminals \perp
Connection	Short-circuit protected



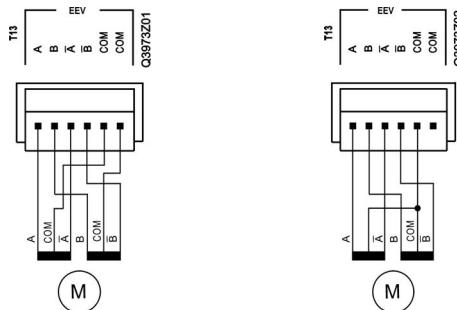
Active digital input	Digital input (0/1 binary)	(Assembled in POL423.50, POL426.50)
DL1 (T12)	Input	Galvanically isolated voltage input

Nominal voltage	AC 115...230 V (-15%, +10%)
Frequency range	45...65 Hz
Input current	3 mA at AC 230 V
Delay	100 ms
Pulse frequency	Max. 5 Hz



EEV (T13)	Configurable Connector	By software B6B-XH-A, JST
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Stepper motor drive	(Assembled in POL423.50)
Motor	Unipolar stepper motor
Connection	DC 12 V, Max. 2 x 375 mA
Supply voltage	5/6 wires
Driver output	DC 12 V (short-circuit protected)
Length of motor cable	4 channels
	<10 m

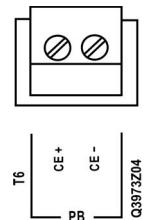


Note:

Maximum current for phase A and phase B is 375 mA respectively.

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 <i>KNX manual - System Specifications</i>)	
Bus cable length between 2 nodes	Max. 350 m	
Total length of bus cable	Max. 700 m	
DPSU	40 mA rated current	

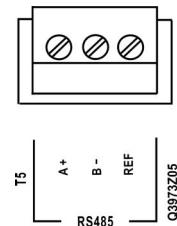


3rd-party bus (Modbus RTU or BACnet MSTP)
A+, B-, REF (T5)

RS485 (EIA-485)	Modbus RTU mode or BACnet MSTP
Bus connection	A+, B-, REF
Bus electronics	<u>Not</u> galvanically isolated
Bus cable	Twisted pair, shielded if length>3 m
Bus polarization	Configurable by software
Bus termination	Configurable by software*

Note:

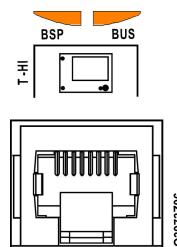
* On RS485 network, it is essential to use terminating resistors that match the cable's characteristic impedance to prevent signal echoes from corrupting the data on the line. The terminating resistors are usually configured at the end of RS485 network.



Tools/HMI Local service interface (T-HI)

Cable connection	RJ45 jack, 8 pins, length of cable<3 m
Local-HMI	
RS485 (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
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M-Bus (T14)	POL426.50/XXX controller Bus connection terminals Bus cable Bus connection / electronics Bus voltage Bus length Number of bus devices (stand. load 1.5 mA) Approved for use with meter types Cable types, bus topology, bus termination Baud rate	M-Bus master CM+, CM- (interchangeable) 2-wire, telephone cable (JYStY N*2*0.8mm) <u>Not</u> galvanically isolated DC 28 V (short-circuit-proof) Max. 50 m Max. 3 UH50.. , 2WR6.. Refer to M-Bus norm DIN EN 13757 300, 2400
LED for BSP run/stop	Mode SW update mode (download active on a new BSP, application) Application running Application loaded but not running Application not loaded BSP error (software error) Hardware error	LED status Alternating between red and green every second Green on Yellow on Yellow on Red blinking at 2 Hz Red on
Note:	LED for bus is <u>not</u> in operation.	
Connection terminals	Possible plugs for I/O signals and communication (not included) Possible plugs for power supply (not included) Solid wire Stranded wire (twisted or with ferrule) Cable length	Phoenix FKCVW 2,5/x-ST Phoenix FKCT 2,5/x-ST Phoenix MVSTBW 2,5/x-ST Phoenix FKCVW 2,5/2-ST OG Phoenix FKCT 2,5/2-ST OG Phoenix MVSTBW 2,5/2-ST OG 0.5...2.5 mm ² 0.5...1.5 mm ² In compliance with the load, local regulations and installation documents
Real-time clock	Buffering with internal Gold Cap	Min. 8 hours
 SD card	SD card Max. capacity Formation	At the right side of the housing 32 GB FAT32
Environment	Operation Temperature Restriction process bus Humidity Air pressure	IEC 60721-3-3 -40...70 °C -25...70 °C <90% r.h. (no condensation) Min. 700 hPa, corresponding to Max. 3,000 m above sea level
	Transport Temperature Humidity Air pressure Mechanical conditions	IEC 60721-3-2 -40...70 °C <95% r.h. (no condensation) Min. 260 hPa, corresponding to Max. 10,000 m above sea level IEC 60721-3-2 Class 2M2

Protection	Degree of protection Safety class	IP20 (EN 60529) Suitable for use in plants with safety class II
Standards	Product safety Automatic electrical controls Electromagnetic compatibility Immunity in the industrial sector Emissions in the domestic sector	EN 60730-1 Suitable for residential and industrial EMC environment EN 61000-6-2 EN 61000-6-3
	CE conformity EMC Directive Low Voltage Directive	2004/108/EC 2006/95/EC
	RoHS compliance	ACPEIP (China) 2011/65/EU (Europe)
	RCA conformity to EMC emission standard	AS/NZS CISPR 22
General data	Dimensions Weight excl. packaging Base Housing	180 x 110 x 75 mm POL423.50/STD: 391 g POL425.50/STD: 388 g POL426.50/STD: 390 g Plastic, pigeon blue RAL 5014 Plastic, light grey RAL 7035
Accessories	PC service cable 1.5 m Connector set (screw, cable side entry) 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	POL 0C2.40/XXX POL042.25/XXX

Types and features

		Hardware I/Os		
		POL423.50/XXX	POL425.50/XXX	POL426.50/XXX
Analog inputs	B1, B2, B3 (NTC 10k / NTC 1k)	✓	✓	✓
Configurable inputs	X1, X2, X6 (Pt1000 / NTC 10k / NTC 1k / LG-Ni1000 / DC 0...10 V / DI)	✓	✓	✓
	X7 (Pt1000 / NTC 10k / NTC 1k / LG-Ni1000 / DC 0...10 V / DI)	✓		✓
Digital inputs	X8 (binary/high speed)	✓	✓	✓
	D1, D2 (binary)	✓	✓	✓
	DL1 (active AC 115...230 V)	✓		✓
Configurable outputs	X3, X4, X5 (DC 0...10 V analog / PWM output)	✓	✓	✓
Digital outputs	Q1, Q3, Q4, Q5, Q6 (relay output)	✓	✓	✓
	DO1, DO2 (triac output)	✓	✓	✓
Interfaces	Process bus interface	✓	✓	✓
	Modbus RTU or BACnet MSTP interface	✓	✓	✓
	SD card interface	✓	✓	✓
	Local service interface	✓	✓	✓
	EEV	✓		
	M-Bus Master for up to 3 slaves			✓

Engineering notes

-  **Warning** In order to protect against accidental contact with relay connections at voltages above 42 V_{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 analogue inputs, because the measured ADC values are undefined. The accuracy of the 10 V analogue inputs is valid for values above 100 mV.

Disposal notes

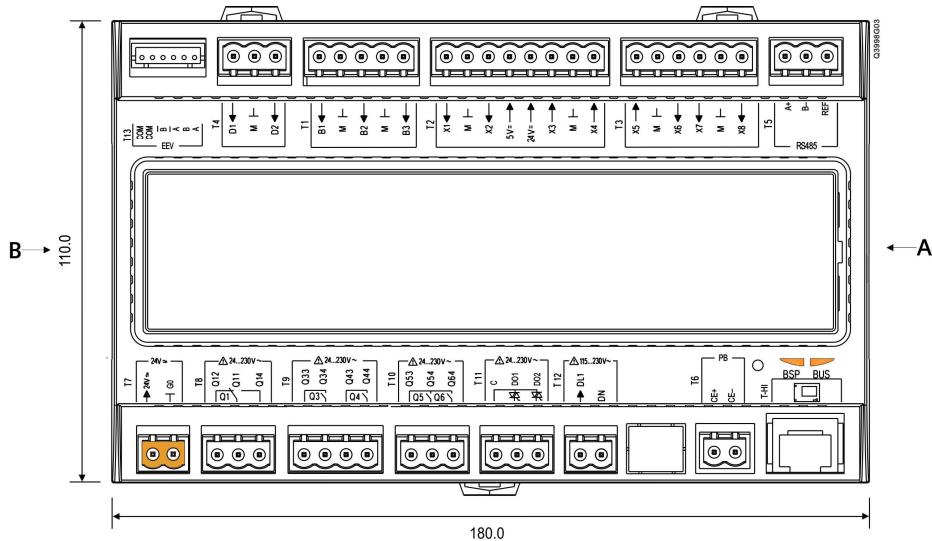


The controller contains electrical and electronic components and must **not** be disposed of with domestic waste.

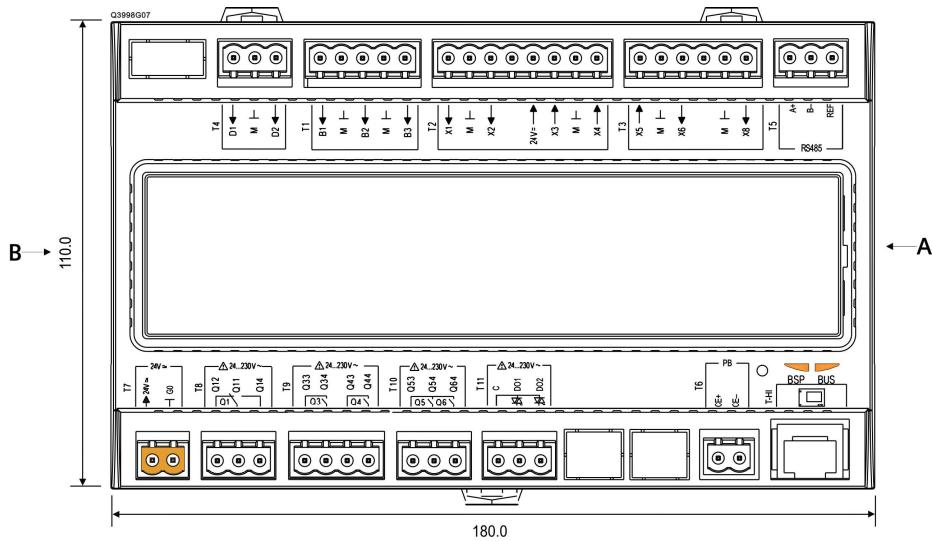
The relevant national legal regulations must be complied with and the products must be disposed of via the appropriate channels. Local and currently valid legislation must be observed!

Layout of controller (mm)

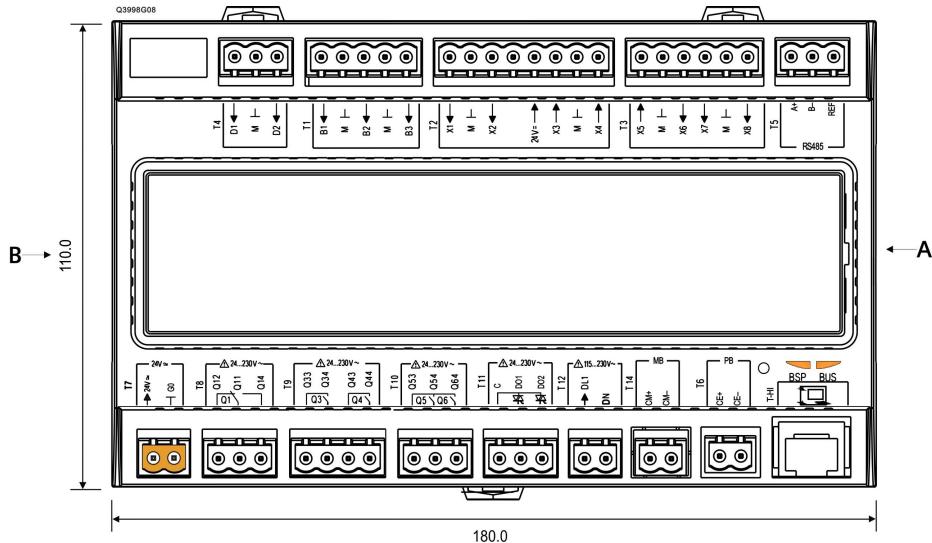
POL 423.50/XXX

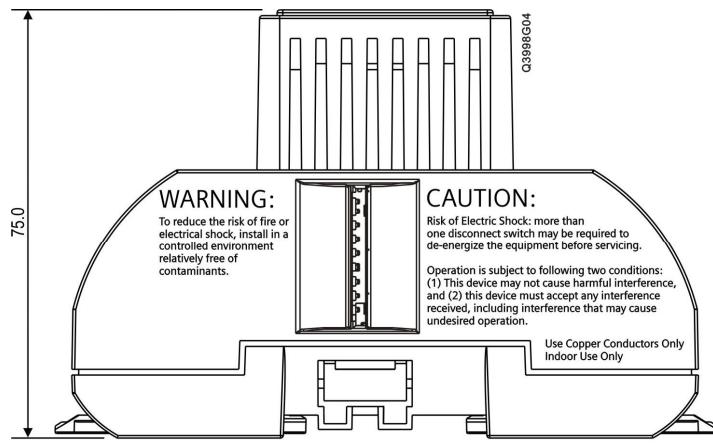


POL 425.50/XXX

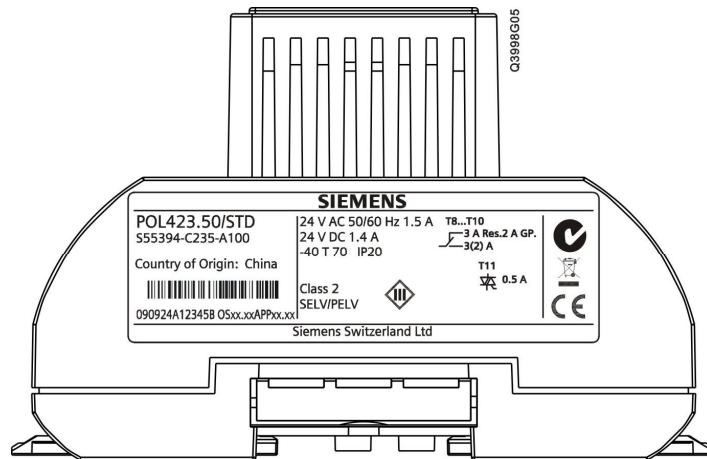


POL 426.50/XXX





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B