SIEMENS

Climatix™ 600

HVAC&R controller

POL687.70/xxx; POL687.00/xxx

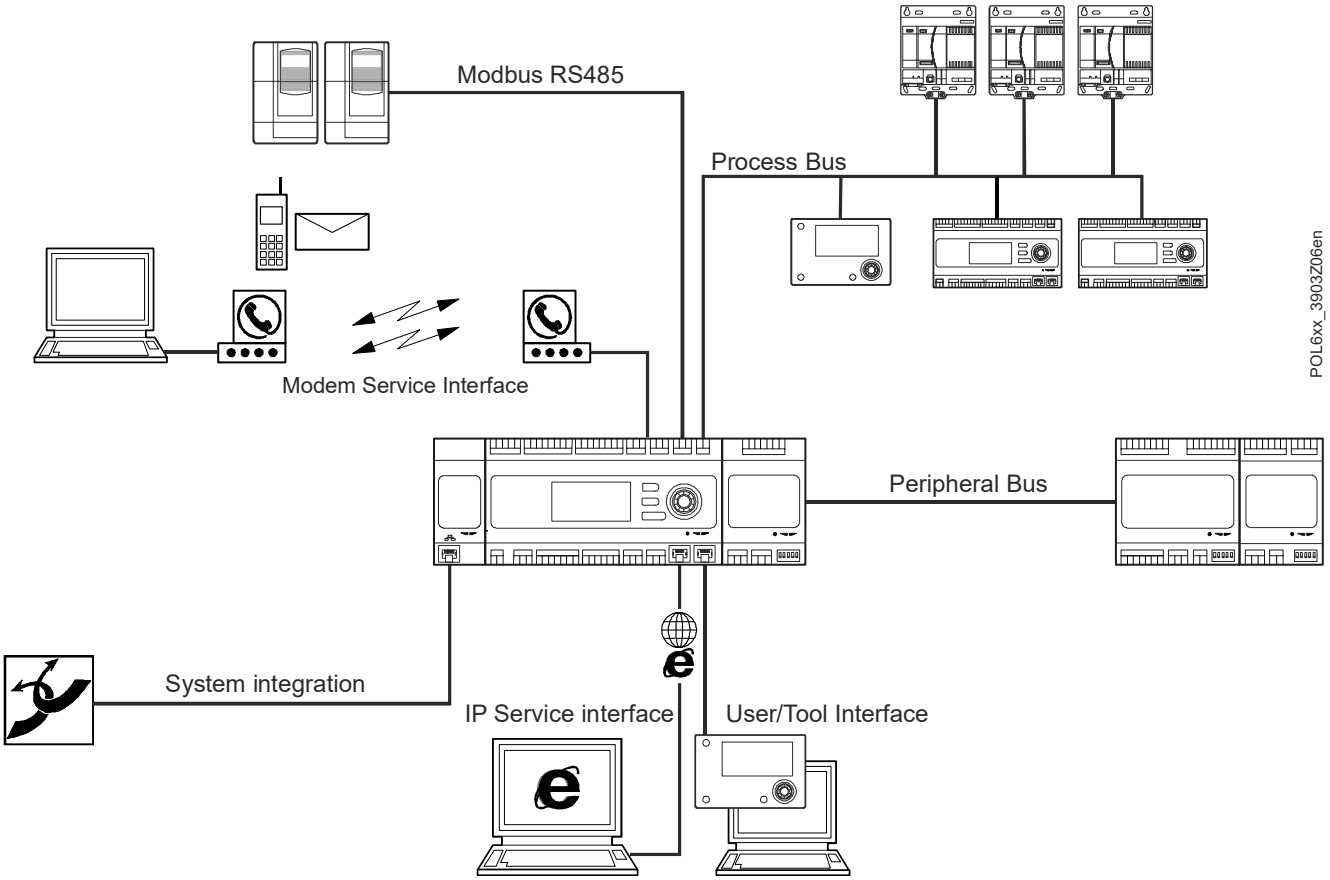
For controlling, switching and monitoring functions.

- Freely programmable Climatix POL68x controllers are designed for use in ventilation, air conditioning and refrigeration equipment.
- Create ventilation, air conditioning, and refrigeration applications using powerful engineering tools
- Easily commission plants with service tools

Application and features

Engineering	• Freely programmable • Graphical programming using Climatix SAPRO tool
Terminal	• Operating voltage AC 24 V or DC 24 V • 8 universal I/Os • 3 analog inputs NTC 10k and NTC 100k • DC 24 V power supply for active sensors and DC 5 V for ratiometric sensors • 2 digital inputs for potential-free contacts • 2 digital inputs AC/DC 24 V, galvanically separated • 2 digital inputs AC 115 / 230 V, galvanically separated • 8 relay outputs (6 NO contacts, 2 changeover contacts) • 2 triac outputs (AC 24/115/230 V)
Interfaces	• Local service connector for user interface and PC tools • Ethernet port for local / remote servicing (web browser) and tools over IP • Full modem RS-232 port for remote service • SD card interface for application and firmware upgrades
Operation	• Operating temperature without LCD -40...70 °C; with LCD -20...60 °C
Extensions	• I/O extension with extension modules (local/remote) • Third party integration via integrated RS-485 supporting Modbus RTU • Networking over the process bus • Communication modules supporting Modbus, BACnet, LON and M-bus

Topologies



Versions

POL687.70 with HMI

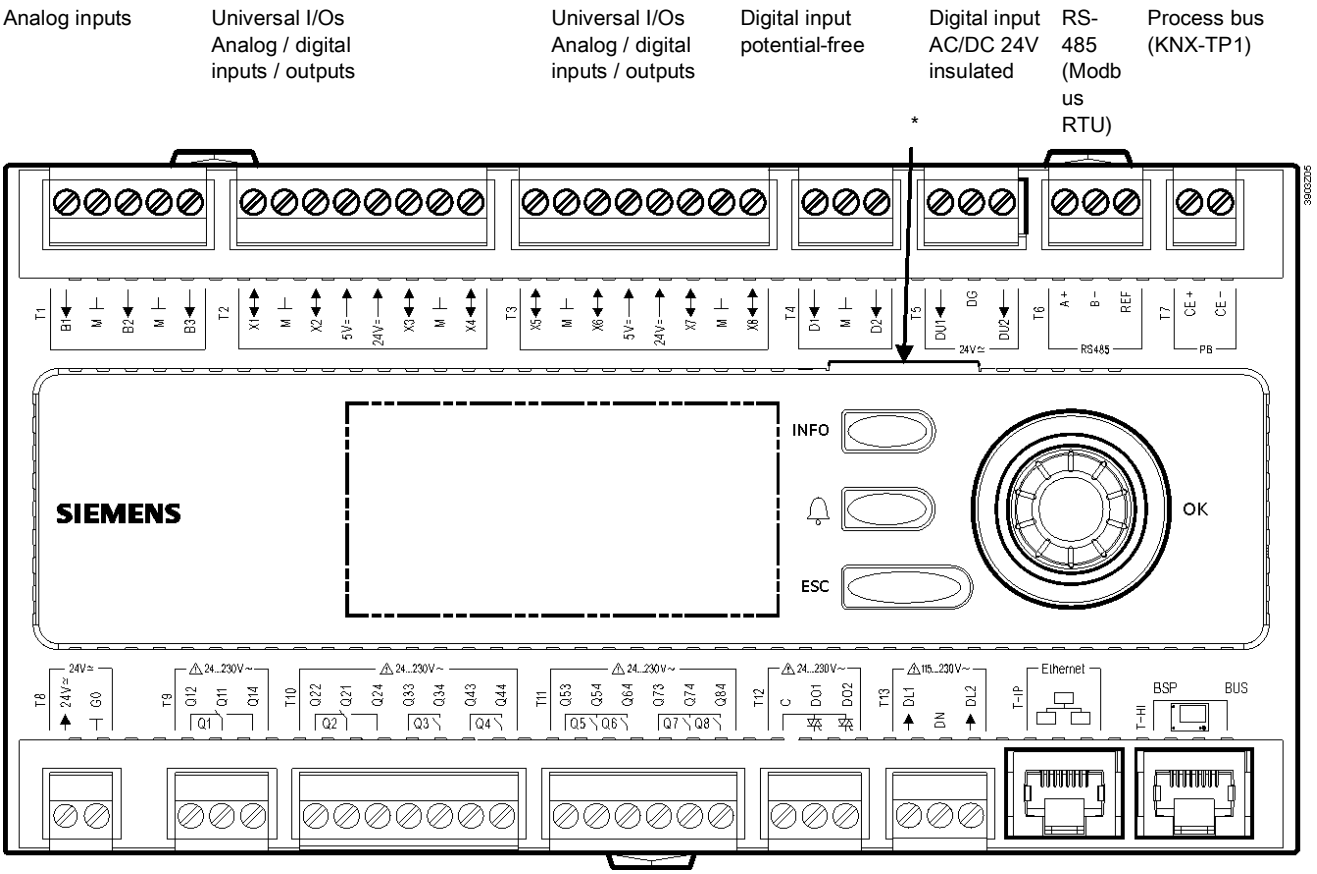
POL687.00 without HMI

Technical data

General data

Weight excl. packaging	
Controller without HMI	375 g
Controller with HMI	450 g
Technical design	
Base	Plastic, pigeon-blue RAL 5014
Housing	Plastic, light-gray RAL 7035
Dimensions	
Controller without HMI	207 x 110 x 75 mm
Controller with HMI	207 x 110 x 79 mm

Overview

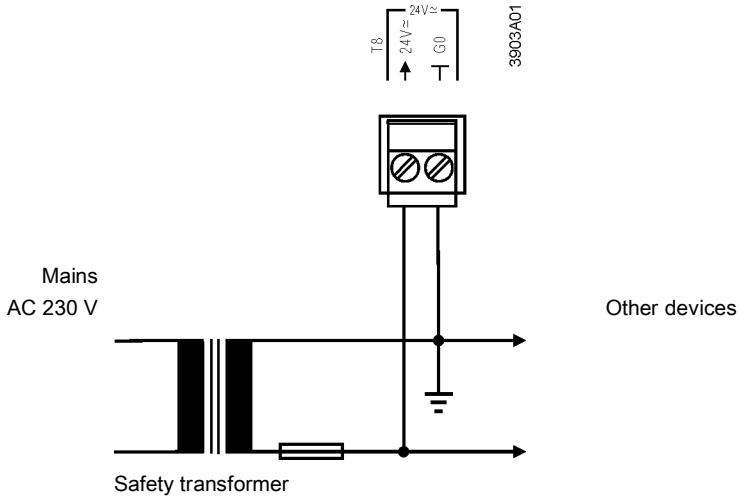


* Modem Service interface

Power supply

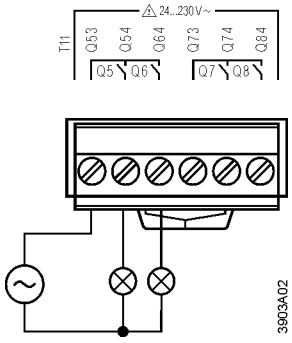
Power supply AC/DC 24 V, G0 (T8)	
Operating voltage	AC 24 V ±20%; DC 24 V ±10%
Frequency	45…65 Hz
Current consumption AC, without extension modules	Max. 1.8 A @ AC 24 V
Current consumption DC, without extension modules	Max. 1.0 A @ DC 24 V (
Current consumption AC for extension modules *	Max. 2.2 A @ AC 24 V
Current consumption DC for extension modules *	Max. 3.0 A @ DC 24 V
External fuse in the supply line	Max. 6.3 A slow wire fuse or circuit breaker

* For calculation, see Q3900



Inputs and outputs

Relay outputs Q1…Q8 (T9, T10, T11)	
Relay: Type, contact	Monostable (NO/NC contact)
	Monostable (NO contact)
Contact rating	
Switching voltage	AC 24 V…230 V (-20 %, +10 %)
Rated current (res. / ind.)	Max. AC 3 A / 2 A (cosφ 0.6)
Switching current at AC 19 V	Min. AC 30 mA
External fuse in the supply line	Max. 6.3 A slow wire fuse or circuit breaker



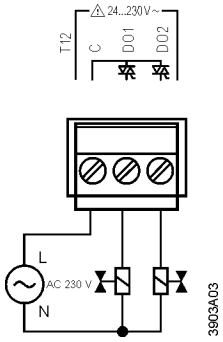
Connecting signal lamps to relay outputs

⚠ WARNING

Note the following for installation:

- Do not mix SELV / PELV and mains power on the same terminal
- Use external protection for inductive load

Triac outputs DO1, DO2 (T11)	
Triac output values	
Switching voltage	AC 24…230 V (-20%, +10%)
Switching capacity	Max. 500 mA / min. 30 mA
External fuse in the supply line	Max. 2.0 A slow wire fuse or circuit breaker



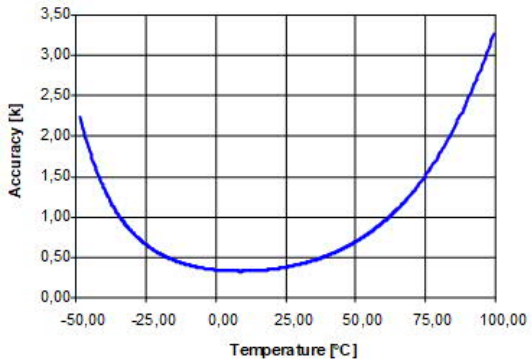
Connecting solenoid valves to triac output

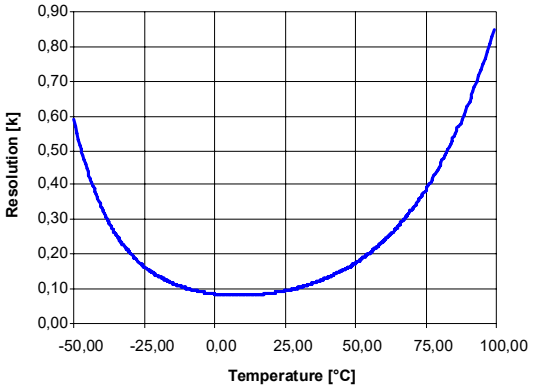
⚠ WARNING

Note the following for installation:

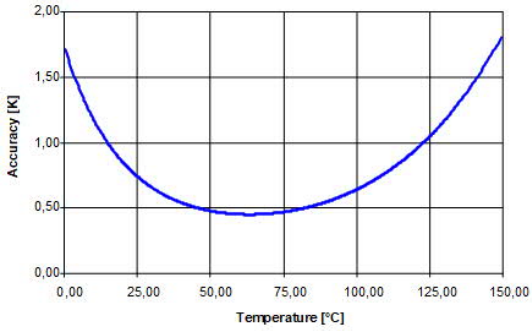
- Do not mix SELV / PELV and mains power on the same terminal
- Use external protection for inductive load

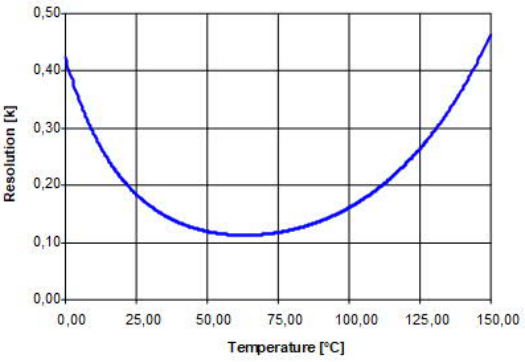
Analog inputs B1…B3 (T1)		
NTC 10k		
Sensor current	60 µA at 25 °C	
Temperature	**Accuracy**	**Resolution**
-50 °C	2.5 K	0.6 K
-40 °C	1.4 K	0.4 K
-30 °C	0.9 K	0.2 K
-10 °C	0.5 K	0.1 K
50 °C	0.7 K	0.2 K
70 °C	1.3 K	0.4 K
90 °C	2.5 K	0.7 K
100 °C	3.4 K	0.9 K

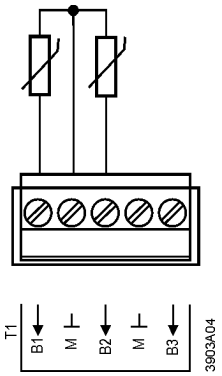




NTC 100k		
Sensor current	15 µA at 25 °C	
Temperature	**Accuracy**	**Resolution**
0 °C	1.8 K	0.5 K
10 °C	1.2 K	0.3 K
30 °C	0.7 K	0.2 K
70 °C	0.5 K	0.2 K
110 °C	0.8 K	0.2 K
120 °C	1.0 K	0.3 K
140 °C	1.5 K	0.4 K
150 °C	1.9 K	0.5 K





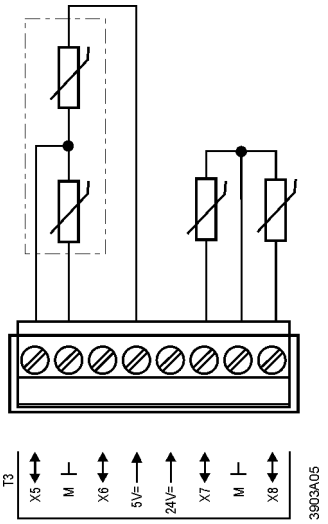


Connecting NTC sensors to analog inputs

Universal I/Os X1…X8 (T2, T3)			
Configurable		Via software	
Reference potential		Terminals ⊥	
Contact voltage		Max. DC 24 V (SELV)	
Overvoltage protection		Up to 40 V	
	Analog inputs (X1…X8)		
	Ni1000		
	Sensor current	1.4 mA	
	Resolution	0.1 K	
	Accuracy within the range -50…150 °C	0.5 K	
	Pt1000		
	Sensor current	1.8 mA	
	Resolution	0.1 K	
	Accuracy within the range -40…120 °C	0.5 K	
	NTC 10k		
	Sensor current	140 µA	
	Temperature range	**Accuracy**	**Resolution**
	-50…-26 °C	1 K	0.2 K
	-25…74 °C	0.5 K	0.1 K
	75…99 °C	1 K	0.3 K
	100…124 °C	3 K	1 K
	125…150 °C	6 K	2.5 K
	NTC 100k		
	Sensor current	140 µA	
	Temperature range	**Accuracy**	**Resolution**
	-25…-11 °C	3 K	0.2 K
	-10…9 °C	1 K	0.1 K
	10…99 °C	0.5 K	0.1 K
	100…150 °C	1 K	0.2 K
	0...2.5 kΩ		
	Sensor current	1.8 mA	
	Resolution	1 Ω	
	Accuracy	4 Ω	

Universal I/Os X1…X8 (T2, T3)		
	DC 0…5 V input for ratiometric sensors	
	Resolution	1 mV
	Accuracy at 0 V	10 mV
	Accuracy at 5 V	25 mV
	Input resistance	100 kΩ

Ratiometric sensor

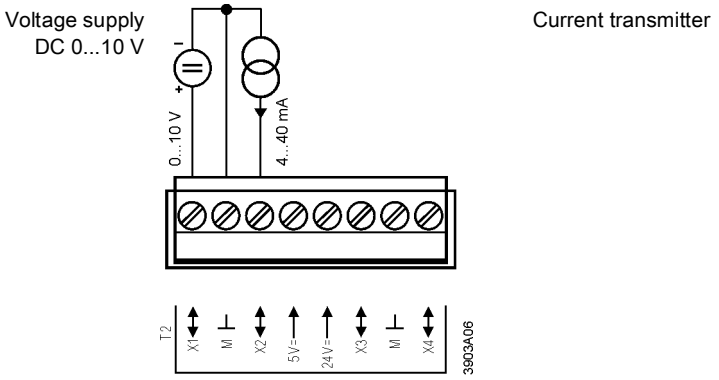


Connecting a ratiometric sensor to universal I/O

Connecting an NTC to universal I/O

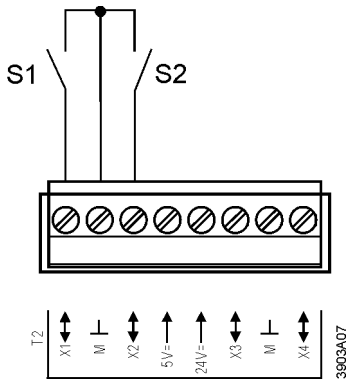
	DC 0...10 V input	
	Resolution	1 mV
	Accuracy at 0 V	10 mV
	Accuracy at 5 V	25 mV
	Accuracy at 10 V	50 mV
	Input resistance	100 kΩ

	DC 0/4...20 mA input	
	Resolution	1 µA
	Accuracy at 4 mA	40 uA
	Accuracy at 12 mA	70 uA
	Accuracy at 20 mA	120 uA
	Input resistance	< 500 Ω



Voltage input DC 0...10 V
and current input 4...20 mA

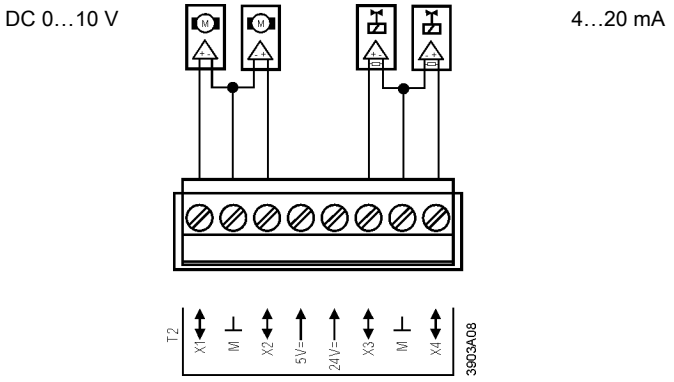
	Digital inputs (X1…X8)	
	0/1 digital signal (binary)	For potential-free contacts
	Sensing voltage / current	DC 24 V / 8 mA
	Contact resistance	Max. 200 Ω (closed) Min. 50 kΩ (open)



Connecting floating contacts to universal I/Os

	Analog outputs (X1…X4)	
	DC 0…10 V output	
	Resolution	11 mV
	Accuracy at 0 V	66 mV
	Accuracy at 5 V	95 mV
	Accuracy at 10 V	124 mV
	Output current	1 mA (short-circuit-proof)

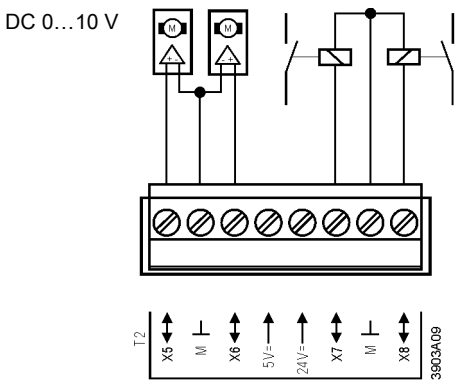
	DC 4…20 mA output	
	Resolution	22 µA
	Accuracy at 4 mA	150 µA
	Accuracy at 12 mA	196 µA
	Accuracy at 20 mA	243 µA



Control of actuators with 0…10V
and 0…20mA analog signals

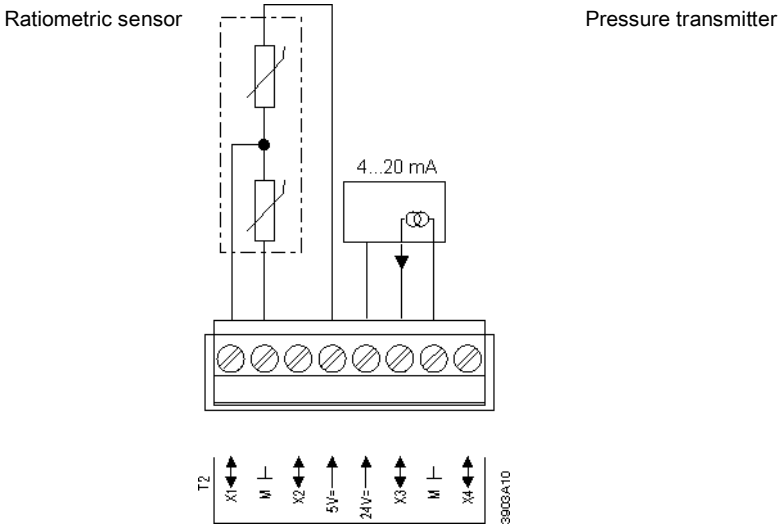
	Analog / digital outputs (X5…X8)	
	DC 0…10 V output	
	Resolution	11 mV
	Accuracy at 0 V	66 mV
	Accuracy at 5 V	95 mV
	Accuracy at 10 V	124 mV
	Output current	1 mA (short-circuit-proof)

	DC output for off-board loads	
	Switching voltage	DC 24 V
	Switching capacity	Max. 25 mA



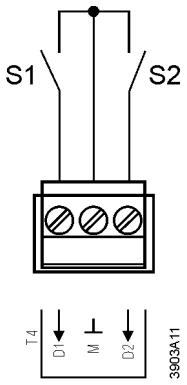
Connecting voltage output and off-board relays to universal I/Os

Power supply for active sensors (DC 24 V) and ratiometric sensors (DC 5 V)	
2 x 2 outputs	
Voltage / current	DC 5 V ±2.5% / 2 x 20 mA
Voltage / current	DC 24 V +10 %, -25% / 2 x 40 mA
Reference potential	Terminals ⊥
Connection	Short-circuit proof



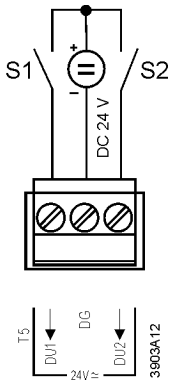
Connection of a ratiometric sensor and pressure transmitter

Digital inputs, potential-free D1, D2 (T4)	
0/1 digital signal (binary)	For potential-free contacts
Sensing voltage / current	DC 24 V / 8 mA
Contact resistance	Max. 200 Ω (closed) Min. 50 kΩ (open)
Counter support: Pulse frequency	Max. 100 Hz



Connecting floating contacts to digital input

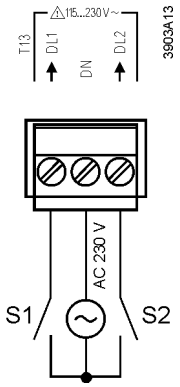
Digital input AC 24 V, DU1, DU2 (T5)	
0/1 digital signal (binary)	Galvanically isolated voltage input
Nominal voltage	AC / DC 24 V
Input current	8 mA
Counter support: Pulse frequency	Max. 5 Hz



Connecting a DC 24 V signal to a digital input

Digital input AC 230 V, DL1, DL2 (T13)	
0/1 digital signal (binary)	Galvanically separated voltage contact
Rated voltage	AC 115 V…230 V (-15%, +10%)
Frequency range	45…65 Hz
Input current	3 mA @ AC 230 V
Counter support: Pulse frequency	Max. 5 Hz

Connecting an AC 230 V signal
to a galvanically separated digital input



Interfaces

Periphery bus	
• For connecting I/O Modules • Power supply: – via controller – separately AC/DC 24 V • Connection via plug at bottom right of the controller – local (board-to-board) – remote (board-to-wire)	
Power supply via controller	See section "Power supply" of the controller
Separate power supply	96 VA limits also apply. Calculation per Q3900
Bus termination (fix)	680 Ω / 120 Ω +1 nF / 680 Ω
Board-to-board (not included) Board-to-wire (not included)	ZEC1.0/4-LPV-3.5 GY35AUC2CI1 ZEC1.0/4-ST-3.5 GY35AUC1R1.4
Solid wire	0.2…1.0 mm²
Stranded wire (twisted and with ferrules)	0.2…1.0 mm²
Bus cable	Shielded if length > 3m , twisted pair
Max number of extension modules	31 (1…31, 0 not usable). Recommended: not more than 10.
Cable lengths	Total max. 30 m

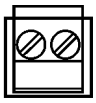
Local

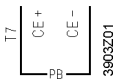
Remote

Local

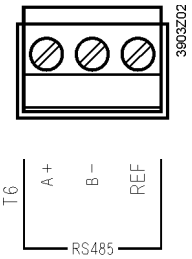
Remote

Process bus CE+, CE- (T7)	
Based on KNX TP1	
Bus connection (twisted pair)	CE+, CE- (not interchangeable)
Bus electronics	Galvanically separated
Bus load	Max. 5 mA
Bus cable	Must be shielded (see KNX Manual “System Specifications”)
Bus cable length between 2 KNX nodes	Max. 700 m
Total length of KNX bus cable	Max. 1,000 m
Bus power supply via	Internal DPSU with 50 mA rated current External standard KNX power pack



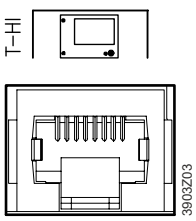


RS-485 Modbus RTU A+, B-, REF (T6)	
RS-485 (EIA 485)	Modbus RTU mode
Bus connection	A+, B-, REF
Bus electronics	Galvanically separated
Bus cable	Shielded if length > 3m , twisted pair
Bus termination (switchable via software)	680 Ω / 120 Ω +1 nF / 680 Ω

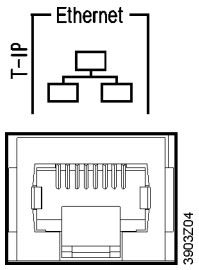


Communication module interface	
• Connection via plug at bottom left of the controller.	
• Based on SPI interface for the communication module connection.	
Number of COM modules	Max. 3 (self-acting module detection)
Power supply	DC 5 V ±10% / max. 1A (short-circuit-proof)
Board-to-board (not included)	ZEC1.0/10-LPV-3.5 GY35AUC2CI1

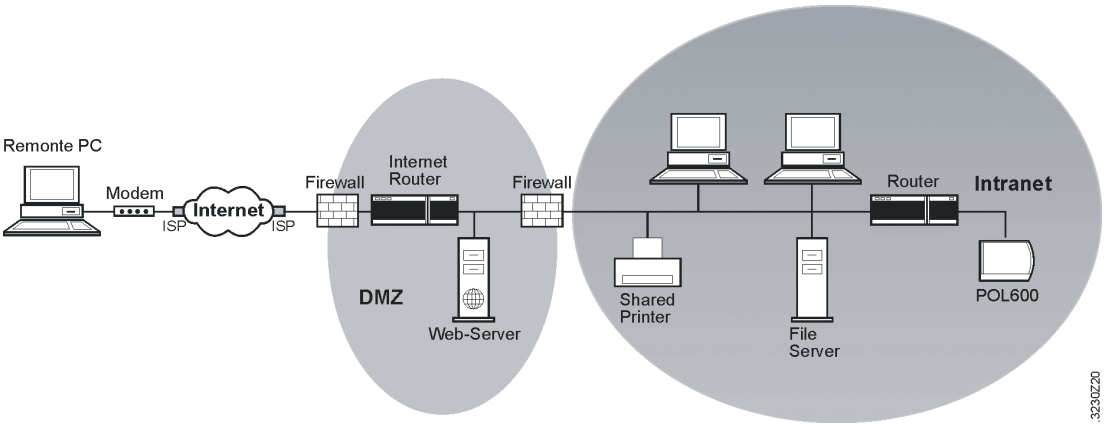
Local HMI service interface (T-HI)	
Connection	RJ45 jack (8 pins)
Cable length	< 3m
Tool communication	USB
HMI communication	RS-485
HMI power supply	24 V max. 100 mA
	• Use USB cable POL0C2 for tools • HMI cable included in POL895.51
Bus termination (fix)	680 Ω / 120 Ω +1 nF / 680 Ω



Ethernet service interface TCP/IP (T-IP)	
Communication	10/100 Mbit (IEEE 802.3U)
Cable connection	RJ45 jack (8 pins)



Ethernet TCP/IP example:



Modem service interface	
Connection via plug at top of the controller	
Full modem interface	
Cable connection	RJ45 jack (8 pins) Cable length <3 m
Supported modem types	Siemens TC65 GSM modem terminal
	Devolo Microlink 56k I

SD card	
Connection via plug at top of the controller	
Card types	SD, SDHC
Card size	128 MB…32 GB
File system	FAT16, FAT32

!	*NOTICE*
	Loss of data Switching on/off during the read-and-write access can lead to loss of data.

Terminals

Connection terminals	
Solid wire	0.5…2.5 mm²
Stranded wire (twisted and with ferrule)	0.5…1.5 mm²
Cable lengths	In compliance with the load, local regulations and installation documents

Cable types	
Process bus	Twisted pair; 0.5…1.5 mm2 (per KNX specification)
RS-485 interface	2-wire, twisted pair , shielded
Periphery bus	4-wire (2 wires as twisted pair), shielded

Conformity

Environmental conditions	
Operation	IEC 60721-3-3 class 3K5
Temperature	-40...70 °C
Restriction LCD	-20…60 °C
Restriction process bus	-25…70 °C
Restriction with 1 COM module	-40…65 °C
Restriction with 2 COM modules	-40…60 °C
Humidity	<90% r.h. (non-condensing)
Air pressure	Min. 700 hPa (corresponding to max. 3,000 m above sea level)
Mechanical conditions	IEC 60721-3-3 class 3M2
Transportation	IEC 60721-3-2 class 2K3/2K4
Temperature	-40...70 °C
Humidity	<95% r.h. (non-condensing)
Air pressure.	Min. 260 hPa (corresponding to max. 10,000 m above sea level)
Mechanical conditions	IEC 60721-3-2 class 2M2

Reliability	
MTBF	24 years

Protection	
Housing type	IP20 (EN 60529)
Protection class	II

Insulation resistance.	
Reinforced insulation between relay outputs and between relay outputs and system electronics	AC 3750 V to EN 60730-1

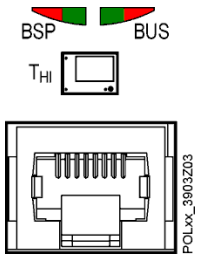
Standards, guidelines	
Product standard	EN60730-x
Electromagnetic compatibility (application range)	For residential, commercial and industrial environment
EU conformity (CE)	CB1T3903xx

Standards, guidelines	
RCM conformity	CB1T3909en_C1
UL approvals	UL916, UL873 http://database.ul.com/
Signal equipment certified for Canada	CSA C22.2M205 http://www.csagroup.org

Environmental compatibility
The product environmental declaration CB1E3903_01 (contains data on RoHS compliance, materials composition, packaging, environmental benefit, disposal)

Functions

LEDs for diagnostics



LED BSP "Run / Stop": 3 colors (green, red, and orange)

Mode	LED
SW update mode (download application or firmware)	Every second alternating between red and green
Application running	Green on
Application loaded, but not running	Orange on
Application not loaded	Orange flashes: 50 ms on, 1000 ms off
Firmware error	Red blinking at 2 Hz
Hardware fault	Red on

LED BUS: 3 colors (green, red and orange)

- This LED only indicates the status of modem communication.

Mode	LED
No modem connected, or LED disabled	Off
Modem connected and initialized no communication active	Orange on
Modem connected and communication active	Green on
Modem connected but errors active (like provider missing, no initialization possible)	Red on

Real-time clock	
Buffering with internal gold cap	Min. 3 days
Buffering with accessory battery	Min. 200 days

Integrated HMI (POL687.70/MCQ only)	
LCD resolution	144 x 64 pixels
Backlit display	White
Navigation pane	Roll-and-push knob 3 function buttons

Order data

Type	Description
POL687.00/STD	Climatix 600 controller
POL687.70/STD	Climatix 600 controller with HMI

Accessories

Type	Description
POL 0C2.40/STD	PC service cable 1.5 m
ACX93.000	SAPRO programming tool license
POL068.75/STD	Plug set, screw type, side entry MVSTBW (not included)
POL068.76/STD	Plug set, spring cage type, top entry FKCT (not included)

Suitable plug Phoenix types for the controller:	
1 x 2 position - MVSTBW, FKCCW or FKCT 2.5/2-ST	Orange
1 x 2 position - MVSTBW, FKCCW or FKCT 2.5/2-ST	Gray
6 x 3 position - MVSTBW, FKCCW or FKCT 2.5/3-ST	Gray
1 x 5 position - MVSTBW, FKCCW or FKCT 2.5/5-ST	Gray
1 x 6 position - MVSTBW, FKCCW or FKCT 2.5/6-ST	Gray
1 x 7 position - MVSTBW, FKCCW or FKCT 2.5/7-ST	Gray
1 x 8 position - MVSTBW, FKCCW or FKCT 2.5/8-ST	Gray

Product documentation

Document ID	Title	Description
M3910	Climatic mounting instructions	Connecting extension modules. Power variants.
Q3993en	EMC design guidelines	Notes on EMC, especially for panel design
A6V101099058_en	Climatix: Technical Limits	Technical limits of the controller and possible integration

Notes

Engineering: Panel

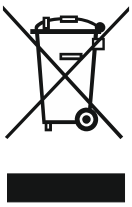
⚠ WARNING

Risk of electric shock by unintentional contact with electrical connections

Touching powered connections (over 42 Volt) can result in serious injury.

- Install the device in a protective housing (preferably a panel).
- A key or tool is required to open the protective housing.
- AC 230 V cable must be double insulated versus safety extra-low voltage (SELV) cables.

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

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

Overview of software licenses

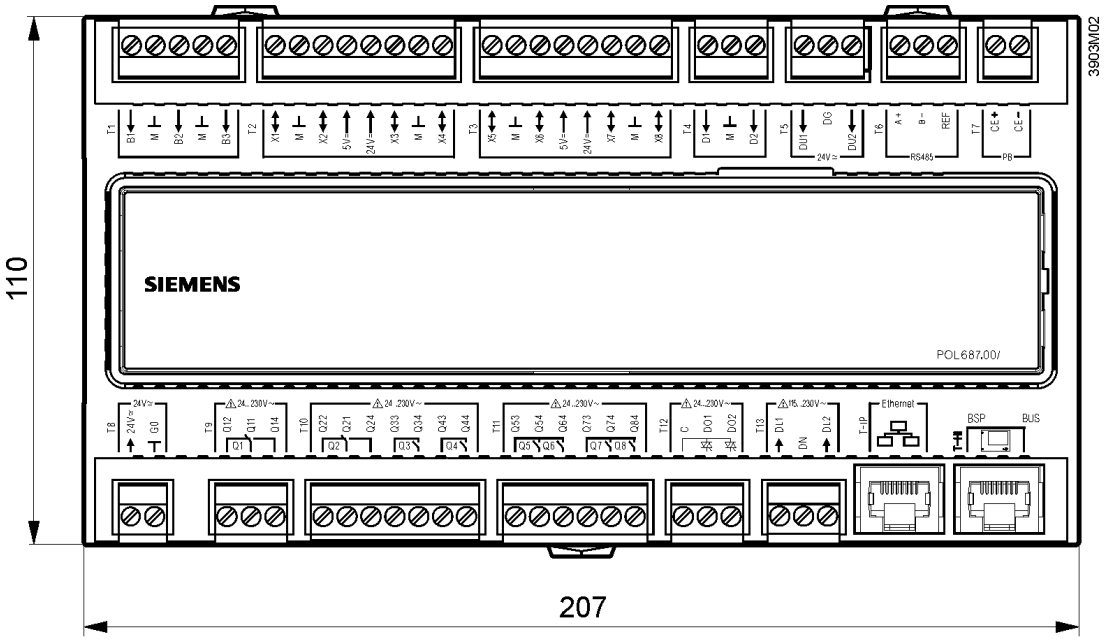
These devices use Open-Source-Software (OSS), please consult the OSS document for the applicable controller type and valid version set (VVS).

Title: License Summary Climatix 600 Controller – VVS10

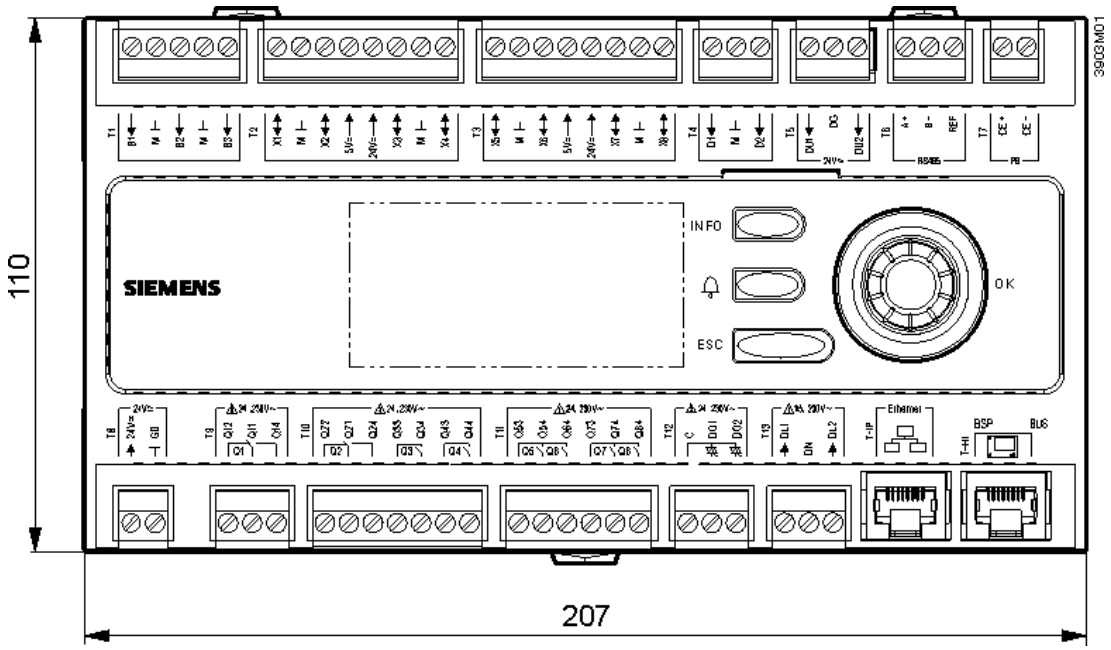
Title: License Summary Climatix 600 Controller – VVS11

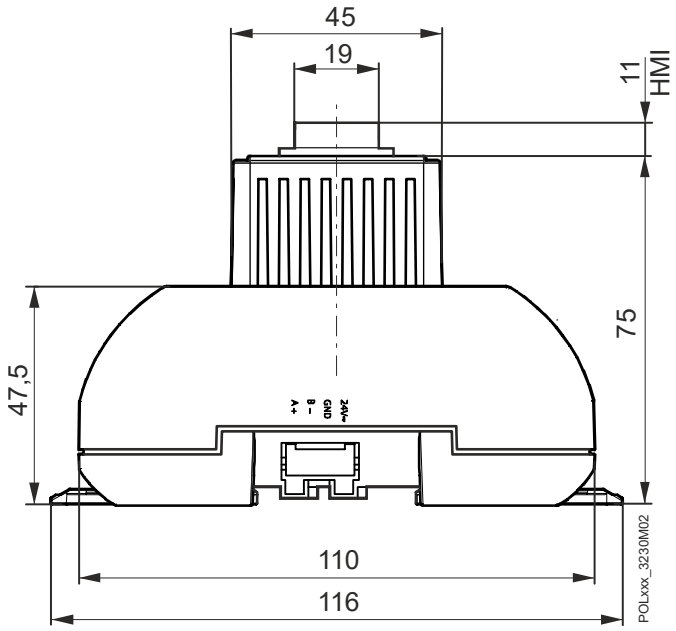
Dimensions

POL687.00/XXX



POL687.70/XXX





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Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
Tel. +41 58 724 2424
www.siemens.com/buildingtechnologies

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