SIEMENS



^{Climatix™} Controllers

POL42X.05/XXX POL42X.50/XXX

For controlling, switching and monitoring functions

The Climatix 42X.05/XXX controllers are HVAC controllers optimized for air handling units, rooftop units, chillers and heat pumps.



POL421.05/XXX

POL422.05/XXX POL422.50/XXX

POL424.05/XXX POL424.50/XXX

Controller types

Main features

The controllers offer 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) or 2 relay outputs (NO contacts)
- 1 stepper motor drive for electrical expansion valve or PWM output
- 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 ℃

Powerful service tools are available to facilitate commissioning.

POL42X.05 is standard controllers without programmability.

POL42X.50 is programmable controllers with programmability.

Note

Communication concept

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User/Tool interface

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Overview



Technical data

Device events		10 041/ 000/ /D0 041/ 400/
Power supply		AC 24 V ±20% / DC 24 V ±10%
AC 24 V, G0 (17)	Frequency	4565 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
		241 241 201 201 201 201 201 201 201 20
	Safety transformer	
	Mains AC 230 V	Use Conter devices
Relay output	Relay	
Q1 (T8)	Contact	Monostable, NO/NC contact, SPDT
	Switching voltage	AC 24230 V (-20%, +10%)
		DC 1830 V
	Rated current (res./ind.) AC 3 A (res.)	
		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 <u>not</u> mix SELV / PELV and line voltage on the same	
	terminal.	
	Use external protection for	000
	inductive load.	$U_{p,p,p,p}$
	AC 24	Č Č

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Polov outputo	Balay			
$\frac{1}{100} \frac{1}{100} \frac{1}$	Contact	Manastable NO contact SPST		
$Q_{3}, Q_{4} (13)$ $O_{5} O_{6} (T_{10})$	Switching voltage			
05, 00 (110)	Switching voltage	AC 24230 V $(-20\%, +10\%)$		
	Poted ourrent (real/ind)	$\Delta C = A (reg) / 2 A (ind second 0.6)$		
	Raled current (res./ind.)	AC 3 A (les.)/2 A (lind. $\cos \psi 0.0$)		
		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 <u>not</u> mix SELV / PELV	₹ ₽ ₽ ₽ ₽		
	and line voltage on the			
	same terminal.			
	Use external protection			
	for inductive load.			
	· · · · · · · · · · · · · · · · · · ·			
	\rightarrow			
	(\sim) \otimes (\bigotimes $\mathbf{\tilde{g}}$ (~) \bigotimes \bigotimes $\mathbf{\tilde{g}}$		
	AC 24230 V			
	••			
Relay outputs	Relay	(Assembled in POL421.05, POL424.05)		
Q7, Q8 (T11)	Contact	Monostable, NO/NC contact, SPST		
	Switching voltage	AC 24230 V (-20%, +10%)		
		DC 1830 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 cvcles @ AC 230 V. 3.0 A (res.)		
	Max external supply line fusing	6.3 A slow wire fuse or circuit breaker		
Morning Norming	Do <u>not</u> mix SELV / PELV	<u> </u>		
Vvarning	and line voltage on the			
	same terminal.	"] "]		
	Use external protection			
	for inductive load.			

~______ AC 24...230 V

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Triac outputs	Triac data	(Assembled in POL422.05)		
DO1, DO2 (T11)	Switching voltage	AC 24230 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		
		<u>⊢∆24230</u> V~─		
A Warning	Do not mix SELV / PELV	D0 D0 c		
	and line voltage on the			
	same terminal.			
	for inductive load			
	L			
	· (~)	X-L L-X g		
	N AC 230			
		a		
Analog inputs	NTC 10k (Barra-3977 K)	(Assembled in POI 421 05, POI 422 05)		
B1 B3 (T1)	Sensor current	120 IIA @ 25 °C		
21	Temperature range	-50 100 °C		
	Accuracy and resolution of input	See diagram below		
	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 ℃	1.3 K 0.4 K		
	90 °C	2.5 K 0.7 K		
	100 °C	3.4 K 0.9 K		
	250	0.90		
	200	0,80		
	3,00	0,70		
	2,50	₹ 0,60		
	2,00 2,00	.g 0,50		
	B 1,50			
	1,00	0,30		
	0,50	0,20		
	0,00	0,00		
	-50,00 -25,00 0,00 25,00 50,00 75,00 100,00	-50,00 -25,00 0,00 25,00 50,00 75,00 100,00		
	Temperature [°C]	Temperature [°C]		





Configurable outputs

X3, X4 (T2), X5 (T3)



By software

DC output for off-board load

Switching voltage Switching capacity

Configurable





Note

Use free wheel diode for inductive load.

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Digital inputs

X6, X7 (T3) DI1, DI2 (T4) 0/1digital 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 k Ω (open) 10 ms Max. 20 Hz



Digital input

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

X8 (T3)

Configurable	By software
0/1 digital signal (binary)	For potential free contacts
Sampling voltage/current	DC 24 V, 8 mA
Contact resistance	Max. 200 Ω (closed)
	Min. 50 kΩ (open)
Delay	10 ms
Pulse frequency	Max. 20 Hz
Pulse measurement	
Sensor	Open-collector
Sampling voltage	DC 24 V, Max. 8 mA
Max. speed	6000 RPM
Min. ON/OFF time	500 µs
Voltage/current	DC 5 V ±2.5%, 20 mA
Voltage/current	DC 24 V (-25%, +10%), 40 mA
Reference potential	Terminals ⊥
Connection	Short circuit protected



Siemens Building Technologies



Siemens Building Technologies

Process bus	Based on KNX TP1	(Assembled in POL422.05, POL424.05)
CE+, CE- (T6)	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
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		00
	¥ ۲	3973204
		PB 8
Third party bus	RS-485 (FIA-485)	Modbus RTU mode
(RS-485 Modbus RTU)	Bus connection	
A + B - REF(T5)	Bus electronics	Not galvanically isolated
, (i, b, (iei (io)	Bus cable	Shielded if length >3 m. twisted pair
	Bus polarization	Configurable by software
	Bus termination	Nono*
	*On DC405 notwork it is accordial to	None
Note 🥵	cable's characteristic impedance to ta on the line.	prevent signal echoes from corrupting the da-
	Г	agal
		02 B - +
	F	39732
	L	— RS485 — Ø
Tools/HMI Local service interface	Cable connection	RJ45 jack, 8 pins, length of cable<3 m
(T-HI)	Local-HMI	
	RS-485 (EIA-485)	Not 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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LED for BSB run/ston	Mada					
		LED Status				
	Sw update mode (download active	Alternating between red and green every				
	on a new BSP, application)	second				
	Application running	Green on				
	Application loaded but not running	Yellow on				
	Application not loaded	Yellow on				
	BSP error (software error)	Red blinking at 2 Hz				
	Hardware error	Red on				
Note G	LED for bus only indicates the status o	f the integrated modem communication.				
	POL42X controllers do not provide this	modem communication.				
Connection terminals	Possible plugs for I/O signals and	Phoenix FKCVW 2,5/x-ST				
	communication (not included)	Phoenix FKCT 2,5/x-ST				
		Phoenix MVSTBW 2,5/x-ST				
	Possible plugs for power supply	Phoenix FKCVW 2.5/2-ST OG				
	(not included)	Phoenix FKCT 2.5/2-ST OG				
	()	Phoenix MVSTBW 2 5/2-ST OG				
	Solid wire	$0.5 - 2.5 \text{ mm}^2$				
	Stranded wire (twisted or with ferrule)	$0.5 1.5 \text{ mm}^2$				
	Cable length	In compliance with the load local				
	Cable length	regulations and installation documents				
Real-time clock	Buffering with internal Gold Cap	Min. 4 hours				
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SunDisk 29	SD card	At the right side of the housing				
2.0 _{GB}		(Assembled in POL422.50, POL424.50)				
SD card	Max. capability	Slot 128 MB…2 GB				
	Formation	FAT16, FAT32				
Note CP	SD Card is installed on POL42X.50/XXX only.					
Environment	Operation	IEC 60721-3-3				
	Temperature	-4070 °C				
	Restriction process bus	-25 70 °C				
	Humidity	<90% r.h. (no condensation)				
		Min 700 bPa corresponding to				
		Max 3 000 m above sea level				
	Transport					
		-4070 C				
	Air pressure	IVIIN. 260 hPa, corresponding to				
		IVIAX. 10,000 m above sea level				
	Mechanical conditions	IEC 60721-3-2 Class 2M2				
Protection	Degree of protection	IP 20 (EN 60529)				
	Safety class	Suitable for use in plants with safety				
	-	class II				

Standards	Product safety					
	Automatic electrical controls	EN 60730-1				
	Electromagnetic compatibility	Suitable for residential and industrial EMC				
		environment				
	Immunity in the industrial sector	EN 61000-6-2				
	Emissions in the domestic sector	EN 61000-6-3				
	CE conformity					
	EMC Directive	2004/108/EC				
	Low Voltage Directive	2006/95/EC				
	Listings					
		UL916, UL873				
		CSA C22.2M205				
	RoHs compliance					
		2002/95/EC (Europe)				
		ACPEIP (China)				
	N474 C-Tick conformity to EMC	MC AS/NSZ CISPR 22				
	emission standard					
General data	Dimensions	180 x 110 x 75 mm				
	Weight excl. packaging	600 g				
	Base	Plastic, pigeon blue RAL 5014				
	Housing	Plastic, light grey RAL 7035				
Accessory parts	PC service cable 1.5 m	POL 0C2.40/STD				
	Connector set (screw, cable side entry) 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		POL421.05	POL422.05	POL424.05	POL422.50	POL424.50
Analog	B1, B2, B3 (NTC 10k)	\checkmark	\checkmark		\checkmark	
inputs	B1, B2, B3 (Ni1000/Pt1000)			\checkmark		\checkmark
Configurable	X1, X2 (NTC 10k / 010 V / DI)	\checkmark	\checkmark		\checkmark	
inputs	X1, X2 (Ni1000 / 010 V / DI)			\checkmark		\checkmark
	X6, X7 (binary)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Digital	X8 (binary/fan speed)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
inputs	D1, D2 (binary)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	DL1 (active AC 115230 V)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Configurable outputs	X3, X4, X5 (010 V analog output / off-board digital output)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	Q1, Q3, Q4, Q5, Q6 (relay output)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Digital	Q7, Q8 (relay output)	\checkmark		\checkmark		\checkmark
outputs	DO1, DO2 (triac output)		\checkmark		\checkmark	
	Process bus interface		\checkmark	\checkmark	\checkmark	\checkmark
Interfeece	Modbus RTU interface	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
interracés	EEV (stepper motor drive/PWM)	\checkmark	\checkmark		\checkmark	
	SD card interface				\checkmark	\checkmark

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 <u>not</u> 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.
Dispo	sal notes	
X		The controller contains electrical and electronic components and must <u>not</u> be disposed of together with household waste.
		Local and currently valid legislation must be observed!

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Subject to change

05.05.2011

Climatix Controllers