



GIO212 Universal input/output module

The GIO212 can measure or output different types of signals. Each channel can be used as an analog or digital output or input. With the standard signals current (0/4 mA to 20 mA) and voltage (± 10 V), various sensors and actuators can be connected. A resolution of 16 bits permits measurement results from signals that do not fully utilize the measuring range (e.g. 0 V to 5 V). Temperatures are playing a significant role in an increasing number of processes, which is why this module supports Pt100/Pt1000 in 2-, 3-, and 4-wire measurement, as well as all standard type thermocouples. Similarly, the channels can be used as digital inputs, which can also be configured as interrupt input or digital 32-bit counters. The values of the pulse length or period measurement can be buffered in a FIFO (1022 values).

The quick digital 24 V output can be selected as Push-Pull, High-Side or Low-Side. The output can be controlled as simple output or as PWM/frequency output. The frequency mode permits the control of the stepper motor output stage via the output of the number of pulses or freely selectable profiles (FIFO).

Up to two signal types can be used simultaneously per channel. This permits the use of up to 24 channels per GIO212. Analog sensors can be supplied via the digital output (short circuit-proof and monitored), actuator signals can be read back and digital signals can be monitored analog. Thus, a single universal module is available for countless applications instead of different modules for each signal type. A cost-effective solution that simplifies logistics and servicing.

Different modes can be combined and set simply using a configuration wizard in the SolutionCenter engineering tool.

Part type designation	Part number
GIO212	00020620-00
GIO212 CC	00020623-00

Features

- 12 channels
- Analog and digital inputs and outputs
- Modes that can be selected per channel:
 - Analog voltage input ± 10 V to ± 10 mV
 - Analog current input 0(4) mA to 20 mA
 - Temperature sensor Pt elements as 2-,3-,4-wire
 - Thermocouples type J, K, T, N, E, R, S, B
 - Analog voltage output ± 10 V
 - Analog current output 0(4) mA to 20 mA
 - Digital input 24 V
 - Digital 32 bit counter, A and A/B operation
 - Digital output 100 mA
- Low-Side, High-Side, Push-Pull
- Digital output as 16 bit PWM / frequency modulation
- Resolution: Input 16 bit with filter, output 14 bit
- Filter adjustable from 4 kHz to 0.5 Hz per channel
- Digital status display for analog channels
- Digital inputs in accordance with IEC 61131 type 1, 2, 3
- Digital outputs up to 10 kHz
- All outputs overload, short-circuit and external voltage-proof
- Measuring range monitoring freely adjustable (± 105 %)
- Error message on overload and overtemperature and undervoltage of the supply
- Galvanic isolation for the system 500 V
- Optional condensation proof ColdClimate design (☼)

GIO212

Inputs/Outputs		
Number	12 channels freely configurable as input or output	
Modes per channel	Analog input Temperature measurement input for Pt elements and thermo couples Analog output Digital input Counter input Digital output PWM output	
SYNC signal	In	Analog input, digital input, temperature measurement, counter (depending on the mode)
	Out	Analog output, digital output
Analog inputs in general		
Digital resolution	16 bit	
Measuring range	$\pm 105\%$ of nominal range	
Measuring range monitoring	Lower and upper measurement range limit, error message as status or measurement range monitoring	
Permitted common mode voltage	Max. ± 1 V	
Refresh cycle time	100 μ s	
Cut-off frequency	4 kHz to 0.5 Hz adjustable channel by channel	
Filter slope	> 80 dB/decade	
Voltage inputs		
Input voltage	± 10 V, ± 1 V, ± 100 mV, ± 10 mV	
Accuracy at 25 °C	Range ± 10 V: $\pm 0.05\%$ FS Range ± 1 V: $\pm 0.05\%$ FS Range ± 100 mV: $\pm 0.05\%$ FS Range ± 10 mV: $\pm 0.2\%$ FS	
Current inputs		
Input current	± 20 mA or 0 mA to 20 mA or 4 mA to 20 mA	
Accuracy at 25 °C	Range ± 20 mA: $\pm 0.1\%$ FS Range 0 mA to 20 mA: $\pm 0.2\%$ FS Range 4 mA to 20 mA: $\pm 0.2\%$ FS	
Input impedance	Typ. 250 Ω Max. 300 Ω	
Shunt short-circuit proof	Up to +24 V	
External withstand voltage	± 24 V	
Temperature inputs PTC		
Temperature inputs	Pt100/Pt1000	
Connection type	2-, 3- or 4-wire, optional	
Input impedance	> 100 k Ω	
Temperature range	-100 °C to $+800$ °C	
Accuracy at 25 °C	Pt100/Pt1000: 0.15 % of 900 °C (measurement range -100 °C to 800 °C)	
Value of LSB	0.1 K; measured value in 1/10 Kelvin	
Temperature inputs TE		
Temperature elements	Types J, K, T, N, E, R, S, B can be selected	
Temperature ranges per type	J	-30 °C to $+1200$ °C
	K	-30 °C to $+1370$ °C

Temperature inputs TE		
	T	-30 °C to +400 °C
	N	-30 °C to +1300 °C
	E	-30 °C to +1000 °C
	R	-30 °C to +1768 °C
	S	-30 °C to +1768 °C
	B	+600 °C to +1820 °C
Ground		Up to ± 3 V
Accuracy at 25 °C		Max. ± 0.15 % of measuring range (S, R, T, B max. ± 0.3 %)
Value of LSB		0.1 K; measured values in 1/10 Kelvin
Analog outputs in general		
Digital resolution		14 bit
Output signal range		± 105 % nominal range
Voltage outputs		
Output voltage		± 10 V
Output current		Max. 10 mA
Accuracy at 25 °C		Min. 1 k Ω , max. ± 0.05 % of output range
Current outputs		
Output current		0(4) mA to 20 mA
Accuracy at 25 °C		Max. ± 0.2 % FS of output range
Burden		Up to 600 Ω
Digital inputs		
Input voltage		Nom. 24 V DC
Low-level		0 V to 5 V
High level		+11 V to +34 V
Acc. to IEC 61131-2	Type 1	2 mA to 6 mA
Input current at 24 V	Type 2	6 mA to 10 mA
	Type 3	2 mA to 6 mA
Input type "source"		2 mA to 6 mA
Input type "comparator"		Typ. 1.2 V (TTL compatible)
Prof. filter for digital inputs		16 μ s to 262 ms, default 1 ms
Digital counter		
Modes		1, 2, 4-fold evaluation Period duration measurement Pulse duration measurement Combination with 2nd channel: pulse/direction mode or quadrature encoder FIFO mode for period/pulse measurement (1022 values)
Counters		Up or down counter (in combination with 2nd channel) 32 bit
Count frequency		125 kHz (500 kHz at 4-fold evaluation)
Input type		24 V, like digital input
Trigger (2nd channel)		Save counter state
Reset (2nd channel)		Reset counter
Digital output		
Output type		Low-Side, High-Side or Push-Pull (half bridge)
Output current / channel		0.1 A (short-term 0.5 A for <10 s)
Short-circuit current/channel		800 mA

Digital output		
Max. switching frequency	10 kHz	
Cable break detection	Yes	
Short circuit, overload	Yes	
PWM output		
Output	Specification like digital output	
Modes	PWM Frequency modulation (frequency, number of pulses, FIFO profile)	
Frequency Range	0.95 Hz to 10 kHz	
Pulse range	100 µs (10 µs) to 8.192 ms	
Frequency resolution	16 bit (LSB is 125 ns or 16 µs)	
Internal power supply		
Internal supply	Via BS2xx backplane	
Internal current consumption	80 mA	
External power supply		
External voltage range	18 V DC to 34 V DC	
External current consumption 24 V	Typically 200 mA without external load	
Galvanic isolation from the system	500 V	
Approvals/Certificates		
General	CE, UKCA, cULus	
Marine	ABS, BV, DNV, KR, LR, NK, RINA	
Environmental conditions		
	Standard	ColdClimate (❄)
Operating temperature	-30 °C to +60 °C	
Relative humidity, operation	5 % to 95 % noncondensing	5 % to 95 % with condensation
Storage temperature	-40 °C to +85 °C	
Relative humidity, storage	5 % to 95 % with condensation	5 % to 95 % with condensation
Pollution degree acc. IEC 60664-1	2 (noncondensing)	2

Order data

Part type designation	Part number	Description
GIO212	00020620-00	Universal input/output module; 12x analog In ± 10 V ± 20 mA Pt TC; 16 bit; analog Out ± 10 V, 20 mA; 14 bit; digital In DI 5 V / 24 V, 125 kHz, sink/source, counter; digital Out 24 V / 100 mA, 10 kHz, highside/lowside/pushpull, PWM; configurable DI/AI filter; 100 µs sample and refresh time; threshold monitoring; isolated
GIO212 CC	00020623-00	Like GIO212; ColdClimate (❄)

Accessories

Part type designation	Part number	Description
KS-GIO212 B+C	00023145-00	Terminal set cage clamp narrow (4x KS 35/15; 1 x KZ 51/02) with labeling strips + coding elements