



GIO212 Universal Input/Output Module

The GIO212 is a module that can measure and output various types of signals. Each channel can be used as analog or digital output or input. With the standard signals current (0/4 to 20 mA) and voltage (± 10 V), various sensors and actuators can be connected. A resolution of 16 bits allows measurement results from signals that do not completely use the measuring range (e.g. 0 to 5 V). Temperatures are playing a significant role in ever more processes, which is why this module supports Pt100/Pt1000 in 2-, 3-, and 4-wire measurement, as well as all standard type thermoelements. Similarly, the channels can be used as digital inputs, which can also be configured as interrupt input and 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 allows 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 allows up to 24 channels per GIO212. Analog sensors can be supplied via the digital output (short circuit-proof and monitored), actuator signals read back and digital signals monitored analog. Thus, this is a single universal module for countless applications instead of different modules for each signal type. A cost-effective solution that simplifies logistics and service.

Various modes can be combined and set easily via a configuration wizard in the SolutionCenter engineering tool.

Item	Item-No.
GIO212	00020620-00
GIO212 CC	00020623-00

- 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) to 20 mA
 - Temperature sensor Pt elements as 2-, 3-, 4-wire
 - Thermoelements type J, K, T, N, E, R, S, B
 - Analog voltage output ± 10 V
 - Analog current output 0(4) 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 from the system 500 V
- Condensation-proof ColdClimate design (✳)

GIO212		
Inputs/Outputs		
Quantity	12 channels, individually configurable as input or output	
Modes per channel	Analog input Temperature measurement input for Pt elements and thermoelements 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 measuring range limit, error message as status or measuring range monitoring	
Allowed 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	
Filtering slope	> 80 dB/decade	
Voltage inputs		
Input voltage	± 10 V, ± 1 V, ± 100 mV, ± 10 mV	
Basic 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 to 20 mA or 4 to 20 mA	
Basic accuracy at 25 °C	Range ± 20 mA: $\pm 0.1\%$ FS Range 0 to 20 mA: $\pm 0.2\%$ FS Range 4 to 20 mA: $\pm 0.2\%$ FS	
Input impedance	Typ. 250 Ohm Max. 300 Ohm	
Shunt short-circuit proof	To +24 V	
Interference voltage strength	+24 V	
Temperature inputs PTC		
Temperature inputs	Pt100/Pt1000	
Connection type	2-, 3- or 4-wire, optional	
Input impedance	> 100 kOhm	
Temperature range	-100 to +800 °C	
Basic accuracy at 25 °C	Pt100/Pt1000: 0.15 % of 900 ° (measuring range -100 to 800 °C)	
Value of the LSB	0.1 K, measurement values in 1/10 Kelvin	

GIO212		
Temperature inputs TE		
Temperature elements	Types J, K, T, N, E, R, S, B can be selected	
Temperature ranges per type	J	-100 to +1200 °C
	K	-100 to +1370 °C
	T	-100 to +400 °C
	N	-100 to +1300 °C
	E	-100 to +1000 °C
	R	-50 to +1768 °C
	S	-50 to +1768 °C
	B	+600 to +1820 °C
Ground	Up to ±3 V	
Basic accuracy at 25 °C	Input range max. ±0.15 % of the measuring range (S, R, T, B max. ±0.3 %)	
Value of the LSB	0.1 K, measurement 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	
Basic accuracy at 25 °C	Min. 1 kOhm, max. ±0.05 % of the output current range	
Current outputs		
Output current	0(4) to 20 mA	
Basic accuracy at 25 °C	Max. ±0.2 %FS of the output current range	
Apparent ohmic resistance	Up to 600 Ohm	
Digital inputs		
Input voltage	Nom. 24 VDC	
Low level	0 to 5 V	
High-level	+11 to +34 V	
According to IEC 61131-2 input current at 24 V	Type 1	2 to 6 mA
	Type 2	6 to 10 mA
	Type 3	2 to 6 mA
Input type "source"	2 to 6 mA	
Input type "comparator"	Typ. 1.2 V (TTL compatible)	
Prof. filter for digital inputs	16 µs 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)	
Counter	Counter up or down (in combination with 2nd channel)	
	32-bit	
Count frequency	125 kHz (500 kHz at 4-fold evaluation)	

GIO212		
Digital counter		
Input type	24 V, like digital input	
Trigger (2nd channel)	Save value	
Reset (2nd channel)	Reset counter	
Digital output		
Output type	Low-Side, High-Side or Push-Pull (half bridge)	
Output current / channel	0.1 A (briefly 0.5 A for <10 s)	
Short-circuit current/channel	800 mA	
Max. switching frequency	10 kHz	
Broken wire detection	Yes	
Short circuit, overload	Yes	
PWM output		
Output	Specification like digital output	
Mode	PWM	
	Frequency modulation (frequency, number of pulses, FIFO profile)	
Frequency range	0.95 Hz to 10 kHz	
Pulse range	100 μ s (10 μ s) to 8.192 ms	
Frequency resolution	16 bit (LSB is 125 ns or 16 μ s)	
Internal power supplyvvvv		
Supply internal	Via backplane BS2xx	
Current consumption internal	80 mA	
Power supply external		
Voltage range external	18 to 34 VDC	
Current consumption external 24 V	Typically 200 mA without external load	
Galvanic isolation from the system	500 V	
Approvals / Certificates		
General	CE, cULus, CCC	
Marine	DNV, LR, ABS, BV	
Ambient conditions		
	Standard	ColdClimate (☼)
Operating temperature	-30 to +60 °C	
Rel. humidity operation	5 to 95 % without condensation	5 to 95 % with condensation
Storage temperature	-40 to +85 °C	
Rel. humidity storage	5 to 95 % with condensation	5 to 95 % with condensation
Pollution degree (IEC 60664-1)	2 (without condensation)	2

Order Codes		
Item	Item No.	Description
GIO212	00020620-00	Universal input/output module; 12x analog In \pm 10V \pm 20mA Pt TC; 16bit; analog Out \pm 10V 20mA; 14bit; digital In DI 5V / 24V, 125kHz, sink/source, counter; digital Out 24V/100mA, 10kHz, highside/lowside/pushpull, pwm; configurable DI/AI filter; 100 μ s sample and refresh time; threshold monitoring; isolated
GIO212 CC	00020623-00	Like GIO212; ColdClimate (☼)
Accessories		
KS-GIO212 B+C	00023145-00	Terminal set cage clamp small (4 x KS 35/15; 1 x KZ 51/02) with labeling strip and coding elements