General Specifications

GX90XA/GX90XD
GX90YD/GX90WD
I/O Modules

SMARTDAC+

GS 04L53B01-01EN

■ OVERVIEW

I/O modules are connected to the GX/GP, Expandable I/O unit, GM main unit, and GM sub unit.

- A module type is four types, an analog input, a digital input, a digital output, and a digital input/output.
- Input and output have module structure and it can extend them easily.
- The GX90XA analog input module provides four types: (1) universal type that allows the measurement input for DCV (direct voltage), TC (thermocouple), RTD (resistance temperature detector), and DI (contact or TTL level voltage), (2) current input type with the built-in shunt resistor to directly input a standard signal of 4-20mA DC, (3) electromagnetic relay scanner type insusceptible to noises that allows the measurement input for DCV, TC, and DI, and (4) low withstand voltage relay type that offers a low cost. In each system, a measurement input signal can be assigned to each channel.
- The GX90XD digital input module, which allows up to 16 digital inputs or pulse inputs*1, can be used as a multipoint digital input or pluse input*1. This module can also be used as a remote control input.
- The GX90YD digital output module is assigned as a relay output (contact C) and is used when an alarm activates. It can also be used to turn the output on and off manually using the touch panel.
- The GX90WD digital input/output module provides eight digital inputs or pulse inputs*1 and six relay outputs. When there are small amounts of digital inputs and digital outputs, you do not need to mount two modules. This enables efficient channel configuration.
- Each module provides a M3 screw terminal and clamp terminal*2. Also, the input terminal can be removed and mounted. This enables wiring work to be carried out efficiently.

*1 The pulse input is only for SMARTDAC+ GM.
*2 GX90YD and GX90WD are only M3 screw terminal.

- The measuring accuracies noted in the general specifications have a margin of error that takes into account the product's components and the equipment used for adjustment and testing. However, the actual values calculated from the accuracy testing data upon shipment of the instrument from the factory are as follows.

Input type		Measuring accuracy*3 (typical value*4)
DCV	20 mV	± (0.01% of rdg + 5 µV)
	6V (1-5V)	± (0.01% of rdg + 2 mV)
TC	R	± 1.1 °C
	K (-200 to 500 °C)	± 0.2 °C (except ±0.15% of rdg + 0.2 °C for -200.0 to 0.0 °C)
	T	± 0.2 °C (except ±0.10% of rdg + 0.2 °C for -200.0 to 0.0 °C)
RTD	Pt100	± (0.02% of rdg + 0.2 °C)
	Pt100 (high resolution)	± (0.02% of rdg + 0.16 °C)

*3 General operating conditions: 23±2 ºC, 55±10% RH, supply voltage 90–132, 180–264 VAC, supply frequency within 50/60 Hz ±1%, warm-up of 30 minutes or more, no vibrations or other hindrances to performance.
*4 For the measuring accuracy (guaranteed), see next page.

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■ INPUT/OUTPUT MODULE SPECIFICATIONS

ANALOG INPUT MODULE (Model GX90XA or GX/GP main unit options /Uxx0)

GX90XA

- Number of inputs: 10
- Input Type:

Suffix Code	Input Type	Description
-U2	DC voltage, standard signal, thermocouple (TC), resistance temperature detector (RTD), DI (voltage, contact), and DC current (by adding an external shunt resistor)	Universal
-C1	DC current (mA), DC current standard signal (4-20 mA)	Current input
-L1	DC voltage, standard signal, thermocouple (TC), DI (voltage, contact), and DC current (by adding an external shunt resistor)	Low withstand voltage relay
-T1	DC voltage, standard signal, thermocouple (TC), DI (voltage, contact), and DC current (by adding an external shunt resistor)	Electromagnetic relay

- Measurement interval: 100 *1 *2, 200 *1 *2, 500 ms*1, 1, 2, 5 s
- Input range: -5% or more and 105% or less (accuracy is guaranteed in the range from 0% to 100% inclusive)
- Measurement ranges and accuracies*3 (However, the number of display digits can be increased by scaling.)

*1 Cannot be specified for the electromagnetic relay scanner type (Type Suffix Code: -T1).
*2 Cannot be specified for L-model DCV/TC/DI, scanner type (Type Suffix Code: -L1).
*3 The following specifications apply to operation of the recorder under standard operation conditions. Temperature: 23 ± 2 °C, Humidity: 55% ± 10% RH, Power supply voltage: 90 to 132 or 180 to 264 VAC, Power supply frequency: 50/60 Hz ± 1%, Warm-up time: At least 30 min. Other ambient conditions such as vibration should not adversely affect recorder operation.

Input Type	Range	Measurement range	Measurement accuracy (digital display)		Max. resolution of digital display
			A/D integration time: 16.7ms or more	A/D integration time: 1.67ms	
DCV	20 mV	-20.000 to 20.000 mV	±(0.05 % of rdg + 12 µV)	±(0.1 % of rdg + 40 µV)	1 µV
	60 mV	-60.00 to 60.00 mV	±(0.05 % of rdg + 0.03 mV)	±(0.1 % of rdg + 0.15 mV)	10 µV
	200 mV	-200.00 to 200.00 mV	±(0.05 % of rdg + 0.03 mV)	±(0.1 % of rdg + 0.4 mV)	10 µV
	1 V	-1.0000 to 1.0000 V	±(0.05 % of rdg + 1.2 mV)	±(0.1 % of rdg + 4 mV)	100 µV
	2 V	-2.0000 to 2.0000 V	±(0.05 % of rdg + 1.2 mV)	±(0.1 % of rdg + 4 mV)	100 µV
	6 V	-6.000 to 6.000 V	±(0.05 % of rdg + 3 mV)	±(0.1 % of rdg + 15 mV)	1 mV
	20 V	-20.000 to 20.000 V	±(0.05 % of rdg + 3 mV)	±(0.1 % of rdg + 40 mV)	1 mV
	50 V	-50.00 to 50.00 V	±(0.05 % of rdg + 0.03 V)	±(0.1 % of rdg + 0.15 V)	10 mV
Standard signal	0.4-2V	0.3200 to 2.0800 V	±(0.05 % of rdg + 1.2 mV)	±(0.1 % of rdg + 4 mV)	100 µV
	1-5V	0.800 to 5.200 V	±(0.05 % of rdg + 3 mV)	±(0.1 % of rdg + 15 mV)	1 mV
DC current	0-20mA	0.000 to 20.000 mA	±(0.3 % of rdg + 5 µA)	±(0.3 % of rdg + 90 µA)	1 µV
DC current (standard signal	4-20mA	3.200 to 20.800 mA			
TC (Excluding RJC accuracy)	R *4	0.0 to 1760.0 °C	±(0.15 % of rdg + 1.0 °C) However, R, S; 0.0 to 800.0 °C: ±2.2 °C, B; 400.0 to 800.0 °C: ±3.0 °C Accuracy at less than 400.0 °C is not guaranteed.	±(0.2 % of rdg + 6.0 °C) However, R, S; 0.0 to 800.0 °C: ±7.6 °C, B; 400.0 to 800.0 °C: ±11.0 °C Accuracy at less than 400.0 °C is not guaranteed.	0.1 °C
	S *4	0.0 to 1760.0 °C			
	B *4	0.0 to 1820.0 °C			
	K *4	-270.0 to 1370.0 °C	±(0.15 % of rdg + 0.7 °C) However, -200.0 to 0.0 °C: ±(0.35 % of rdg + 0.7 °C) Accuracy at less than -200.0 °C is not guaranteed	±(0.2 % of rdg + 5.0 °C) However, -200.0 to 0.0 °C: ±(3 % of rdg + 5.0 °C) Accuracy at less than -200.0 °C is not guaranteed	0.1 °C
		-200.0 to 500.0 °C			
	E *4	-270.0 to 800.0 °C	±(0.15 % of rdg + 0.5 °C) However, -200.0 to 0.0 °C: ±(0.35 % of rdg + 0.5 °C) Accuracy at less than -200.0 °C is not guaranteed	±(0.2 % of rdg + 4.0 °C) However, -200.0 to 0.0 °C: ±(2 % of rdg + 4.0 °C) Accuracy at less than -200.0 °C is not guaranteed	0.1 °C
	J *4	-200.0 to 1100.0 °C			
	T *4	-270.0 to 400.0 °C	±(0.15 % of rdg + 0.5 °C) However, -200.0 to 0.0 °C: ±(0.35 % of rdg + 0.5 °C) Accuracy at less than -200.0 °C is not guaranteed	±(0.2 % of rdg + 2.5 °C) However, -200.0 to 0.0 °C: ±(2 % of rdg + 2.5 °C) Accuracy at less than -200.0 °C is not guaranteed	0.1 °C
	N *4	-270.0 to 1300.0 °C	±(0.15 % of rdg + 0.7 °C) However, -200.0 to 0.0 °C: ±(0.7 % of rdg + 0.7 °C) Accuracy at less than -200.0 °C is not guaranteed	±(0.3 % of rdg + 6.0 °C) However, -200.0 to 0.0 °C: ±(5 % of rdg + 6.0 °C) Accuracy at less than -200.0 °C is not guaranteed	0.1 °C
	W *5	0.0 to 2315.0 °C	±(0.15 % of rdg + 1.5 °C)	±(0.3 % of rdg + 14.0 °C) However, more than 1000.0 °C: ±(0.8 % of rdg + 9.0 °C)	0.1 °C
	L *6	-200.0 to 900.0 °C	±(0.15 % of rdg + 0.5 °C) Less than 0.0 °C: ±(0.5 % of rdg + 0.5 °C)	±(0.2 % of rdg + 4.0 °C) Less than 0.0 °C: ±(3 % of rdg + 4.0 °C)	0.1 °C
	U *6	-200.0 to 400.0 °C	±(0.15 % of rdg + 0.5 °C) Less than 0.0 °C: ±(0.7 % of rdg + 0.5 °C)	±(0.2 % of rdg + 2.5 °C) Less than 0.0 °C: ±(3 % of rdg + 2.5 °C)	0.1 °C
	WRe3-25 *7	0.0 to 2320.0 °C	±(0.2 % of rdg + 2.5 °C)	±18.0 °C More than 2000.0 °C: ±0.9 % of rdg	0.1 °C

Continued

Input Type	Range	Measurement range	Measurement accuracy (digital display)		Max. resolution of digital display
			A/D integration time: 16.7ms or more	A/D integration time: 1.67ms	
TC (Excluding RJC accuracy)	KpvsAu7Fe *8	0.0 to 300.0 K	±(0.15 % of rdg + 2.0 K)	±(0.2 % of rdg + 7.0 K)	0.1 K
	PLATINEL II *8	0.0 to 1395.0 °C	±(0.25 % of rdg + 2.3 °C)	±(0.25% of rdg + 8.0 °C)	0.1 °C
	PR20-40 *9	0.0 to 1900.0 °C	±(0.7 % of rdg + 0.4 °C) However, accuracy at less than 800.0 °C is not guaranteed.	±20.0 °C However, accuracy at less than 800.0 °C is not guaranteed.	0.1 °C
	NiNiMo *8	0.0 to 1310.0 °C	±(0.25 % of rdg + 0.7 °C)	±(0.5% of rdg + 5.0 °C)	0.1 °C
	W/WRe26 *10	0.0 to 2320.0 °C	±(0.2 % of rdg + 2.0 °C) However, accuracy at less than 300.0 °C is not guaranteed.	±(0.4 % of rdg + 12.0 °C) However, accuracy at less than 300.0 °C is not guaranteed.	0.1 °C
	N(AWG14) *11	0.0 to 1300.0 °C	±(0.2 % of rdg + 1.3 °C)	±(0.5% of rdg + 7.0 °C)	0.1 °C
	XK GOST *12	-200.0 to 600.0 °C	±(0.25 % of rdg + 0.8 °C)	±(0.5% of rdg + 4.0 °C)	0.1 °C
RTD	Pt100 *13	-200.0 to 850.0 °C	±(0.15 % of rdg + 0.3 °C)	±(0.3 % of rdg + 1.5 °C)	0.1 °C
		-150.00 to 150.00 °C			0.01 °C
	JPt100 *13	-200.00 to 550.00 °C			0.1 °C
		-150.00 to 150.00 °C			0.01 °C
	Cu10 GE	-200.0 to 300.0 °C	±(0.2 % of rdg + 2.0 °C) guaranteed range Cu10 GE: -70.0 to 170.0 °C Cu10 L&N: -75.0 to 150.0 °C Cu10 WEED: -200.0 to 260.0 °C Other range: -200.0 to 300.0 °C	±(0.4 % of rdg + 6.0 °C) guaranteed range Cu10 GE: -70.0 to 170.0 °C Cu10 L&N: -75.0 to 150.0 °C Cu10 WEED: -200.0 to 260.0 °C Other range: -200.0 to 300.0 °C	0.1 °C
	Cu10 L&N	-200.0 to 300.0 °C			
	Cu10 WEED	-200.0 to 300.0 °C			
	Cu10 BAILEY	-200.0 to 300.0 °C			
	Cu10 at 20 °C α=0.00392	-200.0 to 300.0 °C			
	Cu10 at 20 °C α=0.00393	-200.0 to 300.0 °C			
	Cu25 at 0 °C α=0.00425	-200.0 to 300.0 °C	±(0.3 % of rdg + 0.8 °C)	±(0.5 % of rdg + 3.0 °C)	0.1 °C
	Cu53 at 0 °C α=0.00426035	-50.0 to 150.0 °C	±(0.15 % of rdg + 0.8 °C)	±(0.3 % of rdg + 4.0 °C)	0.1 °C
	Cu100 at 0 °C α=0.00425	-50.0 to 150.0 °C	±(0.2 % of rdg + 1.0 °C)	±(0.4 % of rdg + 5.0 °C)	0.1 °C
	J263B *14	0.0 to 300.0 K	±1.0 K Less than 40.0 K: ±3.0 K	±3.0 K Less than 40.0 K: ±9.0 K	0.1 K
	Ni100 (SAMA)	-200.0 to 250.0 °C	±(0.15 % of rdg + 0.4 °C)	±(0.3 % of rdg + 2.0 °C)	0.1 °C
	Ni100 (DIN) *15	-60.0 to 180.0 °C			
	Ni120 *16	-70.0 to 200.0 °C			
	Pt25 *17	-200.0 to 550.0 °C	±(0.15 % of rdg + 0.8 °C)	±(0.3 % of rdg + 4.0 °C)	0.1 °C
	Pt50 *18	-200.0 to 550.0 °C	±(0.3 % of rdg + 0.6 °C)	±(0.6 % of rdg + 3.0 °C)	0.1 °C
	Pt200 WEED	-100.0 to 250.0 °C	±(0.3 % of rdg + 1.0 °C)		
	Cu10 GOST *19	-200.0 to 200.0 °C	±(0.2 % of rdg + 2.0 °C)	±(0.4 % of rdg + 6.0 °C)	0.1 °C
	Cu50 GOST *20	-200.0 to 200.0 °C	±(0.15 % of rdg + 0.6 °C)	±(0.3 % of rdg + 4.0 °C)	0.1 °C
	Cu100 GOST *21	-200.0 to 200.0 °C	±(0.15 % of rdg + 0.3 °C)	±(0.3 % of rdg + 1.5 °C)	0.1 °C
	Pt46 GOST *20	-200.0 to 550.0 °C	±(0.3 % of rdg + 0.8 °C)	±(0.6 % of rdg + 4.0 °C)	0.1 °C
	Pt100 GOST *21	-200.0 to 600.0 °C	±(0.15 % of rdg + 0.3 °C)	±(0.3 % of rdg + 2.0 °C)	0.1 °C
DI	Level		Threshold level (Vth=2.4 V) Accuracy: ±0.1 V		-
	Contact *22		Less than 1 kΩ: 1(ON), More than 100 kΩ: 0(OFF) (parallel capacitance of 0.01 μF or less)		-

*4 R, S, B, K, E, J, T, N: IEC584-1(1995), DIN IEC584, JIS C1602-1995
*5 W: W-5%Re/W-26%Re(Hoskins Mfg.Co.) ASTM E988-96 (Type C equivalent of OMEGA Engineering Inc.)
*6 L: Fe-CuNi, DIN43710, U: Cu-CuNi, DIN43710
*7 WRe3-25: W-3%Re/W-25%Re(Hoskins Mfg.Co.) ASTM E988-96 (Type D equivalent of OMEGA Engineering Inc.)
*8 KpvsAu7Fe, PLATINEL II, NiNiMo: ASTM E1751
*9 PR20-40: PtRH20%-PtRh40%(Johnson Matthey Plc) ASTM E1751
*10 W/WRe26: W/W-26%Re(Hoskins Mfg.Co.) ASTM E1751 (Type G equivalent of OMEGA Engineering Inc.)
*11 N(AWG14): NBS
*12 XK GOST: Type L (GOST R 8.525-2001)
*13 Pt100: JIS C1604-1997, IEC751-1995, DIN IEC751-1996 JPt100: JIS C1604-1989, JIS C1606-1989
*14 J263B: Yokogawa Electric Corporation J263*B
*15 Ni100 (DIN): DIN 43760
*16 Ni120: McGRAW EDISON COMPANY
*17 Pt25: One-fourth of JPt100 resistance value
*18 Pt50: JIS C1604-1981, JIS C1606-1986
*19 Cu10 GOST: One-tenth of Cu100 GOST resistance value
*20 Cu50 GOST, Pt46 GOST: GOST 6651-94
*21 Cu100 GOST, Pt100 GOST: GOST 6651-2009
*22 The detected current value is approx. 10 μA.

Measurement accuracy at scaling: measurement accuracy at scaling (digits) = measurement accuracy (digits) x scaling span (digits)/ measurement span (digits) + 2 digits

* Rounding up decimal places

- Burnout detection: Burnout upscale, downscale, or OFF selectable (for each channel).
  Available input: TC, RTD, Standard signal
  Detection condition;
  TC; Normal: 2 kΩ or less., Burnout: 200 kΩ or more (parallel capacitance of 0.01 μF or less)
  Detection current: Approx. 10 μA
  RTD; Normal: wiring resistance or less,
  Burnout: 200 kΩ or more
  parallel capacitance of less than 0.01 μF or less
  Detection current: Approx. 10 μA
  Standard signal:
  Normal: Within measuring range
  Burnout: Depends on the setting of the burnout judgment value. The burnout judgment value shall be set with the percentage of the specified span width.
  Lower limit: -20.0 to -5.0 %
  Upper limit: 105 to 120 %
- Input external resistance:
  DC voltage, thermocouple input: 2 kΩ or below
  Resistance temperature detector input: 10 Ω or below in each wire (Same resistance in three wires)
- Input bias current: ±10 nA or less (when burnout function does not work)
- Measured current (for RTD): Approx. 1 mA
- Input resistance:
  10 MΩ or more for TC/DC voltage (1 V range or less) input
  Approx. 1 MΩ for DC voltage (2 V range or more)/standard signal input
  250 Ω (249.5 Ω typ) for DC mA
  * typ: Typical value (Typical)
- Allowable signal source resistance: 2 kΩ or less for TC/DC voltage (1 V range or less) input
- Effect of signal source resistance:
  ±10 μV/1kΩ or less for TC/DC voltage (1 V range or less) input
  ±0.15 %/1kΩ or less for DC voltage (2 V range or more)/standard signal input
- Allowable wiring resistance: Max. 10 Ω per line for RTD input (conductor resistance between the three lines shall be equal)
- Effect of wiring resistance: ±0.1°C/10 Ω for RTD input (conductor resistance between the three lines shall be equal)
- Allowable input voltage:
  ±10 V DC for TC/DC voltage (1 V range or less)/ RTD/DI input, DC mA
  ±60 V DC for DC voltage (2 V range or more) input
- Allowable input current (current scanner type):
  24 mA, 50/60 Hz, peak value including signal
- Noise reduction ratio

Integration time *1	Normal mode	Common mode
1.67 ms	50/60 Hz, no noise reduction	More than 80 dB *2 *4
More than 16.67 ms	More than 40 dB *2 *3	More than 120 dB *2 *4

*1 A frequency discrimination setting is made in the main unit.
*2 A resistance temperature detector range is a converted value of voltage when a measured current flows.
*3 50/60 Hz ± 0.1 %
*4 50/60 Hz ± 0.1%, 500 Ω imbalance, between minus measuring terminal and ground

- Normal mode voltage for TC/ DC voltage (1 V range or less)/DI (voltage): 1.2 times or less of rated range
  Standard signal 0.4 to 2 V range: 2.4 V
  Standard signal 1-5 V range: 6 V
  RTD (100 Ω): 50 mV peak
  RTD (50 Ω): 10 mV peak
  * 50/60Hz, The peak value including the signal.
- Normal mode current (current, scanner type): 24 mA DC (Value converted to voltage: 6V)
  * 50/60 Hz, The peak value including the signal.
- Maximum common mode voltage for measuring input: 30 V ACrms (50/60Hz) or 60 V DC (Maximum common mode noise voltage for measuring input: 250 V ACrms)
- Maximum voltage between measuring input channels: 30 V ACrms (50/60 Hz) or 60 V DC (Maximum common mode noise voltage between measuring input channels: 250 V ACrms (60 V ACrms for low-voltage relay type)
- Reference junction compensation accuracy:
  When measuring temperature greater than or equal to 0 °C and when input terminal temperature is balanced
  Type K, E, J, T, N, XK GOST: ±0.5 °C (23 °C ± 2 °C), ±0.7 °C (0 to 50 °C), ±1.0 °C (-20 to 60 °C)
  Type R, S, W, L, U, W97Re3-W75Re25, Platinel2, NiNiMo, W/WRe26, N(AWG14): ±1.0 °C (23 °C ± 2 °C), ±1.4 °C (0 to 50 °C), ±2.0 °C (-20 to 60 °C)
  Type KpvsAu7Fe: ±1.0 K (23 °C ±2 °C), ±1.4 K (0 to 50 °C), ±2.0 K (-20 to 60 °C)
  Type B, PR20-40: Internal reference compensation is fixed to 0°C
- Sampling interval/A/D integration time:
  10 ch. mode

Universal (-U2)*1 / Current scanner type (-C1)*1

Sampling interval	Integration time
100 ms/200 ms	1.67 ms
500 ms or more	16.67 ms/20 ms
1 s	36.67 ms
2 s or more	100 ms

Electromagnetic relay scanner type (-T1)

Sampling interval	Integration time
1 s or more	16.67 ms/20 ms
2 s	36.67 ms
5 s	100 ms

Scanner type (DCV/TC/DI, 400 VAC, 1min) (-L1)

Sampling interval	Integration time
500 ms or more	16.67 ms/20 ms
2 s	36.67 ms
5 s	100 ms

2 ch. mode*2

Sampling interval	Integration time
100 ms or more	16.67 ms/20 ms
1 s	36.67 ms
2 s or more	100 ms

*1 In 10ch mode, when the scan interval is set to 100 ms or 200 ms, the A/D integration time is fixed at 1.67 ms. This prevents power frequency noise from being eliminated, causing measured values to wobble.

*2 Cannot be specified for the electromagnetic relay scanner type (Type Suffix Code: -T1), Low withstand voltage relay type (Type Suffix Code: -L1).

- Calibration correction:
  Mode: Linearizer Approximation, Linearizer Bias
  Number of correcting points: 12
- Moving average function:
  Can be switched On/Off (Settable for each channel)
  Moving average number can be selected from 2 to 100 times
- Reference junction compensation:
  Mode: Can be switch internal or external (Settable for each channel)
  (Set the value of the compensation temperature at external)
- Input calculation:
  Linear scaling, square root, differential calculations (Settable for each channel)
- Bias function:
  Can be set the bias value to be added to the input value (Settable for each channel)
- Terminal type: M3 screw terminal or Clamp terminal
- Withstand voltage
  Universal, Solid state relay scanner type, Electromagnetic relay scanner type; between the input terminals and the internal circuit: 3000 V AC for one minute
  Between the analog input channels: 1000VAC for one minute
  Current, Scanner type; between the input terminals and the internal circuit: 1500 V AC for one minute
  Between the analog input channels: 1000 V AC for one minute (excluding b-terminal)
  Low withstand voltage type; between the input terminals and the internal circuit: 1500 V AC for one minute
  Between the analog input channels: 400 V AC for one minute (excluding b-terminal)
- Insulation resistance:
  Between the input terminals and the internal circuit: 20 MΩ or greater at 500 VDC
- Recommended replacement period of electromagnetic relay scanner type modules:
  Electromagnetic relay scanner type modules make measurements by switching mechanical contact relays on and off.
  To ensure that the modules continue to operate reliably and correctly, replace them
  Continuous use at measurement interval 1 s: 1 year
  Continuous use at measurement interval 2 s: 2 years
  Continuous use at measurement interval 5 s: 5 years

Safety and EMC Standards

- CSA: CSA22.2 No.61010-1, installation category II *1, pollution degree 2 *2, and CSA-C22.2 NO. 61010-2-030-12
- UL: UL61010-1, UL 61010-2-030 (CSA NRTL/C)
- CE:
  EMC directive
  EN61326-1 compliance, Class A Table 2
  EN61000-3-2 compliance
  EN61000-3-3 compliance
  EN55011 Class A Group 1
  Low voltage directive
  EN61010-1, EN 61010-2-030
  Installation category II *1
  Pollution degree 2 *2
  Measurement category II *3
- Maximum input voltage for measuring input: ± 60 V DC
- Maximum common mode noise voltage for measuring input: 30 V ACrms 50/60 Hz or 60 V DC (However, maximum common mode noise voltage for measuring input: 250 V AC)
- EMC Regulatory Arrangement in Australia and New Zealand (RCM): EN55011 compliance, Class A Group 1
- KC marking: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

*1 Installation category (overvoltage category) II:
Describes a number which defines a transient overvoltage condition.
Implies the regulation for impulse withstand voltage.
"II" applies to electrical equipment which is supplied from the fixed installation like a distribution board.

*2 Pollution degree 2:
Describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering.
"2" applies to normal indoor atmosphere.
Normally, only non-conductive pollution occurs.

*3 Measurement category II (CAT II):
Applies to measuring circuits connected to low voltage installation, and electrical instruments supplied with power from fixed equipment such as electric switchboards.

- WEEE Directive: Compliant

Construction

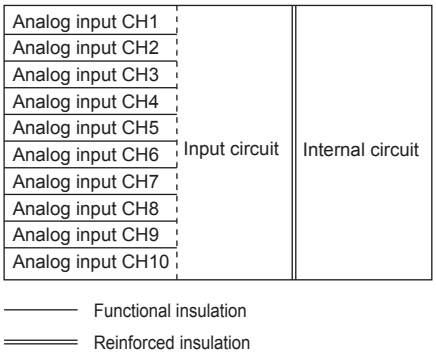
- Front panel (terminal): Water and dust-proof, Complies with IEC529-IP20
- Material: Polycarbonate
- Color;
  Front: Charcoal grey light (CC28)
  Bezel: Smoke blue (CC53)
- Dimensions: 45 mm(W) x 100 mm(H) x 133 mm(D) (D: including terminal cover)
- Weight: Approx. 0.3 kg

Power Supply

Suppy from GX/GP, GX60 expandable I/O, GM90PS power supply module.

- Power consumption:
  GX90XA-10-U2: 0.7 W or less
  GX90XA-10-T1: 0.9 W or less
  GX90XA-10-C1: 0.7 W or less
  GX90XA-10-L1: 0.7 W or less

Isolation



Terminal arrangements

M3 screw terminal

No.	Symbol	No.	Symbol	No.	Symbol
301	CH1(/b)*1	201	CH1(-/B)	101	CH1(+/A)
302	CH2(/b)*1	202	CH2(-/B)	102	CH2(+/A)
303	CH3(/b)*1	203	CH3(-/B)	103	CH3(+/A)
304	CH4(/b)*1	204	CH4(-/B)	104	CH4(+/A)
305	CH5(/b)*1	205	CH5(-/B)	105	CH5(+/A)
306	CH6(/b)*1	206	CH6(-/B)	106	CH6(+/A)
307	CH7(/b)*1	207	CH7(-/B)	107	CH7(+/A)
308	CH8(/b)*1	208	CH8(-/B)	108	CH8(+/A)
309	CH9(/b)*1	209	CH9(-/B)	109	CH9(+/A)
310	CH10(/b)*1	210	CH10(-/B)	110	CH10(+/A)

*1 "NC" (Not connected) for the electromagnetic relay scanner type, the low withstand voltage type, and the current scanner type.

* RTD input terminal b is shorted internally across all channels.

Clamp terminal

No.	Symbol	No.	Symbol
201	CH2(+/A)	101	CH1(+/A)
202	CH2(-/B)	102	CH1(-/B)
203	CH2(/b) *1	103	CH1(/b) *1
204	CH4(+/A)	104	CH3(+/A)
205	CH4(-/B)	105	CH3(-/B)
206	CH4(/b) *1	106	CH3(/b) *1
207	CH6(+/A)	107	CH5(+/A)
208	CH6(-/B)	108	CH5(-/B)
209	CH6(/b) *1	109	CH5(/b) *1
210	CH8(+/A)	110	CH7(+/A)
211	CH8(-/B)	111	CH7(-/B)
212	CH8(/b) *1	112	CH7(/b) *1
213	CH10(+/A)	113	CH9(+/A)
214	CH10(-/B)	114	CH9(-/B)
215	CH10(/b) *1	115	CH9(/b) *1

*1 "NC" (Not connected) for the electromagnetic relay scanner type, the low withstand voltage relay type, and the current scanner type.

* RTD input terminal b is shorted internally across all channels.

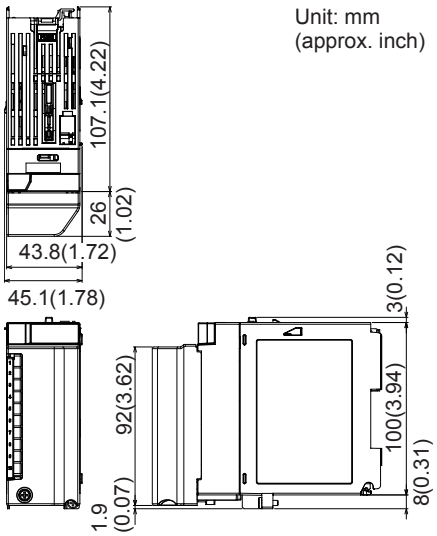
A/D Calibration Value

Two types of A/D calibration values (factory shipment setting and user setting) can be saved. If the user setting is not proper, it can be restored to the calibration value at factory shipment.

External Dimensions

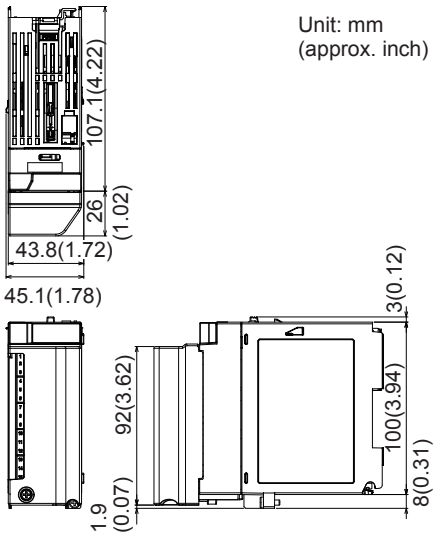
M3 screw terminal

Unit: mm
(approx. inch)



Clamp terminal

Unit: mm
(approx. inch)



Normal Operating Conditions

For normal operating conditions of this module, please refer to the General Specifications of the device (GX/GP, I/O Base Unit, or GM) that this module is mounted.
GX Specifications: GS 04L51B01-01EN
GP Specifications; GS 04L52B01-01EN
I/O Base Unit (Expandable I/O): This General Specifications
GM Specifications: GS 04L55B01-01EN

Transport and Storage Conditions

- Ambient temperature: –25 to 70°C
- Ambient humidity: 5 to 95 %RH (no condensation)
- Vibration: 10 to 60 Hz, 4.9 m/s^2 maximum
- Shock: 392 m/s^2 maximum (in packaged condition)

Effects of Operating Conditions

- Influence of ambient temperature: variation against a change of 10 °C at an accumulation time of 16.67 ms or more ± (0.05% of rdg + 0.05% of range) or below.
  (In case of current scanner type, ± (0.075% of rdg + 0.05% of range) or below.)
  KpvsAu7Fe, PR20-40: ±(0.05% of rdg + 0.1%) or below, Cu10Ω: ±(0.2% of rdg + 0.1 °C) or below
  No reference contact accuracy is guaranteed.
- Influence of power supply voltage variation: Accuracy is satisfied in the range of rated power supply voltage.
- Influence of external magnetic field: Variations against an AC external magnetic field (50/60 Hz, 400 A/m) are ±(0.1% of rdg+ 0 .1%) or below.

DIGITAL INPUT MODULE (Model GX90XD or GX/GP main unit options /CRx1)

GX90XD

- Application: Remote control input, pulse input*1, etc
- Number of inputs: 16
- input type: DI, pulse*1
- Measurement interval: 100 ms (shortest)
- Input type: Open collector or Voltage-free contact
- Insulation type: Photocoupler, Trance (power supply)
- Contact rating: 12 V DC, 20 mA or more
- Input resistance: Approx. 1 kΩ
- Allowable input voltage: 10 V
- ON/OFF detection
  Open collector contact input:
  Voltage in ON state: 0.5 V DC or less
  Leakage current in OFF state: 0.5 mA or less
  Voltage-free contact input:
  Contact resistance in ON state: 200 Ω or less
  Contact resistance in OFF state: 50 kΩ or more
- Number of common: 2 (1 point/8 channels)
- Terminal type: M3 screw terminal or Clamp terminal
  (In case of Options /CRx1, a digital input module has M3 screw terminals.)
- Withstand voltage
  Between the input terminals and the internal circuit: 1500 V AC for one minute
- Insulation resistance:
  Between the input terminals and the internal circuit: 20 MΩ or greater at 500 VDC

[Pulse input specifications]*1

- Counting system: The rising edge (OFF to ON) of the pulse is counted.
- Max. pulse period: 250 Hz
- Min. detection pulse width: Low (close), High (open), both is 2 ms or more
- Pulse detection period: 1 ms
- Pulse measuring accuracy: ±1 pulse
- Pulse count interval: mesurement interval
- Filter: The chattering filter can be switched On/Off.

*1 The pulse input is only for SMARTDAC+ GM. MATH function (optional code /MT) is required.

Safety and EMC Standards

- CSA: CSA22.2 No.61010-1, installation category II (*1), pollution degree 2 (*2)
- UL: UL61010-1 (CSA NRTL/C)
- CE:
  EMC directive
  EN61326-1 compliance, Class A Table 2
  EN61000-3-2 compliance
  EN61000-3-3 compliance
  EN55011 Class A Group 1
  Low voltage directive
  EN61010-1
  Installation category II (*1)
  Pollution degree 2 (*2)
  Not included in the measurement category
- EMC Regulatory Arrangement in Australia and New Zealand (RCM): EN55011 compliance, Class A Group 1
- KC marking: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

*1 Installation category (overvoltage category) II: Describes a number which defines a transient overvoltage condition.
Implies the regulation for impulse withstand voltage.
"II" applies to electrical equipment which is supplied from the fixed installation like a distribution board.

*2 Pollution degree 2:
Describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering.
"2" applies to normal indoor atmosphere.
Normally, only non-conductive pollution occurs.

- WEEE Directive: Compliant

Construction

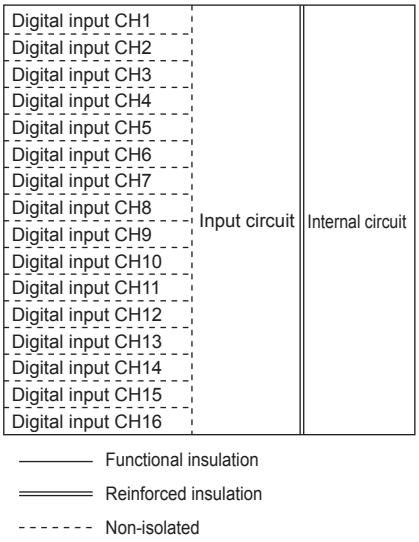
- Front panel (terminal): Water and dust-proof, Complies with IEC529-IP20
- Material: Polycarbonate
- Color;
  Front: Charcoal grey light (CC28)
  Bezel: Smoke blue (CC53)
- Dimensions: 45 mm(W) x 100 mm(H) x 133 mm(D) (D: including terminal cover)
- Weight: Approx. 0.3 kg

Power Supply

Suppy from GX/GP, GX60 expandable I/O, GM90PS power supply module.

- Power consumption: 0.7W or less

Isolation



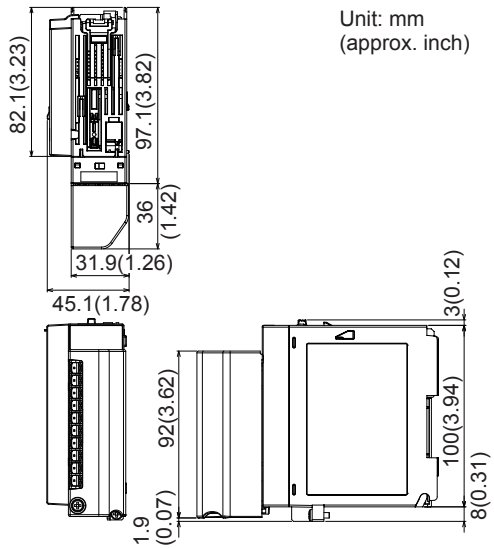
Terminal arrangements

M3 screw terminal/Clamp terminal

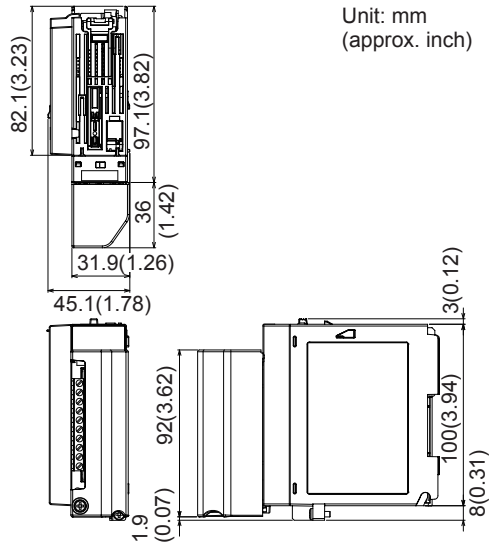
No.	Symbol	No.	Symbol
21	DI9	11	DI1
22	DI10	12	DI2
23	DI11	13	DI3
24	DI12	14	DI4
25	DI13	15	DI5
26	DI14	16	DI6
27	DI15	17	DI7
28	DI16	18	DI8
29	COM	19	COM
30	-	20	-

External Dimensions

M3 screw terminal



Clamp terminal



Normal Operating Conditions

For normal operating conditions of this module, please refer to the General Specifications of the device (GX/GP, I/O Base Unit, or GM) that this module is mounted.
GX Specifications: GS 04L51B01-01EN
GP Specifications; GS 04L52B01-01EN
I/O Base Unit (Expandable I/O): This General Specifications
GM Specifications: GS 04L55B01-01EN

Transport and Storage Conditions

Same as the GX90XA.

DIGITAL OUTPUT MODULE (Model GX90YD, or GX/GP main unit options /CR1x, /CR2x, /CR4x)

GX90YD

- Application: Alarm output, etc
- Number of outputs: 6
- Output update interval: 100 ms (shortest)
- Output type: Relay contact output, SPDT (NO-C-NC)
- Insulation type: Mechanical
- Rated load voltage: 30 V DC or 250 V AC or less
- Max. load current: 3 A (DC)/3 A (AC), resistance load, each channel
- Min. load voltage/current: 5 V DC/10mA
- Recommended replacement periods of contact:
  Mechanical 5,000,000 more ON-OFF operations
  Electrical 30,000 more ON-OFF operations (250 V AC 3 A or 30 V DC 3 A, resistance load)
- Number of common: 6
- Power supply: Not necessary
- Terminal type: M3 screw terminal
- Withstand voltage
  Between the output terminals and the internal circuit: 3000 V AC for one minute
- Insulation resistance:
  Between the output terminals and the internal circuit: 20 MΩ or greater at 500 VDC

Safety and EMC Standards

- Safety and EMC Standards: Same as the digital input module
- WEEE Directive: Compliant

Construction

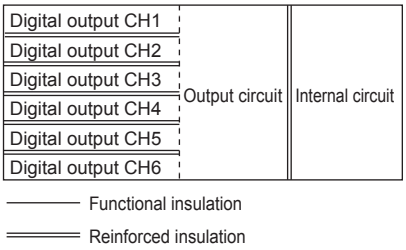
- Front panel (terminal): Water and dust-proof, Complies with IEC529-IP20
- Material: Polycarbonate
- Color;
  Front: Charcoal grey light (CC28)
  Bezel: Smoke blue (CC53)
- Dimensions: 45 mm(W) x 100 mm(H) x 133 mm(D) (D: including terminal cover)
- Weight: Approx. 0.3 kg

Power Supply

Suppy from GX/GP, GX60 expandable I/O, GM90PS power supply module.

- Power consumption: 1.4 W or less

Isolation



Terminal arrangements

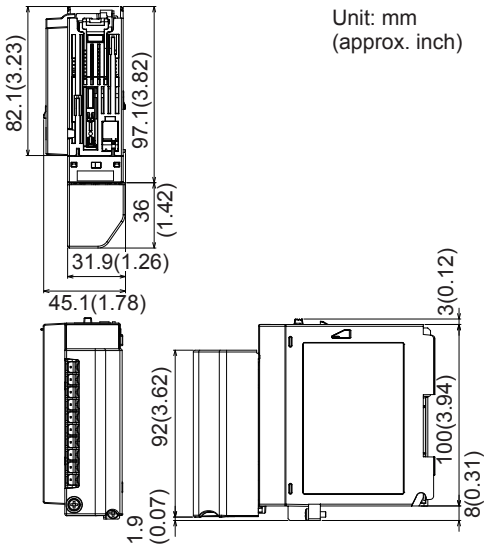
M3 screw terminal

No.	Symbol	No.	Symbol
21	DO4 N.C.	11	DO1 N.C.
22	DO4 COM	12	DO1 COM
23	DO4 N.O.	13	DO1 N.O.
24	DO5 N.C.	14	DO2 N.C.
25	DO5 COM	15	DO2 COM
26	DO5 N.O.	16	DO2 N.O.
27	DO6 N.C.	17	DO3 N.C.
28	DO6 COM	18	DO3 COM
29	DO6 N.O.	19	DO3 N.O.
30	-	20	-

External Dimensions

M3 screw terminal

Unit: mm
(approx. inch)



Normal Operating Conditions

For normal operating conditions of this module, please refer to the General Specifications of the device (GX/GP, I/O Base Unit, or GM) that this module is mounted. However, excluding the shock at energization.
GX Specifications: GS 04L51B01-01EN
GP Specifications; GS 04L52B01-01EN
I/O Base Unit (Expandable I/O): This General Specifications
GM Specifications: GS 04L55B01-01EN

Transport and Storage Conditions

Same as the GX90XA.

DIGITAL INPUT/OUTPUT MODULE (Model GX90WD)

GX90WD

Digital input/output module can be used one module on GX/GP main unit, Expandable I/O, GM main unit, and GM sub unit.

Digital Input Specifications

- Application: Remote control input, pulse input*1, etc
- Number of inputs: 8
- input type: DI, pulse*1
- Measurement interval: 100 ms (shortest)
- Input type: Open collector or Voltage-free contact
- Insulation type: Photocoupler, Trance (power supply)
- Contact rating: Use an external contact of 12 VDC and 20 mA or more.
- Input resistance: Approx. 2.4 kΩ
- Allowable input voltage: 10 V
- ON/OFF detection
  Open collector contact input:
  Voltage in ON state: 0.5 V DC or less
  Leakage current in OFF state: 0.5 mA or less
  Voltage-free contact input:
  Contact resistance in ON state: 200 Ω or less
  Contact resistance in OFF state: 50 kΩ or more
- Number of common: 1 (1 point/8 channels)
- Terminal type: M3 screw terminal
- Withstand voltage
  Between the input terminals and the internal circuit: 1500 V AC for one minute
- Insulation resistance:
  Between the input terminals and the internal circuit: 20 MΩ or greater at 500 VDC

[Pulse input specifications]*1

- Counting system: The rising edge (OFF to ON) of the pulse is counted.
- Max. pulse period: 250 Hz
- Min. detection pulse width: Low (close), High (open), both is 2 ms or more
- Pulse detection period: 1 ms
- Pulse measuring accuracy: ±1 pulse
- Pulse count interval: mesurement interval
- Filter: The chattering filter can be switched On/Off.

*1 The pulse input is only for SMARTDAC+ GM. MATH function (optional code /MT) is required.

Digital Output Specifications

- Application: Alarm output, etc
- Number of outputs: 6
- Output update interval: 100 ms (shortest)
- Output type: Relay contact output, SPDT (NO-C-NC)
- Insulation type: Mechanical
- Rated load voltage:
  Max. 150 VAC when connected to the main circuit (primary power source), Max. 250 VAC when connected to a circuit (secondary power source) derived from the main circuit, or Max. 30 V DC
- Max. load current: 2 A (DC)/2 A (AC), resistance load, each channel
- Min. load voltage/current: 5 V DC/10 mA
- Recommended replacement periods of contact:
  Mechanical 5,000,000 more ON-OFF operations
  Electrical 30,000 more ON-OFF operations (250 V AC 2 A or 30 V DC 2 A, resistance load)
- Number of common: 6 (All-contact independent)
- Terminal type: M3 screw terminal
- Withstand voltage
  Between the output terminals and the internal circuit: 2700 V AC for one minute
- Insulation resistance:
  Between the output terminals and the internal circuit: 20 MΩ or greater at 500 VDC

Safety and EMC Standards

- Safety and EMC Standards: Same as the digital input module
- WEEE Directive: Compliant

Construction

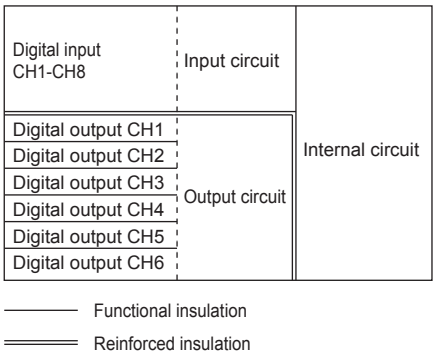
- Front panel (terminal): Water and dust-proof, Complies with IEC529-IP20
- Material: Polycarbonate
- Color;
  Front: Charcoal grey light (CC28)
  Bezel: Smoke blue (CC53)
- Dimensions: 45 mm(W) x 100 mm(H) x 133 mm(D) (D: including terminal cover)
- Weight: Approx. 0.3 kg

Power Supply

Suppy from GX/GP, GX60 expandable I/O, GM90PS power supply module.

- Power consumption: 1.6 W or less

Isolation



Terminal arrangements

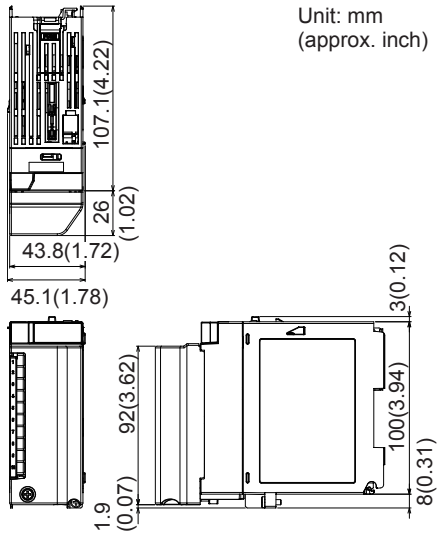
M3 screw terminal

No.	Symbol	No.	Symbol	No.	Symbol
301	DI3	201	DI2	101	DI1
302	DI6	202	DI5	102	DI4
303	DI COM	203	DI8	103	DI7
304	NC	204	NC	104	NC
305	DO1 N.O.	205	DO1 COM	105	DO1 N.C.
306	DO2 N.O.	206	DO2 COM	106	DO2 N.C.
307	DO3 N.O.	207	DO2 COM	107	DO3 N.C.
308	DO4 N.O.	208	DO4 COM	108	DO4 N.C.
309	DO5 N.O.	209	DO5 COM	109	DO5 N.C.
310	DO6 N.O.	210	DO6 COM	110	DO6 N.C.

External Dimensions

M3 screw terminal

Unit: mm
(approx. inch)



Normal Operating Conditions

For normal operating conditions of this module, please refer to the General Specifications of the device (GX/GP, I/O Base Unit, or GM) that this module is mounted. However, excluding the shock at energization.
GX Specifications: GS 04L51B01-01EN
GP Specifications; GS 04L52B01-01EN
I/O Base Unit (Expandable I/O): This General Specifications
GM Specifications: GS 04L55B01-01EN

Transport and Storage Conditions

Same as the GX90XA.

■ MODEL AND SUFFIX CODES

Analog input module, Digital I/O module (sold separately):

MODEL and SUFFIX Code (GX90XA)

Model	Suffix Code					Description
GX90XA						Analog Input Module
Number of channels	**-10**					10 channels
Type		**-C1**				Current, scanner type (isolated between channels)
		-L1				DCV/TC/DI, low withstand voltage scanner type (isolated between channels)
		-U2				Universal, Solid state relay scanner type (3-wire RTD b-terminal common)
		-T1				DCV/TC/DI, Electromagnetic relay scanner type (Isolated between channels)
-			**N**			Always N
Terminal form				**-3**		Screw terminal (M3)
				-C		Clamp terminal
Area					**N**	General

MODEL and SUFFIX Code (GX90XD)

Model	Suffix Code					Description
GX90XD						Digital Input Module
Number of channels	**-16**					16 channels
Type		**-11**				Open collector/Non-voltage, contact (shared common), Rated 5 VDC
-			**N**			Always N
Terminal form				**-3**		Screw terminal (M3)
				-C		Clamp terminal
Area					**N**	General

MODEL and SUFFIX Code (GX90YD)

Model	Suffix Code					Description
GX90YD						Digital Output Module
Number of channels	**-06**					6 channels
Type		**-11**				Relay, SPDT(NO-C-NC)
-			**N**			Always N
Terminal form				**-3**		Screw terminal (M3)
Area					**N**	General

MODEL and SUFFIX Code (GX90WD)

Model	Suffix Code					Description
GX90WD						Digital Iutput/Output Module
Number of channels	**-0806**					8 channel DIs, 6 channel DOs
Type		**-01**				Open collector/non-voltage contact (shared common), rated 5 VDC; Relay, SPDT (NO-C-NC)
-			**N**			Always N
Terminal form				**-3**		Screw terminal (M3)
Area					**N**	General

■ Optional Accessories (Sold Separately)

Product	Model/part no.
Shunt resister for M3 terminal (10 Ω ± 0.1 %)	X010-010-3
Shunt resister for M3 terminal (100 Ω ± 0.1 %)	X010-100-3
Shunt resister for M3 terminal (250 Ω ± 0.1 %)	X010-250-3
Shunt resister for Clamp terminal (10 Ω ± 0.1 %)	438922
Shunt resister for Clamp terminal (100 Ω ± 0.1 %)	438921
Shunt resister for Clamp terminal (250 Ω ± 0.1 %)	438920

Calibration certificate (sold separately)
When ordering the GX10/GX20/GP10/GP20 with options (analog input), the calibration certificate for the modules is included in and shipped with the calibration certificate of the main unit.

When ordering an analog input module, each module gets its own calibration certificate (one certificate per module).

Test certificate (QIC, sold separately)
When ordering the GX10/GX20/GP10/GP20 with options (analog/digial I/O), the QIC for each module is included in and shipped with the QIC of the main unit.

When ordering analog input modules and digital I/O modules, each module gets its own QIC (one QIC per module).

User's Manual
Product user's manuals can be downloaded or viewed at the following URL. To view the user's manual, you need to use Adobe Reader 7 or later by Adobe Systems.

URL: www.smartdacplus.com/manual/en/

Product Purchase Specifications

- The GX10/GX20/GP10/GP20 is composed of the main unit, I/O modules, the expandable I/O, and the expansion module.
  There are two ways to purchase I/O modules.
  One way is to purchase them individually by specifying models GX90XA, GX90XD, GX90YD, and GX90WD.
  The other way is to purchase them as an option (/UCxx or /USxx). Purchasing them as an option is convenient, but this places limitations on the number of analog inputs that you can obtain.
  If you want to use more than 51 channels, please purchase the I/O modules individually.
- The GM is composed of the data aquisition module, the power supply module, the module base, the I/O module, and the expansion module.
  Please purchase the modules and module base individually.

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