Data Acquisition System **GM**

SMARTDAC+®

Data Acquisition & Control

Bulletin 04L55B01-01EN

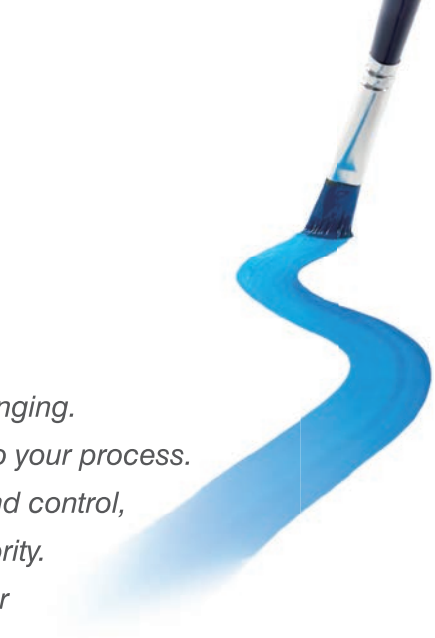
www.smartdacplus.com

vigilantplant.®
The clear path to operational excellence

YOKOGAWA

SMARTDAC+®

Data Acquisition & Control



Your business environment is complex and rapidly changing.
You need smart and powerful systems that can adapt to your process.
***SMARTDACPLUS**® is a fresh approach to data acquisition and control,*
with smart and simple touch operation as a design priority.
Measure, display and archive process data with greater
levels of clarity, intelligence and accessibility.
*The **SMARTDACPLUS**® concept started with the GX/GP,*
an integrated I/O and recording system
with a familiar touch operator interface.
*Building upon the **SMARTDACPLUS**® product family is*
the highly adaptable, scalable and easy to
operate GM data logger.

Now that's SMART.

Precise, Reliable &

Decades of Yokogawa's innovative measuring technology has resulted in a flexible data logger that offers both reliability and ease of use.

Scalability
- Up to 420 ch per system
- Plug and lock modules

Ease of Use
- Web-based configuration
- Live Web-based data viewing

Mobile Connectivity
- Bluetooth
- Mobile Application

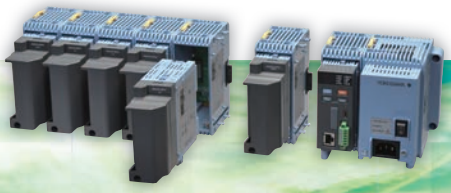
Reliability
- Secure data storage
- High accuracy measurement
- Automatic backfill function (GA10 Data Logging Software)

Noise Tolerance
- Electromagnetic relay module

Adaptable

Enables a scalable data acquisition system

Smart Architecture



Provides a smooth, familiar user experience

Smart User Interface

Offers a seamless data transfer environment

Smart Functionality

Smart Architecture

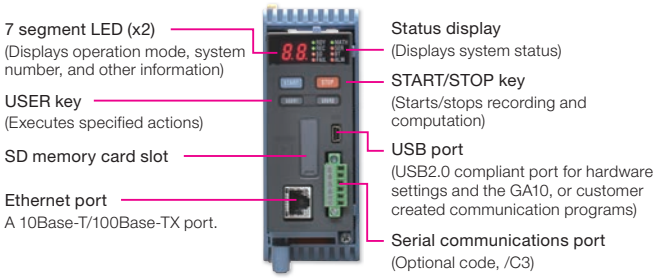
Enables a scalable data acquisition system

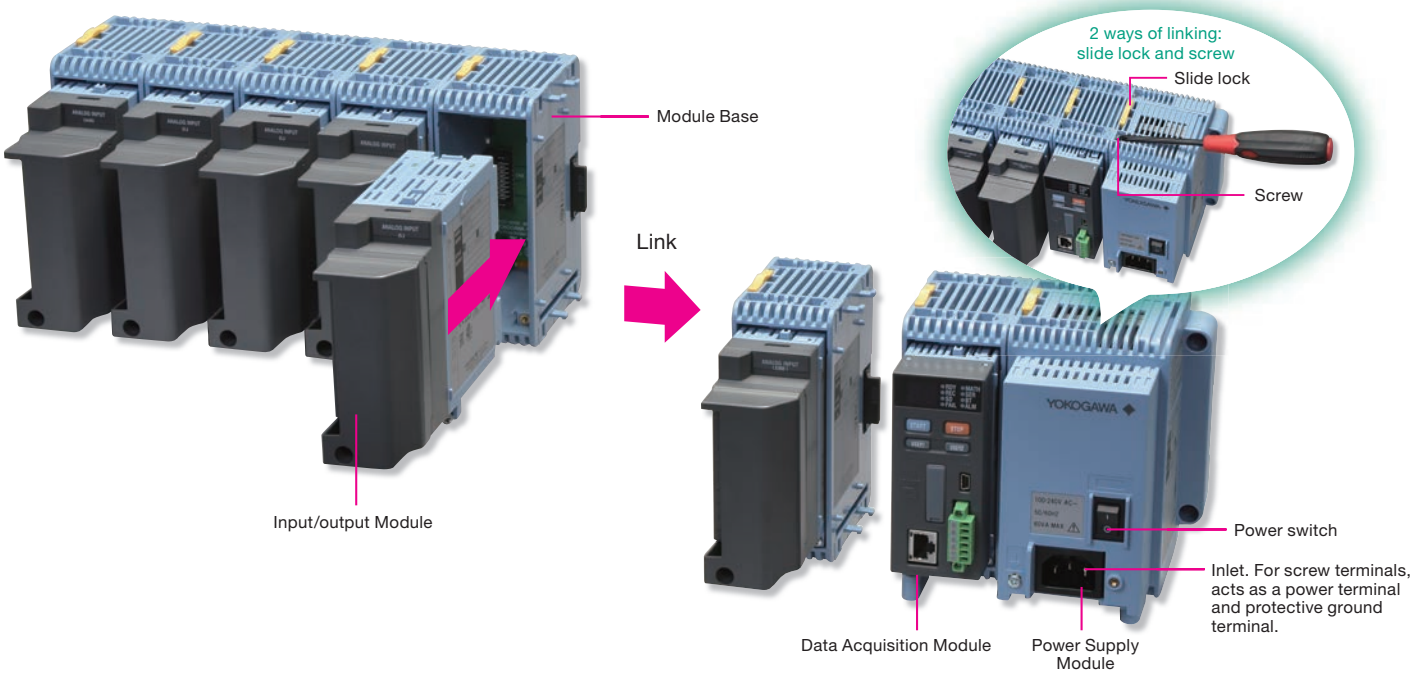
Increase channels by adding additional block modules

YOKOGAWA proprietary block architecture (patent pending)

- Expand one, or multiple module at a time
- Unique design houses modules in linked module bases
- Module base ensures linkage (slide locks and mounting screws also available)
- Modules can be inserted and removed from the front panel for easy maintenance

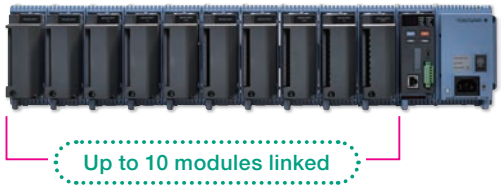
Names of data acquisition module parts





Comes standard with support for up to 100 ch of measurement (single-unit configuration)

Up to 10 I/O modules can be linked to a single data acquisition module (GM10)

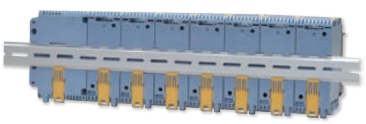


Installs anywhere

For the desktop, DIN rails, or wall-mounting.
No special attachments required.

Desktop

Mounted on DIN rails



Wall-mounted

Select from a wide range of I/O modules

Select modules according to your application.
Noise-resistant, magnetic relay types also available.
All modules have removable terminal blocks for easy wiring.
The same modules used in the SMARTDAC+ series.

Input/output terminals are removable.
Cuts down on rewiring time.

SMARTDAC+ series

Model	Name	Measurement/Application	Channels
GX90XA-10-U2	Analog input module	DC voltage, thermocouple, RTD, contact (semiconductor relay scanner type)	10
GX90XA-10-L1		DC voltage, thermocouple, contact (low withstand voltage)	10
GX90XA-10-T1		DC voltage, thermocouple, contact (electromagnetic relay scanner type)	10
GX90XA-10-C1		DC current (mA)	10
GX90XD	Digital input module	Remote control input, operation recording, or pulse input	16
GX90YD	Digital output module	Alarm output	6
GX90WD	Digital input/output module	Remote control input, operation recording or pulse input/ alarm output	DI:8/DO:6

Analog input module scan interval and measurement type

Type	Channels	Scan interval (shortest)	Scanner	TC	RTD	DCV	DI	mA	Use
Universal (-U2)	10	100ms	SSR	✓	✓	✓	✓		Universal
Low withstand voltage relay (-L1)	10	500ms	SSR	✓		✓	✓		Mid-price
Electromagnetic relay (-T1)	10	1s	Relay	✓		✓	✓		Noise-resistance
DC current input (-C1)	10	100ms	SSR					✓	mA only

✓: Available

Internal memory and max. I/O channels

Type	Internal memory	Max. input/output channels	
GM10-1	500MB	Single-unit configuration	0 to 100
		Multi-unit configuration	0 to 100
GM10-2	1.2GB	Single-unit configuration	0 to 100
		Multi-unit configuration	0 to 420

Actual values support high precision measurement

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

The measuring accuracies noted in the general specifications on page 11 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 listed to the left.

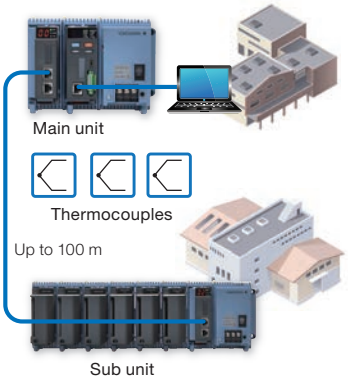
* General operating conditions: 23±2 °C, 55±10% RH, supply voltage 90–132, 180–264 VAC, supply frequency within 50/60 Hz ±1%, warm-up of 30 minutes or more, no vibrations or other hindrances to performance.

Support measurement of up to 420 ch (actual input) by expanding channels across multiple units (multi-unit configuration)

Expand up to 420 ch by using the GX90EX expansion module. (GM10-2)
On the GM10-2 large capacity type, up to 1000 ch are available for recording when including MATH and communication channels.
Connect units with Ethernet cables for dispersed installations.

Reduce wiring with distributed installation

When the data logger is installed offsite (away from the DUT), you can place the sub unit at the site and monitor data without the need for long-distance wiring of thermocouples and other sensors.



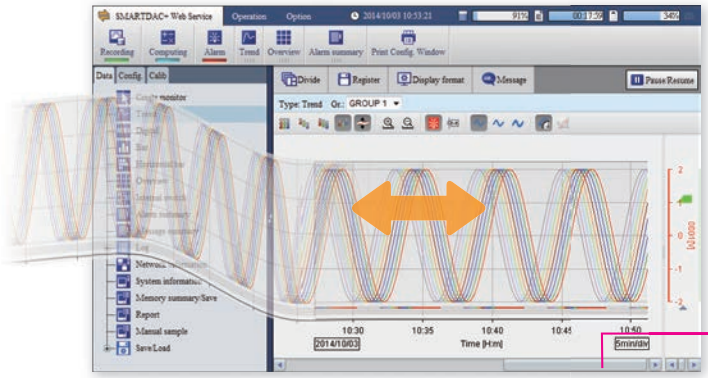
Smart User Interface

Provides a smooth, familiar user experience

Easy access from a Web browser

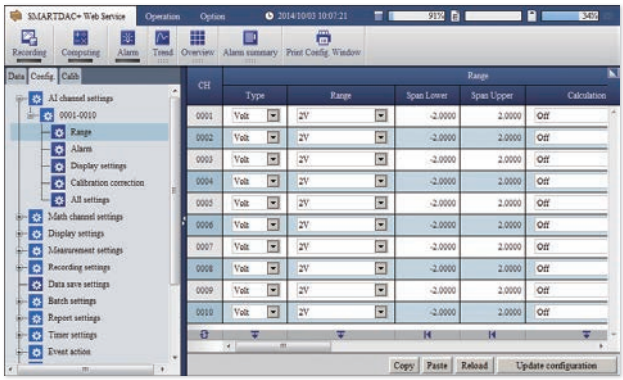
Through a Web browser you can monitor the GM in real time and change settings.
You can easily build a seamless, low-cost remote monitoring system with no additional software.

Real time monitoring screen

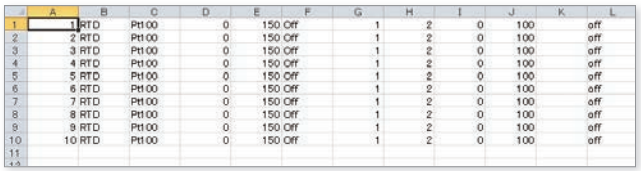


With the scroll bar, you can seamlessly scroll between past and current trends.

Enter settings online with a web browser

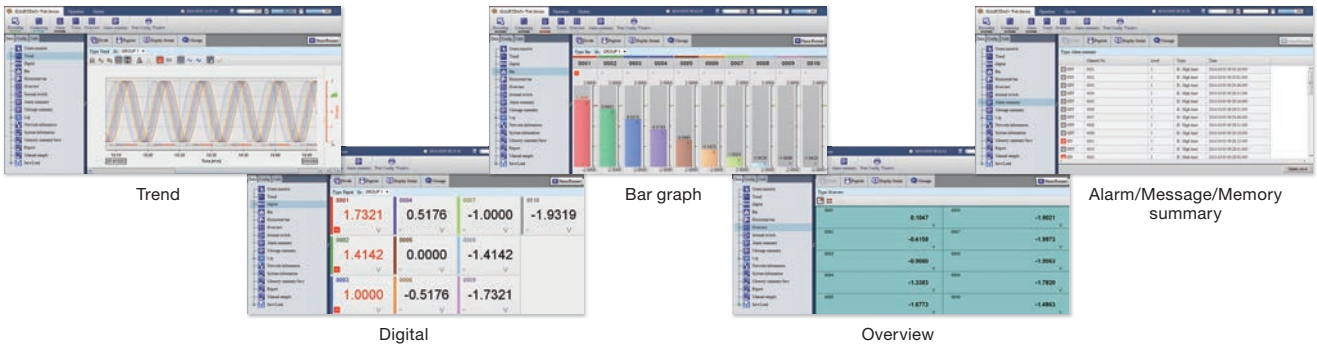


The setting screen lets you copy AI channel settings and other information to Excel for editing.
You can reimport the data into the setting screen after editing.



	A	B	C	D	E	F	G	H	I	J	K	L
1	1	RTD	Pt100	0	150	Off	1	2	0	100		off
2	2	RTD	Pt100	0	150	Off	1	2	0	100		off
3	3	RTD	Pt100	0	150	Off	1	2	0	100		off
4	4	RTD	Pt100	0	150	Off	1	2	0	100		off
5	5	RTD	Pt100	0	150	Off	1	2	0	100		off
6	6	RTD	Pt100	0	150	Off	1	2	0	100		off
7	7	RTD	Pt100	0	150	Off	1	2	0	100		off
8	8	RTD	Pt100	0	150	Off	1	2	0	100		off
9	9	RTD	Pt100	0	150	Off	1	2	0	100		off
10	10	RTD	Pt100	0	150	Off	1	2	0	100		off
11												

Trend, digital, and other real-time displays



Trend

Bar graph

Alarm/Message/Memory summary

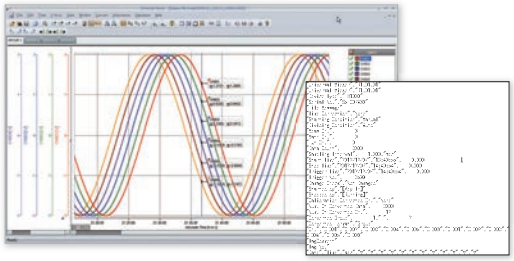
Digital

Overview

Dedicated software (free download) is available for loading waveforms and GM settings

Universal viewer

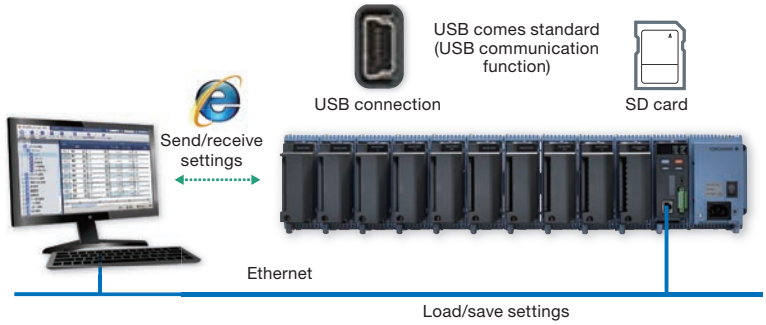
Data files saved on the GM can be viewed and printed.
You can perform statistical computation over an area and export to ASCII, Excel, or other formats.



Data converted to an ASCII file

Offline setting software

Save settings or transfer them to the GM.
Connections can also be made easily via USB or Bluetooth.



Monitoring and settings can also be done on a tablet

Supports Bluetooth (optional code /C8)
You can enter settings or monitor from a tablet without ever bringing a PC to the site.

Dedicated applications will be available for free download. For more information, visit our website.

Safe to use in a wide range of temperatures

With operating temperatures of -20°C–60°C, it supports a wide range of applications without concern about the installation enviroment.

Environmental testing

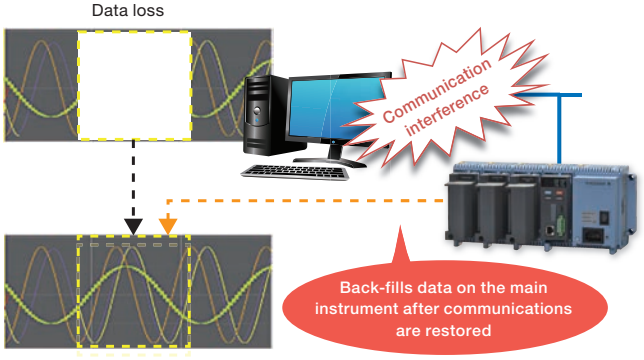
GA10 data logging software (sold separately)

Dedicated software available for powerful system configuration possibilities.
Acquires data from mutliple instruments including SMARTDAC+ GM

- Max. 100 devices
- 100 ms high-speed acquisition
- Max. 2000 channels (tags)

High reliability

- Auto reconnection when communications are lost, protection of data les up to the moment of power failure
- Data supplementing function (Backfill function)



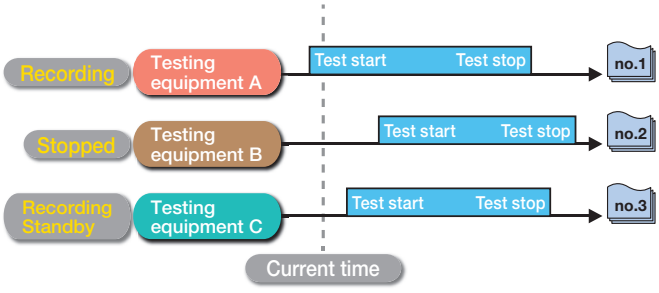
- Server OS support

Enables construction of highly reliable systems that hold up under continuous operation

Windows Server 2008
Windows Server 2012

Multilogging

Muldilogging function enables multiple asynchronous data acquisition jobs.



Results: Manage data from multiple equipment in one place!

Smart Functionality

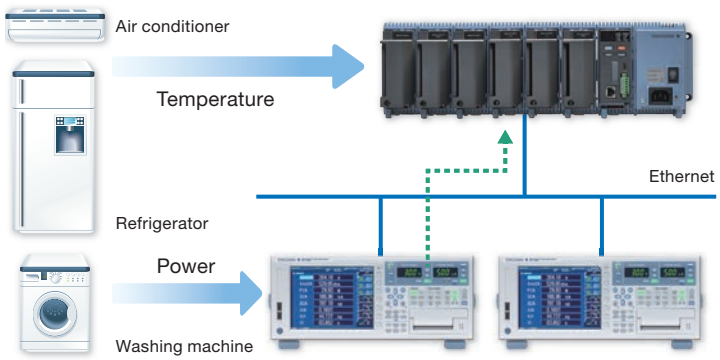
Offers a seamless data transfer environment

Data acquisition on power measuring instruments (optional codes /E2 and /MC)

Acquire precise digital data on the GM by digital communication connectivity to a power measuring instrument (WT series power analyzers) and record it along with the GM's measured data.
Since it records a device's power consumption, temperature, and other phenomena at the same time, the GM is ideal for performance evaluation testing.

Models that can be connected
Yokogawa Meters & Instruments Corp. WT300/WT500/WT1800

Max. no. of connections
16



Comes with communication functions that are compatible with the DARWIN data acquisition unit

The GM supports DARWIN communication commands.
Use your current DARWIN communication programs as-is on the GM.
It's easy to switch from an existing DARWIN unit.

* See your dealer or nearest Yokogawa representative for details.

CENTUM/STARDOM communciation package
CENTUM: LFS2432, DARWIN/DAQSTATION Communication package (for ALE111 [Ethernet])
STARDOM: NT365AJ DARWIN connection package

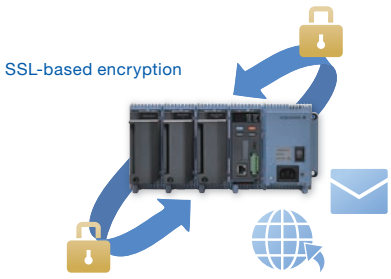
Variety of convenient networking functions

Supports a wide range of networking functions

- Automatic network setup via DHCP
- SNTP based time synchronization
- Email transmission

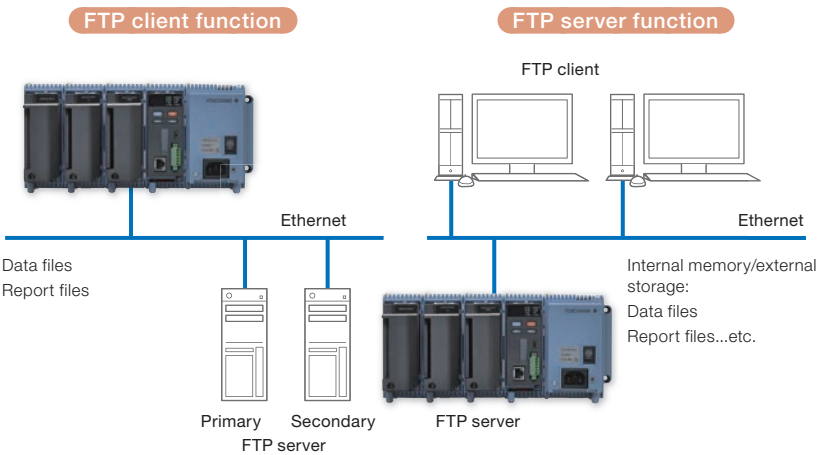
Increased network security with SSL communication

Safely sends and receives customer data.



FTP-based file transfer

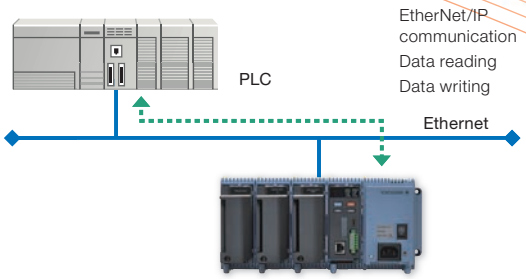
The FTP client/server functions allow you to easily share and manage data from a centralized file server



EtherNet/IP Function

GM supports EtherNet/IP server functions.
You can access GM from PLCs or other devices and load measurement/MATH channels or write to communication input channels*.

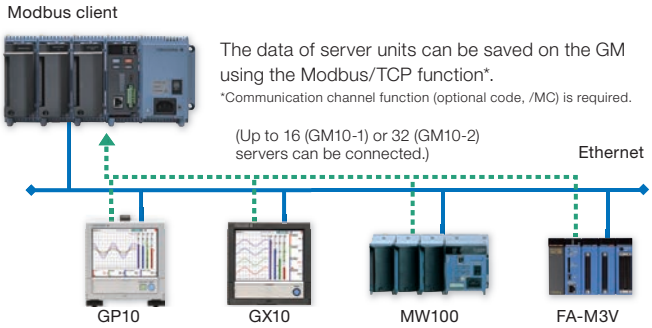
* Communication channel function (optional code, /MC) is required.



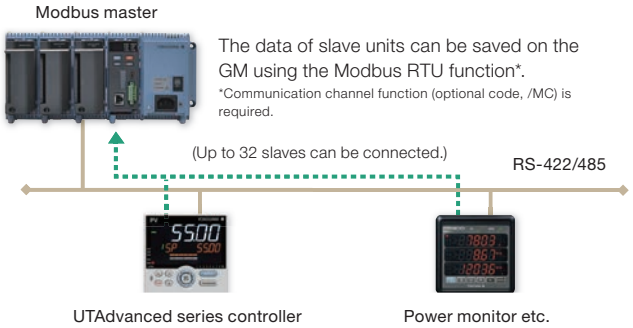
Modbus/TCP and Modbus/RTU Communications

GM supports Modbus TCP/IP client and server modes for Ethernet communications and Modbus RTU master and slave modes for optional serial communications.

Modbus TCP (Ethernet connection)



Modbus RTU (RS-422/485 connection)



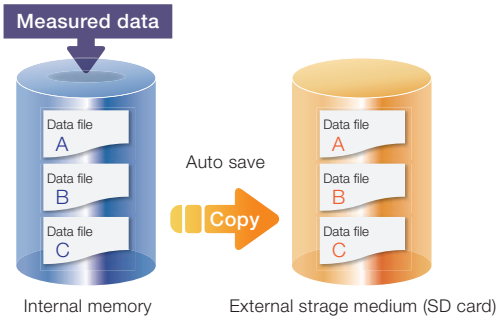
Be confident that recorded data is saved

Supports long-duration and multichannel recording. Measured data is always stored to internal memory, and data is transferred to external storage media at regular intervals. Redundancy can be achieved by sending data to a server with the FTP client function. Securely saves measured data even in the event of a sudden power loss.

Approximate sample time

Number of recording channels	Total sample time
30	Approx. 71 days
100	Approx. 23 days
300	Approx. 7 days

With an internal memory of 1.2 GB and recording interval of 1 sec.



Measured data file type

You can save measured data to editable text files, or to binary files for added security.

Report template function (optional code /MT)

This function automatically creates spreadsheets in PDF or Excel format.

Excel spreadsheet template
PDF spreadsheet template

Spreadsheets generated from PDF spreadsheet templates can be automatically output from the GM to a printer through a PC.

Spreadsheets are created according to the template loaded on the main unit. Templates are available for Excel and PDF. PDF spreadsheet templates are created with a free report template builder program.

Automatically generated spreadsheets (PDF or Excel) are saved to external strage medium (SD card) at regular intervals. You can also transfer them via FTP.

Supports 21 CFR Part 11 (pending; with added specs)

GM supports the USA FDA's Title 21 CFR Part 11 regulation.

FDA 21 CFR PART 11

Specifications

For detailed specs, see the general specifications
(data acquisition module/power supply module/module base: GS 04L55B01-01EN, expansion unit/expansion modules: GS 04L53B00-01EN, I/O modules: GS 04L53B01-01EN).

GM10 Data Acquisition Module

No. of I/O channels:	GM10-1: 100 max. GM10-2: 500 max. (or 420 with AI only)
Scan interval:	100/200/500 ms/1/2/5 s * Some intervals not available depending on system configuration and modules.
Internal memory (flash memory):	GM10-1: 500 MB GM10-2: 1.2 GB
External storage media:	SD memory card (SD/SDHC), up to 1–32 GB (1 GB incl.) Format: FAT32 or FAT16
Data types:	Event, display, alarm summary, manual sample, settings, and report (optional code /MT)
Data format:	Binary or text
Alarms:	Number: Max. 4 alarms per measurement channel Types: high limit, low limit, difference high limit, difference low limit, rate of change increase, rate of change decrease, delay high, delay low
Event actions:	Specified actions can be performed when certain events occur. Number: 50 Events: alarms, remote control input, etc.; Actions: record stop/start, alarm ACK, etc. Timers: 4 Match time timers: 4
Batch function:	Manage data by batch name. Enter text fields and batch comments in data files.
Security functions:	Key lock and login functions.
Insulation resistance:	Between RS-422/485/Ethernet terminals and internal circuitry: 20 MΩ or greater (at 500 VDC)

Ethernet

Electrical/mechanical specifications:	IEEE 802.3 compliant (Ethernet frame type: DIX specification)
Implemented protocols:	TCP, UDP, IP, ICMP, ARP, DHCP, HTTP, FTP, SMTP, SNTP, Modbus, dedicated protocol, SSL, DARWIN-compatible communication

USB communication

Standards conformity:	USB 2.0 compliant (recognized as a serial port by the PC)
Connector format/no. of ports:	mini B/1
Implemented protocol:	Dedicated protocol

RS-422/485 (optional code /C3)

Media:	EIA RS-422/485 compliant
Implemented protocol:	Dedicated protocol, Modbus/RTU, or DARWIN compatible communication

Bluetooth (optional code /C8)

Standards conformity:	Bluetooth® Ver 2.1+EDR compliant
Supported profiles:	SPP (serial port profile)
Communication range:	Approx. 10 m (depending on operating environment) (Class2)
Implemented protocol:	Dedicated protocol

Ethernet/IP communications (optional code /E1)

Can join Ethernet/IP networks as an adapter (server).

Max. connections:	20 (or 10 max. at TCP/IP level)
Supported protocols:	EIP/PCCC, EIP/native
Messaging:	Explict (UCMM Class 3) +I/O (Class 1)
Objects:	Assembly, PCCC, Data Table

WT communication (optional code /E2)

Models supported:	WT1800, WT500, WT300
Supported communication:	Ethernet
Max. connected units:	16
Communication interval:	500 ms/1 s/2 s/5 s/10 s/15 s/20 s/30 s
Acquirable data types:	Voltage, current, power, power factor, phase, watt hours, harmonics, and others.
Max. data assignments:	300

MATH (with Report function, optional code /MT)

No. of MATH channels:	100
MATH types:	Basic math, statistics, special operators, conditional statements, and others.

Communication channels (optional code /MC)

No. of communication channels:	GM10-1: 300 (C001–C300) GM10-2: 500 (C001–C500)

Log scale (optional code /LG)

Input types:	LOG input, pseudo log (input that supports pseudo log), LOG linear (linear input within the log decade)
Scalable range:	LOG input: 1.00E-15 to 1.00E+15 (max. 15 decades), [scale low limit] < [scale high limit] Pseudo log input/LOG linear: 1.00E-15 to 1.00E+15 (max. 15 decades), the mantissa of the scale low and high limits are assumed to be the same.

GM90PS Power Supply Module

Rated supply voltage:	100–240 VAC
Operating supply voltage:	90–132 VAC, 180–264 VAC
Power frequency:	50 Hz±2%, 60 Hz±2%
Insulation resistance:	Between power terminal and earth: 20 MΩ or more (at 500 VDC)
Withstand voltage:	Between power terminal and earth: 3000 VAC (50/60 Hz), 1 minute

GX90XA Analog Input Module

Universal input (-U2), low withstand voltage relay (-L1), electromagnetic relay (-T1)

Inputs:	10
Input types:	Universal: DC voltage, standard signal, thermocouple, RTD, DI (voltage contact), DC current (with external shunt resistor connected) Low withstand voltage relay, electromagnetic relay: DC voltage, standard signal, thermocouple, DI (voltage, contact), DC current (with external shunt resistor connected)
Integral time:	Universal: 1.67 ms/16.7 ms/20 ms/36.7 ms/100 ms Low withstand voltage relay, electromagnetic relay: 16.7 ms/20 ms/36.7 ms/100 ms
Input calculation:	Linear scaling, square root, differential calculations
Input range/accuracy:	Refer to the Measurement range and accuracy table.
Input resistance:	10 MΩ or more for thermocouple/DC voltage (1 V range or lower) Approx. 1 MΩ for DC voltage (2 V range or higher)/standard signal
Input external resistance:	2 kΩ or lower for thermocouple/DC voltage
Effect of signal source resistance:	±10 μV/1 kΩ or lower for thermocouple/DC voltage (1 V range or lower) ±0.15%/1 kΩ or lower for DC voltage (2 V range or higher)/standard signal
Allowable wiring resistance:	Max. 10 Ω/1 wire or less (lead resistance between 3 wires is equal) for RTD input
Effect of wiring resistance:	±0.1°C/10 Ω (lead resistance between 3 wires is equal) for RTD input
Reference junction compensation accuracy:	Measurement of 0°C or higher, input terminal temp. 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, platinel 2, NiNiMo, W/WRe26, N(AWG14): ±1.0°C (23°C±2°C), ±1.4°C (0 to 50°C), ±2.0 (-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: RJC fixed at 0°C * Parentheses ( ) = ambient temperature.
Allowable input voltage:	±60V DC for DC voltage (2 V range or higher)/standard signal ±10 V DC for other conditions.
Noise rejection ratio:	Normal mode: 50/60 Hz no rejection (integral time 1.67 ms), 40 dB or more (integral time 16.67 ms or more) Common mode: 80 dB or more (integral time 1.67 ms), 120 dB or more (integral time 16.67 ms or more)
Max. common mode voltage:	30 VACrms (50/60Hz), or 60 VDC (however, max. common mode noise voltage of measurement input is 250 VACrms)
Max. voltage between measurement input channels:	Universal, electromagnetic relay: 30 VACrms (50/60Hz), or 60 VDC (however, max. common mode noise voltage between measurement input channels is 250 VACrms) Low withstand voltage relay: 30 VACrms (50/60Hz), or 60 VDC (however, max. common mode noise voltage between measurement input channels is 60 VACrms)
Effects of ambient temperature:	Applies when integral time is 16.67 ms or higher, ±(0.05% of rdg + 0.05% of range) or less fluctuation per 10°C change Note, KpvsAu7Fe, PR20-40: ±(0.05% of rdg + 0.1% of range) or less Cu10Ω system: ±(0.2% of range + 0.1°C) or less Excluding guaranteed reference junction accuracy
Insulation resistance:	Between input terminals and internal circuitry: 20 MΩ or greater (at 500 VDC)
Withstand voltage:	Universal, electromagnetic relay: Between input terminals and internal circuitry: 3000 VAC, 1 minute Between analog input channels: 1000 VAC, 1 minute (excluding b terminal) Low withstand voltage relay: Between input terminals and internal circuitry: 1500 VAC, 1 minute Between analog input channels: 400 VAC, 1 minute

DC current (mA) input (-C1)

Inputs:	10
Input types:	DC current (20 mA), standard current signal (4–20 mA)
Integral time:	1.67 ms/16.7 ms/20 ms/36.7 ms/100 ms
Input calculation:	Linear scaling, square root, differential calculations
Input range:	Refer to the Measurement range and accuracy tables.
Input resistance:	250 Ω
Allowable input voltage:	±10 VDC
Allowable input current:	24 mA *50/60 Hz, peak value including the signal portion
Noise rejection ratio:	Normal mode: 50/60 Hz no rejection (integral time 1.67 ms), 40 dB or more (integral time 16.67 ms or more) Common mode: 80 db or more (integral time 1.67 ms), 120 dB or more (integral time 16.67 ms or more)
Max. common mode voltage:	30 VACrms (50/60Hz) or 60 VDC (however, max. common mode noise voltage of measurement input is 250 VACrms)
Max. voltage between measurement input channels:	30 VACrms (50/60Hz) or 60 VDC (however, max. common mode noise voltage between measurement input channels is 250 VACrms)
Effects of ambient temperature:	Applies when integral time is 16.67 ms or more, ±(0.075% of rdg + 0.05% of range) or less fluctuation per 10°C change
Insulation resistance:	Between input terminals and internal circuitry: 20 MΩ or greater (at 500 VDC)
Withstand voltage:	Between input terminals and internal circuitry: 1500 VAC, 1 minute Between analog input channels: 1000 VAC, 1 minute

GX90XD Digital Input Module

Inputs:	16
Input format:	Open collector or non-voltage contact
Range types	DI, pulse (max. 250 Hz, min. pulse width: 2 ms, requires the MATH (optional code /MT)).
ON/OFF detection:	Open collector: Voltage of 0.5 VDC or less when ON, leakage current of 0.5 mA or less when OFF Non-voltage contact: Contact resistance of 200 Ω or less when ON, 50 kΩ or more when OFF
Input calculation:	Linear scaling, differential calculations
Contact rating:	12 VDC, 20 mA or more
Input resistance:	Approx. 1 kΩ
No. of common:	2 (1 common per 8 channels)
Allowable input voltage:	10 V
Insulation resistance:	Between input terminals and internal circuitry: 20 MΩ or greater (at 500 VDC)
Withstand voltage:	Between input terminals and internal circuitry: 1500 VAC, 1 minute

GX90YD Digital Output Module

Outputs:	6
Output format:	Relay contact (c contact)
Rated load voltage:	30 VDC or 250 VAC or less
Max. load current:	3 A (DC)/3 A (AC), resistive load, each
Min. load voltage/current:	5 VDC/10 mA
No. of common:	6 (all outputs independent)
Insulation resistance:	Between output terminals and internal circuitry: 20 MΩ or greater (at 500 VDC)
Withstand voltage:	Between output terminals and internal circuitry: 3000 VAC, 1 minute

GX90WD Digital Input/output Module

Digital input (DI) section

Inputs:	8
Input format:	Open collector or non-voltage contact
Range types:	DI, pulse (max. 250 Hz, min. pulse width: 2 ms, requires the MATH (optional code /MT)).
ON/OFF detection:	Open collector: Voltage of 0.5 VDC or less when ON, leakage current of 0.5 mA or less when OFF Non-voltage contact: Contact resistance of 200 Ω or less when ON, 50 kΩ or more when OFF
Input calculation:	Linear scaling, differential calculations
Contact rating:	12 VDC, 20 mA or more
Input resistance:	Approx. 2.4 kΩ
No. of common:	1 (1 common per 8 channels)
Allowable input voltage:	10 V
Insulation resistance:	Between input terminals and internal circuitry: 20 MΩ or greater (at 500 VDC)
Withstand voltage:	Between input terminals and internal circuitry: 1500 VAC, 1 minute

Digital output (DO) section

Outputs:	6
Output format:	Relay contact (c contact)
Rated load voltage:	150 VAC or less when connected to the main circuit (first-order power supply) 250 VAC or less when connected to a circuit derived from the main circuit (second-order power supply) , or 30 VDC or less
Max. load current:	2 A (DC)/2 A (AC), resistive load, each
Min. load voltage/current:	5 VDC/10 mA
No. of common:	6 (all outputs independent)
Insulation resistance:	Between output terminals and internal circuitry: 20 MΩ or greater (at 500 VDC)
Withstand voltage:	Between output terminals and internal circuitry: 2700 VAC, 1 minute

GX90EX Expansion Module

Connects via dedicated communication between main unit and subunits, and between subunits.

Communication speed:	10Base-T/100Base-TX (Auto)
Ports:	2
Connection cable:	STP cable, CAT5 or later
Connection between modules:	Cascade connection (no ring connection)
Communication range:	100 m

Standards supported

C US 172608 UL61010-1, UL61010-2-030(CSA NRTL/C)

SMARTDAC+ GM common specifications

Standards supported

CSA: CSA22.2 No61010-1, installation category II, pollution degree 2
CSA 22.2 No.61010-2-030-12

UL: UL61010-1, UL61010-2-030 (CSA NRTL/C)

CE:
EMC directive: EN61326-1 Class A Table 2
EN61000-3-2
EN61000-3-3
EN55011 Class A Group 1
Low voltage directives: EN61010-1, EN61010-2-030
Installation category II, pollution degree 2, measurement category II
R&TTE directive (optional code /C8): HEALTH&SAFETY
EN61010-1
EN61010-2-030
Installation category II, pollution degree 2, measurement category II
EN62311
EMC
EN301 489-1
EN301 489-17
EN61326-1
SPECTRUM
EN300 328

EMC Regulatory Arrangement in Australia and New Zealand (RCM):
EN55011 Class A Group 1

Wireless communication standards of Australia and New Zealand (RCM) (optional code /C8):
AS/NZS4268, AS/NZS2772.2

KC marking: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

Environmental performance: WEEE directive support

Wireless (Bluetooth): Supports radio wave regulations of Japan, America, Canada, Europe (EU), Australia, New Zealand, China, and Korea.

Normal operating conditions

Ambient temperature: -20 to 60°C
If less, -20 to 50°C
· When using the GX90YD, GX90WD, and GX90XA-T1 (electromagnetic relay type)
· With the GM10/C8 (Bluetooth option)

Ambient humidity: 20 to 85% RH (no condensation)

Vibration: 5 ≤ f < 8.4 Hz amplitude 3.5 mm (peak)
8.4 ≤ f ≤ 160 Hz acceleration 9.8 m/s^2 (or less)

Shock: When ON, 98 m/s^2 or less, 11 ms, 3 times in 6 directions (±X, ±Y, ±Z), (excluding GX90YD and GX90WD)
When OFF, 500 m/s^2 or less, approx. 10 ms, 3 times in 6 directions (±X, ±Y, ±Z)

Magnetic field: 400 A/m or less (DC and 50/60 Hz)

Measurement range and accuracy*

Input	Type	Range	Measurement accuracy	
			A/D integration time: 16.7ms or more	A/D integration time: 1.67ms
DCV	20mV	-20.000 to 20.000 mV	±(0.05 % of rdg +12 μ V)	±(0.1 % of rdg +40 μ V)
	60mV	-60.00 to 60.00 mV	±(0.05 % of rdg +0.03 mV)	±(0.1 % of rdg +0.15 mV)
	200mV	-200.00 to 200.00 mV	±(0.05 % of rdg +0.03 mV)	±(0.1 % of rdg +0.4 mV)
	1V	-1.0000 to 1.0000 V	±(0.05 % of rdg +1.2 mV)	±(0.1 % of rdg +4 mV)
	2V	-2.0000 to 2.0000 V	±(0.05 % of rdg +1.2 mV)	±(0.1 % of rdg +4 mV)
	6V	-6.000 to 6.000 V	±(0.05 % of rdg +3 mV)	±(0.1 % of rdg +15 mV)
	20V	-20.000 to 20.000 V	±(0.05 % of rdg +3 mV)	±(0.1 % of rdg +40 mV)
	50V	-50.00 to 50.00 V	±(0.05 % of rdg +0.03 V)	±(0.1 % of rdg +0.15 V)
Standard signal	0.4-2V	0.3200 to 2.0800 V	±(0.05 % of rdg +1.2 mV)	±(0.1 % of rdg +4 mV)
	1-5V	0.800 to 5.200 V	±(0.05 % of rdg +3 mV)	±(0.1 % of rdg +15 mV)
DC current	0-20mA	0.000 to 20.000mA	±(0.3 % of rdg +5 μ A)	±(0.3 % of rdg +90 μ A)
DC current (standard signal)	4-20mA	3.200 to 20.800mA		
TC (Excluding RJC accuracy)	R	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 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 not guaranteed
	S	0.0 to 1760.0°C		
	B	0.0 to 1820.0°C		
	K	-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 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 not guaranteed
		-200.0 to 500.0°C		
	E	-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 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 not guaranteed
	J	-200.0 to 1100.0°C		
	T	-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 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 not guaranteed
	N	-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 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 not guaranteed
	W	0.0 to 2315.0°C	±(0.15 % of rdg +1.5°C)	±(0.3 % of rdg +14.0°C) However, 1000.0°C or more: ±(0.8 % of rdg +9.0 °C)
	L	-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)
	U	-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)
	W97Re3-W75Re25	0.0 to 2320.0°C	±(0.2 % of rdg +2.5°C)	±18.0°C 2000.0°C or more: ±0.9 % of rdg
	KpvsAu7Fe	0.0 to 300.0 K	±(0.15 % of rdg +2.0 K)	±(0.2 % of rdg +7.0 K)
	Platinel2	0.0 to 1395.0°C	±(0.25 % of rdg +2.3°C)	±(0.25 % of rdg +8.0°C)
	PR20-40	0.0 to 1900.0°C	±(0.7 % of rdg +0.4°C) Accuracy at less than 800.0°C not guaranteed	±20.0°C Accuracy at less than 800.0°C not guaranteed
	NiNiMo	0.0 to 1310.0°C	±(0.25 % of rdg +0.7°C)	±(0.5 % of rdg +5.0°C)
	W/WRe26	0.0 to 2320.0°C	±(0.2 % of rdg +2.0°C) Accuracy at less than 300.0°C not guaranteed	±(0.4 % of rdg +12.0°C) Accuracy at less than 300.0°C not guaranteed
	N(AWG14)	0.0 to 1300.0°C	±(0.2 % of rdg +1.3°C)	±(0.5 % of rdg +7.0°C)
	XK GOST	-200.0 to 600.0°C	±(0.25 % of rdg +0.8°C)	±(0.5 % of rdg +4.0°C)
RTD	Pt100	-200.0 to 850.0°C	±(0.15 % of rdg +0.3°C)	±(0.3 % of rdg +1.5°C)
		-150.00 to 150.00°C		
	JPt100	-200.0 to 550.0°C		
		-150.00 to 150.00°C		
	Cu10 GE	-200.0 to 300.0°C	±(0.2 % of rdg +2.0°C) Guaranteed measurement accuracy 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: -200.0 to 300.0°C	±(0.4 % of rdg +6.0°C) Guaranteed measurement accuracy 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: -200.0 to 300.0°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 (20°C) alpha=0.00392	-200.0 to 300.0°C		
	Cu10 (20°C) alpha=0.00393	-200.0 to 300.0°C		
	Cu25 (0°C) alpha=0.00425	-200.0 to 300.0°C	±(0.3 % of rdg +0.8°C)	±(0.5 % of rdg +3.0°C)
	Cu53 (0°C) alpha=0.00426035	-50.0 to 150.0°C	±(0.15 % of rdg +0.8°C)	±(0.3 % of rdg +4.0°C)
	Cu100 (0°C) alpha=0.00425	-50.0 to 150.0°C	±(0.2 % of rdg +1.0°C)	±(0.4 % of rdg +5.0°C)
	J263B	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
	Ni100 (SAMA)	-200.0 to 250.0°C	±(0.15 % of rdg +0.4°C)	±(0.3 % of rdg +2.0°C)
	Ni100 (DIN)	-60.0 to 180.0°C		
	Ni120	-70.0 to 200.0°C		
	Pt25	-200.0 to 550.0°C	±(0.15 % of rdg +0.8°C)	±(0.3 % of rdg +4.0°C)
	Pt50	-200.0 to 550.0°C	±(0.3 % of rdg +0.6°C)	±(0.6 % of rdg +3.0°C)
	Pt200 WEED	-100.0 to 250.0°C	±(0.3 % of rdg +1.0°C)	
	Cu10 GOST	-200.0 to 200.0°C	±(0.2 % of rdg +2.0°C)	±(0.4 % of rdg +6.0°C)
	Cu50 GOST	-200.0 to 200.0°C	±(0.15 % of rdg +0.6°C)	±(0.3 % of rdg +4.0°C)
	Cu100 GOST	-200.0 to 200.0°C	±(0.15 % of rdg +0.3°C)	±(0.3 % of rdg +1.5°C)
	Pt46 GOST	-200.0 to 550.0°C	±(0.3 % of rdg +0.8°C)	±(0.6 % of rdg +4.0°C)
	Pt100 GOST	-200.0 to 600.0°C	±(0.15 % of rdg +0.3°C)	±(0.3 % of rdg +2.0°C)
DI	Level		Threshold level (Vth=2.4 V) accuracy ±0.1 V	
	Contact		1 kΩ or less: 1 (ON), 100 kΩ or more: 0 (OFF) (shunt capacitance 0.01 μF or less)	

* Reference operating conditions: 23+/-2°C, 55+/-10% RH, supply voltage 90–132, 180–264 VAC, supply frequency within 50/60 Hz ±1%, warmup 30 minutes or more, no vibrations or other hindrances to performance.
Please inquire for modules with increased guaranteed accuracy specifications. rdg: reading value

GM10 MODEL AND SUFFIX CODES

Model	Suffix code			Optional code	Descripiton
GM10					Data Acquisition Module for SMARTDAC+ GM
Type	-1				Standard (Max. measurement channels: 100 ch)
	-2				Large memory (Max. measurement channels: 500 ch)
Area		E			General (temp. unit: Cel, Deg F)
—			0		Always 0
Optional features				/C3	RS-422/485
				/C8	Bluetooth
				/MT	Mathematical function (with report function) *1
				/MC	Communication channel function
				/LG	Log scale
				/E1	EtherNet/IP communication
				/E2	WT communication *2

*1: Optional code /MT (MATH) required if using the GX90XD's or GX90WD's pulse input.
*2: The Communication Channel function (optional code /MC) is required to specify WT communication (optional code /WT).

GM90PS MODEL AND SUFFIX CODES

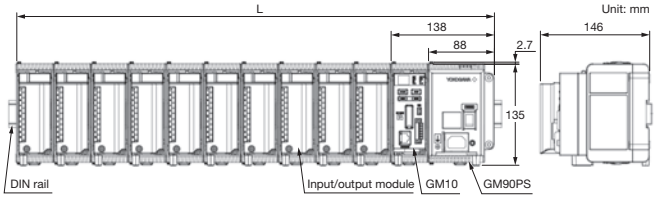
Model	Suffix code					Descripiton
GM90PS						Power Supply Module for SMARTDAC+ GM
Type	-1					Always -1
Area		N				General
Supply voltage			1			100 to 240 V AC
Power supply connection				D		Power inlet with UL/CSA cable
				F		Power inlet with VDE cable
				H		Power inlet with GB cable
				N		Power inlet with NBR cable
				Q		Power inlet with BS cable
				R		Power inlet with AS cable
				W		Screw terminal (without power cable)
—					0	Always 0

GM90MB MODEL AND SUFFIX CODES

Model	Suffix code			Descripiton
GM90MB				Module Base for SMARTDAC+ GM
—	-01			Always -01
Area		N		General
—			0	Always 0

GX90XA MODEL AND SUFFIX CODES

Model	Suffix code					Descripiton
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



Connected modules	1	2	3	4	5	6	7	8	9	10	11
L (mm)	138	188	238	288	338	388	438	488	538	588	638

GX90XD MODEL AND SUFFIX CODES

Model	Suffix code					Descripiton
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

GX90YD MODEL AND SUFFIX CODES

Model	Suffix code					Descripiton
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

GX90WD MODEL AND SUFFIX CODES

Model	Suffix code					Descripiton
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

GX90EX MODEL AND SUFFIX CODES

Model	Suffix code				Descripiton
GX90EX					I/O Expansion Module
Port	-02				2 ports
Type		-TP1			Twisted pair cable
—			N		Always N
Area				-N	General

Standard Accessories

Model	Product	Qty
GM10	SD memory card (1GB)	1
GM90PS	Connector cover	1
	Power cable (depends on the suffix code of the power supply connection)	1
	Interconnect screw (M3)	4
GM90MB	Interconnect screw (M3)	4

Optional Accessories (Sold Separately)

Product	Part Number/Model
SD memory card (1GB)	773001
Shunt resistor for screw terminal (M3) (10 Ω ± 0.1%)	X010-010-3
Shunt resistor for screw terminal (M3) (100 Ω ± 0.1%)	X010-100-3
Shunt resistor for screw terminal (M3) (250 Ω ± 0.1%)	X010-250-3
Shunt resistor for clamp terminal (10 Ω ± 0.1%)	438922
Shunt resistor for clamp terminal (100 Ω ± 0.1%)	438921
Shunt resistor for clamp terminal (250 Ω ± 0.1%)	438920

Application Software (Sold Separately)

Model	Descripiton	OS
GA10	Data Logging Software	Windows Vista/7/8.1 Windows Server 2008/2012

Calibration certificate (sold separately)
A calibration certificate for specific analog input modules.

Test certificate (QIC, sold separately)
A QIC for specific data acquisition modules, power supply modules, module bases, or I/O modules.

User's Manual
Product user's manuals can be downloaded or viewed at the following URL. URL: www.smartdacplus.com/manual/en/

NOTICE
Before operating the product, read the instruction manual thoroughly for proper and safe operation.

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