General Specifications

GA10
Data Logging Software

SMARTDAC+™

GS 04L65B01-01EN

[Version: R4.02]

■ Overview

Data Logging Software GA10 (hereafter referred to as GA10) is used to collect data from measuring instruments and controllers via communication and monitor and record the collected data.

GA10 has two setting modes for configuring data collection, monitoring, and recording: Simple Settings mode and Detail Settings mode.

Recorded data can be displayed and printed from the Viewer software.

■ Specifications

Item	Description
Max. number of simultaneous device connections	100
Max. number of simultaneous client connections [1]	No limit (operation guaranteed up to 32 clients)
Max. number of simultaneous device connections per project	100
Max. number of simultaneous operation projects	30 For a 5000 tag or 10000 tag model: 3 [5]
Max. number of device registrations	1000
Max. number of project registrations	10000
Max. number of user registrations	100
Max. number of clients that can run simultaneously on the same PC	Multiple clients possible (See "Starting Multiple Screens" described later.)
Monitor interval (when set to PC time)	100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 30 min, 1 hour
Monitor interval (when set to device time) [6]	The acquisition interval of each device. [2]
Record interval (when set to PC time)	100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 30 min, 1 hour (limited to an integer multiple of the monitor interval)
Record interval (when set to device time)	Same as the monitor interval of GA10.
Maximum number of recording tags (channels) per project	10000 [4] [5] Models with the math function: 12000 (including the maximum math tags of 2000)
Number of display groups	50 For a 5000 tag, 10000 tag, or GateSushi-added model: 200
Number of channels (tags) per display group	50
Language	English, Japanese, Chinese, French, German, Russian, Korean

1 Make sure that the version of the added client is the same as the server version.
2 GX10/GX20/GP10/GP20/GM10 (R4.0 or later): 1 ms (shortest). MX100/MW100, MXLOGGER: 10ms (shortest). WT3000/WT3000E: Same as the WT's data update rate. (Except for 50 ms.) 100 ms , shortest.
3 Make sure to use the same language setting for this software, Windows OS, and the recorders that data is to be collected from.
4 The performance is guaranteed when you use a high-spec PC with a 5000 tag model or 10000 tag model. For details, refer to "High-Spec Hardware" on page 12).
5 Set the monitor interval to 2 seconds or more when using a 5000 tag model or 10000 tag model.
6 Only PC time can be set when using a 5000 tag model or 10000 tag model.

■ Connectable Devices and Software

The following table lists the devices and software applications that GA10 can connect to. Data can be collected by registering devices to the GA10 and connecting via communication interfaces. Target devices can be registered either online (communication enabled) or offline (communication disabled.)

Name	Release Number	Interface [1]			
		RS-232	RS-422/485	USB	Ethernet
GM10	R2.02 or later	No	Yes	Yes	Yes
GX10	R1.01 or later (R2.01 is supported from GA10 R1.02 onwards.)	Yes	Yes	No	Yes
GX20		Yes	Yes	No	Yes
GP10		Yes	Yes	No	Yes
GP20		Yes	Yes	No	Yes
DX1000 [2]	R2.01 or later	Yes	Yes	No	Yes
DX1000N [2]		Yes	Yes	No	Yes
DX2000 [2]		Yes	Yes	No	Yes
DX1000T [2]	R4.11 or later	Yes	Yes	No	Yes
DX2000T [2]		Yes	Yes	No	Yes
CX1000	R3.20 or later	Yes	Yes	No	Yes
CX2000		Yes	Yes	No	Yes
FX1000	R1.11 or later	Yes	Yes	No	Yes
MV1000	R1.01 or later	Yes	Yes	No	Yes
MV2000		Yes	Yes	No	Yes
μR10000	R1.31 or later	Yes	Yes	No	Yes
μR20000		Yes	Yes	No	Yes
MX100	R3.01 or later	No	No	No	Yes
MW100	R3.01 or later	No	No	No	Yes
DA100	Models released on Nov., 2002 and later R10.03 or later	Yes	Yes	No	Yes
DR130	Models released on Dec., 1999 and later R8.05 or later	Yes	Yes	No	Yes

YOKOGAWA ◆

Name	Release Number	Interface [1]			
		RS-232	RS-422/485	USB	Ethernet
DR230 DR240	• DR231/241	Yes	Yes	No	Yes
	Released on Dec., 1999 and later R8.05 or later				
	• DR232/242				
	Released on Nov., 2002 and later R8.05 or later				
UT32A	No release number. (Supported from GA10 R1.02 onwards.)	No	Yes	No	See note 3
UT35A		No	Yes	No	Yes
UT52A		No	Yes	No	See note 3
UT55A		No	Yes	No	Yes
UT75A		No	Yes	No	Yes
UP35A		No	Yes	No	Yes
UP55A		No	Yes	No	Yes
UM33A		No	Yes	No	See note 3
UPM100	—	No	Yes	No	See note 3
UPM101	—	No	Yes	No	See note 3
PR720	—	No	Yes	No	See note 3
YS1500	—	No	Yes	No	Yes
YS1700	—	No	Yes	No	Yes
Devices supporting the Modbus protocol [4] (Includes Yokogawa control products.)		No	Yes	No	Yes
WT3000 [5]	R2.01 or later	Yes	No	No	Yes
WT3000E [5]	R6.01 or later	Yes	No	No	Yes
GateWT for GA10 [6]	R2.06 or later	No	No	No	Yes
DAQLOGGER [7]	R7.11 or later	No	No	No	Yes
DAQ32Plus [7]	R11.08 or later	No	No	No	Yes
MXLOGGER [7]	R2.08 or later	No	No	No	Yes
GateSushi [8]	—	No	No	No	Yes
VZ20X	R1.01 or later	No	No	No	Yes

1. Yes: Supported , No: Not supported
2. When connecting GA10 to the DXAdvanced (DX1000, DX1000N, DX1000T, DX2000, DX2000T) with Security Function (/AS1) through the Ethernet interface, specify the access user to "Administrator." Additionally, note that the "Administrator" who can login to the DX is limited to one administrator.
3. Open network function is not built in. Ethernet connection requires VJET (Yokogawa Ethernet/RS-485 Converter).
4. Modbus ASCII protocol is not supported. For the data time, you can only select PC time.
5. The WT3000 and WT3000E are precision power analyzers by Yokogawa Meters & Instruments Corporation. GA10 network searching is valid on R6.21 and later for both WT3000 and WT3000E.
6. GateWT for GA10 is YOKOGAWA's driver software. It is software for connecting to the WT series power meters of Yokogawa Meters & Instruments Corporation. (This is not used for connecting to the WT3000/WT3000E.)
7. MXLOGGER, DAQLOGGER, DAQ32Plus are YOKOGAWA's data collection applications.
8. GateSushi is the GA10 GateSushi option (/US). It is the software option for connecting to the Yokogawa Sushi Sensors.

■ Functions

Configuration

There two setting modes for configuring the software: Simple Settings and Detail Settings. The settings that you can configure in each mode is shown below.
- Simple Settings mode: Devices to connect, collection and recording intervals, data file save destination.
- Detail Settings mode: Devices, tags, display groups, collect & monitor, recording, mail, access privileges, others.

Export/Import

You can export/import a project, tag numbers, and tag comments in a server to use it.

Monitoring

The values of data being collected can be monitored from multiple clients. You can create display groups, each consisting of channels of multiple devices, and display vast amounts of collected data in an efficient manner.
- Simple Settings mode: A fixed monitor page consisting of a trend display and digital display.
- Detail Settings mode: Four types of displays (trend, digital, meter, and alarm), and custom display(/CG option), integration graph, demand monitor (/WH option) can be divided into up to 16 displays. You can arrange these displays for easy monitoring of data.

Starting Multiple Screens

You can display multiple client screens on the same PC. This makes it possible to display different projects on the same PC screen or on several displays.

Operating conditions

- When multiple screens are shown, the screens use the same display conditions stored in the PC. If a setting included in these conditions is changed on a given screen, the change are applied the next time the clients are started.

- Limitations may be placed on the number of screens that can be started depending on the PC performance, collection and recording environment, and the like. See the table below for the CPU and memory usage rates.
- When running a single project with four monitor sets.

Clients	Tags	Acquisition interval	CPU usage	Memory usage
2	2000	500 msec	Approx. 19%	Approx. 470 MB
4	2000	500 msec	Approx. 36%	Approx. 940 MB
2	500	100 msec	Approx. 18%	Approx. 400 MB
4	500	100 msec	Approx. 38%	Approx. 800 MB

This example was verified in the following environment. CPU: Intel Core i5 (2.67GHz), Memory: 4.0 GB, OS: Windows 7 Ultimate SP1

- If using a 5000 or 10000 tag model, use a "high-spec" PC.

  See "High-Spec Hardware" on page 12.

Alarm Feature

The alarm feature monitors alarms set on recorders and data loggers and notifies the user when alarms occur.

- Alarm display: When an alarm occurs, the corresponding tag or group on the monitor page blinks in red. The indication returns to its original state when the alarm is cleared. Also, the client window can be shown in front when an alarm occurs.
- Alarm sound: The PC generates beeps when an alarm occurs. You can stop the beeping by clicking a button. You can select whether to share button operations between clients. An alarm sound file in MP3 format can be registered to the each alarm level of the tag.
- Alarm ACK: You can stop the blinking alarm display and reflect the alarm-acknowledged condition on the display. For each project, you can select whether to share displays.
- Acknowledge of Device Communication Interface: You can view the communication errors that occur during data collection and recording and the affected projects.
- Alarm log: The occurrence and clearance of alarms can be logged. The alarm log can be cleared.
- Pop-up function: When an alarm occurs, you can display the corresponding tags in a pop-up digital display on the project screen. You can also display an alarm log from the pop-up digital display.
- Group highlight function

When alarms occur in the trend, digital, or meter display, you can color the monitor screen frameof the corresponding display group in red (anomalies are in yellow).

Email sending

GA10 can send email when alarms occur or when the communication status changes. Instantaneous values or alarm information can be attached on the email. The test mail can be also sent.

- Conditions for sending email can be specified up to 20 sets of mail settings of your choice.
- You can specify up to 20 transmission conditions as you like.
- You can set data ranges and specify individual tags for the data to be included in attached files.
- Support for SMTP Authentication(CRAM-MD5, SSL/TSL, STARTTSL) / POP before SMTP

Conditions for sending email

Alarm occurrence, alarm release, alarm occurrence or release, Disconnect/Recovery, Specified period, Specified time, Data file created, Data loss, Future alarm occurrence

FTP transfer

Recording files, report files (/RP option), and integration report files (/WH option) can be transferred to the specified FTP server.

- Authentication method can be enabled or disabled.
- Encryption (SSL/TSL) is supported.

2 Time modes

The timestamp is selectable from PC time or Device time.

Recording

Collected data can be recorded to the PC.
Data can be saved to GA10 binary files, Excel files or text files (tsv, csv).
In addition, while recording, data files can be saved in sections by using the button (Manual save).
Recording can be manually controlled or automatically started and stopped based on the following conditions: Specified time, specified period, alarm, level

Batch function

By entering a batch name when recording, you can manage data by batch name.

- Batch name: Add batch no. (32 chars.) + lot no. (8 digits) to the file name
- Batch text: Add text to the recorded file.
  Title up to 20 chars., body up to 32 chars.
- Batch comment: Add a comment to the recorded file. Up to 50 chars.

Viewer

The universal viewer can display the following data generated by the recorder on the screen and print it out on the printer.

- Viewer function: Waveform display, digital display, circular display, list display, etc.
- Data conversion: File conversion to ASCII or MS-Excel format
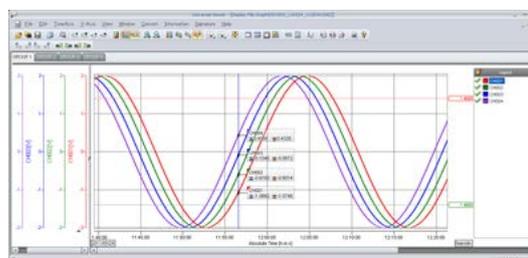
Data supplementing function (Backfill function)

If a data dropout occurs in the data file that is being recorded due to a communication interference, this function automatically acquires data from the internal memory of the device and restores the data loss in the file.

Back-fills data on the main unit after communications are restored.
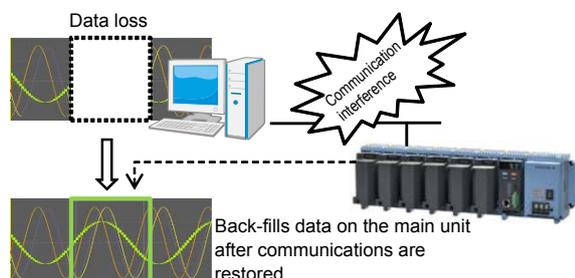
Operating conditions

On the GA10 side

- Applicable data: Binary data (Excel data is not included)
- Data time is set to Device time.

On the connected device side

- Applicable devices: GM10, GX10, GX20, GP10, GP20, DX1000, DX2000, DX1000N, DX1000T, DX2000T, FX1000, MV1000, MV2000
- Device's internal memory contains the event data file corresponding to the data loss location.
- The scan interval of the device is the same as the recording interval of the event data.
- FTP transferring of files is enabled.(FTP server function: ON, Port number: 21)
- The multi batch function is not in use.
- The time zone and daylight saving (DST) settings on the main unit are the same as those on the PC.
- GX/GP/GM with the advanced security function (/AS option)
  » If the advanced security function (/AS option) is disabled, backfill operates.
  » If enabled, backfill operates when Communication in Security basic settings is set to Off.
  » If Communication in Security basic settings is set to Login, backfill operates only when a Monitor user is connected.
- DX with the advanced security function (/AS1 option)
  » Backfill operates regardless of whether the /AS1 advanced security option is enabled or disabled.

Multi-logging

You can register multiple configurations (projects) and collect data at different times.

Additional Monitoring PCs (Clients)

By installing GA10CL to other PCs connected to the network, you can control GA10 from and share collected data between multiple PCs. It is possible for multiple PCs to access a single GA10 simultaneously.

User Management

GA10 users are registered and managed on each server. There are two user levels: administrator and user. Administrators are responsible for registering and deleting all users.
Users enter their IDs and passwords to access a server. Of the users registered in a server, only those that have been granted privileges can access projects. If a user is accessing a project, other users cannot access that project.
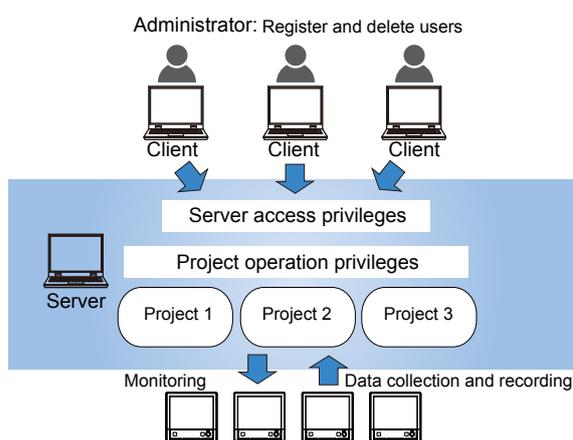
The operation scope of each user can be managed by assigning one of four levels: owner, manager, operator, and monitor. The table below shows the available project access privilege types and their operation scope.

Level	Privilege Type	Allowed Operations	Operation Details
1	Owner	All operations	All operations (including deleting the project) Set project access privileges.
2	Manager	Settings Operation Monitor	Edit setup data. Start/stop data monitoring or recording. View recorded data files. Open data files. Delete data files. Monitor collected data.
3	Operator	Operation Monitor	View setup data. Start/stop data monitoring or recording. View recorded data files. Open data files. Delete data files. Monitor collected data.
4	Monitor	Monitor	View recorded data files. Open data files. Monitor collected data.

Log

Up to 1000 log events that occur from when the user logs in to the server until the user logs out are displayed.

DDE Server

The DDE (Dynamic Data Exchange) server feature allows collected data to be loaded into Excel and other applications. It can also be used with Visual Basic 6.0.

Modbus Server

The Modbus server function receives requests from Modbus/TCP client devices and returns information about the currently running GA10 project specified by the Modbus address as responses.
A Modbus client device can carry out the following operations on the GA10.
• Read the values of tags and math tags, status, and scale upper and lower
• Load project information data

Data Logging Software GA10
Modbus server

Modbus clinent device
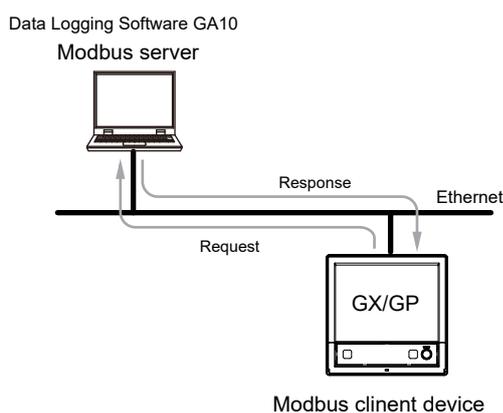
• Basic Modbus Server Specifications

Specification	Description
Protocol	ModbusTCP
Function code	3 (read hold register) 4 (read input register)
Maximum number of connectable clients	30
Data update interval	Same as the monitor interval of the corresponding GA10 project

Trial mode

GA10 has a trial mode that can be used for 60 days without a license. Projects created during the trial period can be exported (output and saved as files) before you enter the license to be used later.

GX/GP/GM web application

Online setting can be made using Web browser. For more information, please see General Specification (GS 04L51B01-01EN or GS 04L52B01-01EN.)

Server and Client

GA10 is a client-server software application. Users perform various server operations from a client. The server collects, records, and manages data received from connected devices on the basis of the instructions received from the client.
The client function and server function are installed together in a single PC. You can also install GA10CL, which is a version that contains only the client function, in other PCs. Multiple clients can simultaneously access a single server.
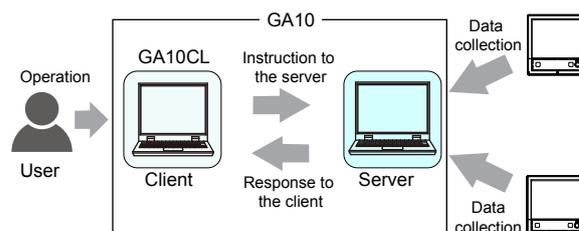
Data Collection Project

GA10 collects data in units of projects. Projects are created by users to suite their purposes.
For example, a project named "Process A" can be created to collect measured data from a process called "A." In this way, a project can be created for each set of collected data.
For each project, the data to be collected, data to be recorded, the monitor page layout, and the like are specified.
Multiple projects can be created in a single server.

Project Setting Display

Project settings can be displayed in tables on a browser. You can select whether to show or hide the settings for each item. Moreover, you can print or save the setting display screen using the Web browser (Note) functions.

Note: The print and save functions depend on the Browser's functions.

Anomaly detection function

This function analyzes the measured data for each display group (anomaly learning and determination), detects anomalies (data that differs from normal data), and notifies you. For alarms, the monitor screen frame in the trend, digital, or meter display appears in yellow. You can also use an AI analyzer function that creates a learning model from past recorded data and performs anomaly analysis.
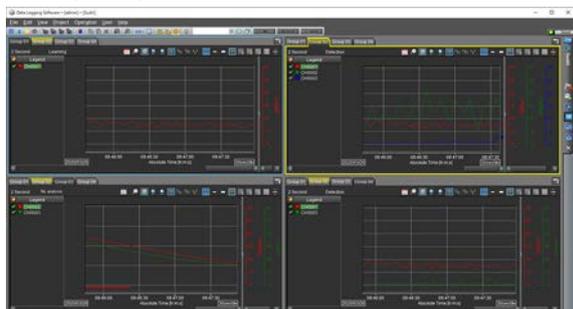
- **Operation limitation**

 Take note that the anomaly detection has the following limitations on detection:
  (1) When using anomaly detection, set 1 second or more for the monitor interval. If you set less than 1 second, anomaly detection is not run.
  (2) If there are many display groups and tags in the groups that are subject to anomaly detection, the likelihood of the internal software becoming busy increases. If anomaly detection is not ready to be run in time as a result of the busy status, anomaly detection is skipped for that monitor interval. Whether a busy state occurs depends on the monitor interval and the PC environment that is used.
  Monitor interval: The longer the interval, the harder it is to become a busy state.
  PC environment: The higher the PC specs, the harder it is to become a busy state.

Future pen function

By periodically learning from acquired data, it draws a predicted future waveform on the trend screen in real time.
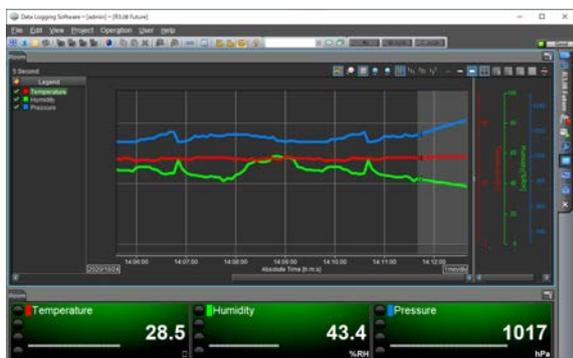
Future pen*

You can draw the future predicted waveform along with the real-time waveform on the trend screen for the tag registered as the target of the future pen.
- No. of simultaneously drawn tags: 500
- Prediction points: 30, 60, or 90
- Monitor interval: Suitable for 1 sec. or more
  * Suitable for relatively moderately fluctuating data. Not suitable for rapidly fluctuating data.

Future alarm*

As for tags registered as targets of the future pen, you can trigger alarms based on predicted measured values.
Use the existing alarm settings for the values of future alarms.
You can check the status of future alarms in the digital, future alarm, or meter display. Lights in yellow when an alarm occurs.
  *The normal alarm display takes precedence.
- Applicable alarm types: Upper or lower limit
- Future alarm email: Email notification can be sent when a future alarm occurs

Functional Addition Option

The following options can be added to the GA10.
 For details on functions, see "Optional Functions."
- Report/Print function (/RP option)
- Math function (/MT option)
- OPC-UA server function (/UA option)
- Custom Display function (/CG option)
- Integration display function (/WH option)
- GateSushi function (/SU option)
- Web server function (/WA, /WB, /WC option)
- External access function (/EA option)

■ System Structure

To use GA10, you need a PC that can connect to target devices. The connection between the PC and target devices is established through Ethernet, serial, or USB (available on GM only) communication.

GA10 can connect to YOKOGAWA recorders and data loggers. It can also collect data that has been acquired by YOKOGAWA's data acquisition software (MXLOGGER, DAQLOGGER, and DAQ32Plus). Moreover, it supports the Modbus protocol [Note], enabling data collection from YOKOGAWA's control instruments (temperature controllers, signal conditioners, and power monitors). GA10 can also collect data from other manufacturers' devices that support Modbus communication.

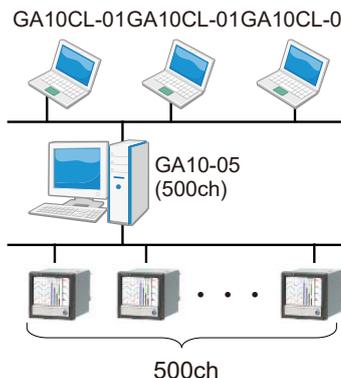Note: Modbus ASCII protocol is not supported.
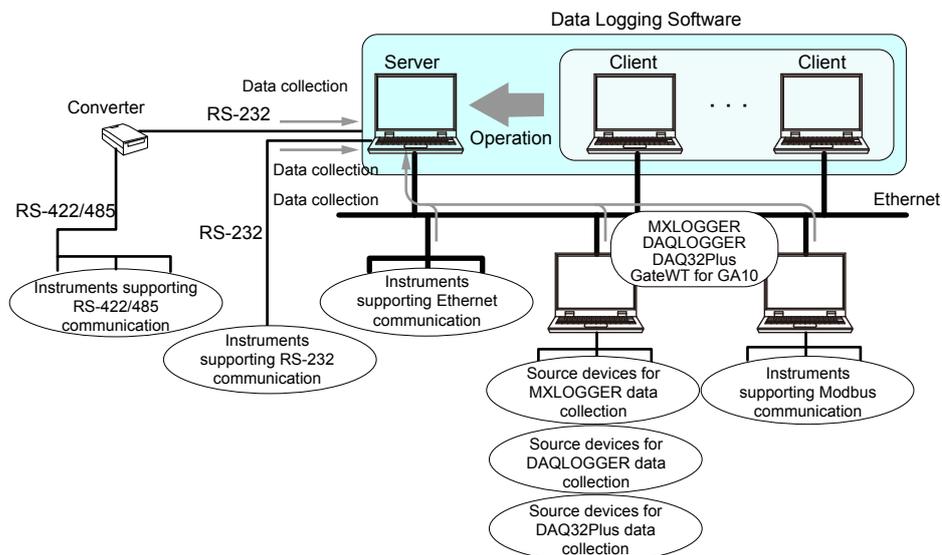
MXLOGGER, DAQLOGGER, DAQ32Plus are YOKOGAWA's data collection applications.
GateWT for GA10 is YOKOGAWA's driver software.

Example 1: 200 channels, 1 PC
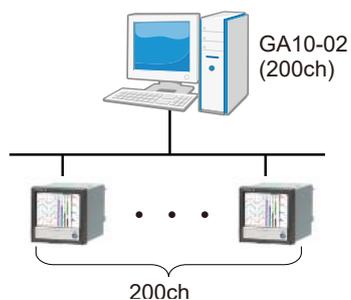
Example 2: 500 channels, 4 PCs

■ Optional Functions

Report/Print Function (/RP)

Standard Print
You can select the display group and display format (trend graph, circular, sheet, alarm list, mark list) and print from a data file at the specified time on the specified printer.

Custom Print
You can select the display group and display format (trend graph, alarm list, mark list) and print from a data file according to the specified template file at the specified time on the specified printer.

Report Output
You can create a report file (PDF, Excel) from a data file according to the specified template file and specified report settings. You can create report data (PDF, Excel) of the average, Max., minimum, sum, and instantaneous values over a specified duration.

Manual Print (Custom Print & Custom Report)
In addition, custom print and report output can be performed manually from the Data files.

Print Types and Their Characteristics

		Standard	Custom	Report Output
Use		Auto printing at the specified time	Auto printing at the specified time using the specified layout	Auto printing at the specified time using the specified layout and report type
Condition		Hourly, Daily, Weekly, Monthly, Periodically, End of record	Hourly, Daily, Weekly, Monthly, Periodically, End of record	Hourly + Daily, Daily + Weekly, Daily + Monthly, Batch, Daily custom
Print Layout		Cannot be specified	Can be specified	Can be specified
		None	Report templates for PDF report files (*.tpl)	Report templates for Excel report files (*.xlsx, *.xlsm), Report templates for PDF report files (*.tpl)
Graph	Print type	Trend Graph, Circular, Sheet, Alarm List, Mark List	Trend Graph, Alarm List, Mark List	Trend Graph, Alarm List, Mark List
	Number of graphs	1 graph/setting	Up to 4 graphs/setting	Up to 4 graphs/setting
	Items	Specified with Print Header	Specified with keyword	Specified with keyword
	Output channel	Cannot be specified	Can be specified	Max. 100 ch
Print destination		Local printer	Local printer, PDF file	Local printer, PDF file, Excel file
Number of graph print pages		Multiple pages	single page	single page

Operating Conditions
- To perform custom print or report output, you must specify a template file.
  SMARTDAC+ Report Template Builder (a tool for creating and viewing report templates in PDF format) can be downloaded from the following URL:
  www.smartdacplus.com/software/en/
- The printers that can be used with the Report/Print function are the local printers registered on the server PC. Network printers are not displayed in print settings. To use a network printer, it must be registered as a local printer.
- Printing may not be possible depending on the settings, such as when security is enabled on the printer side.
- Virtual printers, such as Microsoft OneNote and Adobe PDF, cannot be used.
- Auto print schedules that have not been completed due to a PC shutdown are executed again when the server recovers. However, output results of auto print executed in this way may have up to 10 minutes of data missing before the shutdown.

Math Function (/MT)
The GA10's Math function (/MT option) can be used to set expressions with constants, operators, and functions to display and record (save) the computed results. To use the Math function, you need to set the math tags (channels) on the Math Tag Setting Page.
- 2000 math tags are available, and expressions of up to 127 characters can be set on each.
- Computation starts when data collection starts. You can reset computation from the menu, separately from the acquisition and recording operation, and also can configure the software to reset computing automatically when recording is started.
- You can view the computation execution status with an icon.
- You can use as many user-defined constants as there are math tags. You can set up to 200 pairs of labels (constant names) and their values in advance.
- Up to four levels of alarms can be set for each math tag (channel.)
- You can choose an alarm type of upper limit, lower limit, high limit on rate of change, or low limit on rate of change.
- An hysteresis width can be assigned.
- Alarm sound: The PC makes the GA10's standard alarm sound. You can stop by button operation. Sharing / non-sharing of button operations can be selected between clients. Alarm sound file in MP3 format can be set to each math tag.

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Item	Description
Computation interval	100 ms
Number of math tags (math channels)	The number is synchronized to the number of measurement tags (number of measurement channels) as shown in the following table. (200 to 2000)

Measurement tags	Math tags
100	200
200	200
500	500
1000	1000
2000 or more	2000

Item		Description
Number of math tags (math channels)		If the number of measurement tags increases due to an upgrade, the number of math tags also increases accordingly.
Available expressions	Operators	Four arithmetic operations, remainders, logical operations, relational operations, conditional operations, and Bit operations.
	Functions	Event functions: Functions that perform specific actions (such as math reset or marking.) Reference functions: Functions for retrieving measured values and alarm values. Arithmetic functions, Time functions, Integration functions (/WH option), Moving average functions.
Math constants	User-defined math constants	Constants that you can set up to 200 pairs of labels and values in advance. You can use as many user-defined constants as there are math tags.
	Predefined math constants	Mathematical constants, such as undefined value, over range, Pi, and e, and constants used as parameters of functions can be used as predefined constants.
	Numeric math constants	Can be entered directly into expressions.
Setup items	Span	Decimal point, Min., Max.
	Unit	Up to 6 characters
	Alarms	4 levels: H, L, rH, rL
	Tag number	Up to 16 characters.
	Tag comments	Up to 32 characters.

Operating Conditions

Before using the Math function, set the data time to PC time. If set to Device time, the Math function does not work.

OPC-UA Server Function (/UA)

The GA10's OPC-UA server function enables OPC-UA clients of a host system to access GA10's data. This function can be used to deliver tag information and measured values to OPC-UA clients. Additionally, this function can be used to perform the following server certificate operations.

Installation

Installs the certificate file that the user has prepared in GA10 to make it an OPC-UA server certificate. The certificate must be generated from an internal private key.

Creating a Self-Signed Certificate

A server certificate is typically issued by a certification authority (CA) signing a certificate signing request (CSR). This function can generate a self-signed certificate that can be used when a certification authority (CA) signature is not necessary. A self-signed certificate can be generated from the internal private key and installed.

Creating a Certificate Signing Request (CSR)

A certificate signing request (CSR) to be signed by a certification authority (CA) can be created. It is created from the internal private key available at the time of execution. Basic functions of the OPC-UA server are listed below.

Specification	Description
Compatible profile	UA 1.02 Micro Embedded Server DataAccess Server Facet
Used port	4840: OPC UA TCP Protocol (can be changed)
Max. number of client connections	16 (Max.16 sessions)
Max. number of subscriptions	100/session
Max. number of monitor items	2000/session
Sampling interval	100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 20s, 30s, 1min, 2min, 5 min, 10min
Supported services	FindServers, GetEndpoints
	CreateSession, ActivateSession, CloseSession
	Browse, BrowseNext TranslateBrowsePathsToNodeIds, RegisterNodes, UnregisterNodes
	Read
	CreateMonitoredItems, ModifyMonitoredItems, DeleteMonitoredItems, SetMonitoringMode
	CreateSubscription, ModifySubscription, DeleteSubscriptions, Publish, Republish, SetPublishingMode
Data	Device status information, Device name, Device serial number, Measured value, Upper and lower range limits, Unit, Status of all alarms, Status of each alarm [1]

1   For more information, see User's Manual (IM 04L65B01-01EN.)

Operating Conditions

• There is no compatibility with OPC-DA or other types of OPC communication.
• To confirm the connection compatibility of the OPC-UA products, visit the following website: **http://www.smartdacplus.com/en/**

Custom Display Function (/CG)

With the Custom Display function you can add your original monitor screens to GA10 standard monitor screens (Trend, Meter, Digital, and Alarm.) The original monitor screen can be created by using DAQStudio (DXA170)[1] .

• The original monitor screen can be saved as a display data file.
• You can register the display data files (.gacd), and use them as the monitor screen.
• 1 display data file can be registered for each project. Additionally, 50 screens can be registered in 1 display data file.
• The size and the position of a monitor screen can be set for each project.

• You can use the following components on DAQStudio to create the monitor screens of GA10. [1]

Component type	Component name
Diagram components	Line, Triangle, Rectangle, Arc, Ellipse,
Components for channel assignment	Simple digital, Digital, Simple bar meter, Bar meter, Simple analog meter, Analog meter, Alarm, Representative alarm, Integration bar, Integration trend
Status display component	Disk memory bar
Label components	Label, System label
Components with action functions [2]	Button operation, Digital output, Value list output, Controller component
Components for summary display (GA10: Components for Alarm list)	Alarm summery
Components for trend display	Trend
Components for static image display	Image

1 If you purchased the custom display function, a license for DAQStudio (DXA170), a software application for creating screens, is included.
2 You can control GA10 and devices on the custom display monitor by using the components. For more information about components or operation, see DAQStudio User's Manual (IM 04L41B01-62EN.)

Integration Display Function (/WH)

The integration display function can be used to display integrated effective power or flow rate acquired from a device on an integration graph (integration bar, integration trend).
The integrated effective power can be acquired from a Universal Power Monitor (UPM100, UPM101) and monitored on an integration graph. Demand monitoring is also possible.
In addition, data acquisition of multiple groups is possible by acquiring the integrated effective power data from Universal Power Monitors through the GM data acquisition unit. This makes it possible to comprehensively monitor an entire factory.
In demand monitoring, the estimated demand and alarms can be displayed in addition to the current demand power with respect to the target power.
Integration report files of integrated effective power and demand monitoring data files can be exported.
  * The integration display function is available when the monitor interval is 10 minutes or less.

Integration groups

• You can set up to 20 groups. Up to 50 integration tags can be registered in a group.
• You can set the names of integration groups and the colors of the displayed report channels.

Integration display

• Integration reports can be displayed in the form of integration bars or integration trends. The integration bar display also shows the total integrated quantity.
• Daily reports, weekly reports, monthly reports, and yearly reports can be displayed by switching between them.
• The current display time and previous time can be displayed in the top and bottom rows, respectively, for comparison.

Demand monitoring

• The demand period can be set to 15 min, 30 min, or 1 Hour.
• The alarm mask time* can be set in the range of 0 to 10 (when the demand period is 15 min) or 0 to 20 (when the demand period is not 15 min).
* A time zone in which alarms are not detected after demand monitoring is started.
• You can set four basic alarms. You can set the shape of each alarm (○, □) and the color of On and Off indications.
• You can set a cut-off alarm. You can set the shape of the alarm (○, □) and the color of On and Off indications.

GateSushi Function (/SU)

With the GateSushi function, you can acquire Sushi Sensor data through the LoRaWAN gateway.
• Register up to 1000 Sushi Sensors.
• Set up to 4 levels of alarms per Sushi Sensor.
• Automatically convert units (°C to °F).
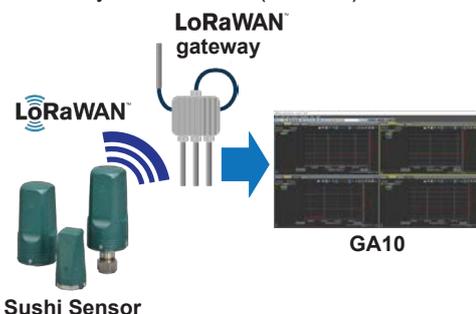
Data Merge Function (/DM)

The data merge function allows you to create a single file of data collected/recorded from multiple instruments (VZ20X) with the time mode prioritizing Device time. And if monitoring on the trend screen, you can also display the data on a single screen.
• Connect up to 15 VZ20Xs
   * The VZ20X and VZ20X are time-synchronized, and must be set to the same data acquisition interval.
   * The data merge function and the functions listed below cannot be used within the same project. If you want to use the data merge function, you can use it in a different project.
   Math function (/MT), integration display function (/WH), anomaly detection function, and future pen function

Things to note when using the data merge function

Depending on the communication environment, PC specs, and the run status of other software programs in the PC, data loss may occur for a brief period of time. When using the date merge function, ensure that the communication environment is stable and use a high-spec PC. For details on high-spec PCs, see "High-Spec Hardware" on page 12.

WEB Server Function (/WA, /WB, /WC)

Adds a web server to the GA10 server PC, which enables you to monitor data acquired by the GA10 from a browser on a tablet or PC.
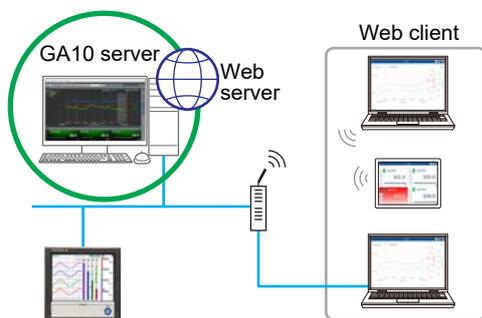
Web server specifications

- Supported protocol: HTTPs
- Port numbers: 1 to 65535 (default: 443)
- Maximum number of concurrent users: 20

Option	Number of concurrent users
/WA	5
/WB	10
/WC	20

- Login management: User account and guest (no credentials)
- Authentication: FORM authentication

Web client specifications

- Operating environment:

| OS	Browser
iPadOS	Google Chrome
iOS	Google Chrome
Android	Google Chrome
Windows [1]	Google Chrome
	Microsoft Edge

1   Same as GA10 supported OS

- Monitoring screens: Trend (including historical data), Digital, Alarm list, Favorites

Networking

For information on the network environments for the Web server function, see "Operating Environment" on page 12.

External Access Function (/EA)

Reads text files created by external programs*, performs real-time analysis of acquired data, and monitors analysis results.
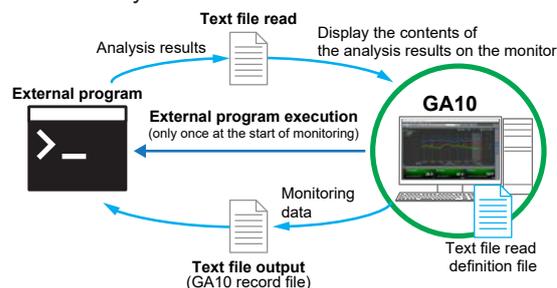
* User-created AI programs (such as with TensorFlow)

- External program execution: Runs registered external programs once at the start of monitoring.
    Maximum number of external programs that can be registered: 30
    Number of external programs that can be run: 1 per project
- Text file reading: Reads and monitors files created by user programs.
    File format: Text (csv or tsv)
  Text reading definition file: A definition file for reading text files.
    File format: Text (csv or tsv)
- Text file output*: Outputs files so that external programs can read the GA10 data in real time.
    File format: text (specify csv or tsv)
    Maximum number of tags per file: 600
    Maximum number of data per file: 3600
    * With the GA10 2000 tag model

Operating conditions

Valid when the data time is PC time.

■ PC System Requirements

Operating Environment

The GA10 is intended for use in a closed (non-Internet) network. The warranty is invalid if the GA10 is used over the Internet.

Hardware

Item		Description
CPU	Windows 10	Intel Core2 Duo E6300 or faster x64 or x86 processor.
	Windows 11	Core i5 or faster and 8th generation or later Intel processor
Main memory	Windows 10	2 GB or more
	Windows 11	8 GB or more
Hard disk	Windows 10	500 MB or more of free space, NTFS recommended.
	Windows 11	64 GB or more of free space, NTFS recommended.
Mouse		Mouse compatible with OS
Display		Display compatible with OS
Communication ports[1]		• RS-232 or Ethernet port compatible with the OS. • To perform RS-232 communication or RS-422/485 communication with a connected device, the server PC needs a RS-232 serial port. • A USB port is required for USB communication.

1 Operation is not guaranteed in case converter cables, such as USB-to-Serial, are used for the communication.

High-Spec Hardware

The performance is guaranteed with the following PC specs or higher when using the 5000 tag (ch) model, 10000 tag (ch) model, or the data merge function (/DM).

Item	Description
PC	Desktop type, 64 bit OS
CPU	Equivalent to Intel Xeon E5 or faster x64 processor (mid-range CPUs for servers)
Main memory	8 GB or more
Hard disk	100 GB or more of free space, SSD (M.2 NVMe)

Operating System [1] [2]

OS	Edition	32 bit	64 bit	SP	Browser
Windows 10	Home	Yes	Yes	No SP	Edge [3]
	Pro	Yes	Yes	No SP	Edge [3]
	Enterprise	Yes	Yes	No SP	Edge [3]
	Enterprise LTSB	Yes	Yes	No SP	Edge [3]
	Enterprise LTSC	Yes	Yes	No SP	Edge [3]
Windows 11	Home	No	Yes	No SP	Edge [3]
	Pro	No	Yes	No SP	Edge [3]
	Enterprise	No	Yes	No SP	Edge [3]
Windows Server 2012	Standard	No	Yes	No SP	Edge [3]
Windows Server 2012 R2	Standard	No	Yes	Update	Edge [3]
Windows Server 2016	Standard	No	Yes	No SP	Edge [3]
Windows Server 2019	Standard	No	Yes	No SP	Edge [3]

1 Make sure to use the same language setting for this software, Windows OS, and the recorders that data is to be collected from.
2 Yokogawa will also stop supporting OSs that Microsoft Corporation no longer supports.
3 Refers to Microsoft Edge (Chromium based). If Edge is not installed but Google Chrome is, features that use a browser will open Chrome.

Other Operating Environments

Item	Description
Microsoft Office Excel [1]	2010, 2013, 2016, 2019
Acrobat Acrobat Reader	Adobe Reader X and later (latest version recommended)
Web browser	Microsoft Edge or Google Chrome
RS-232 - RS-422/485 converter	To perform RS-422/485 communication with a connected device, use a converter. (YOKOGAWA ML2 recommended)
Microsoft .NET [3]	6.0 or higher
Microsoft Visual C++ 2015-2019 Redistributable [3]	It is a package called the Visual C++ Redistributable Package.
Access by Tablet	Recommend 8" x 14" screen, with a web browser that supports the Web client operating environment specifications. Support is verified for the following tablets. Apple iPad Apple iPad Pro Apple iPad Air Apple iPad mini NEC Lavie T8 (Android terminal)

1 Use Microsoft Office Excel 2010 or later to view Excel reports generated with the Report/Print function (/RP option).
2 The GateSushi screen is compatible with Microsoft Edge and Google Chrome.
3 If you run the GA10 installer for version R4.02.01 or later, these runtime and packages are automatically installed. You do not need to prepare anything in advance.

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■ Model and Suffix Codes

Basic Software

Data Logging Software

Model	Suffix Code	Optional code	Description
GA10			Data Logging Software License
Number of channels [1]	-01		100 ch
	-02		200 ch
	-05		500 ch
	-10		1000 ch
	-20		2000 ch
	-50		5000 ch [4] [5]
	-A0		10000 ch [4] [5]
Optional functions		/RP	Report/Print function
		/MT	Math function (Max. 2000 ch)
		/UA	OPC-UA server function
		/CG	Custom display function [2]
		/WH	Integration display function [3]
		/SU	GateSushi function [4]
		/DM	Data merge function [6]
		/WA	WEB server function : Number of users 5 [7]
		/WB	WEB server function : Number of users 10 [7]
		/WC	WEB server function : Number of users 20 [7]
		/EA	External access function

1   When making an order, add the number of communication channels to the number of input channels. If you want to log the math channel of the connected device, also add "the number of math channel".
2   To create monitor screens, you need DAQStudio (DXA170), a software sold separately. The /CG option includes a license for DAQStudio.
3   /MT option must be separately specified when the /WH is selected.
4   The maximum number of display groups is 200.
5   Install using the dedicated installer for the 5000 tag model and 10000 tag model.
6   Use the 64-bit standard installer to install. The 32-bit installer or the dedicated installer for the 5000 tag model and 10000 tag model cannot be used.
7   You can specify one of the following: /WA, /WB, or /WC.

Additional Channels or Functions

Data Logging Software Upgrade license

Model	Suffix Code	Description
GA10UP		Channels upgrade license for GA10
Upgrade	-01	100 ch to 200 ch, 200 ch to 500 ch, 500 ch to 1000 ch, 1000 ch to 2000 ch
	-02	100 ch to 500 ch, 200 ch to 1000 ch, 500 ch to 2000 ch
	-03	100 ch to 1000 ch, 200 ch to 2000 ch
	-04	100 ch to 2000 ch
	-0A	2000 ch to 5000 ch [3] [4] [6]
	-0B	5000 ch to 10000 ch [3] [5] [6]
	-0C	2000 ch to 10000 ch [3] [4] [6]
	-RP	Report/Print function
	-MT	Math function
	-UA	OPC-UA server function
	-CG	Custom display function [1]
	-WH	Integration display function [2]
	-SU	GateSushi function [3]
	-DM	Data merge function [7]
	-WA	WEB server function addition :Add 5 users [8]
	-WB	WEB server function addition :Add 10 users [8]
	-WC	WEB server function addition :Add 20 users [8]
	-EA	External access function addition

1   To create monitor screens, you need DAQStudio (DXA170), a software sold separately. The -CG option includes a license for DAQStudio.
2   If the GA10 does not have the math function (/MT), you also need to upgrade to add the math function (-MT).
3   The maximum number of display groups is 200.
4   You can use it if the server license is for 2000 tag (ch) model.
5   You can use it if the server license is for 5000 tag (ch) model.
6   Install using the dedicated installer for the 5000 tag model and 10000 tag model.
7   Use the 64-bit standard installer to install. The 32-bit installer or the dedicated installer for the 5000 tag model and 10000 tag model cannot be used.
8   The maximum number of concurrent users for the web server function is 20.

Additional Monitoring PCs (clients)[1]

Data Logging Software Client license

Model	Suffix Code	Description
GA10CL		Client license for GA10
Number of licenses	-01	1 license
	-05	5 licenses
	-10	10 licenses
	-50	50 licenses

Version Compatibility

• Make sure that the version of the added client is the same as the server version.

• Projects created in an older GA10 version can be used in the latest version (upper compatible). Projects are not displayed for the opposite case.

• If an option is added to the GA10, projects created in the previous configuration can be used with the GA10 in the current configuration. Projects are not displayed for the opposite case.

• Be sure to export the project (output and save) before entering the upgrade license. After registering the license, import the project (reload) for use.

Compatibility with the 5000 Tag Model and 10000 Tag Model

- You can use project information files created in version R3.07 or earlier by importing them to the 5000 tag model or 10000 tag model. [1] Before you upgrade from version R3.07 or earlier to a 5000 tag model or 10000 tag model, export the project information first.
    1 Excluding OPC-UA server projects and GateSushi server settings
- You cannot connect to servers installed using the dedicated installer for the 5000 tag model and 10000 tag model from a different PC that was installed using the standard installer as the client. The reverse applies.

■ How the Software is Provided

Name	Description
License sheet	Contains the license keys. Check that the correct number of licenses are present. If you purchased the custom display function, a license for DAQStudio (DXA170), a software application for creating screens, is included.
GA10 Data Logging Software Downloading Software and Manuals	1 sheet (A4 size)

Software

Download the latest version from the following URL:

www.smartdacplus.com/software/en/

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 Acrobat Reader (the latest version recommended).

www.smartdacplus.com/manual/en/

License Keys

The license key for GA10 has been changed to R4.01 or later. However, license keys purchased before R3.10 are still valid.
R3.10 or earlier: ***-****-*****-****
R4.01 or later: ***-********-*****-****

■ Basic Conditions and Individual Contracts at the Time of Purchase

The warranty for this product is defined in the basic conditions and individual contracts at the time of purchase. The individual conditions are as follows.

- **Validation**
  Yokogawa does not guarantee the final outcome of validation work even if there is a defect in the product. For the warranty of validation services, please contact the company that performed the validation work.

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