Panasonic
INDUSTRY

RTEX EtherCAT

Motion Controller

GM1 SERIES

CE Marking conformity | KC PNP types are excluded from KC marking | UKCA

PLC + Motion + Communication
All - in - one

IN Better
Solution

RTEX type

EtherCAT type
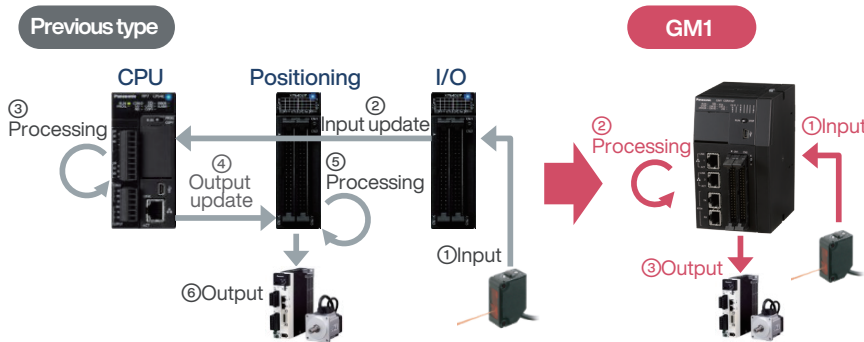
2022.7

PLC + Motion + Communication

Integrate PLC and motion

Standardization of PLC programming

Enhanced communication between the upper level and the device

---

Integrate PLC and motion

High speed motion control Fastest cycle 500μs
Multitask control by function aggregation

Previous type

CPU Positioning I/O

③ Processing
② Input update
④ Output update
⑤ Processing
①Input
⑥Output

GM1

② Processing
①Input
③Output

Motion control

- Positioning / Speed control / Torque control
- Cam synchronization, Gear synchronization, CNC control

Multitask control

- High speed motion control
- Display / Device / Upper communication
- Data processing

Standardization of PLC programming

Break away from manufacturer-dependent programming

Programming: IEC61131-3 standard compliant, PLCopen
Supports 6 languages: LD / ST / FBD / SFC / IL / CFC
Componentization by library function
Supports object orientation

GM Programmer

Panasonic
Control
GM Programmer

*It can be downloaded free of charge from our website.

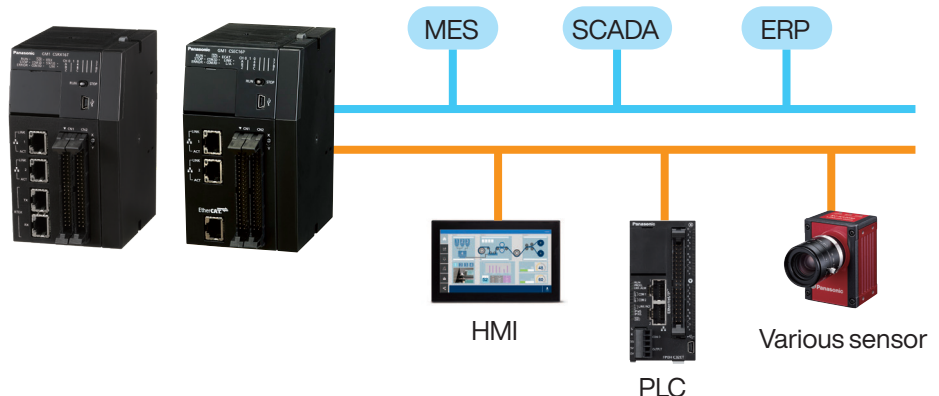## Enhanced communication between the upper level and the device

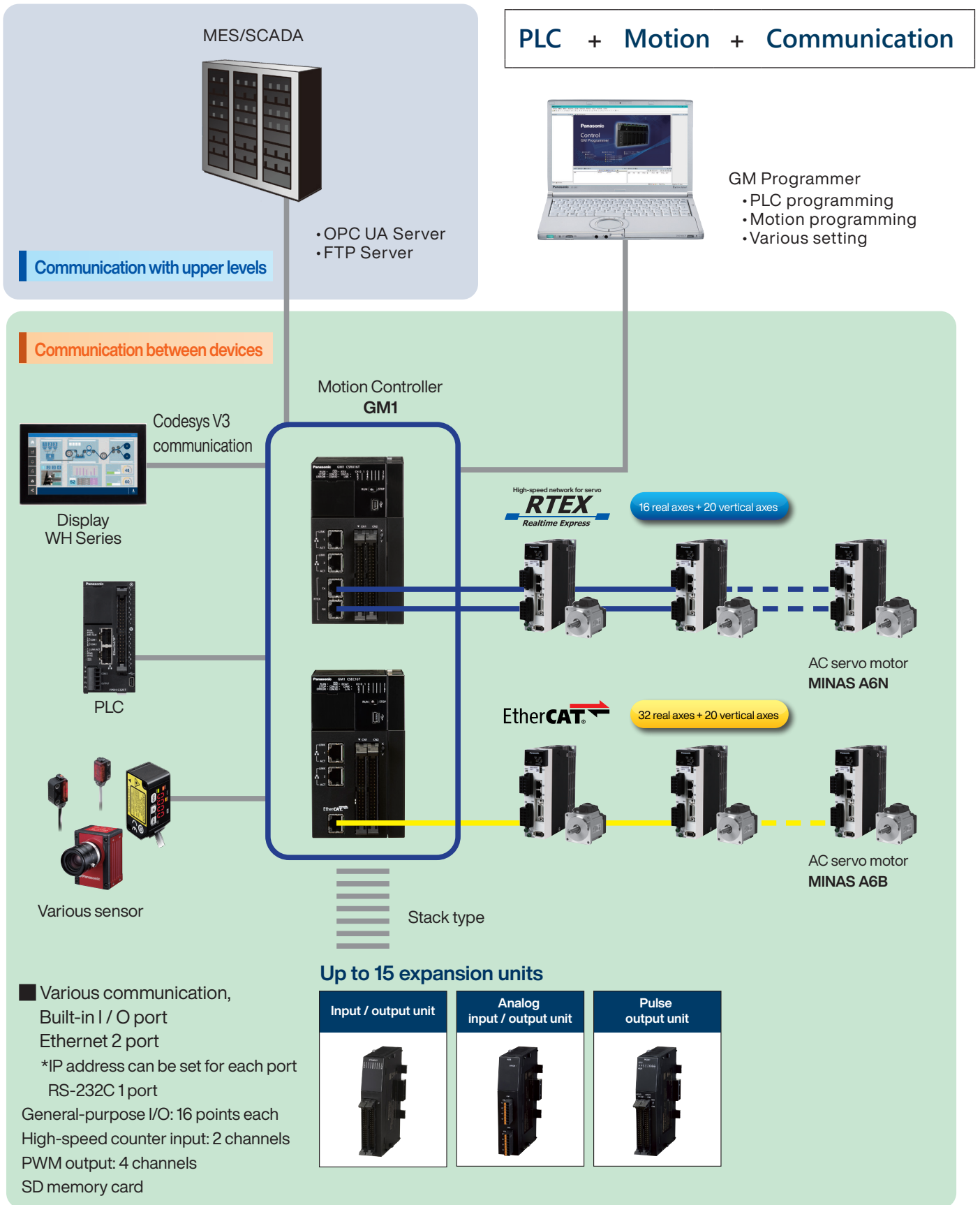### Supports various network protocols

Communication with upper levels

OPC UA Server
FTP Server

Communication between devices

Ethernet/IP
Modbus
Codesys V3 communication

MES   SCADA   ERP

HMI

PLC

Various sensor

System configuration

MES/SCADA

PLC + Motion + Communication

•OPC UA Server
•FTP Server

GM Programmer
•PLC programming
•Motion programming
•Various setting

Codesys V3
communication

Motion Controller
GM1

High-speed network for servo
RTEX
Realtime Express

16 real axes + 20 vertical axes

Display
WH Series

PLC

EtherCAT

32 real axes + 20 vertical axes

AC servo motor
MINAS A6N

Various sensor

AC servo motor
MINAS A6B

Stack type

Up to 15 expansion units

Input / output unit	Analog input / output unit	Pulse output unit

■ Various communication,
   Built-in I / O port
   Ethernet 2 port
   *IP address can be set for each port
   RS-232C 1 port
 General-purpose I/O: 16 points each
 High-speed counter input: 2 channels
 PWM output: 4 channels
 SD memory card

* Realtime Express and RTEX are registered trademarks of Panasonic Holdings Corporation.
  Realtime Express is a high-speed and synchronous motion network exclusively developed by our company.
* The EtherCAT is a registered trademark of patented technology licensed from Beckhoff Automation GmbH in Germany.
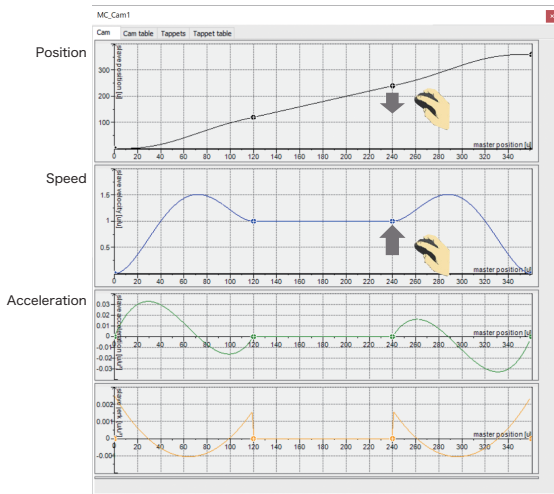
Motion

Various motion control is possible

- Motion and input / output control with the fastest control cycle of 500 μs (including expansion unit)
- Motion control that can be configured with 3 elements of real axis / virtual axis / encoder axis
- Not only basic single axis control (position / speed / torque control) but also multi-axis synchronous control (gear cycle, cam cycle, interpolation control, CNC control) is possible.

You can freely generate a cam curve with the cam editor

- Adjustment is possible while looking at the position, speed, and acceleration curve of the slave axis using the cam editor.
- Timing adjustment with other devices according to the master position is possible (tappet function)

Cam editor

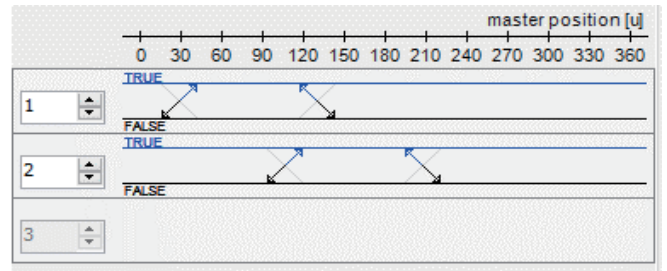Connect points with a linear or degree 5 polynomial

Tappet

Set ON / OFF timing for IO output, etc.

Final adjustment on the cam table input screen

Trajectory generation by G-code description and 3-axis synchronous control are possible with CNC editor

- Control according to the application is possible from interpolation control to complicated trajectory control.
- In-program variable import, repeat processing, coordinate conversion, and smoothing are possible by G-code description.

G-code editor

Graphic editor

```
1   N00 G99 X10 Y0
2   N01 G01 X10 Y10
3   N02 G03 R10 X-10 Y10
4   N03 G01 X-10 Y-10
5   N04 G03 R10 X10 Y-10
6   N05 G01 X10 Y0
```
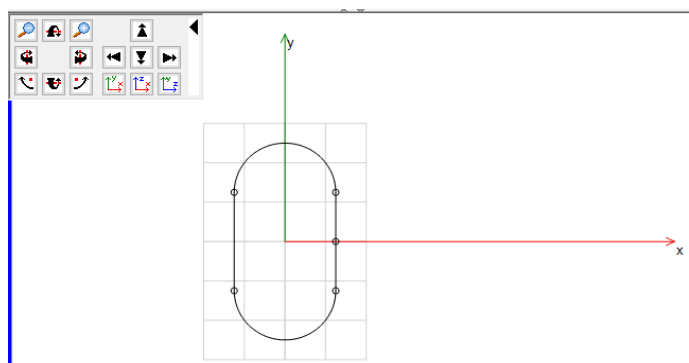
Achieve object-oriented programming

- Divided implementation by POU (program configuration unit)
- Program part, function part (FB, FUN), variable definition part (structure, enumeration, union)
- FB methods and inheritance (equivalent to class concept), interfaces available
- Realization of componentization by library function

```
1  PROGRAM Prog
2  VAR
3      AAA: BOOL;
4      BBB: BOOL;
5      CCC: REAL;
6  END_VAR
7
```
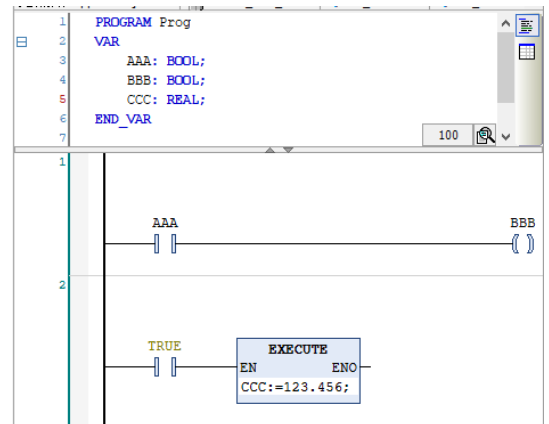
## Project data management is possible   New function

Recipe manager function

- Management of product type data
- Backup / restore of retained data

Variable	Type	Name	Comment	Minimal Value	Maximal Value	Current Value	InitialRecipe	Rcp1	Rcp2
GVL.stRecipesData.int_val[0]	INT	Width		0	10		0	0	0
GVL.stRecipesData.int_val[1]	INT	Height		0	100		1	1	1
GVL.stRecipesData.int_val[2]	INT	Weight		0	99		2	2	2
GVL.stRecipesData.int_val[3]	INT	Length1		0	10000		3	3	3
GVL.stRecipesData.int_val[4]	INT	Length2		0	10000		4	4	4
GVL.stRecipesData.int_val[5]	INT	Length3		0	10000		5	5	5
GVL.stRecipesData.int_val[6]	INT						6	6	6
GVL.stRecipesData.int_val[7]	INT						7	7	7
GVL.stRecipesData.int_val[8]	INT						8	8	8
GVL.stRecipesData.int_val[9]	INT						9	9	9

Project management function

By operating the main unit
- Project backup to SD
- Project restore from SD
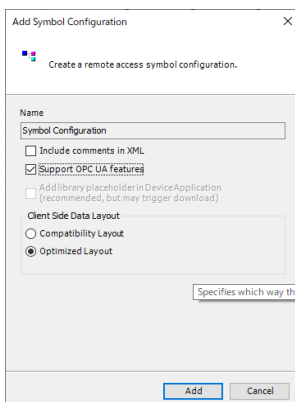
Backup

Restore

SD
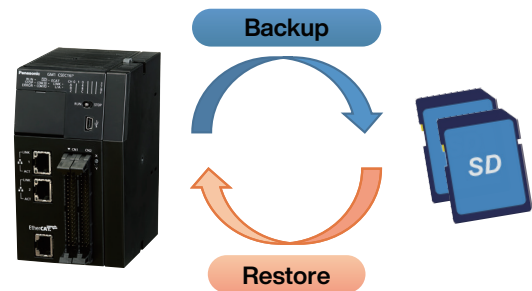
Communication settings can be set easily   New function

Can be easily registered to the display or OPC UA server
Variable list can be generated in XML file

(1) Enable / disable OPC UA server

Add Symbol Configuration

Create a remote access symbol configuration.

Name
Symbol Configuration
☐ Include comments in XML
☑ Support OPC UA features
☐ Add library placeholder in Device Application (recommended, but may trigger download)
Client Side Data Layout
○ Compatibility Layout
● Optimized Layout

Specifies which way the

Add   Cancel

(2) Check the variables to be published and register

Symbol Configuration ✕

View ▾   Build   Settings ▾ Tools ▾
Changed symbol configuration will be transferred with the next download or online change

Symbols	Access Rights	Maximal	Attribute	Type	Members	Comment
Constants						
GVL						
☑ asRecipeNames				ARRAY [1..30] OF STRING		Recipe Name
☑ iRecipeCnt				INT		Recipe Count
☐ stMachineData				Test_St	...	Machine Data
☐ stRecipesData				Test_St	...	Recipe Data
☐ stSettingData				Test_St	...	Other Data

Specifications

■ GM1 Controller unit common specifications

RTEX type
AGM1CSRX16T

EtherCAT type
AGM1CSEC16T
AGM1CSEC16P

Item	Specifications
Rated voltage	24 V DC
Operating voltage range	20.4 to 28.8 V DC
Allowable momentary power failure time	10 ms
Operating ambient temperature	0 to +55 ℃
Storage ambient temperature	-40 to +70 ℃
Operating ambient humidity	10 to 95 %RH (at +25 ℃, no condensation or icing)
Storage ambient humidity	10 to 95 %RH (at +25 ℃, no condensation or icing)
Vibration resistance (Leakage current 5 mA)	500 V AC for one minute (Note 1)
Insulation resistance (Test voltage 500 V DC)	100 MΩ or more (Note 1)
Vibration resistance	Compliant with JIS B 3502, IEC 61131-2 5 to 8.4 Hz, half amplitude 3.5 mm 8.4 to 150 Hz acceleration 9.8 m/s^2 10 sweeps each in X, Y and Z directions (1 octave/min)
Shock resistance	Compliant with JIS B 3502, IEC 61131-2 147 m/s^2, 3 times each in the X, Y, Z directions
Noise resistance	1000 V [P-P] with pulse widths of 1 μs and 50 ns (using a noise simulator) (Power supply terminal)
Atmosphere	Free of corrosive gases No excessive dust
European EU standards	EMC : EN 61131-2 RoHS : EN IEC 63000
Overvoltage category	Category II
Pollution degree	2

(Note 1): For details about the Dielectric strength or the Insulation resistance, check on the specifications of each product.

Specifications of the USB Port

Item	Specifications
Standard	USB2.0 Fullspeed
Connector shape	USB miniB type

Specifications of the COM Port (RS-232C)

Item		Specifications
No. of channels		1
Physical layer		RS-232C, three-wire system (non-isolated)
Transmission distance		MAX. 15 m
Communication mode		1:1 communication
Communication method		Half-duplex transmission
Transmission line		Multicore shielded wire
Baud rate		9600 / 19200 / 38400 / 57600 / 115200 bps
Communication format	Data length	7 bit / 8 bit
	Parity	None, odd, even
	Stop bit	1 bit / 2 bit
	Start code	None
	End code	None
Connector shape		Removable terminal block (5-pin)

Specifications of the LAN Port

Item		Specifications
Number of ports		2
Communication interface		Ethernet 100BASE-TX / 10BASE-T
Baud rate		100 Mbps / 10 Mbps, automatic negotiation
Max. segment length		100 m (Note 1)
Max. distance between nodes		100BASE-TX 2 segments
		10BASE-T 5 segments
Communication cable		Shielded twisted pair (TIA/EIA-568B CAT5e or higher)
Communication protocol		TCP/IP UDP
No. of simultaneous connections	LAN1	Maximum 16 units (System connection: 1 unit, user connection: 15 units)
	LAN2	Max. 32 units, general-purpose: 16 units A cycle restriction is applied depending on the total number of connections.
Communication method		Full-duplex / half-duplex communication
TCP/IP protocol		TCP/IP compliant (IPV4)
Functions		• Modifying or holding the network settings (IP, Subnet, Gateway) • Possible to set the same or different networks between Ethernet ports. • Routing between Ethernet ports is not performed.
LED display	LINK	Lit when connection is established with the device on the Ethernet network.
	ACT	Flashes when some communication is performed such as transmitting commands and responses with the devices with established connections.

(Note 1): The standards cite 100m as the maximum, but noise resistance measures such as attaching a ferrite core may be necessary in some cases, depending on the usage environment. Also, it is recommended to position a hub near the control board, and limit the length within 10m.

Specifications of the RTEX/EtherCAT

Item	Specifications (RTEX type)	Specifications (EtherCAT type)
Baud rate	100 Mbps	
Physical layer	100BASE-TX full duplex (IEEE 802.3u)	
Cable	Shielded twisted pair (TIA/EIA-568B CAT5e or higher)	
Topology	Ring	Daisy chain (No branching)
Insulation method	Pulse transformer	
Connector	8-pin RJ45	
Maximum cable length	Between nodes: 100 m, total length: 200 m	
Transmission distance		Between nodes: Max. 100 m
Communication cycle	500 µs to 2 ms	500 µs or more
Command update period	500 µs to 4 ms	
Operation command	Profile position, cyclic position / speed / torque	
Number of connectable axes	16 real axes , 20 vertical axes (Total 36 axes)	32 real axes , 20 vertical axes (Total 52 axes)

High-speed Counter Input Specifications

Item	Specifications		
	Input A, B, Z signals		
	24 V DC	5 V DC	
		Open collector connection	Line driver connection
Insulation method	Optical coupler		
Rated input voltage	12 V DC to 24 V DC	5 V DC	Equivalent to AM26LS31
Operating voltage range	10.8 V DC to 26.4 V DC	3.5 V DC to 5.5 V DC	
Input points per common	Independent common for each point		
Min. ON voltage / Min. ON current	10 V DC / 4 mA	3 V DC / 4 mA	
Max. OFF voltage / Max. OFF current	2 V DC / 2 mA	1 V DC / 0.5 mA	
Input impedance	Approx. 3.9 kΩ	Approx. 560 Ω	
Operating mode indicator	6-point LED display		

Input Specifications

Item		Specifications
Insulation method		Optical coupler
Rated input voltage		24 V DC
Rated input current		Approx. 3 mA (at 24 V DC)
Input impedance		Approx. 6.8 kΩ
Operating voltage range		21.6 to 26.4 V DC
Min. ON voltage / Min. ON current		19.2 V / 6 mA
Max. OFF voltage / Max. OFF current		2.4 V / 1 mA
Response time	OFF→ON	135 µs max. (Possible to change by using the input time constant selection function)
	ON→OFF	135 µs max. (Possible to change by using the input time constant selection function)
Input points per common		16 points/1 common
Operating mode indicator		16-point LED display (Lit when ON, SW selection)
External connection method		Connector connection (Compliant with the MIL standard, 40P)

Output Specifications

Item		Specifications (sink type)	Specifications (source type)
Insulation method		Optical coupler	Optical coupler
Output type		NPN open collector	PNP open collector
Rated load voltage		5 to 24 V DC	24 V DC
Allowable load voltage range		4.75 to 26.4 V DC	21.6 to 26.4 V DC
Max. load current		0.3 A	
Common restrictions		3.2 A/common	
Max. inrush current		1.0 A	
OFF state leakage current		1 µA or less	2 µA or less
ON state max. voltage drop		0.7 V or less	0.7 V or less
Response time	OFF→ON	6 µs or less (at an ambient temperature of 25℃)	
	ON→OFF	15 µs or less (at an ambient temperature of 25℃)	
External connection method	Voltage	4.75 to 26.4 V DC	21.6 to 26.4 V DC
	Current	35 mA/common (at 24 V)	30 mA/common (at 24 V)
Surge absorber		Zener diode	
Short-circuit protection		Provided (to automatically protect every eight points) (Note 1)	
Input points per common		16 points/1 common	
Operating mode indicator		16-point LED display (Lit when ON, SW selection)	
External connection method		Connector connection (Compliant with the MIL standard, 40P)	

(Note 1): When the maximum inrush current is exceeded, eight output points in the same protection block are turned OFF simultaneously.

Specifications

■ Input Unit Specifications

AGM1X64D2

Item		Specifications
Insulation method		Optical coupler
Rated input voltage		24 V DC
Rated input current		Approx. 2.7 mA (at 24 V DC)
Input impedance		Approx. 6.8 kΩ
Operating voltage range		20.4 to 26.4 V DC
Min. ON voltage / Min. ON current		19.2 V / 2.5 mA
Max. OFF voltage / Max. OFF current		5 V / 1.5 mA
Response time	OFF→ON	0.2 ms max. (Possible to change by using the input time constant selection function)
	ON→OFF	0.2 ms max. (Possible to change by using the input time constant selection function)
Input points per common		32 points/1 common
Operating mode indicator		Operating mode indicator: 32-point LED display (Lit when ON, SW selection)
External connection method		Connector connection (Compliant with the MIL standard, 40P, two pieces used)

■ Output Unit Specifications

AGM1Y64T
AGM1Y64P

Item		Specifications (sink type)	Specifications (source type)
Insulation method		Optical coupler	
Output type		NPN open collector	PNP open collector
Rated load voltage		5 to 24 V DC	
Allowable load voltage range		4.75 to 26.4 V DC	
Max. load current		0.3 A (20.4 to 26.4 V DC), 30 mA (4.75 V DC)	
Common restrictions		3.2 A/common	
Max. inrush current		0.6 A	
OFF state leakage current		1 µA or less	
ON state max. voltage drop		0.5 V or less	
Response time	OFF→ON	0.1 ms or less (Load current: 2 mA or more)	
	ON→OFF	0.3 ms or less (Load current: 2 mA or more)	0.5 ms or less (Load current: 2 mA or more)
External power supply	Voltage	4.75 to 26.4 V DC	
	Current	70 mA/common (at 24 V)	90 mA/common (at 24 V)
Surge absorber		Zener diode	
Short-circuit protection		None	
Input points per common		32 points/1 common	
Operating mode indicator		32-point LED display (Lit when ON, SW selection)	
External connection method		Connector connection (Compliant with the MIL standard, 40P, two pieces used)	

■ Input / Output unit Specifications

AGM1XY64D2T
AGM1XY64D2P

Item			Specifications (sink type)	Specifications (source type)
Input specifications	Insulation method		Optical coupler	
	Rated input voltage		24 V DC	
	Rated input current		Approx. 2.7 mA (at 24 V DC)	
	Input impedance		Approx. 6.8 kΩ	
	Operating voltage range		20.4 to 26.4 V DC	
	Min. ON voltage / Min. ON current		19.2 V / 2.5 mA	
	Max. OFF voltage / Max. OFF current		5 V / 1.5 mA	
	Response time	OFF→ON	0.2 ms max. (Possible to change by using the input time constant selection function)	
		ON→OFF	0.2 ms max. (Possible to change by using the input time constant selection function)	
	Input points per common		32 points/1 common	
Output specifications	Insulation method		Optical coupler	
	Output type		NPN open collector	PNP open collector
	Rated load voltage		5 to 24 V DC	
	Allowable load voltage range		4.75 to 26.4 V DC	
	Max. load current		0.3 A (20.4 to 26.4 V DC), 30 mA (4.75 V DC)	
	Common restrictions		3.2 A/common	
	Max. inrush current		0.6 A	
	OFF state leakage current		1 µA or less	
	ON state max. voltage drop		0.5 V or less	
	Response time	OFF→ON	0.1 ms or less (Load current: 2 mA or more)	
		ON→OFF	0.3 ms or less (Load current: 2 mA or more)	0.5 ms or less (Load current: 2 mA or more)
	External power supply	Voltage	4.75 to 26.4 V DC	
		Current	70 mA/common (at 24 V)	90 mA/common (at 24 V)
	Surge absorber		Zener diode	
	Short-circuit protection		None	
	Input points per common		32 points/1 common	
Operating mode indicator			32-point LED display (Lit when ON, SW selection)	
External connection method			Connector connection (Compliant with the MIL standard, 40P, two pieces used)	

■ Analog input unit Specifications

Item		Specifications
No. of input points		8 ch
Input range (resolution)	Voltage	-10 to +10 V DC (Resolution: 1/64,000) 0 to +10 V DC (Resolution: 1/32,000) -5 to +5 V DC (Resolution: 1/64,000) 0 to +5 V DC (Resolution: 1/32,000) +1 to +5 V DC (Resolution: 1/25,600) (Note 1)
	Current	0 to + 20 mA (Resolution: 1/32,000) +4 to + 20 mA (Resolution: 1/25,600) (Note 1)
Conversion speed		50 µs/ch
Exceeding the rated range		Possible to output up to the rated value ± 2%. With the 0 to 20 mA range, the lower limit is not supported for exceeding the rated range. (Note 2)
Total accuracy		±0.2 %F.S. or less (at +25 ℃) ±0.4 %F.S. or less (at 0 to +55 ℃)
Input impedance		Voltage input: Approximately 1 MΩ; current input: Approximately 250 Ω
Absolute max. input		Voltage input: Approximately -15 V to +15 V; current input: Approximately -30 mA to +30 mA
Insulation method		Between input terminals and internal circuit: Photocoupler and isolated DC/DC converter Between channels: Non-insulated
Execution / Non-execution channel settings		Possible to make non-converted channel settings.
Input range selection		Possible to make settings on a channel-by-channel basis.
Average processing	Number of averaging times	Setting range of 2 to 60,000 times
	Time average	Time setting range of 1 to 1,500 ms
	Moving average	Setting range of 2 to 2,000 times
Offset / Gain settings		A desired value within the digital output range can be set for the offset value. Setting range: -3000 to +3000 A desired value within the digital output range can be set for the gain value. Setting range: +9000 to +11000 (90 % to 110 %)
Scale conversion settings		A desired value within the digital output range can be set for the scale conversion setting value. Setting range: -32768 to +32767
Upper limit / lower limit comparison		Output if the value is outside the preset upper limit or lower limit. Setting range: -32768 to +32767
Max. / Min. hold		Holding max. / min. values sampled
Disconnection detection		Disconnection detection is possible for the following ranges. Possible to select auto or manual resetting. •1 to 5 V range (Detection level: 0.7 V or less) •4 to 20 m Arange (Detection level: 2.8 mA or less)

AGM1AD8

(Note 1): The full scale (F.S.) on the accuracy of an analog voltage input range from +1 to +5 V and that of an analog current input range from +4 to +20 mA are 0 to +5 V and 0 to +20 mA, respectively.
(Note 2): When a value exceeding the rated value ±2% is set, the output is rounded to a value equivalent to the rated value ±2%.

■ Analog output unit Specifications

Item		Specifications
No. of output points		4 ch
Output range (resolution) (Note 1)	Voltage	-10 to +10 V DC (Resolution: 1/64,000) 0 to +10 V DC (Resolution: 1/32,000) -5 to +5 V DC (Resolution: 1/64,000) 0 to +5 V DC (Resolution: 1/32,000) +1 to +5 V DC (Resolution: 1/25,600)
	Current	0 to +20 mA(Resolution: 1/32,000) +4 to +20 mA (Resolution: 1/25,600)
Conversion speed		50 µs/4 ch
Exceeding the rated range		Possible to output up to the rated value ± 2%. With the 0 to 20 mA range, the lower limit is not supported for exceeding the rated range. (Note 2)
Total accuracy		±0.2 %F.S. or less (at +25 ℃) ±0.4 %F.S. or less (at 0 to +55 ℃)
Output impedance (voltage output)		0.5 Ω or less
Maximum output current (voltage output)		10 mA
Output allowable load resistance (current output)		500 Ω or less
Insulation method		Between output terminals and internal circuit: Photocoupler and isolated DC/DC converter Between channels: Non-insulated
Execution / Non-execution channel settings		Possible to make non-converted channel settings.
Clipping function		Upper and lower output limits can be set for digital input values. Setting range: -32,640 to +32,640
Scale conversion settings		A desired value within the digital input range can be set for the scale conversion setting value. Setting range: -32768 to +32767
Offset / Gain settings		A desired value within the digital input range can be set for the offset value. Setting range: -3,000 to + 3,000 A desired value within the digital input range can be set for the gain value. Setting range: + 9000 to +11000 (90 % to 110 %)
Analog output hold (in STOP mode)		A desired output value while in STOP mode can be set as a digital value. Setting range: -32640 to +32640

AGM1DA4

(Note 1): The full scale (F.S.) on the accuracy of an analog voltage output range from +1 to +5 V and that of an analog current output range from +4 to +20 mA are 0 to +5 V and 0 to +20 mA, respectively.
(Note 2): When a value exceeding the rated value ±2% is set, the output is rounded to a value equivalent to the rated value ±2%.

Specifications

■ Performance Specifications of the Pulse Output Unit

AGM1PG04T
AGM1PG04L

Item		Specifications	
Product No.		AGM1PG04T	AGM1PG04L
Output type		Transistor	Line driver
Number of control axes		4 axis, independent	
Position command	Command unit	Pulse unit (for increment or absolute)	
	Max. pulse count	Signed 32 bits (-2,147,483,648 to +2,147,483,647 pulses)	
Speed command	Command range	1 pps to 500 kpps	1 pps to 4 Mpps
		(can be set in 1 pps.)	(can be set in 1 pps.)
Acceleration / deceleration command	Acceleration / deceleration method	Linear acceleration / deceleration, S-shaped acceleration / deceleration control	
	S-shape pattern	Sine curve, Cubic curve (can be select)	
Home return	Home return speed	Speed setting possible (changes return speed and search speed)	
	Input signal	Home input, near home input, over limit input (+), over limit input (-)	
	Output signal	Deviation counter clear signal	
Operation mode		• E-point control (Linear and S-shaped acceleration / deceleration) • P-point control (Linear and S-shaped acceleration / deceleration) • Home return (Home search) • JOG operation (Note 1) • JOG positioning • Pulser input operation (Note 2) Transfer multiplication ratio (×1, ×2, ×5, ×10, ×50, ×100, ×500, ×1000) • Real-time frequency change function	
Startup time		0.001 ms / 0.005 ms / 0.02 ms	
Output interface	Output mode	Pulse/Sign, CW/CCW	
Feedback counter function (Note 2)	Counting range	Signed 32 bits (-2,147,483,648 to +2,147,483,647 pulses)	
	Input mode	2-phase input, direction identification input, individual input (transfer multiple available for each mode)	
	Max. counting speed	4 MHz (2-phase input)	
		1 MHz (Direction distinction input and individual input)	
Other functions		• Built-in over limit input (+) and over limit input (-) • Servo ON output incorporated	

(Note 1): When Linear acceleration/deceleration operation is selected, the target speed can be changed during an operation.
(Note 2): "Pulser input operation" and "Feedback counter" use the same pulse input terminal. Either function of the two can only be used.

■ List of consumption current

Unit type		Consumption current
GM1 controller RTEX type	AGM1CSRX16T	400 mA or less
GM1 controller EtherCAT type	AGM1CSEC16T	400 mA or less
	AGM1CSEC16P	400 mA or less
Input / output unit	AGM1X64D2	90 mA or less
	AGM1Y64T	160 mA or less
	AGM1Y64P	160 mA or less
	AGM1XY64D2T	120 mA or less
	AGM1XY64D2P	120 mA or less
Analog input / output unit	AGM1AD8	130 mA or less
	AGM1DA4	160 mA or less
Pulse output unit	AGM1PG04T	100 mA or less
	AGM1PG04L	100 mA or less

Product types

■ Controller

Product name	Number of axes	Network	Number of I/O	High-speed counter	Rated voltage	Output specifications	Part No.
GM1 controller	16 axes	RTEX	Input: 16 points Output: 16 points	2 ch	24 V DC	Transistor output sink(NPN)	**AGM1CSRX16T**
	32 axes	EtherCAT					**AGM1CSEC16T**
						Transistor output sauce(PNP)	**AGM1CSEC16P** *2

■ Input / output unit

Product name	Type	Number of I/O	Specifications	Part No.
Input / output unit	DC input	Input: 64 points	24 V DC 32 points/1 common	**AGM1X64D2**
	Transistor output sink(NPN)	Output: 64 points	Maximum load current: 0.3 A (20.4 to 26.4 V DC), 30 mA (4.75 V DC) 3.2 A/common 32 points/1 common	**AGM1Y64T**
	Transistor output sauce(PNP)			**AGM1Y64P** *2
	DC input Transistor output sink(NPN)	Input: 32 points Output: 32 points	Input: 24 V DC 32 points/1 common Output: Maximum load current: 0.3 A (20.4 to 26.4 V DC), 30 mA (4.75 V DC) 3.2 A/common 32 points/1 common	**AGM1XY64D2T**
	DC input Transistor output sauce(PNP)			**AGM1XY64D2P** *2

■ Analog input / output unit

Product name	Specifications	Number of channels	Part No.
Analog input unit	Conversion speed 50 μs/ch Resolution 16 bit (maximum) Accuracy ±0.2 %F.S. or less (at+25 ℃)	8 ch	**AGM1AD8**
Analog output unit	Conversion speed 50 μs/4 ch Resolution 16 bit (maximum Accuracy ±0.2 %F.S. or less (at+25 ℃)	4 ch	**AGM1DA4**

■ Pulse output unit

Product name	Output type	Number of control axes	Speed command	Part No.
Pulse output unit	Transistor	4 axes	1 pps to 500 kpps	**AGM1PG04T**
	Line driver		1 pps to 4 Mpps	**AGM1PG04L**

■ Option

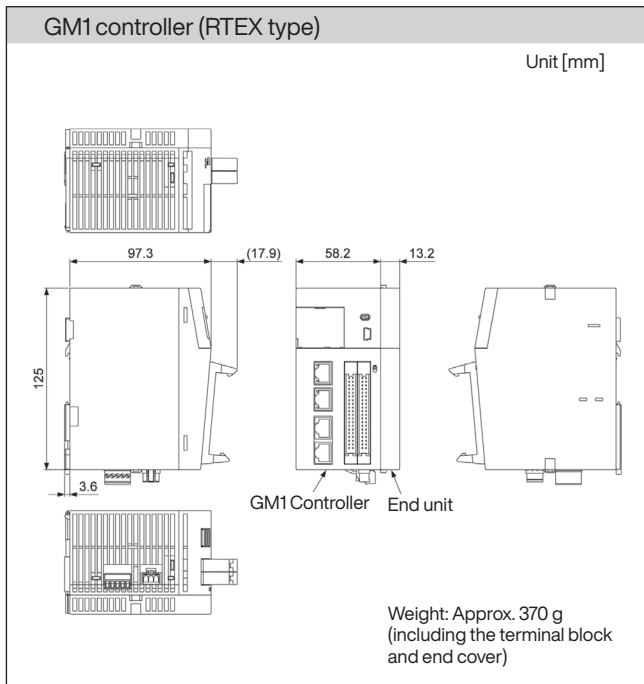| Product name	Description	Part No.
Discrete-wire connector set (40-pin)	For GM1 Controller, for Expansion Unit (2 pieces)	**AFP2801**
Flat cable connector set (40-pin)	Use for batch wiring with flat cable For GM1 Controller, for Expansion Unit (2 pieces)	**AFP2802**

*1 Connectors are not included with the controller or expansion unit. Please ensure you have the following connectors.
   Discrete-wire connector set (Part No.: AFP2801) Flat cable connector set (Part No.: AFP2802)
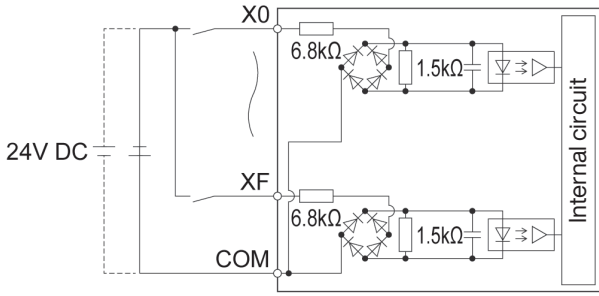   Power cable (Part No.: AFPG805) is included with the controller.
*2 Excluded from KC marking.

Dimensions

GM1 controller (RTEX type)

Unit [mm]

97.3 | (17.9) | 58.2 | 13.2

125

3.6

GM1 Controller | End unit

Weight: Approx. 370 g
(including the terminal block
and end cover)

GM1 controller (EtherCAT type)

Unit [mm]

97.3 | (17.9) | 58.2 | 13.2

125

3.6

GM1 Controller | End unit

Weight: Approx. 370 g
(including the terminal block
and end cover)

Input / output unit / Pulse output unit

Unit [mm]

97.3 | (17.9) | 26.6

125

3.6

Weight: Approx. 160 g
(including the terminal block)

Analog input / output unit

Unit [mm]

97.3 | (17.9) | 26.6

125

3.6

Weight: Approx. 150 g
(including the terminal block)

Circuit Diagram

■ Internal circuit diagram of the GM1 Controller input section

■ Internal circuit diagram of the GM1 Controller (sink type) output section
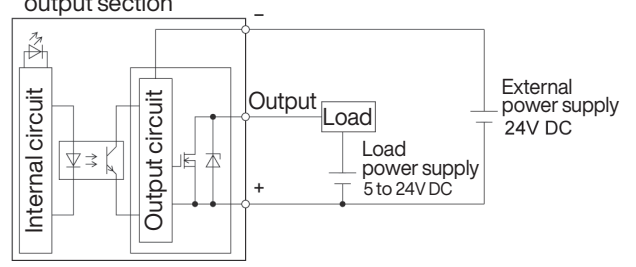
■ Internal circuit diagram of the GM1 Controller output section
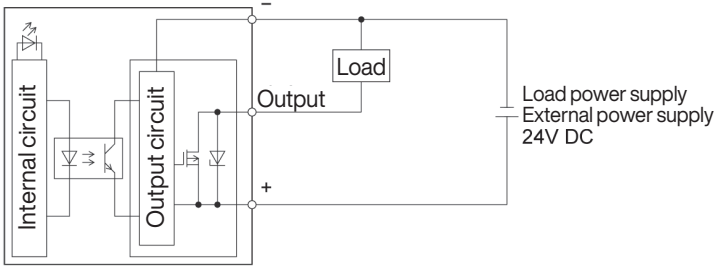
■ Internal circuit diagram of the 64-point digital input unit
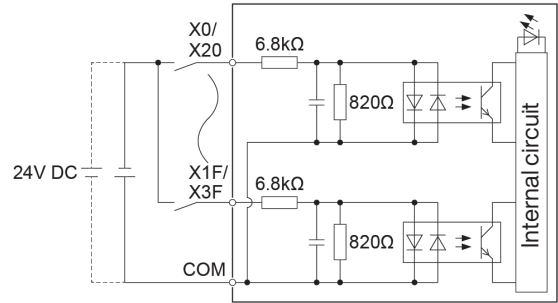
■ Internal circuit diagram of the 64-point digital output unit (sink type)
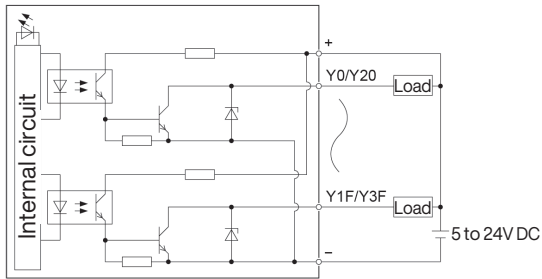
■ Internal circuit diagram of the 64-point digital output unit (source type)
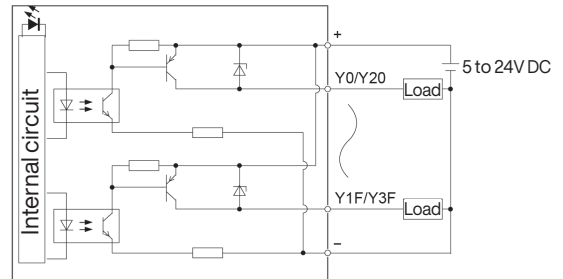
■ Internal circuit diagram of the 64-point digital input / output unit (sink type)

Input section (32 points)
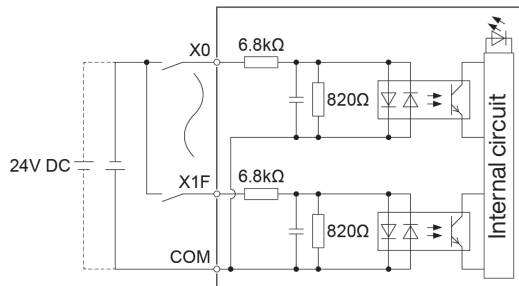
Output section (32 points)
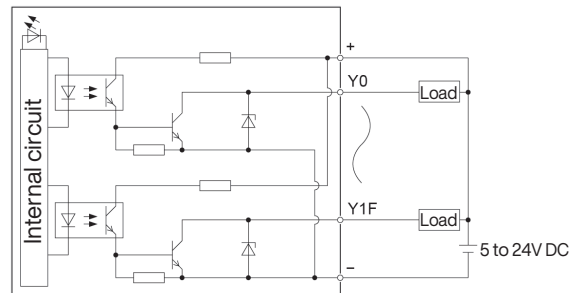
■ Internal circuit diagram of the 64-point digital input / output unit (source type)

Input section (32 points)

Output section (32 points)

Motor and driver combinations

MINAS A6 Family

Programmable Controller — **Controller**

RTEX
Realtime Express

EtherCAT®

Simple network
small axis
and distributed control

Open network
multi-axis and high-speed

Amplifier

| Standard | type |
A6NE series

Rotary motor

| Multi function | type |
A6NF series

| Standard | type |
A6NM series
A6NL series

Special Order Product

Linear motor / DD motor

*The photograph represents A6NM series.

| Standard | type |
A6BE series

Rotary motor

| Multi function | type |
A6BF series

| Standard | type |
A6BM series
A6BL series

Special Order Product

Linear motor / DD motor

*The photograph represents A6NM series.

AC Servo Motor — **Motor**

MSMF
Low inertia

MQMF
Middle inertia/
Flat type

MDMF
Middle inertia

MGMF
Middle inertia/
Low speed/High torque type

MHMF
High inertia

Special Order Product For more information, visit the website or please request to our distributors separately.

Motor Line-up

Motor			Rated output (kW)		Rated rotational speed (Max. speed) (r/min)	Rotary encoder 23 bit absolute	Enclosure	Motor lead-out configuration	Features	Applications
Low inertia	**MSMF**	80 mm sq. or less	0.05 0.1 0.2 0.4 0.75 1.0		3000 (6000)	○	IP65	Leadwire	• Small capacity • Suitable for high speed application • Suitable for all applications	• Bonder • Semiconductor production equipment • Packing machines etc
		80 mm sq. or less	0.05 0.1 0.2 0.4 0.75 1.0		3000 (6000)	○	IP67	Connector		
		100 mm sq. or more	1.0 1.5 2.0 3.0		3000 (5000)	○	IP67	Connector	• Middle capacity • Suitable for the machines directly coupled with ball screw and high stiffness and high repetitive application	• SMT machines • Food machines • LCD production equipment etc
			4.0 5.0		3000 (4500)					
Middle inertia	**MQMF** (Flat type)	80 mm sq. or less	0.1 0.2 0.4		3000 (6500)	○	IP65	Leadwire	• Small capacity • Flat type and suitable for low stiffness machines with belt driven • Motors with gear reducers are also available.	• SMT machines • Inserter machines • Belt drive machines • unloading robot
		80 mm sq. or less	0.1 0.2 0.4		3000 (6500)	○	IP67	Connector		
	MDMF	130 mm sq. or more	1.0 1.5 2.0 3.0 4.0 5.0		2000 (3000)	○	IP67 (22.0 kW : IP44)	Connector (22.0 kW : Terminal)	• Middle capacity • Suitable for low stiffness machines with belt driven	• Conveyors • Robots • Machine tool etc
			7.5		1500 (3000)					
			11.0 15.0 22.0		1500 (2000)					
	MGMF (Low speed/ High torque type)	130 mm sq. or more	0.85 1.3 1.8 2.4 2.9 4.4 5.5		1500 (3000)	○	IP67	Connector	• Middle capacity • Suitable for low speed and high torque application	• Conveyors • Robots • Textile machines etc
High inertia	**MHMF**	80 mm sq. or less	0.05 0.1 0.2 0.4		3000 (6500)	○	IP65	Leadwire	• Small capacity • Suitable for low stiffness machines with belt driven • Motors with gear reducers are also available.	• Conveyors • Robots etc
			0.75 1.0		3000 (6000)					
		80 mm sq. or less	0.05 0.1 0.2 0.4		3000 (6500)	○	IP67	Connector		
			0.75 1.0		3000 (6000)					
		130 mm sq. or more	1.0 1.5 2.0 3.0 4.0 5.0		2000 (3000)	○	IP67	Connector	• Middle capacity • Suitable for low stiffness machines with belt driven, and large load moment of inertia	• Conveyors • Robots • LCD manufacturing equipment etc
			7.5		1500 (3000)					

NETWORK MOTION

	GM1	FP0H	FP-XH M8N
Controller			
Network	RTEX EtherCAT	RTEX	RTEX
Corresponding AC servomotor	MINAS-A6N / A5N MINAS-A6B / A5B	MINAS-A6N / A5N	MINAS-A6N / A5N
Maximum number of sync axes	RTEX　　　16 axes EtherCAT　　32 axes	4/8 axes	8 axes
Command update period (Max.)	500 μs	1 ms	1 ms
Operation command	position / speed / torque	position	position
Interpolation control	Straight line / Arc / Spiral	Straight line / Arc / Spiral	Straight line / Arc / Spiral
Synchronization command	Cam synchronization, Gear synchronization, CNC control	Synchronization, Electronic cam, Electronic clutch, Electronic gear	Synchronization, Electronic cam, Electronic clutch, Electronic gear
Tool	GM Programmer	Control FPWIN GR7 Control FPWIN Pro7	Control FPWIN GR7 Control FPWIN Pro7
Ethernet Port	2 port *IP address can be set for each port	2 port *Only one IP address can be set	none
Communication protocol (Ethernet)	OPC UA, Ethernet / IP, Modbus-TCP, CodesysV3	Ethernet / P, Modbus-TCP, MC protocol	
FTP server function	○	○	
System scale	Large ◄————————————————————————— Small		

⚠ Safety Precautions

- Before you use the product, please carefully read through the instruction manual, the installation instructions and the manuals, and understand them in detail to use the product properly.

Please contact ....

Panasonic
INDUSTRY

🔍 Panasonic Industrial   Search

Specifications are subject to change without notice.

No.PCE-GM1-3   2022.7