Panasonic
INDUSTRY

NEW RTEX EtherCAT

Motion Controller
GM1 SERIES

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

All Functions of Motion, PLC, and I/O Contained in One Unit

RTEX type

EtherCAT type

2022.4

Equipped with main functions necessary for general-purpose machine

Positioning **Torque control** **Speed control** Improves high-speed and high-accuracy

Motion control

RTEX type   Real axes: 16

EtherCAT type   Real axes: 32

Selectable network

High-speed network for servo

RTEX Realtime Express   **EtherCAT®**

Ethernet: 2 ports

EtherNet/IP* (1 port)
Modbus-TCP
General-purpose
communication

RS-232C

Modbus-RTU
General-purpose
communication

SD memory card

General-purpose I/O: 16 points each

Input: 16 points/output: 16 points
NPN/PNP transistor
Expansion unit (64 points) ×
Up to 15 units

High-speed counter input: 2 channels

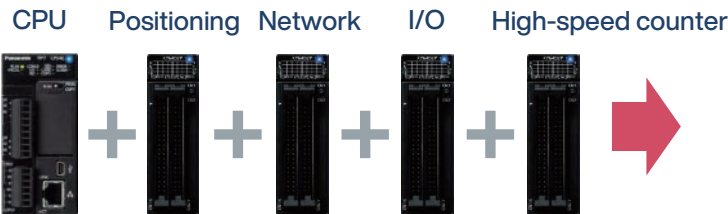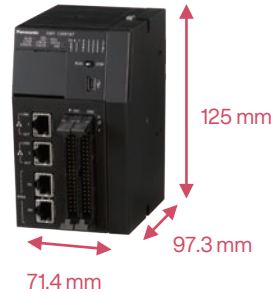4-multiple, 16 MHz

PWM output: 4 channels

Up to 100 kHz

*EtherNet/IP is a trademark of ODVA, Inc.
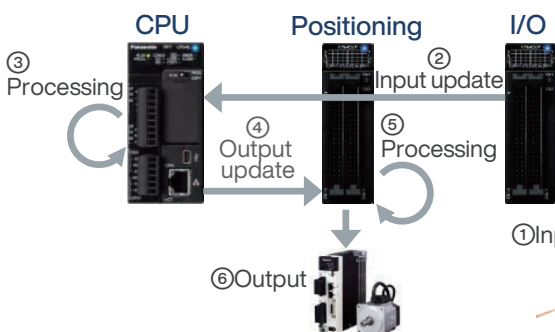

ALL IN ONE enables space-saving

Previous type

GM1

CPU   Positioning   Network   I/O   High-speed counter
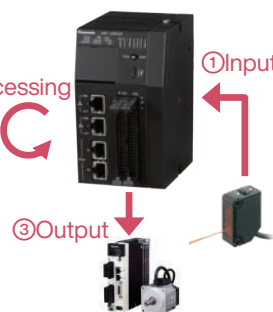
125 mm
97.3 mm
71.4 mm

4 functions in one

High-speed response (Improved accuracy) by integrated type

Previous type

GM1

CPU   Positioning   I/O

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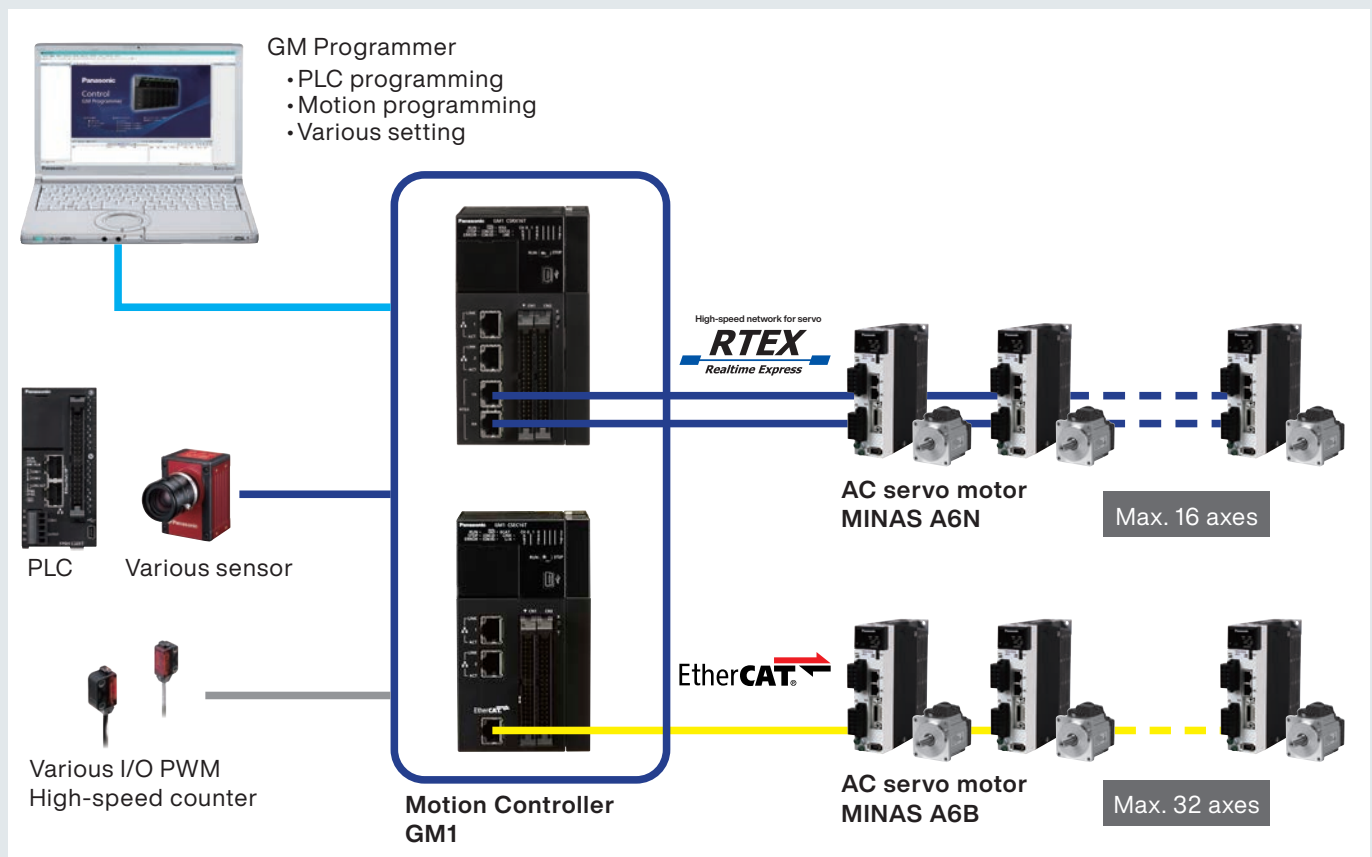⑥ Output

② Processing
① Input
③ Output

High-speed processing is possible with few steps

Up to 15 expansion units

Expansion unit Line-up

Input / output unit	Analog input / output unit	Pulse output unit
• Expansion unit (64 points) × Up to 15 units • NPN/PNP transistor	• Insulation range Support various devices with high-speed sampling.	• Ultra high-speed positioning control has achieved. The Startup speed to output pulse after receiving pulse output command from CPU unit is 1μs, ultra high-speed.

System configuration

GM Programmer
• PLC programming
• Motion programming
• Various setting

High-speed network for servo
RTEX Realtime Express

PLC   Various sensor

AC servo motor
MINAS A6N   Max. 16 axes

Various I/O PWM
High-speed counter

EtherCAT

Motion Controller
GM1

AC servo motor
MINAS A6B   Max. 32 axes

* Realtime Express and RTEX are registered trademarks of Panasonic 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.

MINAS A6 Family

Controller / Programmable Controller

RTEX Realtime Express

EtherCAT

Simple network
small axis
and distributed control

Open network
multi-axis and high-speed

Amplifier

Standard type	Multi function type	Standard type
A6NE series	A6NF series	A6NM series / A6NL series
Rotary motor		Linear motor / DD motor

*The photograph represents A6NM series.

Standard type	Multi function type	Standard type
A6BE series	A6BF series	A6BM series / A6BL series
Rotary motor		Linear motor / DD motor

Special Order Product

*The photograph represents A6NM series.

Motor / AC Servo 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

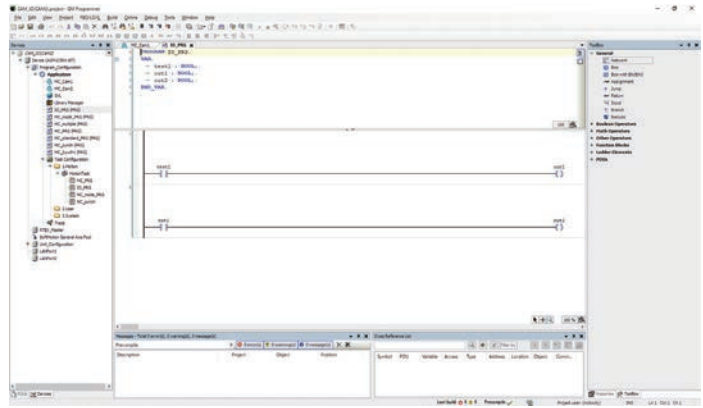| Motor			Rated output (kW)		Rated rotational speed (Max. speed) (r/min)	Rotary encoder 23 bit absolute	Enclosure	Motor lead-out configuration	Features	Applications
Low inertia	MSMF	80 mm sq. or less	0.05 / 0.1 / 0.2 / 0.4 / 0.75 / 1.0		3000 (6000)	○	IP65	Leadwire	• Small capacity • Suitable for high 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)					

Complies with IEC 61131-3 standard

GM Programmer

6 programming languages

- LD (Ladder Diagram)
- FBD (Function Block Diagram)
- ST (Structured Text)

- SFC (Sequential Function Chart)
- CFC (Continuous Function Chart)
- IL (Instruction List)*

* Selectable by changing software settings.

Cam editor

The graphical interface enables direct drag-and-drop editing of cam curves. Smooth shifting is achieved through intuitive operation.

Cam curves adjustment by cam editor function

Position

Speed
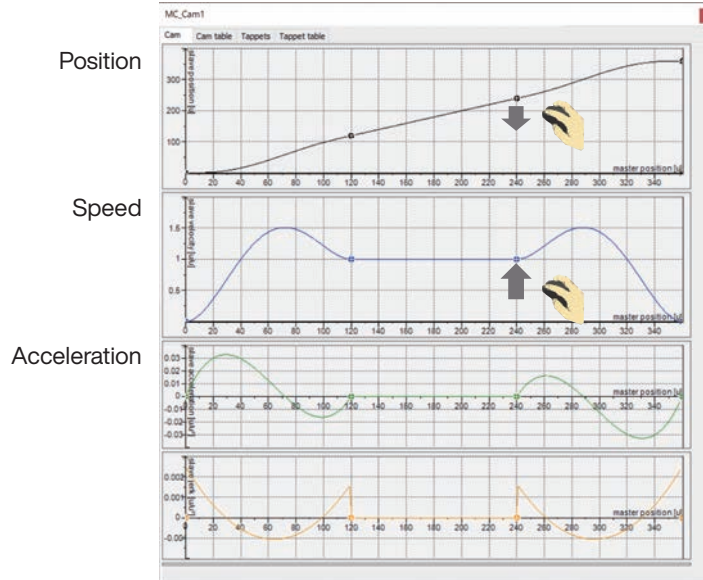
Acceleration

Final adjustment on the cam table input screen

Simulation function

In simulation mode, the operation can be checked and the program can be debugged without a connection to the actual devices. The motor operation can be checked with tracing function.
This helps to reduce debugging time and system-design labor time.

Support for motor tracing

CNC editor (G code)

The interpolation control (linear interpolation, circular interpolation, helical interpolation) is performed using G code. The setting operations can be displayed graphically in real time. Also it is possible to rotate the display or change the scale.

G code editor
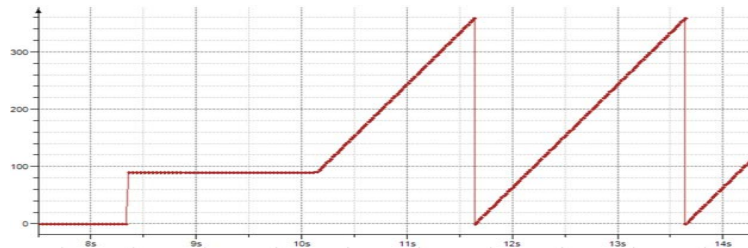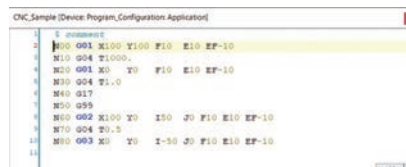

CNC graphical editor
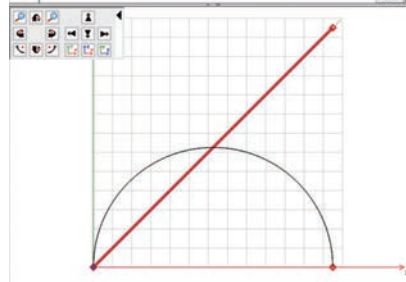
PANATERM Lite for GM

The Amplifier parameters can be monitored or changed without a connection between the Servo Amplifiers and the computer. This helps to reduce debugging or maintenance labor time.

* Attached to GMProgrammer, you can download it for free from our website.
  Not all features of PANATERM are supported.

When using PANATERM Lite for GM

Computer

Possible to set and monitor the amplifiers via GM1 from a remote location.

GM1

General-purpose LAN/USB

Servo Amplifiers

Parameters can be copied between amplifiers
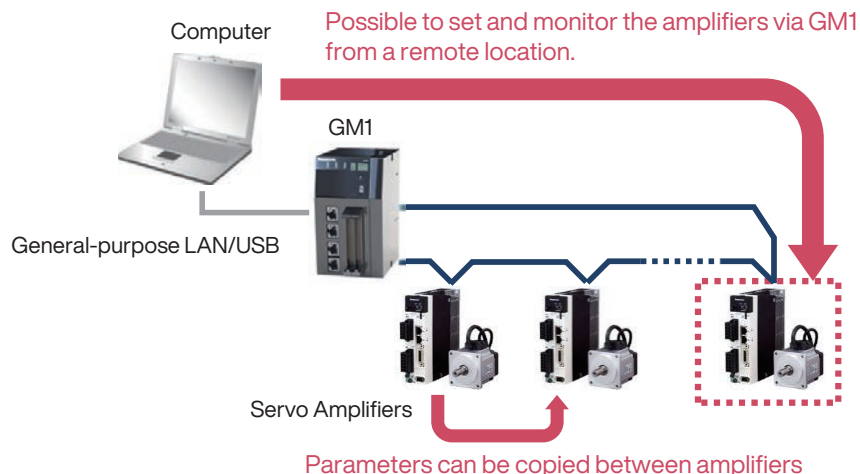
Specifications

■ 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
EU Directive applicable standard	EMC Directive: EN 61131-2 RoHS Directive: 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	

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 speci-fications	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 speci-fications	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

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	

AGM1PG04T
AGM1PG04L

(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)
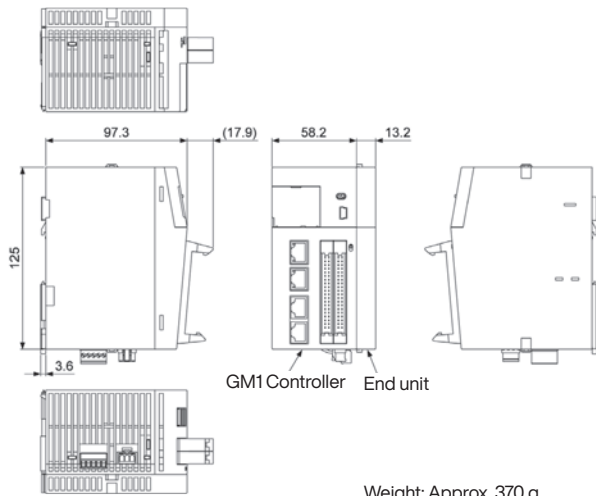Power cable (Part No.: AFPG805) is included with the controller.
*2 Excluded from KC marking.
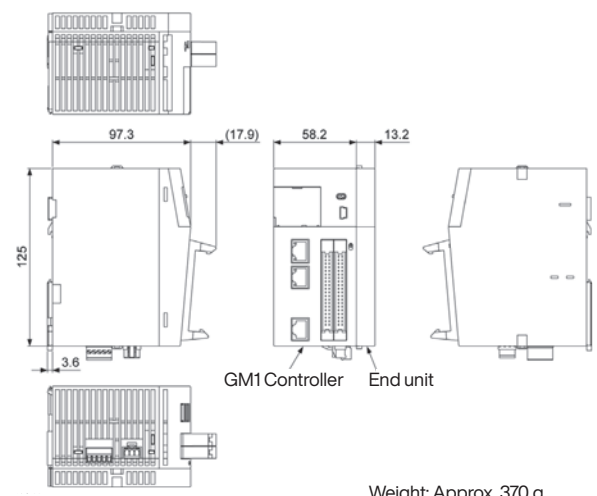
Dimensions

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)
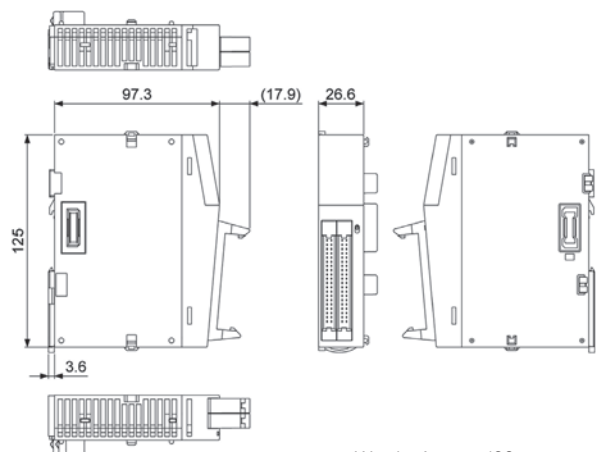
Unit [mm]

97.3　(17.9)　58.2　13.2

125

3.6

GM1 Controller　End unit

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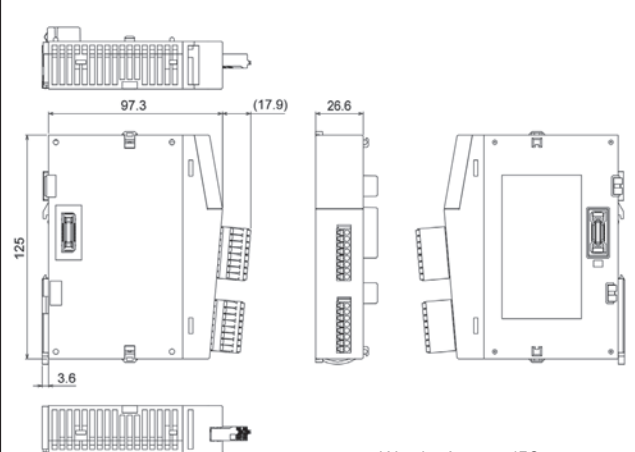and end cover)

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
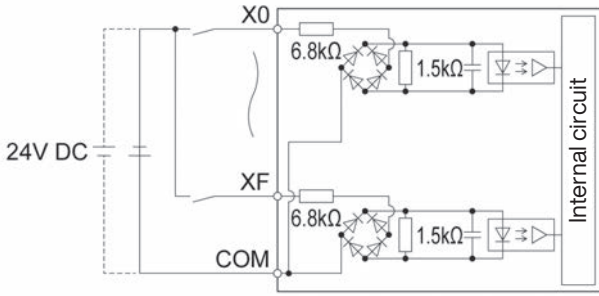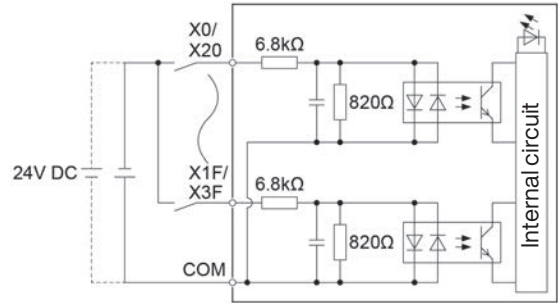

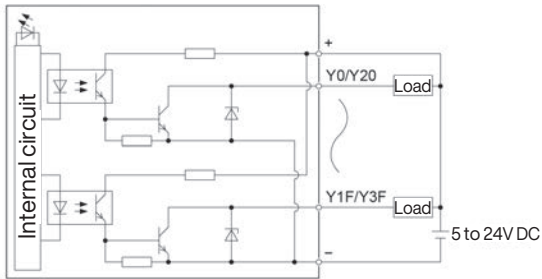■ Internal circuit diagram of the GM1 Controller (sink type) output section
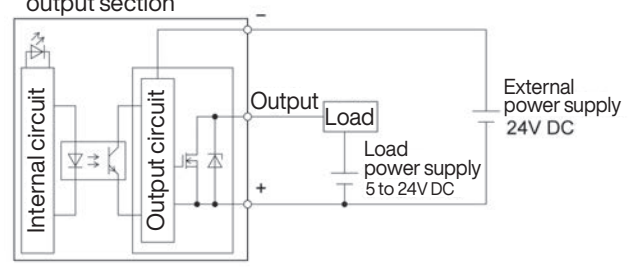
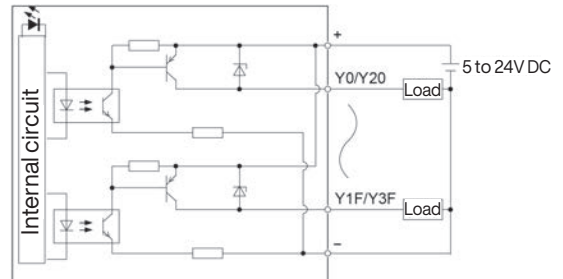■ Internal circuit diagram of the GM1 Controller output section
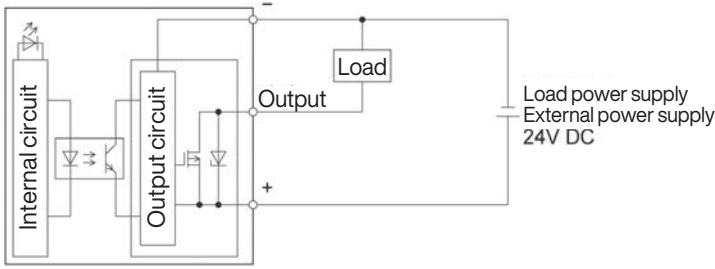
■ Internal circuit diagram of the 64-point digital input unit

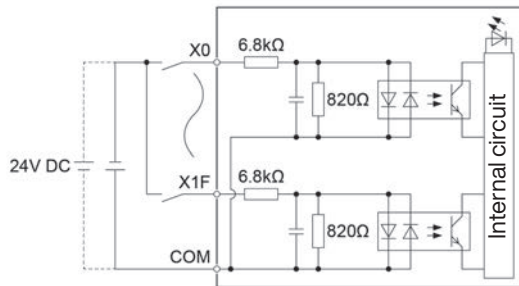■ Internal circuit diagram of the 64-point digital output unit (sink type)

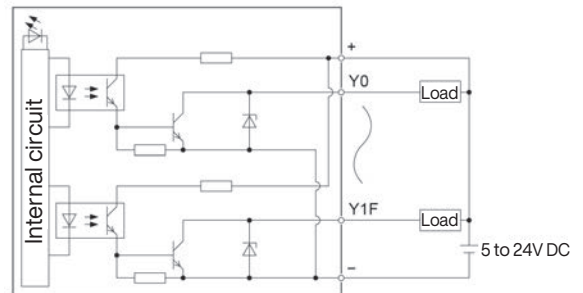■ Internal circuit diagram of the 64-point digital output unit (source type)

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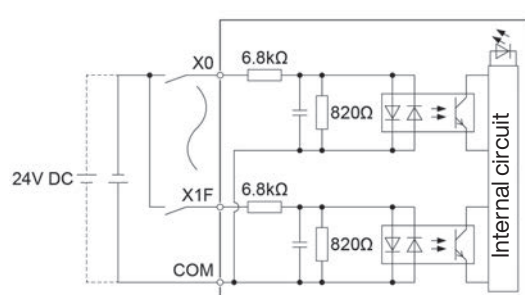
Input section (32 points)
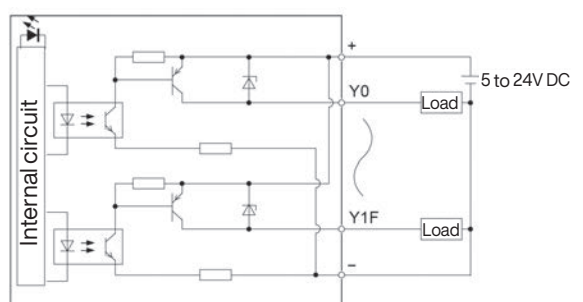

Output section (32 points)

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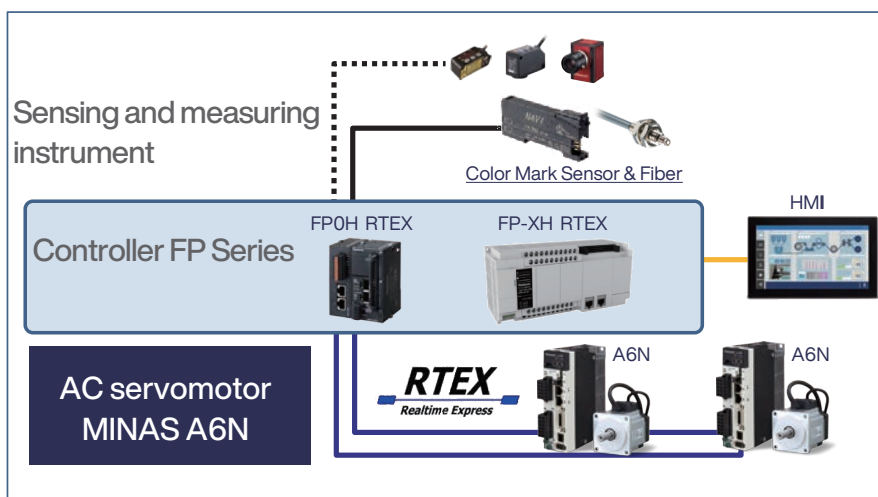
Input section (32 points)

Output section (32 points)

Sensing and measuring instrument

Color Mark Sensor & Fiber

Controller FP Series

FP0H RTEX   FP-XH RTEX   HMI

AC servomotor MINAS A6N

RTEX Realtime Express   A6N   A6N

FP-XH

Product name	Power Supply	Specifications	Programming capacity	RS-232C port	USB port	Part No.
FP-XH M8N16T Control Unit	100 to 240 V AC	24 V DC, 8 input points, 0.5 A/24 V DC Transistor output, 8 points (NPN) RTEX I/F for motion control (8 axes) Pulse input, 4 ch	24k/32k/40k steps	1 port	1 port	**AFPXHM8N16T**

FP0H

Product name	Specifications		Part No.
FP0H Control Unit	Ethernet Number of I/O Input: 16 points, Output: 16 points Rated voltage 24 V DC	NPN Transistor output	**AFP0HC32ET**
		PNP Transistor output	**AFP0HC32EP**
FP0H Positioning RTEX unit	RTEX I/F for motion control (4 axes)		**AFP0HM4N**
	RTEX I/F for motion control (8 axes)		**AFP0HM8N**

WH

Product name	Descriptions							Communication function		USB	SD	Part No.
	Display		Resolution		Memory (RAM)	Touch switch	Front cover	Power supply voltage	Ethernet	Serial	USB	SD	
Standard model	4.3 inch wide TFT	WQVGA	480 × 272		512MB	Resistive film type	Black	24V DC	1 port	1 port RS-232C / RS-422 / RS-485 *Software configurable	1 port	—	**AWHS1R043**
	7 inch wide TFT	WVGA	800 × 480		512MB								**AWHS1R070**
	10.1 inch wide TFT	-	1024 × 600		512MB								**AWHS1R101**
Advanced model	5 inch wide TFT	WVGA	800 × 480		512MB	Capacitive type	—		2 port		1 port	1 slot	**AWHA1C050**
	7 inch wide TFT	WVGA	800 × 480		1GB				3 ports		2 ports		**AWHA1C070**
	10.1 inch wide TFT	WXGA	1280 × 800		1GB								**AWHA1C101**
	15.6 inch wide TFT	HD	1366 × 768		2GB								**AWHA1C156**
	21.5 inch wide TFT	Full HD	1920 × 1080		2GB								**AWHA1C215**

⚠ 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 ....

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Panasonic
INDUSTRY

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