Panasonic
INDUSTRY

Motion Controller
GM1 Series

All in one - Motion control, PLC, and I/Os combined in one unit

Catalog 2022

EtherCAT type

RTEX type

IN Your
Innovation

With all the necessary main functions for universal automation machines

| Positioning | Torque control | Speed control | **Higher speed and higher accuracy** |

Motion control

Real axes: 16 (RTEX type)
Real axes: 32 (EtherCAT type)

Ethernet: 2 ports

EtherNet/IP* (1 port)
Modbus-TCP
General-purpose communication
FTP server / client
OPC UA server

RS232C

Modbus-RTU
General-purpose communication

SD memory card

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

Selectable network

High-speed network for servo drives

RTEX Realtime Express   **EtherCAT**

General-purpose I/O:
16 inputs / 16 outputs

NPN/PNP transistor outputs
64 I/O per expansion unit (up to 15 units)

High-speed counter input: 2 channels

4-fold evaluation by 16MHz

PWM output: 4 channels

Up to 100kHz

The all-in-one unit saves space

Conventional solution

GM1

CPU   Positioning   Network   I/O   High-speed counter
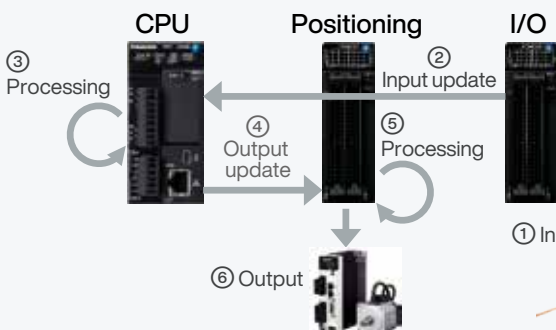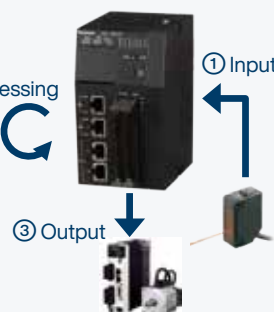
125 mm
97.3 mm
71.4 mm
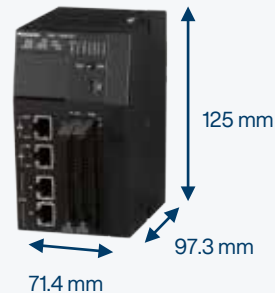
4 functions in one

The all-in-one unit is faster and more accurate

Conventional solution

GM1

CPU   Positioning   I/O

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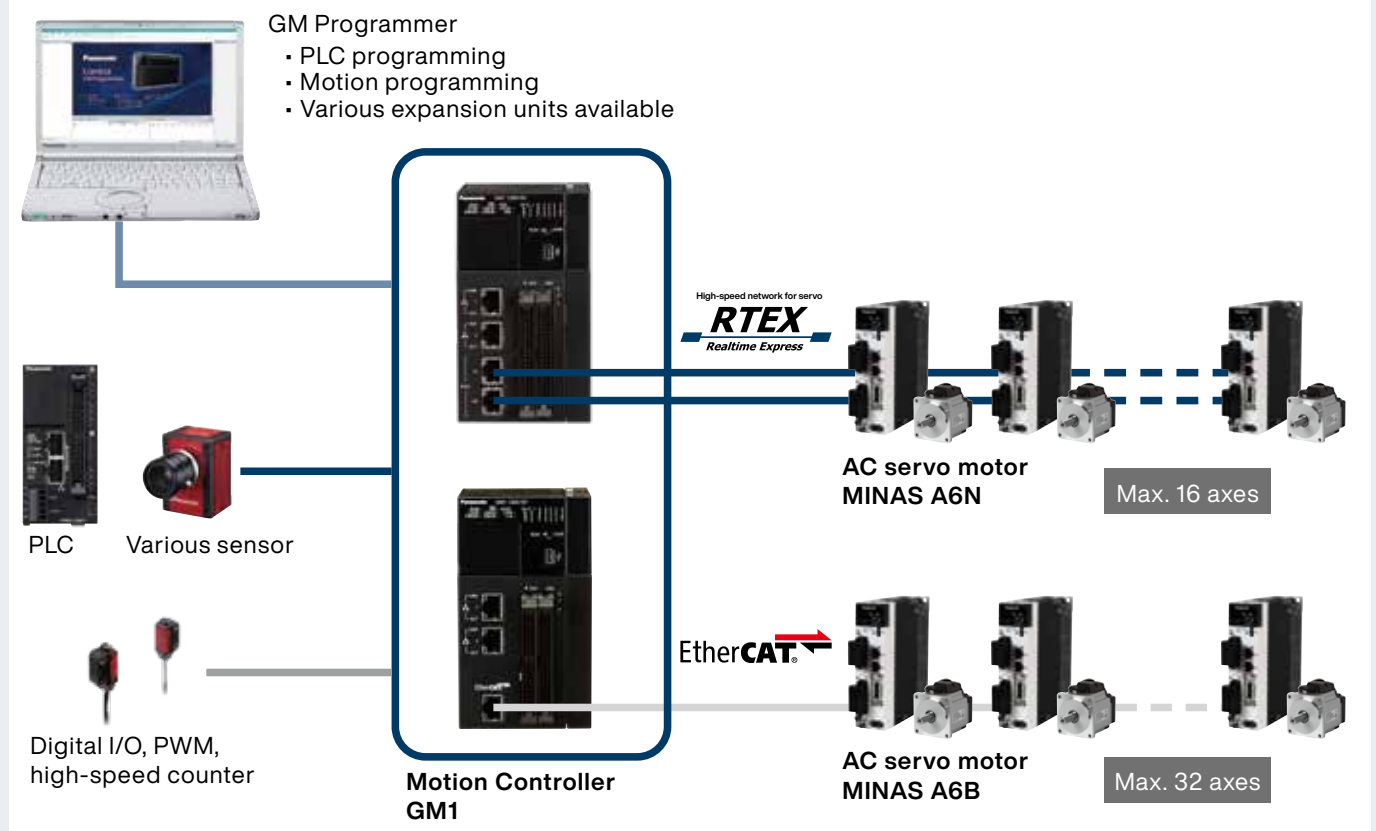① Input

② Processing
① Input
③ Output

High-speed processing is possible with fewer steps

Expansion unit line-up

Input / output unit

- 64 I/O per expansion unit (up to 15 units)
- NPN/PNP transistor outputs

Analog input / output unit

- Insulation range Support various devices with high-speed sampling.

Pulse output unit

- Ultra high-speed positioning control has achieved.
- Very low startup speed of 1μs

System configuration

GM Programmer
· PLC programming
· Motion programming
· Various expansion units available

PLC   Various sensor

Digital I/O, PWM, high-speed counter

Motion Controller GM1

High-speed network for servo
RTEX
Realtime Express

AC servo motor MINAS A6N

Max. 16 axes

EtherCAT.

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.
* EtherCAT is a registered trademark of patented technology licensed from Beckhoff Automation GmbH in Germany.

MINAS A6 Family

Motion controller

RTEX
Realtime Express

EtherCAT®

Simple/robust network for applications with a small number of axes, ring topology

Open network for applications when more axes are needed, line topology

Servo driver

Picture: A6NM

Picture: A6BM

| Standard | type | Multifunction | type | Multifunction / Standard | type | Standard | type | Multifunction | type | Multifunction / Standard | type |

A6NE series   **A6NF** series   **A6NM** series* / **A6NL** series*

A6BE series   **A6BF** series   **A6BM** series* / **A6BL** series*

Rotary motor   **Linear motor / DD motor**   **Rotary motor**   **Linear motor / DD 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 contact our distributors directly

Motor line-up

| Motor			Rated output (kW)		Rated rotational speed (max.) (r/min)	Rotary encoder 23 bit absolute	Enclosure's degree of protection	Connector type	Features	Applications
Low inertia	MSMF	Max. □80mm	0.05 / 0.1 / 0.2 / 0.4 / 0.75 / 1.0		3000 (6000)	○	IP65	Lead wire	Low power range, low inertia, suitable for all kinds of applications, also suitable for high-speed applications	Bonders, equipment for transistor production, packaging machines, etc.
Low inertia	MSMF	Max. □80mm	0.05 / 0.1 / 0.2 / 0.4 / 0.75 / 1.0		3000 (6000)	○	IP67	Connector		
Low inertia	MSMF	Min. □100mm	1.0 / 1.5 / 2.0 / 3.0		3000 (5000)	○	IP67	Connector	Medium power range, low inertia, suitable for machinery directly connected with a ball screw drive and with high machine rigidity and repetition rate	SMD machinery Machines for food production and LCDs, etc.
Low inertia	MSMF	Min. □100mm	4.0 / 5.0		3000 (4500)					
Middle inertia	MQMF (Flat type)	Max. □80mm	0.1 / 0.2 / 0.4		3000 (6500)	○	IP65	Lead wire	Low power range, flat type and suitable for belt-driven machinery with low rigidity. Motors with gear reducers are also available.	SMD machinery, inserter machines, belt-driven machines, unloading robot
Middle inertia	MQMF (Flat type)	Max. □80mm	0.1 / 0.2 / 0.4		3000 (6500)	○	IP67	Connector		
Middle inertia	MDMF	Min. □130mm	1.0 / 1.5 / 2.0 / 3.0 / 4.0 / 5.0		2000 (3000)	○	IP67 (22.0 kW: IP44)	Connector (22.0 kW: terminal)	Medium power range, medium inertia, suitable for belt-driven machinery with low rigidity	Conveyor machinery, robots, tool machines, etc.
Middle inertia	MDMF	Min. □130mm	7.5		1500 (3000)					
Middle inertia	MDMF	Min. □130mm	11.0 / 15.0 / 22.0		1500 (2000)					
Middle inertia	MGMF (Low speed/ High torque type)	Min. □130mm	0.85 / 1.3 / 1.8 / 2.4 / 2.9 / 4.4 / 5.5		1500 (3000)	○	IP67	Connector	Medium power range, suitable for low speed and high torque application	Conveyor machinery, robots, textile machines, etc.
High inertia	MHMF	Max. □80mm	0.05 / 0.1 / 0.2 / 0.4		3000 (6500)	○	IP65	Lead wire	Low power range, high inertia, suitable for belt-driven machinery with low rigidity. Motors with gear reducers are also available	Conveyor machinery, robots, etc.
High inertia	MHMF	Max. □80mm	0.75 / 1.0		3000 (6000)					
High inertia	MHMF	Max. □80mm	0.05 / 0.1 / 0.2 / 0.4		3000 (6500)	○	IP67	Connector		
High inertia	MHMF	Max. □80mm	0.75 / 1.0		3000 (6000)					
High inertia	MHMF	Min. □130mm	1.0 / 1.5 / 2.0 / 3.0 / 4.0 / 5.0		2000 (3000)	○	IP67	Connector	Medium power range, high inertia, suitable for belt-driven machinery with low rigidity	Conveyor machinery, robots, machines for LCD
High inertia	MHMF	Min. □130mm	7.5		1500 (3000)					

Complies with IEC 61131-3 standard
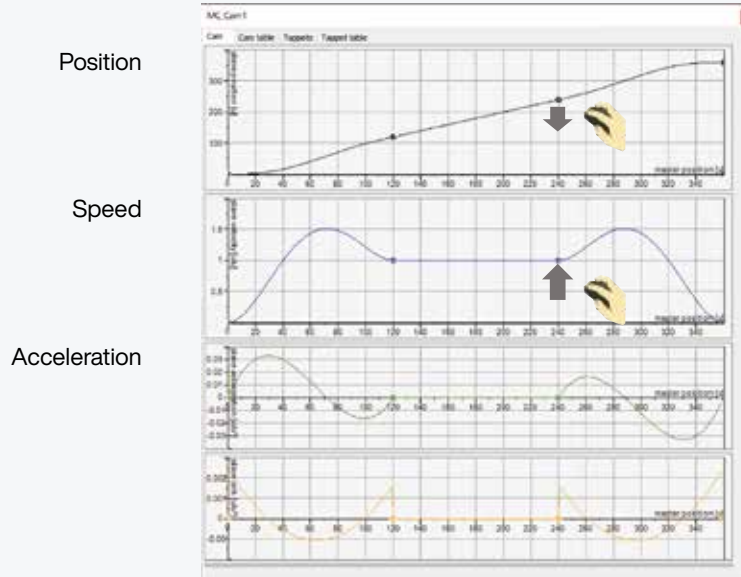
GM Programmer
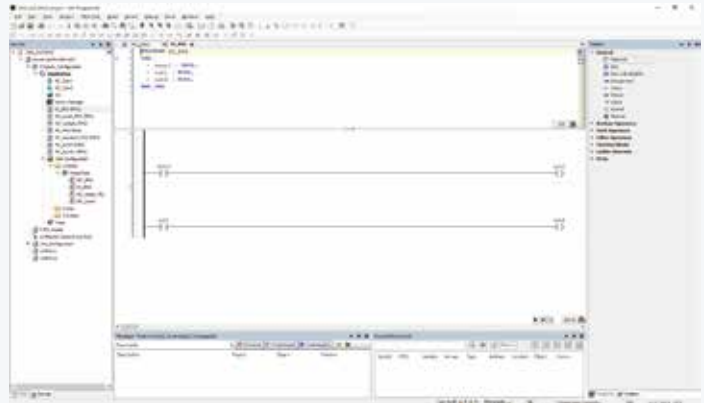
6 programming languages

- LD (ladder diagram)
- FBD (function block diagram)
- ST (structured text)

- SFC (sequential function chart)
- CFC (continuous function chart)
- IL (instruction list)

Cam editor

The graphical interface enables direct drag-and-drop editing of cam curves. Cam curves can be shifted smoothly in the editor.

Cam curve adjustment in the cam editor

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 the tracing function. This helps to reduce debugging time and system-design labor time.
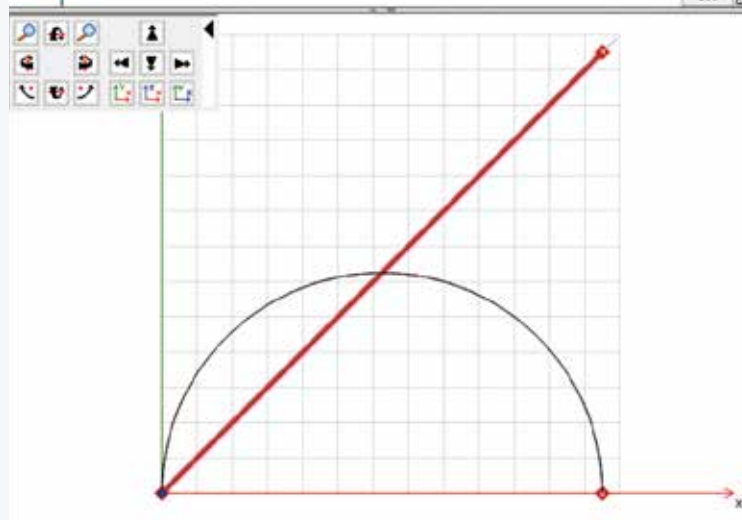
Support for motor tracing
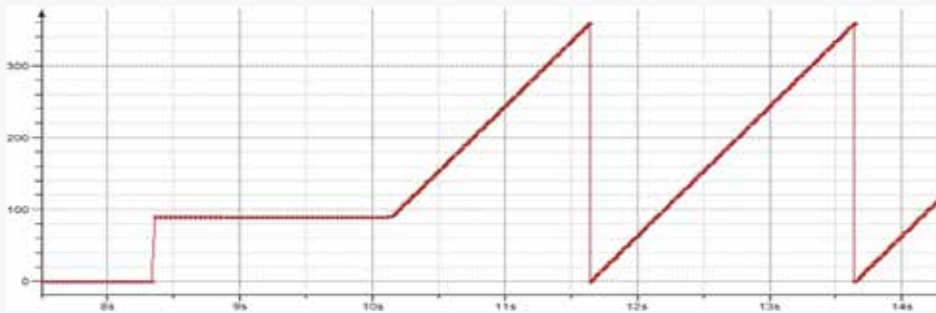
CNC editor (G code)

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

G code editor

CNC graphical editor

Specifications

■ GM1 controller common specifications

RTEX type AGM1CSRX16T

EtherCAT type AGM1CSEC16P

Item	Specifications
Rated voltage	24V DC
Operating voltage range	20.4 to 28.8V DC
Allowable momentary power failure time	10ms
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 5mA)	500V AC for one minute (Note 1)
Insulation resistance (Test voltage 500V DC)	Min. 100MΩ (Note 1)
Vibration resistance	Compliant with JIS B 3502, IEC 61131-2 5 to 8.4Hz, half amplitude 3.5mm 8.4 to 150Hz acceleration 9.8m/s^2 10 sweeps each in X, Y and Z direction (1 octave/min)
Shock resistance	Compliant with JIS B 3502, IEC 61131-2 147m/s^2, 3 times each in X, Y, Z direction
Noise resistance (Power supply terminal)	1000V [P-P] with pulse widths of 1μs and 50ns (using a noise simulator)
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 the specifications of each product.

Specifications of the USB port

Item	Specifications
Standard	USB 2.0 full speed
Connector	USB mini-B

Specifications of the COM port (RS232C)

Item		Specifications
No. of channels		1
Physical layer		RS232C, three-wire system (non-isolated)
Transmission distance		Max. 15 m
Communication mode		1:1 communication
Communication method		Half-duplex transmission
Transmission line		Multi-core shielded wire
Baud rate		9600 / 19200 / 38400 / 57600 / 115200bit/s
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		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		100Mbps / 10Mbps, automatic negotiation
Max. segment length		100m (Note 2)
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	Max. 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 devices in the Ethernet network
	ACT	Flashes during communication with connected devices, i.e. transmitting commands and receiving responses.

(Note 2): 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 operating environment. Also, it is recommended to position a hub near the control board and limit the length to 10m.

Specifications of the RTEX/EtherCAT type

Item	RTEX type	EtherCAT type
Baud rate	100Mbps	
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: 100m, total length: 200m	
Transmission distance		Between nodes: Max. 100m
Communication cycle	500μs to 2ms	Min. 500μs
Command update period	500μs to 4ms	
Operation command	Profile position, cyclic position / speed / torque	

High-speed counter input specifications

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

Input specifications

Item		Specifications
Insulation method		Optocoupler
Rated input voltage		24V DC
Rated input current		Approx. 3mA (at 24V DC)
Input impedance		Approx. 6.8kΩ
Operating voltage range		21.6 to 26.4V DC
Min. ON voltage / Min. ON current		19.2V / 6mA
Max. OFF voltage / Max. OFF current		2.4V / 1mA
Response time	OFF→ON	135μs max. (selectable with the input time constant selection function)
	ON→OFF	135μs max. (selectable with the input time constant selection function)
Output points per common		16 points/1 common
Operating mode indicator		16 LEDs (indicates whether output is ON or OFF depending on the setting of the display selector switch)
Connector		40-pin connector (MIL standard compliant)

Output specifications

Item		Specifications (sink type)	Specifications (Input A, B, Z signals)
Insulation method		Optocoupler	Optocoupler
Output type		NPN open collector	PNP open collector
Rated load voltage		5 to 24V DC	24V DC
Allowable load voltage range		4.75 to 26.4V DC	21.6 to 26.4V DC
Max. load current		0.3 A	
Max. load current per common		3.2A	
Max. inrush current		1.0 A	
OFF state leakage current		Max. 1μA	2 μA or less
ON state max. voltage drop		0.7V or less	0.7V or less
Response time	OFF→ON	6μs or less (at an ambient temperature of 25℃)	
	ON→OFF	15μs or less (at an ambient temperature of 25℃)	
Analog output	Voltage	4.75 to 26.4V DC	21.6 to 26.4V DC
	Current	35mA/common (at 24V)	30mA/common (at 24V)
Surge absorber		Zener diode	
Short-circuit protection		Provided (to automatically protect every eight points) (Note 1)	
Output points per common		16 points/1 common	
Operating mode indicator		16 LEDs (indicates whether output is ON or OFF depending on the setting of the display selector switch)	
Connector		40-pin connector (MIL standard compliant)	

(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		Optocoupler
Rated input voltage		24V DC
Rated input current		Approx. 2.7mA (at 24V DC)
Input impedance		Approx. 6.8kΩ
Operating voltage range		20.4 to 26.4V DC
Min. ON voltage / Min. ON current		19.2V / 2.5mA
Max. OFF voltage / Max. OFF current		5V / 1.5mA
Response time	OFF→ON	0.2ms max. (selectable with the input time constant selection function)
	ON→OFF	0.2ms max. (selectable with the input time constant selection function)
Output points per common		32 points/1 common
Operating mode indicator		32 LEDs (indicates whether output is ON or OFF depending on the setting of the display selector switch)
Connector		2 x 40-pin connector (MIL standard compliant)

■ Output unit specifications

AGM1Y64P

Item		Specifications (source type)
Insulation method		Optocoupler
Output type		PNP open collector
Rated load voltage		5 to 24V DC
Allowable load voltage range		4.75 to 26.4V DC
Max. load current		0.3A (20.4 to 26.4V DC), 30mA (4.75V DC)
Common restrictions		3.2A/common
Max. inrush current		0.6 A
OFF state leakage current		Max. 1μA
ON state max. voltage drop		Max. 0.5V
Response time	OFF→ON	Max. 0.1ms (load current: min. 2mA)
	ON→OFF	Max. 0.5ms (load current: min. 2mA)
External power supply	Voltage	4.75 to 26.4V DC
	Current	90mA/common (at 24V)
Surge absorber		Zener diode
Short-circuit protection		None
Output points per common		32 points/1 common
Operating mode indicator		32 LEDs (indicates whether output is ON or OFF depending on the setting of the display selector switch)
Connector		2 x 40-pin connector (MIL standard compliant)

■ Input / Output unit specifications

AGM1XY64D2P

Item			Specifications (source type)
Input specifications	Insulation method		Optocoupler
	Rated input voltage		24V DC
	Rated input current		Approx. 2.7mA (at 24V DC)
	Input impedance		Approx. 6.8kΩ
	Operating voltage range		20.4 to 26.4V DC
	Min. ON voltage / Min. ON current		19.2V / 2.5mA
	Max. OFF voltage / Max. OFF current		5V / 1.5mA
	Response time	OFF→ON	0.2ms max. (selectable with the input time constant selection function)
		ON→OFF	0.2ms max. (selectable with the input time constant selection function)
	Output points per common		32 points/1 common
Output specifications	Insulation method		Optocoupler
	Output type		PNP open collector
	Rated load voltage		5 to 24V DC
	Allowable load voltage range		4.75 to 26.4V DC
	Max. load current		0.3A (20.4 to 26.4V DC), 30mA (4.75V DC)
	Common restrictions		3.2A/common
	Max. inrush current		0.6A
	OFF state leakage current		Max. 1μA
	ON state max. voltage drop		Max. 0.5V
	Response time	OFF→ON	Max. 0.1ms (load current: min. 2mA)
		ON→OFF	0.5ms (load current: min. 2mA)
	External power supply	Voltage	4.75 to 26.4V DC
		Current	90mA/common (at 24V)
	Surge absorber		Zener diode
	Short-circuit protection		None
	Output points per common		32 points/1 common
Operating mode indicator			32 LEDs (indicates whether output is ON or OFF depending on the setting of the display selector switch)
Connector			2 x 40-pin connector (MIL standard compliant)

■ Analog input unit specifications

Item		Specifications
No. of input points		8 ch
Input range (resolution)	Voltage	-10 to +10V DC (resolution: 1/64000) 0 to +10V DC (resolution: 1/32000) -5 to +5V DC (resolution: 1/64000) 0 to +5V DC (resolution: 1/32000) +1 to +5V DC (resolution: 1/25600)
	Current	0 to + 20mA (resolution: 1/32000) +4 to + 20mA (resolution: 1/25600)
Conversion time		50µs/ch
Total accuracy		Max. ±0.2% F.S. (at +25℃) Max. ±0.4% F.S. (at 0 to +55℃)
Input impedance		Voltage input: approximately 1MΩ; current input: approximately 250Ω
Absolute max. input		Voltage input: approximately -15V to +15 V; current input: approximately -30mA to +30mA
Insulation method		Between input terminals and internal circuit: optocoupler and isolated DC/DC converter Between channels: non-insulated
Execution / Non-execution channel settings		Possible to make non-converted channel settings.
Input range selection		For each channel separately
Average processing	Number of averaging times	2 to 60000 times
	Time average	1 to 1,500ms
	Moving average	2 to 2000 times
Offset / Gain settings		Setting range for the offset value: -3000 to +3000 Setting range for the gain value: +9000 to +11000 (90% to 110%)
Scale conversion settings		Setting range for the scale conversion setting value: -32768 to +32767
Upper limit / lower limit comparison		Setting range for the output if the value is outside the preset upper limit or lower limit: -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 5V range (detection level: max. 0.7V) • 4 to 20mA range (detection level: max. 2.8mA)

AGM1AD8

■ Analog output unit specifications

Item		Specifications
No. of output points		4 ch
Output range (resolution) (Note 1)	Voltage	-10 to +10V DC (resolution: 1/64000) 0 to +10V DC (resolution: 1/32000) -5 to +5V DC (resolution: 1/64000) 0 to +5V DC (resolution: 1/32000) +1 to +5V DC (resolution: 1/25600)
	Current	0 to +20mA (resolution: 1/32000) +4 to +20mA (resolution: 1/25600)
Conversion time		50µs/ch
Total accuracy		Max. ±0.2% F.S. (at +25℃) Max. ±0.4% F.S. (at 0 to +55℃)
Output impedance (voltage output)		Max. 0.5Ω
Maximum output current (voltage output)		10mA
Output allowable load resistance (current output)		Max. 500Ω
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		Setting range for upper and lower output limits: -32,640 to +32,640
Scale conversion settings		Setting range for the scale conversion setting value: -32768 to +32767
Offset / Gain settings		Setting range for the offset value: -3000 to +3000 Setting range for the gain value: +9000 to +11000 (90% to 110%)
Analog output hold (in STOP mode)		Setting range for the output value in STOP mode: -32640 to +32640

AGM1DA4

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	32 bits (signed, -2,147,483,648 to +2,147,483,647 pulses)	
Speed command	Command range	1 pps to 500 kpps (can be set in 1 pps.)	1 pps to 4 Mpps (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 • 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		0.001ms / 0.005ms / 0.02ms	
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	4MHz (2-phase input)	
		1MHz (Direction identification input and individual input)	
Other functions		• Built-in over limit input (+) and over limit input (-)	

(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. You can only use one of these functions.

■ List of consumption current

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

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	16 inputs 16 outputs	2 ch	24V DC	Transistor output sink type (NPN)	**AGM1CSRX16T**
	32 axes	EtherCAT				Transistor output source type (PNP)	**AGM1CSEC16P**

■ Input / output unit

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

■ Analog input / output unit

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

■ Accessories

Product name	Description	Part No.
Discrete-wire connector set (40-pin)	For GM1 Controller, for expansion unit (2 pieces)	**AFP2801J**
Flat cable connector set (40-pin)	Use for flat cable wiring. Compatible for GM1 and expansion unit (2 pieces)	**AFP2802J**

Note: Connectors are not included with the controller or expansion unit. Please ensure you have the necessary connectors.
The controller is delivered with a power cable (AFPG805J).
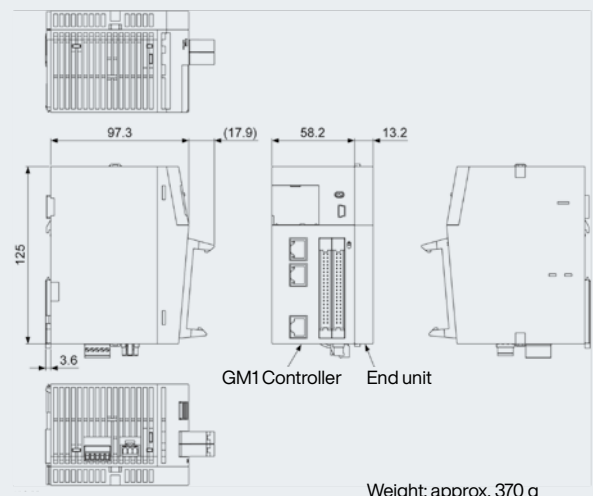
GM1 controller (RTEX type)

Unit [mm]

97.3   (17.9)   58.2   13.2

125

3.6

GM1 Controller   End unit
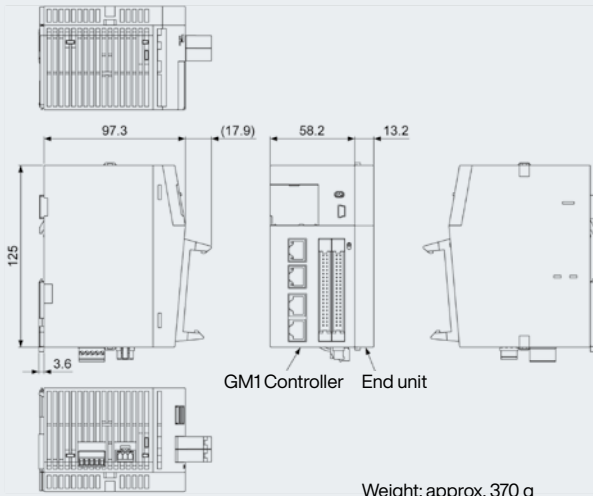
Weight: approx. 370 g
(including the terminal block
and end cover)

GM1 controller (EtherCAT type)

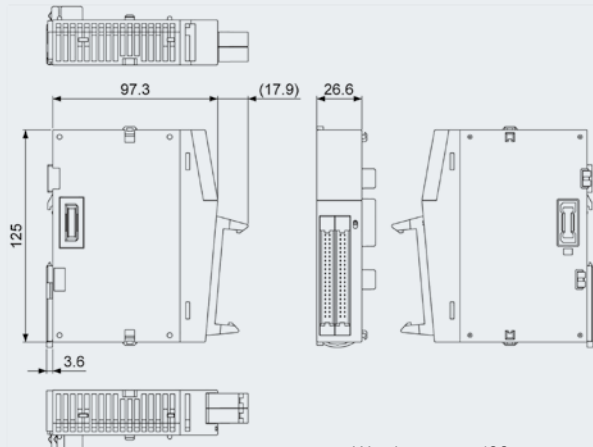Unit [mm]

97.3   (17.9)   58.2   13.2

125

3.6

GM1 Controller   End unit

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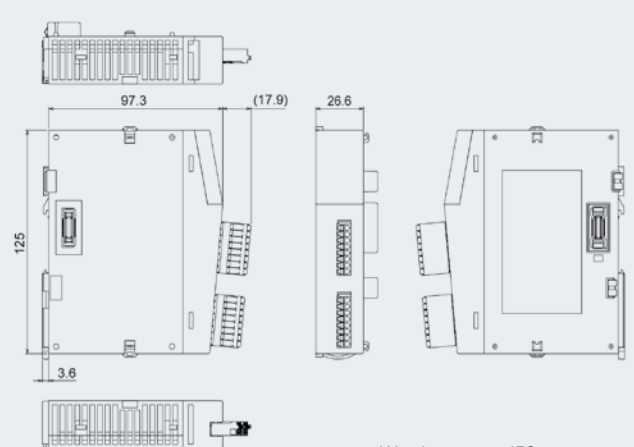and end cover)

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)

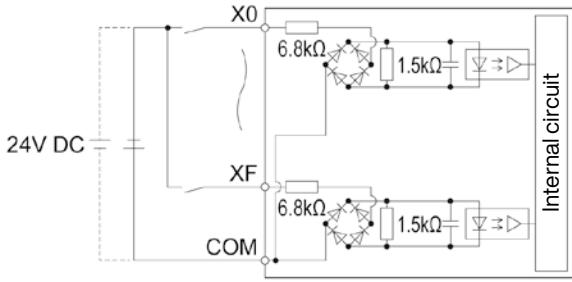## Analog input / output unit
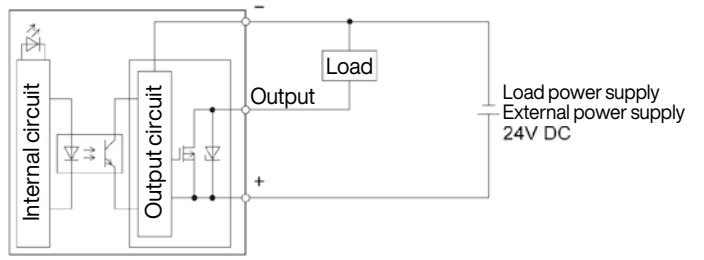
Unit [mm]

97.3   (17.9)   26.6

125

3.6

Weight: approx. 150 g
(including the terminal block)
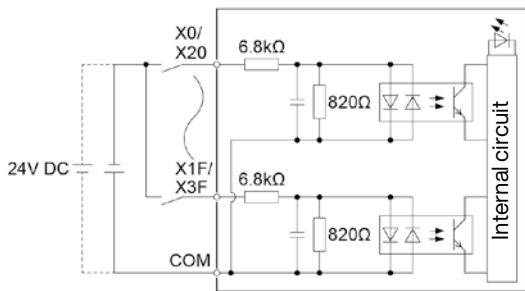
Circuit Diagram

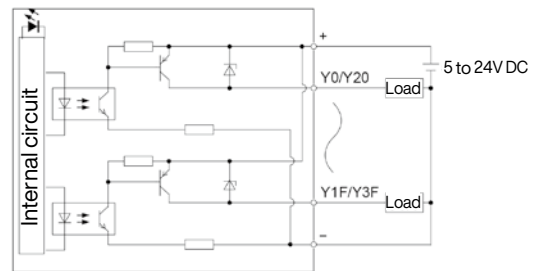■ Internal circuit diagram of the GM1 Controller input section

■ Internal circuit diagram of the GM1 Controller output section (source type, PNP)

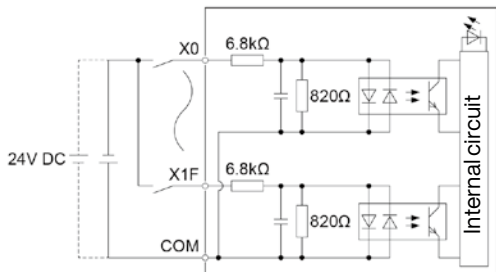■ Internal circuit diagram of the 64-point digital input unit

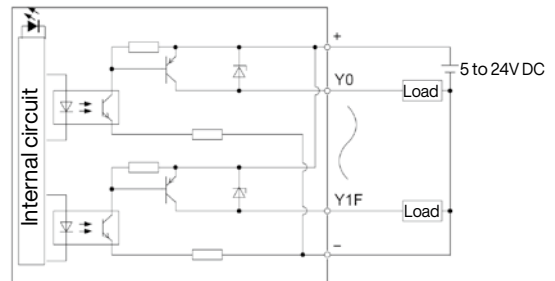■ Internal circuit diagram of the 64-point digital output unit (source type, PNP)

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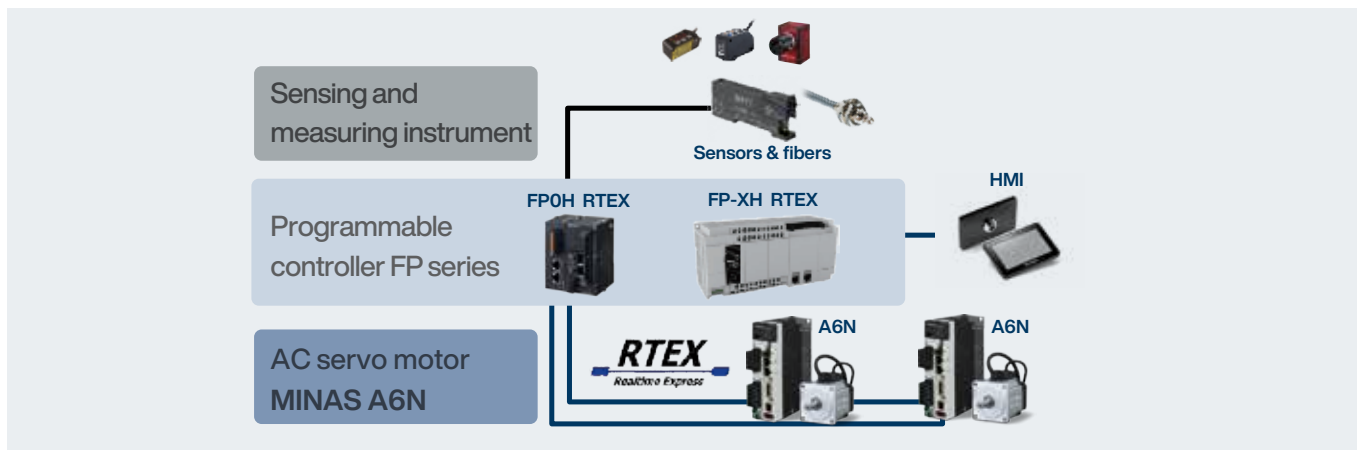
Input section (32 points)

Output section (32 points)

FP-XH

Product name	Power supply	Specifications	Programming capacity	RS232C port	USB port	Part No.
FP-XH RTEX CPU	100 to 240V AC	24V DC, 8 inputs 24V DC, transistor outputs (PNP, 0.5A) RTEX I/F for motion control (8 axes) Pulse input, 4 ch	24k/32k/40k steps	1 port	1 port	**AFPXHM8N16PD**

FP0H

Product name	Specifications		Part No.
FP0H CPU	Ethernet, 16 inputs, 16 outputs, 24 V DC Rated voltage 24V 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**

HMI

Product series	Display	Resolution	Memory (RAM)	Touchscreen	Front cover	Power supply	USB port	SD card	Ethernet port	COM port	Wi-Fi	Part No.
HMe	4.3" TFT	480 x 272	256MB	Resistive	Black	24V DC	1	/	1	1	/	**AIHME04**
	7.0" TFT	800 x 480	256MB				1	/	1	1	/	**AIHME07**
	10.1" TFT	1024 x 600	512MB				1	/	1	1	/	**AIHME10**
HMx700	5.0" TFT	800x480	512MB	Projected-capacitive touchscreen made from glass, multi-touch			1	Yes	2	1	/	**AIHMX705**
	7.0" TFT	800x480	1GB				2	Yes	3	1	/	**AIHMX707**
	10.1" TFT	1280x800	1GB				2	Yes	3	1	/	**AIHMX710**
	15.6" TFT	1366x768	2GB				2	Yes	3	1	/	**AIHMX715**
	21.5" TFT	1920x1080	2GB				2	Yes	3	1	/	**AIHMX721**
HMs700	5.0" TFT	800x480	1GB	Projected-capacitive, multi-touch			1	/	1	/	/	**AIHMS705**
	7.0" TFT	1024x600	1GB				1	/	1	/	Yes	**AIHMS707**
	10.1" TFT	1280x800	1GB				1	/	1	/	Yes	**AIHMS710**
	15.6" TFT	1366x768	2GB				1	/	1	/	Yes	**AIHMS715**
	21.5" TFT	1920x1080	2GB				1	/	1	/	Yes	**AIHMS721**

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