Panasonic

CE
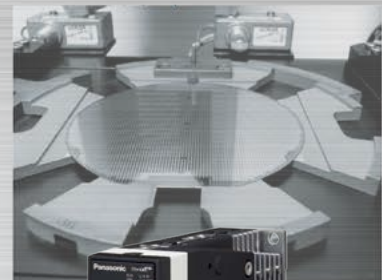
Motion Control of Up to 64 axes in One Unit

Motion Control Unit
EtherCAT type
AFP7MC□EC

EtherCAT → EtherCAT Communication
AC servo motors & driver
MINAS A6B

A Single **FP7** Motion Control Unit can Control 64 axes of **MINAS A6B / A5B** and 32 Virtual axes. It is Now Easier to Perform Multiple axial Control.

Total 96 axes

Virtual axis
32 axes

Real axis
64 axes

EtherCAT Communication
AC servo motors & driver
MINAS A6B

Motion Control Unit
EtherCAT* type
AFP7MC☐EC

*One CPU unit can be expanded with up to 14 motion control units.
 Note that the number of expanded units is limited by operation power
 supply and ambient temperature.
*EtherCAT® is a registered trademark and patent-protected technology,
 licensed by Beckhoff Automation GmbH of Germany.

Item	Transmission cycle		
	16 axes	32 axes	64 axes
Independent axis control Interpolation control Synchronous control	1 ms	2 ms	4 ms

*The transmission cycle has changed from firmware Ver. 1.2.

Furthermore,

• Up to 32 synchronous groups!
 (32 groups of 2 axes to 2 groups of 32 axes)
• Industry's fastest class with 0.5 ms* transmission cycle

*4 axes (2-axis interpolation × 2 groups). Our company created send/receive allocation.

• Control system: Cyclic position control
• Positioning table: 1,000 tables/axis

Supported Servo Motors

Panasonic MINAS A6B Series

EtherCAT
EtherCAT Communication
AC servo motors & driver
MINAS A6B

High Performance
●Frequency response: **3,200 Hz**
●Supports network communication
 "**EtherCAT**".
●Transmission speed: **100 Mbps**
●Real-time auto tuning function and
 anti-vibration filters are available.
●Life and degradation diagnosis
 Warning is output when limit is
 reached for motor and driver life,
 and device degradation.

Motor Miniaturization
●New construction method developed.
 Also, miniaturized through new motor core
 design
●MHMF type motors 400 W or less support
 6,500 r/min.
●IP65 and IP67 rating (Motor)
●Compliance with international safety
 standards
 EU directive, UL and CSA standards, Korea
 Certification Mark (KC) and IEC safety I/F
 model available.

Driver line-up

		Motor rated output (Because there is the case that is different from the part number in the table by the motor, please check the combination in the catalog of the A6 always.)						
		50 W	100 W	200 W	400 W	750 W	1 kW	1.5 kW
Driver power supply	Single phase 100-120 V AC	MADLT 01BF	MADLT 11BF	MADLT 21BF	MADLT 31BF	–	–	–
	Single / 3-phase 200-240 V AC	MADLT 05BF	MADLT 05BF	MADLT 15BF	MADLT 25BF	MADLT 35BF	MADLT 45BF	MADLT 55BF
		2 kW	3 kW	4 to 5 kW				
Driver power supply	3-phase 200-230 V AC	MADLT 83BF	MFDLT A3BF	MFDLT B3BF				

●Part numbers include IEC safety I/F.
 IEC 61800-5-2 STO, IEC 61508 SIL3

Easy support of motion settings and test runs using dedicated software tool (Control Motion Integrator).

Control Motion Integrator facilitates setting of EtherCAT
transmission settings and parameters such as the unit's
motion control parameter.
Tool can be run during tests, so operation can be easily
checked during startup.

Control Motion Integrator
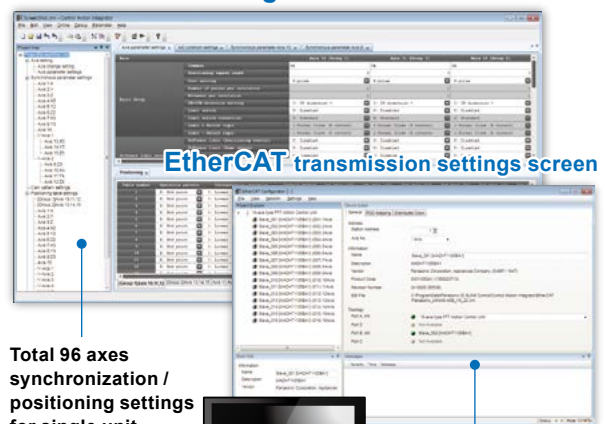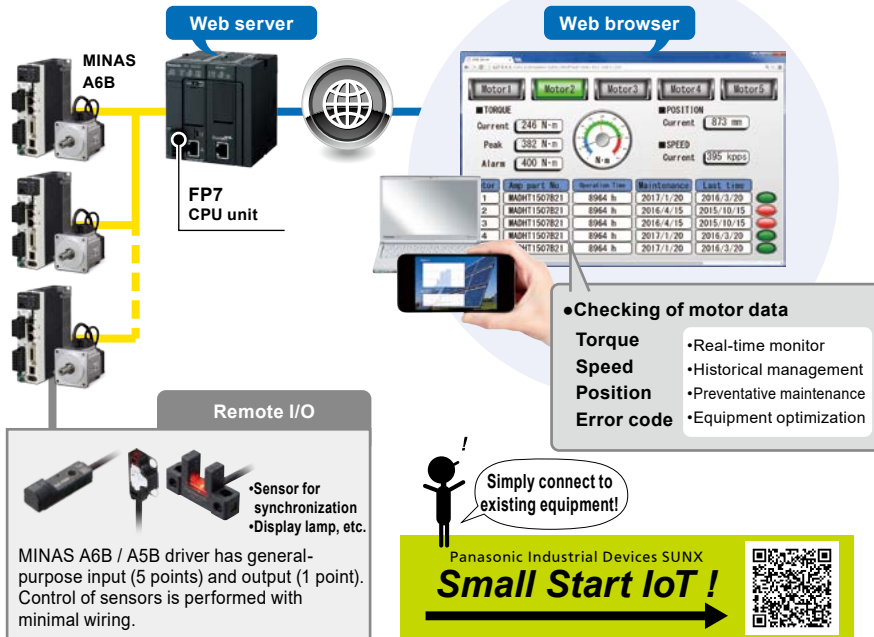
EtherCAT transmission settings screen

Total 96 axes
synchronization /
positioning settings
for single unit

Installation complete
of A6B / A5B ESI file

Operational status of motor is remotely monitored. More powerful preventative maintenance and historical management.

Through use of Web server function on **FP7** CPU unit, remote monitoring is possible of things such as torque, speed and position of the motor. Also, with inclusion of peripheral sensor, total operation monitoring is achieved.

Web server

Web browser

MINAS
A6B

**FP7
CPU unit**

Motor1　Motor2　Motor3　Motor4　Motor5

■TORQUE
Current　246 N·m
Peak　382 N·m
Alarm　400 N·m

●POSITION
Current　873 mm
■SPEED
Current　395 kpps

Unit	Amp part No.	Operation time	Maintenance	Last time	
1	MADHT1507B21	8964 h	2017/1/20	2016/3/20	
2	MADHT1507B21	8964 h	2016/4/15	2015/10/15	
3	MADHT1507B21	8964 h	2016/4/15	2015/10/15	
4	MADHT1507B21	8964 h	2017/1/20	2016/3/20	
5	MADHT1507B21	8964 h	2017/1/20	2016/3/20	

●Checking of motor data

Torque	•Real-time monitor
Speed	•Historical management
Position	•Preventative maintenance
Error code	•Equipment optimization

Remote I/O

•Sensor for synchronization
•Display lamp, etc.

MINAS A6B / A5B driver has general-purpose input (5 points) and output (1 point). Control of sensors is performed with minimal wiring.

!
Simply connect to existing equipment!

Panasonic Industrial Devices SUNX
Small Start IoT !

*When limiting is available, there are three general-purpose input points.

Built-in multiple axis waveform logging / display function!

Waveform logging and operation analysis achieved by registering beforehand the information about each slave you wish to monitor.
•Max. points of registration: 256 points
•Number of successive triggers: 16 points
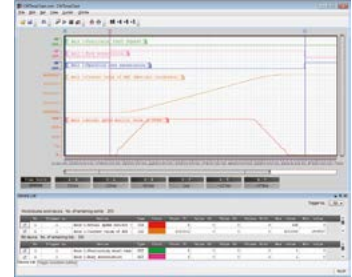
## Collection of sensor information and setting possible on same network!

Reading and writing possible of amount of light input and threshold values. Also, I/O control is possible via **S-LINK V**.

EtherCAT
EtherCAT Communication
AC servo motors & driver
MINAS **A6B**

**Communication unit
SC-GU3-03**
Max. connectable units:
16 units/unit*

Connectable sensors
Digital fiber sensor FX-501/502,
Digital laser sensor LS-501/403,
Digital pressure sensor
DPS-401/402, etc.

Max. 128 units/master can be connected

**S-LINK V
Gateway controller
SL-VGU1-EC**

Max. controllable points:
512 points/unit

S-LINK V

All types of sensors

*Max. 12 units if **FX-500** / **LS-500** series is included.

Smooth debugging at startup.

Unit equipped with SD memory card
Communications log can be analyzed at startup which makes debugging easy.
Also, writing possible of operating waveform.

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4GB
SLC
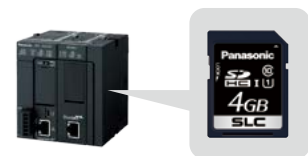
*When logging during operation, be aware of communication lags on the EtherCAT side when data is being written.
*Please use the Ethernet function built-in type CPU units (**AFP7CPS□E**, **AFP7CPS□ES**).

Product types

■ Motion control units

Product name	Number of axis		Part No.
	Real axis	Virtual axis	
FP7 motion control unit
EtherCAT type	16	8	**AFP7MC16EC**
	32	16	**AFP7MC32EC**
	64	32	**AFP7MC64EC**

*EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

■ Motion control setting tools

Product name	Descriptions	Part No.
Motion control setting tool
Control Motion Integrator	Windows version. Downloadable free of charge from our website. Please purchase Key unit separately.	**AFPSMTEN**
Control Motion Integrator Key unit	License key for **Control Motion Integrator**. 1 license. For USB port.
Please purchase **Control Motion Integrator** if you use it after 60 days since installing it.	**AFPSMTKEY**

● Key unit
AFPSMTKEY

■ Specifications

Item	16 axes type	32 axes type	64 axes type
CE marking directive compliance	EMC Directive, RoHS Directive		
Connected slave (Note 1) (Note 2) (Note 3)	Panasonic AC servo motor MINAS A6B / A5B series
EtherCAT-compatible communication unit for digital sensor **SC-GU3-03**
EtherCAT-compatible **S-LINK V** gateway controller **SL-VGU1-EC**		
Number of control axes	Real axis: 16 axes
Virtual axis: 8 axes	Real axis: 32 axes
Virtual axis: 16 axes	Real axis: 64 axes
Virtual axis: 32 axes
Transmission cycle	0.5 ms / 1 ms / 2 ms / 4 ms		
Interpolation control	2-axis linear interpolation, 2-axis circular interpolation, 3-axis linear interpolation and 3-axis spiral interpolation		
Number of occupied I/O points	Input: 16 points, Output: 16 points		

			16 axes type	32 axes type	64 axes type
Automatic operation	Positioning control (CSP)	Position specification method	Absolute (specified absolute position), Increment (specified relative position)		
		Position specified unit	pulse
μm (select a minimum instruction unit of 0.1 μm or 1 μm)
inch (select a minimum instruction unit of 0.00001 inch or 0.0001 inch)
degree (select a minimum instruction unit of 0.1 degree or 1 degree)		
		Position reference range	pulse: −2,147,483,648 to 2,147,483,647 pulse
μm (0.1 μm): −214,748,364.8 to 214,748,364.7 μm
μm (1 μm): −2,147,483,648 to 2,147,483,647 μm
inch (0.00001 inch): −21,474.83648 to 21,474.83647 inch
inch (0.0001 inch): −214,748.3648 to 214,748.3647 inch
degree (0.1 degree): −214,748,364.8 to 214,748,364.7 degree
degree (1 degree): −2,147,483,648 to 2,147,483,647 degree		
		Speed reference range	pulse: 1 to 2,147,483,647 pps
μm: 1 to 2,147,483,647 μm/sec.
inch: 0.001 to 2,147,483,647 inch/sec.
degree: 0.001 to 2,147,483,647 rev/sec.		
		Acceleration/deceleration type	Linear acceleration/deceleration, S-shaped acceleration/deceleration		
		Acceleration/deceleration time	0 to 10,000 ms (adjustable in 1 ms increments)		
		Number of positioning tables	Each axis standard area: 1,000 points
Expansion area: 100 points (24 axes when simultaneously launched)		
	Control method	Independent	PTP control (E point control, C point control), CP control (P point control), Speed control (J point control)		
		2-axis interpolation / Linear interpolation	E point, P point and C point controls: Specify synthesis speed or major axis speed		
		2-axis interpolation / Circular interpolation	E point, P point and C point controls: Center point or passing point		
		3-axis interpolation / Linear interpolation	E point, P point and C point controls: Specify synthesis speed or major axis speed		
		3-axis interpolation / Spiral interpolation	E point, P point and C point controls: Center point or passing point		
	Other function	Dwell time	0 to 32,767 ms (adjustable in 1 ms increments)		

Notes: 1) A6B and **SL-VGU1-EC** are compatible with **FP7** motion control unit Ver. 1.2 or later.
2) One unit or more A6B or A5B must exist on the network. Also, A6B and A5B can both be used on the network.
3) The hub for EtherCAT / Ethernet cannot be used.

	Item		16 axes type	32 axes type	64 axes type
Manual operation	JOG/inching operation	Speed reference range	pulse: 1 to 2,147,483.647 pps
μm: 1 to 2,147,483.647 μm/sec.
inch: 0.001 to 2,147,483.647 inch/sec.
degree: 0.001 to 2,147,483.647 rev/sec.		
		Acceleration/deceleration type	Linear acceleration/deceleration, S-shaped acceleration/deceleration		
		Acceleration/deceleration time	0 to 10,000 ms (adjustable in 1 ms increments)		
	Home return	Speed reference range	pulse: 1 to 2,147,483.647 pps
μm: 1 to 2,147,483.647 μm/sec.
inch: 0.001 to 2,147,483.647 inch/sec.
degree: 0.001 to 2,147,483.647 rev/sec.		
		Acceleration/deceleration type	Linear acceleration/deceleration, S-shaped acceleration/deceleration		
		Acceleration/deceleration time	0 to 10,000 ms (adjustable in 1 ms increments)		
		Return methods	DOG method (4 types), Limit method (2 types), Data set method, Z phase method, Stop-on-contact method (2 types)		
Stop function	Deceleration stop	Deceleration time	Axis operation mode startup time of activated axis		
	Emergency stop	Deceleration time	0 to 10,000 ms (adjustable in 1 ms increments)		
	Limit stop	Deceleration time	0 to 10,000 ms (adjustable in 1 ms increments)		
	Error stop	Deceleration time	0 to 10,000 ms (adjustable in 1 ms increments)		
	System stop	Deceleration time	Immediate stop (1 ms), all axes stop		
Synchronous operation function	Synchronous basic setting	Master axis	Selection possible of real axis and virtual axis		
		Slave axis	Max. 8 axes/master	Max. 16 axes/master	Max. 32 axes/master
	Electronic gear function	Operation setting	Gear ratio setting		
		Operation method	Direct method, Acceleration/deceleration method		
	Electronic clutch function	Clutch ON trigger	Contact input		
		Clutch method	Direct method, Linear slide method		
	Electronic cam function	Cam curve	Select from 20 types
Multiple curves can be specified within a phase (0 to 100 %).		
		Resolution	1,024, 2,048, 4,096, 8,192, 16,384, 32,768		
		Number of cam patterns	16 to 64
(Depends on resolution)	32 to 128
(Depends on resolution)	64 to 256
(Depends on resolution)
Other specifications	Software limit function	Set range	pulse: −2,147,483,648 to 2,147,483,647 pulse
μm (0.1 μm): −214,748,364.8 to 214,748,364.7 μm
μm (1 μm): −2,147,483,648 to 2,147,483,647 μm
inch (0.00001 inch): −21,474.83648 to 21,474.83647 inch
inch (0.0001 inch): −214,748.3648 to 214,748.3647 inch
degree (0.1 degree): −214,748,364.8 to 214,748,364.7 degree
degree (1 degree): −2,147,483,648 to 2,147,483,647 degree		
	Monitor judgment	Torque judgment	Torque judgment
Selection possible of active/non-active and error/warning 0.0 to ±500.0 %		
		Actual speed judgment	Actual speed judgment
Selection possible of active/non-active and error/warning 0.0 to ±5,000 rpm		
	Backup		Parameters and positioning data are saved to flash memory (battery free)		
			· Limit input CWL, CCWL monitor and proximity (DOG) monitor
· General-purpose input: 5 points, General-purpose output: 1 point (I/O from AMP)
· Auxiliary output contact and auxiliary output cord		
Current consumption (at 24 V DC)			180 mA approx.		
Weight			150 g approx.		