⚠ Safety Precautions

- Important Notes on exporting this product or equipment containing this product;
  If the end-user or application of this product is related to military affairs or weapons, its export may be controlled by “Foreign Exchange and Foreign Trade Control Law” of Japan where export license will be required before product can be exported from Japan.
- This product is designed and manufactured for use in General Purpose Industrial Equipment and it is not intended to be used in equipment or system that may cause personal injury or death.
- All servicing such as installation, wiring, operation, maintenance and etc., should be performed by qualified personnel only.
- Tighten mounting screws with an adequate torque by taking into consideration strength of the screws and the characteristics of material to which the product will be mounted. Over tightening can damage the screw and/or material; under tightening can result in loosening.
- Install safety equipment to prevent serious accidents or loss that is expected in case of failure of this product.
- Consult us before using this product under such special conditions and environments as nuclear energy control, aerospace, transportation, medical equipment, various safety equipments or equipments which require a lesser air contamination.
- We have been making the best effort to ensure the highest quality of our products, however, some applications with exceptionally large external noise disturbance and static electricity, or failure in input power, wiring and components may result in unexpected action. It is highly recommended that you make a fail-safe design and secure the safety in the operative range.
- If the motor shaft is not electrically grounded, it may cause an electrolytic corrosion to the bearing, depending on the condition of the machine and its mounting environment, and may result in the bearing noise. Checking and verification by customer is required.
- Failure of this product depending on its content may generate smoke of about one cigarette. Take this into consideration when the application of the machine is clean room related.
- Please be careful when using the product in an environment with high concentrations of sulfur or sulfuric gases, as sulfuration can lead to disconnection from the chip resistor or a poor contact connection.
- Do not input a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may lead to damage of the internal parts, causing smoke and/or fire and other troubles.
- The user is responsible for matching between machine and components in terms of configuration, dimensions, life expectancy, characteristics, when installing the machine or changing specification of the machine. The user is also responsible for complying with applicable laws and regulations.
- Manufacturer’s warranty will be invalid if the product has been used outside its stated specifications.
- Component parts are subject to minor change to improve performance.
- Read and observe the instruction manual to ensure correct use of the product.

Repair	Consult to the dealer from whom you have purchased this product for details of repair work. When the product is incorporated to the machine you have purchased, consult to the machine manufacturer or its dealer.
URL	Electronic data of this product (Instruction Manual, CAD data) can be downloaded from the following web site; industrial.panasonic.com/ac/e/

●Contact to : ——————————————

Panasonic
INDUSTRY

Panasonic Industry Co., Ltd.,
Industrial Device Business Division
1-1 Morofuku 7-chome, Daito, Osaka 574-0044, Japan

Panasonic Industrial Search

■AQCTB0100E-3 202401-y

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Panasonic
INDUSTRY

AC Servo Motor & Driver

MINAS A6 Family
MINAS E series

IN Better Solution

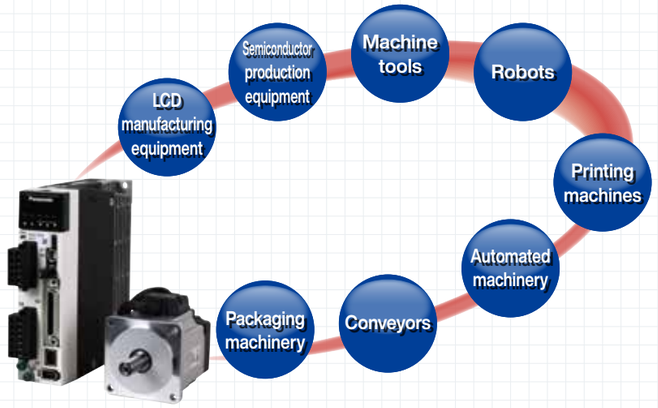
2024.1

● This product is for industrial equipment. Don't use this product at general household.

MINAS A6 Family

More compact, more faster and more easy-to-use Servomotors that meet the demands of the present age.

The MINAS A6 family of advanced AC servomotors is changing the landscape of industrial machinery.

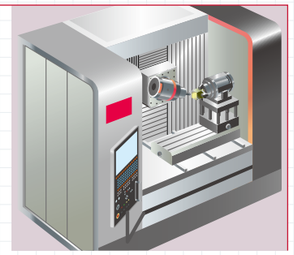


Robots

A robot is required to operate stably despite arm posture and position, workload and other conditions changing from moment to moment. The MINAS A6 family assures stable operation by suppressing effects of load to a minimum using “adaptive load control.”

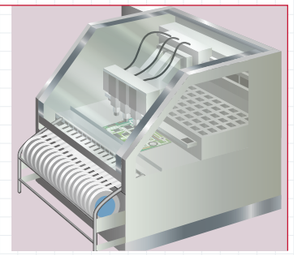
Processing machinery

With metal processing machine, it is very difficult to render mirror-like finishing on a polygonal body.
The A6 family realizes “3.2 kHz frequency response” to improve feedback responsiveness, thus enabling mirror surfacing without generating lines or streaks.



Component mounting machines

The A6 family also shows its versatility when used with a component mounting machine where speed and positional accuracy are demanded. In addition to high frequency response, it can process accidental disturbances with the help of built-in “adaptive load control,” thus maintaining high productivity.



INDEX

A6 Family

Servomotors that flexibly and effectively fit into various system configurations MINAS A6 Family

Controller

●For compatible controllers, see our website or request the necessary information separately.

●For compatible controllers, see our website or request the necessary information separately.

●For compatible controllers, see our website or request the necessary information separately.

Modbus network (Block operation position control)

Pulse train position command (Block operation position control by external I/O)

Analog velocity control

Analog torque control

RTEX Realtime Express

EtherCAT®

Driver

Basic type
A6SE series

RS485 communication type
A6SG series

Multifunction type
A6SF series

Standard type
A6NE series

Multifunction type
A6NF series

Standard type
A6BE series
Special order product

Multifunction type
A6BF series
Special order product

Motor

MSMF
Low inertia

MDMF
Middle inertia

MQMF
Middle inertia/ Flat type

MGMF
Middle inertia/ Low speed high torque

MHMF
High inertia

MQMF
with gear reducer

MHMF
with gear reducer

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

Slim design and position control type

E series

- Ultra-small design and pulse train command type only, DIN-rail mountable (using mounting Kit)
- Rated output: 50 W to 400 W

MINAS A6 DC24 V / DC48 V type

Special order product

- DC24 V / DC48 V power supply
- Rated output :
  DC24 V: 50 W
  100 W
  133 W
  DC48 V: 50 W
  100 W
  133 W
  266 W

Dual-axis servo driver

Special order product

RTEX Realtime Express

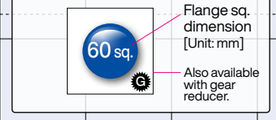
- Reduced wiring by dual-axis integration
- Supports both rotary motors and linear / DD motors
- Rated output :
  Max.200 W ×2-axis
  Max.400 W ×2-axis
  Max.750 W ×2-axis
  Max.1 kW × 2-axis

It is MINAS A6 Family lineup that meets the manufacturing industry needs. MINAS A6 Family

Motor line-up

		50 W	100 W	200 W	400 W	750 W	850 W	1000 W	1.0 kW	1.3 kW	1.5 kW	1.8 kW	2.0 kW	2.4 kW	2.9 kW	3.0 kW	4.0 kW	4.4 kW	5.0 kW	5.5 kW	7.5 kW	11.0 kW	15.0 kW	22.0 kW
Low inertia MSMF	100 V	38 sq.	38 sq.	60 sq.	60 sq.																			
	Rated rotational speed (Maximum rotational speed)	3000 r/min(6000 r/min)																						
	200 V	38 sq.	38 sq.	60 sq.	60 sq.	80 sq.		80 sq.	100 sq.		100 sq.		100 sq.			120 sq.	130 sq.		130 sq.					
	Rated rotational speed (Maximum rotational speed)	3000 r/min(6000 r/min)							3000 r/min(5000 r/min)						3000 r/min(5000 r/min)									
	400 V								100 sq.		100 sq.		100 sq.			120 sq.	130 sq.		130 sq.					
	Rated rotational speed (Maximum rotational speed)								3000 r/min(5000 r/min)						3000 r/min(5000 r/min)									
Middle inertia/Flat type MQMF	100 V		60 sq. G	80 sq. G	80 sq. G																			
	Rated rotational speed (Maximum rotational speed)		3000 r/min(6500 r/min)																					
	200 V		60 sq. G	80 sq. G	80 sq. G																			
	Rated rotational speed (Maximum rotational speed)		3000 r/min(6500 r/min)																					
Middle inertia MDMF	200 V								130 sq.		130 sq.		130 sq.			130 sq.	176 sq.		176 sq.		176 sq.	220 sq.	220 sq.	220 sq.
	Rated rotational speed (Maximum rotational speed)								2000 r/min(3000 r/min)						2000 r/min(3000 r/min)						1500 r/min *1	1500 r/min(2000 r/min)		
	400 V								130 sq.		130 sq.		130 sq.			130 sq.	176 sq.		176 sq.					
	Rated rotational speed (Maximum rotational speed)								2000 r/min(3000 r/min)						2000 r/min(3000 r/min)									
Middle inertia/Low speed high torque MGMF	200 V					130 sq.				130 sq.			130 sq.	176 sq.	176 sq.			176 sq.		176 sq.				
	Rated rotational speed (Maximum rotational speed)					1500 r/min(3000 r/min)							1500 r/min(3000 r/min)											
	400 V					130 sq.				130 sq.			130 sq.	176 sq.	176 sq.			176 sq.						
	Rated rotational speed (Maximum rotational speed)					1500 r/min(3000 r/min)							1500 r/min(3000 r/min)											
High inertia MHMF	100 V	40 sq.	40 sq. G	60 sq. G	60 sq. G																			
	Rated rotational speed (Maximum rotational speed)		3000 r/min(6500 r/min)																					
	200 V	40 sq.	40 sq. G	60 sq. G	60 sq. G	80 sq. G		80 sq.	130 sq.		130 sq.		176 sq.			176 sq.	176 sq.		176 sq.		176 sq.			
	Rated rotational speed (Maximum rotational speed)		3000 r/min(6500 r/min)			3000 r/min(6000 r/min)			2000 r/min(3000 r/min)						2000 r/min(3000 r/min)						1500 r/min *1			
	400 V			60 sq.	60 sq.	80 sq.		80 sq.	130 sq.		130 sq.		176 sq.			176 sq.	176 sq.		176 sq.					
	Rated rotational speed (Maximum rotational speed)			3000 r/min(6500 r/min)		3000 r/min(6000 r/min)			2000 r/min(3000 r/min)						2000 r/min(3000 r/min)									

Table description

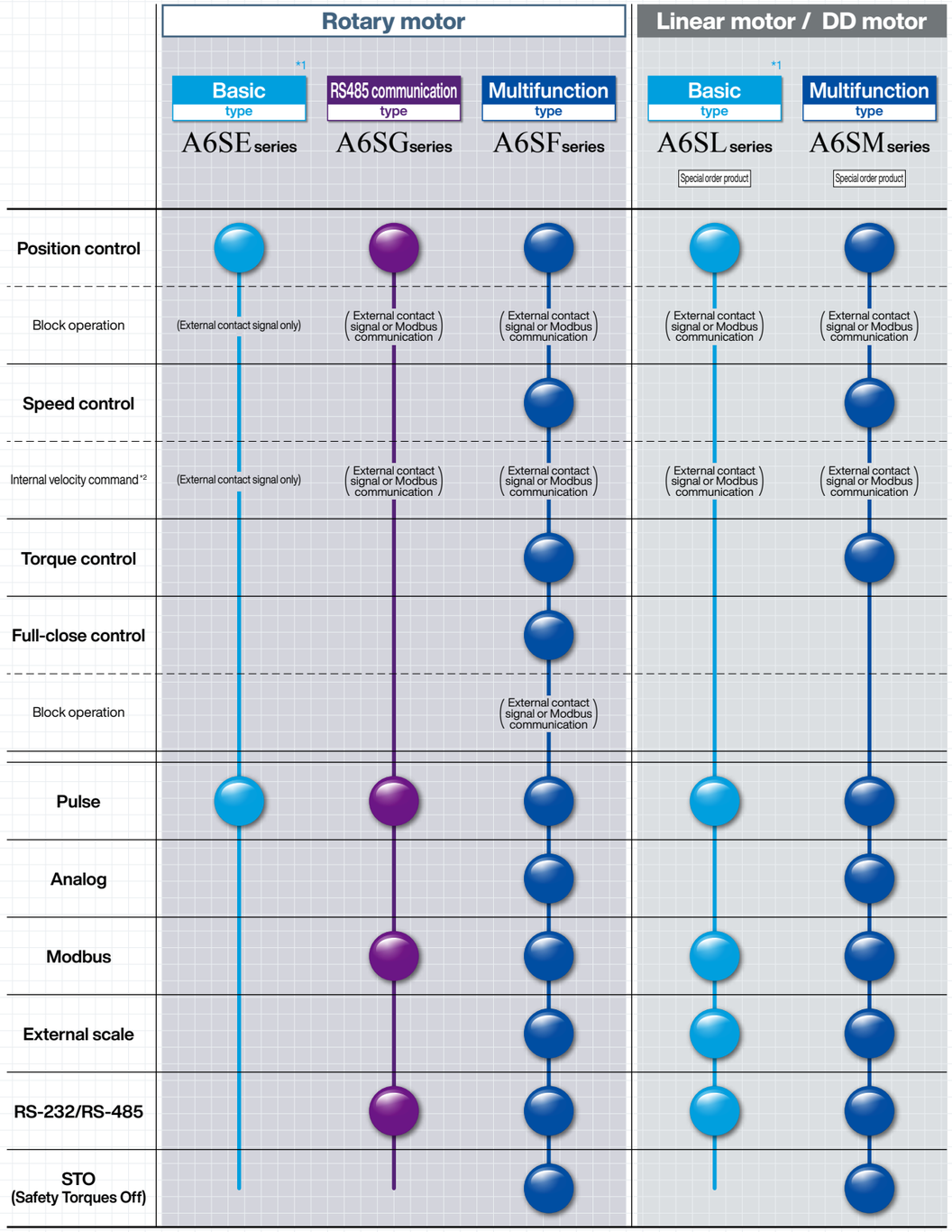


<Information> **"MINAS A6 Family 400 V Series" catalog is available separately.**
For more information, please visit our website or request to our distributors separately.

*1 Maximum rotational speed is 3000 r/min.

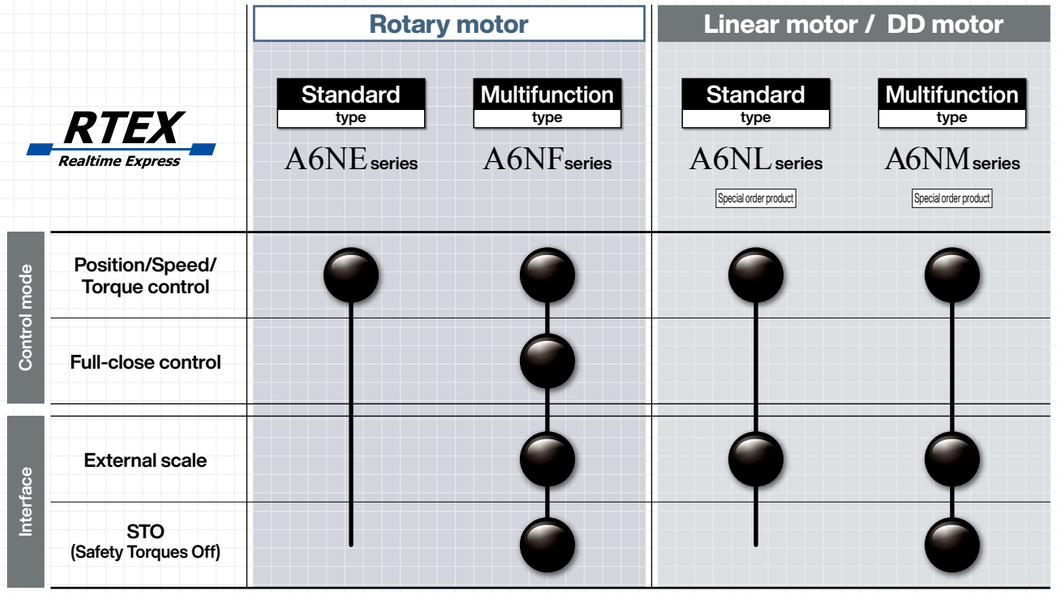
It is MINAS A6 Family lineup that meets the manufacturing industry needs. MINAS A6 Family

Driver line-up

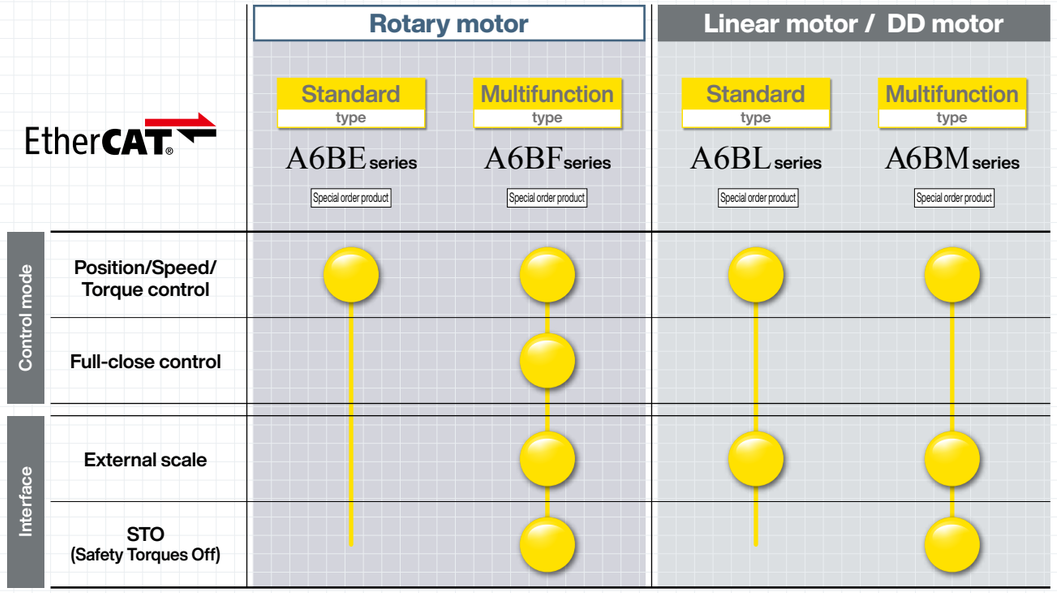


*1 A6SE series driver (Position control only) does not correspond to the absolute system of using the serial communication with the host device. It supports incremental system only.
*2 When using internal speed command with Modbus, external servo ON is required.

High speed communication For Realtime Express Network servo driver ▶ For Details see P.349



Servo drivers with EtherCAT open network ▶ For Details see P.369



● Please check the instruction manual for necessary wiring.
Special order product For more information, please visit our website or request to our distributors separately.

Small, light, powerful and speedy ※1

MINAS A6 Family

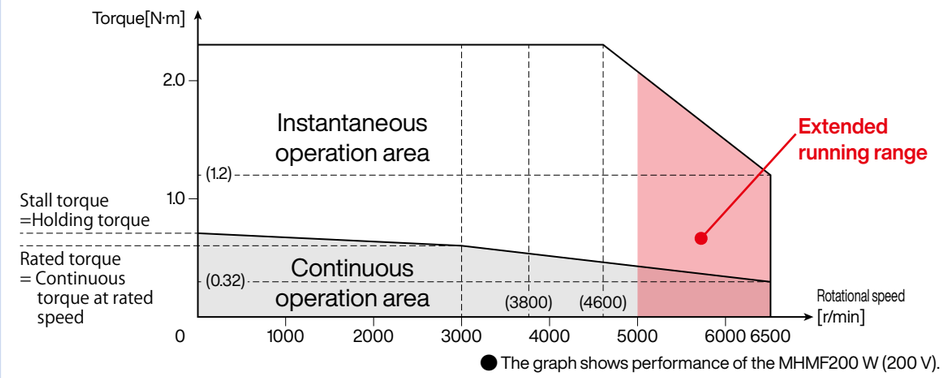
● Size of a typical business card (W90 mm × H55 mm)

High-speed, high-torque, compact and lightweight. ※1

Max. speed	Max. torque	Overall length	Weight
6500 r/min ※2	Approx. 350 % ※2	67.5 mm ※2	750 g ※2
Fast	High	Short	Light
A5Family ※3 5000 r/min	A5Family ※3 Approx 300 %	A5Family ※3 99.0 mm	A5Family ※3 960 g

※1 Middle and high inertia types only ※2 MHMF200 W ※3 MHMD200 W

Thanks to high-speed and high-torque, the application area is greatly expanded.



● The graph shows performance of the MHMF200 W (200 V).

Enhanced position detecting resolution enables smoother and more precise positioning.

Encoder		Communication speed		
23 bit (8388608 Pulse / rotation)		5 Mbps		
8 times higher resolution	+	Improved	=	Low vibrations High speed and high precision positioning
(A5 Family ※4 20 bit)		(A5 Family 2.5 Mbps)		

※4 Incremental encoder

Swifter, smarter and easier to use

MINAS A6 Family

Powered Up compact driver

Full-scale

- New two-degree-of-freedom control system
- Frequency response 3.2 kHz
- Built-in filters and adjusting functions
- PANATERM Support
- Modbus Support (A6SF、A6SG Series)
- Block operation position control (Supports Modbus and external I/O)

Image of block operations

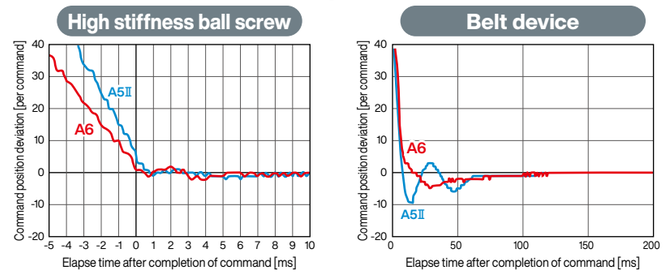
Servo on
Instruct the Operation block No.

Block No.0 Run	Block No.10 Run	Block No.100 Run
Block No.1 Run	Block No.11 Run	Block No.200 Run
Block No.2 Run	Block No.12 Run	Block No.255 Run

High-speed response, high-precision positioning for quick and accurate movement

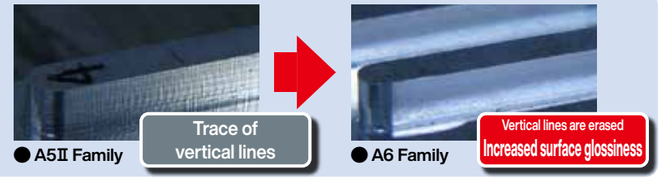
Our proprietary algorithm in addition to upgraded CPU and other hardware realized further high-speed response. Furthermore, high-precision positioning is achieved by automatically eliminating micro vibrations and machine oscillation caused by the resonance.

● **Comparison of position setting waveforms**



Example of operation with processing machine

A mirror finish is obtained even if a process that tends to cause streaking.



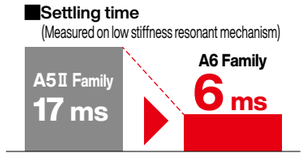
● A5Ⅱ Family ● A6 Family

Easy and quick setting, shortening conventional settling time by approx. 64%.※1

Newly developed fit gain function substantially reduces adjustment time. Adaptive notch filter and various gains can be automatically set and adjusted.

※1 Comparison with conventional product A5Ⅱ Family

■**Settling time**
(Measured on low stiffness resonant mechanism)



Ball screw settling time **0 ms**

Belt device settling time **4 ms**

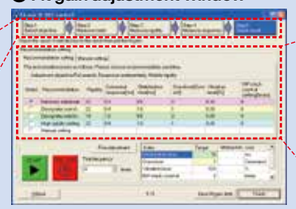
● The above is a measure based on our test environment

Adjustment completed in only 3 processes

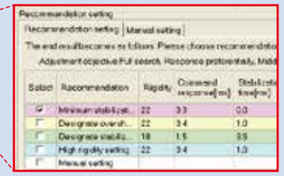
① Condition setting → ② Measurement → ③ Result determination

Load Stiffness Command response

● **Fit gain adjustment window**



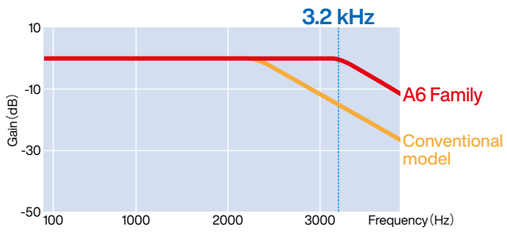
● **Automatically proposes various settings**



Realized 3.2 kHz frequency response to improve productivity

Realizes 3.2 kHz frequency response. At 139% that of conventional models *1, it enables high-speed operation and improves productivity.

※1 Comparison with conventional product A5Ⅱ Family



Reduced maintenance work and trouble.

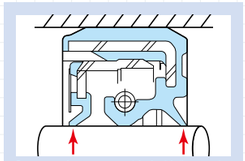
MINAS A6 Family

Lineup of motors protected by high dust-proof, high heat-resistant oil seal (With protective lip)

Motors protected by a highly dust-proof, oil-tight oil seal (with protection lip) have been added to the lineup of motor products equipped with oil seals of conventional specifications. The oil seals of this type of motor are made of a material of higher heat resistance.

You can select appropriate motor type according to your application environment such as dusty, powdery or gear connection necessity.

- Oil-seals (with protective lip) are not available for MSMF motors with flange size 80 mm or smaller.
- MQMF and MHMF motors with flange size of 80 mm or smaller provided with oils seals (with protective lip) are not mounting-compatible with A5 Family models.



Some products are provided with "protective lip" that prevents dust and oil penetration.

■ **Applicable oil seals**

Flange size	Motor type	With oil seal		With oil seal (with protective lip)		
80 mm or less	MSMF	◎	Made of nitrile rubber (NBR)	No setting		
	MHMF, MQMF	◎		◎	Made of fluororubber	Not mounting-compatible with A5 Family products
100 mm or more	All Type	◎		◎		Mounting-compatible with A5 Family products

IP67 enclosure rating (Motors with flange size of 80 mm or smaller are order-made products)

Direct-mount connectors are used for the motor power supply and encoder input and output to improve sealing performance of the motor to IP67.

- IP67-compatible motors with flange size of 80 mm or smaller are order-made products.
- For environmental conditions of applications, refer to P.303.

What is IP?

An international standard that specifies the degree of dustproof and waterproof performance. (IP: Ingress Protection)

IP-67

- 6: Dust-tight type: Totally protected against dust penetration.
- 7: Protected against water penetration when immersed in water for the specified period of time and under the specified pressure.

Adoption of direct-mount connector

Lifespan diagnosis / degradation diagnosis

It warns expected lifetime of the motor & driver, and deterioration limit of the equipment.

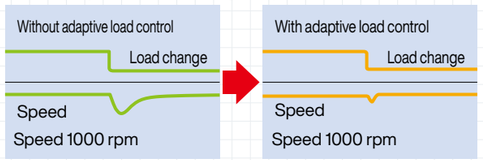
Geared servomotor

The geared servomotor lineup is also added.

Other driver functions

Adaptive load control

Adaptive load control automatically sets the best suitable gain table in response to fluctuations in inertia caused by changes in workload, thus keeping machines operating stably at all times.

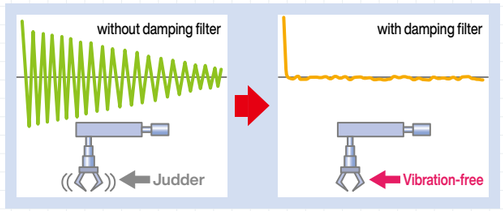


Friction torque compensation

This function reduces the effect of machine related friction and improves responsiveness. Three kinds of friction compensation can be set: unbalanced load compensation, which sets an offset torque that is constantly applied; kinetic friction compensation, which changes direction in response to the direction of movement; and viscous friction compensation, which changes according to the speed command.

Manual/Auto damping filter

Equipped with a damping filter that is automatically set through the setup support software.This filter removes the natural vibration frequency component from the command input, greatly reducing vibration of the axis when stopping. The number of filters for simultaneous use has been increased to three from the conventional two filters. (Two from one in the two-degree-of-freedom-control mode.) The adaptive frequency has also been significantly expanded from 0.5 Hz to 300 Hz.

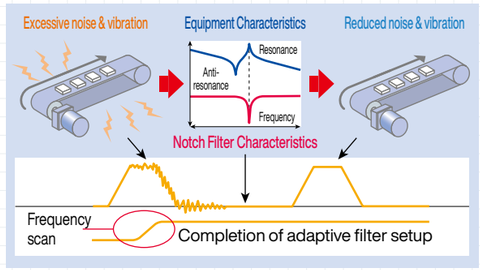


Manual/Auto notch filter

Equipped with auto-setting notch filters for greater convenience. Now there is no need to measure troublesome vibration frequencies.

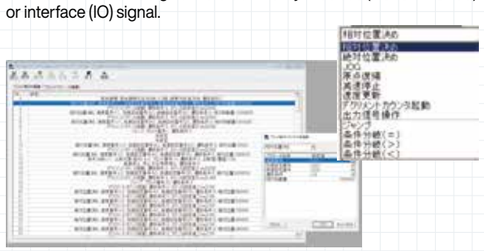
Our notch filters automatically detect vibration and provide simple auto-setting. These notch filters greatly reduce noise and vibration caused by equipment resonance and respond quickly.

The A6 Family is equipped with 5 notch filters with frequencies settable from 50 Hz to 5000 Hz. Depth can be individually adjusted within this range. (Two of the filters share automatic settings.)



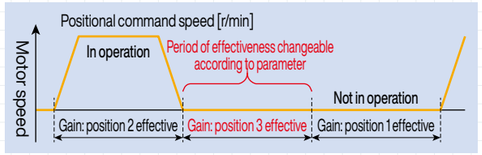
Block operation function

256 block patterns can be created. Easy control is possible because the instruction can be given to block No. by Modbus (RS232, RS485) or interface (IO) signal.



3-step gain

A 3-step gain switch is available in addition to the normal gain switch.This chooses appropriate gain tunings at both stopping and running. The 3-step gain switch gives you choices of 3 different tunings for normal running, stopping for faster positioning and at stopping. The right gaining tunings achieve lower vibration and quicker positioning time of your application.



Inertia ratio conversion

You can adjust right inertia ratio by Inertia ratio conversion input (J-SEL) of interface. When you have significant load inertia changes, it can adjust unbalanced speed and position gain turning combination.It ends up quicker response of your system.

Input/output signal assignment

You can use the parameters to arbitrarily allocate the universal 10 inputs and 6 outputs. (Inputs can be selected as either A contacts or B contacts). The Panaterm setup software provides an exclusive screen for a more simplified setup.

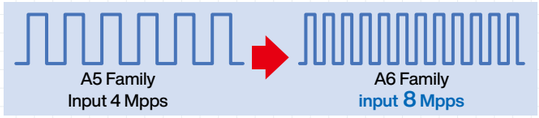
Torque limiter switching

These can be used for applications such as simplified pressure, tension control, and sensor-less homing.

Supports semi-/full-closed loop (8 Mpps input pulse, 4 Mpps output pulse) control.

Supports full-closed loop control. The A6SF series accommodates a command input of 8 Mpps and feedback output of 4 Mpps, enabling high-resolution, high-speed operation.Supports the industry's leading positioning resolution commands (pulse-train commands).

- The A6SE and A6SG series do not support full-closed loop control.
- Applicable scale: AB-phase feedback scale (general purpose product) and serial feedback scale (dedicated to Panasonic format product)



Dynamic braking

With parameter settings, you can select dynamic braking, which shorts servomotor windings U, V and W at Servo-OFF, during positive direction/ negative direction, and during power shutdown and tripping of the circuit breaker for over travel inhibition.

- The desired action sequence can be set up to accommodate your machine requirements.

Inrush current preventive function

This driver is equipped with a rush current preventive resistor to prevent the circuit breaker from shutting off the power supply as a result of inrush current occurring at power-on.

Parameter initialization

Using the front panel or by connecting a PC, you can restore the parameters to the factory settings.

Regenerative energy discharge

A regenerative resistor is used to discharge regenerative energy, which is the energy generated when stopping a load with a large moment of inertia or when using this unit in vertical operation. This energy is returned to the driver from the motor.

- Frame A, and frame B model drivers do not contain a regenerative resistor. Optional regenerative resisters are recommended.
- Frame C to frame F model drivers contain one regenerative resistor; however, adding an optional regenerative resistor provides additional regeneration capability.

Multifunctional software for quick adjustment support

MINAS A6 Family

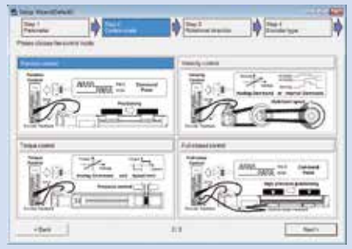
PANATERM set-up support software

The PANATERM set-up support software, with many added features. The PANATERM assists users in setting parameters, monitoring control conditions, setup support, and analyzing mechanical operation data on the PC screen, when installed in a commercially available personal computer, and connected to the MINAS A6 Family through the USB interface. Choose either English, Japanese, Chinese, Korean-language display.

Please download from our web site and use after install to the PC.
https://industrial.panasonic.com/ww/products/motors-compressors/fa-motors/ac-servo-motors/minas-a5-panaterm

Setup wizard

This wizard supports fundamental settings in each control mode step by step, including reading of default setting. In On-line condition, Input data related to each step can be monitored in real time.

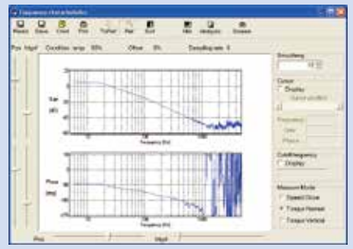


Trial run

This function supports positioning with the Z-phase search and software limit.

Frequency characteristics measurement function

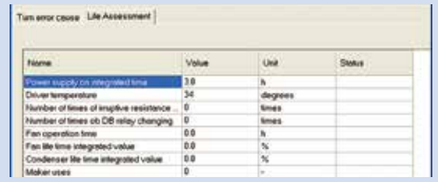
Can check frequency response characteristics of the mechanism and motor. Since resonance frequency of the mechanism is measurable, it is effective for start-up time reduction.



Service Life Prediction

The service life prediction function considers the internal temperature for main components such as the fan and condenser. If the rated value is exceeded, an alarm is displayed. This approach prevents unexpected suspension of operation and allows for planning of systemized maintenance.

Note: The life span prediction value should be considered as a guide only.

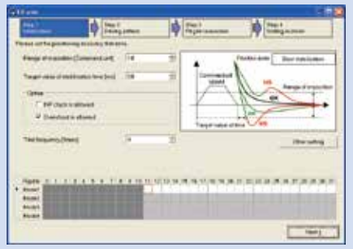


The fit gain function for setting Two-degree-of-freedom control.

1) Select the adjustment method 2) Load measurement
3) Confirming results Adjust gain to meet your needs

Fit gain

This function automatically searches the best suitable stiffness setting and mode and adjusts the gain once the target in-position range and setting time are set.



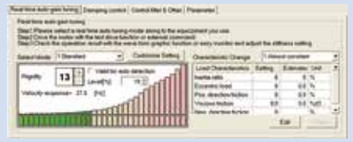
Encoder temperature monitor

The Encoder Temperature Monitor is a new function capable of real-time measurement of the interior temperature of the encoder, something that has been difficult to achieve in the past. It is valuable for monitoring the motor and can be used as a diagnostic in the event of a malfunction.

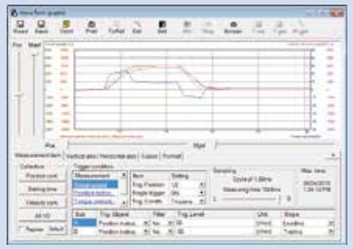
Deterioration diagnosis

From the equipment information that can be detected by the motor, it is possible to display and check the deterioration and aging status of the equipment.

Added New screen for gain adjustment, equipped with stiffness oscillation auto-reduction function



Significant increase of measuring objects Multi-functional waveform graphic



Other features It has convenient functions such as motor / driver information such as load factor, power supply voltage, driver temperature etc, logging function capable of recording interface recording, display function of non-rotating factors etc
● Deterioration diagnosis ● Block action editor / monitor (A6SE, A6SG, A6SF series) ● Battery refresh ● Object editor (A6BE, A6BF series)

• Hardware configuration

Personal computer	CPU	800 MHz or more
	Memory	System memory 512 MB or more Graphics memory 32 MB or more
	Hard disk capacity	Vacancy of 512MB or more recommended
	OS	Windows® Vista SP1 (32 bit), Windows® 7 (32 bit, 64 bit), Windows® 8 (32 bit, 64 bit), Windows® 10 (32 bit, 64 bit) Japanese, English, Chinese (Simplified), Korean version
	Serial communication function	USB port, COM port (Communication speeds: 2400 bps to 115200 bps) * A COM port is required to use RS232 communications. A 9600 bps or higher baud rate is recommended.
Display	Resolution	1024 × 768 pix or more
	Number of colors	24 bit colors (TrueColor) or more

<CAUTION> This software is applicable only to A5 Family, A6 Family. To apply this software to A, AIII, E or A4 series, consult our distributors.

Lineup of two types of network servo driver

MINAS A6 Family

Realtime Express(RTEX)

Ultimate **Real-time** performance

- Com. period min. **0.0625 ms**
- Com. speed **100 Mbps** Full-duplex
- Velocity response **3200 Hz**

Functionality to meet various needs

- Precise position latch & comparing
- Infinitely rotatable absolute encoder
- IEC safety I/F model available *1

*1 : Multi-functional type F. IEC61800-5-2 STO, IEC61508 SIL3.

RTEX Realtime Express

Simple network

- High-performance & Low-cost
- Isochronous established by ASIC
- Easy device development

Max **16000** times/s

MINAS A6N series

EtherCAT

High-Performance

- Frequency response: **3200 Hz**
- Supports network communication "**EtherCAT**".
- High-Speed **100 Mbps**
- Real-time auto tuning function, Anti-vibration filters are available.

EtherCAT®

High-functions

- **EtherCAT** with many supported applications
  <7 control modes, 32 hm methods, DC(Synch), SM2(Synch), FreeRUN (Non-synch)>
- System-up possible with various slaves.
- Supports PC-based controller.
- A6BL/A6BM (for Linear Motor) will be available soon.

Standards

- Official EtherCAT Conformance Tested model available.
- IEC safety I/F model available.*2

*2 : Supported by multifunction type. EN61800-5-2 STO, EN61508 SIL3.

Small size servo driver with EtherCAT

MINAS A6B series Special order product

Absolute system can be configured without the battery.

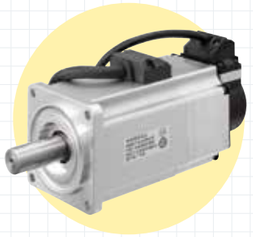
Battery-less absolute encoder motor

For details on the battery-less absolute encoder type, refer to the "MINAS A6 Family Battery-less Absolute Encoder Models" catalog.

Reduced the battery for the absolute encoder by installing the power generating element in the motor.
In addition to improving maintainability, we support the construction of ecological and economical industrial machines and systems.

Maintenance work such as battery replacement is reduced because battery is not required anymore.

Reduce wasteful inventory management and replacement costs as battery is no required anymore. It contributes to the construction of ecological and economical industrial machines and systems.



Battery-less absolute encoder motor list

	80 mm sq. or less Leadwire type						100 mm sq. or more Encoder connector (Small size JN2) type					
	50 W	100 W	200 W	400 W	750 W	1000 W	1.0 kW	1.5 kW	2.0 kW	3.0 kW	4.0 kW	5.0 kW
Low inertia **MSMF**	100 V 200 V	100 V 200 V	100 V 200 V	100 V 200 V	200 V	200 V	200 V	200 V	200 V	200 V	200 V	200 V
Middle inertia **MQMF**		100 V 200 V	100 V 200 V	100 V 200 V								
Middle inertia **MDMF**							200 V	200 V	200 V	200 V	200 V	200 V
Middle inertia **MGMF**							850 W 200 V	1.3 kW 200 V	1.8 kW 200 V	2.4 kW 200 V	2.9 kW 200 V	4.4 kW 200 V
High inertia **MHMF**	100 V 200 V	100 V 200 V	100 V 200 V	100 V 200 V	200 V	200 V	200 V	200 V	200 V	200 V	200 V	200 V

Table description
Voltage specifications — 100 V 200 V

<Information> **"MINAS A6 Family 400 V Series" catalog is available separately.**
For more information, please visit our website or request to our distributors separately.

Compliance with MINAS A6 Family international standards

(A6SF series) (A6SE and A6SG series)

		Driver	Motor
EU/UK Standards	**EU EMC Directives/ UK EMC Regulation**	EN55011 EN61000-6-2 EN61000-6-4 EN61800-3	—
	EU Low Voltage Directives/ UK Low Voltage Regulation	EN61800-5-1	EN60034-1 EN60034-5
	Machinery (Functional safety *1)	ISO13849-1 EN61508 EN62061 EN61800-5-2	—
UL Standards		UL61800-5-1 (E164620)	UL1004-1, UL 1004-6 (E327868)
CSA Standards		C22.2 No.274	C22.2 No.100
Radio Waves Act (South Korea) (KC)*2		KN11 KN61000-4-2,3,4,5,6,8,11	—

IEC : International Electrotechnical Commission
UL : Underwriters Laboratories
EN : Europaischen Normen
CSA : Canadian Standards Association
EMC : Electromagnetic Compatibility

Safety parameter

	Diagnosis based on EDM	No diagnosis based on EDM
Safety Integrity Level	EN61508 (SIL3) EN62061 (SILCL3)	EN61508 (SIL2) EN62061 (SILCL2)
Performance level	ISO13849-1 PL e (Cat.3)	ISO13849-1 PL d (Cat.3)
Safety function	EN61800-5-2 (SIL 3, STO)	EN61800-5-2 (SIL 2, STO)
Hazardous failure probability per hour	<For size A,B,C,D,E,F> PFH = 1.34×10^{-8} (% SIL3 = 13.4 %) <For size G and H> PFH = 1.78×10^{-8} (% SIL3 = 17.8 %)	<For size A,B,C,D,E,F> PFH = 1.40×10^{-8} (% SIL2 = 1.40 %) <For size G and H> PFH = 1.85×10^{-8} (% SIL2 = 1.85 %)
Average time of hazardous failure	MTTFd : High (100 years)	MTTFd : High (100 years)
Average self-diagnosis rate	DC : Medium	DC : Low
Task time	15 years	15 years

- When export this product, follow statutory provisions of the destination country.

*1 A6SE, A6SG, A6NE and A6BE series doesn't correspond to the functional safety standard.

*2 Information related to the Korea Radio Law
This servo driver is a Class A commercial broadcasting radio wave generator not designed for home use.
The user and dealer should be aware of this fact.

A 급 기기 (업무용 방송통신기자재)
이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

(대상기종 : Servo Driver)

This products is not an object of china compulsory certification (CCC).

Low noise, compliant with EU EMC Directives/UK EMC Regulation

Radiated noise is minimized to meet EU EMC Directives/UK EMC Regulation and to support international standards.

Compliance with EU safety standards.

Features non-software-based independent redundant circuitry for motor power isolation. Independent redundant circuitry for motor power isolation. This obviates the need for magnetic contactors to isolate the required motor in order to accommodate EU Low Voltage Directives/UK Low Voltage Regulation machinery commands. (The final safety compliance must be applied as machine.)

SEMI-F47

Includes a function in compliance with the SEMI F47 standard for voltage sag immunity under no load or light load. Ideal for the semiconductor and LCD industries.
- Excluding the single-phase 100-V type.
- Please verify the actual compliance with your machine checking the F47 standard for voltage sag immunity.