Communication cycle 0.0625 ms — Ultra-high-speed network driver

RTEX Realtime Express
Realtime Express (RTEX)
AC servo motor & driver

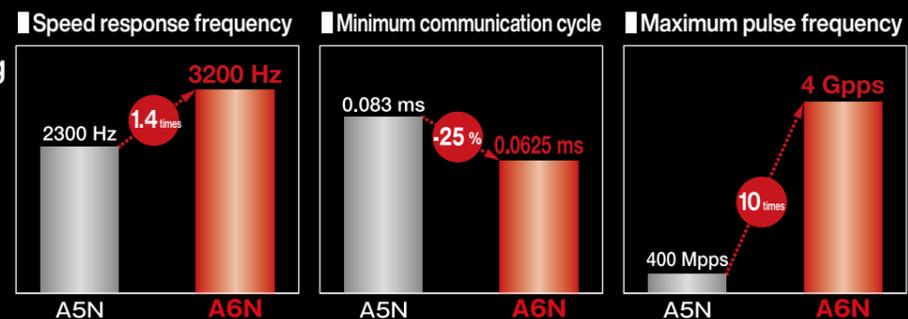## MINAS A6N Series

A6 Series
A6N Series
A6B Series (Special Order Product)
Information

Pursuit of ultimate real-time processing

Pursuit of ultimate real-time processing

Speed response frequency	Minimum communication cycle	Maximum pulse frequency
2300 Hz → 3200 Hz (1.4 times)	0.083 ms → 0.0625 ms (-25 %)	400 Mpps → 4 Gpps (10 times)
A5N / A6N	A5N / A6N	A5N / A6N

● Max.4 Mpps, when using AB-phase external scale

Multifunctional capabilities to match various needs
◎ Supports all positions, speeds and torque modes (w/built-in positioning function)
◎ High-precision position latch and comparison
◎ Communication cycle can be set to any time between 2 ms and 62.5 μs.
● Easy setup with setup support software "PANATERM".

Simple network
◎ Satisfies both high performance and low cost requirements
◎ Synchronization established by communication IC
◎ Easier development of compatible equipment

● Realtime Express and RTEX are registered trademarks of Panasonic Holdings Corporation..

● The "Conventional I/F" used in this document means a pulse train and analog I/F.

Wire-saving

Wire-saving reduces various troubles relating to wires. The cables used are widely available Ethernet cables, which are easy to obtain and inexpensive.

Conventional I/F
(50P PLUG)

RTEX
(Commercially available Ethernet cables)
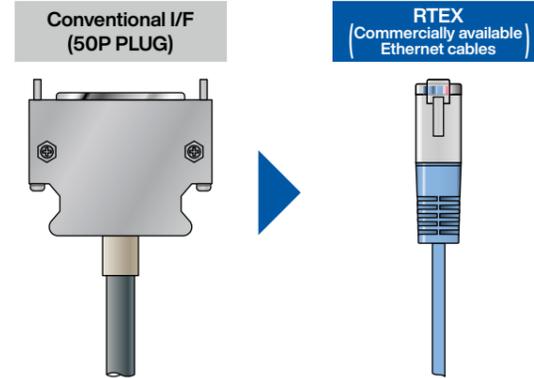
Maximum length of the node-to-node cable is 100 m.

Flexibility increases in the layout of an upper controller and servo motors. The RTEXs can also support large-scale systems.

RTEX

Max. 100 m
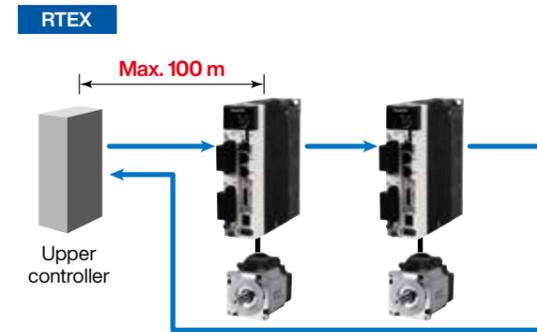
Upper controller

Configurable parameter settings

Upper controllers can configure servo parameters. This enables parameters to be configured automatically instead by human at installation.

RTEX **Automatic parameter configuration**

Upper controller

* Parameters can be changed even during operation
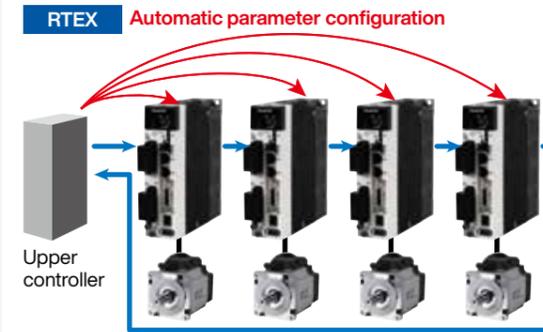
Real time monitoring is enabled.

Upper controllers can monitor various information, such as position, speed, and torque, etc. in real time. Since alarm codes can also be read out, analysis can be performed promptly at trouble occurrence.

RTEX **Real time information on each axis**

Upper controller

Up to 32 axes can be controlled.

In comparison with conventional I/Fs, the number of axes increases that can be controlled by next upper controllers.

Conventional I/F

RTEX **Up to 32 axes**

Upper controller
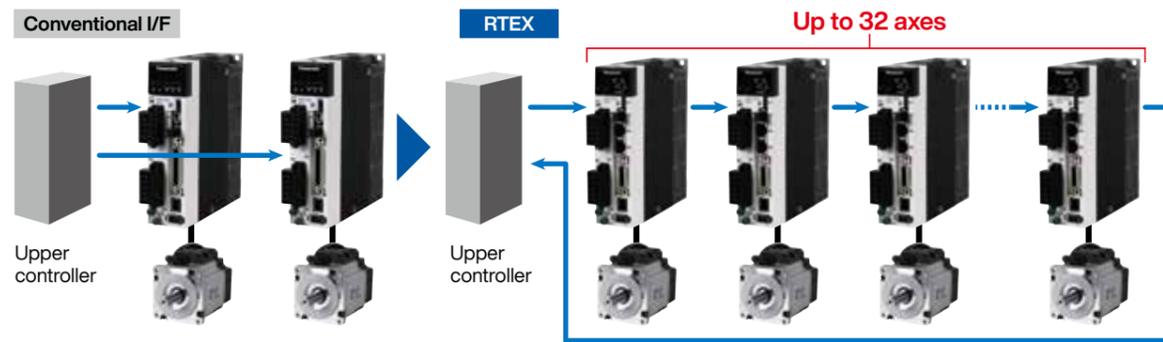
Upper controller

* If devices other than servo motors are also connected, up to 32 nodes can be connected as entire slaves
  including the servo motors. Actual number of controllable axes depends on the specification of an upper controller.
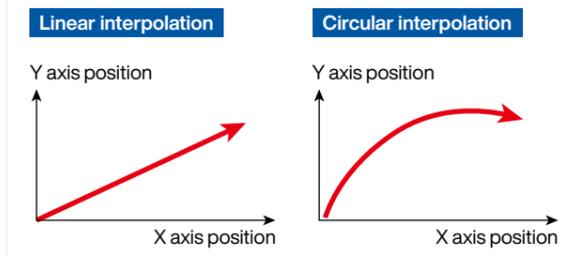
Profile position mode is supported

Profile position mode is supported for PTP control as well as cyclic position, speed, and torque. The processing done by upper controllers can be simplified.

RTEX

Motion profile is produced.

Target position, target speed, acceleration, reduction ratio
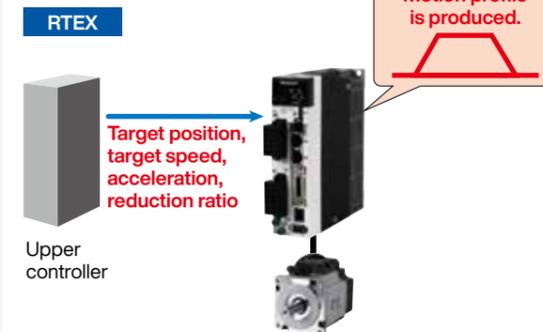
Upper controller

## High synchronization capability among axes

Upper controllers synchronize with entire servo motor axes at high accuracy. With the synchronization capability higher than that of conventional I/F, the RTEX is best suitable for machine tools, robots, gantry systems, and others.

Linear interpolation

Y axis position

X axis position

Circular interpolation

Y axis position

X axis position

* Interpolation depends on the specification of upper controllers. This is not the function of individual servo motor.

Absolute system can easily be built.

Conventional I/F requires an additional wire to transmit absolute data, while the RTEX doesn't. Each servo motor synthesizes one-revolution data and multi-revolution data to produce an actual position, so that the amount of work to be done by an upper controller is decreased.

Conventional I/F

Upper controller

Absolute data

Command

One-revolution data and multi-revolution data are synthesized.

Absolute encoder

RTEX

Upper controller

One-revolution data and multi-revolution data are synthesized.

Absolute encoder
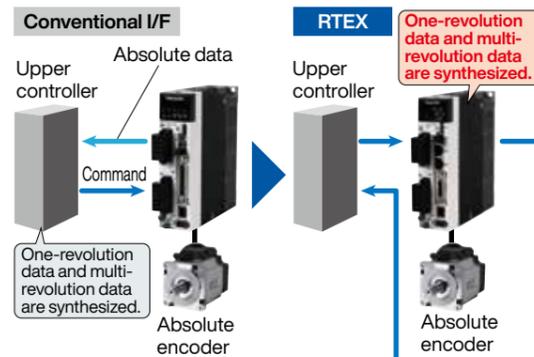
High resolution command is enabled

The position command rate of max. 8 Mpps* in a pulse train I/F is improved to 4 Gpps* in the RTEX. Vibrations are reduced due to a smooth command sent to a servo motor using the advantage of the high-resolution encoder.

Pulse train I/F command

Position

Coarse

Time

RTEX command

Position

Smooth

Time
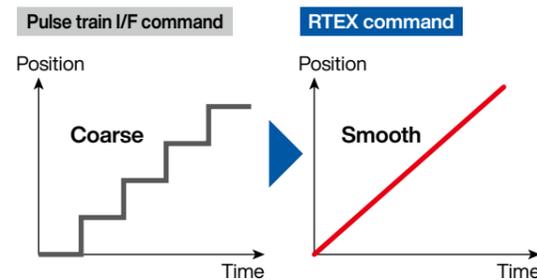
* Max. 8 Mpps is a rate when A6 servo driver is used.
  Max. 4 Gpps is a rate when A6N servo driver is used.

High noise-proof property

With a patented error correction function, noise-proof property is at least 2.5 KV. This conforms to IEC61000-4-4 standard.

RTEX

Data is broken by noise.

Data is recovered.

Data is broken by noise.

Data is recovered.

Upper controller
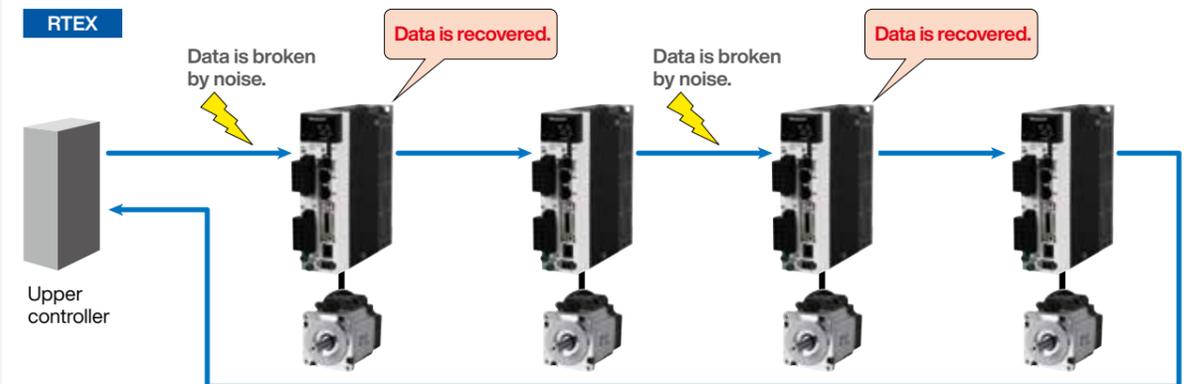
* The error correction function has a limit. Unrecovered broken data causes a communication error.

A6 Series

A6N Series

A6B Series
Special Order Product

Information

*For combination of elements of model number, refer to Index P.411.

■ Servo Motor

M	S	M	F	5	A	Z	L	1	A	1	*
①			②	③		④	⑤	⑥	⑦		

Special specifications

① Type

Symbol	Type	
MSM	Low inertia	(50 W to 5.0 kW)
MQM	Middle inertia	(100 W to 400 W)
MDM	Middle inertia	(1.0 kW to 22.0 kW)
MGM	Middle inertia	(0.85 kW to 5.5 kW)
MHM	High inertia	(50 W to 7.5 kW)

② Series

Symbol	Series name
F	A6 Family

③ Motor rated output

Symbol	Rated output		Symbol	Rated output		Symbol	Rated output
5A	50 W		13	1.3 kW		44	4.4 kW
01	100 W		15	1.5 kW		50	5.0 kW
02	200 W		18	1.8 kW		55	5.5 kW
04	400 W		20	2.0 kW		75	7.5 kW
08	750 W		24	2.4 kW		C1	11.0 kW
09	0.85 kW, (130 mm sq.) 1000 W (80 mm sq.)		29	2.9 kW		C5	15.0 kW
			30	3.0 kW		D2	22.0 kW
10	1.0 kW		40	4.0 kW			

④ Voltage specifications

Symbol	Specifications
1	100 V
2	200 V
Z	100 V/ 200 V common (50 W only)

⑥ Design order

Symbol	Specifications
1	Standard

<Note>
When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

⑤ Rotary encoder specifications

Symbol	Format	Pulse counts	Resolution	Wires
L	Absolute	23-bit	8388608	7

⑦ Motor specifications: IP67 [*2] 100 mm sq. to 220 mm sq. MSMF, MHMF, MDMF, MGMF

Symbol		Shaft		Holding brake		Oil seal			Encoder terminal	
		Round	Key-way	without	with	with	With protective lip	Connector JN2 (Small size)	Connector JL10 (Large size) [*3]
C	5	●		●		●		●	
C	6	●		●		●			●
C	7	●			●		●	●	
C	8	●			●		●		●
D	5	●		●		●		●	
D	6	●		●		●			●
D	7	●			●		●	●	
D	8	●			●		●		●
G	5		●	●		●		●	
G	6		●	●		●			●
G	7		●		●		●	●	
G	8		●		●		●		●
H	5		●	●		●		●	
H	6		●	●		●			●
H	7		●		●		●	●	
H	8		●		●		●		●

⑦ Motor specifications: 80 mm sq. or less MSMF 50 W to 1000 W

Symbol		Shaft		Holding brake		Oil seal		Motor encoder terminal [*1]	
		Round	Key-way, center tap	without	with	without	with	Connector JN	Lead wire
A	1		●	●		●		●	
A	2	●		●		●			●
B	1		●		●	●		●	
B	2	●			●	●			●
C	1		●	●			●	●	
C	2	●		●			●		●
D	1		●		●		●	●	
D	2	●			●		●		●
S	1		●	●		●		●	
S	2		●	●		●			●
T	1		●		●	●		●	
T	2		●		●	●			●
U	1		●	●			●	●	
U	2		●	●			●		●
V	1		●		●		●	●	
V	2		●		●		●		●

⑦ Motor specifications: 80 mm sq. or less MHMF 50 W to 1000 W MQMF 100 W to 400 W

Symbol		Shaft		Holding brake		Oil seal		Motor encoder terminal [*1]	
		Round	Key-way, center tap	without	with	without	with	With protective lip	Connector JN	Lead wire
A	1	●		●		●			●	
A	2	●		●		●				●
B	1	●			●	●			●	
B	2	●			●	●				●
C	1	●		●			●		●	
C	2	●		●			●			●
C	3	●		●				●	●	
C	4	●		●				●		●
D	1	●			●		●		●	
D	2	●			●		●			●
D	3	●			●			●	●	
D	4	●			●			●		●
S	1		●	●		●			●	
S	2		●	●		●				●
T	1		●		●	●			●	
T	2		●		●	●				●
U	1		●	●			●		●	
U	2		●	●			●			●
U	3		●	●				●	●	
U	4		●	●				●		●
V	1		●		●		●		●	
V	2		●		●		●			●
V	3		●		●			●	●	
V	4		●		●			●		●

*1 Connector type: IP67, Lead wire type: IP65 *2 22.0 kW: IP44
*3 Connector on the motor side encoder. (Also applicable to screwed type.)

■ Servo Driver

M	A	D	L	N	1	5	N	E	*	*	*
①			②	③	④		⑤	⑥	⑦		

Special specifications

① Frame symbol

Symbol	Frame		Symbol	Frame
MAD	A-Frame		MED	E-Frame
MBD	B-Frame		MFD	F-Frame
MCD	C-Frame		MGD	G-Frame
MDD	D-Frame		MHD	H-Frame

② Series

Symbol	Series name
L	A6 Family

③ Safety Function [*4]

Symbol	Specifications
N	without the safety function
T	with the safety function

④ Max. current rating

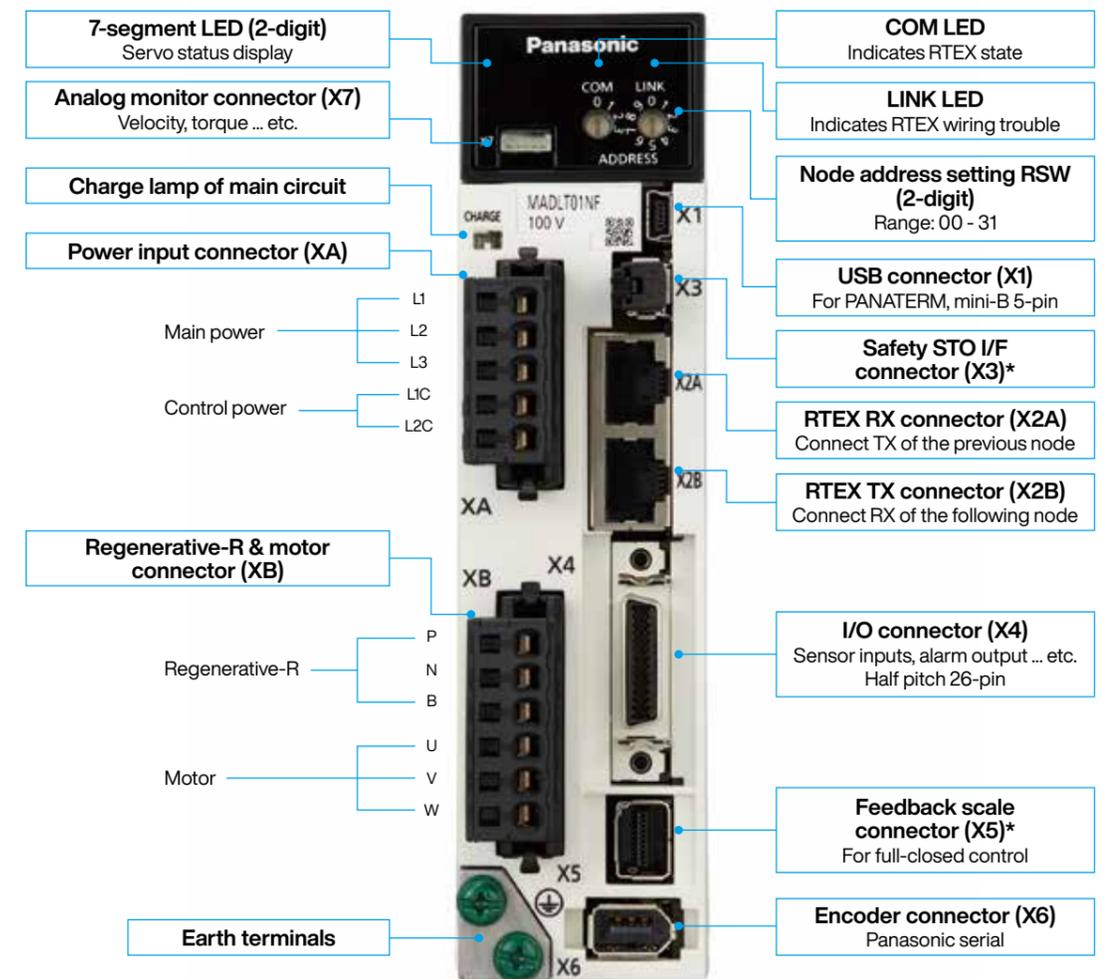| Symbol	Current rating		Symbol	Current rating
0	6 A		9	80 A
1	8 A		A	100 A
2	12 A		B	120 A
3	22 A		C	160 A
4	24 A		E	240 A
5	40 A		F	360 A
8	60 A			

⑤ Supply voltage specifications

Symbol	Specifications
1	Single phase 100 V
3	3-phase 200 V
5	Single/3-phase 200 V

⑥ I/f specifications ⑦ Classification of type [*4]

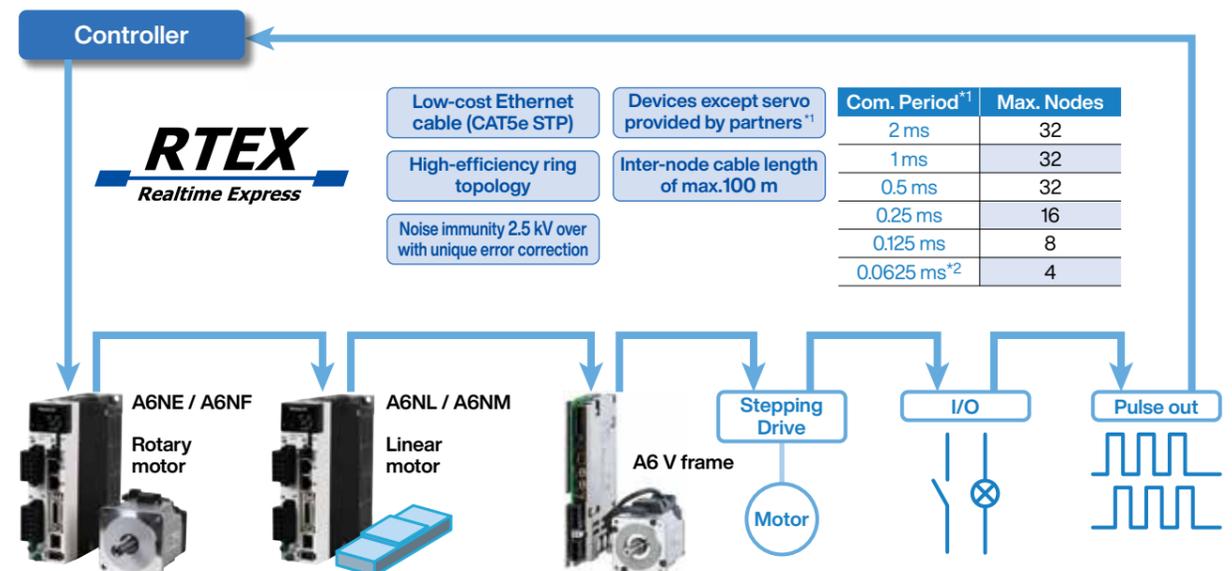| Symbol (specification)	Symbol	Specification
N (RTEX)	E	Standard for rotary motor
	F	Multifunction for rotary motor
	L	Standard for linear/ DD motor **Special Order Product**
	M	Multifunction for linear/ DD motor **Special Order Product**

*4 Standard type (with a part number ending in E or L) has no safety function. Multi-function type (with a part number ending in F or M) has a safety function.

Appearance

- **7-segment LED (2-digit)** Servo status display
- **Analog monitor connector (X7)** Velocity, torque ... etc.
- **Charge lamp of main circuit**
- **Power input connector (XA)**
  - Main power — L1, L2, L3
  - Control power — L1C, L2C
- **Regenerative-R & motor connector (XB)**
  - Regenerative-R — P, N, B
  - Motor — U, V, W
- **Earth terminals**

- **COM LED** Indicates RTEX state
- **LINK LED** Indicates RTEX wiring trouble
- **Node address setting RSW (2-digit)** Range: 00 - 31
- **USB connector (X1)** For PANATERM, mini-B 5-pin
- **Safety STO I/F connector (X3)***
- **RTEX RX connector (X2A)** Connect TX of the previous node
- **RTEX TX connector (X2B)** Connect RX of the following node
- **I/O connector (X4)** Sensor inputs, alarm output ... etc. Half pitch 26-pin
- **Feedback scale connector (X5)*** For full-closed control
- **Encoder connector (X6)** Panasonic serial

*The photo is A6NF series. There are no X3 and X5 connectors in the A6NE series.

Typical system configuration

Controller

RTEX Realtime Express

- Low-cost Ethernet cable (CAT5e STP)
- Devices except servo provided by partners [*1]
- High-efficiency ring topology
- Inter-node cable length of max.100 m
- Noise immunity 2.5 kV over with unique error correction

Com. Period [*1]	Max. Nodes
2 ms	32
1 ms	32
0.5 ms	32
0.25 ms	16
0.125 ms	8
0.0625 ms [*2]	4

- **A6NE / A6NF** Rotary motor
- **A6NL / A6NM** Linear motor
- **A6 V frame**
- **Stepping Drive** Motor
- **I/O**
- **Pulse out**

*1: The communication period and connection of slave devices depend on the controller specification.
*2: For communication period 0.0625 ms, command update period is 0.125 ms only.

Side tabs: A6 Series | A6N Series | A6B Series (Special Order Product) | Information

● 80 mm sq. or less 50 W to 1000 W　MSMF, MQMF, MHMF　Leadwire type IP65

Motor				Driver		Power capacity (at rated load)
Motor series		Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame
MSMF (Leadwire type) 3000 r/min Low inertia		Single phase 100 V	50	MSMF5AZL1□2	MADL☆01N☆	A-frame	Approx. 0.4 kVA
			100	MSMF011L1□2	MADL☆11N☆		
			200	MSMF021L1□2	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MSMF041L1□2	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	50	MSMF5AZL1□2＊	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			100	MSMF012L1□2＊			
			200	MSMF022L1□2＊	MADL☆15N☆		
			400	MSMF042L1□2＊	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
			750	MSMF082L1□2＊	MCDL☆35N☆	C-frame	Approx. 1.8 kVA
			1000	MSMF092L1□2＊	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
MQMF (Leadwire type) 3000 r/min Middle inertia Flat type		Single phase 100 V	100	MQMF011L1□□	MADL☆11N☆	A-frame	Approx. 0.4 kVA
			200	MQMF021L1□□	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MQMF041L1□□	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	100	MQMF012L1□□＊	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			200	MQMF022L1□□＊	MADL☆15N☆		
			400	MQMF042L1□□＊	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
MHMF (Leadwire type) 3000 r/min High inertia		Single phase 100 V	50	MHMF5AZL1□□	MADL☆01N☆	A-frame	Approx. 0.4 kVA
			100	MHMF011L1□□	MADL☆11N☆		
			200	MHMF021L1□□	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MHMF041L1□□	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	50	MHMF5AZL1□□＊	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			100	MHMF012L1□□＊			
			200	MHMF022L1□□＊	MADL☆15N☆		
			400	MHMF042L1□□＊	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
			750	MHMF082L1□□＊	MCDL☆35N☆	C-frame	Approx. 1.8 kVA
			1000	MHMF092L1□□＊	MDDL☆55N☆	D-frame	Approx. 2.4 kVA

□ ☆ ＊：For more information, refer to "Model Designation" on P.353.

● 80 mm sq. or less 50 W to 1000 W　MSMF, MQMF, MHMF　Connector type IP67

Motor				Driver		Power capacity (at rated load)
Motor series		Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame
MSMF (Connector type) 3000 r/min Low inertia		Single phase 100 V	50	MSMF5AZL1□1	MADL☆01N☆	A-frame	Approx. 0.4 kVA
			100	MSMF011L1□1	MADL☆11N☆		
			200	MSMF021L1□1	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MSMF041L1□1	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	50	MSMF5AZL1□1	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			100	MSMF012L1□1			
			200	MSMF022L1□1	MADL☆15N☆		
			400	MSMF042L1□1	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
			750	MSMF082L1□1	MCDL☆35N☆	C-frame	Approx. 1.8 kVA
			1000	MSMF092L1□1	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
MQMF (Connector type) 3000 r/min Middle inertia Flat type		Single phase 100 V	100	MQMF011L1□□	MADL☆11N☆	A-frame	Approx. 0.4 kVA
			200	MQMF021L1□□	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MQMF041L1□□	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	100	MQMF012L1□□	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			200	MQMF022L1□□	MADL☆15N☆		
			400	MQMF042L1□□	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
MHMF (Connector type) 3000 r/min High inertia		Single phase 100 V	50	MHMF5AZL1□□	MADL☆01N☆	A-frame	Approx. 0.4 kVA
			100	MHMF011L1□□	MADL☆11N☆		
			200	MHMF021L1□□	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MHMF041L1□□	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	50	MHMF5AZL1□□	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			100	MHMF012L1□□			
			200	MHMF022L1□□	MADL☆15N☆		
			400	MHMF042L1□□	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
			750	MHMF082L1□□	MCDL☆35N☆	C-frame	Approx. 1.8 kVA
			1000	MHMF092L1□□	MDDL☆55N☆	D-frame	Approx. 2.4 kVA

□ ☆：For more information, refer to "Model Designation" on P.353.

A6 Series

A6N Series

A6B Series Special Order Product

Information

● 100 mm sq. or more 0.85 kW to 5.0 kW   MSMF, MDMF, MGMF, MHMF
Encoder connector (Large size JL10)[*1] type   IP67

Motor				Driver		Power capacity (at rated load)
Motor series	Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MSMF (Large size JL10 type) 3000 r/min Low inertia IP67	Single phase/ 3-phase 200 V	1000	MSMF102L1□□＊	MDDL☆55N☆	D-frame	Approx. 2.9 kVA
		1500	MSMF152L1□□＊			
	3-phase 200 V	2000	MSMF202L1□□＊	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MSMF302L1□□＊	MFDL☆A3N☆		Approx. 5.2 kVA
		4000	MSMF402L1□□＊	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		5000	MSMF502L1□□＊			
MDMF (Large size JL10 type) 2000 r/min Middle inertia IP67	Single phase/ 3-phase 200 V	1000	MDMF102L1□□＊	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1500	MDMF152L1□□＊	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	2000	MDMF202L1□□＊	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MDMF302L1□□＊	MFDL☆A3N☆		Approx. 5.2 kVA
		4000	MDMF402L1□□＊	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		5000	MDMF502L1□□＊			
MGMF (Large size JL10 type) [Low speed/ High torque type] 1500 r/min Middle inertia IP67	Single phase/ 3-phase 200 V	850	MGMF092L1□□＊	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1300	MGMF132L1□□＊	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	1800	MGMF182L1□□＊	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		2400	MGMF242L1□□＊	MEDL☆93N☆		Approx. 4.5 kVA
		2900	MGMF292L1□□＊	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		4400	MGMF442L1□□＊			
MHMF (Large size JL10 type) 2000 r/min High inertia IP67	Single phase/ 3-phase 200 V	1000	MHMF102L1□□＊	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1500	MHMF152L1□□＊	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	2000	MHMF202L1□□＊	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MHMF302L1□□＊	MFDL☆A3N☆		Approx. 5.2 kVA
		4000	MHMF402L1□□＊	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		5000	MHMF502L1□□＊			

□ ☆ ＊ : For more information, refer to "Model Designation" on P.353.

● 100 mm sq. or more 0.85 kW to 5.0 kW   MSMF, MDMF, MGMF, MHMF
Encoder connector (Small size JN2)[*2] type   IP67

Motor				Driver		Power capacity (at rated load)
Motor series	Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MSMF (Small size JN2 type) 3000 r/min Low inertia IP67	Single phase/ 3-phase 200 V	1000	MSMF102L1□□	MDDL☆55N☆	D-frame	Approx. 2.9 kVA
		1500	MSMF152L1□□			
	3-phase 200 V	2000	MSMF202L1□□	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MSMF302L1□□	MFDL☆A3N☆		Approx. 5.2 kVA
		4000	MSMF402L1□□	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		5000	MSMF502L1□□			
MDMF (Small size JN2 type) 2000 r/min Middle inertia IP67	Single phase/ 3-phase 200 V	1000	MDMF102L1□□	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1500	MDMF152L1□□	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	2000	MDMF202L1□□	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MDMF302L1□□	MFDL☆A3N☆		Approx. 5.2 kVA
		4000	MDMF402L1□□	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		5000	MDMF502L1□□			
MGMF (Small size JN2 type) [Low speed/ High torque type] 1500 r/min Middle inertia IP67	Single phase/ 3-phase 200 V	850	MGMF092L1□□	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1300	MGMF132L1□□	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	1800	MGMF182L1□□	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		2400	MGMF242L1□□	MEDL☆93N☆		Approx. 4.5 kVA
		2900	MGMF292L1□□	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		4400	MGMF442L1□□			
MHMF (Small size JN2 type) 2000 r/min High inertia IP67	Single phase/ 3-phase 200 V	1000	MHMF102L1□□	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1500	MHMF152L1□□	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	2000	MHMF202L1□□	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MHMF302L1□□	MFDL☆A3N☆		Approx. 5.2 kVA
		4000	MHMF402L1□□	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		5000	MHMF502L1□□			

□ ☆ : For more information, refer to "Model Designation" on P.353.

● 176 mm sq. or more 5.5 kW or more   MDMF, MGMF, MHMF
Encoder connector (Large size JL10)[*1] type IP67

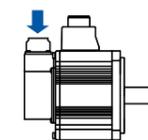| Motor				Driver		Power capacity (at rated load)
Motor series	Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MDMF (Large size JL10 type) 1500 r/min Middle inertia IP67[*3]	3-phase 200 V	7500	MDMF752L1□6＊	MGDLTC3NF	G-frame	Approx. 11 kVA
		11000	MDMFC12L1□6	MHDLTE3NF	H-frame	Approx. 15 kVA
		15000	MDMFC52L1□6	MHDLTE3NF		Approx. 20 kVA
		22000 [*3]	MDMFD22L1□6	MHDLTF3NF		Approx. 28 kVA
MGMF (Large size JL10 type) [Low speed/ High torque type] 1500 r/min Middle inertia IP67	3-phase 200 V	5500	MGMF552L1□6＊	MGDLTC3NF	G-frame	Approx. 8.5 kVA
MHMF (Large size JL10 type) 1500 r/min High inertia IP67	3-phase 200 V	7500	MHMF752L1□6＊	MGDLTC3NF	G-frame	Approx. 11 kVA

□ ☆ ＊ : For more information, refer to "Model Designation" on P.353.

● 176 mm sq. or more 5.5 kW or more   MDMF, MGMF, MHMF
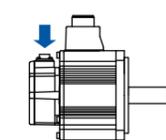Encoder connector (Small size JN2)[*2] type IP67

Motor				Driver		Power capacity (at rated load)
Motor series	Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MDMF (Small size JN2 type) 1500 r/min Middle inertia IP67[*3]	3-phase 200 V	7500	MDMF752L1□5	MGDLTC3NF	G-frame	Approx. 11 kVA
		11000	MDMFC12L1□5	MHDLTE3NF		Approx. 15 kVA
		15000	MDMFC52L1□5	MHDLTE3NF	H-frame	Approx. 20 kVA
		22000 [*3]	MDMFD22L1□5	MHDLTF3NF		Approx. 28 kVA
MGMF (Small size JN2 type) [Low speed/ High torque type] 1500 r/min Middle inertia IP67	3-phase 200 V	5500	MGMF552L1□5	MGDLTC3NF	G-frame	Approx. 8.5 kVA
MHMF (Small size JN2 type) 1500 r/min High inertia IP67	3-phase 200 V	7500	MHMF752L1□5	MGDLTC3NF	G-frame	Approx. 11 kVA

□ ☆ : For more information, refer to "Model Designation" on P.353.

*1: Encoder connector (Large size JL10)

*2: Encoder connector (Small size JN2)

*3: 22.0 kW motor is IP44.

Basic Specifications

Input power	100 V	Main circuit		Single phase 100 V $^{+10\%}_{-15\%}$ to 120 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
		Control circuit		Single phase 100 V $^{+10\%}_{-15\%}$ to 120 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
	200 V	Main circuit	A-frame to D-frame	Single/3-phase 200 V $^{+10\%}_{-15\%}$ to 240 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
			E-frame to H-frame	3-phase 200 V $^{+10\%}_{-15\%}$ to 240 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
		Control circuit	A-frame to D-frame	Single phase 200 V $^{+10\%}_{-15\%}$ to 240 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
			E-frame to H-frame	Single phase 200 V $^{+10\%}_{-15\%}$ to 240 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz

Environment	temperature	Ambient temperature: 0 ˚C to 55 ˚C (free from freezing) Storage temperature: –20 ˚C to 65 ˚C (Max.temperature guarantee: 80 ˚C for 72 hours free from condensation[1])
	humidity	Both operating and storage : 20 %RH to 85 %RH (free from condensation[1])
	Altitude	Lower than 1000 m
	Vibration	5.88 m/s^2 or less, 10 Hz to 60 Hz
Control method		IGBT PWM Sinusoidal wave drive
Encoder feedback		23-bit (8388608 resolution) absolute encoder, 7-wire serial * When using it as an incremental system (not using multi-turn data), do not connect the battery for absolute encoder. Parameter Pr. 0.15 must be set to "1" (factory settings).

External scale feedback		A/B phase, homing signal differential input. Serial communication is also supported.
		Manufacturers that support serial communication scale:
		  Fagor Automation S.Coop., HEIDENHAIN, Magnescale Co., Ltd., Mitutoyo Corporation
		  Nidec Instruments Corporation, Renishaw plc

Interface connector	Control signal	Input	Each 8 input can be assigned by the parameter.
		Output	Each 3 output can be assigned by the parameter.
	Analog signal	Output	2 outputs for analog monitors 1 and 2
	Pulse signal	Output	Line driver output for encoder pulses (A/B phase signal) or external scale pulses.
Communication	Realtime Express (RTEX)		Communication for transmission of a real-time operation command, the parameter setting, or the status monitoring.
	USB		USB interface to connect to computers (setup support software PANATERM) for parameter setting or status monitoring.
Safety terminal		Terminal to support safety function.
Front panel		(1) 7 segment LED (double digits) (2) Network status LED(LINK,COM) (3) Rotary switch for node address setting (4) Analog monitor output(Analog monitors 1 and 2)
Regeneration		Size A, B, G and H: Without built-in regenerative resistor (use external resistor) Size C to F: Built-in regenerative resistor (External regenerative resistor is also available)
Dynamic brake		A to G frame: built-in H frame: External resistor only

Control mode		(1) Semi-closed control
		    Position control: Profile position control (PP), Cyclic position control (CP)
		    Velocity control: Cyclic velocity control (CV)
		    Torque control: Cyclic torque control (CT)
		(2) Full-closed control
		    Position control: Profile position control (PP), Cyclic position control (CP)
		• The two modes, ［1］and ［2］above are switched by parameters.
		• Switch PP/CP/CV/CT mode according to the RTEX communication command.

*1 Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.

Function

Position control

Control input		Positive direction drive inhibit input, Negative direction drive inhibit, Latch signal, Near home position, etc
Control output		Positioning completion etc.
Position command input	Input mode	Command type by RTEX command
	Smoothing filter	Either a primary delay filter or a FIR type filter can be selected against command input.
Damping control		Available (Up to 3 frequency settings,out of 4 settings in total,can be used simultaneously.)
Model type damping filter		Available (2 filter available used simultaneously)
Feed forward function		Available（speed/torque）
Load variation suppression control		Available
Gain 3 switching function		Available
Quadrant glitch inhibit function		Available
Two-degree-of-freedom control mode		Available
Motor operatable setup function		Available
External scale position information monitor		Available
Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function, Single-turn absolute function, Continuous rotating absolute encoder function

Speed control

Control input		Positive direction drive inhibit input , Negative direction drive inhibit, Latch signal, etc
Control output		At speed etc.
Position command input	Input mode	Command type by RTEX command
Soft start/slowdown function		0 s to 10 s / 1000 r/min Acceleration and deceleration can be set separately. S-curve acceleration/deceleration is also available.
Feed forward function		Available（torque）
Load variation suppression control		Available
Two-degree-of-freedom control mode		Available（standard type）
External scale position information monitor		Available
Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function, Single-turn absolute function, Continuous rotating absolute encoder function

Torque control

Control input		Positive direction drive inhibit input, Negative direction drive inhibit, Latch signal, etc
Control output		At speed etc.
Position command input	Input mode	Command type by RTEX command
Speed limit function		Speed limit value can be set by parameter. (Switched by RTEX command.)
External scale position information monitor		Available
Other available functions		Single-turn absolute function Continuous rotating absolute encoder function

Full-closed control

Control input		Positive direction drive inhibit input , Negative direction drive inhibit, Latch signal, Near home position , etc
Control output		Positioning completion etc.
Position command input	Input mode	Command type by RTEX command
	Smoothing filter	Either a primary delay filter or a FIR type filter can be selected against command input.
Setting range of external scale division/multiplication.		1/40 times to 125200 times Although the ratio of the encoder pulse (numerator) and external scale pulse (denominator) can be set anywhere between the range of 1 to 2^{23} for the numerator and 1 to 2^{23} for the denominator, Please use within the range indicated above.
Damping control		Available(Up to 3 frequency settings,out of 4 settings in total,can be used simultaneously.)
Feed forward function		Available（speed/torque）
Load variation suppression control		Available
Gain 3 switching function		Available
Hybrid vibration suppression function		Available
Quadrant glitch inhibit function		Available
Two-degree-of-freedom control mode		Available（standard type）
Motor operatable setup function		Available
External scale position information monitor		Available
Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function

Common

Electronic gear ratio setting	Applicable scaling ratio: 1/1000 to 8000 Although any value of 1 to 2^{30} (numerator) and any value of 1 to 2^{30} (denominator) can be used,resulting value should be within the range shown above.
Auto tuning	Identifies the load inertia real-time and automatically sets up the gain that meets the stiffness setting when the motor is running with upper and internal operation commands.
Notch filter	Available (5 filters available)
Gain switching function	Available
2-step torque filter	Available
Position comparison output function	Available
Protective function	Over-voltage, under-voltage, over-speed, over-load, over-heat, over-current, encoder error, excess position deviation, EEPROM error etc.
Alarm data trace back function	Tracing back of alarm data is available
Deterioration diagnosis function	Available

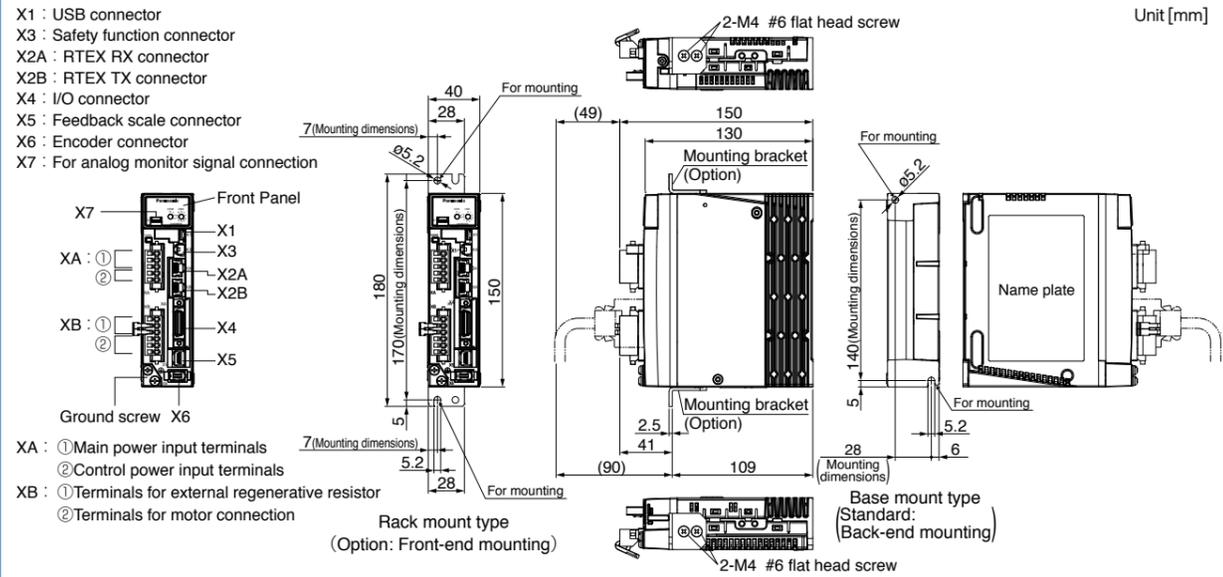|				
Basic Specifications	**Input power**	100 V	Main circuit	Single phase 100 V $^{+10\%}_{-15\%}$ to 120 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
			Control circuit	Single phase 100 V $^{+10\%}_{-15\%}$ to 120 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
		200 V	Main circuit — A-frame to D-frame	Single/3-phase 200 V $^{+10\%}_{-15\%}$ to 240 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
			Main circuit — E-frame, F-frame	3-phase 200 V $^{+10\%}_{-15\%}$ to 240 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
			Control circuit — A-frame to D-frame	Single phase 200 V $^{+10\%}_{-15\%}$ to 240 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
			Control circuit — E-frame, F-frame	Single phase 200 V $^{+10\%}_{-15\%}$ to 240 V $^{+10\%}_{-15\%}$ 50 Hz / 60 Hz
	Environment	temperature		Ambient temperature: 0 ˚C to 55 ˚C (free from freezing) Storage temperature: −20 ˚C to 65 ˚C (Max.temperature guarantee: 80 ˚C for 72 hours free from condensation[*1])
		humidity		Both operating and storage : 20 %RH to 85 %RH (free from condensation[*1])
		Altitude		Lower than 1000 m
		Vibration		5.88 m/s^2 or less, 10 Hz to 60 Hz
	Control method			IGBT PWM Sinusoidal wave drive
	Encoder feedback			23-bit (8388608 resolution) absolute encoder, 7-wire serial * When using it as an incremental system (not using multi-turn data), do not connect the battery for absolute encoder. Parameter Pr. 0.15 must be set to "1" (factory settings).
	Interface connector	Control signal	Input	Each 8 input can be assigned by the parameter.
			Output	Each 3 output can be assigned by the parameter.
		Analog signal	Output	2 outputs for analog monitors 1 and 2
		Pulse signal	Output	Line driver output for encoder pulses (A/B phase signal).
		Communication	Realtime Express (RTEX)	Communication for transmission of a real-time operation command, the parameter setting, or the status monitoring.
			USB	USB interface to connect to computers (setup support software PANATERM) for parameter setting or status monitoring.
	Front panel			(1) 7 segment LED (double digits) (2) Network status LED(LINK,COM) (3) Rotary switch for node address setting (4) Analog monitor output(Analog monitors 1 and 2)
	Regeneration			Size A and B: Without built-in regenerative resistor (use external resistor) Size C to F: Built-in regenerative resistor (External regenerative resistor is also available)
	Dynamic brake			A to F frame: built-in
	Control mode			(1) Semi-closed control Position control: Profile position control (PP), Cyclic position control (CP) Velocity control: Cyclic velocity control (CV) Torque control: Cyclic torque control (CT) • Switch PP/CP/CV/CT mode according to the RTEX communication command.

*1 Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.

Function	**Position control**	Control input		Positive direction drive inhibit input, Negative direction drive inhibit, Latch signal, Near home position , etc
		Control output		Positioning completion etc.
		Position command input	Input mode	Command type by RTEX command
			Smoothing filter	Either a primary delay filter or a FIR type filter can be selected against command input.
		Damping control		Available(Up to 3 frequency settings,out of 4 settings in total,can be used simultaneously.)
		Model type damping filter		Available(2 filter available used simultaneously)
		Feed forward function		Available（speed/torque）
		Load variation suppression control		Available
		Gain 3 switching function		Available
		Quadrant glitch inhibit function		Available
		Two-degree-of-freedom control mode		Available
		Motor operatable setup function		Available
		Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function, Single-turn absolute function, Continuous rotating absolute encoder function
	Speed control	Control input		Positive direction drive inhibit input , Negative direction drive inhibit, Latch signal, etc
		Control output		At speed etc.
		Position command input	Input mode	Command type by RTEX command
		Soft start/slowdown function		0 s to 10 s / 1000 r/min Acceleration and deceleration can be set separately. S-curve acceleration/deceleration is also available.
		Feed forward function		Available（torque）
		Load variation suppression control		Available
		Two-degree-of-freedom control mode		Available（standard type）
		Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function, Single-turn absolute function, Continuous rotating absolute encoder function
	Torque control	Control input		Positive direction drive inhibit input, Negative direction drive inhibit, Latch signal, etc
		Control output		At speed etc.
		Position command input	Input mode	Command type by RTEX command
		Speed limit function		Speed limit value can be set by parameter. (Switched by RTEX command.)
		Other available functions		Single-turn absolute function Continuous rotating absolute encoder function
	Common	Electronic gear ratio setting		Applicable scaling ratio: 1/1000 to 8000 Although any value of 1 to 2^{30} (numerator) and any value of 1 to 2^{30} (denominator) can be used,resulting value should be within the range shown above.
		Auto tuning		Identifies the load inertia real-time and automatically sets up the gain that meets the stiffness setting when the motor is running with upper and internal operation commands.
		Notch filter		Available (5 filters available)
		Gain switching function		Available
		2-step torque filter		Available
		Position comparison output function		Available
		Protective function		Over-voltage, under-voltage, over-speed, over-load, over-heat, over-current, encoder error, excess position deviation, EEPROM error etc.
		Alarm data trace back function		Tracing back of alarm data is available
		Deterioration diagnosis function		Available

* All dimensions shown in this catalog are for the A6NF series, but outer dimensions are the same as the A6NE series.

A-frame

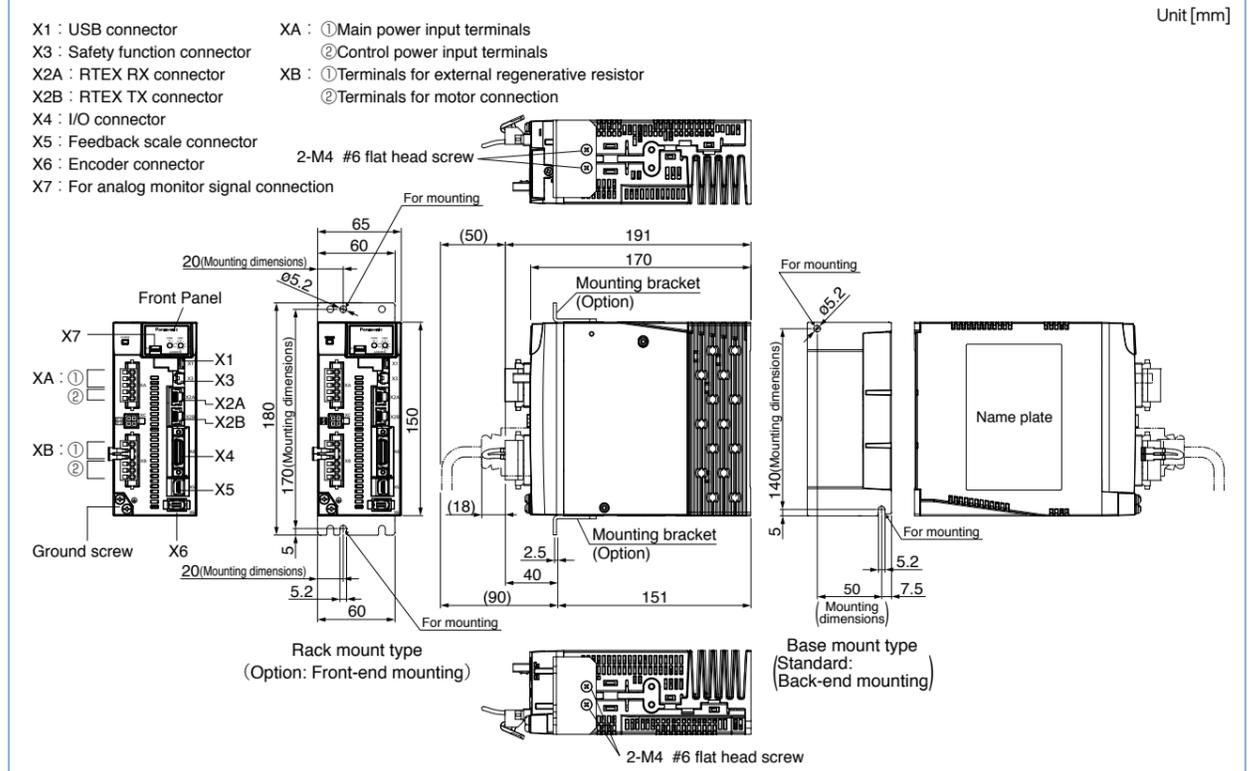Unit [mm]

X1：USB connector
X3：Safety function connector
X2A：RTEX RX connector
X2B：RTEX TX connector
X4：I/O connector
X5：Feedback scale connector
X6：Encoder connector
X7：For analog monitor signal connection

X7
X1
X3
X2A
X2B
XA：①
②
XB：①
②
X4
X5

Front Panel

Ground screw X6

XA：①Main power input terminals
②Control power input terminals
XB：①Terminals for external regenerative resistor
②Terminals for motor connection

2-M4 #6 flat head screw

For mounting

40
28
(49)
150
130

Mounting bracket (Option)

Name plate

180
170(Mounting dimensions)
150
140(Mounting dimensions)
ø5.2
7(Mounting dimensions)

Mounting bracket (Option)

2.5
41
5.2
28
(90)
109
28 Mounting dimensions
6
5.2

For mounting

Rack mount type
（Option: Front-end mounting）

2-M4 #6 flat head screw

Base mount type
(Standard: Back-end mounting)

Mass: 0.8 kg

A-frame: Connector of driver side			Multifunction type	Basic type
Connector XA	S05B-F32SK-GGXR (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector XB	S06B-F32SK-GGXR (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector X1	UB-M5BR-S14-4S (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector X3	CIF-HS08SS-071-TB (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	–
Connector X2A	MOD-WRJ88LY1G-TP+ (or equivalent)	HTK	●	●
Connector X2B	MOD-WRJ88LY1G-TP+ (or equivalent)	HTK	●	●
Connector X4	DF02R026NA2 (or equivalent)	Japan Aviation Electronics Ind.	●	●
Connector X5	MUF-RS10SK-GKX-TB (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	–
Connector X6	3E106-2230KV (or equivalent)	3M Japan	●	●
Connector X7	533984005 (5pin)	Molex	●	●

<Attached to the driver>

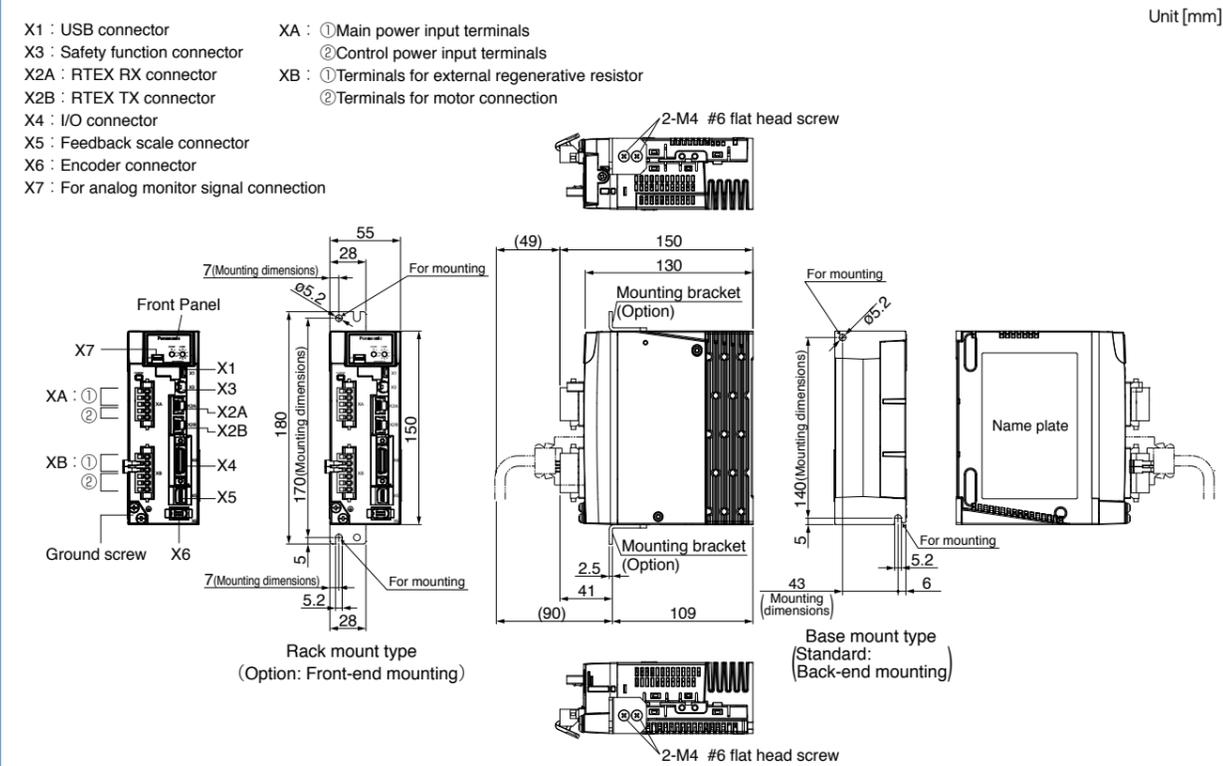| Connector of power and motor side		
Connector XA	05JFAT-SAXGGKK-A	J.S.T. Mfg. Co., Ltd.
Connector XB	06JFAT-SAXGGKK-A	J.S.T. Mfg. Co., Ltd.

B-frame

Unit [mm]

X1：USB connector
X3：Safety function connector
X2A：RTEX RX connector
X2B：RTEX TX connector
X4：I/O connector
X5：Feedback scale connector
X6：Encoder connector
X7：For analog monitor signal connection

XA：①Main power input terminals
②Control power input terminals
XB：①Terminals for external regenerative resistor
②Terminals for motor connection

2-M4 #6 flat head screw

X7
X1
X3
X2A
X2B
XA：①
②
XB：①
②
X4
X5

Front Panel

Ground screw X6

55
28
(49)
150
130

Mounting bracket (Option)

Name plate

180
170(Mounting dimensions)
150
140(Mounting dimensions)
ø5.2
7(Mounting dimensions)

Mounting bracket (Option)

2.5
41
5.2
28
(90)
109
43 Mounting dimensions
6
5.2

For mounting

Rack mount type
（Option: Front-end mounting）

2-M4 #6 flat head screw

Base mount type
(Standard: Back-end mounting)

Mass: 1.0 kg

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

C-frame

Unit [mm]

X1：USB connector
X3：Safety function connector
X2A：RTEX RX connector
X2B：RTEX TX connector
X4：I/O connector
X5：Feedback scale connector
X6：Encoder connector
X7：For analog monitor signal connection

XA：①Main power input terminals
②Control power input terminals
XB：①Terminals for external regenerative resistor
②Terminals for motor connection

2-M4 #6 flat head screw

X7
X1
X3
X2A
X2B
XA：①
②
XB：①
②
X4
X5

Front Panel

Ground screw X6

65
60
20(Mounting dimensions)
(50)
191
170

Mounting bracket (Option)

Name plate

180
170(Mounting dimensions)
150
140(Mounting dimensions)
ø5.2
(18)

Mounting bracket (Option)

2.5
40
20(Mounting dimensions)
5.2
60
(90)
151
50 Mounting dimensions
7.5
5.2

For mounting

Rack mount type
（Option: Front-end mounting）

2-M4 #6 flat head screw

Base mount type
(Standard: Back-end mounting)

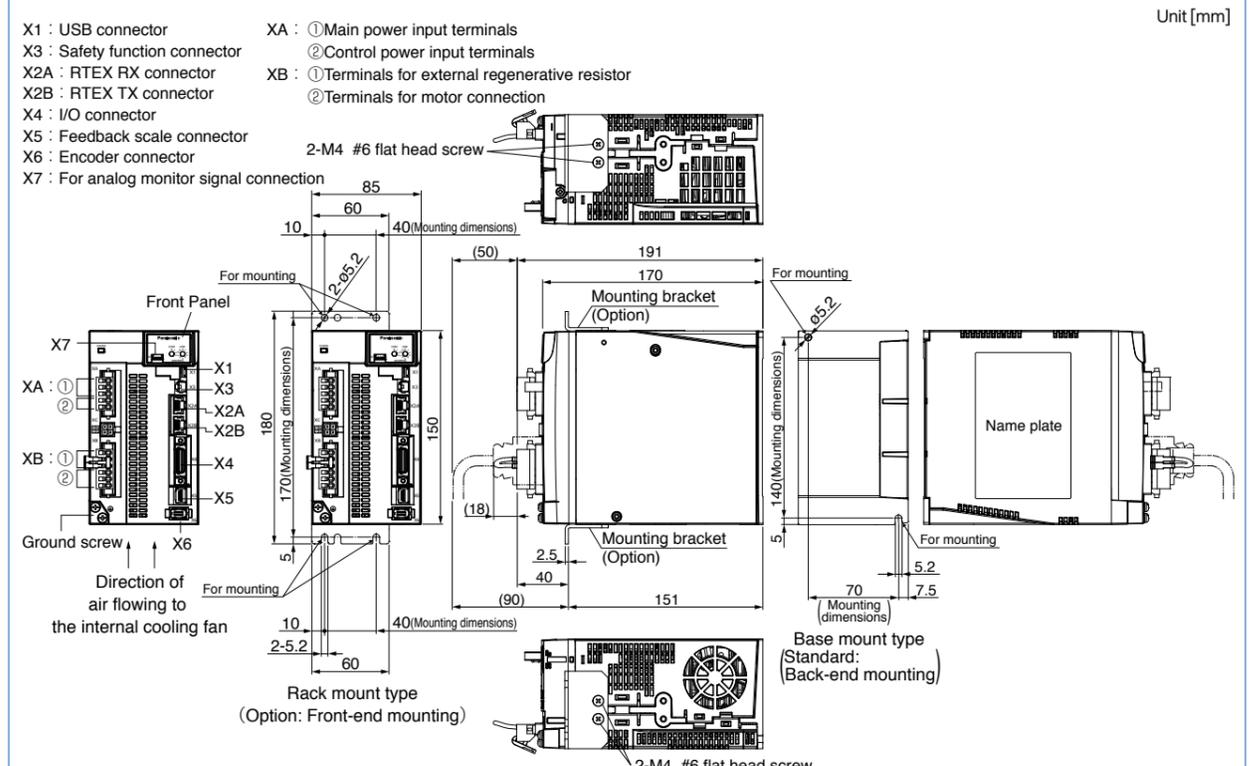* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 1.6 kg

D-frame (200 V)

Unit [mm]

X1：USB connector
X3：Safety function connector
X2A：RTEX RX connector
X2B：RTEX TX connector
X4：I/O connector
X5：Feedback scale connector
X6：Encoder connector
X7：For analog monitor signal connection

XA：①Main power input terminals
②Control power input terminals
XB：①Terminals for external regenerative resistor
②Terminals for motor connection

2-M4 #6 flat head screw

X7
X1
X3
X2A
X2B
XA：①
②
XB：①
②
X4
X5

Front Panel

Ground screw X6

Direction of air flowing to the internal cooling fan

85
60
10
40(Mounting dimensions)
(50)
191
170

Mounting bracket (Option)

Name plate

180
170(Mounting dimensions)
150
140(Mounting dimensions)
2-ø5.2
(18)

Mounting bracket (Option)

2.5
40
10
40(Mounting dimensions)
2-5.2
60
(90)
151
70 Mounting dimensions
7.5
5.2

For mounting

Rack mount type
（Option: Front-end mounting）

2-M4 #6 flat head screw

Base mount type
(Standard: Back-end mounting)

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 2.1 kg

* All dimensions shown in this catalog are for the A6NF series, but outer dimensions are the same as the A6NE series.

E-frame (200 V)

Unit [mm]

X1 ： USB connector
X3 ： Safety function connector
X2A ： RTEX RX connector
X2B ： RTEX TX connector
X4 ： I/O connector
X5 ： Feedback scale connector
X6 ： Encoder connector
X7 ： For analog monitor signal connection

XA ： ①Main power input terminals
　　　②Control power input terminals
XB ： Terminals for motor connection
XC ： Terminals for external regenerative resistor

Front Panel

X7
XA ：①
　　②
XC
XB

X1
X3
X2A
X2B
X4
X5
X6

Ground screw

Direction of air flowing to the internal cooling fan

85
50 (Mounting dimensions)
2-5.2
For mounting
198
188 (Mounting dimensions)
5
2-5.2
50 (Mounting dimensions)

2-M4 #6 flat head screw

Mounting bracket
(If re-positioned from front end)

(70) 196.5 2.5
168
160 33 (70)
2.5
3.5

Name plate

Mounting bracket
Mounting bracket
(If re-positioned from front end)
(18) 216 (18)
52

2-M4 #6 flat head screw

E-frame: Connector of driver side		
Connector XA	S05B-JTSLSK-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XB	S03B-JTSLSK-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XC	S04B-JTSLSS-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.

\<Attached to the driver\>

E-frame: Connector of power and motor side		
Connector XA	05JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XB	03JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XC	04JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 2.7 kg

F-frame (200 V)

Unit [mm]

X1 ： USB connector
X3 ： Safety function connector
X2A ： RTEX RX connector
X2B ： RTEX TX connector
X4 ： I/O connector
X5 ： Feedback scale connector
X6 ： Encoder connector
X7 ： For analog monitor signal connection

Front Panel

X7
①
②
③
④

X1
X3
X2A
X2B
X4
X5
X6

Direction of air flowing to the internal cooling fan

①Main power input terminals
②Control power input terminals
③Terminals for external regenerative resistor
④Terminals for motor connection

130
100 (Mounting dimensions)
2-5.2
For mounting
250
240 (Mounting dimensions)
220
5
2-5.2
100 (Mounting dimensions)

2-M4 #6 flat head screw

Mounting bracket
(If re-positioned from front end)

(20) 219.5 2.5
169 47 (20)
2.5
3.5

Name plate

Mounting bracket
2.5
47
Mounting bracket
Mounting bracket
(If re-positioned from front end)
(67) 169

2-M4 #6 flat head screw

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 5.2 kg

G-frame (200 V) (A6NE series are not available.)

Unit [mm]

Front Panel

Control power input terminals
Main power input terminals

Terminals for external regenerative resistor

Terminals for motor connection

X7 ： For analog monitor signal connection
X1 ： USB connector
X3 ： Safety function connector
X2A ： RTEX RX connector
X2B ： RTEX TX connector
X4 ： I/O connector
X5 ： Feedback scale connector
X6 ： Encoder connector
XE： Connector for external dynamic brake signal
XS： Built-in dynamic brake switch

Direction of air flowing to the internal cooling fan

3-M4 #6 flat head screw

3-M4 #6 flat head screw

184
90 (Mounting dimensions)
47
2-6.2
For mounting
257
241 (Mounting dimensions) 220
8
2-6.2
For mounting
47
90 (Mounting dimensions)

(50) 257 2.5
Mounting bracket
(If re-positioned from front end)
197 56 (50)
2.5

Mounting bracket

Name plate

Mounting bracket
Mounting bracket
(If re-positioned from front end)
2.5
56
(106) 199

3-M4 #6 flat head screw

3-M4 #6 flat head screw

Connector of driver side	Controlor side (customer prepares)
Connector XE : 5569-04A2-210 (Molex)	Connector : 5557-04R-210 (Molex) Pin　　　 : 5556PBTL

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.
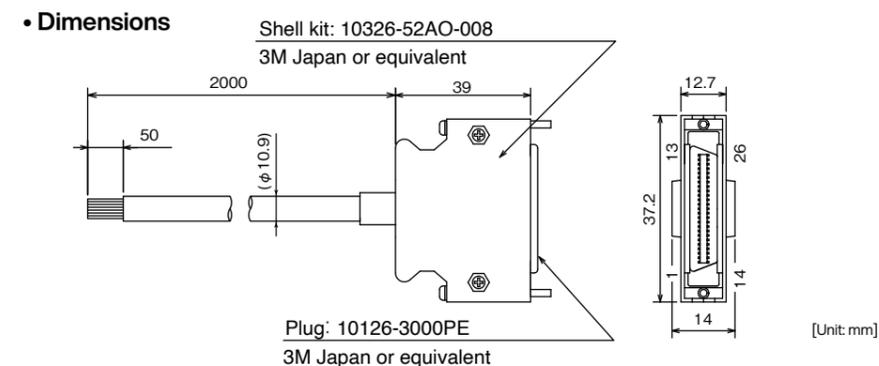
Mass: 8.2 kg

H-frame (200 V) (A6NE series are not available.)

Unit [mm]

Front Panel

X7 : For analog monitor signal connection
X1 : USB connector
X3 : Safety function connector
X2A : RTEX RX connector
X2B : RTEX TX connector
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector

Ground screws (2 places)

Direction of air flowing to the internal cooling fan

Terminal for external dynamic brake control signal

Control power input terminals

Terminals for motor connection

Terminals for external regenerative resistor

Main power input terminals

244

(70) 222 4

30 184 (Mounting dimensions)

For mounting

2-ϕ7.3

Name plate

Carrying pit

390

375 (Mounting dimensions)

2-7.3
For mounting

30 184 (Mounting dimensions)

7.5

Mass:
MHDLTE3NF/ 14.2 kg
MHDLTF3NF/ 15.2 kg

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Cable for Interface

Part No.	DV0P0800	Cable length 2 m, core wire AWG 26 is connected.

• Dimensions

Shell kit: 10326-52AO-008
3M Japan or equivalent

2000 39 12.7
50 (ϕ10.9) 13 26
37.2 1 14
14
Plug: 10126-3000PE
3M Japan or equivalent

[Unit: mm]

• Table for wiring

Pin No.	Signal name	color	Pin No.	Signal name	color	Pin No.	Signal name	color
1*	BRK-OFF+	Orange (Red1)	10*	HOME	Pink (Black1)	19	OB−/OCMP2−	Pink (Red2)
2*	BRK-OFF−	Orange (Black1)	11*	EXT2	Orange (Red2)	20	OB+/OCMP2+	Pink (Black2)
3*	ALM+	Gray (Red1)	12*	EXT3	Orange (Black2)	21	OCMP3+	Orange (Red3)
4*	ALM−	Gray (Black1)	13*	SI-MON4	Gray (Red2)	22	OCMP3−	Gray (Red3)
5*	SI-MON5	White (Red1)	14	BTP-I	Gray (Black2)	23	–	Gray (Black3)
6	I-COM	White (Black1)	15	BTN-I	White (Red2)	24	–	White (Red3)
7*	POT	Yellow (Red1)	16	GND	White (Black2)	25*	EX-OUT1+	White (Black3)
8*	NOT	Yellow (Black1)	17	OA+/OCMP1+	Yellow (Red2)	26*	EX-OUT1−	Orange (Black3)
9*	SI-MON1	Pink (Red1)	18	OA−/OCMP1−	Yellow (Black2)			

The signals allocated to the pin No. with " * " in the table are factory default.

<Remarks>
Color designation of the cable   e.g.) Pin-1 Cable color : Orange (Red1) : One red dot on the cable

<Caution>
The shield of this cable is not connected to the terminal of the connector.
The shielded wire of the cable is connected to the connector shell of the cable, and is connected to the FG via the connector shell on the Driver side. When connecting the shielded wire of the cable to GND, use the connector kit DV0P0770 for the interface. At that time, please note that if you connect the shield and the connector shell on the cable side and process it, FG and GND will be connected.
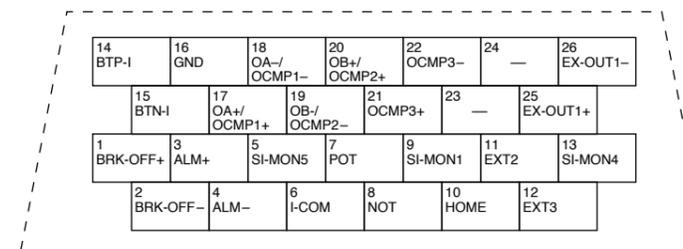
Connector Kit for Interface

Part No.	DV0P0770

• Components

Title	Part No.	Number	Manufacturer	Note
Connector	10126-3000PE	1	3M Japan (or equivalent)	For CN X4 (26-pins)
Connector cover	10326-52A0-008	1		

• Pin disposition: Connector X4 (26 pins) (viewed from the soldering side)

14 BTP-I	16 GND	18 OA−/OCMP1−	20 OB+/OCMP2+	22 OCMP3−	24 —	26 EX-OUT1−
15 BTN-I	17 OA+/OCMP1+	19 OB−/OCMP2−	21 OCMP3+	23 —	25 EX-OUT1+	
1 BRK-OFF+	3 ALM+	5 SI-MON5	7 POT	9 SI-MON1	11 EXT2	13 SI-MON4
2 BRK-OFF−	4 ALM−	6 I-COM	8 NOT	10 HOME	12 EXT3	

<Remarks>
1. Check the stamped pin-No. on the connector body while making a wiring.
2. For the symbols representing the signal names or the functions of the signals in the figure above, refer to the operation manual.

Servo driver with EtherCAT open network

EtherCAT
AC servo motor & driver

MINAS A6B Series — Special Order Product

A6BE Series
A6BF Series

A6 Series
A6N Series
A6B Series — Special Order Product
Information

Quickly — Response frequency 3200 Hz & communication rate 100 Mbps enable fast and highly accurate operation.
Configurable even for motors with a maximum rotating speed 6500 r/min.*

* MHMF and MQMF types with a maximum wattage 400 W

Wisely — New algorithm "Two-degree-of-freedom control method" is used to improve machining accuracy and productivity.

Easily — Easy and speedy set-up with set-up support software "PANATERM"

● Fully-featured EtherCAT application (7 control modes, 32 origin-return modes, 2 synchronous modes, and an asynchronous mode.) ● Capable of system upgrade with various slaves. ● Capable of establishing PC-based systems without needing dedicated hardware. ● Planed to pass official EtherCAT Conformance Test. ● A6BF with safety I/F *2 corresponding to international standard, and A6BL/A6BM supporting linear motors *2：IEC61800-5-2 STO, IEC61508 SIL3.

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

MINAS A6B Series — Model Designation — Special Order Product

For more information, please visit our website or request to our distributors separately.

■ Servo Driver

M	A	D	L	N	1	5	B	E	* * *

① ② ③ ④ ⑤ ⑥ ⑦ — Special specifications

① Frame symbol

Symbol	Frame	Symbol	Frame
MAD	A-Frame	MED	E-Frame
MBD	B-Frame	MFD	F-Frame
MCD	C-Frame	MGD	G-Frame
MDD	D-Frame	MHD	H-Frame

② Series

Symbol	Series name
L	A6 Family

③ Safety Function *1

Symbol	Specifications
N	without the safety function
T	with the safety function

④ Max. current rating

Symbol	Current rating	Symbol	Current rating
0	6 A	9	80 A
1	8 A	A	100 A
2	12 A	B	120 A
3	22 A	C	160 A
4	24 A	E	240 A
5	40 A	F	360 A
8	60 A		

⑤ Supply voltage specifications

Symbol	Specifications
1	Single phase 100 V
3	3-phase 200 V
5	Single/3-phase 200 V

⑥ I/f specifications

Symbol (specification)
B (EtherCAT)

⑦ Classification of type *1

Symbol	Specification
E	Standard for rotary motor — Special Order Product
F	Multifunction for rotary motor — Special Order Product
L	Standard for linear/ DD motor — Special Order Product
M	Multifunction for linear/ DD motor — Special Order Product

*1 Standard type (with a part number ending in E or L) has no safety function.
Multi-function type (with a part number ending in F or M) has a safety function.

Appearance

- **7-segment LED (2-digit)** Servo status display
- **Analog monitor connector (X7)** Velocity, torque ... etc.
- **Charge lamp of main circuit**
- **Power input connector (XA)**
  - Main power — L1 / L2 / L3
  - Control power — L1C / L2C
- **Regenerative-R & motor connector (XB)**
  - Regenerative-R — P / N / B
  - Motor — U / V / W
- **Earth terminals**

EtherCAT Indicators
- RUN : EMS status (Green)
- ERR : Alarm status (Red)
- L/A IN :
- L/A OUT : Indication of LINK status and operation status of the physical layer of each port (Green)

- **Rotary switch** to set Station alias (ID)
- **USB connector (X1)** For PANATERM, mini-B 5-pin
- **Safety STO I/F connector (X3)***
- **Connector X2A: IN for EtherCAT** Connection to TX of upstream node
- **Connector X2B: OUT for EtherCAT** Connection to RX of downstream node
- **I/O connector (X4)** Sensor inputs, alarm output ... etc. Half pitch 26-pin
- **Feedback scale connector (X5)*** For full-closed control
- **Encoder connector (X6)** Panasonic serial

* The photo is A6BF series. There are no X3 and X5 connectors in the A6BE series.

Typical system configuration

Controller

EtherCAT

- A6BE / A6BF — Rotary motor
- A6BL / A6BM — Linear motor
- A6 V frame
- Stepping Drive — Motor
- I/O
- Pulse out

EtherCAT specification

Device profile	CoE (CANOpen over EtherCAT)
Control mode	csp, pp, hm, csv, cst, pv, tq
hm method (homing mode)	−4 to −1, 1 to 14, 17 to 30, 33, 34, 35, 37
Synchronized mode	DC (Synch.), SM2 (Synch.), FreeRun (Non-synch.)
Supported cycle time	125 μs, 250 μs, 500 μs, 1 ms, 2 ms, 4 ms

Applicable motor
Please refer to P.29 to P.42 of the A6 series.

Applicable option

Interface cable	DV0P0800
Interface connector kit	DV0P0770
Options other than interface cables and interface connectors	Please refer to P.29 to P.42 of the A6 series.

* Refer to P.368 of the A6N series for the "parallel I/O connector (X4)" option. The "signal names" and "pin assignments" for the parallel I/O connector (X4) option "interface cable" and "interface connector kit" are different from those described on P.368. For details, please refer to the specifications of the A6B series.

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* All dimensions shown in this catalog are for the A6BF series, but outer dimensions are the same as the A6BE series.

A-frame

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection

2-M4 #6 flat head screw

Rack mount type (Option: Front-end mounting)

Base mount type (Standard: Back-end mounting)

Mass: 0.8 kg

A-frame: Connector of driver side			Multifunction type	Basic type
Connector XA	S05B-F32SK-GGXR (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector XB	S06B-F32SK-GGXR (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector X1	UB-M5BR-S14-4S (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector X3	CIF-HS08SS-071-TB (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	−
Connector X2A	MOD-WRJ88LY1G-TP+ (or equivalent)	HTK	●	●
Connector X2B	MOD-WRJ88LY1G-TP+ (or equivalent)	HTK	●	●
Connector X4	DF02R026NA2 (or equivalent)	Japan Aviation Electronics Ind.	●	●
Connector X5	MUF-RS10SK-GKX-TB (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	−
Connector X6	3E106-2230KV (or equivalent)	3M Japan	●	●
Connector X7	533984005 (5pin)	Molex	●	●

<Attached to the driver>

Connector of power and motor side		
Connector XA	05JFAT-SAXGGKK-A	J.S.T. Mfg. Co., Ltd.
Connector XB	06JFAT-SAXGGKK-A	J.S.T. Mfg. Co., Ltd.

B-frame

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection

2-M4 #6 flat head screw

Rack mount type (Option: Front-end mounting)

Base mount type (Standard: Back-end mounting)

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 1.0 kg

C-frame

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
　　②Control power input terminals
XB : ①Terminals for external regenerative resistor
　　②Terminals for motor connection

Rack mount type
（Option: Front-end mounting）

Base mount type
(Standard:
Back-end mounting)

Mass: 1.6 kg

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

D-frame (200 V)

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
　　②Control power input terminals
XB : ①Terminals for external regenerative resistor
　　②Terminals for motor connection

Direction of
air flowing to
the internal cooling fan

Rack mount type
（Option: Front-end mounting）

Base mount type
(Standard:
Back-end mounting)

Mass: 2.1 kg

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

E-frame (200 V)

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
　　②Control power input terminals
XB : Terminals for motor connection
XC : Terminals for external regenerative resistor

Direction of
air flowing to
the internal cooling fan

E-frame: Connector of driver side		
Connector XA	S05B-JTSLSK-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XB	S03B-JTSLSK-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XC	S04B-JTSLSS-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.

<Attached to the driver>

E-frame: Connector of power and motor side		
Connector XA	05JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XB	03JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XC	04JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.

Mass: 2.7 kg

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

F-frame (200 V)

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

Direction of
air flowing to
the internal cooling fan

①Main power input terminals
②Control power input terminals
③Terminals for external regenerative resistor
④Terminals for motor connection

Mass: 5.2 kg

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

G-frame (200 V) (A6BE series are not available.)

Unit [mm]

Front Panel

X7 : For analog monitor signal connection
X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
XE: Connector for external dynamic brake signal
XS: Built-in dynamic brake switch

Control power input terminals
Main power input terminals
Terminals for external regenerative resistor
Terminals for motor connection

Direction of air flowing to the internal cooling fan

3-M4 #6 flat head screw

3-M4 #6 flat head screw

184
90 (Mounting dimensions)
47
2-6.2
For mounting
(50) 257 2.5
Mounting bracket (If re-positioned from front end)
197 56 (50)
2.5

Mounting bracket

Name plate

257
241 (Mounting dimensions)
220
8
2-6.2
For mounting
47
90 (Mounting dimensions)

2.5
56
(106) 199
Mounting bracket
Mounting bracket (If re-positioned from front end)

3-M4 #6 flat head screw

3-M4 #6 flat head screw

Connector of driver side	Controlor side (customer prepares)
Connector XE : 5569-04A2-210 (Molex)	Connector : 5557-04R-210 (Molex) Pin : 5556PBTL

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 8.2 kg

H-frame (200 V) (A6BE series are not available.)

Unit [mm]

Front Panel

X7 : For analog monitor signal connection
X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector

L1C L2C DB1 DB2
L1 L2 L3 P B N U V W

Ground screws (2 places)

Direction of air flowing to the internal cooling fan
Terminal for external dynamic brake control signal
Control power input terminals
Terminals for motor connection
Terminals for external regenerative resistor
Main power input terminals

30 184 (Mounting dimensions)
For mounting
2-φ7.3

244
(70) 222 4
390
375 (Mounting dimensions)

Name plate

Carrying pit

2-7.3
For mounting
30 184 (Mounting dimensions)
7.5

Mass:
MHDLTE3BF/ 14.2 kg
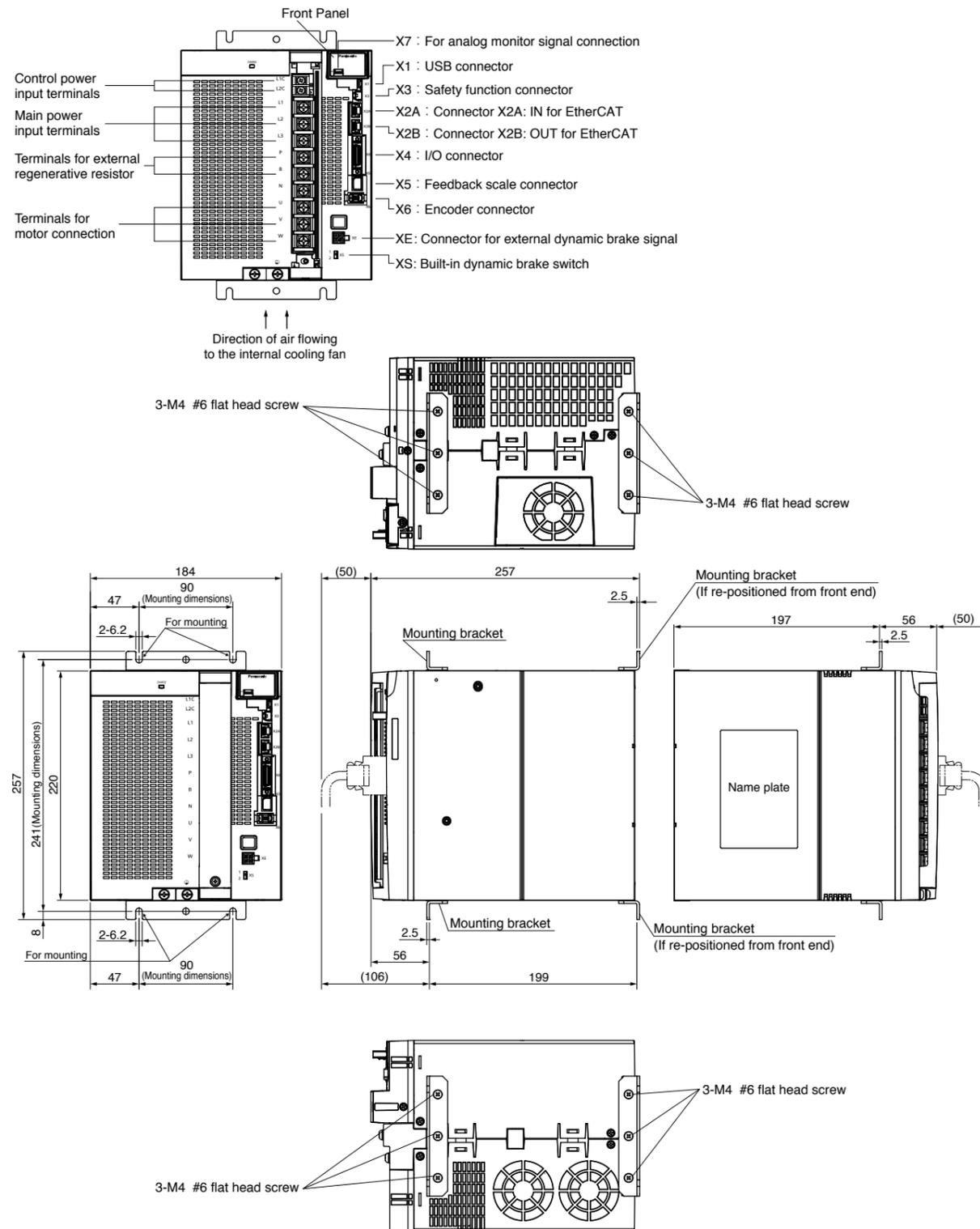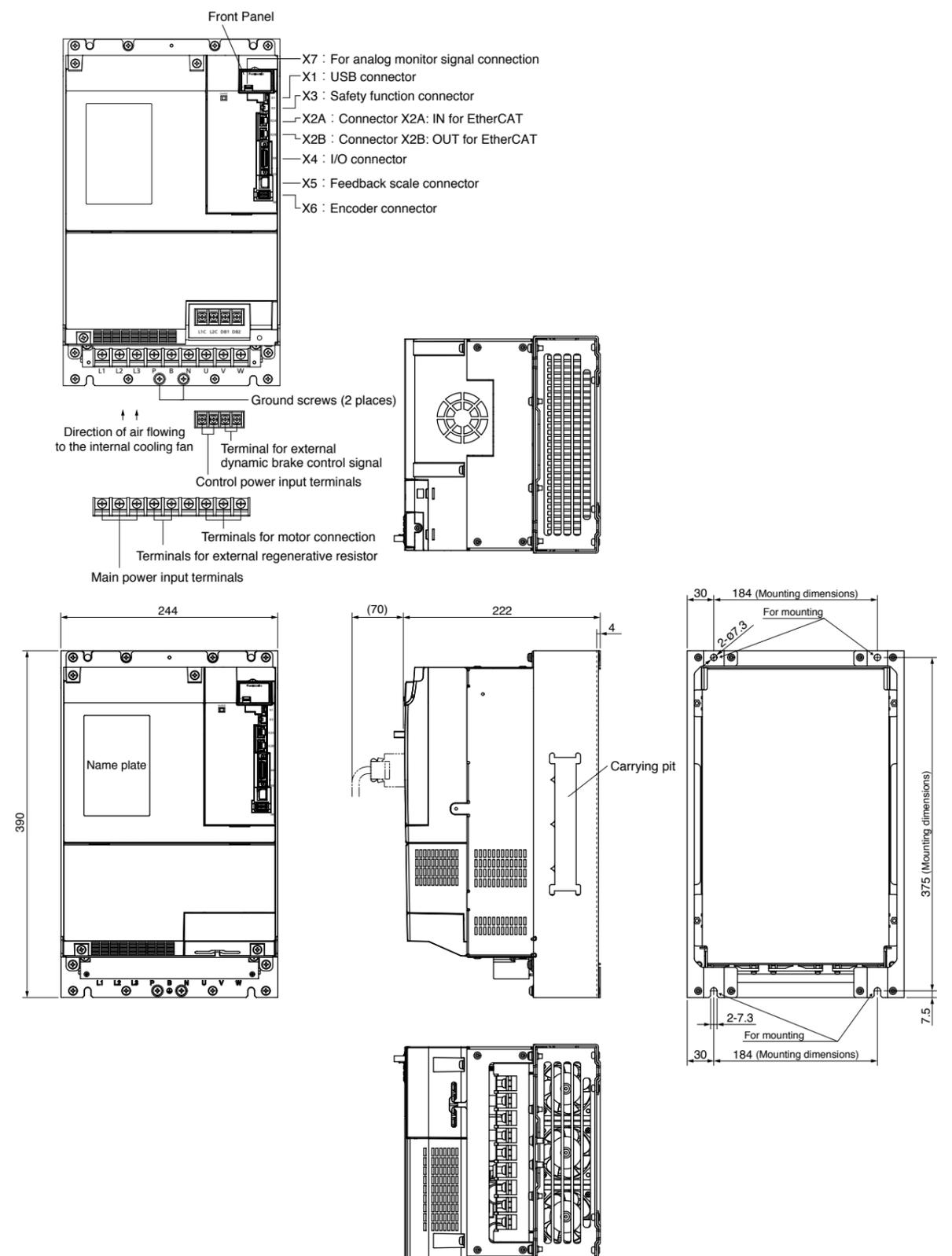MHDLTF3BF/ 15.2 kg

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

A6 Series
A6N Series
A6B Series Special Order Product
Information

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Panasonic Industry Co., Ltd. | 376