# **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
- · 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.
- \*Example: apply 2.7 N·m 3.3 N·m torque when tightening steel screw (M5) to steel surface.
- · 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

Electric data of this product (Instruction Manual, CAD data) can be download from the following web site; http://industrial.panasonic.com/ww/products/motors-compressors/fa-motors

Contact to :



Certificate division

ISO14001 Certificate division

ISO 14001

Panasonic Corporation, Automotive & Industrial Systems Company, Smart Factory Solutions Business Division, **Motor Business Unit** 

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Tel: +81-72-871-1212 Fax: +81-72-870-3151

The contents of this catalog apply to the products as of January 2016.

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

· Printed colors may be slightly different from the actual products

Specifications and design of the products are subject to change without notice for the product improvement



MINAS A6 family **MINAS E series** 

Servo Motor & Driver < MINAS A<sub>6</sub> family, MINAS Ш series>

# AC Servo Motor & Driver

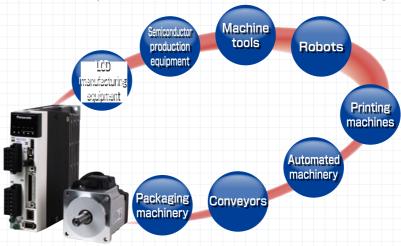


2016

<16.1®>



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

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



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The A6 family also shows its versatility when high productivity.

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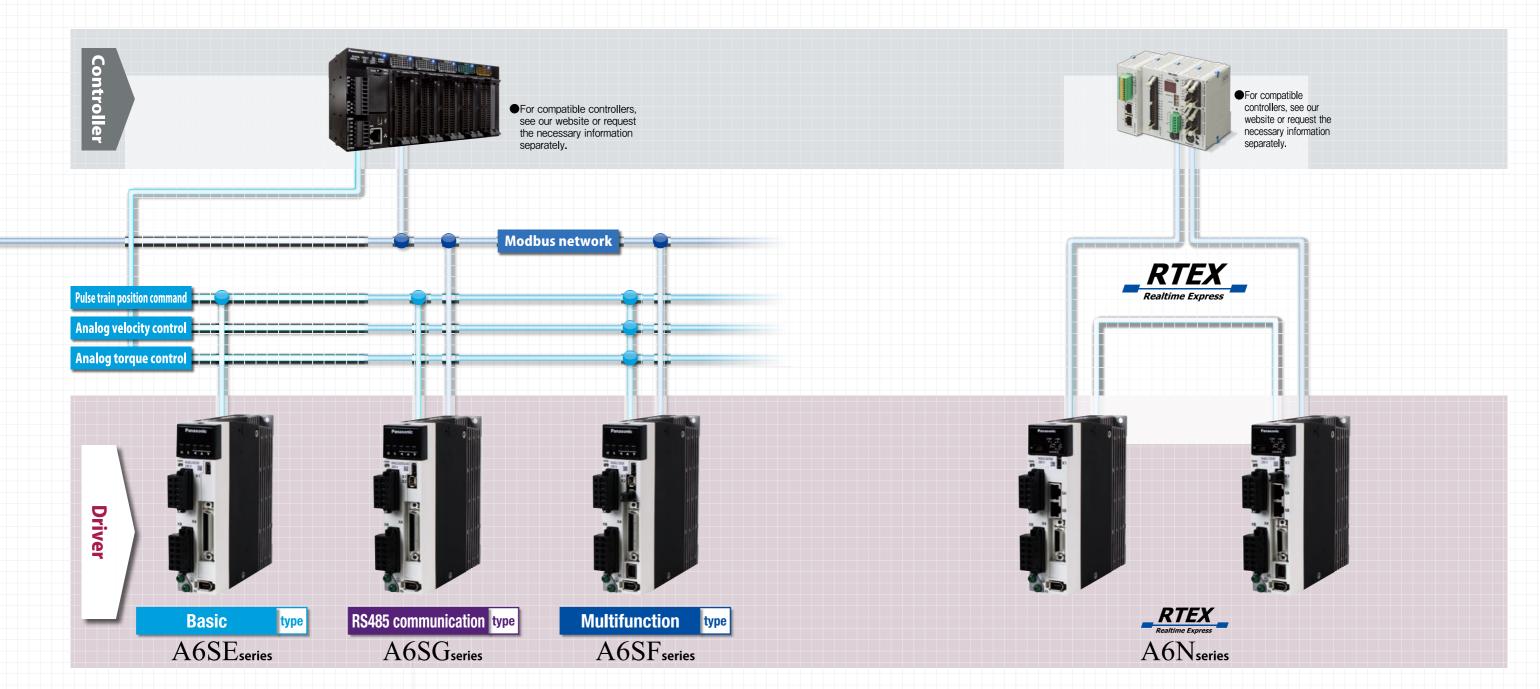
List of Peripheral Equipment

1 MINAS A6 Family MINAS A6 Family 2

# Servomotors that flexibly and effectively fit into

# various system configurations











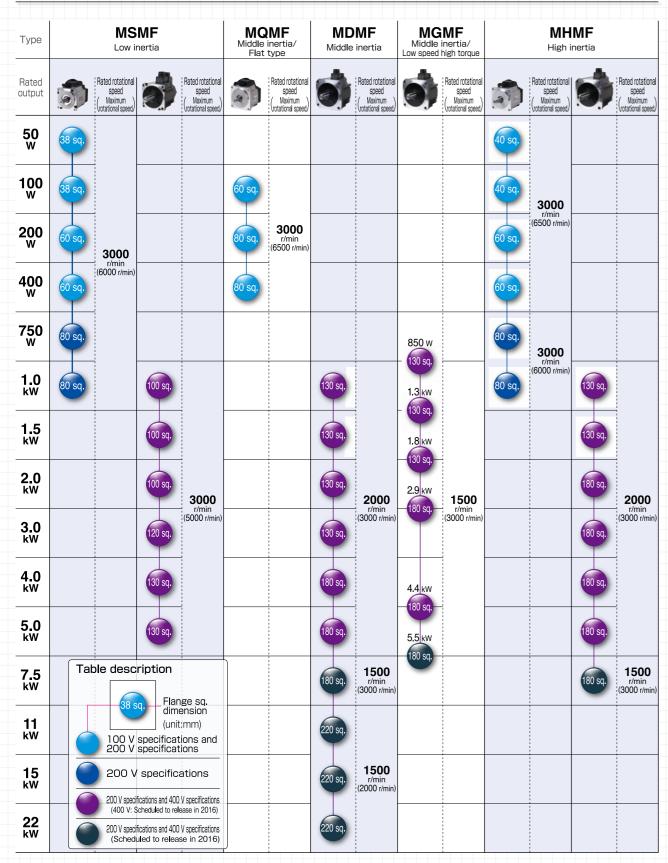


# It is MINAS A6 Family lineup that meets the

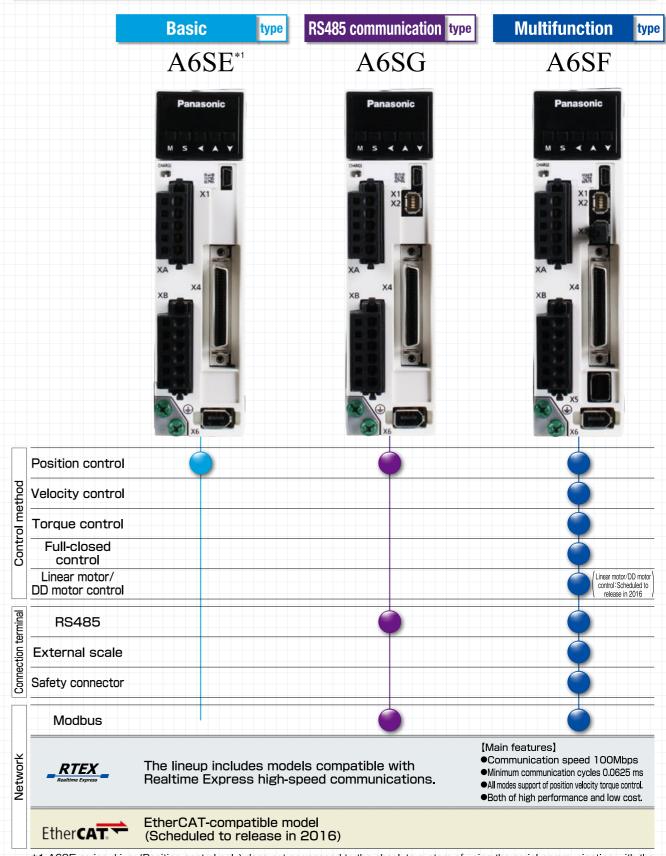
# manufacturing industry needs. 1



# ■Motor line-up



■Driver line-up



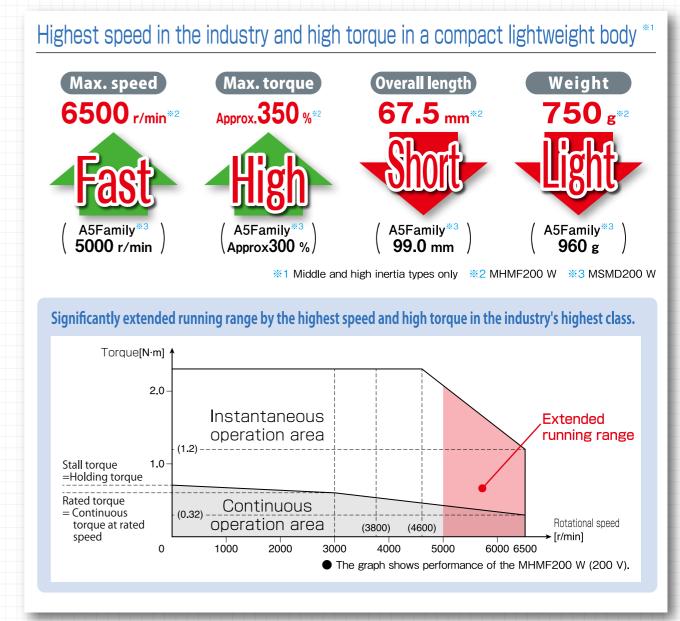
<sup>\*1</sup> A6SE series driver (Position control only) does not correspond to the absolute system of using the serial communication with the host device. It supports incremental system only.

5 MINAS A6 Family MINAS A6 Family

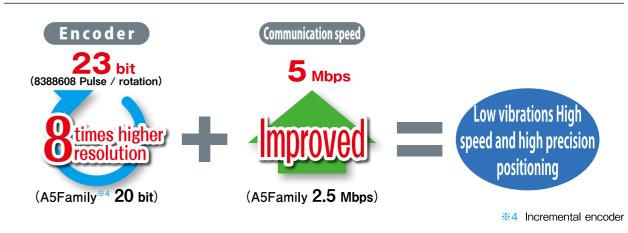
# Small, light, powerful and speedy







Enhanced position detecting resolution enables smoother and more precise positioning.

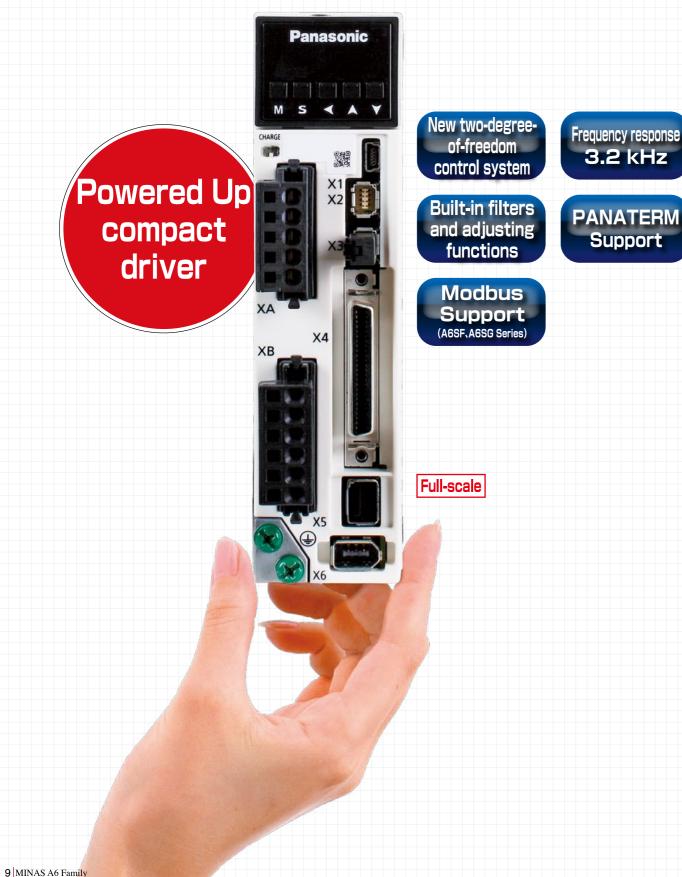


7 MINAS A6 Family

# Swifter, smarter and easier to use

3.2 kHz

Support





# 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 High stiffness ball screw

Belt device

Example of operation with processing machine A mirror finish is obtained even if a process that tends to cause streaking.

Trace of ●A5II Family

# Easy and quick setting, shortening conventional settling time by approx. 64%."

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

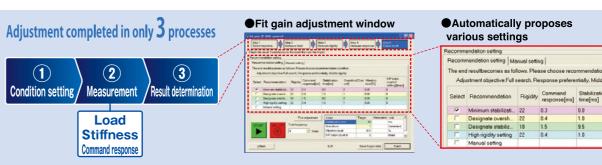
\*1 Comparison with conventional product A5II family

Settling time (Measured on low stiffness resonant mechanism) A6 Family **6** ms

settling time



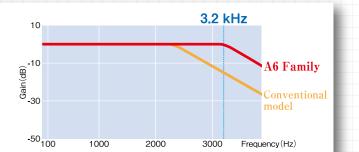
The above is a measure based on our test environment.



# 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.

Comparison with conventional product A5II family



# Reduced maintenance work and trouble.

# 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.



#### ■Applicable oil seals

Flange size	Motor type	With oil seal		With oil seal(with protective lip)			
00	MSMF	0			No s	setting	
80 mm or less	MHMF,MQMF	0	Made of nitrile rubber (NBR)	0	Made of	Not mounting-compatible with A5 family products	
100 mm or more	All Type	0	Tubbol (NDII)	0	fluororubber	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. 165.



# What is IP?

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

- Protected against solid objects over 50 mm in diameter. Protected against solid objects over 12.5 mm in diameter.
- 3 Protected against solid objects over 2.5 mm in diameter.
- 4 Protected against solid objects over 1.0 mm in diameter.
- Dust-proof type: Protected against dust penetration. Continues normal operation even if penetrated by a small quantity of dust.
- 6 Dust-tight type: Totally protected against dust penetration.

# IP- 6 7

- Protected against vertically falling drops of water or condensation 2 Protected against falling drops of water, if the case is inclined no more than 15' off vertical
- Protected against sprays of water from any direction, ever
  - 4 Protected against water splashed from any direction.
    - 5 Protected against direct low pressure water jets from any direction. Limited penetration permitted 6 Protected against direct high pressure water jets from any direction. Limited penetration permitted
      - otected against water penetration when immersed in water for the specified period of time and under the specified pressure
      - 8 Protected against water penetration when immersed in water for long, continuous periods of time.

#### 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.

# Other driver functions

# 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)

## 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.)

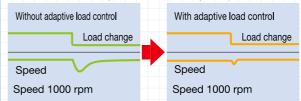
#### Manual/Auto damping filter

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.

# **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.



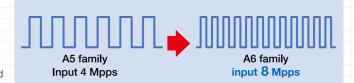
# Regenerative energy discharge

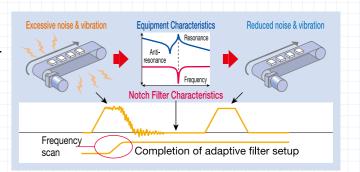
A regenerative resistor is used to discharge regenerative energy, which is the energy generated when stopping a load with a large moment of inertia or when using this unit in vertical operation. This energy is returned to the driver from the motor.

- 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.

#### 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.





# without damping filter with damping filter

#### 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.

11 MINAS A6 Family MINAS A6 Family 12

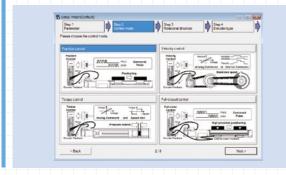
# Multifunctional software for quick adjustment support

# **PNATERM** 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-language display.

#### 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.



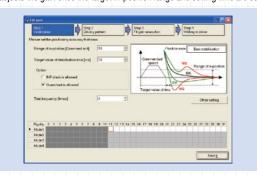
## The fit gain function for setting Two-degree-of-freedom control.

- 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.



#### **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.



#### **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 .

#### **Other New Function**

The software offers a wide range of convenient features including motor and driver data such as load factor, voltage, and driver temperature. Moreover, the logging function records the interface history. As well, a non-rotating contributing factor display function.



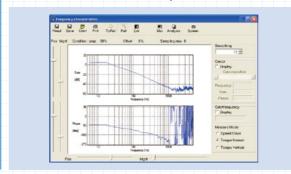


Please download from our web site and use after install to the PC.

http://industrial.panasonic.com/ww/products/motors-compressors/fa-motors

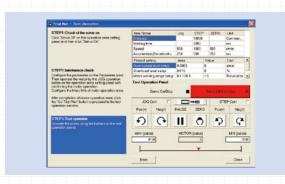
# Frequency characteristics measurement function

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.



#### rial run

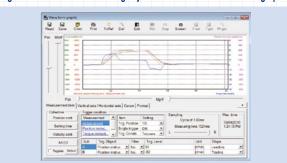
This function supports positioning with the Z-phase search and software limit.



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



#### Significant increase of measuring objects Multi-functional waveform graphic



# Hardware configuration

CPU	800 MHz or more
Memory	System memory 512MB or more Graphics memory 32MB 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) Japanese, English, Chinese (Simplified) ver ,
Serial communication	USB port, COM port (Communication speeds: 24000115200 bps)
function	* A COM port is required to use RS232 communications. A 9600 bps or higher baud rate is recommended.
Resolution	1024 × 768 pix or more
Number of colors	24bit colors (TrueColor) or more
	Memory Hard disk capacity OS Serial communication function Resolution

<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.

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# Compliance with MINAS international standards









			Moto
(A6SF se	ries)	(A6SE,A6SG	series)

		Driver	Motor
	EMC Directives	EN55011	
		EN61000-6-2	
		EN61000-6-4	_
		EN61800-3	
	Low-Voltage Directives	EN61800-5-1	EN60034-1
<b>EU Directives</b>	Low-voitage Directives	EN50178	EN60034-5
		ISO13849-1(PL e , Cat.3)	
		EN61508(SIL3)	
	Machinery Directives	EN62061(SILCL 3)	
	Functional safety *1	EN61800-5-2(SIL3、STO)	_
		IEC61326-3-1	
		IEC60240-1	
III. Otassalassala		UL508C	UL1004-1 , UL 1004-6
UL Standards		(E164620)	(E327868)
CSA Standards		C22.2 No.14	C22.2 No.100 -04
Radio Waves Act		KN11	
South Korea) (KC)*2		KN61000-4-2,3,4,5,6,8,11	_

IEC: International Electrotechnical Commission

EN: Europaischen Normen

EMC: Electromagnetic Compatibility UL: Underwriters Laboratories

CSA: Canadian Standards Association

Pursuant to the directive 2004/108/EC, article 9(2)

Panasonic Testing Centre

Panasonic Service Europe, a division of Panasonic Marketing Europe GmbH

Winsbergring 15, 22525 Hamburg, F.R. Germany

- When export this product, follow statutory provisions of the destination country.
- A6SE and A6SG series doesn't correspond to the functional safety standard.
- 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)

#### Low noise, compliant with EMC directives

Radiated noise is minimized to meet EMC directives 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 low-voltage machinery commands.(The final safety compliance must be applied as machine.)

certification (CCC).

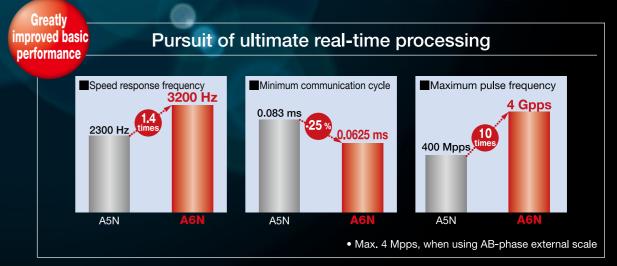
Includes a function in compliance with the SEMI F47 standard for voltage sag immunity under no load or light load. Ideal for the semiconductor and LCD industries.

This products is not an object of china compulsory

- Excluding the single-phase 100-V type.
- Please verify the actual compliance with your machine checking the F47 standard for voltage sag immunity.

# Ultra-high-speed network driver Realtime Express (RTEX)





Multifunctional capabilities to match various needs

Supports all positions, speeds and torque modes (w/ built-in positioning function).

©High-precision position latch and comparison

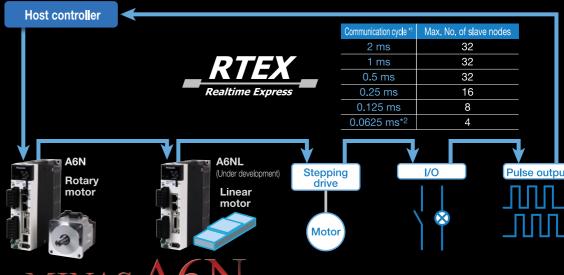
©Communication cycle can be set to any time between 2 ms and 62.5 μs.

# Simple network

OSatisfies both high performance and low cost requirements. **O**Synchronization established by communication IC

©Easier development of compatible equipment

System configuration example



• Realtime Express and RTEX are registered trademarks of Panasonic Corporation. Realtime Express is a high-speed synchronous motion network we developed.\*1 Communication cycle and connections to slave devices other than servomotors should be made according to controller specifications.\*2 Commands are updated every 0.125 ms when the communication cycle is 0.0625 ms.

Motor

Rated rotational Rotary

(Max. speed) 23-bit

speed

(r/min)

3000

(6000)

3000

(6000)

3000

(5000)

3000

(4500)

3000

(6500)

3000

(6500)

2000

(3000)

1500

(3000)

3000 (6500)

3000

(6000)

3000

(6500)

3000

(6000)

2000

(3000)

 $\bigcirc$ 

 $\bigcirc$ 

 $\bigcirc$ 

 $\bigcirc$ 

 $\bigcirc$ 

encoder Enclosure

IP65

IP67

IP65

IP67

absolute

 $\bigcirc$ 

Rated output

(kW)

0.05 0.1

0.2 0.4

0.75 1.0

0.05 0.1

0.2 0.4

0.75 1.0

1.0 1.5

2.0 3.0

0.1 0.2

0.4

0.1 0.2

0.4

1.0 1.5

0.85 1.3

1.8 2.9

4.4

0.05 0.1

0.2 0.4

0.75 1.0

0.05 0.1

0.2 0.4

0.75 1.0

1.0 1.5

2.0 3.0

5.0

4.0

3.0

5.0

2.0

4.0

5.0

4.0

Motor

lead-out

configuration

I eadwire

Connector

Leadwire

Connector

IP67 Connector

IP67 Connector

IP65 Leadwire

IP67 Connector

IP67 Connector

IP67 Connector

Features

Small capacity

plications

Suitable for high

speed application

Suitable for all ap-

Middle capacity

Suitable for the

machines directly

coupled with ball screw and high

stiffness and high

Small capacity

Middle capacity

Middle capacity

Suitable for low

speed and high

Small capacity

Middle capacity

Suitable for low

of inertia

stiffness machines

with belt driven, and

large load moment

Suitable for low stiff-

ness machines with

torque application

belt driven

Suitable for low stiff-

ness machines with

driven

Flat type and suit-

machines with belt

able for low stiffness

repetitive application

Applications

Bonder

ductor

Semicon-

production

equipment

Packing

SMT

Food

SMT

machines

machines

Belt drive

machines

unloading

Conveyors

Robots

tool

etc

Machine

Conveyors

Robots

Textile

machines

Conveyors

Conveyors

LCD man-

ufacturing

equipment

etc

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**Motor Line-up** 

**MSMF** 

MQMF

(Flat type)

**MDMF** 

MGME

**MHMF** 

Middle inertia

80 mm sq. or less

130 mm sq. or mor

Low inertia

# \* For combination of elements of model number, refer to Index P.272.

# Servo Motor

MINAS A6 Family

**Model Designation** 

M S M	F	5 A	Z	L	1	A 1	* — Special specifications
1)	2	3	4	<u>(5)</u>	6	7	

# (1) **Type**

ш тур	е		(	2) Seri	es
Symbol		Туре		Symbol	Series name
MSM	Low inertia	(50 W to 5.0 kW)		F	A6 series
MQM	Middle inertia	(100 W to 400 W)	ľ		
MDM	Middle inertia	(1.0 kW to 5.0 kW)			
MGM	Middle inertia	(0.85 kW to 4.4 kW)			
MHM	High inertia	(50 W to 5.0 kW)			

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

		Sh	aft	Holding	g brake	Oil s	seal	termi	
Syn	nbol	Round	Key-way, center tap	without	with	without	with	Connector JN	Lead wire
Α	1	•		•		•		•	
Α	2	•		•		•			•
В	1	•			•	•		•	
В	2	•			•	•			•
С	1	•		•			•	•	
С	2	•		•			•		•
D	1	•			•		•	•	
D	2	•			•		•		•
S	1		•	•		•		•	
S	2		•	•		•			•
T	1		•		•	•		•	
Т	2		•		•	•			•
U	1		•	•			•	•	
U	2		•	•			•		•
V	1		•		•		•	•	
٧	2		•		•		•		•

# 3 Motor rated output

4 Voltage specifications

_			
Symbol	Rated output	Symbol	Rated output
5A	50 W	15	1.5 kW
01	100 W	18	1.8 kW
02	200 W	20	2.0 kW
04	400 W	29	2.9 kW
08	750 W	30	3.0 kW
09	0.85 kW, 1000 W	40	4.0 kW
09	(130 mm sq.) (80 mm sq.)	44	4.4 kW
10	1.0 kW	50	5.0 kW
13	1.3 kW		

	• .		•
ymbol	Specifications	Symbol	Sp
1	100 V	1	;
2	200 V	<note></note>	
Z	100 V/ 200 V common (50 W only)		sing a rota

#### 6 Design order

Specifications
Standard
Otaridard

otary 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: 100 mm sq. or more MSMF, MHMF, MDMF, MGMF

Symbol		Sh	aft	Holding	g brake	Oil	seal	Encorder terminal		
		Round	Key- way	without	with	with	With protective lip	Connector JN2 (Small size)	Connector JL10 (Large size)*2	
С	5	•		•		•		•		
С	6	•		•		•			•	
С	7	•		•			•	•		
С	8	•		•			•		•	
D	5	•			•	•		•		
D	6	•			•	•			•	
D	7	•			•		•	•		
D	8	•			•		•		•	
G	5		•	•		•		•		
G	6		•	•		•			•	
G	7		•	•			•	•		
G	8		•	•			•		•	
Н	5		•		•	•		•		
Н	6		•		•	•			•	
Н	7		•		•		•	•		
Н	8		•		•		•		•	

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

		Sh	aft	Holding	g brake		Oil sea	terminal *1		
Syn	lodr	Round	Key-way, center tap	without	with	without	with	With protective lip	Connector JN	Lead wire
Α	1	•		•		•			•	
Α	2	•		•		•				•
В	1	•			•	•			•	
В	2	•			•	•				•
С	1	•		•			•		•	
С	2	•		•			•			•
С	3	•		•				•	•	
С	4	•		•				•		•
D	1	•			•		•		•	
D	2	•			•		•			•
D	3	•			•			•	•	
D	4	•			•			•		•
S	1		•	•		•			•	
S	2		•	•		•				•
Т	1		•		•	•			•	
Т	2		•		•	•				•
U	1		•	•			•		•	
U	2		•	•			•			•
U	3		•	•				•	•	
U	4		•	•				•		•
V	1		•		•		•		•	
V	2		•		•		•			•
V	3		•		•			•	•	
V	4		•		•			•		•

<sup>\*1</sup> Connector type: IP67, Lead wire type: IP65

#### Servo Driver

#### MADLN15SE \* \* \* -Special specifications

#### 1) Frame symbol

Symbol	Frame	Symbol	Frame
MAD	A-Frame	MDD	D-Frame
MBD	B-Frame	MED	E-Frame
MCD	C-Frame	MFD	F-Frame

# 2 Series

Symbol	Series name
L	A6 series

## **3 Safety Function**

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	5	40 A
1	8 A	8	60 A
2	12 A	Α	100 A
3	22 A	В	120 A
4	24 A		

#### (5) Supply voltage specifications

Supply voltage specification								
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

Symbol (specification)	Symbol	Specification
	Е	Basic type (Pulse train only)
S (Analog/Pulse)	F	Multi fanction type (Pulse, analog, full-closed)
	G	RS485 communication type (Pulse train only)
N	E	without the safety function
(RTEX)	F	with the safety function
B (EtherCAT)	(Sch	neduled to release in 2016)

- (\*1) Except for output shaft, and connector.
- \* For possible combinations of motors and drivers, see P. 23 to P. 32.

80 mm sq. or less

130 mm sq. or more

- · When using a rotary encoder as an absolute system (using multi-turn data), connect a battery to the absolute encoder.
- When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

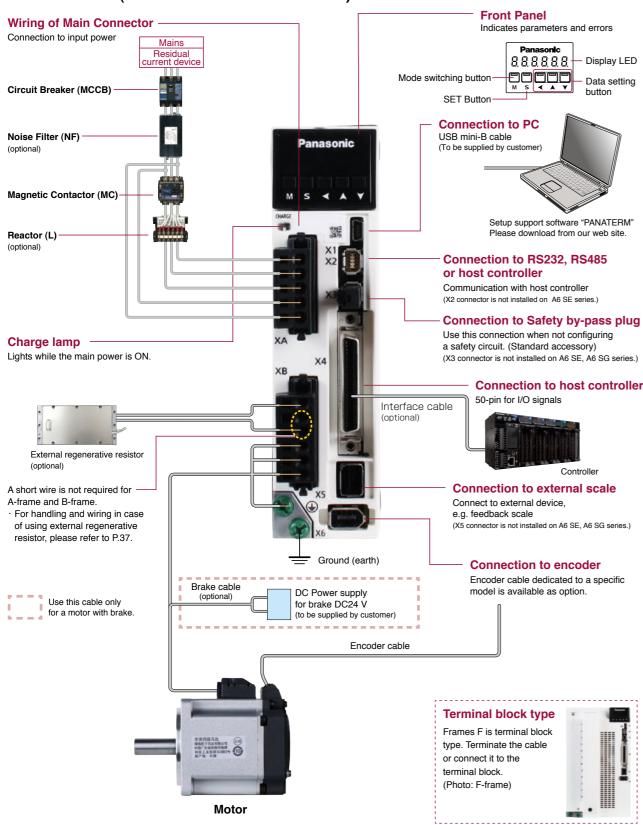
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High inertia

<sup>\*2</sup> Connector on the motor side encoder. (Also applicable to screwed type.)

MINAS A6 Family

# <A6 SF Series (Driver: A-frame Motor: 200 W)>

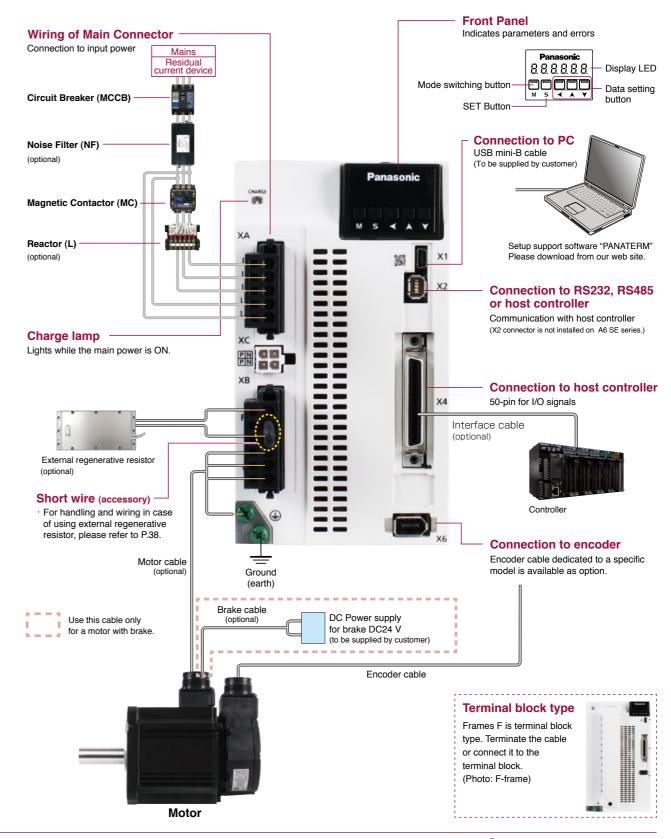


#### <Caution>

Apply adequate tightening torque to the product mounting screw by taking into consideration strength of the screw and the characteristics of material to which the product is installed. Overtightening can damage the screw and/or material; undertightening can result in loosening.

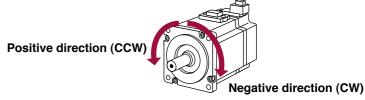
Example) Steel screw (M5) into steel section: 2.7 N·m to 3.3 N·m.

# <A6 SG Series/ A6 SE Series (Driver: D-frame Motor: 1.0 kW)>



#### <Note>

Initial setup of rotational direction: positive = CCW and negative = CW. Pay an extra attention.



# MINAS A6 Family

# **Driver and List of Applicable Peripheral Equipments**

Driver	Applicable motor	Voltage (V) *1	Rated output (kW)	Required Power at the rated load) (kVA)	Circuit breaker (rated (current)	Noise filter (Single phase) 3-phase	Surge absorber (Single phase 3-phase	Ferite core	Rated operating current of magnetic (contactor contact configuration	Diameter and withstand voltage of main circuit cable	Crimp terminal for main circuit terminal block *2	Diameter and withstand voltage of control power supply cable	Crimp terminal for control power supply terminal block	Diameter and withstand voltage of motor cable *3	Diameter and withstand voltage of brake cable	
	MSMF MHMF	Single	0.05													
MADI	MSMF MQMF MHMF	phase, 100	0.1	approx. 0.4		DV0P4170	DV0P4190	90								
MADL	MSMF MHMF	Single/	0.05				DV0P4190									
	MSMF MQMF MHMF	3-phase 200	0.1, 0.2	approx. 0.5	10	DV0PM20042	DV0P1450			0.75 mm <sup>2</sup> /				0.75 mm²/	0.28 mm <sup>2</sup> to 0.75 mm <sup>2</sup> /	
MDDI	MSMF	Single phase, 100	0.2			DV0P4170	DV0P4190		20 A (3P+1a)	AWG18 600 VAC or more				AWG18 600 VAC or more	to AWG18 100 VAC	
MBDL	MQMF MHMF	Single/ 3-phase 200	0.4	approx. 0.9		DV0P4170 DV0PM20042	DV0P4190 DV0P1450				δ		δ		or more	
MCDL	MSMF MQMF MHMF	Single phase, 100	0.4	approx. 0.9	45	DV0PM20042	DV0P4190	DV0P1460			onnection t	Connection to exclusive connector  0.75 mm²/ AWG18 600 VAC or more	Connection to exclusive connector			
MCDL	MSMF MHMF	Single/ 3-phase 200	0.75	approx.	15	DV0PM20042	DV0P4190 DV0P1450				o exclusive			o exclusive		
	MGMF		0.85								2.0 mm²/ AWG14 600 VAC or more		WG18 00 VAC	2.0 mm²/ AWG14 600 VAC or more		
	MSMF	_	1.0 (80 mm sq.)	approx. 1.8												
	MDMF MHMF		1.0						AWG: 600 VA						0.75 mm²/	
MDDL	MHMF	Single/ 3-phase 200	1.0 (80 mm sq.)		20	DV0P4220	DV0P4190 DV0P1450			0.021						
	MSMF		1.0	annray						AWG14 600 VAC						
	MGMF		1.3	approx. 2.3												
	MSMF MDMF MHMF		1.5													
	MGMF		1.8												AWG18	
MEDL	MSMF MDMF MHMF	3-phase 200	2.0	approx. 3.8	30	DV0PM20043	DV0P1450		60 A (3P+1a)						or more	
	MSMF MDMF MHMF		3.0	approx. 4.5				DV0P1460	, ,		11 mm or		11 mm or			
	MGMF		2.9					RJ8035 (Recommended) component			11 mm or smaller		11 mm or smaller	_		
MFDL	MSMF MDMF MHMF	3-phase 200	4.0	approx.	50	DV0P3410	DV0P1450	*4	100 A	3.5 mm²/ AWG12 600 VAC or more	φ <sub>5.3</sub>		φ <sub>5.3</sub> Terminal	3.5 mm²/ AWG12 600 VAC or more		
	MGMF		4.4	7.5					(3P+1a)	OI MUIE	Terminal		block	OI MOIE		
N	MSMF MDMF MHMF		5.0								M5		M5			

<sup>\*1</sup> Select peripheral equipments for single/3phase common specification according to the power source.

## Related page

## About circuit breaker and magnetic contactor

Suitable for use on a circuit capable of delivering not more than 5000 Arms symmetrical amperes, below the maximum input voltage of the product.

If the short-circuit current of the power supply exceeds this value, install a current limit device (current limiting fuse, current limiting circuit breaker, transformer, etc.) to limit the short-circuit current.

#### <Caution>

· Select a circuit breaker and noise filter which match to the capacity of power supply (including a load condition).

# Terminal block and protective earth terminals

- · Use a copper conductor cables with temperature rating of 75 °C or higher.
- · Use the attached exclusive connector for A-frame to E-frame, and maintain the peeled off length of 8 mm to 9 mm.

## ■ Fastening torque list (Terminal block screw/Terminal cover fastening screw)

	Driver	Termina	al block screw	Terminal cover fastening screw		
Frame	Terminal name	Nominal size	Fastening torque (N·m) Note)1	Nominal Fastenin torque (N·m) Note		
F	L1, L2, L3, L1C, L2C, P, RB, B, N, U, V, W	M5	1.0 to 1.7	МЗ	0.19 to 0.21	

#### ■ Fastening torque list (Ground terminal screw/Connector to host controller [X4])

	Grou	und screw		nnector to ontroller (X4)
Driver frame	Nominal size	Fastening torque (N·m) Note)1	Nominal size	Fastening torque (N·m) Note)1
A to E	M4	0.7 to 0.8	MO 6	0.0 +- 0.05
F	M5	1.4 to 1.6	M2.6	0.3 to 0.35

#### Note)1 < Caution>

- · Applying fastening torque larger than the maximum value may result in damage to the product.
- · Do not turn on power without tightening all terminal block screws properly, otherwise, loose contacts may generate heat (smoking, firing) .

#### <Remarks>

· To check for looseness, conduct periodic inspection of fastening torque once a year.

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<sup>\*2</sup> For the ground screw, use the same crimp terminal as that for the main circuit terminal block.

<sup>\*3</sup> The diameter of the ground cable must be equal to, or larger than that of the motor cable.

<sup>\*4</sup> Use thses products to suit an international standard.

# A6 Family Table of Part Numbers and Options

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

			Moto	or			Driver					Optiona	al parts	<b>.</b>					■ Options			
						A6 SF series	A6 SG series		Power	Encoder C	able Note)3	Motor	Cable	Note)3						Title	Part No.	Page
					Rating/	Multi fanction type	RS485 communication		capacity	23-bit A	bsolute								Interface Cable	e 	DV0P4360	182
M	otor series		Output	Part No.	Spec.	/Pulse, analog,\	A6 SE series	Frame	at rated	Use in the	Use in the	without		with	Brake Cable	External Regenerative	Reactor  Single phase	Noise Filter /Single phase			DV0P4120	182
		supply	(W)	Note)1	Dimensions (page)	full-closed /	Basic		\ load / (kVA)	absolute system	Incremental system	Brake		Brake	Note)3	Resistor	3-phase	3-phase			DV0P4121	182
							(Pulse signal input) Note)2, Note)4			(with battery box) Note)5	(without battery box)								Interface Conv	ersion Cable	DV0P4130	182
			50	MSMF5AZL1 ☐ 2	51	MADLT01SF	MADLN01S♦														DV0P4131	182
		Single	100	MSMF011L1 2	53	MADLT11SF	MADLN11S♦	A-frame	Approx. 0.4							DV0P4280	DV0P227	DV0P4170	Connector Kit	Single row	DV0P4132	182
		phase							Approx.									DV0F4170	for Power	to type	DV0PM20032	185
		100 V	200	MSMF021L1 ☐ 2	55	MBDLT21SF	MBDLN21S♦	B-frame	0.5							DV0P4283	DV0P228		Connection	D-frame Double row	DV0PM20033	185
	MSMF		400	MSMF041L1 ☐ 2	57	MCDLT31SF	MCDLN31S♦	C-frame	Approx.							DV0P4282		DV0PM20042	Connector Kit for Motor	A-frame to D-frame	DV0PM20034	186
Lov	/Leadwire\		50	MSMF5AZL1 □ 2	52	MADLT05SF	MADLN05S♦			MFECA	MFECA					D) (0D (00)			Connection Connector Kit		DV0D4000	100
v iner	( type )		100	MSMF012L1 ☐ 2	54	MADLT05SF	MADLN05S♦	A-frame	Approx.	0 * * 0EAE (For fixed)	0**0EAD		MFMC. * * 0E		MFMCB 0**0GET		DV0P227	DV0P4170	Motor/Encode		DV0P4290	186
tia	3000 r/min IP65	Single	200	MSMF022L1 ☐ 2	56	MADLT15SF	MADLN15S♦	-	0.0	(For lixea)	(For fixed)						DV0P220	DV0PM20042		RS485, RS232	DV0PM20024	183
		phase/				MBDLT25SF		D.	Approx.							DV0D4000				Safety	DV0PM20025	183
		3-phase 200 V	400	MSMF042L1 ☐ 2	58	MIDDLI 200F	MBDLN25S♦	B-frame	0.9							DV0P4283			Connector Kit		DV0P4350	184
			750	MSMF082L1 ☐ 2	59	MCDLT35SF	MCDLN35S♦	C-frame	1.3								DVUP220	DV0PM20042		External Scale	DV0PM20026	184
			1000	MSMF092L1 ☐ 2	60	MDDLT45SF	MDDLN45S♦	D-frame	Approx.							DV0P4284	DV0P228	DV0P4220	Datta on face Alexander	Encoder	DV0PM20010	184
				MQMF011L1 2													DV0P222		Battery for Abs	Absolute Encoder	DV0P2990	194
		Single	100	MQMF011L1  4	67	MADLT11SF	MADLN11S♦	A-frame Approx. 0.4						DV0P4280	DV0P227	DV0P4170	Note)5	For A-frame,	DV0P4430	194		
Mic		phase	200	MQMF021L1 ☐ 2 MQMF021L1 ☐ 4	69	MBDLT21SF	MBDLN21S♦	B-frame	B-frame Approx. 0.5 Approx.						DV0P4283		5 (0) 1170	Mounting Bracket	B-frame	DV0PM20100	195	
iddle i	MQMF	100 V	400	MQMF041L1 🗌 2	71	MCDLT31SF	MCDLN31S♦	C-frame							DV0P4282	DV0P228	DV0PM20042	Diacket	For C-frame, D-frame	DV0PM20101	195	
nertia	(Leadwire)			MQMF041L1  4 MQMF012L1  2			_	- mann	0.9	MFECA 0**0EAE	MFECA 0**0EAD		MFMC		MFMCB				Encoder	with Battery Box	MFECA0**0EA	E 171
ı Fla	3000 r/min	Single	100	MQMF012L1  4	68	MADLT05SF	MADLN05S♦	A-frame	Approx.	(For fixed)	(For fixed)	0 %	* *0E	Eυ	0 * * 0GET	DV0P4281	DV0P227		Cable	Note)5 without	MEEOAO A A OFAI	D 474
t type	IP65	phase/	200	MQMF022L1 ☐ 2 MQMF022L1 ☐ 4	70	MADLT15SF	MADLN15S♦	, and	0.5								DV0P220			Battery Box	MFECA0 * * 0EAI	
Φ		3-phase 200 V	400	MQMF042L1 ☐ 2	70	MDDLTOSOF	MDDI NOSO A	_	Approx.							DV0P4283	DV0P228	DV0PM20042		without Brake	MFMCA0 * * 0EE	
			400	MQMF042L1 ☐ 4	72	MBDLT25SF	MBDLN25S♦	B-frame	0.9								DV0P220		Brake Cable		MFMCB0 * * 0GE	
			50	MHMF5AZL1 ☐ 2 MHMF5AZL1 ☐ 4	73	MADLT01SF	MADLN01S♦		Approx.											50 Ω 25 W	DV0P4280	197
		Single	100	MHMF011L1 2 MHMF011L1 4	75	MADLT11SF	MADLN11S♦	A-frame	0.4							DV0P4280	DV0P227	DV0P4170	External	100 Ω 25 W	DV0P4281	197
		phase 100 V	200	MHMF021L1 2	77	MBDLT21SF	MBDLN21S♦	B.frame	Approx.							DV0P4283			regenerative resistor	25 Ω 50 W	DV0P4282	197
		100 V		MHMF021L1  4 MHMF041L1  2					Annroy								DV0P228			50 Ω 50 W	DV0P4283	197
	MHMF		400	MHMF041L1  4 MHMF5AZL1  2	79	MCDLT31SF	MCDLN31S♦	C-frame	0.9							DV0P4282		DV0PM20042		30 Ω 100 W	DV0P4284	197
High	(Leadwire)		50	MHMF5AZL1 🗌 4	74	MADLT05SF	MADLN05S♦			MFECA	MFECA	 	MFMC	A	MFMCB	DV0P4281	DV/ODCC-				DV0P220	196
inert	( type / 3000 r/min		100	MHMF012L1 ☐ 2 MHMF012L1 ☐ 4	76	MADLT05SF	MADLN05S♦	A-frame	Approx. 0.5	0 * * 0EAE (For fixed)	0 * * 0EAD (For fixed)		* * 0E		0 * * 0GET		DV0P227 DV0P220	DV0P4170	Reactor		DV0P227	196
ā	IP65	Single phase/	200	MHMF022L1 ☐ 2 MHMF022L1 ☐ 4	78	MADLT15SF	MADLN15S♦											DV0PM20042			DV0P228	196 196
			400	MHMF042L1  2	80	MBDLT25SF	MBDLN25S♦	B-frame	Approx.							DV0P4283	DVODOOC				DV0P228 DV0P4170	
		200 V		MHMF042L1								DV0P228 DV0P220	DV0PM20042	Noise Filter		DV0P4170 DV0PM20042	236					
			750	MHMF082L1  4	81	MCDLT35SF	MCDLN35S♦	C-frame	1.3									DVUPM20042	INDISE FILLET		DV0PM20042 DV0P4220	236
			1000	MHMF092L1 ☐ 2 MHMF092L1 ☐ 4	82	MDDLT55SF	MDDLN55S♦	D-frame	Approx.							DV0P4284	DV0P228 DV0P222	DV0P4220			DV0P4220 DV0P4190	
Nict		Poprocoss	to the		(rofor t	"Model design	ation" D 19 \					Nata\F F	Dlogg	note that -	hattanila			n 00 hit	Surge Absorbe	er	DV0P4190 DV0P1450	237
Note Note		-		motor specifications driver specifications		_									battery is no cable (with b		getner witi	1 ∠3-DIT	Forito Coro			
	,	•		cable length (03/3 m	•	•	•	m/MF	ECA00	30EAE						nber "DV0P2	9990" sepa	rately.	Ferite Core		DV0P1460	238

Note)2  $\diamondsuit$ : Represents the driver specifications. (refer to "Model designation" P.18.) Note)3 \*\*: Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030EAE

Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.

Please buy the battery part number "DV0P2990" separately.

# A6 Family Table of Part Numbers and Options

# **80 mm sq. or less 50 W to 1000 W** MSMF, MQMF: Connector type IP67

Part			Moto	r			Driver					Optional p	arts					■ Options		
Part						A6 SE sarias	A6 SG series		-	Encoder Ca	able Note)3									Part No.
Part					Rating/	Multi fanction	RS485		1			illotor ot	1515 11010/0					Interface Cable	<u>e</u>	DV0P4360 DV0P4120
	Por sorios	ower	Output	Part No.	_			Eromo	1	lise in the	Use in the						Noise Filter	Interface Conv	version Cable	DV0P4121 DV0P4130
Part	sup	upply	(W)	Note)1				riaille	\ load /	absolute	Incremental					Sirigle priase				DV0P4131
March   Marc					(page)				(kVA)		1	Diake	Diake			3-priase	3-pilase /	Connector Kit	Single row	DV0P4132
							Note)2, Note)5											for Power	A-frame type	DV0PM20032
Sept					51															DV0PM20033
Sample   10			50	MSMF5AZL1 ∐ 1		MADLT01SF	MADLN01S		Annrox										A-frame to	DVODMOOOA
Private   Priv					53			A-frame							DV0P4280	DV0P227				
Marco   Marc	Sin	ingle	100	MSMF011L1 ∐ 1		MADLT11SF	MADLN11S										DV0P4170		MSMF	DV0PM20035
March   Marc				_	55				Approx	MEEGA	MEEGA	MF	MCA	MEMOR			-	Encoder Con-	MQMF	DV0PM24582
March   Marc	100	00 V	200	MSMF021L1 ☐ 1		MBDLT21SF	MBDLN21S♦	B-frame							DV0P4283 Γ				for Brake Connection	DV0PM20040
Moder   Mode					57		_		Annrox	direction of	direction of	dire	ction of	direction of		DV0P228		-		DV0PM20024
September   Sept			400	MSMF041L1 ∐ 1		MCDLT31SF	MCDLN31S♦	C-frame				MF	MCA		DV0P4282		DV0PM20042	Connector Kit		DV0P4350
	MSMF				52					0 * * 0MKE	0 * * 0MKD			0 * * 0 P K	т					DV0PM20026
100   MSMF012.1   1   1   1   1   1   1   1   1   1	Connector		50	MSMF5AZL1 ∐ 1		MADLT05SF	MADLN05S			opposite direction	opposite direction	opposi	e direction	opposite directi	.			Battery for Abs		DV0PM20010
Modername	'			_	54			-	Approx	,		ME	MCA.		DV0P4281	DV0P227			r Absolute Encoder	DV0P4430
Single   S			100	MSMF012L1 ∐ 1	100	MADLT05SF	MADLN05S	A-frame		0 * * 0TJE	0**0TJD	0*:	k 0RJD	0 * * 0 S J	Г	DV0P220	DV0P4170	<del>  '</del>	For A-frame,B-frame	DV0PM20100
Part					56					direction of	direction of	dire	ction of	direction of		-	DV0PM20042	Bracket	· · · · · · · · · · · · · · · · · · ·	
2-90   40   MSMF0421   1   50   MBDLT2SSF   MBDLN2SSP   State   Name   Approx   Calcium   Free   Name   Approx   Calcium   Name   Approx   Name   N			200	MSMF022L1 ∐ 1		MADLT15SF	MADLN15S♦			MFECA	MFECA			MFMCB					of motor shaft	MFECA0**(
Part					58				Approx						1		-		direction of motor shaft	MFECA0**0
Part	200	00 V	400	MSMF042L1 ∐ 1		MBDLT25SF	MBDLN25S♦	B-frame	1.1.			opposi	e direction		DV0P4283	DV0P228		\	motor shaft	MFECA0 * * 0
ACM					59				Approx	-		N	ote)4			DV0P220		,	direction of motor shaft	MFECA0**0
Mode			750	MSMF082L1 ∐ 1		MCDLT35SF	MCDLN35S♦	C-frame									DV0PM20042		of motor shaft	MFECA0**0
MOMFORTILL   1   10   MOULTISSF   MOULTISS   Mount   1.8					60			_	Approx.	-						DV0P228		Cable	direction of motor shaft	MFECA0 * * 0
MOMFO11L   1   67   MADLT1SF			1000	MSMF092L1 ∐ 1		MDDL145SF	MDDLN45S	D-frame							DV0P4284	DV0P222	DV0P4220		motor shaft	MFECA0 * * 0
MOMF01LL   3   104   MADLT1SF   MADLN1S   Afterwise   0.4   MFECA   MFECA   0.4   MFECA   MF				MOME011L1 □ 1	67				Annroy									-	direction of motor shaft	MFECA0**0
Single   Pase   200   MGMF021L1   1   6   6   MGMF021L1   1   6   6   MGMF021L1   1   7   MGMF041L1   1   7   MG			100			MADLT11SF	MADLN11S	A-frame	1.1.						DV0P4280	DV0P227			of motor shaft	MFMCA0 * *(
MOMF021L1   3   104   MBUL121SF   MBULN21SV   Brame   0.5   MFCA   MFC	Sin	ingle		MOMEONIA I	00					/For movable,\	/For movable,\	/For movable,\	/For movable	e,\			DV0P4170		direction of motor shaft	MFMCA0 * *(
MOMF			200			MBDLT21SF	MBDLN21S♦	B-frame							DV0P4283			(FOI MOME type)	motor shaft	MFMCA0**(
MOMF041L1   3   105   MCDLT31SF   MCDLT31S		00 V								-						DV0P228			direction of motor shaft	MFMCA0**(
Type   Mode   Mo			400	_		MCDLT31SF	MCDLN31S♦	C-frame		/ For movable, \	/ For movable, \	/ For movable,	For movable	e, \	DV0P4282		DV0PM20042		of motor shaft	MFMCA0**(
100   MCMH012L1   3   104   MADLT0SSF   MADLN0SS   Aframe   Approx.	type			WQWI 041E1 🗆 3	100					of motor shaft		of motor shaft		ft /				(For MQMF type)	direction of motor shaft	MFMCA0 * *
Single phase/ 3-phase/ 3-phase 200 V	000 r/min		100			MADLT05SF	MADLN05S♦			-					DV0P4281			(without Brake)	motor shaft	MFMCA0 * *(
phase/ 3-phase 200 V WOMMOF022L1 1 70 NGMF02L1 1 70 NGMF02	IP67 Sin	inale		MQMF012L1 ∐ 3	104		-	A-frame		/ For fixed, \	/ For fixed, \	/ For fixed, \	/ For fixed,	1		DV0P227			direction of motor shaft	MFMCA0**
S-phase   MOMF022L1   3   104			200	MQMF022L1 ☐ 1		MADIT15SE	MADI N15SA	7 1 1 1 1 1 1 1	0.5	\motor shaft/	motor shaft/	\motor shaft/	motor shaf	1		DV0P220	DV0P4170		of motor shaft	MFMCA0**(
MQMF042L1			200	MQMF022L1 ☐ 3	104	WINDELLIOO	IVII NDEI VIOO			0 * * 0TKE	0 * * 0TKD	0 * * 0WGE	0 * * 0XC		DV0B4000		DV0PM20042	(For MQMF type)	direction of motor shaft	MFMCA0 * *
400   MQMF042L1 □ 3   105   MBDL125SF   MBDLN25SV   B-frame   0.9	200	.UU V	40.5	MQMF042L1 ☐ 1	72	MDDITOTOF	MDDI MATO A	_	Approx.	For fixed, opposite direction	For fixed, opposite direction	For fixed, opposite direction	For fixed, opposite direct	tion	DV0P4283			(with Brake)	motor shaft	MFMCA0**
□ : Represents the motor specifications. (refer to "Model designation" P.18.) □ : Represents the driver specifications. (refer to "Model designation" P.18.) □ : Represents the driver specifications. (refer to "Model designation" P.18.) □ : Represents the driver specifications. (refer to "Model designation" P.18.) □ : Represents the driver specifications. (refer to "Model designation" P.18.) □ : Represents the driver specifications. (refer to "Model designation" P.18.) □ : Represents the driver specifications. (refer to "Model designation" P.18.) □ : Represents the driver specifications. (refer to "Model designation" P.18.) □ : Represents the driver specifications. (refer to "Model designation" P.18.) □ : Represents the driver specification where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application where the cable is movable. □ : For application of motor shaft   Secondary   Second			400			MBDLT25SF	MBDLN25S♦	B-frame		U INOLOF STAIL	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\ or motor shaft	/ Or motor sha	н /		DV0P220			direction of motor shaft	MFMCA0**
Fixed : For application where the cable is fixed.  ** Represents the driver specifications. (refer to "Model designation" P.18.)  ** Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030MJE  Cables for opposite to output shaft cannot be used with 50 W or 100 W motor. (MSMF connector type only.)  Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.  Fixed : For application where the cable is fixed.  For fixed, direction of motor shaft   MFMCBO    MFMCBO    MFMCBO    MFMCBO    MFMCBO    MFMCBO    MFMCBO    MFMCBO    MFMCBO    For fixed, direction of motor shaft   Cable direction of motor shaft    MFMCBO	□ . Dan==	rocont-	the -	notor aposifications	(rofor to	"Model design	tion" D 10 \		1	I	1	Movable :	For applica	tion where the	cable is mova	ble.	1	1	of motor shaft	MFMCB0 * *(
* * : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030MJE  Cables for opposite to output shaft cannot be used with 50 W or 100 W motor. (MSMF connector type only.)  Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.  Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box).    Direction of motor shaft/Opposite direction of motor shaft: Cable direction of motor shaft is not supplied direction of motor shaft cannot be used with 50 W or 100 W motor. (MSMF connector type only.)    Direction of motor shaft/Opposite direction of motor shaft: Cable direction of motor shaft is not supplied direction of motor shaft is	•			•	•	•	,											Brake Cable	direction of motor shaft	MFMCB0 * * 0
Cables for opposite to output shaft cannot be used with 50 W or 100 W motor. (MSMF connector type only.)  Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.  Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box).    MFMCBO	•			•	•	•	,	m/MF	ECA00	30MJE		Direction	of motor sha	ft/Opposite dir	ection of moto	or shaft : Ca	able direction		motor shaft	MFMCB0 * * 0
Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.  Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box).  External regenerative (25 Ω 50 W DV0P42) DV0P42 Tesistor Sixtor (30 Ω 25 W DV0P42) The system specification, (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42) The system can be used in combination. (25 Ω 50 W DV0P42)				• ,			, .												direction of motor shaft	MFMCB0 * * 0
only incremental system can be used in combination.  Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box).  DV0P42  So Ω 50 W  DV0P42					-		t support the ab	solute	system	specification	,							External		DV0P4280 DV0P4281
	-		-						l **	- I \								regenerative		DV0P4282
Please buy the battery part number "DV0P2990" separately.					-		ite encoder cable	e (with	battery	y DOX).								resistor	50 Ω 50 W 30 Ω 100 W	DV0P4283 DV0P4284

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MINAS A6 Family 26

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DV0P220, DV0P222

DV0P227, DV0P228 DV0P4170, DV0PM20042

DV0P4190, DV0P1450

DV0P4220

DV0P1460

Reactor

Noise Filter

Surge Absorber Ferite Core

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# A6 Family Table of Part Numbers and Options

# 80 mm sq. or less 50 W to 1000 W

MHMF: Connector type IP67

			Moto	r			Driver					Optiona	al parts						■ Options		
						A6 SF series	A6 SG series		-	Encoder C	able Note)3	Motor	Cable N	Note)3						Title	Part No.
						Multi fanction	RS485		Power		,	IIIOCO	- Cubio ii	1010/0					Interface Cable	<b>e</b>	DV0P4360 DV0P4120
					Rating/	type	communication		capacity	23-DIT A	Absolute				Brake	External					DV0P4121
M	tor series	Power	Output	Part No.	Spec.	/Pulse, analog,\	A6 SE series	Frame	rated	Use in the	Use in the				Cable	Regenerative	Reactor	Noise Filter	Interface Conv	version Cable	DV0P4130
IVIC	itor series	supply	(W)	Note)1	Dimensions	( full-closed )	Basic	ranie	load /	absolute	Incremental	without		with	Note)3	Resistor	Sirigie priase	Single phase		0.0.0 0.0	DV0P4131
					(page)				(kVA)	system	system	Brake	1	Brake	14010/0	ricolotoi	3-phase	3-phase			DV0P4132
							(Pulse signal input) Note)2, Note)4			(with battery box) Note)5	(without battery box)								Connector Kit for Power	A-frame Single row type	DV0PM20032
												MFMCA	A M	MFMCA					Supply Input Connection	D-frame Double row	DV0PM20033
			50	MHMF5AZL1 ☐ 1 MHMF5AZL1 ☐ 3	73 109	MADLT01SF	MADLN01S♦					0 * * 7UF  Movable/fixe common-us direction of	ed (Mor se, of di	* * 7VFD ovable/fixed ommon-use, direction of					Connector Kit for Motor Connection	A-frame to D-frame	DV0PM20034
			100	MHMF011L1 🗌 1	75	MADITAGE	MADI NIMO A	A-frame	Approx. 0.4			\ motor shaf MFMCA 0 * *7U0	A M	MFMCA * * 7VGD		DV0P4280	DV0P227		Connector Kit for Motor/ Encoder Con- nection	MHMF 200 W to 1.0 kW MHMF 50 W, 100 W	DV0PM24582 DV0PM24581
			100	MHMF011L1 ☐ 3	109	MADLT11SF	MADLN11S♦					Movable/fixe common-us	e,     con	ovable/fixed ommon-use,						for Brake Connection	DV0PM20040
												opposite direct of motor sha	aft   loppos	osite direction f motor shaft				DV0P4170	Commodor rate	RS485, RS232	DV0PM20024
													_					- 200		Safety	DV0PM20025
												MFMCA		MFMCA					Connector Kit		DV0P4350
		Single										0 * * 0UF		* * 0VFD						External Scale	DV0PM20026
		phase		MUMEOOTI 1 - 1	77							/For movable direction of	f di	or movable, direction of						Encoder	DV0PM20010
		100 V	200	MHMF021L1  1	77	MBDLT21SF	MBDLN21S♦	B-frame	Approx.			\ motor shaf	ft / \ m	motor shaft /		DV0P4283			Battery for Abs		DV0P2990
		100 V		MHMF021L1 ☐ 3	110				0.5			MFMCA 0 * * 0U0		MFMCA **0VGD						r Absolute Encoder	DV0P4430
												For movable opposite direct		or movable, osite direction					Mounting	For A-frame, B-frame	DV0PM20100
												of motor sha	aft / of n	motor shaft			DV0P228		Bracket	For C-frame, D-frame	DV0PM20101
										MFECA	MFECA	MFMCA	A M	MFMCA						For movable, direction	MFECA0**0MJ
										0 * * 0MJE	0 * * 0MJD	0 * * 0WI / For fixed,	\ / F	* * 0XFD For fixed,					Encoder Cable	of motor shaft  For movable, opposite	MFECA0 * * 0MK
			400	MHMF041L1	79 110	MCDLT31SF	MCDLN31S♦	C-frame	Approx. 0.9	direction of motor shaft	direction of motor shaft	direction of motor shaf	ft/ \m	direction of motor shaft		DV0P4282		DV0PM20042	(with Battery Box)	For fixed, direction of motor shaft	MFECA0 * * 0TJI
	MHMF			WITHWIN OFFICE						MFECA 0**0MKE	MFECA 0**0MKD	MFMCA 0 * * 0W( / For fixed,	GD 0*	MFMCA  * * 0XGD For fixed,					Note)5	For fixed, opposite direction of motor shaft	MFECA0 * * 0TK
igh	Connector type									For movable, opposite direction of motor shaft	For movable, opposite direction of motor shaft	opposite direct of motor shall	ction   oppos	osite direction motor shaft					Canaday	For movable, direction of motor shaft	MFECA0**0MJ
inertia	3000 r/min			MHMF5AZL1 □ 1	74					MFECA	MFECA	MFMCA 0 * * 7UF		MFMCA k ∗7VFD	_				Encoder Cable	For movable, opposite direction of motor shaft  For fixed, direction of	MFECA0 * * 0MK
ש	IP67		50	MHMF5AZL1   3	109	MADLT05SF	MADLN05S♦			0 * * 0TJE  For fixed, \direction of	0 * * 0TJD  For fixed, \direction of	Movable/fixe   common-us   direction of	ed /Mor	ovable/fixed ommon-use, direction of					(without (Battery Box)	motor shaft For fixed, opposite	MFECA0 * * OTJ
								-		\motor shaft/ MFECA	\motor shaft/ MFECA	\ motor shaf	ft / \ m	notor shaft /		DV0P4281				direction of motor shaft For movable, direction	MFECA0 * * 0TK
				MHMF012L1 🗌 1	76			Δ.	Approx.	0 * * 0TKE	0 * * 0TKD	0 * * 7U0	GD 0*	MFMCA ⊧∗7VGD			DV0P227		Motor Cable	of motor shaft For movable, opposite	MFMCA0 * * 0UF
			100	MHMF012L1 🗌 3	109	MADLT05SF	MADLN05S♦	A-frame	0.5	opposite direction of motor shaft	opposite direction	/ Movable/fixe common-us opposite direc	e, con	ovable/fixed ommon-use, osite direction			DV0P220	DV0P4170	(For MHMF 200 W to 1.0 kW)	For fixed, direction of	
												of motor sha		f motor shaft /			-	DV0PM20042	(without Brake)	For fixed, opposite direction of motor shaft	MFMCA0**0W0
		Single	200	MHMF022L1 ☐ 1 MHMF022L1 ☐ 3	78 110	MADLT15SF	MADLN15S♦					MFMCA 0 * * 0 UF	FD 0*	MFMCA * * 0VFD						For movable, direction of motor shaft	MFMCA0**0VF
		phase/ 3-phase		IVII IIVII UZZLI 🗌 3	110							/For movable direction of motor shaf	f di	or movable, direction of notor shaft					Motor Cable /For MHMF	For movable, opposite direction of motor shaft	MFMCA0**0VG
		200 V		MHMF042L1 □ 1	80				Approx.			MFMCA		MFMCA					(200 W to 1.0 kW) (with Brake)	For fixed, direction of motor shaft	MFMCA0 * * 0XF
			400	MHMF042L1   3	110	MBDLT25SF	MBDLN25S♦	B-frame	0.9			0 * * 0U0 For movable opposite direc	e, \ / For	* * 0VGD or movable, osite direction		DV0P4283	DVODOOO			For fixed, opposite direction of motor shaft	MFMCA0 * * 0XG
				MHMF082L1 ☐ 1	81				Approx			\ of motor sha	aft / \ of m A M	MFMCA			DV0P228 DV0P220		Motor Cable (For MHMF 50 W, 100 W)	Movable/fixed common-use, direction of motor shaft  Movable/fixed	MFMCA0**7UF
			750	MHMF082L1  3	111	MCDLT35SF	MCDLN35S◇	C-frame	Approx. 1.3			0 * * 0WI For fixed, direction of motor shaf	f) (F	* * 0XFD For fixed, direction of motor shaft				DV0PM20042		common-use, opposite direction of motor shaft  Movable/fixed	MFMCA0**7UG
			1000	MHMF092L1 □ 1	82	MDDLT55SF	MDDLN55S♦	D-frame	Approx.			MFMCA 0**0W0	A M	MFMCA * * 0XGD		DV0P4284	DV0P228	DV0P4220	Motor Cable (For MHMF (50 W, 100 W)	common-use, direction of motor shaft  Movable/fixed	
			1000	MHMF092L1 ☐ 3	111	MIDDELOOT	MIDDEI	-iiame	2.3			opposite direct of motor shall	ction   oppos	For fixed, osite direction motor shaft		D V 01 4204	DV0P222	D VOI 4220	(with Brake)	common-use, opposite direction of motor shaft	
								-	-									_		50 Ω 25 W	DV0P4280
Vote	•			otor specifications.	•	•	,					Movable	e : For a	application w	vhere the ca	able is mova	ble.		External	100 Ω 25 W	DV0P4281
Vote	)2 🔷 : R	epresent	s the d	river specifications.	(refer to	"Model designat	ion" P.18.)					Fixed	: For a	application w	vhere the ca	able is fixed.			regenerative resistor	25 Ω 50 W	DV0P4282 DV0P4283
						-	-					ı							LIESISIOI	P(1 ( 1 P(1) \/\/	- ロングロレインダク

Note)3 \*\*: Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030MJE

Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification,

only incremental system can be used in combination.

Note)5 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box).

Please buy the battery part number "DV0P2990" separately.

Direction of motor shaft/Opposite direction of motor shaft : Cable direction

Connection	D-frame			
Connector Kit for Motor/	MHMF 200	W to 1.0 kW	DV0PM24582	188
Encoder Con- nection	MHMF 50 V	V, 100 W	DV0PM24581	188
Connector Kit fo	or Brake C	onnection	DV0PM20040	193
	RS485, F	RS232	DV0PM20024	183
	Safety		DV0PM20025	183
Connector Kit	Interface		DV0P4350	184
	External	Scale	DV0PM20026	184
	Encoder		DV0PM20010	184
Battery for Abso	olute Enco	oder	DV0P2990	194
Battery Box for Note)5	Absolute	Encoder	DV0P4430	194
Mounting	For A-fram	ne,B-frame	DV0PM20100	195
Bracket		ne,D-frame	DV0PM20101	19
_	For movabl		MFECA0**0MJE	17
Encoder Cable	of motor sh For movabl direction of		MFECA0 * * 0MKE	172
(with	For fixed, d		MEEOAO ** ** OT !E	47
(Battery Box) Note)5	motor shaft For fixed, o	pposite	MFECA0 * * 0TJE  MFECA0 * * 0TKE	172
	For movabl		MFECA0**0TKE	172
Encoder	of motor sh For movabl	aft		
Cable /without \		motor shaft	MFECAO**OMKD	172
(Battery Box)	motor shaft For fixed, o		MFECAO * * OTJD	172
		motor shaft	MFECA0 * * 0TKD	172
Motor Cable For MHMF 200 W to 1.0 kW	of motor sh	aft	MFMCA0 * * 0UFD	176
		motor shaft	MFMCA0 * * 0UGD	170
(without Brake)	motor shaft		MFMCA0 * * 0WFD	176
		motor shaft	MFMCA0 * * 0WGD	176
Motor Cable	of motor sh	aft	MFMCA0 * * 0VFD	178
(For MHMF 200 W to 1.0 kW)	direction of	motor shaft	MFMCA0 * * 0VGD	178
(with Brake)	For fixed, d motor shaft		MFMCA0**0XFD	178
	For fixed, o direction of	pposite motor shaft	MFMCA0 * * 0XGD	178
Motor Cable /For MHMF \	Movable/fix common-us of motor sh	se, direction	MFMCA0**7UFD	17
(50 W, 100 W) (without Brake)	Movable/fix	ed se, opposite	MFMCA0**7UGD	17
` '	Movable/fix			_
Motor Cable (For MHMF (50 W, 100 W)	of motor sh		MFMCA0**7VFD	178
(with Brake)		ea se, opposite motor shaft	MFMCA0**7VGD	178
	50 Ω 25 \		DV0P4280	197
External	100 Ω 25	W	DV0P4281	19
regenerative	25 Ω 50 \		DV0P4282	19
resistor	50 Ω 50 \		DV0P4283	19
	30 Ω 100		DV0P4284	197
Reactor			, DV0P222 ', DV0P228	196
Noise Filter		DV0P417 DV0P422	70, DV0PM20042 20	230
Surge Absorbe	r	DV0P419	0, DV0P1450	23
		DV0P146		238

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DV0P1460

DV0P4190, DV0P1450

Surge Absorber

Ferite Core

# A6 Family **Table of Part Numbers**

and Options

# 100 mm sq. or more 0.85 kW to 5.0 kW

IP67 motor Encorder connector (Large size JL10) type

			Moto	r			Driver					Optiona	l parts	3				■ Options			
										Encoder Ca	ble Note)3,5	Motor C	able	Note)3,5					Title	Part No.	Page
N	lotor series	Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions	A6 SF series Multi fanction type (Pulse, analog, full-closed)	A6 SG series RS485 communication A6 SE series	Frame	Power capacity  at rated load	JL10 (La One-touch N/MS scree 23-bit A	ewed type			ck type d type	External Regenerative	Reactor	Noise Filter	Interface Cable		DV0P4360 DV0P4120 DV0P4121 DV0P4130 DV0P4131	182 182 182 182 182
		Supply	()	Note	(page)	( idir-closed )	Basic (Pulse signal input) Note)2, Note)4		(kVA)	Use in the absolute system (with battery box) Note)7	Use in the Incremental system (without battery box)	without Brake		with Brake	Resistor	(Single phase / 3-phase)		Connector Kit for Power Supply Input Connection	to Double ro	DV0PM20032  DV0PM20033	182 185 185
		Single phase/ 3-phase	1000 1500	MSMF102L1	61 62	MDDLT55SF	MDDLN55S♦	D-frame	Approx.			MFMCD 0**2EU		MFMCA * * 2FUD	DV0P4284	DV0P228 / DV0P222 DV0PM20047 / DV0P222	DV0P4220	Connector Kit for Motor Connection	E-frame A-frame to D-frame E-frame	DV0PM20044 DV0PM20034 DV0PM20046	185 186 186
Low i	MSMF Large size JL10 type	200 V	2000	MSMF152L1	63	MEDLT83SF	MEDLN83S♦	E-frame	Approx.	MFECA 0**0EPE	MFECA 0**0EPD	MFMCD 0**2EC		MFMCA * * 2FCD	DV0P4285 Note)6	DV0P223	DV0PM20043	Connector Kit for Regenera- tive Resistor		DV0PM20045	185
nertia	3000 r/min	3-phase	3000	MSMF302L1 ☐ 6 MSMF302L1 ☐ 8	64	MFDLTA3SF	MFDLNA3S		Approx. 4.5	MFECA 0**0ESE	MFECA 0**0ESD	MFMCA 0**3EU		MFMCA * *3FUT		DV0P224				DV0PM24587 MSMF 1.0 kW to 2.0 kl MDMF 1.0 kW to 2.0 kl	w   189
		200 V	4000 5000	MSMF402L1	65 66	MFDLTB3SF MFDLTB3SF	MFDLNB3S♦	F-frame	Approx. 7.5			MFMCA 0 * * 3EC	-   -	MFMCA **3FCT	DV0P4285 ×2 in parallel	DV0P225	DV0P3410		without Brake	MGMF 0.85 kW to 1.8 k MHMF 1.0 kW, 1.5 kW DV0PM24588 MSMF 3.0 kW to 5.0 kV	w
		Single phase/	1000	MSMF502L1	89	MDDLT45SF	MDDLN45S♦	_	Approx.			MFMCD		MFMCA	D) (0D 400 4	DV0P228 / DV0P222	DI IOD 1000	Connector Kit for Motor/ Encoder Con-		MDMF 3.0 kW to 5.0 k' MGMF 2.9 kW, 4.4 kW MHMF 2.0 kW to 5.0 k'	w 190
	MDMF	3-phase 200 V	1500	MDMF152L1	90	MDDLT55SF	MDDLN55S♦	D-frame	Approx. 2.3	MFECA	MFECA	0**2EU  MFMCD	-   -	* * 2FUD MFMCA	DV0P4284	DV0PM20047 / DV0P222	DV0P4220	nection	MSMF 1.0 kW to 2.0 kV MDMF 1.0 kW to 2.0 kV MGMF 0.85 kW to 1.8 kV MHMF 1.0 kW 1.5 kW		
	Large size JL10 type		2000	MDMF202L1	91	MEDLT83SF		E-frame	3.0	0 * * 0EPE	0**0EPD	0**2EC	D 0	* * 2FCD	DV0P4285 Note)6	DV0P223	DV0PM20043		with Brake	DV0PM24590 MSMF 3.0 kW to 5.0 kV MDMF 3.0 kW to 5.0 kV	w
	2000 r/min IP67	3-phase 200 V	4000	MDMF302L1	92	MFDLTB3SF	MFDLNB3S	3	4.5	MFECA 0**0ESE	MFECA 0**0ESD	0 * * 3EU		MFMCA **3FUT	DV0P4285	DV0P224	DV0P3410		RS485, RS232	MGMF 2.9 kW, 4.4 kW MHMF 2.0 kW to 5.0 k'	/
Middle in			5000	MDMF402L1 ☐ 8 MDMF502L1 ☐ 6 MDMF502L1 ☐ 8	94	MFDLTB3SF	MFDLNB3S		Approx. 7.5			MFMCA 0**3EC		MFMCA * *3FCT	×2 in parallel	DV0P225		Connector Kit	Safety Interface External Scale	DV0PM20025 DV0P4350 DV0PM20026	183 184 184
nertia	MGMF	Single phase/ 3-phase	850	MGMF092L1	95	MDDLT45SF	MDDLN45S♦	D-frame	Approx.  1.8  Approx.			MFMCD 0**2EU		MFMCA * * 2FUD	DV0P4284	DV0P228 / DV0P221	DV0P4220	Battery for Abs	Encoder solute Encoder	DV0PM20010 DV0P2990	184
	Large size JL10 type	200 V	1300	MGMF132L1	96 97	MDDLT55SF MEDLT83SF	MDDLN55S♦ MEDLN83S♦	E-frame	2.3 Approx.	MFECA 0**0EPE	MFECA 0**0EPD	MFMCD 0**2E0		MFMCA * * 2FCD	DV0P4285	DV0PM20047 / DV0P222	DV0PM20043	Note)7 Mounting	r Absolute Encode D-frame	DV0P4430	194
	Low speed/ High torque type	3-phase		MGMF182L1	98	MFDLTB3SF	MFDLNB3S♦		3.8	MFECA 0**0ESE	MFECA 0**0ESD	MFMCA 0**3EU		MFMCA * * 3FUT		DV0P224		Bracket Encoder Cable		pe MFECA0 * * 0EPE	
	1500 r/min IP67	200 V	4400	MGMF442L1	99	MFDLTB3SF	MFDLNB3S♦	F-frame	Approx. 7.5			MFMCA 0 * * 3EC	-   -	MFMCA **3FCT	DV0P4285 ×2 in parallel	DV0P225	DV0P3410	(with (Battery Box) Note)7	Screwed type	MFECA0 * * 0ESE	
		Single	1000	MHMF102L1	83	MDDLT45SF	MDDLN45S♦		Approx.			MFMCD 0**2EU		MFMCA **2FUD		DV0P228 / DV0P222		Encoder Cable (without Battery Box)	One-touch lock ty Screwed type	MFECA0 * * 0EPI	
		phase/ 3-phase 200 V	1500	MHMF152L1	84	MDDLT55SF	MDDLN55S♦	D-frame	Approx.			MFMCD 0**2E0		MFMCA * * 2FCD	DV0P4284	DV0PM20047 / DV0P222	DV0P4220		Screwed type	MFMCD0 * *2EU MFMCD0 * *2EC oe MFMCE0 * *2EU	D 176
High ine	MHMF Large size JL10 type		2000	MHMF202L1 ☐ 6 MHMF202L1 ☐ 8	85	MEDLT83SF	MEDLN83S♦	E-frame	Approx.	MFECA 0**0EPE ———————————————————————————————————	MFECA 0**0EPD ————————————————————————————————————	MFMCE 0 * * 2EU MFMCE	D 0	MFMCE * * 2FUD MFMCE	DV0P4285 Note)6	DV0P223	DV0PM20043	(without Brake) Screwed type One-touch lock t Screwed type	MFMCE0 * *2EC  DE MFMCA0 * *3EU  MFMCA0 * *3EC  DE MFMCA0 * *2FU	D 177 T 177 T 177	
rtia	2000 r/min IP67	3-phase 200 V	3000	MHMF302L1   6	86	MFDLTA3SF	MFDLNA3S♦		Approx.	0**0ESE	_	0**2EC	D 0	* * 2FCD MFMCA		DV0P224		Motor Cable (with Brake)	Screwed type One-touch lock ty Screwed type	MFMCA0 * *2FClose MFMCE0 * *2F	D 179
			4000	MHMF302L1	87	MFDLTB3SF		F-frame	Approx.			0**3EU MFMCA	T 0	* *3FUT MFMCA	DV0P4285 ×2 in parallel	DVODOSE	DV0P3410	One-touch lock type MFMCA0 * *3 Screwed type MFMCA0 * *3		T 180	
	=		5000	MHMF502L1  6 MHMF502L1 8	88	MFDLTB3SF	MFDLNB3S		7.5			0 * * 3EC	T 0	* *3FCT		DV0P225		External regenerative resistor	30 Ω 100 W 20 Ω 130 W	DV0P4284 DV0P4285	197
	e)2 🔷 : F	lepresent	s the d	notor specifications river specifications able length (03/3 m	(refer to	"Model designat	ion" P.18.)	m/ME	=	SUEDE		t	ouch I	lock connec		es and motor cables en tional screwed type N used		Reactor	DV0P2 DV0P2	222, DV0P223 224, DV0P225 228, DV0PM20047	196
	,	•		river (dedicated for			, .									s, refer to P.197.		Noise Filter	DV0P4 DV0P3	220, DV0PM20043 3410	23

Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.

Note)7 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number "DV0P2990" separately.

Note)6 For other possible combinations, refer to P.197.

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# A6 Family

# Table of Part Numbers and Options

# **100 mm sq. or more 0.85 kW to 5.0 kW** IP67 motor Encorder connector (Small size JN2) type

			Moto	r			Driver					Optional	parts				■ Options			
										Encoder C	able Note)3		ble Note)3,5				Interfese Cobl	Title	Part No.	Page
						A6 SF series	A6 SG series		Power		,		L10	_			Interface Cabl	9	DV0P4360 DV0P4120	182 182
					Rating/	Multi fanction	RS485 communication		capacity	`	nall size) h lock type)	One-tou	ch lock type						DV0P4121	182
		Power	Output	Part No.	Spec.	type /Pulse, analog,\		_	/ at \	`		\ JL04 sc	rewed type /	External			Interface Conv	ersion Cable	DV0P4130	182
, N	otor series	supply	(W)	Note)1	Dimensions	(full-closed)	A6 SE series Basic	Frame	rated   load	23-bit A	Use in the			Regenerative	Reactor (Single phase / 3-phase)	Noise Filter			DV0P4131 DV0P4132	182 182
					(page)		(Pulse signal input)		(kVA)	absolute	Incremental	without	with	Resistor	, , ,		Connector Kit	A-frame Single row	DV0PM20032	185
							Note)2, Note)4			system (with battery box)	system (without battery box)	Brake	Brake				for Power	to type		_
										Note)7	(,						Supply Input Connection	D-frame type	DV0PM20033 DV0PM20044	185 185
		Single	1000	MSMF102L1 5	61 102	MDDLT55SF	MDDLN55S♦					MFMCD	MFMCA		DV0P228 / DV0P222		Connector Kit	A-frame to		
		phase/ 3-phase		MSMF102L1 ☐ 7 MSMF152L1 ☐ 5	62			D-frame	Approx.			0**2EUD		DV0P4284		DV0P4220	for Motor	D-frame	DV0PM20034	186
	MSMF	200 V	1500	MSMF152L1	102	MDDLT55SF	MDDLN55S♦					MFMCD	MFMCA		DV0PM20047 / DV0P222		Connection Connector Kit	E-frame	DV0PM20046	186
٥	Small size		2000	MSMF202L1 ☐ 5	63	MEDLT83SF	MEDLN83S♦	E-frame	Approx.			0**2ECD		DV0P4285	DV0P223	DV0PM20043	for Regenera-	E-frame	DV0PM20045	185
Į.	JN2 type			MSMF202L1 7	102				3.0	MFECA 0 * * 0ETE	MFECA 0 * * 0ETD			Note)6	3.0. 220	2 7 01 111200 10	tive Resistor		DV0PM24583	+
ertie	3000 r/min	3-phase	3000	MSMF302L1 ☐ 5 MSMF302L1 ☐ 7	64 102	MFDLTA3SF	MFDLNA3S♦		Approx. 4.5	U T T ULIL	0 % % OLID	MFMCA	MFMCA		DV0P224				MSMF 1.0 kW to 2.0 kW MDMF 1.0 kW to 2.0 kW	
-	IP67	200 V	4000	MSMF402L1	65	MFDLTB3SF	MFDLNB3S	E,				0 * * 3EUT	0 * * 3FUT	DV0P4285		DV0P3410			MGMF 1.0 kW to 2.0 kW MGMF 0.85 kW to 1.8 kW MHMF 1.0 kW, 1.5 kW	
			4000	MSMF402L1  7	102	WII DET DOOI	WII DENDOS	F-frame	Approx. 7.5			MFMCA	MFMCA	×2 in parallel	DV0P225	DV0F3410		without Brake	DV0PM24584	+
			5000	MSMF502L1 $\square$ 5 MSMF502L1 $\square$ 7	66 102	MFDLTB3SF	MFDLNB3S♦		7.5			0 * *3ECT	0 * * 3FCT						MSMF 3.0 kW to 5.0 kW MDMF 3.0 kW to 5.0 kW	/ 190
		Single	1000	MDMF102L1	89	MDDLT4FOE	MDDLN45S♦		Approx.						DVODOOO / DVODOOO		Connector Kit for Motor/		MGMF 2.9 kW, 4.4 kW MHMF 2.0 kW to 5.0 kW	
		phase/	1000	MDMF102L1  7	113	MDDLT45SF	MDDLN455	D-frame	1.8			MFMCD 0**2EUD	MFMCA 0**2FUD	DV0P4284	DV0P228 / DV0P222	DV0P4220	Encoder Con- nection		DV0PM24585	
		3-phase 200 V	1500	MDMF152L1 ☐ 5 MDMF152L1 ☐ 7	90 113	MDDLT55SF	MDDLN55S♦		Approx. 2.3						DV0PM20047 / DV0P222		Hection		MSMF 1.0 kW to 2.0 kW MDMF 1.0 kW to 2.0 kW	/ 189
	MDMF			MDMF202L1 ☐ 5	91				Approx			MFMCD	MFMCA	DV0P4285				with Brake	MGMF 0.85 kW to 1.8 kW MHMF 1.0 kW, 1.5 kW	
	Small size JN2 type		2000	MDMF202L1	113	MEDLT83SF	MEDLN83S♦	E-frame	3.8	MFECA	MFECA	0**2ECD	0**2FCD	Note)6	DV0P223	DV0PM20043		Will Brano	DV0PM24586 MSMF 3.0 kW to 5.0 kW	,
	2000 r/min		3000	MDMF302L1 🗌 5	92	MFDLTA3SF	MFDLNA3S♦		Approx.	0 * * 0ETE	0 * * 0ETD	MFMCA	MFMCA		DV0P224				MDMF 3.0 kW to 5.0 kW MGMF 2.9 kW, 4.4 kW	190
	IP67	3-phase 200 V		MDMF402L1  7	113	22.7.133.	22. 0.00 0	-	4.5			0 * * 3EUT	0 * * 3FUT	DV0P4285	210. 22.	_		DC405 DC000	MHMF 2.0 kW to 5.0 kW	_
I≤		200 1	4000	MDMF402L1 ☐ 5 MDMF402L1 ☐ 7	93 113	MFDLTB3SF	MFDLNB3S	F-frame	Approx.			145104		×2 in parallel		DV0P3410		RS485, RS232 Safety	DV0PM20024 DV0PM20025	183 183
iddle			5000	MDMF502L1 🗌 5	94	MFDLTB3SF	MFDLNB3S♦		7.5			MFMCA 0**3ECT	MFMCA 0**3FCT		DV0P225		Connector Kit	Interface	DV0P4350	184
e in		0	5000	MDMF502L1 7	113	WII DETBOOT	WII DENEDOO V		ļ									External Scale Encoder	DV0PM20026 DV0PM20010	184 184
ertia		Single phase/	850	MGMF092L1 ☐ 5 MGMF092L1 ☐ 7	95 114	MDDLT45SF	MDDLN45S♦		Approx.			MFMCD	MFMCA	D) (00 (00 )	DV0P228 / DV0P221	D) /DD /DD	Battery for Abs		DV0P2990	194
	MGMF	3-phase	1300	MGMF132L1 🗌 5	96	MDDLT55SF	MDDLN55S♦	D-frame	Approx.			0**2EUD	0 * * 2FUD	DV0P4284	DV0PM20047 / DV0P222	DV0P4220	Battery Box fo Note)7	r Absolute Encoder	DV0P4430	194
	Small size	200 V	1000	MGMF132L1 7	114	Wibbergoo!	IIIDDE/1000 V		2.3			MFMCD	MFMCA		DVOI WILCOM / DVOI ELE		Mounting	D #11-11-1	DVODNAGGAGA	405
	JN2 type		1800	MGMF182L1 ☐ 5 MGMF182L1 ☐ 7	97 114	MEDLT83SF	MEDLN83S♦	E-frame	Approx.	MFECA	MFECA	0 * * 2 E C D	0**2FCD	DV0P4285	DV0P223	DV0PM20043	Bracket	D-frame	DV0PM20101	195
	Low speed/ High torque	0		MGMF292L1 ☐ 5	98					0 * * 0ETE	0 * * 0ETD	MFMCA	MFMCA				Encoder Cable			
		3-phase 200 V	2900	MGMF292L1 ☐ 7	114	MFDLTB3SF	MFDLNB3S	_	Approx.			0 * *3EUT	0 * * 3FUT	DV0P4285	DV0P224		(with Battery Box)		MFECA0 * * 0ETE	174
	1500 r/min IP67			MGMF442L1 ☐ 5	99			F-frame	7.5			MFMCA	MFMCA	×2 in parallel		DV0P3410	Note)7	One-touch lock type	•	
	IF 07		4400	MGMF442L1  7	114	MFDLTB3SF	MFDLNB3S					0 * *3ECT	0 * * 3FCT		DV0P225		Encoder Cable			
		Oire est e		MHMF102L1   5	83				Approx.			MFMCD	MFMCA				/without \		MFECA0 * * 0ETD	174
		Single phase/	1000	MHMF102L1 $\square$ 7	112	MDDLT45SF	MDDLN45S♦		1.8			0**2EUD			DV0P228 / DV0P222		Battery Box	One-touch lock type	MFMCD0 * *2EUD	176
		3-phase		MHMF152L1   5	84			D-frame	Approx.			MFMCD	MFMCA	DV0P4284		DV0P4220		Screwed type	MFMCD0 * * 2ECD	176
		200 V	1500	MHMF152L1	112	MDDLT55SF	MDDLN55S♦		2.3			0**2ECD			DV0PM20047 / DV0P222		Motor Cable (without Brake)		MFMCE0 * * 2EUD  MFMCE0 * * 2ECD	
	MHMF											MFMCE	MFMCE				(Without Branc)		MFMCA0 * *3EUT	
High	Small size			MHMF202L1 ☐ 5	85				Approx.	MEEOA	MEEOA	0 * * 2EUD	0 * * 2FUD	DV0P4285				Screwed type	MFMCA0 * *3ECT	
ine	JN2 type		2000	MHMF202L1  7	112	MEDLT83SF	MEDLN83S♦	E-frame	3.8	MFECA 0 * * 0ETE	MFECA 0**0ETD	MFMCE	MFMCE	Note)6	DV0P223	DV0PM20043		One-touch lock type Screwed type	MFMCA0 * *2FUD MFMCA0 * *2FCD	_
rtia	2000 r/min	0										0 * * 2ECD					Motor Cable		MFMCE0**2FUD	
	IP67	3-phase 200 V	3000	MHMF302L1 ☐ 5	86	MFDLTA3SF	MFDLNA3S		Approx.			MFMCA	MFMCA		DV0P224		(with Brake)	Screwed type	MFMCE0 * *2FCD	
		200 1	3000	MHMF302L1 7	112	WII DETAGGI	WII DEIVASS	-	4.5			0 * *3EUT	0 * * 3FUT	D) (0D 4005	DV01 224	-		One-touch lock type Screwed type	MFMCA0 * *3FUT MFMCA0 * *3FCT	
			4000	MHMF402L1 ☐ 5 MHMF402L1 ☐ 7	87 112	MFDLTB3SF	MFDLNB3S	F-frame	Approx.					DV0P4285 ×2 in parallel		DV0P3410	External	30 Ω 100 W	DV0P4284	
			5000	MHMF502L1   5	88	MFDLTB3SF	MFDLNB3S♦		7.5			MFMCA 0 * *3ECT	MFMCA 0**3FCT		DV0P225		regenerative resistor	20 Ω 130 W	DV0P4285	197
				MHMF502L1 ☐ 7	112														2, DV0P223	+
Not	•	•		otor specifications.	•	-	,					•			enable one-touch lock		Reactor		4, DV0P225 8, DV0PM20047	196
	•	•		river specifications. able length (03/3 m	•	•	,	m/MF	FCAnn	30FTF					4V type cables can al s, refer to P.197.	so de usea.	Noise Filter	DV0P42	20, DV0PM20043	236
Not				river (dedicated for							,	· · · · · · · · · · · · · · · · · · ·	•		s, refer to 1.197. I supplied together wit	h 23-bit		DV0P34		
				can be used in co	-				-					er cable (with ba			Surge Absorbe Ferite Core	DV0P41 DV0P14	90, DV0P1450 60	237
												Pl	ase huv the b	nattory nart nun	ber "DV0P2990" sepa	arately				

MINAS A6 Family 32

# A6 SF series (Multifanction type) Driver Specifications A6 SF series (Multifanction type) Position, Speed, Torque, Full-closed type

		100 V	Mair	n circuit	Single phase 100 V +10 % to 120 V +10 % 50 Hz / 60 Hz
		100 1	Contr	rol circuit	Single phase 100 V +10 % to 120 V +10 % 50 Hz / 60 Hz
	Input I		Main	A-frame to D-frame	Single/3-phase 200 V +10 % to 240 V +10 % 50 Hz / 60 Hz
	Input power	200 V	circuit	E-frame, F-frame	Single/3-phase 200 V +10 % to 240 V +10 % 50 Hz / 60 Hz
		200 V	Control	A-frame to D-frame	Single phase 200 V $^{+10}_{-15}\%$ to 240 V $^{+10}_{-15}\%$ 50 Hz / 60 Hz
			circuit	E-frame, F-frame	Single phase 200 V <sup>+10 %</sup> <sub>-15 %</sub> to 240 V <sup>+10 %</sup> <sub>-15 %</sub> 50 Hz / 60 Hz
			temp	perature	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)
	Εn	/ironment	hu	midity	Both operating and storage: 20 % to 85 %RH (free from condensation*1)
			Al	titude	Lower than 1000 m
			Vib	oration	5.88 m/s <sup>2</sup> or less, 10 Hz to 60 Hz
	Coi	ntrol metho	d		IGBT PWM Sinusoidal wave drive
	Encoder feedback				23-bit (8388608 resolution) absolute encoder, 7-wire serial  * When using the product as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder. Instead, set the parameter Pr0.15 to [1] (default).
Basic Specifications	Ext	ernal scale	feedba	ck	A/B phase, initialization signal defferential input.  Manufacturers that support serial communication scale: Fagor Automation S.Coop., Magnescale Co., Ltd., Mitutoyo Corporation Nidec Sankyo Corporation, Renishaw plc
ecificati	Control sign		anal	Input	General purpose 10 inputs  The function of general-purpose input is selected by parameters.
Snc	Pa	Control si	griai	Output	General purpose 6 outputs  The function of general-purpose output is selected by parameters.
	ralle			Input	3 inputs (16-bit A/D : 1 input, 12-bit A/D : 2 inputs)
	)   	Analog sig	gnai	Output	2 outputs (Analog monitor: 2 output)
	Parallel I/O connector	Duloo sigr	no!	Input	2 inputs (Photo-coupler input, Line receiver input)  Both open collector and line driver interface can be connected.  High speed line driver interface can be connected.
		Pulse sigr	iai	Output	4 outputs (Line driver: 3 output, open collector: 1 output) Line driver output for encoder pulses (A/B/Z signal) or external feedback pulses (EXA/EXB/EXZ signal) open collector output also available for Z or EXZ signal.
	_			USB	USB interface to connect to computers for parameter setting or status monitoring.
		mmunicatio ction	on	RS232	1:1 communication
		function RS485		RS485	1: n communication (max 31)
	Saf	Safety function			A dedicated connector is provided for Functional Safety.
	Fro	nt panel			(1) 5 keys (2) LED (6-digit)
	Re	generation			A-frame, B,-frame: no built-in regenerative resistor (external resistor only)  C-frame to F-frame: Built-in regenerative resistor (external resistor is also enabled.)
	Dyr	namic brak	е		A-frame to F-frame: Built-in
		ntrol mode			Switching among the following 7 mode is enabled,  (1) Position control (2) Speed control (3) Toque control (4) Position/Speed control  (5) Position/Torque control (6) Speed/Torque control (7) Full-closed control

<sup>\*1</sup> Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.

Co	ontrol input			(1) servo-ON input (2) Alarm clear input (3) Gain switch input (4) Positive direction drive inhibit input (5) Negative direction drive inhibit input
	minor imput			(6) Forced alarm input (7) Inertia ratio switch input  (1) Servo-alarm output (2) Servo-ready output (3) External brake off output
Co	ntrol outpu	ut		(4) At-speed output (5) Torque in-limit output (6) Zero speed detection output (7) Warning output (8) Alarm clear attribute output (9) Servo on status output
	Control ir	nput		<ul><li>(1) Deviation counter clear input (2) Command pulse inhibit input</li><li>(3) Command division/multiplication switch input (4) Anti-vibration switch input</li><li>(5) Torque limit switch input (6) Control mode switch input</li></ul>
	Control o	utput		(1) In-position output (2) Position command ON/OFF output
		Max. command	pulse frequency	500 kpps (Optocoupler interface), 8 Mpps (When using line receiver input multiplied by
Pos		Input pulse si	gnal format	Differential input. Selectable by parameter. ([1]Positive/Negative pulse [2]A/B quadrature [3]Pulse/Direction)
Position control	Pulse input	Electronic gea (Division/Mult command pul	iplication of	Applicable scaling ratio: 1/1000 times to 8000 times  Any value of 1 - 2 <sup>30</sup> can be set for both numerator (which corresponds to encoresolution) and denominator (which corresponds to command pulse resolution motor revolution), but the combination has to be within the range shown above
으		Smoothing file	er	Primary delay filter or FIR type filter is adaptable to the command input
	Analog	Torque limit c	ommand input	Individual torque limit for both positive and negative direction is enabled.
	input	Torque feed f	orward input	Analog voltage can be used as torque feed forward input.
		ree-of-freedom	control	Available
	Anti-vibra	ation control		Available
	Load var	iation suppress	ion function	Available
	Control ir	<u> </u>		(1) Internal command velocity selection input (2) Speed zero clamp input (3) Velocity command sign input (4) Control mode switch input
	Control o	utput		(1) Speed coincidence output (2) Velocity command ON/OFF output
Speed control	Analog	Velocity comr		Velocity command input with analog voltage is possible. Scale setting and command polarity vary depending on parameters. (6 V/Rated rotational speed: Defa
be	input		ommand input	Individual torque limit for both positive and negative direction is enabled.
얼		Torque feed f		Analog voltage can be used as torque feed forward input.
큥	Internal v	elocity comma	nd	Switching the internal 8 speed is enabled by command input.
_	Soft-start	/down function		Individual setup of acceleration and deceleration is enabled, with 0 s to 10 s/1000 r/min. Sigmoid acceleration/deceleration is also enabled
	Speed ze			Internal velocity command can be clamped to 0 with speed zero clamp input.
		ree-of-freedom	control	Available
렃	Control in	nput		Speed zero clamp input, torque command sign input, control mode switch input
que	Control o	utput		(1) Speed coincidence output (2) Speed in-limit output
Torque contro	Analog input	Torque comm	and input	Torque command input with analog voltage is possible. Scale setting and command polarity vary depending on parameters. (3 V/rated torque Default)
<u>o</u>	Speed lin	nit function		Speed limit value with parameter is enabled.
	Control in	nput		<ul><li>(1) Deviation counter clear input (2) Command pulse inhibit input</li><li>(3) Command division/multiplication switch input</li><li>(4) Anti-vibration switch input (5) Torque limit switch input</li></ul>
	Control o	utnut		(1) In-position output (2) Position command ON/OFF output
	Control o		pulse frequency	500 kpps (Optocoupler interface), 8 Mpps (When using line receiver input multiplied b
		Input pulse si		Differential input. Selectable by parameter. ([1]Positive/Negative pulse [2]A/B quadrature [3]Pulse/Direction)
Full-closed control	Pulse input	Electronic gea (Division/Mult command pul	iplication of	Applicable scaling ratio: 1/1000 times to 8000 times Any value of 1 - 2 30 can be set for both numerator (which corresponds to enco resolution) and denominator (which corresponds to command pulse resolution motor revolution), but the combination has to be within the range shown above
Ó C		Smoothing file	er	Primary delay filter or FIR type filter is adaptable to the command input
ont	Analog		ommand input	Individual torque limit for both positive and negative direction is enabled.
<u>o</u>	input	Torque feed f		Analog voltage can be used as torque feed forward input.
		ange of externa	I scale	1/40 times to 1280 times Although ratio of the encoder pulse (numerator) and external scale pulse (denominator) can be arbitrarily set in the range of 1 to $2^{23}$ for the numerator and the range of 1 to $2^{23}$ for the denominator, this product should be used within the aforementioned range.
	Two-degi	ree-of-freedom	control	Available
	Anti-vibra	ation control		Available
C	Auto tuni	ng		The load inertia is identified in real time by the driving state of the motor operating cording to the command given by the controlling device and set up support softwar "PANATERM". The gain is set automatically in accordance with the rigidity setting.
óm	Division of	of encoder feed	back pulse	Set up of any value is enabled (encoder pulses count is the max.).
Common	Protective	e function	Hard error	Over-voltage, under-voltage, over-speed, over-load, over-heat, over-current are encoder error etc.
ž				
Š			Soft error	Excess position deviation, command pulse division error, EEPROM error etc.

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# A6 Family A6 SG series (RS485 communication type) A6 SE series (Besic type) Position control only type

		100 V	Maii	n circuit	Single phase 100 V +10	) % to	120 V +10 % -15 %	50 Hz / 60 Hz
		100 V	Conti	rol circuit	Single phase $100 \text{ V}_{-15}^{+10}$	) % 5 % to	120 V +10 % -15 %	50 Hz / 60 Hz
	Input		Main	A-frame to D-frame	Single/3-phase 200 V +10	) % 5 % to :	240 V +10 % -15 %	50 Hz / 60 Hz
	Input power	200 V	circuit	E-frame to F-frame	Single/3-phase 200 V +10 -15	% to :	240 V +10 % -15 %	50 Hz / 60 Hz
		200 V	Control	A-frame to D-frame	Single phase 200 V +10	% to:	240 V +10 % -15 %	50 Hz / 60 Hz
			circuit	E-frame to F-frame	Single phase 200 V +10 -15	) % 5 % to :	240 V +10 % -15 %	50 Hz / 60 Hz
			temp	perature	Ambient temperature: 0 °C to 55 °C (fr Storage temperature: -20 °C to 65 °C (Max.temperature guarantee: 80 °C fo		-	condensation*1)
	Enν	vironment	hu	midity	Both operating and storage : 20 % to 8	35 %RF	I (free from co	ondensation*1)
			Al	titude	Lower than 1000 m			
			Vik	oration	5.88 m/s <sup>2</sup> or less, 10 Hz to 60 Hz			
Basi	Cor	ntrol metho	od		IGBT PWM Sinusoidal wave drive			
Basic Specifications	End	oder feedl	oack		23-bit (8388608 resolution) absolute e  * When using the product as an incr connect a battery for absolute encode	ementa	ıl system (no	· /·
ions		Control oi	anal	Input	General purpose 10 inputs The function of general-purpose input	is selec	cted by param	eters.
	Parallel I/O	Control si	gnai	Output	General purpose 6 outputs The function of general-purpose input	is selec	cted by param	eters.
	1/O cc	A I		Input	None			
	connector	Analog si	gnai	Output	2 outputs (Analog monitor: 2 output)			
	ör	Dulas sis		Input	2 inputs (Photo-coupler input, Line rec	eiver in	put)	
		Pulse sigi	nai	Output	4 outputs ( Line driver: 3 output, open	collecto	or: 1 output)	
				USB	USB interface to connect to computers	s for pa	rameter settin	g or status monitoring.
		nmunication	on	RS232	1:1 communication		* RS485, R	S232 connector is not installed
				RS485	1: n communication (max 31)		on A6 SE s	
	Fro	nt panel			(1) 5 keys (2) LED (6-digit)			
	Reg	generation			A-frame, B,-frame: no built-in regenerate C-frame to F-frame: Built-in regenerate			- · ·
	Dyr	namic brak	е		Built-in			
	Cor	ntrol mode			(1) Position control (2) Internal velocit	y comn	nand (3) Posi	tion/Internal velocity command

<sup>\*1</sup> Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.

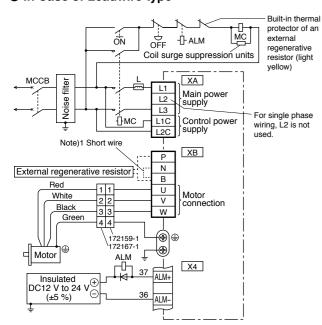
		Control inp	ut	<ul><li>(1) servo-ON input (2) Alarm clear input (3) Gain switch input</li><li>(4) Positive direction drive inhibit input ect.</li></ul>
		Control out	put	In-Position output etc.
			Max. command pulse frequency	500 kpps (Optocoupler interface) 8 Mpps (Line receiver interface)
- Control	Position contro	Pulse	Input pulse signal format	Differential input. Selectable by parameter. ([1]Positive/Negative pulse [2]A/B quadrature [3]Pulse/Direction)
	control	input	Electronic gear (Division/Multiplica- tion of command pulse)	Applicable scaling ratio: 1/1000 times to 8000 times  Any value of 1 - 2 30 can be set for both numerator (which corresponds to encoder resolution) and denominator (which corresponds to command pulse resolution per motor revolution), but the combination has to be within the range shown above.
			Smoothing filter	Primary delay filter or FIR type filter is adaptable to the command input
		Anti-vibration	on control	Available
		Two-degree	e-of-freedom control	Available
ב די		Control inp	ut	Internal command speed selections 1-3, speed-zero clamp, etc.
Function		Control out	put	At speed etc.
0	Speed	Internal vel	ocity command	Switching the internal 8 speed is enabled by command input.
	8	Soft-start/d	own function	Individual setup of acceleration and deceleration is enabled, with 0 s to 10 s/1000 r/min. Sigmoid acceleration/deceleration is also enabled.
		Zero-speed	i clamp	Internal velocity command can be clamped to 0 with speed zero clamp input.
		Two-degree	e-of-freedom control	Available
		Auto tuning	J	The load inertia is identified in real time by the driving state of the motor operating according to the command given by the controlling device and set up support software "PANATERM". The gain is set automatically in accordance with the rigidity setting.
C	Con	Division of pulse	encoder feedback	Set up of any value is enabled (encoder pulses count is the max.).
	Common	Protective function	Hard error	Over-voltage, under-voltage, over-speed, over-load, over-heat, over-current and encoder error etc.
		TOTIONOTI	Soft error	Excess position deviation, command pulse division error, EEPROM error etc.
		Alarm data	trace back	Tracing back of alarm data is available

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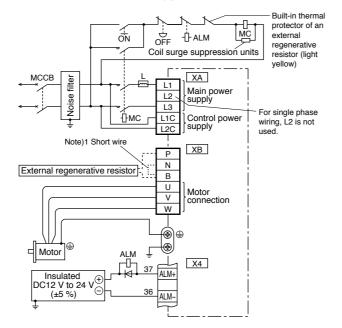
# **Wiring Diagram**

# In Case of Single phase, A-frame, B-frame, 100 V / 200 V type

## ● In Case of Leadwire type

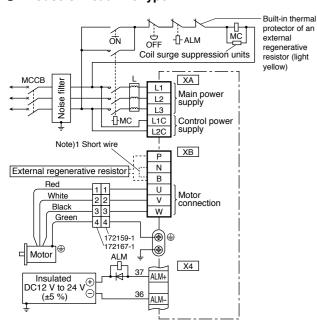


# In Case of Connector type

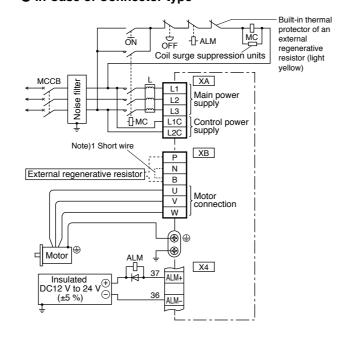


# In Case of 3-phase, A-frame, B-frame, 200 V type

# ● In Case of Leadwire type



# ● In Case of Connector type



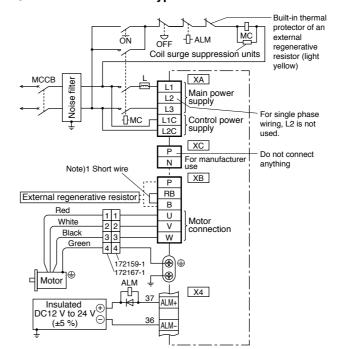
#### Note)1

Frama	Chart wire	Built-in	Connection of th	e connector XB
Frame No.	Short wire (Accessory)	regenerative resistor	In case of using an external regenerative resistor	In case of not using an external regenerative resistor
A-frame B-frame	without	without	<ul> <li>Connect an external regenerative resistor between P-B.</li> </ul>	Always open between P-B.

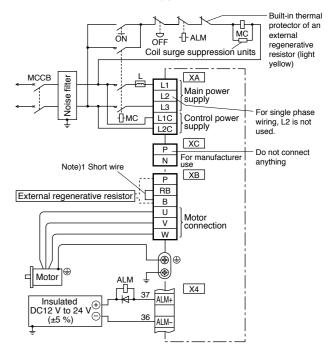
<sup>\*</sup> Refer to P.169, P.170, Specifications of Motor connector.

# In Case of Single phase, C-frame, D-frame, 100 V / 200 V type

#### In Case of Leadwire type

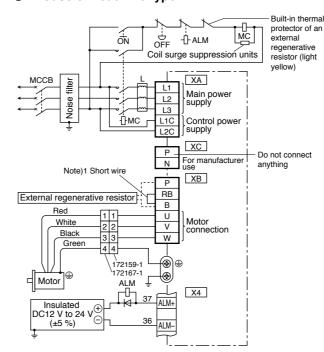


# In Case of Connector type

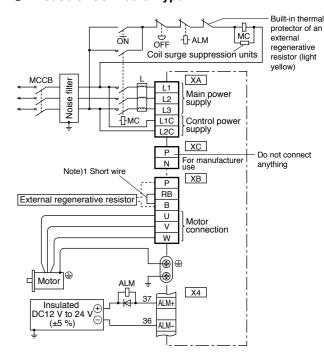


# In Case of 3-phase, C-frame, D-frame, 200 V type

# ■ In Case of Leadwire type



# ■ In Case of Connector type



#### Note)1

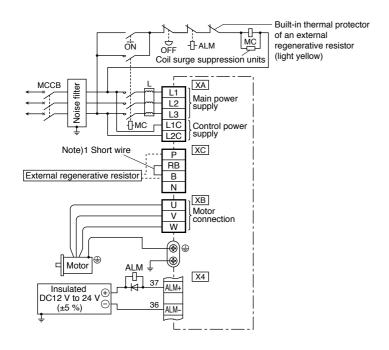
Eromo	Short wire	Built-in	Connection of the	ne connector XB
Frame No.	(Accessory)	regenerative resistor	In case of using an external regenerative resistor	In case of not using an external regenerative resistor
C-frame D-frame	with	with	<ul> <li>Remove the short wire accessory from between RB-B.</li> <li>Connect an external regenerative resistor between P-B.</li> </ul>	Shorted between RB-B with an attached short wire

<sup>\*</sup> Refer to P.169, P.170, Specifications of Motor connector.

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**Wiring Diagram** 

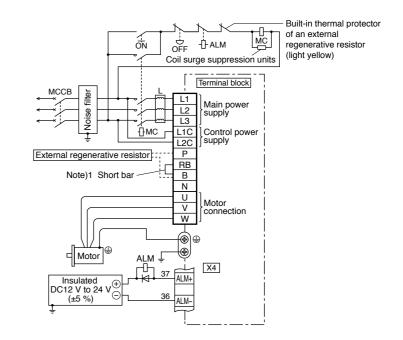
# In Case of 3-phase, E-frame, 200 V type



#### Note)1

Fromo	Short wire	Built-in	Connection of the connector XC		
Frame No.	(Accessory)	regenerative resistor	In case of using an external regenerative resistor	In case of not using an external regenerative resistor	
E-frame	with	with	<ul> <li>Remove the short wire accessory from between RB-B.</li> <li>Connect an external regenerative resistor between P-B.</li> </ul>	Shorted between RB-B with an attached short wire	

# In Case of 3-phase, F-frame, 200 V type



#### Note)1

Fromo	Short bar	Built-in	Connection of terminal block		
Frame No.	(Accessory)	regenerative resistor	In case of using an external regenerative resistor	In case of not using an external regenerative resistor	
F-frame	with	with	<ul> <li>Remove the short bar accessory from between RB-B.</li> <li>Connect an external regenerative resistor between P-B.</li> </ul>	Shorted between RB-B with an attached short bar	

<sup>\*</sup> Refer to P.170, Specifications of Motor connector.

<sup>\*</sup> Refer to P.170, Specifications of Motor connector.

# Wiring to the Connector, X4

**A6 Family** 

# Safety Function

\* Excluding A6 SE, A6 SG Series

Wiring to the Connector, X3

Connecting the host controller can configure a safety circuit that controls the safety functions.

When not constructing the safety circuit, use the supplied safety bypass plug.

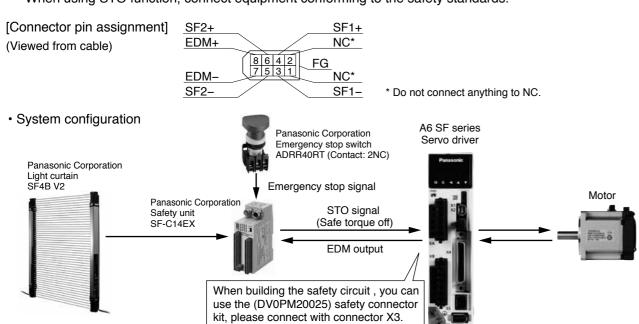
# Outline Description of Safe Torque Off (STO)

The safe torque off (STO) function is a safety function that shuts the motor current and turns off motor output torque by forcibly turning off the driving signal of the servo driver internal power transistor. For this purpose, the STO uses safety input signal and hardware (circuit).

When STO function operates, the servo driver turns off the servo ready output signal (S-RDY) and enters STO state. When the driver becomes STO state, front panel displays the "St.". Then, when the driver's state is STO input is off and servo-on input is off, the driver automatically becomes servo-off.

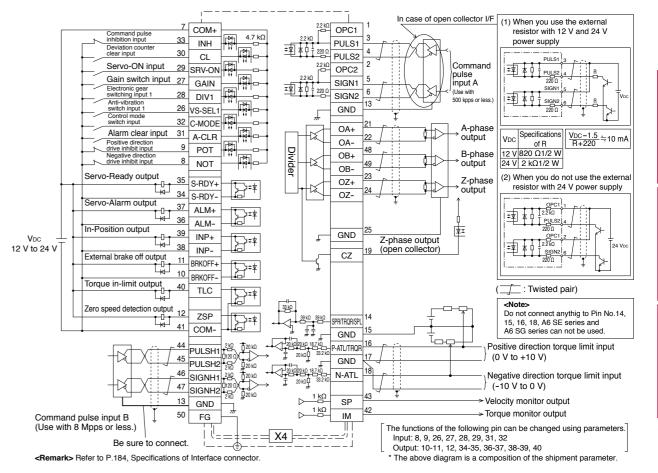
# **Safety Precautions**

- · When using the STO function, be sure to perform equipment risk assessment to ensure that the system conforms to the safety requirements.
- · Even while the STO function is working, the following potential safety hazards exist. Check safety in risk assessment.
- The motor may move when external force (e.g. gravity force on vertical axis) is exerted on it. Provide an external brake, etc., as necessary to secure the motor. Note that the purpose of motor with brake is holding and it cannot be used for braking application.
- · When parameter Pr5.10 Sequence at alarm is set to free run (disable dynamic brake), the motor is free run state and requires longer stop distance even if no external force is applied. Make sure that this does not cause any problem.
- When power transistor, etc., becomes defective, the motor will move to the extent equivalent of 180 electrical angle (max.). Make sure that this does not cause any problem.
- The STO turns off the current to the motor but does not turn off power to the servo driver and does not isolate it. When starting maintenance service on the servo driver, turn off the driver by using a different disconnecting device.
- External device monitor (EDM) output signal is not a safety signal. Do not use it for an application other
- Dynamic brake and external brake release signal output are not related to safety function. When designing the system, make sure that the failure of external brake release during STO condition does not result in
- When using STO function, connect equipment conforming to the safety standards.



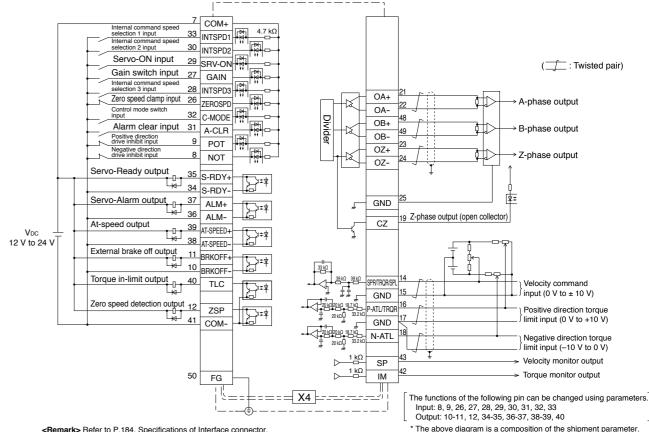
Panasonic Corporation Automotive & Industrial Systems Company http://panasonic.net/id/

# Wiring Example of Position Control Mode



# **Wiring Example of Velocity Control Mode**

\* Excluding A6 SE, A6 SG Series



<Remark> Refer to P.184, Specifications of Interface connector

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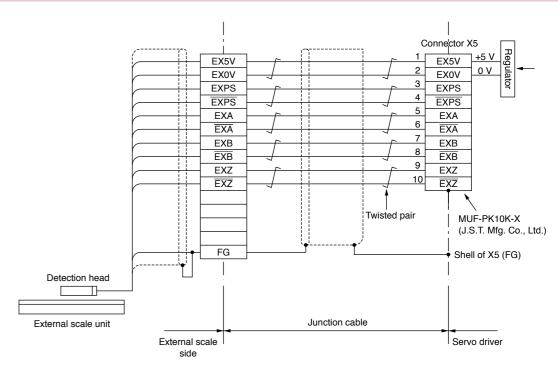
A6 Family

# **Applicable External Scale**

Applicable External Scale	Manufacturer	Model No.	Resolution [µm]	Maximum speed (m/s)*1
Parallel type (AB-phase)	General	_		eed after 4 × on : 4 Mpps
	Nidec Sankyo Corporation	PSLH	0.1	6
		SL700-PL101RP/RHP	0.1	10
Serial type		SL710-PL101RP/RHP	0.1	10
(Incremental)	Magnescale Co., Ltd.	SR75	0.01 to 1	3.3
		SR85	0.01 to 1	3.3
		BF1	0.001/0.01	0.4/1.8
		LIC2197P/LIC2199P	0.05/0.1	10
	HEIDENHAIN	LIC4193P/LIC4195P LIC4197P/LIC4199P	0.001 /0.005 /0.01	10
	Managarda On IIII	SR77	0.01 to 1	3.3
	Magnescale Co., Ltd.	SR87	0.01 to 1	3.3
	M	AT573A	0.05	2.5
Serial type	Mitutoyo Corporation	ST778A(L)	0.1	5
(Absolute)			0.001	0.4
	Renishaw plc	RESOLUTE	0.05	20
			0.1	40
		SAP / SVAP / GAP	0.05	2.5
	FACOR ALITOMATION	LAP		2
	FAGOR AUTOMATION	SAP10/SVAP10/GAP10	0.01	3
		LAP10	0.01	2

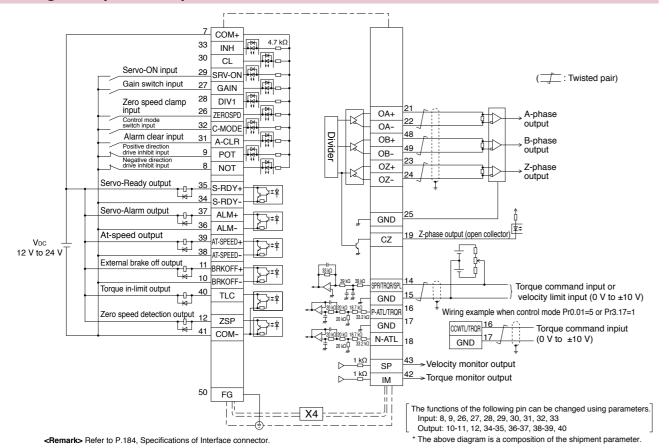
<sup>\*1</sup> The maximum speed is a characteristic of the driver. It is limited by the configration of the machine and the system.

# Wiring Diagram of X5



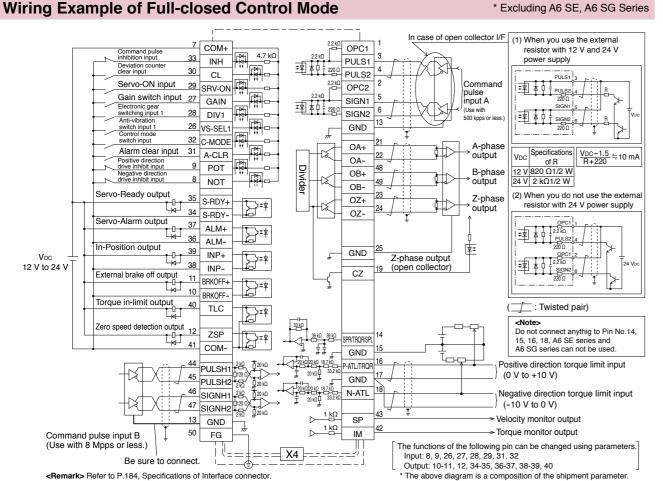
# **Wiring Example of Torque Control Mode**

\* Excluding A6 SE, A6 SG Series



Wiring to the Connector, X4

\* Excluding A6 SE, A6 SG Series

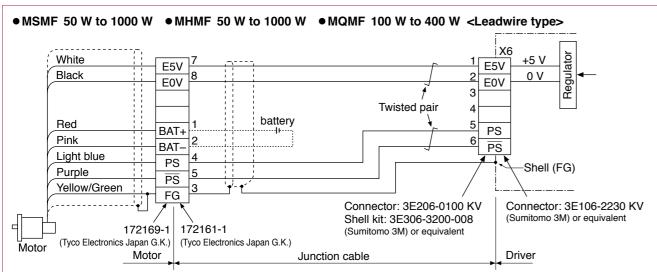


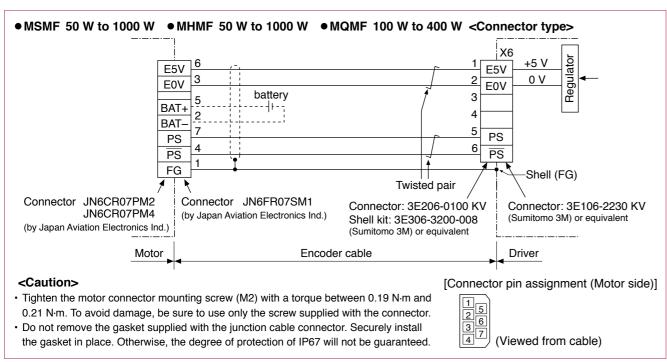
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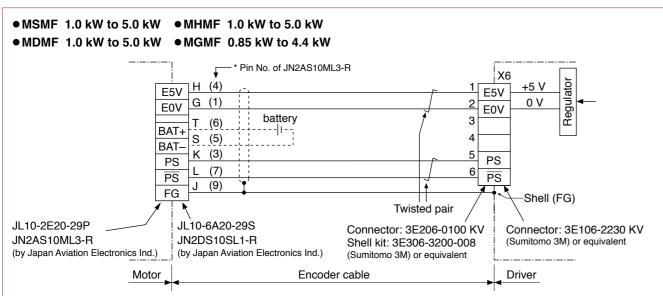
<sup>\*</sup> For more information about the external scale product, please contact the manufacturer.

# When using a 23-bit absolute encoder as an absolute system\*.

\* When use a multi-turn data.



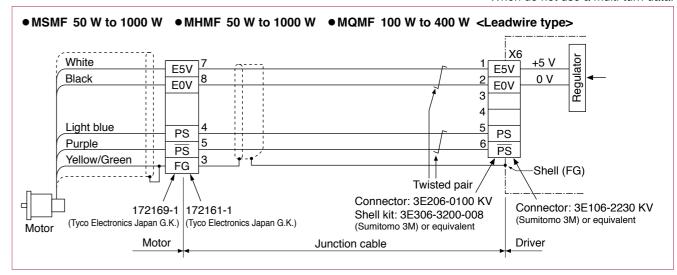


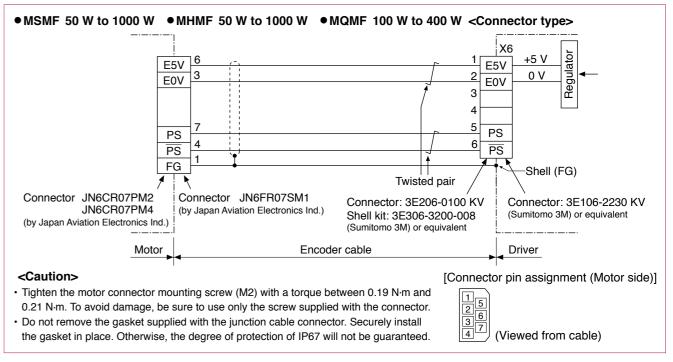


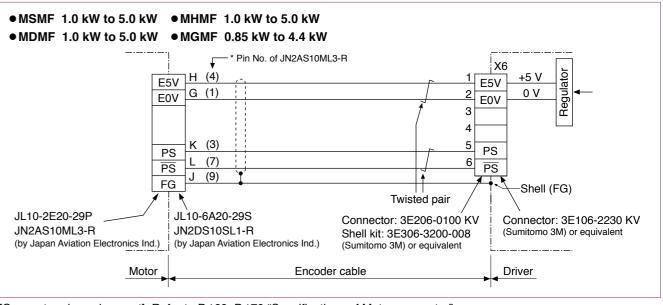
[Connector pin assignment] Refer to P.169, P.170 "Specifications of Motor connector".

# When using a 23-bit absolute encoder as a incremental system\*.

\* When do not use a multi-turn data.







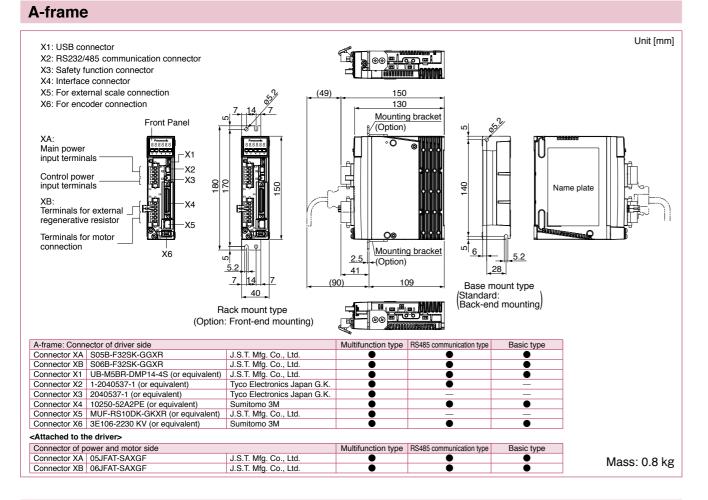
[Connector pin assignment] Refer to P.169, P.170 "Specifications of Motor connector".

# A6 Family

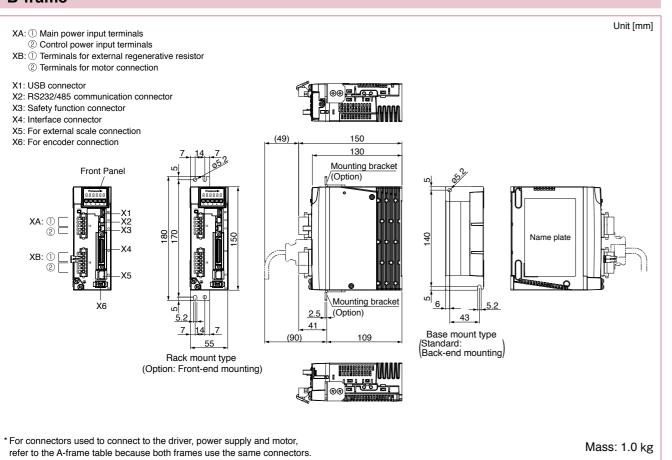
s | Imformation

Mass: 1.6 kg

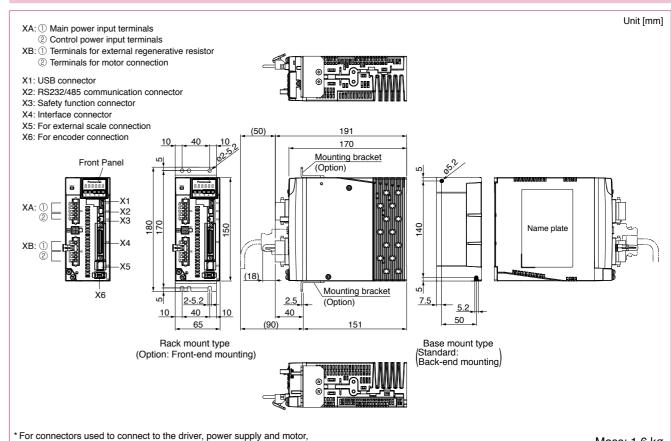
\* All dimensions shown in this catalog are for the A6 SF series, but outer dimensions are the same as the A6 SE series. For appearance, refer to P. 19 and P. 20.



# **B-frame**

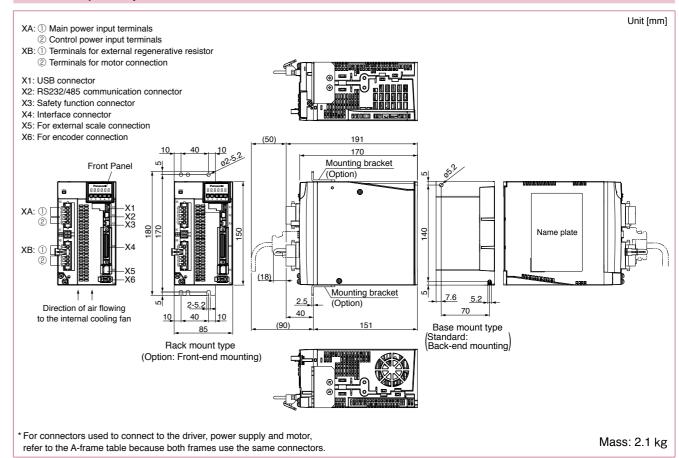


# C-frame



# **D-frame (200 V)**

refer to the A-frame table because both frames use the same connectors.



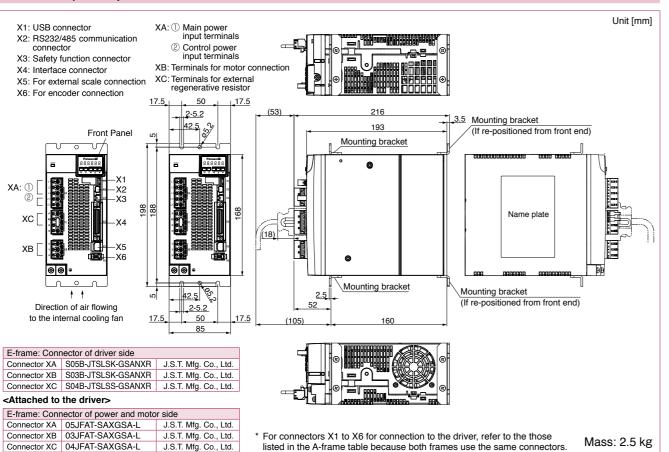
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# **Dimensions of Driver**

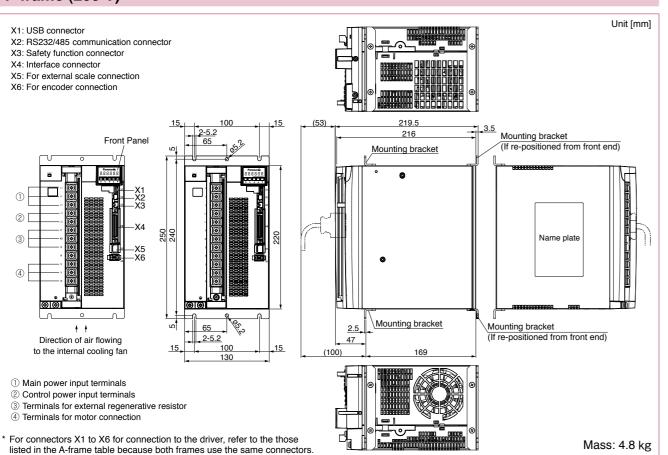
A6 Family

\* All dimensions shown in this catalog are for the A6 SF series, but outer dimensions are the same as the A6 SE series. For appearance, refer to P.19 and P.20.

# E-frame (200 V)



# F-frame (200 V)



# **Features/Lineup**

#### **Features**

- · Line-up IP67 motor: 50 W to 5.0 kW
- Max speed: 6500r/min (MHMF 50 W to 400 W)
- · Low inertia (MSMF) to High inertia (MHMF).
- Low cogging torque: Rated torque ratio 0.5 % (typical value).
- · 23-bit absolute encoder (8388608 pulse).

# **Motor Lineup**

ō

E

9



#### **MSMF** Low inertia

Max. speed : 6000 r/min Rated speed: 3000 r/min Rated output: 50 W to 1000 W Enclosure:

IP65: Leadwire type IP67: Connector type



#### MQMF (Flat type) Middle inertia

Max. speed : 6500 r/min Rated speed: 3000 r/min Rated output: 100 W to 400 W Enclosure:

IP65: Leadwire type IP67: Connector type



#### MHMF High inertia Max. speed :

6500 r/min 6000 r/min (750 W,1000 W) Rated speed: 3000 r/min Rated output: 50 W to 1000 W Enclosure:

IP65: Leadwire type IP67: Connector type



# Low inertia

Max. speed : 5000 r/min 4500 r/min (4.0 kW,5.0 kW)

Rated speed: 3000 r/min Rated output: 1.0 kW to 5.0 kW Enclosure : IP67: Connector type



# **MDMF** Middle inertia

Max. speed : 3000 r/min Rated speed: 2000 r/min Rated output: 1.0 kW to 5.0 kW Enclosure : IP67: Connector type



#### **MGMF** (Low speed/ High torque type) Middle inertia

Max. speed : 3000 r/min Rated speed: 1500 r/min Rated output: 0.85 kW to 4.4 kW Enclosure : IP67: Connector type



## MHMF High inertia

Max. speed : 3000 r/min Rated speed: 2000 r/min Rated output: 1.0 kW to 5.0 kW Enclosure : IP67: Connector type

#### **Motor Contents**

<b>WSMF</b> 50 W to 5.0 kW	P.51
MQMF 100 W to 400 W	P.67
<b>MHMF</b> 50 W to 5.0 kW	P.73
<b>MDMF</b> 1.0 kW to 5.0 kW	P 89

# **Dimensions**

**MGMF** 

MSMF (50 W to 1000 W)	
Connector type	P.100

0.85 kW to 4.4 kW ..... P.95

MSMF (1.0 kW to 5.0 kW) ...P.102 Small size connector...

MQMF (100 W to 400 W) Leadwire type with protective lip/ with oil seal

MQMF (100 W to 400 W) ....P.104 Connector type .....

MHMF (750 W. 1000 W) Leadwire type with oil seal...

MHMF (50 W to 1000 W) Leadwire type with protective lip/ with oil seal ...P.107

MHMF (50 W to 1000 W) Connector type .....

Small size connector ...... P.112 MDMF (1.0 kW to 5.0 kW)

MHMF (1.0 kW to 5.0 kW)

Small size connector .....P.113 MGMF (0.85 kW to 4.4 kW)

Small size connector ......P.114

# **Motor Specification** Description

Environmental Conditions... P.165 Notes on [Motor specification] page.... Permissible Load at Output Shaft..... .. P.166 Built-in Holding Brake ...... P.167

# **Specifications**

		AC100 V			
Motor model*1	model <sup>*1</sup> IP65				MSMF5AZL1
		Multi	function type	)	MADLT01SF
Applicable	Model No.	RS48	5 communicati	on type *2	MADLN01SG
driver		Basic	type *2		MADLN01SE
	Frame	sym	bol		A-frame
Power supply	capacity	′		(kVA)	0.4
Rated output				(W)	50
Rated torque				(N·m)	0.16
Continuous sta	all torque	е		(N·m)	0.16
Momentary Ma	ax. peak	torqu	ıe	(N·m)	0.48
Rated current			(.	A(rms))	1.1
Max. current			(	(A(o-p))	4.7
Regenerative I	brake		Without option		No limit Note)2
frequency (time	es/min) N	Note)1	DV0P4280		No limit Note)2
Rated rotation	al speed	t		(r/min)	3000
Max. rotationa	l speed			(r/min)	6000
Moment of ine	rtia		Without br	ake	0.026
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	)	0.029
Recommended moment of inertia ratio of the load and the rotor Note)3					30 times or less
Rotary encoder specification			ns <sup>+3</sup>		23-bit Absolute
	Res	olutic	n per single	turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

## • Permissible load (For details, refer to P.166)

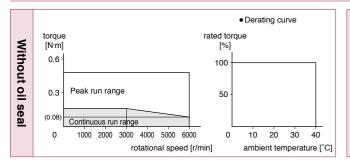
During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88.0
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

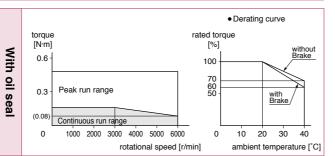
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

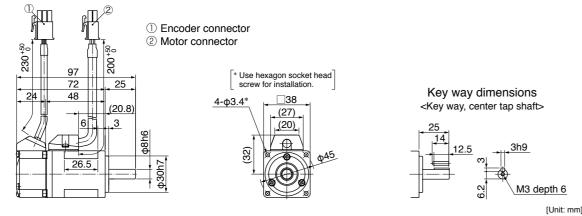
# Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

Mass: 0.32 kg <without Brake>



For connector type IP67 motors, refer to P.100.

• For the dimensions with brake, refer to the right page

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

# **Specifications**

					AC200 V	
Motor model *1	IP65			MSMF5AZL1		
		Multif	function type		MADLT05SF	
Applicable	Model No	RS485	5 communication	n type *2	MADLN05SG	
driver	140.	Basic	type *2		MADLN05SE	
	Frame	e sym	bol		A-frame	
Power supply	capacit	y		(kVA)	0.5	
Rated output				(W)	50	
Rated torque				(N·m)	0.16	
Continuous sta	all torqu	ie		(N·m)	0.16	
Momentary Ma	ax. peal	k torqu	ıe	(N·m)	0.48	
Rated current			(A	(rms))	1.1	
Max. current			(A	(o-p))	4.7	
Regenerative I	brake		Without opt	ion	No limit Note)2	
frequency (time	es/min)	Note)1	DV0P4281		No limit Note)2	
Rated rotation	al spee	d	(	r/min)	3000	
Max. rotationa	l speed		(	r/min)	6000	
Moment of ine	rtia		Without brake		0.026	
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		0.029	
Recommended moment of inertia ratio of the load and the rotor					30 times or less	
Rotary encode	r speci	ficatio	ns <sup>⁺3</sup>		23-bit Absolute	
	Re	solutio	n per single t	urn	8388608	

• Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

# • Permissible load (For details, refer to P.166)

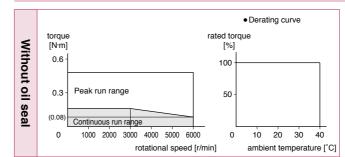
During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88.0
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

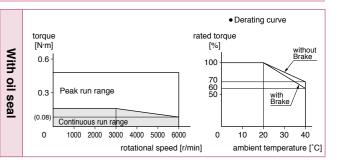
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

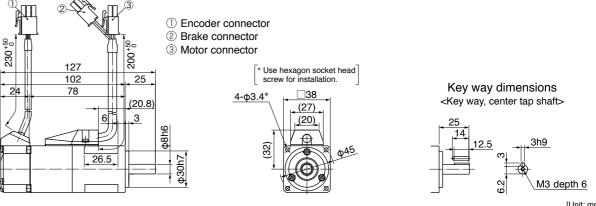
# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

Mass: 0.53 kg <with brake>



For connector type IP67 motors, refer to P.100.

• For the dimensions without brake, refer to the left page

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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**Imformation** 

[Unit: mm]

				AC100 V
Motor model *1	IP65			MSMF011L1
		Multi	function type	MADLT11SF
Applicable	Model No	RS48	5 communication type *2	MADLN11SG
driver		Basic	type *2	MADLN11SE
	Fram	e sym	bol	A-frame
Power supply	capacit	у	(kVA)	0.4
Rated output			(W)	100
Rated torque			(N·m)	0.32
Continuous sta	all torqu	0.32		
Momentary Ma	ax. pea	k torqı	ue (N·m)	0.95
Rated current			(A(rms))	1.6
Max. current			(A(o-p))	6.9
Regenerative brake			Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4280	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	0.048
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake	0.051
Recommended moment of inertia ratio of the load and the rotor Note)3				30 times or less
Rotary encode	er speci	ficatio	ns*3	23-bit Absolute
	Re	solutio	on per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

## • Permissible load (For details, refer to P.166)

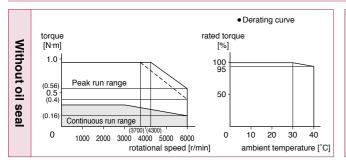
During assen	<b>5</b> .	Radial load P-direction (N)	147
	During	Thrust load A-direction (N)	88.0
	docombry	Thrust load B-direction (N)	117.6
	During	Radial load P-direction (N)	68.6
operation	Thrust load A, B-direction (N)	58.8	

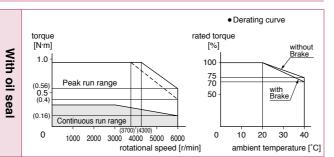
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

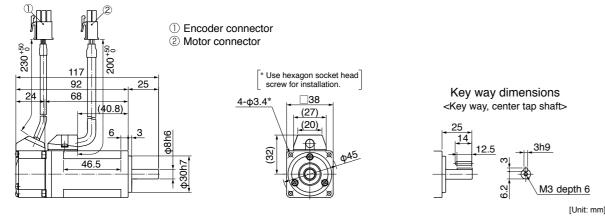
# Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

Mass: 0.47 kg <without brake>



For connector type IP67 motors, refer to P.100.

• For the dimensions with brake, refer to the right page

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

[Low inertia] 38 mm sq. 200 V MSMF 100 W

# **Specifications**

				AC200 V
Motor model *1			IP65	MSMF012L1□□
		Multi	function type	MADLT05SF
Applicable	Model No	RS48	5 communication type *2	MADLN05SG
driver	140.	Basic	type *2	MADLN05SE
	Frame	e sym	bol	A-frame
Power supply	capacit	y	(kVA)	0.5
Rated output			(W)	100
Rated torque			(N·m)	0.32
Continuous sta	all torqu	е	(N·m)	0.32
Momentary Ma	ax. peal	k torqu	ue (N·m)	0.95
Rated current			(A(rms))	1.1
Max. current			(A(o-p))	4.7
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4281	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	0.048
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake	0.051	
Recommended moment of inertia ratio of the load and the rotor Note)3				30 times or less
Rotary encode	r speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Res	solutio	n per single turn	8388608

• Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

# • Permissible load (For details, refer to P.166)

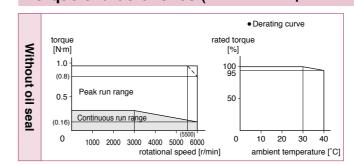
During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	0.88
docombry	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

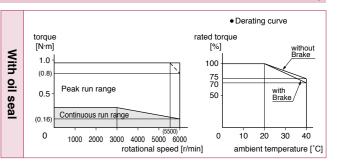
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

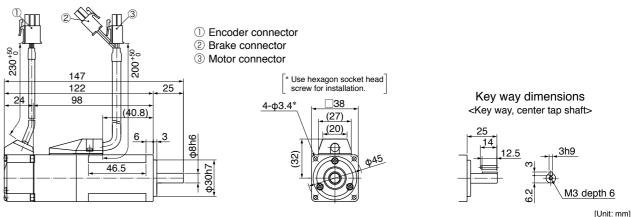
# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

Mass: 0.68 kg <with brake>



For connector type IP67 motors, refer to P.100.

• For the dimensions without brake, refer to the left page

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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**Imformation** 

				AC100 V
Motor model <sup>*1</sup>			IP65	MSMF021L1□□
		Multi	function type	MBDLT21SF
Applicable	Model No	RS48	5 communication type *2	MBDLN21SG
driver		Basic	type *2	MBDLN21SE
	Fram	e sym	bol	B-frame
Power supply	capacit	у	(kVA)	0.5
Rated output			(W)	200
Rated torque			(N·m)	0.64
Continuous sta	all torqu	0.64		
Momentary Ma	ax. pea	k torqu	ue (N·m)	1.91
Rated current		(A(rms))	2.5	
Max. current			(A(o-p))	10.6
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4283	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	0.14
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	0.17
Recommender ratio of the loa		30 times or less		
Rotary encode	er speci	ficatio	ns <sup>∗3</sup>	23-bit Absolute
	Re	solutic	n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

## • Permissible load (For details, refer to P.166)

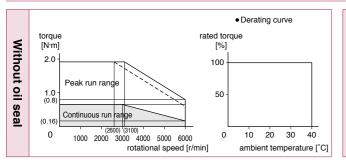
		Radial load P-direction (N)	392
During assembly	Thrust load A-direction (N)	147	
	assembly	Thrust load B-direction (N)	196
	During	Radial load P-direction (N)	245
operation	Thrust load A, B-direction (N)	98.0	

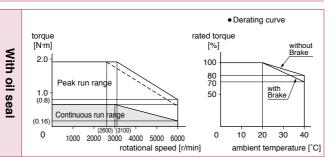
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

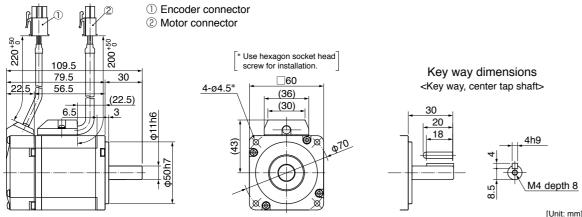
# Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

Mass: 0.82 kg <without brake>



For connector type IP67 motors, refer to P.100.

• For the dimensions with brake, refer to the right page

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

200 V MSMF 200 W Low inertia 60 mm sq.

# **Specifications**

					AC200 V
Motor model *1	IP65				MSMF022L1□□
		Multif	function type		MADLT15SF
Applicable	Model No	RS48	5 communication	type *2	MADLN15SG
driver	140.	Basic	type *2		MADLN15SE
	Frame	sym	bol		A-frame
Power supply	capacity	/	(	kVA)	0.5
Rated output				(W)	200
Rated torque			(	N·m)	0.64
Continuous sta	all torqu	е	(	N·m)	0.64
Momentary Ma	ax. peak	torqu	ie (	N·m)	1.91
Rated current			(A(r	ms))	1.5
Max. current	Max. current			o-p))	6.5
Regenerative I	orake		Without optio	n	No limit Note)2
frequency (time	s/min) 1	Note)1	DV0P4283		No limit Note)2
Rated rotation	al speed	b	(r/	min)	3000
Max. rotationa	l speed		(r/	min)	6000
Moment of inertia			Without brake	Э	0.14
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		0.17
Recommended moment of inertia ratio of the load and the rotor Note)3					30 times or less
Rotary encode	r specif	icatio	ns*3		23-bit Absolute
	Res	solutio	n per single tu	rn	8388608

• Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

#### • Permissible load (For details, refer to P.166)

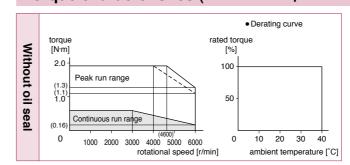
During assembly  During operation	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98.0

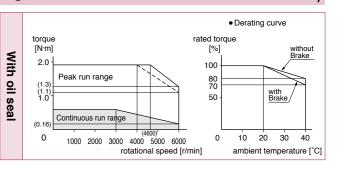
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

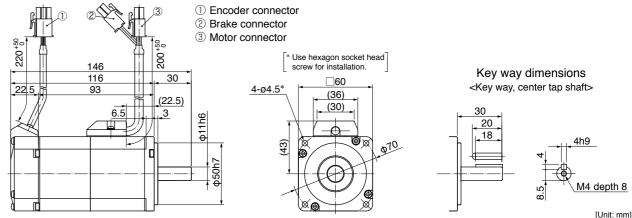
# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

<with brake>



For connector type IP67 motors, refer to P.100.

• For the dimensions without brake, refer to the left page

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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MINAS A6 Family 56

Mass: 1.3 kg

# **Specifications**

				AC100 V
Motor model*1			IP65	MSMF041L1□□
		Multi	function type	MCDLT31SF
Applicable	Model No.	RS48	5 communication type *2	MCDLN31SG
driver	140.	Basic	type *2	MCDLN31SE
	Fram	e sym	bol	C-frame
Power supply	capacit	у	(kVA)	0.9
Rated output			(W)	400
Rated torque			(N·m)	1.27
Continuous sta	all torqu	ie	(N·m)	1.27
Momentary Ma	ax. pea	k torqu	ue (N·m)	3.82
Rated current			(A(rms))	4.6
Max. current (A(o-p))				19.5
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4282	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	0.27
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake	0.30	
Recommender ratio of the loa		30 times or less		
Rotary encode	er speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Re	solutio	on per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

## • Permissible load (For details, refer to P.166)

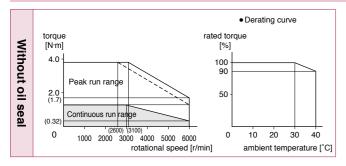
	During assembly	Radial load P-direction (N)	392
		Thrust load A-direction (N)	147
		Thrust load B-direction (N)	196
	During operation	Radial load P-direction (N)	245
		Thrust load A, B-direction (N)	98.0

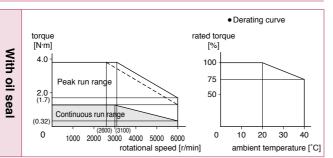
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

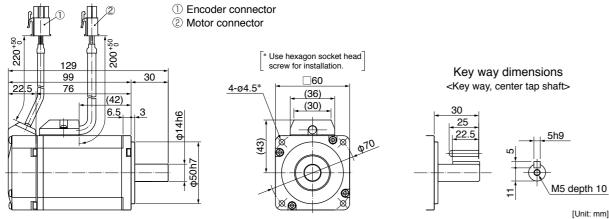
# Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

Mass: 1.2 kg <without brake>



For connector type IP67 motors, refer to P.101.

• For the dimensions with brake, refer to the right page

**Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

# **Specifications**

					AC200 V
Motor model *1			IP65		MSMF042L1□□
		Multif	function type		MBDLT25SF
Applicable	Model No.	RS48	communication typ	e *2	MBDLN25SG
driver	110.	Basic	type *2		MBDLN25SE
	Fram	e syml	bol		B-frame
Power supply	capacit	у	(kV	/A)	0.9
Rated output			(1	W)	400
Rated torque			(N·	m)	1.27
Continuous sta	all torqu	ie	(N·	m)	1.27
Momentary Ma	ax. pea	k torqı	ıe (N⋅	m)	3.82
Rated current			(A(rm	s))	2.4
Max. current	ax. current (A(o-p))				10.2
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	DV0P4283		No limit Note)2
Rated rotation	al spee	d	(r/m	in)	3000
Max. rotationa	l speed		(r/m	in)	6000
Moment of inertia			Without brake		0.27
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake		0.30
Recommended moment of inertia ratio of the load and the rotor Note)3					30 times or less
Rotary encode	r speci	ficatio	ns *3		23-bit Absolute
	Re	solutio	n per single turn		8388608

200 V MSMF 400 W Low inertia 60 mm sq.

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

#### • Permissible load (For details, refer to P.166)

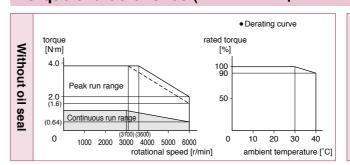
During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
Thrust load B-direction (N)		196
During	Radial load P-direction (N)	245
operation	Thrust load A, B-direction (N)	98.0

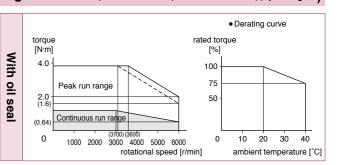
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

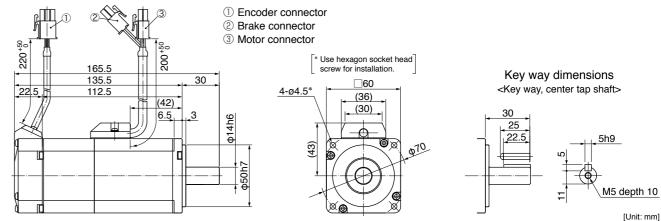
# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

Mass: 1.7 kg <with brake>



For connector type IP67 motors, refer to P.101.

• For the dimensions without brake, refer to the left page

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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				AC200 V
Motor model*1		MSMF082L1		
		Multit	function type	MCDLT35SF
Applicable	Model		5 communication type *2	
driver	INO.		type *2	MCDLN35SE
	Frame		,	C-frame
Power supply			(kVA)	1.3
Rated output			(W)	750
Rated torque			(N·m)	2.39
Continuous sta	all torque	9	(N·m)	2.39
Momentary M	ax. peak	torqu	ue (N·m)	7.16
Rated current			(A(rms))	4.1
Max. current				17.4
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min) N	lote)1	DV0P4283	No limit Note)2
Rated rotation	al speed	i	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of inertia of rotor (×10 <sup>-4</sup> kg·m²)			Without brake	0.96
		With brake	1.06	
	Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encode	er specifi	catio	ns <sup>*3</sup>	23-bit Absolute
	Res	olutic	n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	2.45 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

## • Permissible load (For details, refer to P.166)

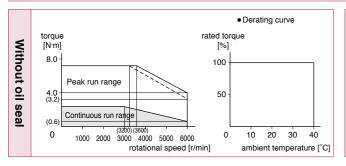
During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

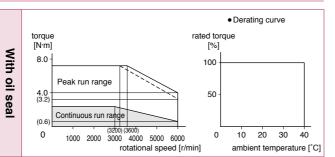
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

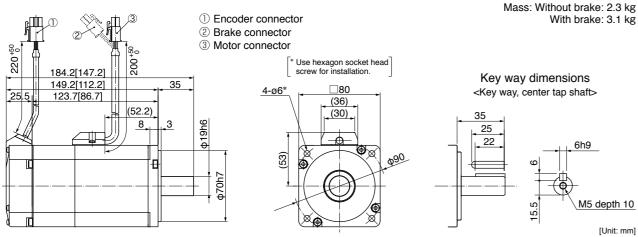
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**



For connector type IP67 motors, refer to P.101.

•Figures in [ ] represent the dimensions without brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

# 200 V MSMF 1000 W Low inertia 80 mm sq.

# **Specifications**

				AC200 V
Motor model *1			IP65	MSMF092L1□□
		Multif	function type	MDDLT45SF
Applicable	Model No	RS48	5 communication type *2	MDDLN45SG
driver	140.	Basic	type *2	MDDLN45SE
	Frame	sym	bol	D-frame
Power supply	capacity	,	(kVA)	1.8
Rated output			(W)	1000
Rated torque			(N·m)	3.18
Continuous sta	all torqu	е	(N·m)	3.18
Momentary Ma	ax. peak	torqu	ue (N·m)	9.55
Rated current			(A(rms))	5.7
Max. current			24.2	
Regenerative I	orake		Without option	No limit Note)2
frequency (time	s/min) N	Note)1	DV0P4284	No limit Note)2
Rated rotation	al speed	t	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	1.26
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	1.36
Recommended ratio of the load		15 times or less		
Rotary encode	r specif	icatio	ns <sup>*3</sup>	23-bit Absolute
	Res	olutio	n per single turn	8388608

 Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	3.80 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

# • Permissible load (For details, refer to P.166)

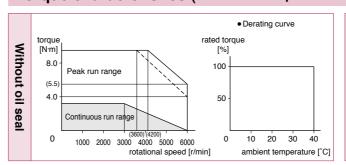
During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
docombry	Thrust load B-direction (N)	392
During	Radial load P-direction (N)	392
operation	Thrust load A, B-direction (N)	147

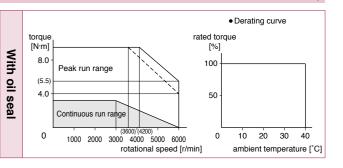
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

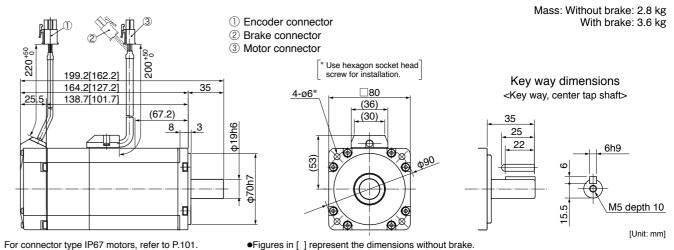
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**



<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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**Imformation** 

# **Specifications**

				AC200 V
Motor model*1			IP67	MSMF102L1
		Multi	function type	MDDLT55SF
Applicable	Model No	RS48	5 communication type *	MDDLN55SG
driver	110.	Basic	type *2	MDDLN55SE
	Frame	e sym	bol	D-frame
Power supply	capacit	/	(kVA)	2.3
Rated output			(W)	1000
Rated torque			(N·m)	3.18
Continuous sta	all torqu	е	(N·m)	3.82
Momentary Ma	ax. peal	c torqu	ıe (N⋅m)	9.55
Rated current			(A(rms))	6.6
Max. current			(A(o-p))	28
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4284	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	5000
Moment of ine	rtia		Without brake	2.15
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake	2.47	
Recommender ratio of the loa		15 times or less		
Rotary encode	r speci	icatio	ns*3	23-bit Absolute
	Res	solutio	n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

		Radial load P-direction (N)	980
During assembly		Thrust load A-direction (N)	588
	docombry	Thrust load B-direction (N)	686
	During	Radial load P-direction (N)	490
operation	Thrust load A, B-direction (N)	196	

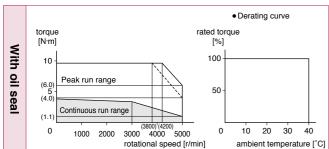
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

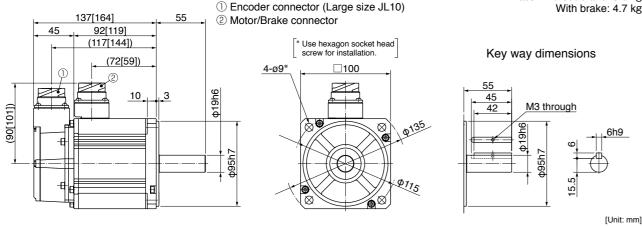
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Mass: Without brake: 3.6 kg

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



# **Dimensions**



Encoder connector (Small size JN2), refer to P.102. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

# **Specifications**

				AC200 V
Motor model *1			IP67	MSMF152L1□□
		Multi	function type	MDDLT55SF
Applicable	Model No.	RS48	5 communication type *2	MDDLN55SG
driver	140.	Basic	type *2	MDDLN55SE
	Fram	e sym	bol	D-frame
Power supply	capacit	у	(kVA)	2.3
Rated output			(W)	1500
Rated torque			(N·m)	4.77
Continuous sta	all torqu	ie	(N·m)	5.72
Momentary Ma	ax. pea	k torqı	ue (N·m)	14.3
Rated current			(A(rms))	8.2
Max. current (A(o-p				35
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4284	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	5000
Moment of ine	rtia		Without brake	3.10
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake	3.45
Recommender ratio of the loa		15 times or less		
Rotary encode	r speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Re	solutio	on per single turn	8388608

200 V MSMF 1.5 kW Low inertia 100 mm sq.

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.' Do not use this for braking the motor in motion.

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

# • Permissible load (For details, refer to P.166)

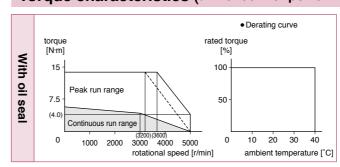
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

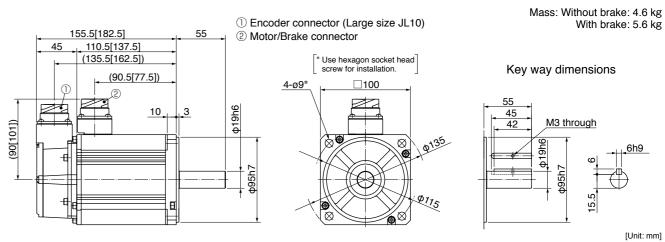
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



# **Dimensions**



Encoder connector (Small size JN2), refer to P.102. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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**Imformation** 

# **Specifications**

		AC200 V		
Motor model *1			IP67	MSMF202L1□□
			function type	MEDLT83SF
Applicable	Model No.	RS48	5 communication type	MEDLN83SG
driver		Basic	type *2	MEDLN83SE
	Fram	e sym	bol	E-frame
Power supply	capacit	у	(kVA	3.8
Rated output			(W	2000
Rated torque			(N·m	6.37
Continuous sta	all torqu	ie	(N·m	7.64
Momentary Ma	ax. pea	k torqı	ue (N⋅m	19.1
Rated current (A(rms))			11.3	
Max. current (A(o-p))			) 48	
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285	No limit Note)2
Rated rotation	al spee	d	(r/min	3000
Max. rotationa	l speed		(r/min	5000
Moment of ine	rtia		Without brake	4.06
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake	4.41
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less	
Rotary encode	er speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Re	solutio	n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

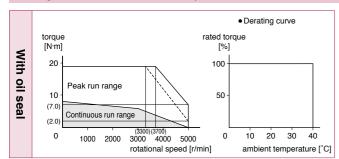
		Radial load P-direction (N)	980
During assembly		Thrust load A-direction (N)	588
	docombry	Thrust load B-direction (N)	686
	During	Radial load P-direction (N)	490
operation	Thrust load A, B-direction (N)	196	

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

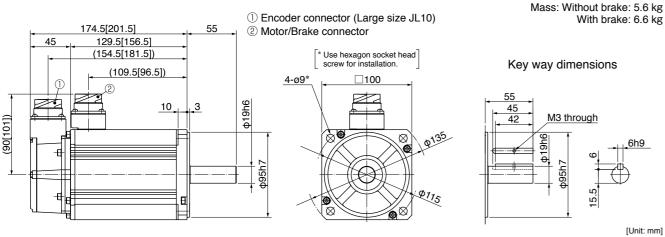
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



# **Dimensions**



Encoder connector (Small size JN2), refer to P.102. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

# **Specifications**

				AC200 V
Motor model *1			IP67	MSMF302L1□□
		Multi	function type	MFDLTA3SF
Applicable	Model No	RS48	communication type	<sup>'2</sup> MFDLNA3SG
driver	110.	Basic	type *2	MFDLNA3SE
	Fram	e sym	bol	F-frame
Power supply	capacit	y	(kVA	4.5
Rated output			(W	3000
Rated torque			(N·m	9.55
Continuous sta	all torqu	ie	(N·m	11.0
Momentary Ma	ax. pea	k torqı	ıe (N⋅m	28.6
Rated current			(A(rms)	18.1
Max. current			(A(o-p)	77
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al spee	d	(r/min	3000
Max. rotationa	l speed		(r/min	5000
Moment of ine	rtia		Without brake	7.04
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake	7.38
Recommender ratio of the loa		15 times or less		
Rotary encode	r speci	ficatio	ns*³	23-bit Absolute
	Re	solutio	n per single turn	8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.' Do not use this for braking the motor in motion.

Static friction torque (N·m)	12.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

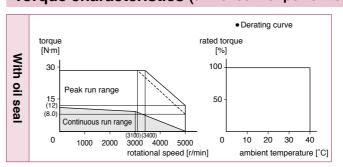
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

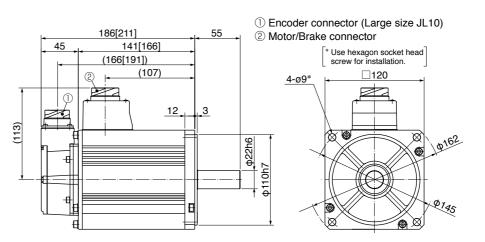
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



# **Dimensions**

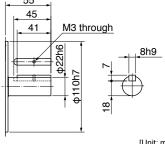


Encoder connector (Small size JN2), refer to P.102. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Mass: Without brake: 8.7 kg

45



[Unit: mm]

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With brake: 9.9 kg

Key way dimensions

				4.0000.1/
		AC200 V		
Motor model <sup>*1</sup>			IP67	MSMF402L1□□
		Multi	function type	MFDLTB3SF
Applicable	Model No.	RS48	5 communication type *2	MFDLNB3SG
driver	140.	Basic	type *2	MFDLNB3SE
	Fram	e sym	bol	F-frame
Power supply	capacit	у	(kVA)	7.5
Rated output			(W)	4000
Rated torque			(N·m)	12.7
Continuous sta	all torqu	ie	(N·m)	15.2
Momentary Ma	ax. pea	k torqı	ue (N·m)	38.2
Rated current		19.6		
Max. current (A(o-p))				83
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	4500
Moment of ine	rtia		Without brake	14.4
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	15.6
	Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encode	er speci	ficatio	ns <sup>∗3</sup>	23-bit Absolute
	Re	solutic	on per single turn	8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	16.2 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

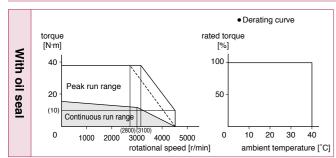
	Radial load P-direction (N)	980
During assembly	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During	Radial load P-direction (N)	784
operation	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

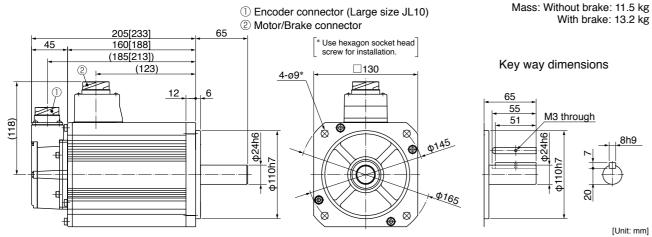
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



# **Dimensions**



Encoder connector (Small size JN2), refer to P.102. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

# **Specifications**

				AC200 V
Motor model *1			IP67	MSMF502L1
		Multi	function type	MFDLTB3SF
Applicable	Model No.	RS48	5 communication type *2	MFDLNB3SG
driver	140.	Basic	type *2	MFDLNB3SE
	Fram	e sym	bol	F-frame
Power supply	capacit	у	(kVA)	7.5
Rated output			(W)	5000
Rated torque			(N·m)	15.9
Continuous sta	all torqu	ie	(N·m)	19.1
Momentary Ma	ax. pea	k torqı	ue (N·m)	47.7
Rated current			(A(rms))	24.0
Max. current (A(o-p))				102
Regenerative brake		Without option	No limit Note)2	
frequency (time	es/min)	Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	4500
Moment of ine	rtia		Without brake	19.0
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	20.2
Recommended moment of inertia ratio of the load and the rotor Note)3				15 times or less
Rotary encode	r speci	ficatio	ns*3	23-bit Absolute
	Re	solutio	n per single turn	8388608

200 V **MSMF** 5.0 kW [Low inertia]

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.' Do not use this for braking the motor in motion.

Static friction torque (N·m)	22.0 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

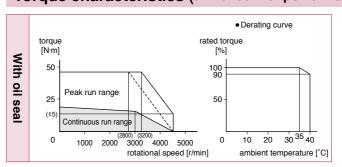
<b>.</b> .	Radial load P-direction (N)	980
During assembly	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During	Radial load P-direction (N)	784
operation	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

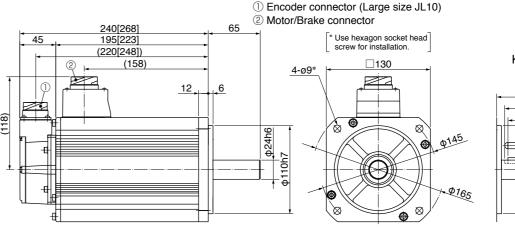
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



# **Dimensions**



Encoder connector (Small size JN2), refer to P.102. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Mass: Without brake: 14.5 kg

With brake: 16.1 kg

Key way dimensions

M3 through

[Unit: mm]

		AC100 V		
Motor model*1			IP65	MQMF011L1
		Multi	function type	MADLT11SF
Applicable	Model No.	RS48	5 communication type	MADLN11SG
driver		Basic	type *2	MADLN11SE
	Fram	e sym	bol	A-frame
Power supply	capacit	у	(kVA	0.4
Rated output			(W	) 100
Rated torque			(N·m	0.32
Continuous sta	ontinuous stall torque (N·m) 0.33		0.33	
Momentary Max. peak torque (N·m)			) 1.11	
Rated current (A(rms))			1.6	
Max. current (A(o-p))			7.9	
Regenerative brake		Without option	No limit Note)2	
frequency (times/min) Note)1		Note)1	DV0P4280	No limit Note)2
Rated rotation	al spee	d	(r/min	3000
Max. rotational speed (r/min)			) 6500	
Moment of inertia		Without brake	0.15	
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake	0.18	
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less	
Rotary encode	er speci	ficatio	ns*3	23-bit Absolute
	Re	solutio	on per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	0.39 or more
Engaging time (ms)	15 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

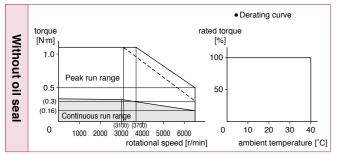
During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During	Radial load P-direction (N)	68.6
operation	Thrust load A, B-direction (N)	58.8

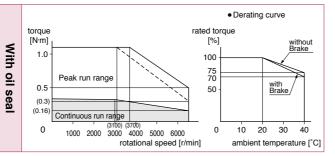
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

Mass: 0.54 kg (0.57 kg with oil seal) <without brake> Encoder connector ② Motor connector \* Use hexagon socket head a: 81.2[84.7] screw for installation. Key way dimensions b: 56.2[59.7] <Key way, center tap shaft> c: 39.7[43.2] (30.8)d: (14[17.5]) (2.1) Figures in [ ] represent with oil seal **Ф**70

For motors with protective lip, refer to P.103. For connector type IP67 motors, refer to P.104. • For the dimensions with brake, refer to the right page

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

# **Specifications**

				AC200 V
Motor model *1			IP65	MQMF012L1
			function type	MADLT05SF
Applicable	Model No	RS48	5 communication type	<sup>'2</sup> MADLN05SG
driver		Basic	type *2	MADLN05SE
	Fram	e sym	bol	A-frame
Power supply	capacit	у	(kVA	0.5
Rated output			(W	100
Rated torque			(N·m	0.32
Continuous sta	all torqu	ie	(N·m	0.33
Momentary Ma	ax. pea	k torqı	ue (N·m	1.11
Rated current			(A(rms)	)) 1.1
Max. current (A(o-				5.5
Regenerative brake		Without option	No limit Note)2	
frequency (times/min) Note)1		DV0P4281	No limit Note)2	
Rated rotation	al spee	d	(r/min	3000
Max. rotationa	l speed		(r/min	6500
Moment of inertia			Without brake	0.15
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake	0.18
Recommender ratio of the loa		20 times or less		
Rotary encode	r speci	23-bit Absolute		
	Resolution per single tu			8388608

200 V MQMF 100 W Middle inertia Flat type 60 mm sq.

• Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

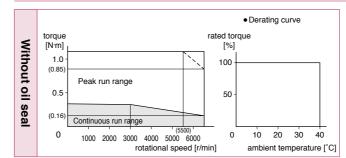
Static friction torque (N·m)	0.39 or more
Engaging time (ms)	15 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

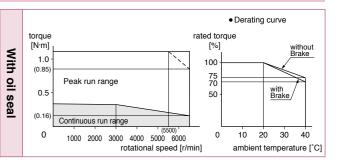
# • Permissible load (For details, refer to P.166)

	Radial load P-direction (N)	147
During assembly	Thrust load A-direction (N)	88
dooonibiy	Thrust load B-direction (N)	117.6
During	Radial load P-direction (N)	68.6
operation	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.18.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





# **Dimensions**

Mass: 0.79 kg (0.82 kg with oil seal) <with brake> ① Encoder connector ② Brake connector ③ Motor connector Use hexagon socket head 102.5[106] screw for installation. Key way dimensions Figures in [ ] represent 77.5[81] □60 <Key way, center tap shaft> 61[64.5] with oil seal. (30.8)(2.1)

For motors with protective lip, refer to P.103. For connector type IP67 motors, refer to P.104. •For the dimensions without brake, refer to the left page.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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# **Specifications**

				AC100 V
Motor model *1			IP65	MQMF021L1
		Multi	function type	MBDLT21SF
Applicable	Model No	RS48	5 communication type	MBDLN21SG
driver	110.	Basic	type *2	MBDLN21SE
	Frame	e sym	bol	B-frame
Power supply	capacity	/	(kVA)	0.5
Rated output			(W)	200
Rated torque			(N·m)	0.64
Continuous sta	all torqu	е	(N·m)	0.76
Momentary Ma	ax. peal	c torqu	ue (N·m)	2.23
Rated current (A(rms))			2.1	
Max. current (A(o-p))			10.4	
Regenerative brake		Without option	No limit Note)2	
frequency (time	es/min) I	Note)1	DV0P4283	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6500
Moment of ine	rtia		Without brake	0.50
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake	0.59	
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less	
Rotary encode	er specit	icatio	ns *3	23-bit Absolute
Resolution			n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

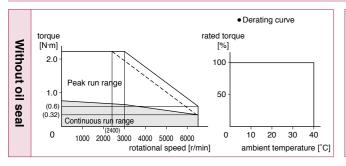
		Radial load P-direction (N)	392
	During assembly	Thrust load A-direction (N)	147
	During operation	Thrust load B-direction (N)	196
		Radial load P-direction (N)	245
(		Thrust load A, B-direction (N)	98

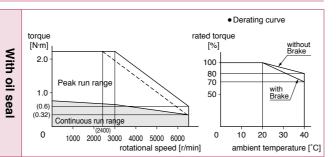
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

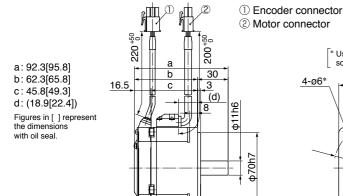


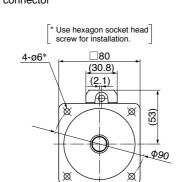


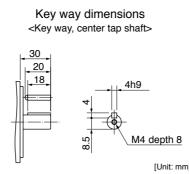
# **Dimensions**

<without brake>

Mass: 1.1 kg (1.2 kg with oil seal)







For motors with protective lip, refer to P.103. For connector type IP67 motors, refer to P.104. • For the dimensions with brake, refer to the right page.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

200 V MQMF 200 W Middle inertia Flat type 80 mm sq.

# **Specifications**

				AC200 V
Motor model *1	IP65			MQMF022L1
Applicable driver	Model No.	Multi	function type	MADLT15SF
		RS48	5 communication type *2	MADLN15SG
		Basic	type *2	MADLN15SE
	Frame	sym	bol	A-frame
Power supply	capacity	/	(kVA)	0.5
Rated output			(W)	200
Rated torque			(N·m)	0.64
Continuous sta	all torqu	е	(N·m)	0.76
Momentary Ma	ax. peal	torqu	ue (N·m)	2.23
Rated current			(A(rms))	1.4
Max. current			(A(o-p))	6.9
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2	
		Note)1	DV0P4283	No limit Note)2
Rated rotational speed			(r/min)	3000
Max. rotational speed			(r/min)	6500
Moment of inertia of rotor (×10 <sup>-4</sup> kg·m²)		Without brake	0.50	
		With brake	0.59	
Recommended moment of inertia ratio of the load and the rotor Note)3				20 times or less
Rotary encoder specifications *3				23-bit Absolute
	Res	solutio	n per single turn	8388608

 Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

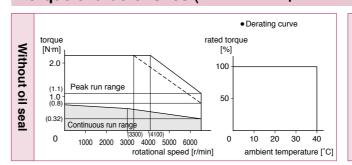
During assembly During	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
	Radial load P-direction (N)	245
operation	Thrust load A, B-direction (N)	98

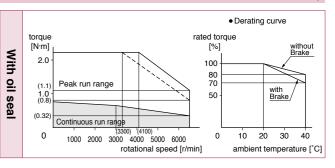
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

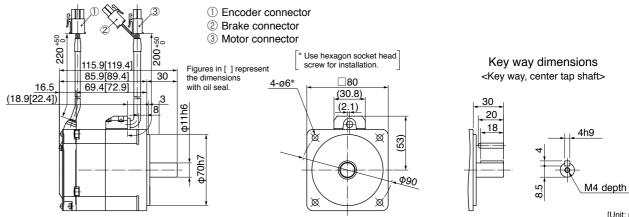




Mass: 1.5 kg (1.6 kg with oil seal)

# **Dimensions**

<with brake>



For motors with protective lip, refer to P.103. For connector type IP67 motors, refer to P.104. • For the dimensions without brake, refer to the left page.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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## **Specifications**

				AC100 V
Motor model *1			IP65	MQMF041L1
			function type	MCDLT31SF
Applicable	Model No	RS48	5 communication type *2	MCDLN31SG
driver	140.	Basic	type *2	MCDLN31SE
	Fram	e sym	bol	C-frame
Power supply	capacit	у	(kVA)	0.9
Rated output			(W)	400
Rated torque			(N·m)	1.27
Continuous sta	all torqu	ie	(N·m)	1.40
Momentary Ma	ax. pea	k torqu	ue (N·m)	4.46
Rated current			(A(rms))	4.1
Max. current			(A(o-p))	20.3
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4282	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6500
Moment of ine	rtia		Without brake	0.98
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake	1.06	
Recommended moment of inertia ratio of the load and the rotor Note)3				20 times or less
Rotary encode	er speci	ficatio	ns *3	23-bit Absolute
	Resolution			8388608

# Brake specifications (For details, refer to P.167) (This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

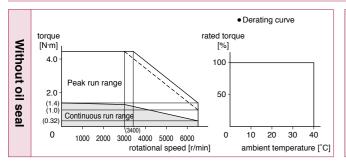
	During assembly  During operation	Radial load P-direction (N)	392
		Thrust load A-direction (N)	147
		Thrust load B-direction (N)	196
		Radial load P-direction (N)	245
		Thrust load A, B-direction (N)	98

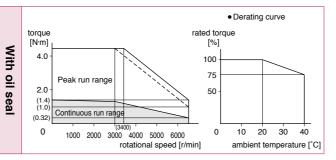
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1 \( \subseteq \) in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

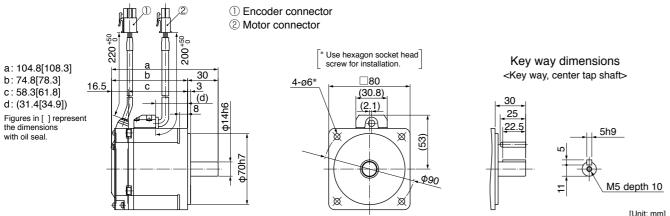




## **Dimensions**

<without brake>

Mass: 1.5 kg (1.6 kg with oil seal)



For motors with protective lip, refer to P.103. For connector type IP67 motors, refer to P.105. • For the dimensions with brake, refer to the right page.

<a href="#"><Cautions></a>
Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

# Specifications

200 V **MQMF** 400 W

Middle inertia

Flat type 80 mm sq.

A COOO 1/

				AC200 V
Motor model *1	IP65			MQMF042L1□□
		Multi	function type	MBDLT25SF
Applicable	Model No.	RS48	5 communication type *2	MBDLN25SG
driver	140.	Basic	type *2	MBDLN25SE
	Fram	e sym	bol	B-frame
Power supply	capacit	y	(kVA)	0.9
Rated output			(W)	400
Rated torque			(N·m)	1.27
Continuous sta	all torqu	е	(N·m)	1.40
Momentary Ma	ax. peal	k torqu	ue (N·m)	4.46
Rated current			(A(rms))	2.1
Max. current			(A(o-p))	10.4
, togorioranto brano		Without option	No limit Note)2	
		Note)1	DV0P4283	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6500
Moment of inertia		Without brake	0.98	
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	1.06
Recommended moment of inertia ratio of the load and the rotor Note)3				20 times or less
Rotary encoder specifications *3			ns*3	23-bit Absolute
Resolution p			on per single turn	8388608

# Brake specifications (For details, refer to P.167) (This brake will be released when it is energized.) Do not use this for braking the motor in motion.

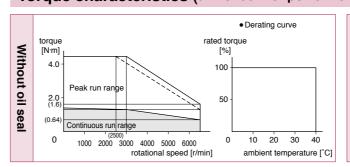
Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

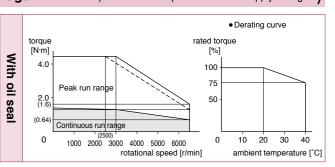
## • Permissible load (For details, refer to P.166)

During assembly During operation	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1 in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.18.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

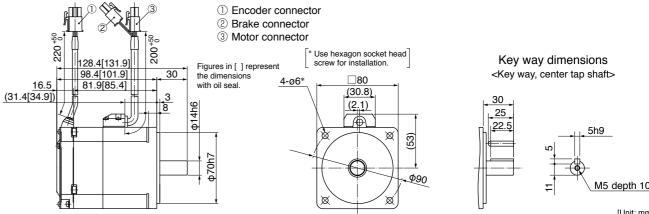
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## Dimensions

<with brake>



For motors with protective lip, refer to P.103. For connector type IP67 motors, refer to P.105. • For the dimensions without brake, refer to the left page.

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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lmfc

Mass: 2.0 kg (2.1 kg with oil seal)

A6 Family

## **Specifications**

					AC100 V
Motor model <sup>*1</sup>			IP65		MHMF5AZL1
		Multi	function t	уре	MADLT01SF
Applicable	Model No	RS48	RS485 communication type *2		MADLN01SG
driver		Basic	type *2		MADLN01SE
	Frame	e sym	bol		A-frame
Power supply	capacity	y		(kVA)	0.4
Rated output				(W)	50
Rated torque				(N·m)	0.16
Continuous sta	ous stall torque (N·m) 0.18		0.18		
Momentary Ma	ax. peal	k torqı	ıe	(N·m)	0.56
Rated current				(A(rms))	1.1
Max. current				(A(o-p))	5.5
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	DV0P4280		No limit Note)2
Rated rotation	al spee	d		(r/min)	3000
Max. rotationa	l speed			(r/min)	6500
Moment of ine	rtia		Without brake		0.038
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		0.042	
Recommended moment of inertia ratio of the load and the rotor Note)3			Note)3	30 times or less	
Rotary encode	er speci	ficatio	ns <sup>⁺3</sup>		23-bit Absolute
	Res	solutio	n per sin	gle turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

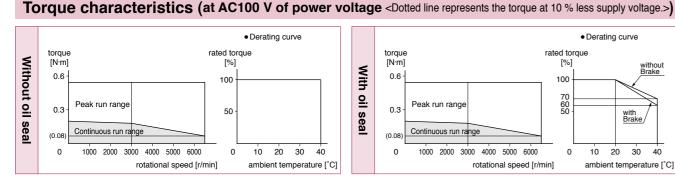
#### • Permissible load (For details, refer to P.166)

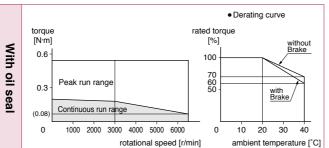
	During assembly  During operation	Radial load P-direction (N)	147
		Thrust load A-direction (N)	88
		Thrust load B-direction (N)	117.6
		Radial load P-direction (N)	68.6
		Thrust load A, B-direction (N)	49

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

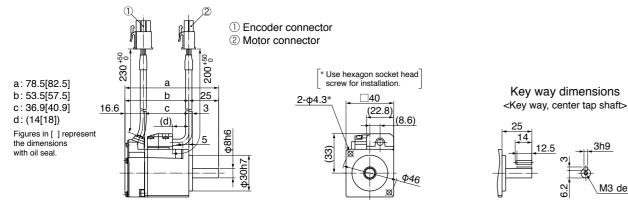




## **Dimensions**

73 MINAS A6 Family

Mass: 0.29 kg (0.31 kg with oil seal) <without brake>



For motors with protective lip, refer to P.107. For connector type IP67 motors, refer to P.109. • For the dimensions with brake, refer to the right page

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

					AC200 V
Motor model *1			IP65		MHMF5AZL1 🗆 🗆
		Multifunction type			MADLT05SF
Applicable	Model No.	RS485	5 communication	type *2	MADLN05SG
driver	110.	Basic type *2		MADLN05SE	
	Fram	e syml	bol		A-frame
Power supply	capacit	у	(	kVA)	0.5
Rated output				(W)	50
Rated torque			(	N·m)	0.16
Continuous sta	all torqu	ie	(	N·m)	0.18
Momentary Ma	ax. pea	k torqu	ue (	N·m)	0.56
Rated current	current (A(rms))				1.1
Max. current	x. current (A(o-p)				5.5
Regenerative brake		Without option		No limit Note)2	
frequency (time	s/min)	Note)1	DV0P4281		No limit Note)2
Rated rotation	al spee	d	(r/	min)	3000
Max. rotationa	l speed		(r/	min)	6500
Moment of ine	rtia		Without brake		0.038
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake		0.042
Recommended moment of inertia ratio of the load and the rotor Note)3				30 times or less	
Rotary encode	r speci	ficatio	ns <sup>*3</sup>		23-bit Absolute
	Re	solutio	n per single tu	rn	8388608

• Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

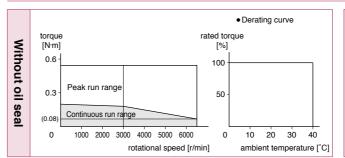
Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

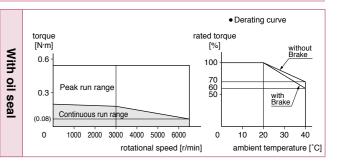
#### • Permissible load (For details, refer to P.166)

During assembly  During operation	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	49

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.18.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

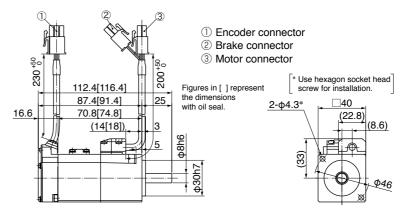
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

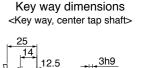


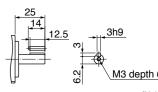


## **Dimensions**

Mass: 0.51 kg (0.53 kg with oil seal) <with brake>







MINAS A6 Family 74

For motors with protective lip, refer to P.107. For connector type IP67 motors, refer to P.109. •For the dimensions without brake, refer to the left page.

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

40 mm sq.

A6 Family

## **Specifications**

				AC100 V
Motor model *1		MHMF011L1		
			function type	MADLT11SF
Applicable	Model No	RS485 communication type *2		MADLN11SG
driver	140.	Basic	type *2	MADLN11SE
	Fram	e sym	bol	A-frame
Power supply	capacit	y	(kVA)	0.4
Rated output			(W)	100
Rated torque			(N·m)	0.32
Continuous sta	all torqu	ie	(N·m)	0.33
Momentary Ma	ax. pea	k torqı	ue (N·m)	1.11
Rated current			(A(rms))	1.6
Max. current			(A(o-p))	7.9
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4280	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6500
Moment of ine	rtia		Without brake	0.071
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake	0.074	
Recommended moment of inertia ratio of the load and the rotor				30 times or less
Rotary encode	er speci	ficatio	ns *3	23-bit Absolute
	Resolution			8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • P

		Radial load P-direction (N)	147
	During assembly	Thrust load A-direction (N)	88
	assembly	Thrust load B-direction (N)	117.6
	During operation	Radial load P-direction (N)	68.6
		Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.165.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are

Detail of model designation, refer to P.18.

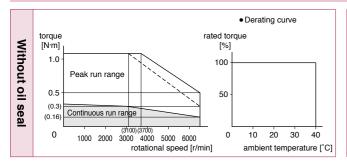
system (not using multi-turn data), do not connect a battery for absolute encoder.

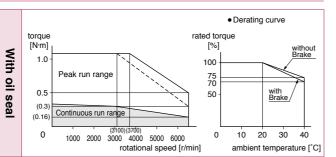
Permissible load (For details, refer to P.166)					
Exciting voltage (DC) (V) 24±2.4					
Releasing voltage (DC) (V)	1 or more				
Exciting current (DC) (A)	0.30				
Releasing time (ms) Note)4	20 or less				
Engaging time (ms)	35 or less				
Static friction torque (N·m)	0.38 or more				

- · Dimensions of Driver, refer to P.47.
- "Position control type".

\*3 When using a rotary encoder as an incremental

## Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





Mass: 0.40 kg (0.42 kg with oil seal)

## **Dimensions**

<without brake>

(1) Encoder connector ② Motor connector \* Use hexagon socket head a: 92.5[96.5] b: 67.5[71.5] 2-φ4.3\* c: 50.9[54.9] (22.8)d: (28[32]) Figures in [ ] represent the dimensions with oil seal.

Key way dimensions <Key way, center tap shaft>

For motors with protective lip, refer to P.107. For connector type IP67 motors, refer to P.109. • For the dimensions with brake, refer to the right page

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

## **Specifications**

200 V MHMF 100 W

					AC200 V
Motor model *1			IP65		MHMF012L1
		Multifunction type			MADLT05SF
Applicable	Model No	RS485	RS485 communication type *2		MADLN05SG
driver	110.	Basic type *2			MADLN05SE
	Fram	e syml	bol		A-frame
Power supply	capacit	y	(	(kVA)	0.5
Rated output				(W)	100
Rated torque			(	(N·m)	0.32
Continuous sta	all torqu	ie	(	(N·m)	0.33
Momentary Ma	ax. pea	k torqu	ue (	(N·m)	1.11
Rated current			(A(	rms))	1.1
Max. current				(o-p))	5.5
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	DV0P4281		No limit Note)2
Rated rotation	al spee	d	(r	/min)	3000
Max. rotationa	l speed		(r	/min)	6500
Moment of ine	rtia		Without brak	e	0.071
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake		0.074
Recommended moment of inertia ratio of the load and the rotor Note)3				30 times or less	
Rotary encode	r speci	ficatio	ns*3		23-bit Absolute
	Re	solutio	n per single tu	ırn	8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

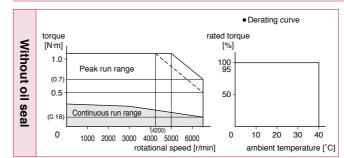
During assembly During operation	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

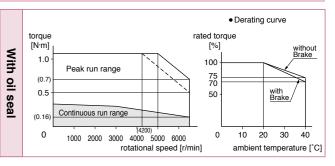
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

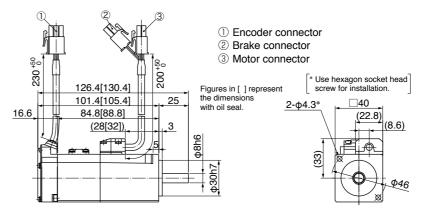
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



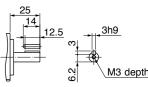


## **Dimensions**

Mass: 0.62 kg (0.64 kg with oil seal) <with brake>



Key way dimensions <Key way, center tap shaft>



For motors with protective lip, refer to P.107. For connector type IP67 motors, refer to P.109. • For the dimensions without brake, refer to the left page.

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

A6 Family

## **Specifications**

					AC100 V
Motor model *1	Motor model <sup>*1</sup> IP65			MHMF021L1	
		Multi	function type		MBDLT21SF
Applicable	Model No	RS48	RS485 communication type *2		MBDLN21SG
driver	110.	Basic	type *2		MBDLN21SE
	Frame	e sym	bol		B-frame
Power supply	capacit	у	(kVA	4)	0.5
Rated output			(V	V)	200
Rated torque			(N·n	n)	0.64
Continuous sta	all torqu	е	(N·n	(N·m) 0.76	
Momentary Ma	ax. peal	k torqu	ıe (N·n	n)	2.23
Rated current			(A(rms	))	2.1
Max. current			(A(o-p	))	10.4
Regenerative I	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	te)1 DV0P4283		No limit Note)2
Rated rotation	al spee	d	(r/mir	n)	3000
Max. rotationa	l speed		(r/mir	n)	6500
Moment of ine	rtia		Without brake		0.29
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		0.31	
Recommended moment of inertia ratio of the load and the rotor			9)3	30 times or less	
Rotary encode	r speci	ficatio	ns *3		23-bit Absolute
Resolution po			n per single turn		8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

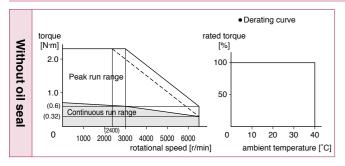
	During assembly  During operation	Radial load P-direction (N)	392
		Thrust load A-direction (N)	147
		Thrust load B-direction (N)	196
		Radial load P-direction (N)	245
		Thrust load A, B-direction (N)	98

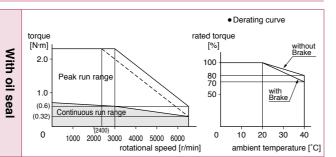
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**

Mass: 0.75 kg (0.78 kg with oil seal) <without brake> Encoder connector ② Motor connector \* Use hexagon socket head a: 97.5[101] screw for installation Key way dimensions b: 67.5[71] □60 16.5 <Key way, center tap shaft> c:51[54.5] (30.8)d: (25.3[28.8]) (2.1)Figures in [ ] represent with oil seal

For motors with protective lip, refer to P.107. For connector type IP67 motors, refer to P.110. • For the dimensions with brake, refer to the right page

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

					AC200 V
Motor model *1			IP65		MHMF022L1
		Multifunction type			MADLT15SF
Applicable	Model No	RS48	5 communication t	ype *2	MADLN15SG
driver	110.	Basic	c type *2		MADLN15SE
	Fram	e syml	bol		A-frame
Power supply	capacit	y	(1	(VA)	0.5
Rated output				(W)	200
Rated torque			1)	N·m)	0.64
Continuous sta	all torqu	ie	1)	√m)	0.76
Momentary Ma	ax. peal	k torqu	ne (1	√m)	2.23
Rated current	Rated current (A(rms)				1.4
Max. current				o-p))	6.9
Regenerative I	brake		Without option	n	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4283		No limit Note)2
Rated rotation	al spee	d	(r/i	min)	3000
Max. rotationa	l speed		(r/i	min)	6500
Moment of ine	rtia		Without brake	)	0.29
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake		0.31
Recommended moment of inertia ratio of the load and the rotor Note)3				Note)3	30 times or less
Rotary encode	r speci	ficatio	ns*3		23-bit Absolute
	Re	solutio	n per single tur	n	8388608

• Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

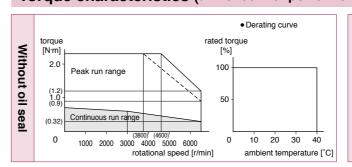
Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

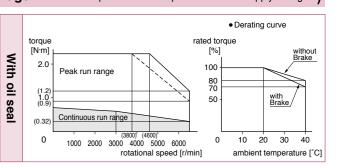
#### • Permissible load (For details, refer to P.166)

	Radial load P-direction (N)	392
During assembly	Thrust load A-direction (N)	147
docombry	Thrust load B-direction (N)	196
During	Radial load P-direction (N)	245
operation	Thrust load A, B-direction (N)	98

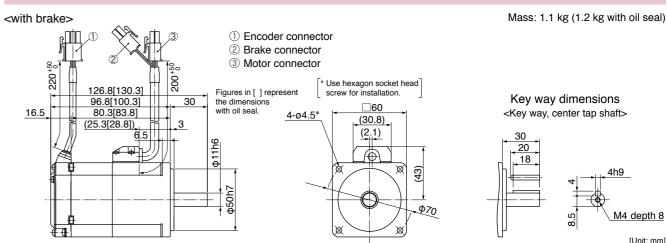
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.18.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**



For motors with protective lip, refer to P.107. For connector type IP67 motors, refer to P.110. ● For the dimensions without brake, refer to the left page.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

## **Specifications**

					AC100 V
Motor model*1			IP65		MHMF041L1
		Multi	function type		MCDLT31SF
Applicable	Model No	RS485 communication type *2		*2	MCDLN31SG
driver	110.	Basic	type *2		MCDLN31SE
	Frame	e sym	bol		C-frame
Power supply	capacit	y	(kVA	١)	0.9
Rated output			(W	/)	400
Rated torque			(N·m	1)	1.27
Continuous sta	all torqu	е	(N·m	1)	1.40
Momentary Ma	ax. peal	k torqı	ue (N⋅m	1)	4.46
Rated current			(A(rms	))	4.1
Max. current			(A(o-p	))	20.3
Regenerative I	brake		Without option		No limit Note)2
frequency (time	s/min)	Note)1	e)1 DV0P4282		No limit Note)2
Rated rotation	al spee	d	(r/mir	1)	3000
Max. rotationa	speed		(r/mir	1)	6500
Moment of ine	rtia		Without brake		0.56
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		0.58
Recommended moment of inertia ratio of the load and the rotor			)3	30 times or less	
Rotary encode	r speci	ficatio	ns <sup>*3</sup>		23-bit Absolute
	Res	solutio	n per single turn		8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

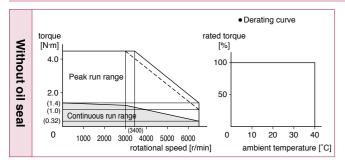
	During assembly  During operation	Radial load P-direction (N)	392
		Thrust load A-direction (N)	147
		Thrust load B-direction (N)	196
		Radial load P-direction (N)	245
		Thrust load A, B-direction (N)	98

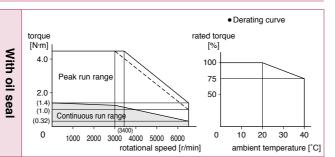
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC100 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**

Mass: 1.1 kg (1.2 kg with oil seal) <without brake> ① Encoder connector 2 Motor connector \* Use hexagon socket head a: 114.5[118] Key way dimensions b: 84.5[88] <Key way, center tap shaft> c: 68[71.5] 4-ø4.5\* (30.8)d: (42.3[45.8]) (2.1)Figures in [ ] represent the dimension with oil seal.

For motors with protective lip, refer to P.108. For connector type IP67 motors, refer to P.110. • For the dimensions with brake, refer to the right page.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

**Specifications** 

				AC200 V
Motor model *1			IP65	MHMF042L1□□
		Multi	function type	MBDLT25SF
Applicable	Model No.	RS48	5 communication type *2	MBDLN25SG
driver	140.	Basic	type *2	MBDLN25SE
	Frame	e sym	bol	B-frame
Power supply	capacity	y	(kVA)	0.9
Rated output			(W)	400
Rated torque			(N·m)	1.27
Continuous sta	all torqu	е	(N·m)	1.40
Momentary Max. peak torque (N·m)				4.46
Rated current Max. current			(A(rms))	2.1
			(A(o-p))	10.4
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2	
		Note)1	DV0P4283	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6500
Moment of ine	rtia		Without brake	0.56
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )		With brake	0.58	
Recommended moment of inertia ratio of the load and the rotor Note)3				30 times or less
Rotary encode	r speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Res	solutio	n per single turn	8388608

• Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

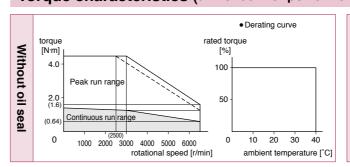
Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

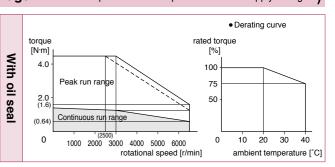
#### • Permissible load (For details, refer to P.166)

	Radial load P-direction (N)	392
During assembly	Thrust load A-direction (N)	147
dooonibiy	Thrust load B-direction (N)	196
During	Radial load P-direction (N)	245
operation	Thrust load A, B-direction (N)	98

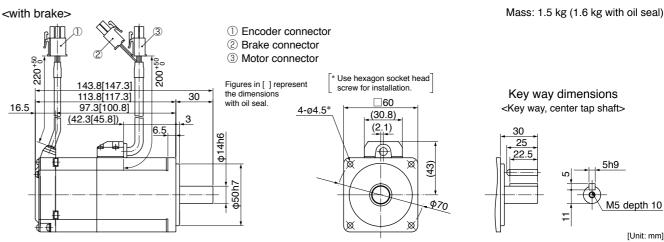
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.18.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**



For motors with protective lip, refer to P.108. For connector type IP67 motors, refer to P.110. •For the dimensions without brake, refer to the left page.

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

A6 Family

**Imformation** 

## **Specifications**

				AC200 V
Motor model *1		MHMF082L1		
		Multi	function type	MCDLT35SF
Applicable	Model No	RS485 communication type *2		MCDLN35SG
driver	140.	Basic	type *2	MCDLN35SE
	Fram	e sym	bol	C-frame
Power supply	capacit	у	(kVA)	1.3
Rated output			(W)	750
Rated torque			(N·m)	2.39
Continuous sta	all torqu	ie	(N·m)	2.86
Momentary Ma	ax. pea	k torqı	ue (N·m)	8.36
Rated current			(A(rms))	3.8
Max. current			(A(o-p))	18.8
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4283	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	1.56
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	1.66
Recommended moment of inertia ratio of the load and the rotor				20 times or less
Rotary encode	er speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Re	solutio	on per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	3.8 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

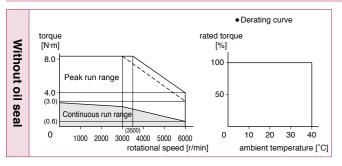
		Radial load P-direction (N)	686
	During assembly	Thrust load A-direction (N)	294
	assembly	Thrust load B-direction (N)	392
	During operation	Radial load P-direction (N)	392
		Thrust load A, B-direction (N)	147

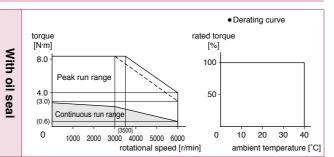
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

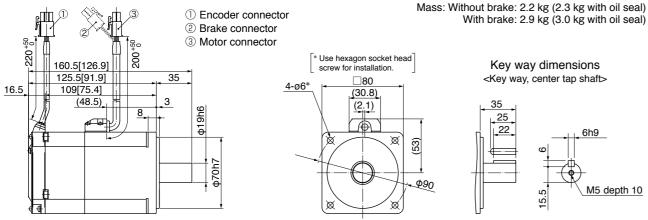
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**



Key way dimensions <Key way, center tap shaft>

With brake: 2.9 kg (3.0 kg with oil seal)

M5 depth 10

•Figures in [ ] represent the dimensions without brake.

[Unit: mm]

For motors with oil seal, refer to P.106. For motors with protective lip, refer to P.108. For connector type IP67 motors, refer to P.111.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

					AC200 V
Motor model *1	IP65			MHMF092L1	
		Multi	function type		MDDLT55SF
Applicable	Model No	RS48	RS485 communication type *2		MDDLN55SG
driver	140.	Basic type *2			MDDLN55SE
	Frame	e sym	bol		D-frame
Power supply	capacity	/		(kVA)	2.3
Rated output				(W)	1000
Rated torque				(N·m)	3.18
Continuous sta	all torqu	е		(N·m)	3.34
Momentary Ma	ax. peal	c torqu	ue	(N·m)	11.1
Rated current	ed current			(rms))	5.7
Max. current			(A	(o-p))	28.2
Regenerative I	brake		Without opti	ion	No limit Note)2
frequency (time	es/min) I	Note)1	DV0P4284		No limit Note)2
Rated rotation	al spee	d	(	r/min)	3000
Max. rotationa	l speed		(	r/min)	6000
Moment of ine	rtia		Without brake		2.03
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		2.13	
Recommended ratio of the load			Note)3	20 times or less	
Rotary encoder specifications *3					23-bit Absolute
	Res	solutio	n per single turn		8388608

 Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	3.8 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

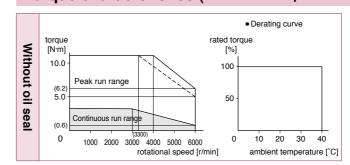
During assembly  During operation	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

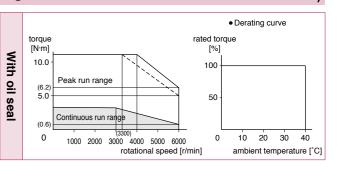
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

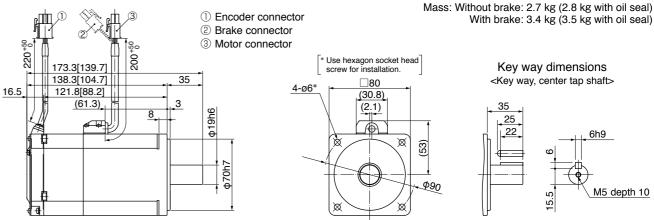
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**



•Figures in [ ] represent the dimensions without brake.

[Unit: mm]

For motors with oil seal, refer to P.106. For motors with protective lip, refer to P.108. For connector type IP67 motors, refer to P.111.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

					AC200 V
Motor model*1			IP67		MHMF102L1
		Multi	function type		MDDLT45SF
Applicable	Model No	RS48	5 communication type	e *2	MDDLN45SG
driver		Basic	type *2		MDDLN45SE
	Fram	e sym	bol		D-frame
Power supply	capacit	у	(kV	A)	1.8
Rated output			(V	V)	1000
Rated torque			(N·n	n)	4.77
Continuous sta	all torqu	ie	(N·n	n)	5.25
Momentary Ma	ax. pea	k torqı	ue (N·n	n)	14.3
Rated current			(A(rms	s))	5.2
Max. current			(A(o-p	)))	22
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	DV0P4284		No limit Note)2
Rated rotation	al spee	d	(r/mi	n)	2000
Max. rotationa	l speed		(r/mi	n)	3000
Moment of ine	rtia		Without brake		22.9
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )		With brake		24.1	
Recommended moment of inertia ratio of the load and the rotor Note)3			e)3	5 times or less	
Rotary encoder specifications *3			ns *3		23-bit Absolute
Resolution			on per single turn		8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

	During assembly During operation	Radial load P-direction (N)	980
		Thrust load A-direction (N)	588
		Thrust load B-direction (N)	686
		Radial load P-direction (N)	490
		Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

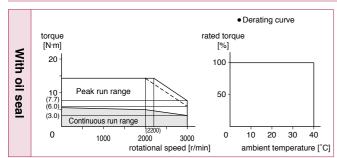
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Mass: Without brake: 6.1 kg

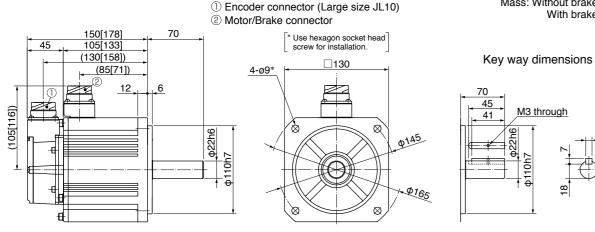
With brake: 7.6 kg

[Unit: mm]

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.112. • Figures in [ ] represent the dimensions with brake.

<a href="#"><Cautions></a> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

					AC200 V
Motor model *1	IP67			MHMF152L1	
		Multif	function type	MDDLT55SF	
Applicable	Model No	RS485 communication type *2		n type *2	MDDLN55SG
driver		Basic type *2			MDDLN55SE
	Frame	sym	bol		D-frame
Power supply	capacity	,		(kVA)	2.3
Rated output				(W)	1500
Rated torque				(N·m)	7.16
Continuous sta	all torque	е		(N·m)	7.52
Momentary Ma	ax. peak	torqu	ıe	(N·m)	21.5
Rated current			(A	(rms))	8.0
Max. current			(/	A(o-p))	34
Regenerative I	orake		Without opt	ion	No limit Note)2
frequency (time	s/min) N	lote)1	DV0P4284		No limit Note)2
Rated rotation	al speed	t		(r/min)	2000
Max. rotationa	speed			(r/min)	3000
Moment of ine	rtia		Without bra	ıke	33.4
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		34.6
Recommended moment of inertia ratio of the load and the rotor Note)3					5 times or less
Rotary encoder specifications *3			ns*3		23-bit Absolute
	Res	olutio	on per single turn		8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.' Do not use this for braking the motor in motion.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

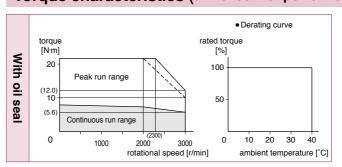
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

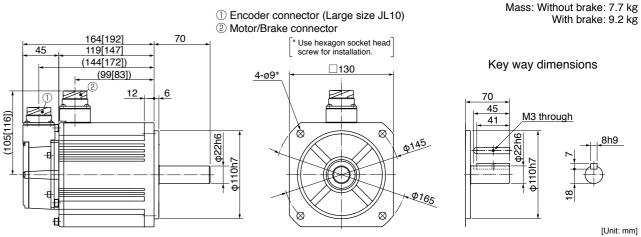
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.112. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

83 MINAS A6 Family

MINAS A6 Family 84

A6 Family

				AC200 V
Motor model*1			IP67	MHMF202L1
		Multi	unction type	MEDLT83SF
Applicable	Model No.	RS48	communication type	MEDLN83SG
driver		Basic	type *2	MEDLN83SE
	Fram	e sym	ool	E-frame
Power supply	capacit	у	(kVA)	3.8
Rated output			(W)	2000
Rated torque			(N·m)	9.55
Continuous sta	ntinuous stall torque (N·m)		11.5	
Momentary Ma	ax. pea	k torqu	ıe (N·m)	28.6
Rated current			(A(rms))	12.5
Max. current			(A(o-p))	53
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285	No limit Note)2
Rated rotation	al spee	d	(r/min)	2000
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	55.7
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )		With brake	61.0	
Recommended moment of in ratio of the load and the roto				5 times or less
Rotary encode	er speci	ficatio	าร <sup>*3</sup>	23-bit Absolute
	Re	solutic	n per single turn	8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

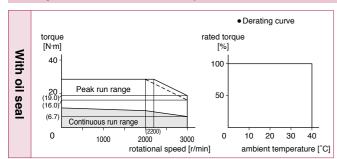
		Radial load P-direction (N)	1666
	uring sembly	Thrust load A-direction (N)	784
uo	assembly	Thrust load B-direction (N)	980
Dι	During operation	Radial load P-direction (N)	784
ор		Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

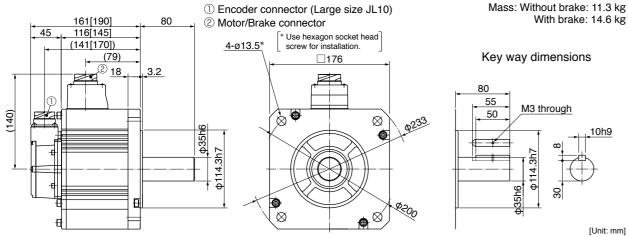
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.112. • Figures in [ ] represent the dimensions with brake.

<a>Cautions></a> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

				AC200 V
Motor model *1	IP67			MHMF302L1
		Multi	function type	MFDLTA3SF
Applicable	Model No	RS485 communication type *2		MFDLNA3SG
driver	140.	Basic	type *2	MFDLNA3SE
	Fram	e sym	bol	F-frame
Power supply	capacit	у	(kVA)	4.5
Rated output			(W)	3000
Rated torque			(N·m)	14.3
Continuous sta	all torqu	ie	(N·m)	17.2
Momentary Ma	ax. pea	k torqı	ue (N·m)	43.0
Rated current			(A(rms))	17.0
Max. current			(A(o-p))	72
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al spee	d	(r/min)	2000
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	85.3
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake	90.7
Recommended moment of inertia ratio of the load and the rotor				5 times or less
Rotary encoder specifications *3				23-bit Absolute
Resolution per single turn				8388608

200 V MHMF 3.0 kW High inertia 176 mm sq.

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.' Do not use this for braking the motor in motion.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

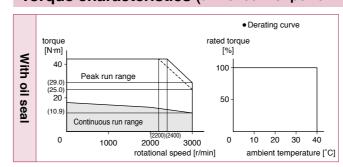
During assembly  During operation	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

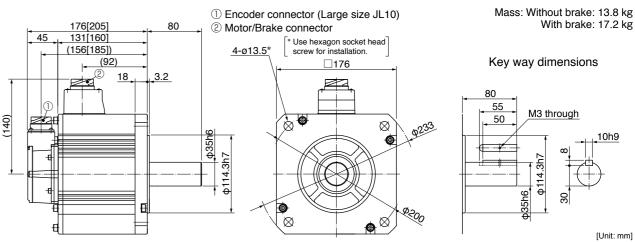
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.112. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

A6 Family

## **Specifications**

				AC200 V
Motor model*1	IP67			MHMF402L1□□
		Multi	function type	MFDLTB3SF
Applicable	Model No.	RS48	5 communication type *2	MFDLNB3SG
driver	140.	Basic	type *2	MFDLNB3SE
	Fram	e sym	bol	F-frame
Power supply	capacit	у	(kVA)	7.5
Rated output			(W)	4000
Rated torque			(N·m)	19.1
Continuous sta	all torqu	ie	(N·m)	22.0
Momentary Ma	ax. pea	k torqu	ue (N·m)	57.3
Rated current		20		
Max. current (A(o-p))				85
Regenerative brake Without option				No limit Note)2
_		DV0P4285×2	No limit Note)2	
Rated rotation	al spee	d	(r/min)	2000
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	104
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	110
Recommended moment of inertia ratio of the load and the rotor Note)3				5 times or less
Rotary encode	er speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Resolution p			8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

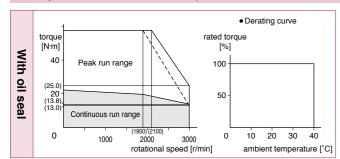
	During assembly During operation	Radial load P-direction (N)	1666
		Thrust load A-direction (N)	784
		Thrust load B-direction (N)	980
		Radial load P-direction (N)	784
		Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

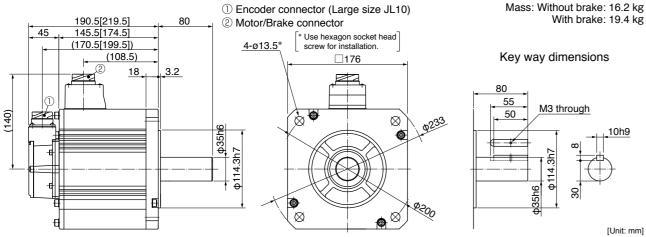
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.112. • Figures in [ ] represent the dimensions with brake.

<a>Cautions></a> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

					AC200 V
Motor model *1	IP67			MHMF502L1□□	
		Multif	function type		MFDLTB3SF
Applicable	Model No	RS485	S485 communication type *2		MFDLNB3SG
driver	140.	Basic	type *2		MFDLNB3SE
	Frame	e sym	bol		F-frame
Power supply	capacit	y	(k	VA)	7.5
Rated output				(W)	5000
Rated torque			(N	l·m)	23.9
Continuous sta	all torqu	е	(N	l·m)	26.3
Momentary Ma	ax. peal	k torqu	ıe (N	l·m)	71.6
Rated current (A(rn				ns))	23.3
Max. current (A(o-p))				99	
Regenerative I	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285×2		No limit Note)2
Rated rotation	al spee	d	(r/n	nin)	2000
Max. rotationa	l speed		(r/n	nin)	3000
Moment of ine	rtia		Without brake		146
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		151	
Recommended moment of inertia ratio of the load and the rotor			ote)3	5 times or less	
Rotary encode	r speci	23-bit Absolute			
	Re	solutio	n per single turr	า	8388608

#### Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

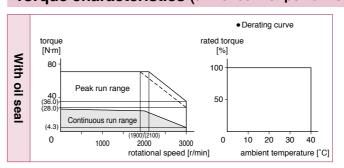
	Radial load P-direction (N)	1666
During assembly	Thrust load A-direction (N)	784
assembly	Thrust load B-direction (N)	980
During	Radial load P-direction (N)	784
operation	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

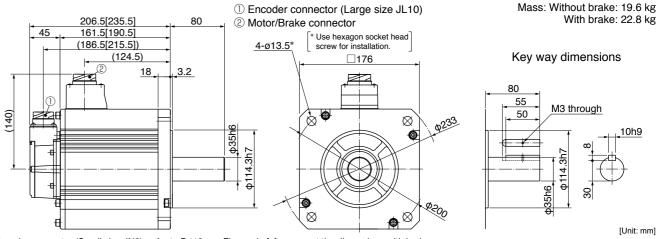
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.112. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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## **Specifications**

				AC200 V
Motor model *1	del <sup>*1</sup> IP67			MDMF102L1
			function type	MDDLT45SF
Applicable	Model No.	RS48	5 communication type	MDDLN45SG
driver		Basic	type *2	MDDLN45SE
	Fram	e sym	bol	D-frame
Power supply	capacit	у	(kVA	1.8
Rated output			(W	1000
Rated torque			(N·m	4.77
Continuous sta	all torqu	ie	(N·m	5.25
Momentary Ma	ax. pea	k torqı	ue (N⋅m	14.3
Rated current (A(rms))			5.2	
Max. current			(A(o-p)	) 22
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4284	No limit Note)2
Rated rotation	al spee	d	(r/min	2000
Max. rotationa	l speed		(r/min	3000
Moment of ine	rtia		Without brake	6.18
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )		With brake	7.40	
Recommended moment of inertia ratio of the load and the rotor				10 times or less
Rotary encode	er speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
Resolution			n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

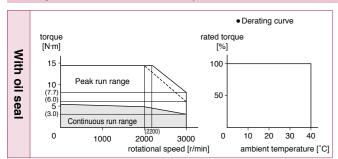
		Radial load P-direction (N)	980
	During assembly	Thrust load A-direction (N)	588
	assembly	Thrust load B-direction (N)	686
	During operation	Radial load P-direction (N)	490
		Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

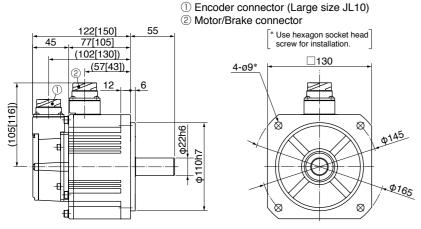
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Mass: Without brake: 4.6 kg With brake: 6.1 kg

Key way dimensions

M3 through [Unit: mm]

Encoder connector (Small size JN2), refer to P.113. • Figures in [ ] represent the dimensions with brake.

<a>Cautions></a> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

					AC200 V
Motor model *1		IP67			MDMF152L1
		Multi	function type		MDDLT55SF
Applicable	Model No	RS48	5 communicatio	n type *2	MDDLN55SG
driver	140.	Basic	c type *2		MDDLN55SE
	Frame	sym	bol		D-frame
Power supply	capacity	/		(kVA)	2.3
Rated output				(W)	1500
Rated torque				(N·m)	7.16
Continuous sta	all torqu	е		(N·m)	7.52
Momentary Ma	ax. peak	torqu	ue	(N·m)	21.5
Rated current			(A	(rms))	8.0
Max. current				A(o-p))	34
Regenerative brake			Without option		No limit Note)2
frequency (times/min) Note)1		Note)1	DV0P4284		No limit Note)2
Rated rotation	al speed	b		(r/min)	2000
Max. rotationa	speed			(r/min)	3000
Moment of ine	rtia		Without bra	ıke	9.16
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		10.4	
Recommended moment of ir ratio of the load and the roto				Note)3	10 times or less
Rotary encode	r specif	icatio	ns*³		23-bit Absolute
	Res	solutio	n per single turn		8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

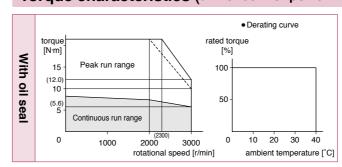
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

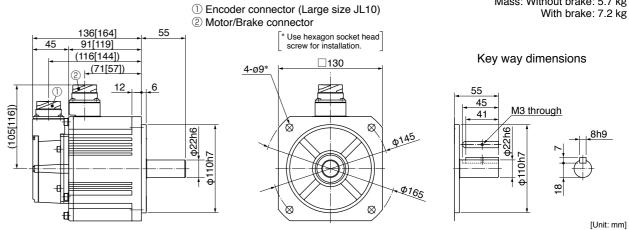
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.113. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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**Imformation** 

Mass: Without brake: 5.7 kg With brake: 7.2 kg

A6 Family

## **Specifications**

				AC200 V
Motor model 11 IP67			MDMF202L1□□	
		Multi	function type	MEDLT83SF
Applicable	Model No.	RS48	5 communication type *	MEDLN83SG
driver	110.	Basic	type *2	MEDLN83SE
	Frame	sym	bol	E-frame
Power supply	capacity	/	(kVA)	3.8
Rated output			(W)	2000
Rated torque			(N·m)	9.55
Continuous sta	all torqu	е	(N·m)	10.0
Momentary Ma	ax. peak	torqu	ue (N·m)	28.6
Rated current			(A(rms))	9.9
Max. current			(A(o-p))	42
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min) I	Note)1	DV0P4285	No limit Note)2
Rated rotation	al speed	d	(r/min)	2000
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	12.1
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	13.3
Recommended moment of inertia ratio of the load and the rotor				10 times or less
Rotary encode	er specif	icatio	ns*3	23-bit Absolute
Resolution			n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

During assembly During		Radial load P-direction (N)	980
		Thrust load A-direction (N)	588
	docombry	Thrust load B-direction (N)	686
	During	Radial load P-direction (N)	490
	operation	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

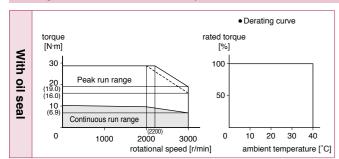
Mass: Without brake: 6.9 kg

M3 through

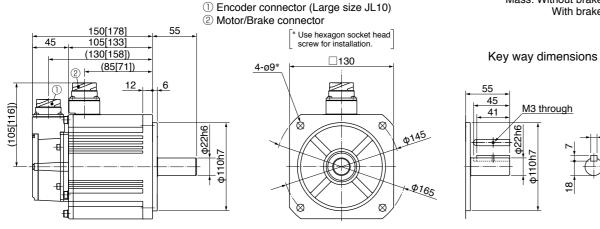
With brake: 8.4 kg

[Unit: mm]

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.113. • Figures in [ ] represent the dimensions with brake.

<a href="#"><Cautions></a> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

					AC200 V
Motor model *1	IP67			MDMF302L1	
		Multif	function type		MFDLTA3SF
Applicable	Model No	RS48	5 communication	type *2	MFDLNA3SG
driver	140.	Basic type *2			MFDLNA3SE
	Frame	e sym	bol		F-frame
Power supply	capacity	/	(	kVA)	4.5
Rated output				(W)	3000
Rated torque			(	N·m)	14.3
Continuous sta	all torqu	е	(	N·m)	15.0
Momentary Ma	ax. peal	k torqu	ie (	N·m)	43.0
Rated current			(A(I	rms))	16.4
Max. current			(A(	o-p))	70
Regenerative I	orake		Without option	n	No limit Note)2
frequency (time	s/min)	Note)1	DV0P4285×2	2	No limit Note)2
Rated rotation	al spee	d	(r	/min)	2000
Max. rotationa	l speed		(r	/min)	3000
Moment of ine	rtia		Without brak	е	18.6
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		19.6
Recommended moment of ine ratio of the load and the rotor				Note)3	10 times or less
Rotary encode	r speci	icatio	ns*³		23-bit Absolute
Resolution			n per single tu	rn	8388608

 Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.' Do not use this for braking the motor in motion.

Static friction torque (N·m)	22.0 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

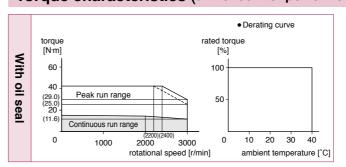
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

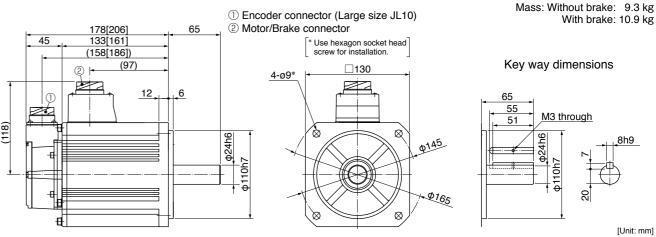
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.113. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

A6 Family

## **Specifications**

				AC200 V
Motor model *1	Motor model*1 IP67			MDMF402L1
		Multi	unction type	MFDLTB3SF
Applicable	Model No.	RS48	communication type *2	MFDLNB3SG
driver		Basic	type *2	MFDLNB3SE
	Fram	e sym	ool	F-frame
Power supply	capacit	у	(kVA)	7.5
Rated output			(W)	4000
Rated torque			(N·m)	19.1
Continuous sta	all torqu	ie	(N·m)	22.0
Momentary Ma	ax. pea	k torqı	ie (N·m)	57.3
Rated current			(A(rms))	20.0
Max. current			(A(o-p))	85
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al spee	d	(r/min)	2000
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	46.9
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake	52.3	
Recommended moment of inert ratio of the load and the rotor				10 times or less
Rotary encoder specification Resolutio			ns <sup>*3</sup>	23-bit Absolute
			n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

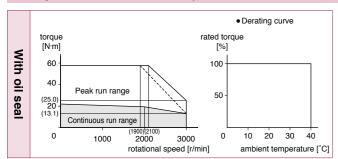
	During assembly	Radial load P-direction (N)	1666
		Thrust load A-direction (N)	784
	docombry	Thrust load B-direction (N)	980
	During	Radial load P-direction (N)	784
	operation	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

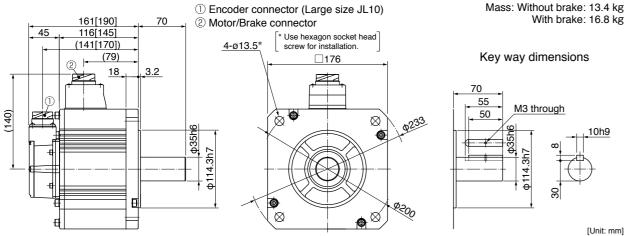
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.113. • Figures in [ ] represent the dimensions with brake.

<a>Cautions></a> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

				AC200 V
Motor model *1	IP67			MDMF502L1
		Multi	function type	MFDLTB3SF
Applicable	Model No	RS485 communication type *2		MFDLNB3SG
driver	140.	Basic	c type *2	MFDLNB3SE
	Fram	e sym	bol	F-frame
Power supply	capacit	у	(kVA)	7.5
Rated output			(W)	5000
Rated torque			(N·m)	23.9
Continuous sta	all torqu	ie	(N·m)	26.3
Momentary Ma	ax. pea	k torqı	ue (N·m)	71.6
Rated current			(A(rms))	23.3
Max. current			(A(o-p))	99
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al spee	d	(r/min)	2000
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	58.2
of rotor ( $\times 10^{-4}$	kg·m²)		With brake	63.0
Recommended moment of in ratio of the load and the roto				10 times or less
Rotary encoder specifications *3			ns <sup>*3</sup>	23-bit Absolute
Resolution			n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

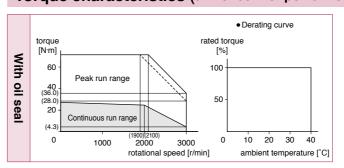
During assembly  During operation	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

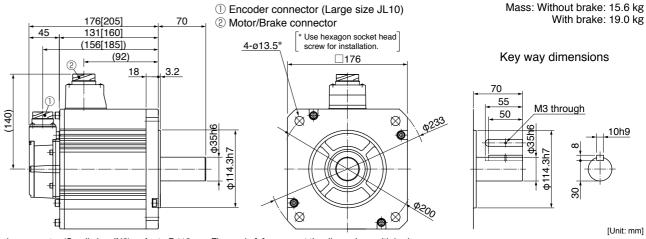
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.113. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

**Specifications** 

				AC200 V
Motor model *1			IP67	MGMF092L1□□
			function type	MDDLT45SF
Applicable	Model No	RS48	5 communication type *2	MDDLN45SG
driver	140.	Basic	type *2	MDDLN45SE
	Fram	e sym	bol	D-frame
Power supply	capacit	у	(kVA)	1.8
Rated output			(W)	850
Rated torque			(N·m)	5.41
Continuous sta	all torqu	ie	(N·m)	5.41
Momentary Ma	ax. pea	k torqu	ue (N·m)	14.3
Rated current			(A(rms))	5.9
Max. current			(A(o-p))	22
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4284	No limit Note)2
Rated rotation	al spee	d	(r/min)	1500
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	6.18
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	7.40
Recommended moment of inertia ratio of the load and the rotor Note)3				10 times or less
Rotary encoder specifications *3  Resolution pe			ns <sup>∗3</sup>	23-bit Absolute
			n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

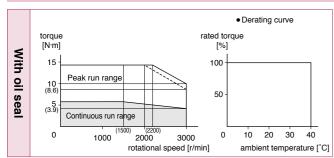
	During assembly  During operation	Radial load P-direction (N)	980
		Thrust load A-direction (N)	588
		Thrust load B-direction (N)	686
		Radial load P-direction (N)	686
		Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

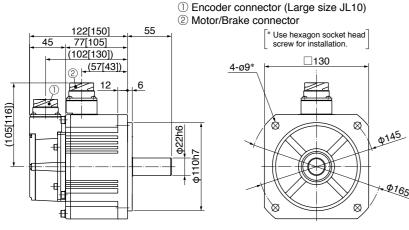
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

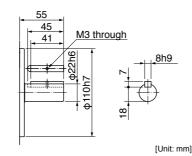


## **Dimensions**



Mass: Without brake: 4.6 kg With brake: 6.1 kg

Key way dimensions



Encoder connector (Small size JN2), refer to P.114. • Figures in [ ] represent the dimensions with brake.

<a>Cautions></a> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Middle inertia MGMF 1.3 kW Low speed/High torque type 130 mm sq.

## **Specifications**

					AC200 V
Motor model *1		IP67			MGMF132L1□□
		Multif	function type		MDDLT55SF
Applicable	Model No	RS48	5 communication t	ype *2	MDDLN55SG
driver	110.	Basic	type *2		MDDLN55SE
	Frame	e syml	bol		D-frame
Power supply	capacity	/	(I	(VA)	2.3
Rated output				(W)	1300
Rated torque			1)	V·m)	8.28
Continuous sta	all torqu	е	1)	V·m)	8.28
Momentary Ma	ax. peal	c torqu	ue (I	V·m)	23.3
Rated current			(A(rı	ms))	9.3
Max. current			(A(d	o-p))	37
Regenerative I	orake		Without option	n	No limit Note)2
frequency (time	s/min)	Note)1	DV0P4284		No limit Note)2
Rated rotation	al spee	d	(r/	min)	1500
Max. rotationa	l speed		(r/	min)	3000
Moment of ine	rtia		Without brake	)	9.16
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		10.4
Recommended moment of inertia ratio of the load and the rotor Note)3					10 times or less
Rotary encoder specifications *3					23-bit Absolute
	solutio	n per single tur	'n	8388608	

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

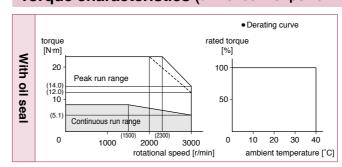
	Radial load P-direction (N)	980
During assembly	Thrust load A-direction (N)	588
assembly	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

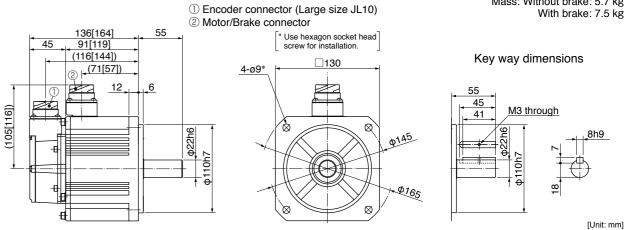
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.114. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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**Imformation** 

Mass: Without brake: 5.7 kg

				AC200 V
Motor model*1			IP67	MGMF182L1□□
		Multi	function type	MEDLT83SF
Applicable	Model No	RS48	5 communication type *2	MEDLN83SG
driver		Basic	type *2	MEDLN83SE
	Frame	sym	bol	E-frame
Power supply	capacity	,	(kVA)	3.8
Rated output			(W)	1800
Rated torque			(N·m)	11.5
Continuous sta	all torqu	е	(N·m)	11.5
Momentary Ma	ax. peak	torqu	ue (N·m)	28.7
Rated current			(A(rms))	11.8
Max. current			(A(o-p))	42
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min) N	Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al speed	t	(r/min)	1500
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	12.1
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	13.3
Recommende ratio of the loa		10 times or less		
Rotary encoder specifications *3				23-bit Absolute
	Res	olutic	n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

	During assembly  During operation	Radial load P-direction (N)	980
		Thrust load A-direction (N)	588
		Thrust load B-direction (N)	686
		Radial load P-direction (N)	686
		Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

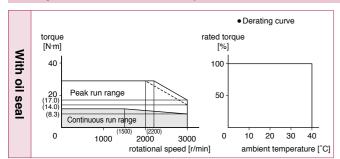
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

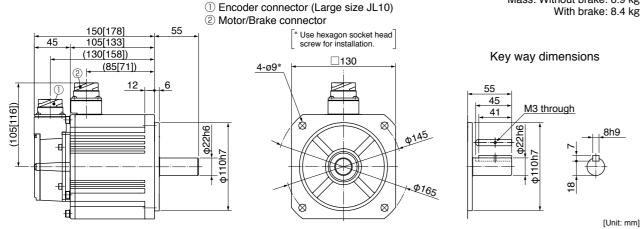
Mass: Without brake: 6.9 kg

[Unit: mm]

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.114. • Figures in [ ] represent the dimensions with brake.

<a>Cautions></a> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## **Specifications**

MGMF 2.9 kW

					AC200 V
Motor model *1		IP67			MGMF292L1□□
		Multif	function type		MFDLTB3SF
Applicable	Model No	RS485	5 communication ty	pe *2	MFDLNB3SG
driver	140.	Basic	type *2		MFDLNB3SE
	Frame	e sym	bol		F-frame
Power supply	capacity	y	(k\	VA)	7.5
Rated output			(	W)	2900
Rated torque			(N	·m)	18.5
Continuous sta	all torqu	е	(N	·m)	18.5
Momentary Ma	ax. peal	k torqu	ue (N	·m)	45.2
Rated current			(A(rm	ıs))	19.3
Max. current			(A(o-	p))	67
Regenerative I	orake		Without option		No limit Note)2
frequency (time	s/min)	Note)1	DV0P4285×2		No limit Note)2
Rated rotation	al spee	d	(r/m	nin)	1500
Max. rotationa	l speed		(r/m	nin)	3000
Moment of ine	rtia		Without brake		46.9
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake		52.3
Recommended moment of inertia ratio of the load and the rotor				ote)3	10 times or less
Rotary encoder specifications *3					23-bit Absolute
Resolution per single turn				1	8388608

Middle inertia

.176 mm sq.

Low speed/High torque type

• Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

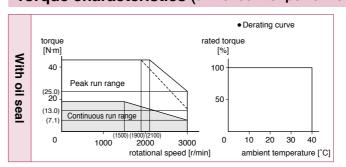
During assembly During operation	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

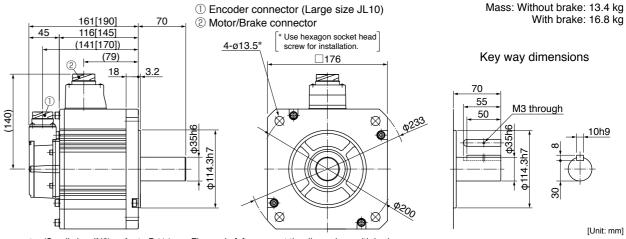
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Encoder connector (Small size JN2), refer to P.114. • Figures in [ ] represent the dimensions with brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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## **Specifications**

				AC200 V
Motor model*1		MGMF442L1□□		
			function type	MFDLTB3SF
Applicable	Model No.	RS48	5 communication type *2	MFDLNB3SG
driver		Basic	type *2	MFDLNB3SE
	Frame	sym	bol	F-frame
Power supply	capacity	/	(kVA)	7.5
Rated output			(W)	4400
Rated torque			(N·m)	28.0
Continuous sta	all torqu	е	(N·m)	28.0
Momentary Ma	ax. peak	torqu	ue (N·m)	70.0
Rated current			(A(rms))	27.2
Max. current			(A(o-p))	96
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min) N	Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al speed	t	(r/min)	1500
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	58.2
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	63.0
Recommende ratio of the loa				10 times or less
Rotary encode	er specif	icatio	ns <sup>*3</sup>	23-bit Absolute
	Res	olutic	n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) (This brake will be released when it is energized.) Do not use this for braking the motor in motion.

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

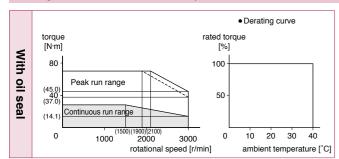
	Radial load P-direction (N)	1666
During assembly	Thrust load A-direction (N)	784
assembly	Thrust load B-direction (N)	980
During	Radial load P-direction (N)	1470
operation	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor
- \*2 Basic type and RS485 communication type are "Position control type".

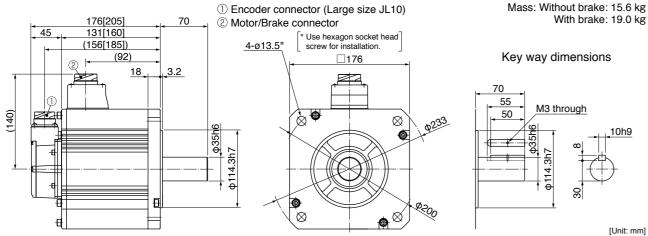
Detail of model designation, refer to P.18.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**

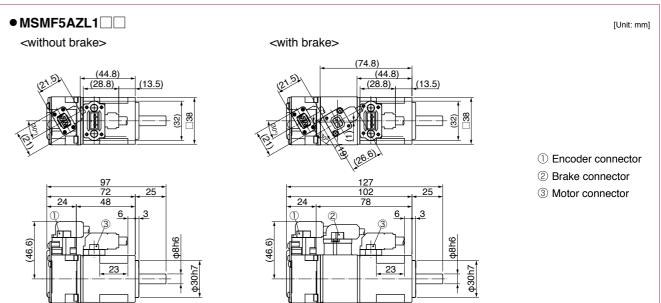


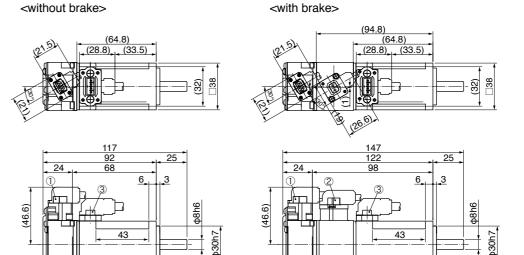
Encoder connector (Small size JN2), refer to P.114. • Figures in [ ] represent the dimensions with brake.

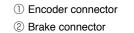
**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

# MSMF 50 W to 200 W Connector type (IP67)

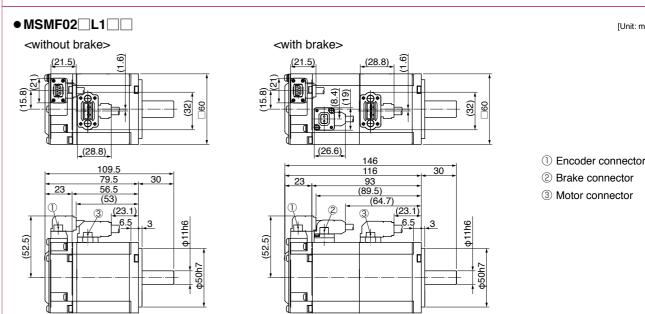
● MSMF01 L1 □







3 Motor connector



<sup>\*</sup> For motor specifications and mounting dimensions (on flange face), refer to P.51 to P.56.

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Imformation

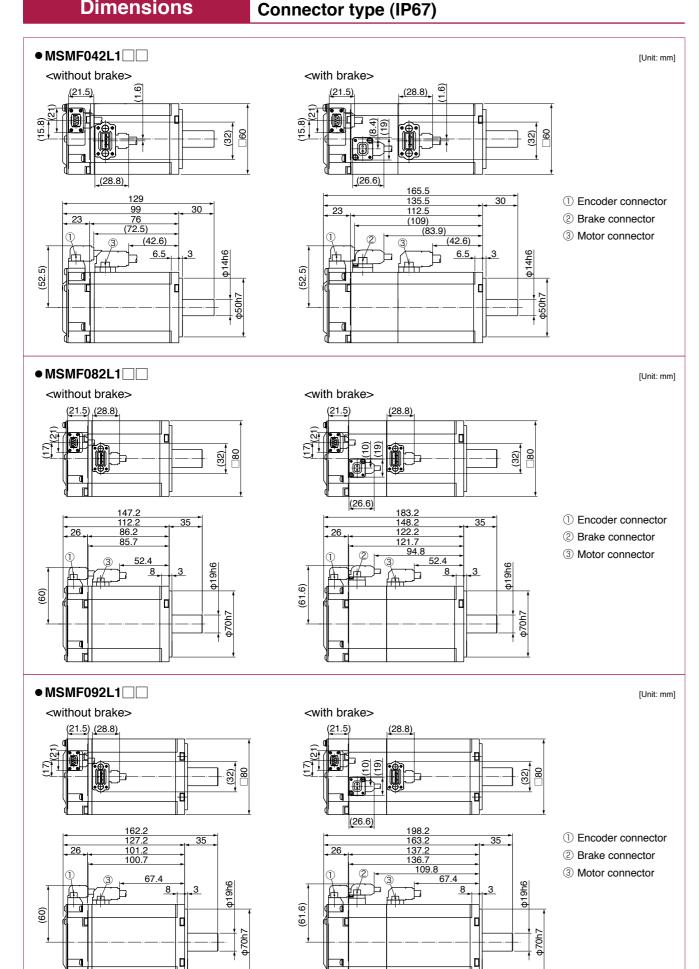
[Unit: mm]

[Unit: mm]

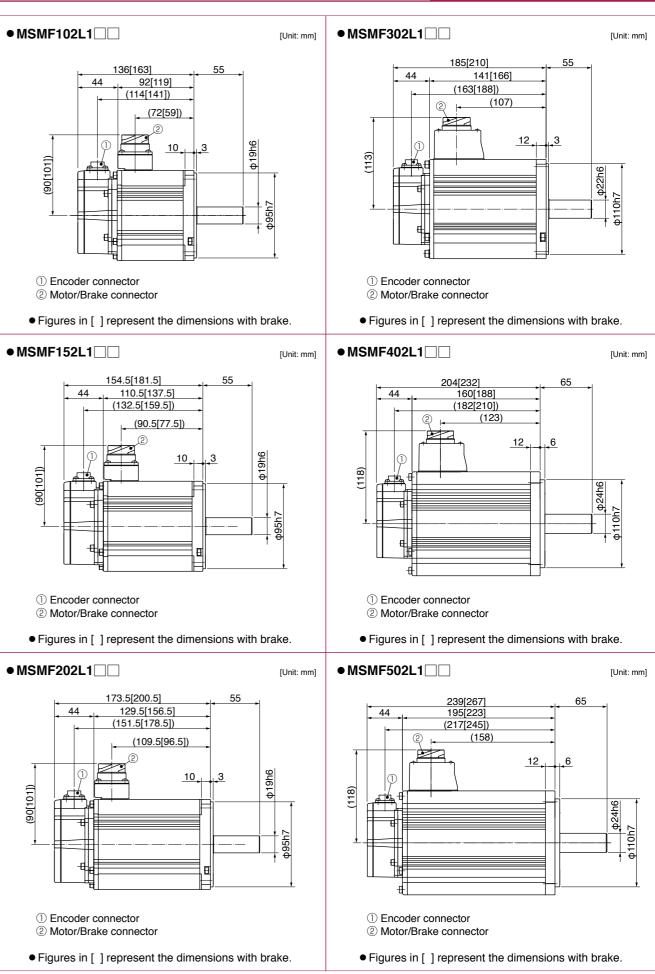
## MSMF 1.0 kW to 5.0 kW Small size connector (JN2)

Imformation



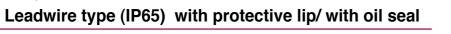


MSMF 400 W to 1000 W

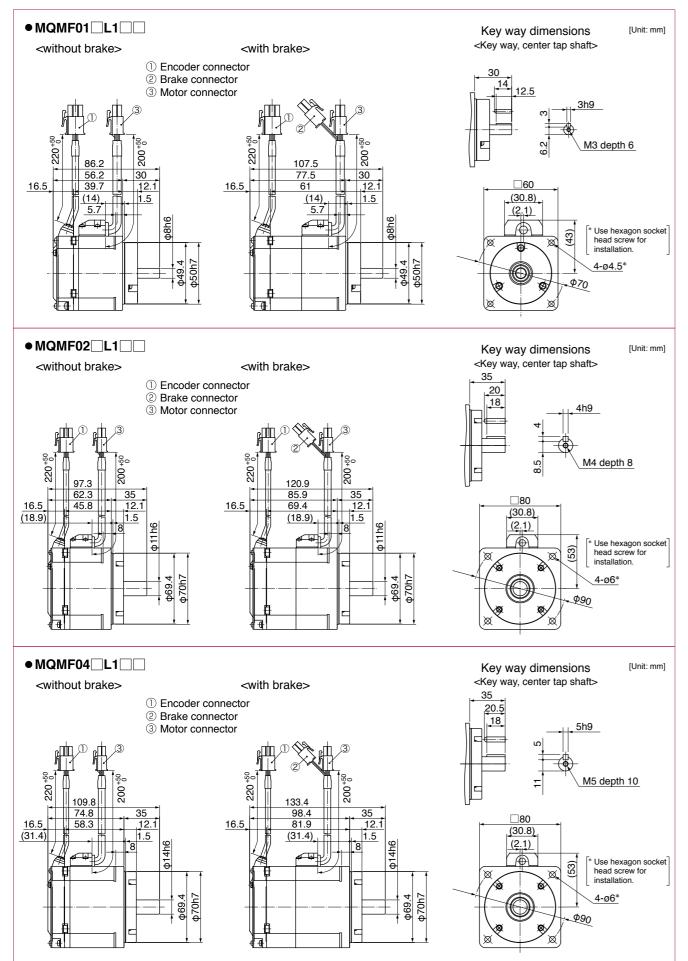


<sup>\*</sup> For motor specifications and mounting dimensions (on flange face), refer to P.61 to P.66.

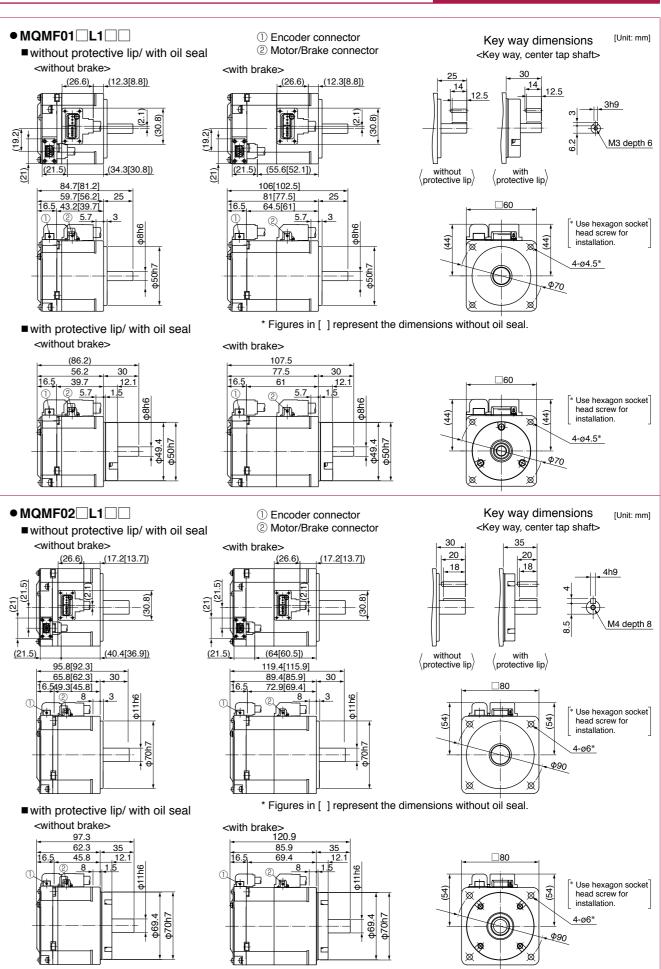
<sup>\*</sup> For motor specifications and mounting dimensions (on flange face), refer to P.57 to P.60.



MQMF 100 W to 400 W



<sup>\*</sup> For motors specifications, refer to P.67 to P.72.



<sup>\*</sup> For motors specifications, refer to P.67 to P.70.

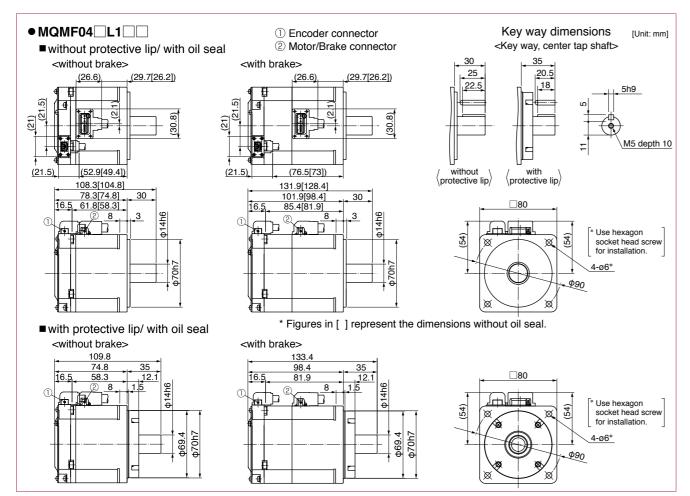
**MQMF 100 W, 200 W** 

Connector type (IP67)

# MHMF 750 W, 1000 W

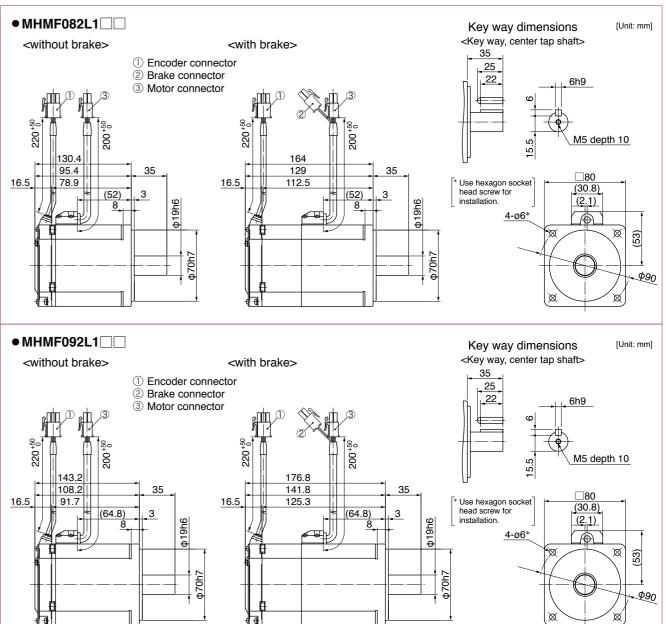
Leadwire type (IP65) with oil seal





**MQMF 400 W** 

**Connector type (IP67)** 



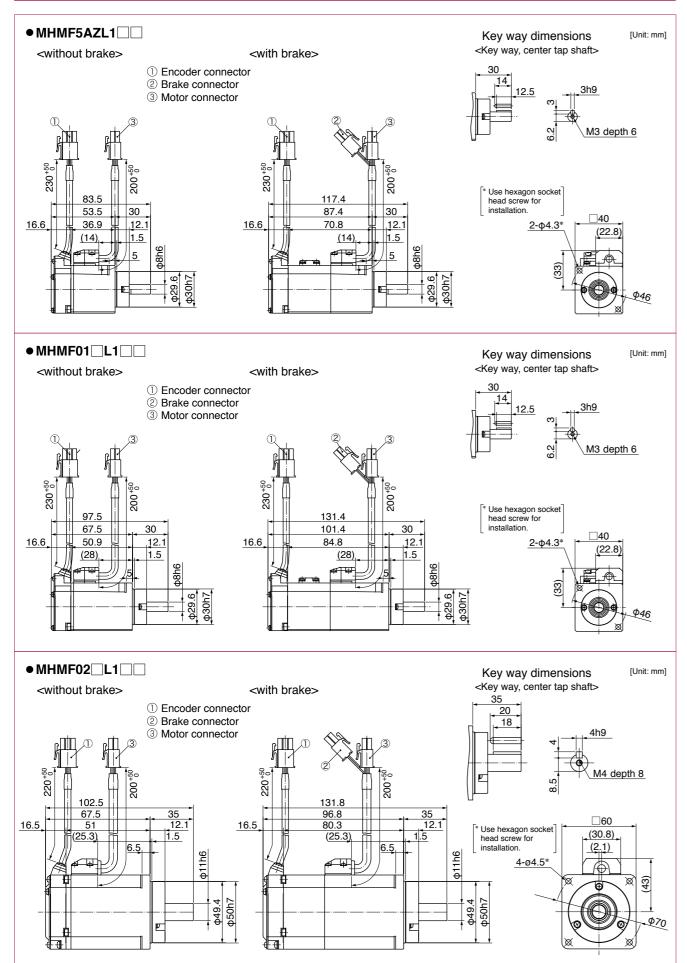
<sup>\*</sup> For motors specifications, refer to P.81, P.82.

<sup>\*</sup> For motors specifications, refer to P.71, P.72.

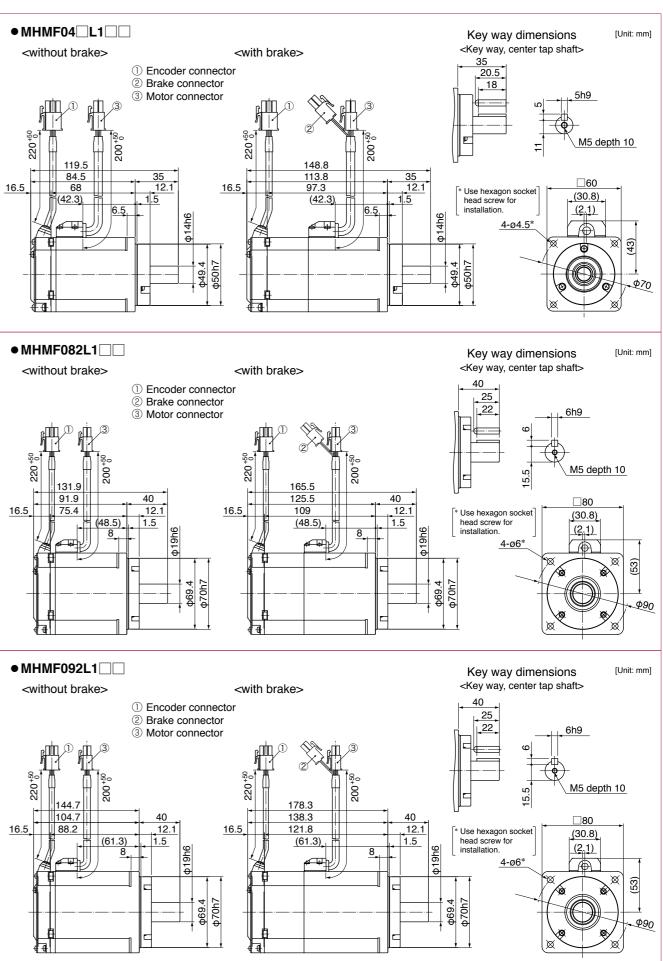
Leadwire type (IP65) with protective lip/ with oil seal

MHMF 400 W to 1000 W





<sup>\*</sup> For motors specifications, refer to P.73 to P.78.

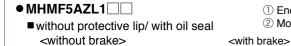


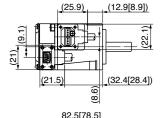
<sup>\*</sup> For motors specifications, refer to P.79 to P.82.

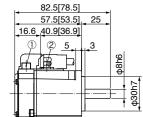
## MHMF 200 W, 400 W Connector type (IP67)

Imformation

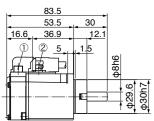
## **Dimensions**



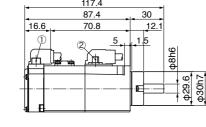




■ with protective lip/ with oil seal <without brake>



■ without protective lip/ with oil seal



MHMF 50 W, 100 W

**Connector type (IP67)** 

① Encoder connector

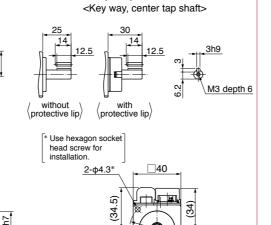
② Motor/Brake connector

116.4[112.4]

91.4[87.4]

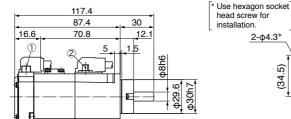
74.8[70.8]

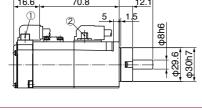
<with brake>

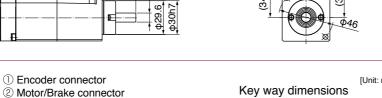


Key way dimensions

\* Figures in [ ] represent the dimensions without oil seal.

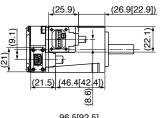






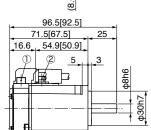
without

2-ф4.3\*

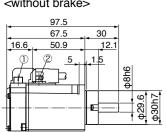


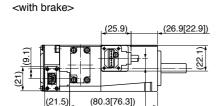
● MHMF01 □ L1 □ □

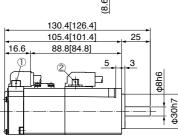
<without brake>

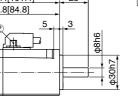


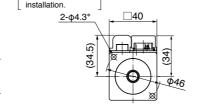
■ with protective lip/ with oil seal <without brake>









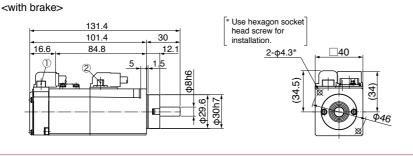


with protective lip

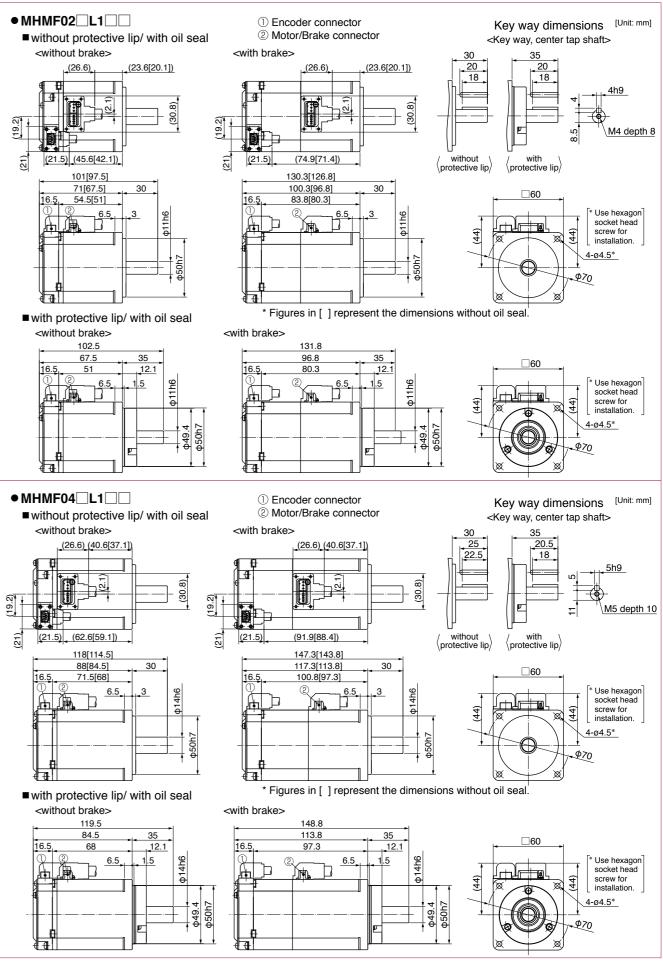
<Key way, center tap shaft>

M3 depth 6

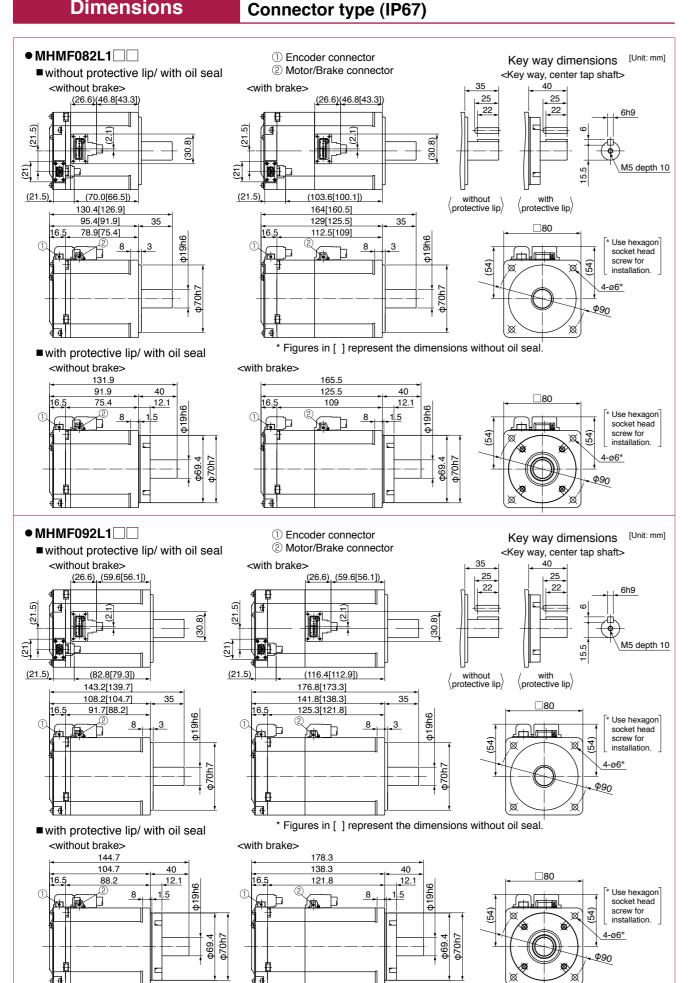
\* Figures in [ ] represent the dimensions without oil seal.



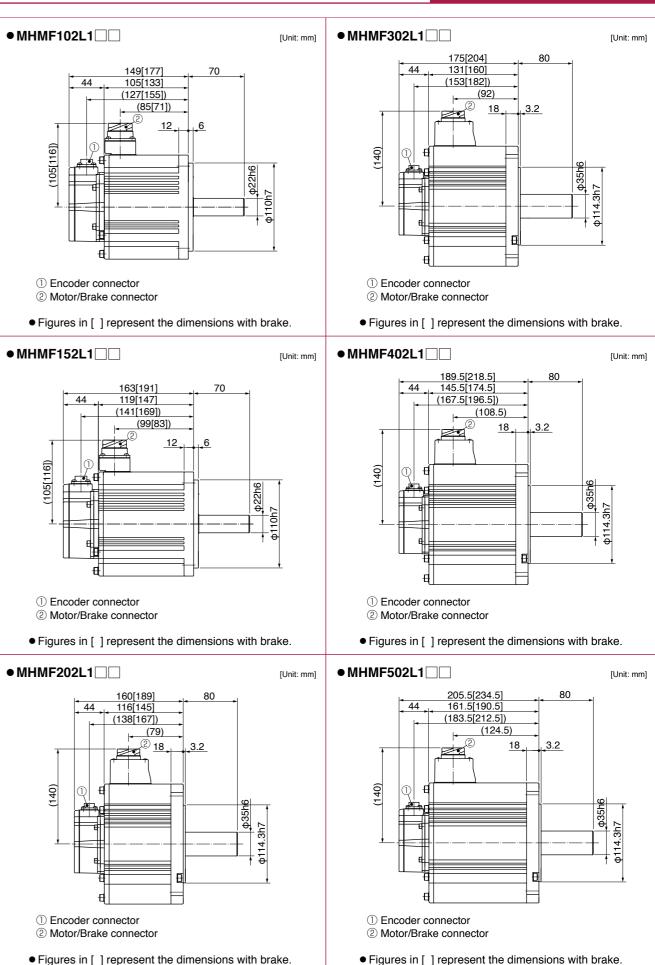
<sup>\*</sup> For motors specifications, refer to P.73 to P.76.



<sup>\*</sup> For motors specifications, refer to P.77 to P.80.



MHMF 750 W, 1000 W



<sup>\*</sup> For motor specifications and mounting dimensions (on flange face), refer to P.83 to P.88.

111 MINAS A6 Family

<sup>\*</sup> For motors specifications, refer to P.81, P.82.

77[105]

(99[127])

(57[43])

● MDMF102L1 □ □

## MGMF 0.85 kW to 4.4 kW Small size connector (JN2)

177[205] 133[161]

(155[183])

(97)

[Unit: mm]

MDMF 1.0 kW to 5.0 kW

● MDMF302L1 □ □

Small size connector (JN2)

[Unit: mm]

[Unit: mm]

Imformation



[Unit: mm]

[Unit: mm]

- Figures in [ ] represent the dimensions with brake.

160[189] 116[145] (138[167]) 18\_ (1) Encoder connector ② Motor/Brake connector

● MGMF442L1□□□

[Unit: mm] 175[204] 131[160] (153[182]) (92)18 ① Encoder connector

• Figures in [ ] represent the dimensions with brake.

② Motor/Brake connector

● MGMF092L1 □ □

44 (99[127]) (57[43])

(1) Encoder connector ② Motor/Brake connector

● MGMF132L1 □ □

(105[116])

① Encoder connector

① Encoder connector

② Motor/Brake connector

● MGMF182L1□□□

② Motor/Brake connector

• Figures in [ ] represent the dimensions with brake.

91[119]

(113[141])

② <del>| (71[57])</del>

• Figures in [ ] represent the dimensions with brake.

105[133]

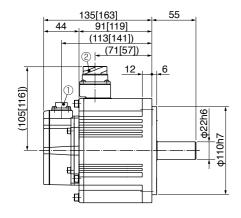
(127[155])

(85[71])

• Figures in [ ] represent the dimensions with brake.

● MDMF152L1 □ □ [Unit: mm]

• Figures in [ ] represent the dimensions with brake.

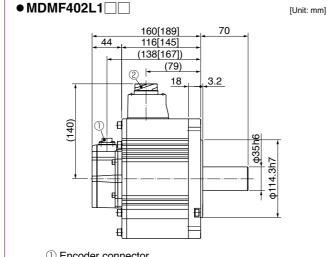


① Encoder connector

(1) Encoder connector

② Motor/Brake connector

- ② Motor/Brake connector
- Figures in [ ] represent the dimensions with brake.



• Figures in [ ] represent the dimensions with brake.

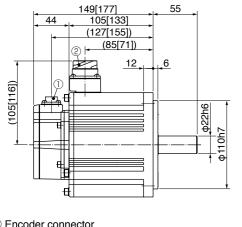
① Encoder connector

(1) Encoder connector

② Motor/Brake connector

- ② Motor/Brake connector
- Figures in [ ] represent the dimensions with brake.

● MDMF202L1 □ □ [Unit: mm] (127[155])



• Figures in [ ] represent the dimensions with brake.

- ① Encoder connector ② Motor/Brake connector
- MDMF502L1 □ □ [Unit: mm] 175[204] 131[160] (153[182]) ① Encoder connector ② Motor/Brake connector • Figures in [ ] represent the dimensions with brake.

<sup>\*</sup> For motor specifications and mounting dimensions (on flange face), refer to P.89 to P.94.

<sup>\*</sup> For motor specifications and mounting dimensions (on flange face), refer P.95 to P.99.

## **Model Designation**

\* For combination of elements of model number, refer to Index P.272.

Imformation

- Line-up IP67 motor: 1.0 kW to 5.0 kW
- Max speed: 6500r/min (MHMF 50 W to 400 W)
- · Low inertia (MSMF) to High inertia (MHMF).
- Low cogging torque: Rated torque ratio 0.5 % (typical value).
- · 23-bit absolute encoder (8388608 pulse).

## **Motor Lineup**

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80

ō

9



## MSMF Low inertia

Max. speed : 6000 r/min Rated speed: 3000 r/min Rated output: 50 W to 1000 W Enclosure: IP65: Leadwire type



#### **MQMF** (Flat type) Middle inertia

Max. speed : 6500 r/min Rated speed: 3000 r/min Rated output: 100 W to 400 W

Enclosure: IP65: Leadwire type



## High inertia

Max. speed 6500 r/min 6000 r/min (750 W,1000 W) Rated speed: 3000 r/min

Rated output: 50 W to 1000 W Enclosure:

IP65: Leadwire type



#### **MSMF** Low inertia

Max. speed : 5000 r/min 4500 r/min (4.0 kW,5.0 kW)

Rated speed: 3000 r/min Rated output: 1.0 kW to 5.0 kW Enclosure : IP67



## **MDMF** Middle inertia

Max. speed : 3000 r/min Rated speed: 2000 r/min Rated output: 1.0 kW to 5.0 kW

Enclosure : IP67



## (Low speed/ High torque type) Middle inertia

Max. speed : 3000 r/min Rated speed: 1500 r/min Rated output: 0.85 kW to 4.4 kW Enclosure : IP67



## High inertia

Max. speed : 3000 r/min Rated speed: 2000 r/min Rated output: 1.0 kW to 5.0 kW

Enclosure : IP67

Special Order Product **Motor Contents** 

MSMF (200 V) 50 W to 5.0 kW...

MQMF (200 V)

100 W to 400 W.....

MHMF (200 V)

50 W to 5.0 kW.. . P.136

MDMF (200 V)

1.0 kW to 5.0 kW ..... P.148

MGMF (200 V)

0.85 kW to 4.4 kW ..... P.154

#### **Dimensions**

MQMF (100 W to 400 W) Leadwire type with oil seal ..

...P.159 MQMF (100 W to 400 W) Leadwire type

with protective lip/ with oil seal

MHMF (50 W, 1000 W) Leadwire type

....P.161 with oil seal .....

MHMF (50 W to 1000 W) Leadwire type with protective lip/ with oil seal

## Motor Specification Description

Environmental Conditions... P.165 Notes on [Motor specification] ..... P.165 Permissible Load at 

Built-in Holding Brake .......P.167

...P.160

## **Servo Motor**



#### 1) Type

Symbol		Туре
MSM	Low inertia	(50 W to 5.0 kW)
MQM	Middle inertia	(100 W to 400 W)
MDM	Middle inertia	(1.0 kW to 5.0 kW)
MGM	Middle inertia	(0.85 kW to 4.4 kW)
MHM	High inertia	(50 W to 5.0 kW)

#### 2 Series

Symbol	Series name
F	A6 series

#### **3 Motor rated output**

Symbol	Rated output		Symbol	Rated output
5A	50 W		15	1.5 kW
01	100 W		18	1.8 kW
02	200 W		20	2.0 kW
04	400 W		29	2.9 kW
08	750 W		30	3.0 kW
09	0.85 kW, 1000 W		40	4.0 kW
09	(130 mm sq.) (80 mm sq.)		44	4.4 kW
10	1.0 kW		50	5.0 kW
13	1.3 kW	ľ		

#### **4** Voltage specifications

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

## **5** Rotary encoder specifications

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

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

#### 6 Design order

Symbol	Specifications
1	Standard

#### 7 Motor specifications: 80 mm sq. or less Leadwire type IP65 MSMF 50 W to 1000 W

			Shaft		Holding	g brake	Oil seal		
Symbol		nbol	Round	Key-way, center tap	without	with	without	with	
F	4	2	•		•		•		
Е	3	2	•			•	•		
C	)	2	•		•			•	
Е	)	2	•			•		•	
5	3	2		•	•		•		
1	Т	2		•		•	•		
ι	J	2		•	•			•	
\	/	2		•		•		•	

#### 7 Motor specifications: 80 mm sq. or less Leadwire type IP65 MHMF 50 W to 1000 W, MQMF 100 W to 400 W

Symbol		Shaft		Holding brake		Oil seal		
		Round	Round Key-way, center tap		with	without with pro		With protective lip
Α	2	•		•		•		
В	2	•			•	•		
С	2	•		•			•	
С	4	•		•				•
D	2	•			•		•	
D	4	•			•			•
S	2		•	•		•		
Т	2		•		•	•		
U	2		•	•			•	
U	4		•	•				•
V	2		•		•		•	
V	4		•		•			•

#### 7 Motor specifications: 100 mm sq. or more Encoder connector : JL10 IP67 MSMF, MHMF, MDMF, MGMF

		Sh	aft	Holding	g brake	Oil seal			
Symbol		Round	Key-way	without	with	with	With protective lip		
С	6	•		•		•			
С	8	•		•			•		
D	6	•			•	•			
D	8	•			•		•		
G	6		•	•		•			
G	8		•	•			•		
Н	6		•		•	•			
Н	8		•		•		•		

<sup>\*</sup> Encoder connector JL10: Also applicable to screwed type

## **Servo Driver**



## ① Frame symbol

Symbol	Frame	Symbol	Frame
MAD	A-Frame	MDD	D-Frame
MBD	B-Frame	MED	E-Frame
MCD	C-Frame	MFD	F-Frame

## 2 Series

Symbol	Series name
L	A6 series

#### **3 Safety Function**

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

#### (4) Max. current rating

Symbol	Current rating	Symbol	Current rating
0	6 A	5	40 A
1	8 A	8	60 A
2	12 A	Α	100 A
3	22 A	В	120 A
4	24 A		

## (5) Supply voltage specifications

u	bil i airmage aparamenti
Symbol	Specifications
3	3-phase 200 V
5	Single/3-phase 200 V

#### 6 l/f specifications 7 Classification of type

(specification)	Symbol	Specification
	Е	Basic type (Pulse train only)
S (Analog/Pulse)	F	Multi fanction type (Pulse, analog, full-closed)
	G	RS485 communication type (Pulse train only)
N	Е	without the safety function
(RTEX)	F	with the safety function
B (EtherCAT)	(Sch	neduled to release in 2016)

<Cautions> Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Options

	Motor Driver				Optional parts   Options																					
						A6 SF series	A6 SG series		_	Encoder Ca	able Note)3		Motor Cab	ole Note)3						Title	Part No.	Page				
					Datin/	Multi fanction	RS485 communication		Power capacity	23-bit A	bsolute		10,000				· .		_				Interface Cable	e 	DV0P4360	182
B.O	ator corios	Power	Output	Part No.	Rating/ Spec.	type /Pulse, analog, \		Frame	/ at	Use in the	Use in the				Brake	External	Reactor	Noise Filter			DV0P4120	182				
IVI	otor series	supply	(W)	Note)1	Dimensions (page)		A6 SE series Basic	riaille	load /	absolute	Incremental		without Brake	with Brake	Cable Note)3	Regenerative Resistor	Single phase 3-phase	Single phase 3-phase			DV0P4121	182				
					(page)		(Pulse signal input)	)	(KVA)	, ,	system (without battery box)		2.50	2.20			( ) , /	( /	Interface Conv	ersion Cable	DV0P4130	182				
							Note)2, Note)4			Note)5											DV0P4131	182				
			50	MSMF5AZL1 ☐ 2M	121	MADLT05SF	MADLN05S♦														DV0P4132	182				
								-								DV0P4281			Connector Kit for Power	A-frame Single row type	DV0PM20032	185				
			100	MSMF012L1 □ 2M	122	MADLT05SF	MADLN05S♦	A-frame	Approx.								DV0P227		Supply Input	to Double row type	DV0PM20033	185				
	MOME							-	0.0				MFMCA 0**0EED			DV0P220	DV0P4170	Connection Connector Kit	A-frame to		$\square$					
Low	MSMF /Leadwire\	Single	200	MSMF022L1 □ 2M	123	MADLT15SF	MADLN15S♦			MFECA	MFECA						DV0PM20042	for Motor Connection	D-frame	DV0PM20034	186					
w inertia	type	phase/ 3-phase								0**0EAE	0**0EAD			MFMCB 0**0GET				Connector Kit		DV0P4290	186					
rtia	3000 r/min	200 V	400	MSMF042L1 ☐ 2M	124	MBDLT25SF	MBDLN25S♦	B-frame	Approx. 0.9	(For fixed)	(For fixed)			0 * * 00.2.	DV0P4283	DVODOOO		Motor/Encoder	RS485, RS232	DV0PM20024	183					
	IP65															DV0P228 DV0P220			Safety	DV0PM20025	183					
			750	MSMF082L1 ☐ 2M	125	MCDLT35SF	MCDLN35S♦	C-frame	Approx.									DV0PM20042	Connector Kit		DV0P4350	184				
																	DV0P228		Connector Kit		DV0PM20026					
			1000	MSMF092L1 ☐ 2M	126	MDDLT45SF	MDDLN45S♦	D-frame	Approx.					DV0P4284	DV0P4220 DV0P222	DV0P4220		External Scale		184						
<b>Z</b>				MQMF012L1 ☐ 2M																Encoder	DV0PM20010	184				
Middle	MQMF		100	MQMF012L1  4M	133	MADLT05SF	MADLN05S♦		Approx.							DV0P4281	DV0P227	Battery for Abs	r Absolute Encoder	DV0P2990	194					
inertia	(Leadwire)	Single phase/		MQMF022L1 ☐ 2M				A-frame	0.5	MFECA	MFECA		MEN	ИС.A	MFMCB		DV0P220 DV0P4170 DV0PM20042	Note)5		DV0P4430	194					
tia –	type )	3-phase	200	MQMF022L1  4M	134	MADLT15SF	MADLN15S♦			0 * * 0EAE (For fixed)	0 * * 0EAD (For fixed)		MFMCA 0 * * 0EED	-	0 * * 0GET				Mounting	For A-frame, B-frame	DV0PM20100	195				
Flat type	3000 r/min IP65	200 V		MQMF042L1 ☐ 2M				_	Approx.	( 2:22)	(* 21 127)					DV0P4283		Bracket	For C-frame, D-frame	DV0PM20101	195					
ype			400	MQMF042L1 ☐ 4M	135	MBDLT25SF	MBDLN25S♦	B-frame	0.9								DV0P220			with		[]				
				MHMF5AZL1 ☐ 2M	400	MADITOSOS	MADI NOSO A												Encoder Cable	Battery Box Note)5	MFECA0 * * 0EAE	1/1				
			50	MHMF5AZL1 ☐ 4M	136	MADLT05SF	MADLN05S♦									D) (0D (05 )			Cable	without Battery Box	MFECA0 * * 0EAD	171				
			100	MHMF012L1 □ 2M	137	MADLT05SF	MADLN05S♦	Δ.	Approx.							DV0P4281	DV0P227	P227	Motor Cable	without Brake	MFMCA0 * * 0EED	175				
			100	MHMF012L1 ☐ 4M	137	INIADELOSSE	INIADEINOS	A-trame	0.5								DV0P220	DV0P4170	Brake Cable	1	MFMCB0 * * 0GET	181				

MFMCB

0 \* \* 0GET

DV0P4283

DV0P4284

DV0P228

DV0P220

DV0P228

DV0P222

MFMCA

0 \* \* 0 EED

Note)1 : Represents the motor specifications. (refer to "Model designation" P.116.)

Note)2  $\diamondsuit$ : Represents the driver specifications. (refer to "Model designation" P.116.)

MHMF022L1 

2M

MHMF022L1 ☐ 4M

MHMF042L1 ☐ 2M

MHMF042L1 ☐ 4M

MHMF082L1 ☐ 2M

MHMF082L1 ☐ 4M

MHMF092L1 

2M

MHMF092L1 ☐ 4M

Note)3 \*\*: Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030EAE

140

141

Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification,

MADLT15SF

MBDLT25SF

MCDLT35SF

MDDLT55SF

MADLN15S♦

MBDLN25S♦

MCDLN35S♦

MDDLN55S♦

MFECA

(For fixed)

0.9

Approx.

0\*\*0EAE 0\*\*0EAD

MFECA

(For fixed)

**Table of Part Numbers and Options:** 

only incremental system can be used in combination.

MHMF

(Leadwire type

3000 r/min

IP65

Single

phase/

3-phase

200 V

200

400

750

Note)5 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box).

Please buy the battery part number "DV0P2990" separately.

		■ Options				
			Title		Part No.	Page
		Interface Cable	•		DV0P4360	182
	Noise Filter			DV0P4120	182	
	Single phase 3-phase				DV0P4121	182
1	( S pridos )	Interface Conv	ersion Ca	ble	DV0P4130	182
					DV0P4131	182
				DV0P4132	182	
		Connector Kit for Power	A-frame	Single row type	DV0PM20032	185
)	DV0P4170	Supply Input Connection	to D-frame	Double row type	DV0PM20033	185
	DV0PM20042	Connector Kit for Motor Connection	A-frame D-frame	to	DV0PM20034	186
		Connector Kit f Motor/Encoder		on	DV0P4290	186
;			RS485, I	RS232	DV0PM20024	183
)	DV0DM00040		Safety		DV0PM20025	183
	DV0PM20042	Connector Kit	Interface		DV0P4350	184
3	DV0P4220		External	Scale	DV0PM20026	184
	D V 01 4220		Encoder		DV0PM20010	184
		Battery for Abs	olute Enc	DV0P2990	194	
		Battery Box for Note)5	Absolute	DV0P4430	194	
,	DV0P4170 DV0PM20042	Mounting	For A-fra B-frame	me,	DV0PM20100	195
;		Bracket	For C-fra	ıme,	DV0PM20101	195
)		Encoder	with Battery E Note)5	Вох	MFECA0**0EAE	171
		Cable	without Battery E	Box	MFECA0 * * 0EAD	171
		Motor Cable	without E		MFMCA0 * * 0EED	175
)	DV0P4170	Brake Cable		MFMCB0 * * 0GET	181	
	DV0PM20042		50 Ω 25	W	DV0P4280	197
			100 Ω 25	5 W	DV0P4281	197
		External regenerative	25 Ω 50	W	DV0P4282	197
		resistor	50 Ω 50	W	DV0P4283	197
'	DV0PM20042		30 Ω 100	W	DV0P4284	197
			1		DV0P220	196
•	DV0P4220				DV0P222	196
		Reactor			DV0P227	196
					DV0P228	196
					DV0P4170	236
		Noise Filter			DV0PM20042	236
					DV0P4220	236
					DV0P4190	237
		Surge Absorbe	r		DV0P1450	237
		Ferite Core			DV0P1460	238

## **Table of Part Numbers and Options:** Special Order Product 100 mm sq. or more 0.85 kW to 5.0 kW

☐ : Represents the motor specifications. (refer to "Model designation" P.116.)

: Represents the driver specifications. (refer to "Model designation" P.116.)

\*\*: Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030EPE

Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination

Note)5 Use of JL10 type encoder cables and motor cables enable onetouch lock connections. Conventional screwed type N/MS and

JL04V type cables can also be used Note)6 For other possible combinations, refer to P.197.

Note)7 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number "DV0P2990" separately.

	- Options						
1		Title		Part No.	Page		
	Interface Cable	9		DV0P4360	182		
				DV0P4120	182		
				DV0P4121	182		
	Interface Conv	ersion Cal	ble	DV0P4130	182		
				DV0P4131	182		
				DV0P4132	182		
	Connector Kit for Power	A-frame to	Single row type	DV0PM20032	185		
	Supply Input Connection	D-frame	Double row type	DV0PM20033	185		
1		E-frame		DV0PM20044	185		
	Connector Kit for Motor	A-frame D-frame	to	DV0PM20034	186		
	Connection	E-frame		DV0PM20046	186		
3	Connector Kit for Regenerative Resistor	E-frame		DV0PM20045	185		
		without B	rako	DV0PM24587 MSMF 1.0 kW to 2.0 kW MDMF 1.0 kW to 2.0 kW MGMF 0.85 kW to 1.8 kW MHMF 1.0 kW, 1.5 kW	189		
	Connector Kit for Motor/	WILLIOUT B	iake	DV0PM24588  MSMF 3.0 kW to 5.0 kW  MDMF 3.0 kW to 5.0 kW  MGMF 2.9 kW, 4.4 kW  MHMF 2.0 kW to 5.0 kW	190		
	Encoder Connection			DV0PM24589 MSMF 1.0 kW to 2.0 kW MDMF 1.0 kW to 2.0 kW MGMF 0.85 kW to 1.8 kW MHMF 1.0 kW, 1.5 kW	189		
3		with Brak	е	DV0PM24590 MSMF 3.0 kW to 5.0 kW MDMF 3.0 kW to 5.0 kW MGMF 2.9 kW, 4.4 kW MHMF 2.0 kW to 5.0 kW	190		
		RS485, F	RS232	DV0PM20024	183		
		Safety		DV0PM20025	183		
	Connector Kit	Interface		DV0P4350	184		
╛		External	Scale	DV0PM20026	184		
		Encoder		DV0PM20010	184		
	Battery for Abs	olute Enc	oder	DV0P2990	194		
	Battery Box for Note)7			DV0P4430	194		
3	Mounting Bracket	D-frame		DV0PM20101	195		
	Encoder	One-touc	h lock type	MFECA0 * * 0EPE	173		
	Cable (with (Battery Box) Note)7	Screwed	type	MFECA0 * * 0ESE	174		
	Encoder	One-touc	h lock type	MFECA0 * * 0EPD	173		
	(without (Battery Box)	Screwed	type	MFECA0 * * 0ESD	173		
		One-touc	h lock type	MFMCD0 * *2EUD	176		
		Screwed		MFMCD0 * * 2ECD	176		
	Motor Cable	One-touc	h lock type	MFMCE0 * * 2EUD	177		
1	(without Brake)	Screwed	type	MFMCE0**2ECD	177		
			h lock type	MFMCA0 * *3EUT	177		
3		Screwed	type	MFMCA0 * *3ECT	177		
		One-touc	h lock type	MFMCA0 * *2FUD	179		
		Screwed	type	MFMCA0**2FCD	179		
4	Motor Cable		h lock type	MFMCE0**2FUD	180		
	(with Brake)	Screwed	type	MFMCE0**2FCD	180		
		One-touc	h lock type	MFMCA0**3FUT	180		
		Screwed	type	MFMCA0 * *3FCT	180		
	External regenerative resistor	30 Ω 100 20 Ω 130		DV0P4284 DV0P4285	197		
	Reactor		DV0P224	2, DV0P223 4, DV0P225 8, DV0PM20047	196		
	Noise Filter		DV0P422 DV0P341	20, DV0PM20043 0	236		
	Surge Absorbe	r		00, DV0P1450	237		
	Ferite Core		DV0P146	V0P1460			

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## **Specifications**

					AC200 V
Motor model*1			IP65		MSMF5AZL1□□M
		Multi	function type	)	MADLT05SF
Applicable	Model No	RS48	5 communicati	ion type *2	MADLN05SG
driver		Basio	type *2		MADLN05SE
	Frame	sym	bol		A-frame
Power supply	capacity	,		(kVA)	0.5
Rated output				(W)	50
Rated torque				(N·m)	0.16
Continuous sta	all torque	9		(N·m)	0.16
Momentary Ma	ax. peak	torqı	ie	(N·m)	0.48
Rated current			(	A(rms))	1.1
Max. current	Max. current			(A(o-p))	4.7
Regenerative	brake		Without or	otion	No limit Note)2
frequency (time	es/min) N	lote)1	DV0P4281		No limit Note)2
Rated rotation	al speed	l		(r/min)	3000
Max. rotationa	l speed			(r/min)	6000
Moment of ine	rtia		Without br	ake	0.026
of rotor ( $\times 10^{-4}$	kg·m²)		With brake	9	0.029
	Recommended moment of atio of the load and the rot			Note)3	30 times or less
Rotary encode	er specifi	catio	ns *3		23-bit Absolute
Resolution per single turn				turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

## • Permissible load (For details, refer to P.166)

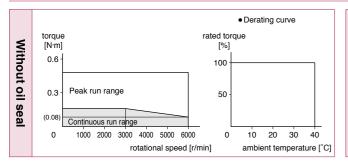
	During assembly  During operation	Radial load P-direction (N)	147
		Thrust load A-direction (N)	88.0
		Thrust load B-direction (N)	117.6
		Radial load P-direction (N)	68.6
		Thrust load A, B-direction (N)	58.8

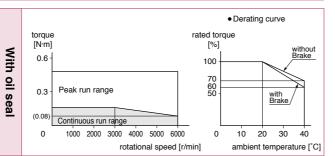
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

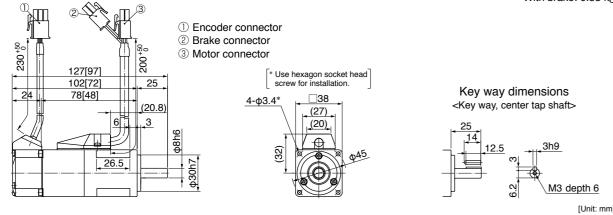
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**

Mass: Without brake: 0.32 kg With brake: 0.53 kg



• Figures in [ ] represent the dimensions without brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

## **Specifications**

Special Order Product

				AC200 V
Motor model *1			IP65	MSMF012L1□□M
		Multi	function type	MADLT05SF
Applicable	Model No.	RS48	5 communication type *2	MADLN05SG
driver	140.	Basic	c type *2	MADLN05SE
	Fram	e sym	bol	A-frame
Power supply	capacit	у	(kVA)	0.5
Rated output			(W)	100
Rated torque			(N·m)	0.32
Continuous sta	all torqu	ie	(N·m)	0.32
Momentary Ma	ax. pea	k torqı	ue (N·m)	0.95
Rated current	ated current (A(rms))			1.1
Max. current (			(A(o-p))	4.7
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4281	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	0.048
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	0.051
Recommender ratio of the loa			30 times or less	
Rotary encode	er speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Re	solutio	on per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

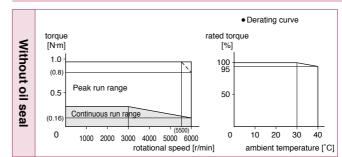
Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

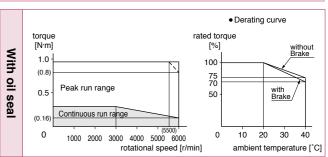
#### • Permissible load (For details, refer to P.166)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88.0
docombry	Thrust load B-direction (N)	117.6
During	Radial load P-direction (N)	68.6
operation	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

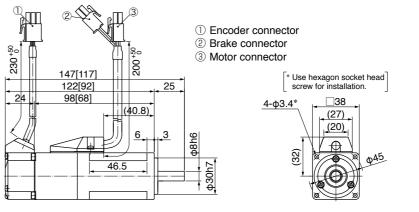
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



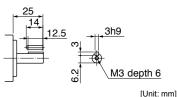


## **Dimensions**

Mass: Without brake: 0.47 kg With brake: 0.68 kg



Key way dimensions <Key way, center tap shaft>



• Figures in [ ] represent the dimensions without brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

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## **Specifications**

					AC200 V
Motor model*1			IP65		MSMF022L1□□M
		Multi	function ty	ре	MADLT15SF
Applicable	Model No.	RS485 communication type *2		ation type *2	MADLN15SG
driver	140.	Basic	asic type *2		MADLN15SE
	Frame	sym	bol		A-frame
Power supply	capacity	/		(kVA)	0.5
Rated output				(W)	200
Rated torque				(N·m)	0.64
Continuous sta	all torqu	е		(N·m)	0.64
Momentary Ma	ax. peak	torqu	ne	(N·m)	1.91
Rated current	ed current (A(rms))			(A(rms))	1.5
Max. current	current (A(o-p)			(A(o-p))	6.5
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min) 1	Note)1	DV0P4283		No limit Note)2
Rated rotation	al speed	t		(r/min)	3000
Max. rotationa	l speed			(r/min)	6000
Moment of ine	rtia		Without I	orake	0.14
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		0.17	
Recommende ratio of the loa				Note)3	30 times or less
Rotary encode	er specif	icatio	ns <sup>∗3</sup>		23-bit Absolute
Resolution per single				le turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

#### • Permissible load (For details, refer to P.166)

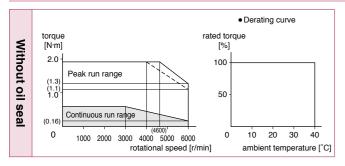
	Radial load P-direction (N)	392
During assembly	Thrust load A-direction (N)	147
assembly	Thrust load B-direction (N)	196
During	Radial load P-direction (N)	245
operation	Thrust load A, B-direction (N)	98.0

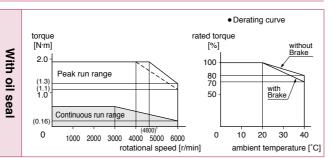
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1 in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

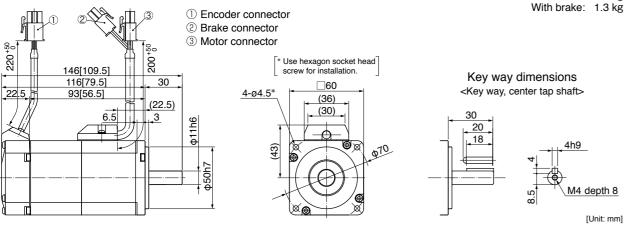




Mass: Without brake: 0.82 kg

## **Dimensions**

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• Figures in [ ] represent the dimensions without brake

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

## **Specifications**

Special Order Product

200 V | MSMF 400 W

				AC200 V
Motor model *1			IP65	MSMF042L1□□M
		Multifunction type		MBDLT25SF
Applicable	Model No	RS48	5 communication type *2	MBDLN25SG
driver	110.	Basic	type *2	MBDLN25SE
	Frame	e sym	bol	B-frame
Power supply	capacity	/	(kVA)	0.9
Rated output			(W)	400
Rated torque			(N·m)	1.27
Continuous sta	all torqu	е	(N·m)	1.27
Momentary Ma	ax. peal	c torqu	ue (N·m)	3.82
Rated current			(A(rms))	2.4
Max. current			(A(o-p))	10.2
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4283	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	0.27
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	0.30
Recommender ratio of the loa		30 times or less		
Rotary encode	r speci	icatio	ns <sup>*3</sup>	23-bit Absolute
	Res	solutio	n per single turn	8388608

[Low inertia]

60 mm sq.

 Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

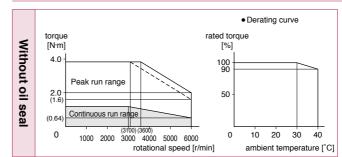
Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

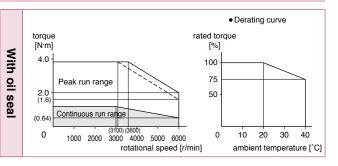
#### • Permissible load (For details, refer to P.166)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98.0

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

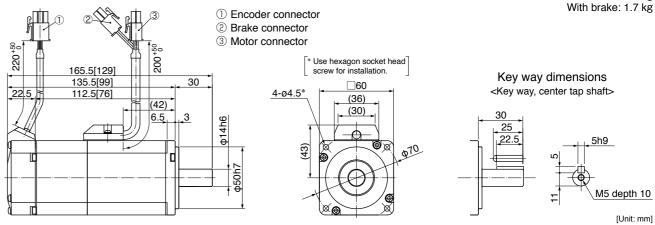




Mass: Without brake: 1.2 kg

MINAS A6 Family 124

## **Dimensions**



• Figures in [ ] represent the dimensions without brake

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

「Low inertia⁻

80 mm sq.

## Please contact us for more information

## **Specifications**

		AC200 V		
Motor model *1			IP65	MSMF082L1□□M
		Multi	function type	MCDLT35SF
Applicable	Model No	RS485 communication type *2		MCDLN35SG
driver		Basic	type *2	MCDLN35SE
	Frame	e sym	bol	C-frame
Power supply	capacity	y	(kVA)	1.3
Rated output			(W)	750
Rated torque			(N·m)	2.39
Continuous sta	all torqu	е	(N·m)	2.39
Momentary Ma	ax. peal	k torqı	ie (N·m)	7.16
Rated current	Rated current (A(rms))			4.1
Max. current	Max. current (A(o-p))			17.4
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4283	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	0.96
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	1.06
Recommender ratio of the loa				20 times or less
Rotary encode	er speci	ficatio	ns <sup>⁺3</sup>	23-bit Absolute
Resolution			n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	2.45 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

## • Permissible load (For details, refer to P.166)

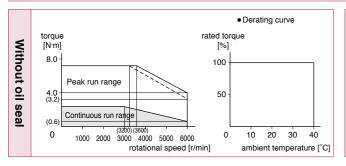
During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During	Radial load P-direction (N)	392
operation	Thrust load A, B-direction (N)	147

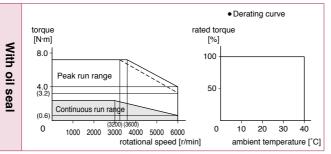
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1 in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

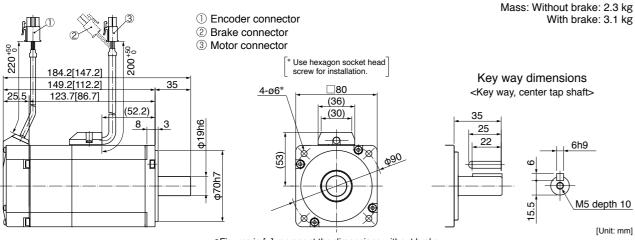
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**



•Figures in [ ] represent the dimensions without brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

· Please contact us for more information.

S	pe	cif	ica	tio	ns

Special Order Product

200 V MSMF 1000 W

				AC200 V
Motor model *1	IP65			MSMF092L1□□M
		Multifunction type		MDDLT45SF
Applicable	Model No.	RS48	5 communication type *2	MDDLN45SG
driver	140.	Basic	c type *2	MDDLN45SE
	Frame	e sym	bol	D-frame
Power supply	capacit	у	(kVA)	1.8
Rated output			(W)	1000
Rated torque			(N·m)	3.18
Continuous sta	all torqu	ie	(N·m)	3.18
Momentary Ma	ax. peal	k torqı	ue (N·m)	9.55
Rated current	Rated current (A(rms))			5.7
Max. current (A(o-p))			24.2	
Regenerative brake		Without option	No limit Note)2	
frequency (time	es/min)	Note)1	DV0P4284	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6000
Moment of ine	rtia		Without brake	1.26
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	1.36
Recommended moment of inertia ratio of the load and the rotor				15 times or less
Rotary encode	er speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Re	solutio	on per single turn	8388608

 Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	3.80 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

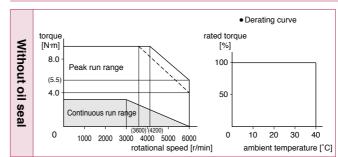
During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During	Radial load P-direction (N)	392
operation	Thrust load A, B-direction (N)	147

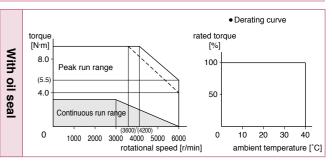
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

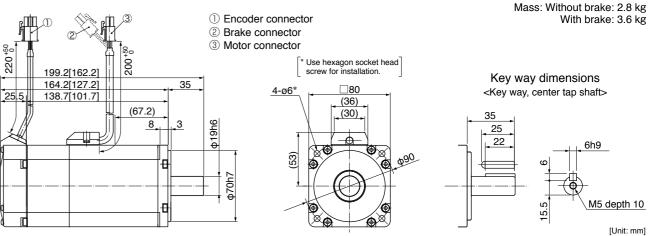
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**



•Figures in [ ] represent the dimensions without brake

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

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## **Specifications**

					AC200 V	
Motor model*1			IP67		MSMF102L1□□M	
		Multi	function typ	е	MDDLT55SF	
Applicable	Model No	RS485 communication type *2		tion type *2	MDDLN55SG	
driver		Basic	c type <sup>*2</sup>		MDDLN55SE	
	Frame	sym	bol		D-frame	
Power supply	capacity	/		(kVA)	2.3	
Rated output				(W)	1000	
Rated torque				(N·m)	3.18	
Continuous st	all torqu	е		(N·m)	3.82	
Momentary Ma	ax. peak	torqu	ne	(N·m)	9.55	
Rated current				(A(rms))	6.6	
Max. current	ax. current (A(o-p))		28			
Regenerative	brake		Without option		No limit Note)2	
frequency (times/min) Note)1		Note)1	DV0P4284		No limit Note)2	
Rated rotation	al speed	d	(r/min)		3000	
Max. rotationa	ıl speed			(r/min)	5000	
Moment of ine	ertia		Without brake		2.15	
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		2.47		
Recommended moment of inertia ratio of the load and the rotor Note)3			Note)3	15 times or less		
Rotary encoder specifications *3				23-bit Absolute		
	Res	solutio	on per single	e turn	8388608	

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

	During assembly  During operation	Radial load P-direction (N)	980
		Thrust load A-direction (N)	588
		Thrust load B-direction (N)	686
		Radial load P-direction (N)	490
		Thrust load A, B-direction (N)	196

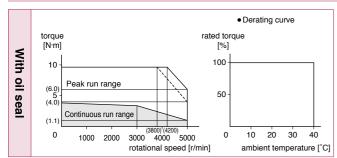
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

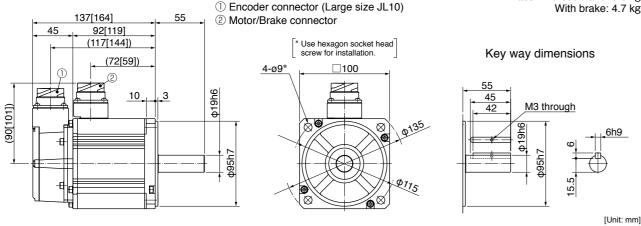
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Mass: Without brake: 3.6 kg

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



• Figures in [ ] represent the dimensions with brake.

<a>Cautions></a> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Special Order Product

## **Specifications**

				AC200 V
Motor model *1			IP67	MSMF152L1□□M
		Multifunction type		MDDLT55SF
Applicable	Model No	RS48	5 communication type *2	MDDLN55SG
driver	110.	Basic	type *2	MDDLN55SE
	Frame	e sym	bol	D-frame
Power supply	capacity	y	(kVA)	2.3
Rated output			(W)	1500
Rated torque			(N·m)	4.77
Continuous sta	all torqu	е	(N·m)	5.72
Momentary Ma	ax. peal	k torqu	ue (N·m)	14.3
Rated current (A(rms))				8.2
Max. current (A(o-p))				35
Regenerative brake		Without option	No limit Note)2	
frequency (time	es/min)	Note)1	DV0P4284	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	5000
Moment of ine	rtia		Without brake	3.10
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	3.45
Recommended moment of inertia ratio of the load and the rotor $${\tt Note}{\tt )3}$$				15 times or less
Rotary encoder specifications *3			ns <sup>*3</sup>	23-bit Absolute
	Res	solutio	on per single turn	8388608

#### Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

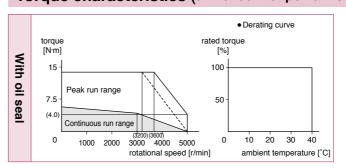
Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

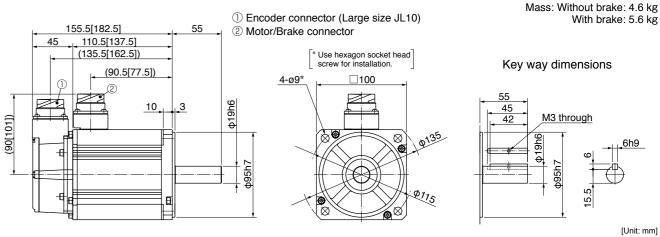
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



## **Dimensions**



• Figures in [ ] represent the dimensions with brake.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

## Please contact us for more information

## **Specifications**

					AC200 V
Motor model*1		IP67			MSMF202L1□□M
		Multi	function type		MEDLT83SF
Applicable	Model No	RS485 communication type *2		ype *2	MEDLN83SG
driver		Basic	type *2		MEDLN83SE
	Frame	e sym	bol		E-frame
Power supply	capacit	y	(H	(VA)	3.8
Rated output				(W)	2000
Rated torque			1)	√m)	6.37
Continuous sta	all torqu	е	1)	N·m)	7.64
Momentary Max. peak torque (N·m)			19.1		
Rated current	Rated current (A(rms))		11.3		
Max. current	current (A(o-p))		48		
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285		No limit Note)2
Rated rotation	al spee	d	(r/min)		3000
Max. rotationa	l speed		(r/min)		5000
Moment of ine	rtia		Without brake		4.06
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		4.41
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less		
Rotary encode	er speci	ficatio	ns*3		23-bit Absolute
	Resolution per single turn				8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

[Low inertia]

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

	During assembly  During operation	Radial load P-direction (N)	980
		Thrust load A-direction (N)	588
		Thrust load B-direction (N)	686
		Radial load P-direction (N)	490
		Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

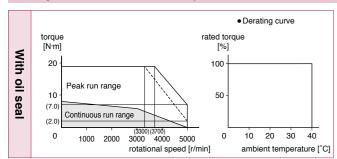
Mass: Without brake: 5.6 kg

Key way dimensions

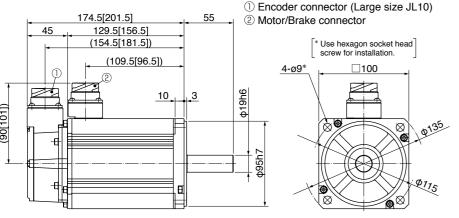
With brake: 6.6 kg

[Unit: mm]

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



• Figures in [ ] represent the dimensions with brake.

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan. Special Order Product

200 V MSMF 3.0 kW

## **Specifications**

				AC200 V
Motor model *1	IP67			MSMF302L1□□M
		Multi	function type	MFDLTA3SF
Applicable	Model No.	RS48	5 communication type *2	MFDLNA3SG
driver	140.	Basic	c type *2	MFDLNA3SE
	Frame	e sym	bol	F-frame
Power supply	capacit	y	(kVA)	4.5
Rated output			(W)	3000
Rated torque			(N·m)	9.55
Continuous sta	all torqu	е	(N·m)	11.0
Momentary Ma	ax. peal	k torqı	ue (N·m)	28.6
Rated current			(A(rms))	18.1
Max. current (A(o-p))			77	
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2	
		DV0P4285×2	No limit Note)2	
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	5000
Moment of ine	rtia		Without brake	7.04
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	7.38
Recommended moment of incratio of the load and the rotor				15 times or less
Rotary encoder specifications *3			ns <sup>*3</sup>	23-bit Absolute
	Re	solutio	on per single turn	8388608

#### Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

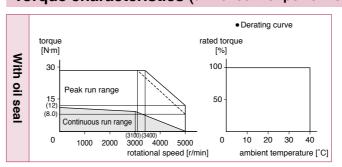
Static friction torque (N·m)	12.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

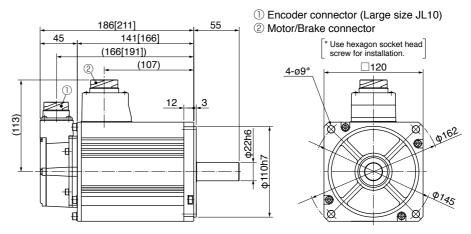
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



## **Dimensions**



• Figures in [ ] represent the dimensions with brake. Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

> Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

MINAS A6 Family 130

129 MINAS A6 Family

**Imformation** 

Mass: Without brake: 8.7 kg

With brake: 9.9 kg

Key way dimensions

[Unit: mm]

#### Please contact us for more information

## **Specifications**

					AC200 V
Motor model*1		IP67			MSMF402L1□□M
		Multi	function ty	уре	MFDLTB3SF
Applicable	Model No	RS48	RS485 communication type *2		MFDLNB3SG
driver	140.	Basic	c type *2		MFDLNB3SE
	Frame	e sym	bol		F-frame
Power supply	capacity	/		(kVA)	7.5
Rated output				(W)	4000
Rated torque				(N·m)	12.7
Continuous st	all torqu	е		(N·m)	15.2
Momentary M	ax. peal	c torqu	ne	(N·m)	38.2
Rated current	Rated current (A(rms))		19.6		
Max. current	ax. current (A(o-p))		(A(o-p))	83	
Regenerative	brake		Without option		No limit Note)2
frequency (times/min) Note)1		Note)1	DV0P4285×2		No limit Note)2
Rated rotation	al spee	d	(r/min)		3000
Max. rotationa	l speed		(r/min)		4500
Moment of ine	rtia		Without brake		14.4
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		15.6	
Recommended moment of inertia ratio of the load and the rotor Note)3			Note)3	15 times or less	
Rotary encode	er specif	icatio	ns <sup>*3</sup>		23-bit Absolute
	Res	solutio	on per sin	gle turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

[Low inertia]

Static friction torque (N·m)	16.2 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

		Radial load P-direction (N)	980
During assembly	Thrust load A-direction (N)	588	
	Thrust load B-direction (N)	686	
	During operation	Radial load P-direction (N)	784
		Thrust load A, B-direction (N)	343

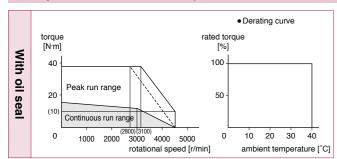
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

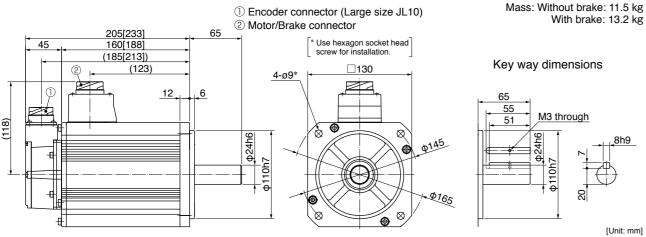
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

[Unit: mm]

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



• Figures in [ ] represent the dimensions with brake.

**<Cautions>** Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Special Order Product

## **Specifications**

					AC200 V
Motor model *1	IP67				MSMF502L1□□M
		Multifunction type			MFDLTB3SF
Applicable	Model No	RS48	communication type	e *2	MFDLNB3SG
driver	140.	Basic	Basic type *2		MFDLNB3SE
	Frame	e sym	bol		F-frame
Power supply	capacit	у	(kV	A)	7.5
Rated output			(V	V)	5000
Rated torque			(N·r	n)	15.9
Continuous sta	all torqu	ie	(N·r	n)	19.1
Momentary Max. peak torque (N·m)				n)	47.7
Rated current			(A(rms	s))	24.0
Max. current (A			(A(o-p	)))	102
Regenerative brake			Without option		No limit Note)2
frequency (times/min) Note)1		DV0P4285×2		No limit Note)2	
Rated rotation	al spee	d	(r/mi	n)	3000
Max. rotationa	l speed		(r/mi	n)	4500
Moment of inertia			Without brake		19.0
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake		20.2
Recommended moment of inertia ratio of the load and the rotor Note)3					15 times or less
Rotary encoder specifications *3					23-bit Absolute
Resolution per single turn					8388608

#### Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	22.0 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

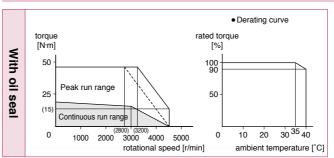
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

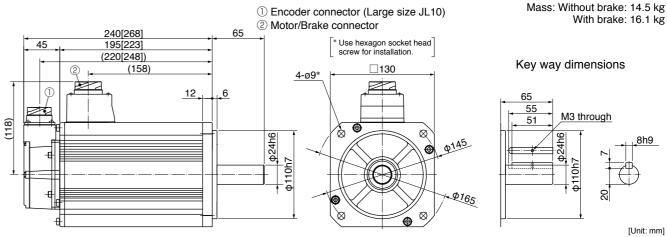
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



• Figures in [ ] represent the dimensions with brake

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

MINAS A6 Family 132

[Unit: mm]

With brake: 16.1 kg

M3 through

## Please contact us for more information

## **Specifications**

					AC200 V
Motor model*1			IP65		MQMF012L1 M
		Multi	function type		MADLT05SF
Applicable	Model No	RS48	5 communication	type *2	MADLN05SG
driver		Basic type *2			MADLN05SE
	Frame	sym	bol		A-frame
Power supply	capacity	/		(kVA)	0.5
Rated output				(W)	100
Rated torque				(N·m)	0.32
Continuous st	all torqu	е		(N·m)	0.33
Momentary M	ax. peak	torqı	ie	(N·m)	1.11
Rated current			(A	(rms))	1.1
Max. current		(A(o-p))		5.5	
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min) I	Note)1	DV0P4281		No limit Note)2
Rated rotation	al speed	d	(	r/min)	3000
Max. rotational speed			(	r/min)	6500
Moment of inertia			Without brake		0.15
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		0.18	
Recommended moment of inertia ratio of the load and the rotor Note)3			Note)3	20 times or less	
Rotary encoder specifications *3				23-bit Absolute	
	Res	Resolution per single turn			8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Flat type 60 mm sq.

· Please contact us for more information.

Middle inertia

Static friction torque (N·m)	0.39 or more
Engaging time (ms)	15 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

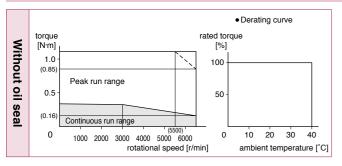
	During assembly  During operation	Radial load P-direction (N)	147
		Thrust load A-direction (N)	88
		Thrust load B-direction (N)	117.6
		Radial load P-direction (N)	68.6
		Thrust load A, B-direction (N)	58.8

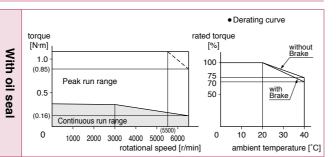
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

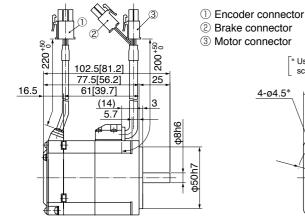
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

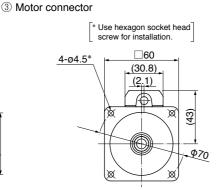




## **Dimensions**

Mass: Without brake: 0.54 kg (0.57 kg with oil seal) With brake: 0.79 kg (0.82 kg with oil seal)





Key way dimensions <Key way, center tap shaft>

[Unit: mm]

For motors with oil seal, refer to P.159. For motors with protective lip, refer to P.160. • Figures in [ ] represent the dimensions without brake

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan. Special Order Product

200 V MQMF 200 W Flat type 80 mm sq.

**Specifications** 

				AC200 V
Motor model *1	IP65			MQMF022L1□□M
		Multifunction type		MADLT15SF
Applicable	Model No.	RS48	5 communication type *2	MADLN15SG
driver	140.	Basic	c type *2	MADLN15SE
	Frame	e sym	bol	A-frame
Power supply	capacit	у	(kVA)	0.5
Rated output			(W)	200
Rated torque			(N·m)	0.64
Continuous sta	all torqu	ie	(N·m)	0.76
Momentary Ma	ax. peal	k torqı	ue (N·m)	2.23
Rated current			(A(rms))	1.4
Max. current			(A(o-p))	6.9
Regenerative brake W		Without option	No limit Note)2	
frequency (times/min) Note)1		Note)1	DV0P4283	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6500
Moment of ine	rtia		Without brake	0.50
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake	0.59
Recommended moment of inertia ratio of the load and the rotor				20 times or less
Rotary encode	er speci	ficatio	ns*3	23-bit Absolute
	Re	solutio	on per single turn	8388608

 Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

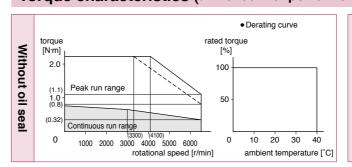
Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

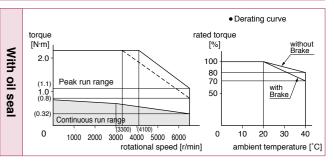
## • Permissible load (For details, refer to P.166)

	Radial load P-direction (N)	392
During assembly	Thrust load A-direction (N)	147
assembly	Thrust load B-direction (N)	196
During	Radial load P-direction (N)	245
operation	Thrust load A, B-direction (N)	98

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

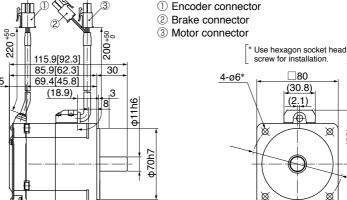
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**

Mass: Without brake: 1.1 kg (1.2 kg with oil seal) With brake: 1.5 kg (1.6 kg with oil seal)



Key way dimensions <Key way, center tap shaft> 20 \_18 4h9

For motors with oil seal, refer to P.159. For motors with protective lip, refer to P.160. • Figures in [ ] represent the dimensions without brake.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

133 MINAS A6 Family

[Unit: mm]

## **Specifications**

					AC200 V
Motor model *1			IP65		MQMF042L1 M
		Multi	function type	9	MBDLT25SF
Applicable	Model No	RS48	5 communicati	ion type *2	MBDLN25SG
driver	. 10.	3asic	type *2		MBDLN25SE
	Frame	sym	bol		B-frame
Power supply	capacity			(kVA)	0.9
Rated output				(W)	400
Rated torque				(N·m)	1.27
Continuous sta	all torque	!		(N·m)	1.40
Momentary Ma	ax. peak	torqı	ıe	(N·m)	4.46
Rated current			(	A(rms))	2.1
Max. current	ax. current (A(o		(A(o-p))	10.4	
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min) No	ote)1	DV0P4283		No limit Note)2
Rated rotation	al speed			(r/min)	3000
Max. rotationa	l speed			(r/min)	6500
Moment of inertia			Without brake		0.98
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		1.06	
Recommended moment of inertia ratio of the load and the rotor				Note)3	20 times or less
Rotary encode	er specific	catio	ns <sup>+3</sup>		23-bit Absolute
	Reso	olutio	n per single	turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Flat type 80 mm sq.

· Please contact us for more information.

Middle inertia

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

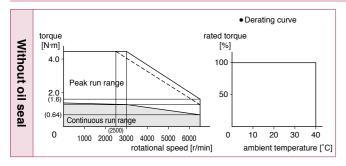
During assembly  During operation	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

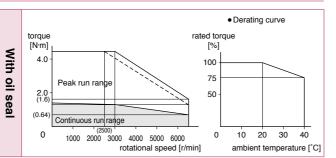
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

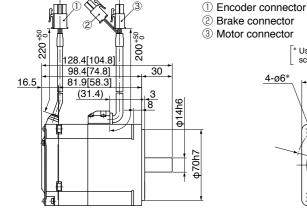
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

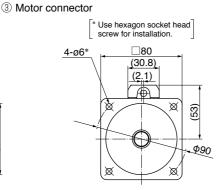


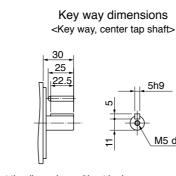


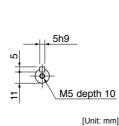
## **Dimensions**

Mass: Without brake: 1.5 kg (1.6 kg with oil seal) With brake: 2.0 kg (2.1 kg with oil seal)









For motors with oil seal, refer to P.159. For motors with protective lip, refer to P.160. • Figures in [ ] represent the dimensions without brake

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan. Special Order Product

[High inertia] 40 mm sq.

## **Specifications**

					AC200 V
Motor model *1	IP65			MHMF5AZL1 M	
		Multi	function type		MADLT05SF
Applicable	Model No	RS48	5 communication typ	e *2	MADLN05SG
driver	140.	Basic type *2			MADLN05SE
	Frame	e sym	bol		A-frame
Power supply	capacit	y	(kV	/A)	0.5
Rated output			(1	W)	50
Rated torque			(N·	m)	0.16
Continuous sta	all torqu	е	(N·	m)	0.18
Momentary Max. peak torque (N-				m)	0.56
Rated current			(A(rm	s))	1.1
Max. current			(A(o-	p))	5.5
Regenerative brake		Without option		No limit Note)2	
frequency (times/min) Note)1		Note)1	DV0P4281		No limit Note)2
Rated rotation	al spee	d	(r/m	in)	3000
Max. rotationa	l speed		(r/m	in)	6500
Moment of inertia			Without brake		0.038
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake		0.042
Recommended moment of inertia ratio of the load and the rotor Note)3				te)3	30 times or less
Rotary encode	er speci	ficatio	ns*3		23-bit Absolute
	Re	solutio	n per single turn		8388608

 Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

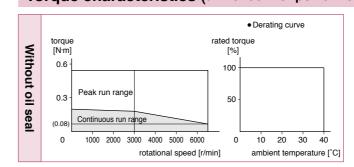
During assembly  During operation	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	49

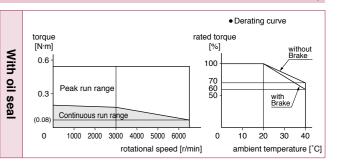
- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

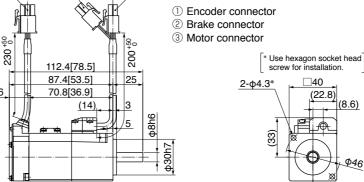
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

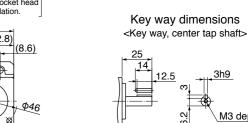




## **Dimensions**

Mass: Without brake: 0.29 kg (0.31 kg with oil seal) With brake: 0.51 kg (0.53 kg with oil seal)





[Unit: mm]

For motors with oil seal, refer to P.161. For motors with protective lip, refer to P.163. • Figures in [ ] represent the dimensions without brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

135 MINAS A6 Family

## **Specifications**

				AC200 V
Motor model *1			IP65	MHMF012L1 M
		Multi	function type	MADLT05SF
Applicable	Model No	RS48	communication type *2	MADLN05SG
driver		Basic	type *2	MADLN05SE
	Fram	e sym	bol	A-frame
Power supply	capacit	y	(kVA)	0.5
Rated output			(W)	100
Rated torque			(N·m)	0.32
Continuous sta	all torqu	е	(N·m)	0.33
Momentary Ma	ax. peal	k torqu	ıe (N·m)	1.11
Rated current (A(rms))			1.1	
Max. current (A(o-p))			5.5	
Regenerative	brake		Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4281	No limit Note)2
Rated rotation	al spee	d	(r/min)	3000
Max. rotationa	l speed		(r/min)	6500
Moment of ine	rtia		Without brake	0.071
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	0.074
Recommended moment of inertia ratio of the load and the rotor				30 times or less
Rotary encode	er speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
Resolution p			n per single turn	8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

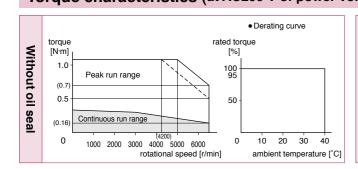
During assembly During operation	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

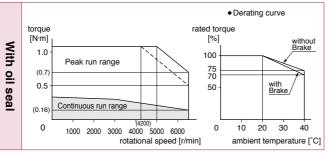
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1 in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

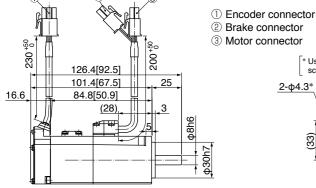
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

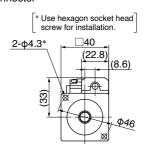




## **Dimensions**

Mass: Without brake: 0.40 kg (0.42 kg with oil seal) With brake: 0.62 kg (0.64 kg with oil seal)





Key way dimensions <Key way, center tap shaft> [Unit: mm]

For motors with oil seal, refer to P.161. For motors with protective lip, refer to P.163. • Figures in [ ] represent the dimensions without brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan. Special Order Product

[High inertia] 200 V | MHMF 200 W 60 mm sq.

Please contact us for more information

## **Specifications**

				AC200 V
Motor model *1	IP65			MHMF022L1 M
		Multifunction type		MADLT15SF
Applicable	Model No	RS48	5 communication type *2	MADLN15SG
driver	140.	Basic	c type *2	MADLN15SE
	Fram	e sym	bol	A-frame
Power supply	capacit	у	(kVA)	0.5
Rated output			(W)	200
Rated torque			(N·m)	0.64
Continuous sta	all torqu	ie	(N·m)	0.76
Momentary Ma	ax. pea	k torqı	ue (N·m)	2.23
Rated current			(A(rms))	1.4
Max. current			(A(o-p))	6.9
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2	
		DV0P4283	No limit Note)2	
Rated rotational speed		(r/min)	3000	
Max. rotationa	l speed		(r/min)	6500
Moment of ine	rtia		Without brake	0.29
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake	0.31	
Recommended moment of in ratio of the load and the roto				30 times or less
Rotary encode	r speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Resolution per single turn			8388608

 Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

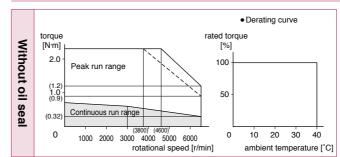
Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

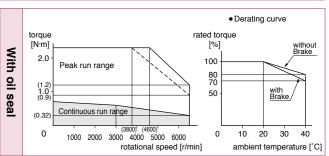
## • Permissible load (For details, refer to P.166)

During assembly During operation	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





Mass: Without brake: 0.75 kg (0.78 kg with oil seal)

## **Dimensions**

With brake: 1.1 kg (1.2 kg with oil seal) ① Encoder connector ② Brake connector ③ Motor connector Use hexagon socket head 126.8[97.5] screw for installation Key way dimensions 96.8[67.5] □60 <Key way, center tap shaft> 16.5 (30.8) (2.1)M4 depth 8

For motors with oil seal, refer to P.161. For motors with protective lip, refer to P.163. • Figures in [ ] represent the dimensions without brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

137 MINAS A6 Family

[Unit: mm]

A6 Family

## **Specifications**

					AC200 V
Motor model*1			IP65		MHMF042L1 M
		Multi	function t	уре	MBDLT25SF
Applicable	Model No.	RS48	5 communi	cation type *2	MBDLN25SG
driver		Basic	type *2		MBDLN25SE
	Frame	sym	bol		B-frame
Power supply	capacity			(kVA)	0.9
Rated output				(W)	400
Rated torque				(N·m)	1.27
Continuous sta	all torque	)		(N·m)	1.40
Momentary M	ax. peak	torqu	ıe	(N·m)	4.46
Rated current		(A(rms))	2.1		
Max. current	ax. current		(A(o-p))	10.4	
Regenerative	brake		Without option		No limit Note)2
frequency (times/min) Note)1		DV0P4283		No limit Note)2	
Rated rotational speed			(r/min)	3000	
Max. rotational speed			(r/min)	6500	
Moment of inertia			Without brake		0.56
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )		With brake		0.58	
Recommende ratio of the loa				Note)3	30 times or less
Rotary encode	er specifi	catio	ns *3		23-bit Absolute
	Resolution per single turn				8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

	,
Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

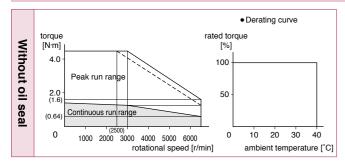
	Radial load P-direction (N)	392
During assembly	Thrust load A-direction (N)	147
document	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

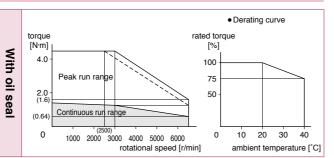
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.47.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

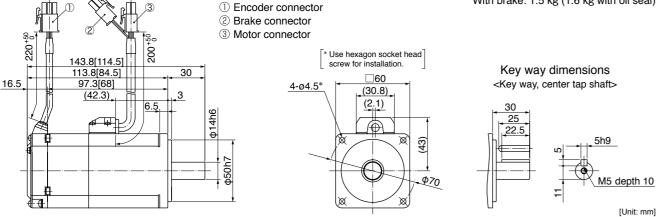
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**

Mass: Without brake: 1.1 kg (1.2 kg with oil seal) With brake: 1.5 kg (1.6 kg with oil seal)



For motors with oil seal, refer to P.162. For motors with protective lip, refer to P.164. • Figures in [ ] represent the dimensions without brake

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Special Order Product

[High inertia] 200 V MHMF 750 W 80 mm sq.

Please contact us for more information

## **Specifications**

					AC200 V
Motor model *1	IP65			MHMF082L1 M	
		Multi	function type		MCDLT35SF
Applicable	Model No	RS48	5 communication t	ype *2	MCDLN35SG
driver	140.	Basic type *2			MCDLN35SE
	Frame	e sym	bol		C-frame
Power supply	capacit	y	(1	kVA)	1.3
Rated output				(W)	750
Rated torque			(1	N·m)	2.39
Continuous sta	all torqu	е	(1	N·m)	2.86
Momentary Ma	ax. peal	k torqu	ue (I	N·m)	8.36
Rated current			(A(r	ms))	3.8
Max. current			(A(	o-p))	18.8
Regenerative brake			Without option		No limit Note)2
frequency (times/min) Note)1		DV0P4283		No limit Note)2	
Rated rotation	al spee	d	(r/	min)	3000
Max. rotationa	l speed		(r/	min)	6000
Moment of ine	rtia		Without brake		1.56
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		1.66
Recommended moment of inertia ratio of the load and the rotor				Note)3	20 times or less
Rotary encoder specifications <sup>*3</sup>					23-bit Absolute
	Resolution per single tur			rn	8388608

#### Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	3.8 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

During assembly During operation	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.

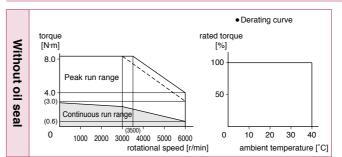
**Imformation** 

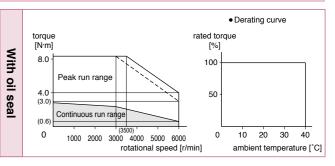
\*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

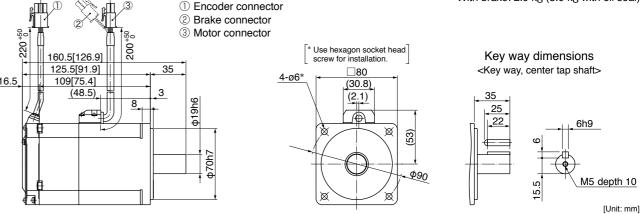
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**

Mass: Without brake: 2.2 kg (2.3 kg with oil seal) With brake: 2.9 kg (3.0 kg with oil seal)



For motors with oil seal, refer to P.162. For motors with protective lip, refer to P.164. • Figures in [ ] represent the dimensions without brake.

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

**Specifications** 

					AC200 V
Motor model *1		IP65			MHMF092L1 M
Applicable driver			fultifunction type		MDDLT55SF
	Model No	RS485 communication type *2		ation type *2	MDDLN55SG
	140.	Basic type *2			MDDLN55SE
	Fram	Frame symbol			D-frame
Power supply capacity (k'			(kVA)	2.3	
Rated output			(W)	1000	
Rated torque (N			(N·m)	3.18	
Continuous stall torque (N·m)				3.34	
Momentary Max. peak torque (N·m)				11.1	
Rated current				(A(rms))	5.7
Max. current				(A(o-p))	28.2
Regenerative brake			Without option		No limit Note)2
frequency (times/min) Note)1		DV0P4284		No limit Note)2	
Rated rotational speed				(r/min)	3000
Max. rotational speed				(r/min)	6000
Moment of ine	rtia		Without brake		2.03
of rotor ( $\times 10^{-4}$	kg·m²)		With brake		2.13
Recommended moment of inertia ratio of the load and the rotor Note)3				20 times or less	
Rotary encoder specifications *3				23-bit Absolute	
Resolution			on per sing	gle turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

[High inertia]

80 mm sq.

Static friction torque (N·m)	3.8 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

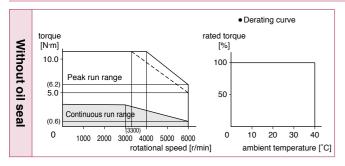
During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

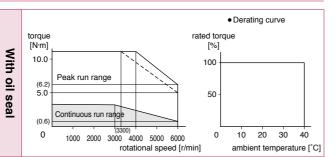
- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

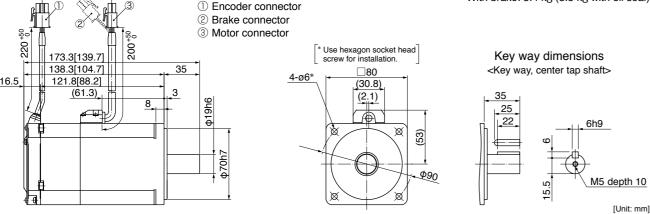
## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)





## **Dimensions**

Mass: Without brake: 2.7 kg (2.8 kg with oil seal) With brake: 3.4 kg (3.5 kg with oil seal)



For motors with oil seal, refer to P.162. For motors with protective lip, refer to P.164. • Figures in [ ] represent the dimensions without brake

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Special Order Product

[High inertia] 130 mm sq.

Please contact us for more information

## **Specifications**

					AC200 V
Motor model *1		IP67			MHMF102L1□□M
Applicable driver	Mult		fultifunction type		MDDLT45SF
	Model No.	RS485 communication type *2		MDDLN45SG	
		Basic type *2			MDDLN45SE
	Frame symbol				D-frame
Power supply capacity (kV			VA)	1.8	
Rated output				(W)	1000
Rated torque (N·m)				4.77	
Continuous stall torque (N·m)					5.25
Momentary Max. peak torque (N·m)					14.3
Rated current			(A(rn	ns))	5.2
Max. current			(A(o	-p))	22
Regenerative brake frequency (times/min) Note)1		Without option	1	No limit Note)2	
		Note)1	DV0P4284		No limit Note)2
Rated rotational speed			(r/r	nin)	2000
Max. rotational speed			(r/r	nin)	3000
Moment of inertia of rotor (×10 <sup>-4</sup> kg·m²)		Without brake		22.9	
			With brake		24.1
Recommended moment of inertia ratio of the load and the rotor Note)3				5 times or less	
Rotary encoder specifications *3			23-bit Absolute		
	Re	solutio	n per single turi	า	8388608

 Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

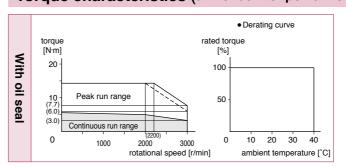
Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

## • Permissible load (For details, refer to P.166)

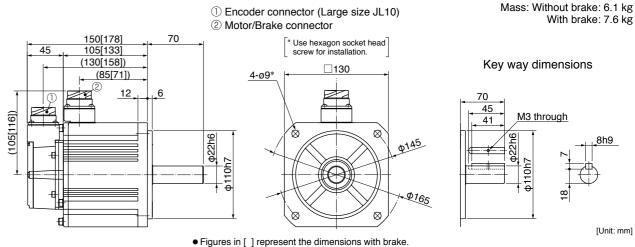
During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



## **Dimensions**



Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

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#### Please contact us for more information

#### **Specifications**

					AC200 V
Motor model*1		IP67		MHMF152L1□□M	
		Multi	tifunction type		MDDLT55SF
Applicable	Model No	RS48	5 communication	type *2	MDDLN55SG
driver		Basic	type *2		MDDLN55SE
	Frame	e sym	bol		D-frame
Power supply	capacity	/	(	(kVA)	2.3
Rated output				(W)	1500
Rated torque			(	(N·m)	7.16
Continuous sta	all torqu	е	(	(N·m)	7.52
Momentary Ma	, , , , , , , , , , , , , , , , , , , ,		(N·m)	21.5	
Rated current			rms))	8.0	
Max. current			(A)	(o-p))	34
Regenerative	brake		Without option		No limit Note)2
frequency (time		Note)1	DV0P4284		No limit Note)2
Rated rotation	al spee	d	(r	/min)	2000
Max. rotationa	l speed		(r	/min)	3000
Moment of ine	rtia		Without brake		33.4
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		34.6	
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less		
Rotary encode	er specif	icatio	ns*3		23-bit Absolute
	Res	solutio	n per single tu	ırn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

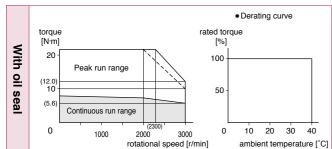
		Radial load P-direction (N)	980
During assembly	Thrust load A-direction (N)	588	
	Thrust load B-direction (N)	686	
	During operation	Radial load P-direction (N)	490
		Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

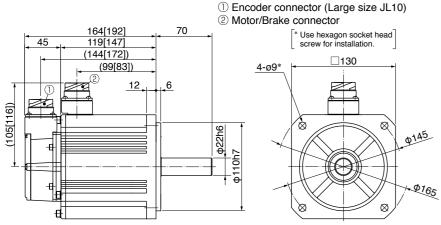
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

# Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

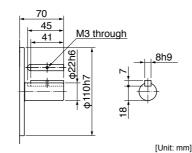


#### **Dimensions**



Mass: Without brake: 7.7 kg With brake: 9.2 kg

Key way dimensions



• Figures in [ ] represent the dimensions with brake.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

[High inertia] 200 V MHMF 2.0 kW 176 mm sq.

#### **Specifications**

Special Order Product

					AC200 V
Motor model *1	IP67				MHMF202L1 M
		Multifunction type			MEDLT83SF
Applicable	Model No.	RS48	5 communication type	e *2	MEDLN83SG
driver	140.	Basic	Basic type *2		MEDLN83SE
	Frame	e sym	bol		E-frame
Power supply	capacity	/	(kVA	A)	3.8
Rated output			(V	V)	2000
Rated torque			(N·n	n)	9.55
Continuous sta	all torqu	е	(N·n	n)	11.5
Momentary Ma	ax. peal	c torqu	ue (N·n	n)	28.6
Rated current	ed current (A(rms))			5))	12.5
Max. current	t (A(o-p))			)))	53
Regenerative brake frequency (times/min) Note)1		Without option		No limit Note)2	
		DV0P4285		No limit Note)2	
Rated rotation	al spee	d	(r/mir	n)	2000
Max. rotationa	l speed		(r/mir	n)	3000
Moment of inertia of rotor (×10 <sup>-4</sup> kg·m²)		Without brake		55.7	
		With brake		61.0	
Recommended moment of inertia ratio of the load and the rotor Note)3				e)3	5 times or less
Rotary encoder specifications *3					23-bit Absolute
	Res	solutio	n per single turn		8388608

#### • Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

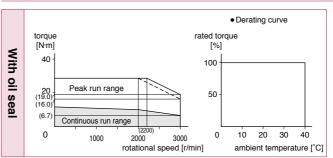
During assembly  During operation	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

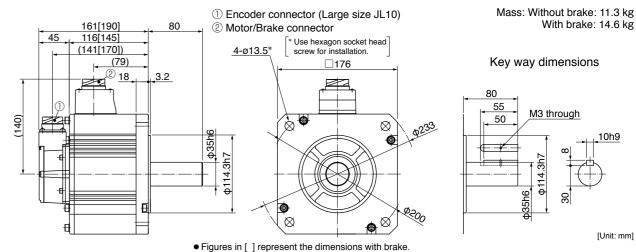
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



#### **Dimensions**



<Cautions>

Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

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**Imformation** 

### Please contact us for more information

#### **Specifications**

					AC200 V
Motor model *1			IP67		MHMF302L1 M
		Multi	function t	ype	MFDLTA3SF
Applicable	Model No	RS48	RS485 communication type *2		MFDLNA3SG
driver	INO.	Basic	type *2		MFDLNA3SE
	Frame	e sym	bol		F-frame
Power supply	capacity	/		(kVA)	4.5
Rated output				(W)	3000
Rated torque				(N·m)	14.3
Continuous sta	all torqu	е		(N·m)	17.2
Momentary Ma	nentary Max. peak torque (N·m)			43.0	
Rated current	ated current (A(rms))		(A(rms))	17.0	
Max. current				(A(o-p))	72
Regenerative	brake		Without option		No limit Note)2
frequency (times/min) Note)1		Note)1	DV0P4285×2		No limit Note)2
Rated rotation	al spee	d		(r/min)	2000
Max. rotationa	l speed		(r/min)		3000
Moment of ine	rtia		Withou	t brake	85.3
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		90.7	
Recommended moment of inertia ratio of the load and the rotor Note)3			Note)3	5 times or less	
Rotary encode	er specif	icatio	ns <sup>⁺3</sup>		23-bit Absolute
	Res	solutio	on per single turn		8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

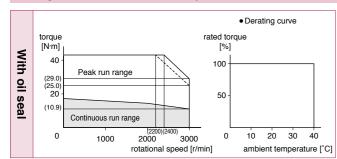
		Radial load P-direction (N)	1666
During assembly	Thrust load A-direction (N)	784	
	Thrust load B-direction (N)	980	
	During operation	Radial load P-direction (N)	784
		Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

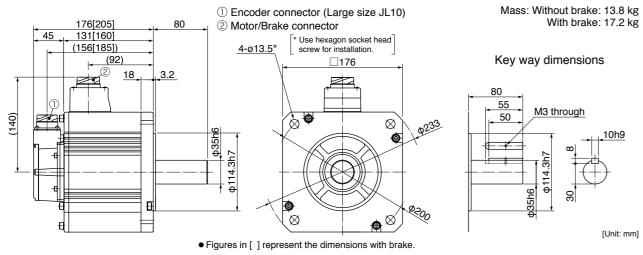
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



#### **Dimensions**



Reduce the moment of inertia ratio if high speed response operation is required. <Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products. Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

**Specifications** 

Special Order Product

				AC200 V
Motor model *1	IP67			MHMF402L1□□M
		Multifunction type		MFDLTB3SF
Applicable	Model No	RS48	5 communication type *2	MFDLNB3SG
driver	140.	Basic	type *2	MFDLNB3SE
	Fram	e sym	bol	F-frame
Power supply	capacit	у	(kVA)	7.5
Rated output			(W)	4000
Rated torque			(N·m)	19.1
Continuous sta	all torqu	ie	(N·m)	22.0
Momentary Max. peak torque (N·m)			ue (N·m)	57.3
Rated current			(A(rms))	20
Max. current		(A(o-p))	85	
Regenerative brake		Without option	No limit Note)2	
frequency (time	es/min)	Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al spee	d	(r/min)	2000
Max. rotationa	l speed		(r/min)	3000
Moment of inertia of rotor (×10 <sup>-4</sup> kg·m²)		Without brake	104	
		With brake	110	
Recommended moment of ine ratio of the load and the rotor				5 times or less
Rotary encode	er speci	ficatio	ns <sup>*3</sup>	23-bit Absolute
	Re	solutio	n per single turn	8388608

#### Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

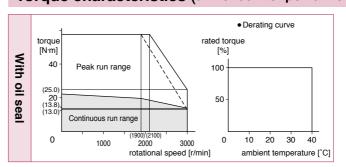
During assembly  During operation	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

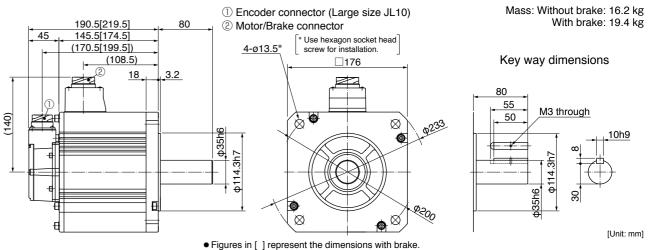
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



#### **Dimensions**



Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

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**Imformation** 

#### **Specifications**

					AC200 V
Motor model *1			IP67		MHMF502L1□□M
		Multi	function	type	MFDLTB3SF
Applicable	Model No	RS48	5 commun	ication type *2	MFDLNB3SG
driver		Basic	type *2		MFDLNB3SE
	Fram	e sym	bol		F-frame
Power supply	capacit	y		(kVA)	7.5
Rated output				(W)	5000
Rated torque				(N·m)	23.9
Continuous sta	all torqu	е		(N·m)	26.3
Momentary Ma	ax. peal	k torqı	ıe	(N·m)	71.6
Rated current				(A(rms))	23.3
Max. current	ax. current (A(o-p))		99		
Regenerative I	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285×2		No limit Note)2
Rated rotation	al spee	d		(r/min)	2000
Max. rotationa	l speed			(r/min)	3000
Moment of ine	rtia		Without brake		146
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		151
Recommended moment of inertia ratio of the load and the rotor Note)3			Note)3	5 times or less	
Rotary encoder specifications *3			ns <sup>⁺3</sup>		23-bit Absolute
	Re	solutio	n per sir	igle turn	8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

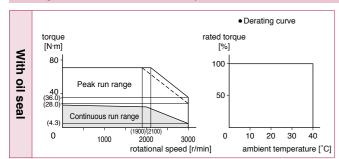
During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
docombry	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

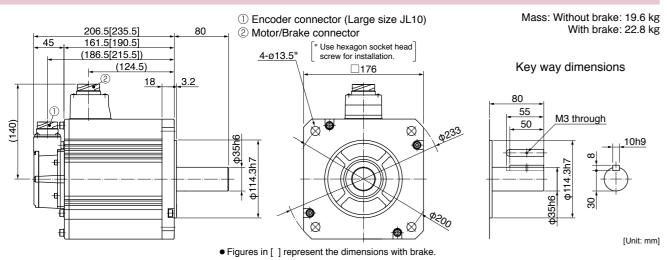
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



#### **Dimensions**



**Cautions>** Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Special Order Product

200 V MDMF 1.0 kW

Please contact us for more information

#### **Specifications**

					AC200 V
Motor model *1	IP67			MDMF102L1□□M	
		Multif	function type		MDDLT45SF
Applicable	Model No	RS48	5 communication t	ype *2	MDDLN45SG
driver	INO.	Basic	type *2		MDDLN45SE
	Frame	e sym	bol		D-frame
Power supply	capacity	у	(1	kVA)	1.8
Rated output				(W)	1000
Rated torque			(1	N·m)	4.77
Continuous sta	all torqu	е	(1	N·m)	5.25
Momentary Ma	ax. peal	k torqu	re (I	N·m)	14.3
Rated current			(A(r	ms))	5.2
Max. current			(A(	o-p))	22
Regenerative brake			Without option		No limit Note)2
frequency (times/min) Note)1		DV0P4284		No limit Note)2	
Rated rotation	al spee	d	(r/	min)	2000
Max. rotationa	l speed		(r/	min)	3000
Moment of ine	rtia		Without brake		6.18
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )		With brake		7.40	
Recommended moment of inertia ratio of the load and the rotor Note)3				Note)3	10 times or less
Rotary encoder specifications *3				23-bit Absolute	
	Res	solutio	n per single tui	rn	8388608

#### Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

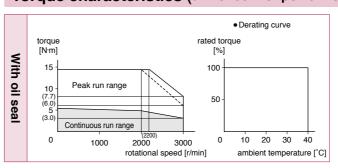
Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

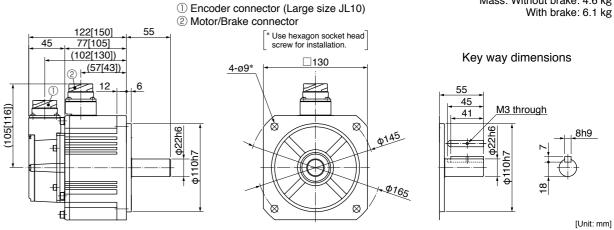
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



#### **Dimensions**



• Figures in [ ] represent the dimensions with brake.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

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Mass: Without brake: 4.6 kg

#### **Specifications**

					AC200 V
Motor model *1			IP67		MDMF152L1□□M
		Multi	function ty	ре	MDDLT55SF
Applicable	Model No	RS48	5 communic	ation type *2	MDDLN55SG
driver		Basic	type *2		MDDLN55SE
	Frame	sym	bol		D-frame
Power supply	capacity	/		(kVA)	2.3
Rated output				(W)	1500
Rated torque				(N·m)	7.16
Continuous sta	all torqu	е		(N·m)	7.52
Momentary Ma	ax. peak	torqı	ıe	(N·m)	21.5
Rated current				(A(rms))	8.0
Max. current				(A(o-p))	34
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min) I	Note)1	DV0P4284		No limit Note)2
Rated rotation	al speed	d		(r/min)	2000
Max. rotationa	l speed		(r/min)		3000
Moment of ine	rtia		Without brake		9.16
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		10.4
Recommended moment of inertia ratio of the load and the rotor Note)3				10 times or less	
Rotary encode	er specif	icatio	ns <sup>∗3</sup>		23-bit Absolute
	Res	solutio	n per sing	le turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

130 mm sq.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

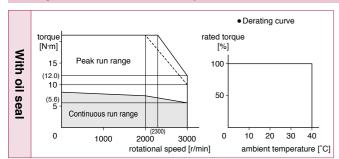
	During assembly During operation	Radial load P-direction (N)	980
		Thrust load A-direction (N)	588
		Thrust load B-direction (N)	686
		Radial load P-direction (N)	490
		Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

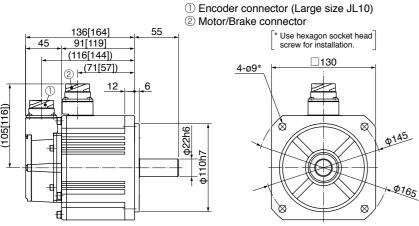
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

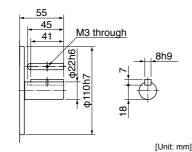


#### **Dimensions**



Mass: Without brake: 5.7 kg With brake: 7.2 kg

Key way dimensions



• Figures in [ ] represent the dimensions with brake.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Special Order Product

200 V MDMF 2.0 kW

Please contact us for more information

#### **Specifications**

					AC200 V
Motor model *1	IP67			MDMF202L1 M	
		Multifunction type			MEDLT83SF
Applicable	Model No	RS485	RS485 communication type *2		MEDLN83SG
driver	Basic type *2				MEDLN83SE
	Frame	e sym	bol		E-frame
Power supply	capacity	y	(I	(VA)	3.8
Rated output				(W)	2000
Rated torque			1)	V·m)	9.55
Continuous sta	all torqu	е	1)	V·m)	10.0
Momentary Ma	ax. peal	k torqu	ıe (1	V·m)	28.6
Rated current			(A(ri	ms))	9.9
Max. current		(A(d	o-p))	42	
Regenerative brake		Without option		No limit Note)2	
frequency (time	es/min)	Note)1	DV0P4285		No limit Note)2
Rated rotation	al spee	d	(r/	min)	2000
Max. rotationa	l speed		(r/	min)	3000
Moment of ine	rtia		Without brake		12.1
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )		With brake		13.3	
Recommended moment of inertia ratio of the load and the rotor Note)3				Note)3	10 times or less
Rotary encoder specifications *3				23-bit Absolute	
	Res	solutio	n per single tur	'n	8388608

#### Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

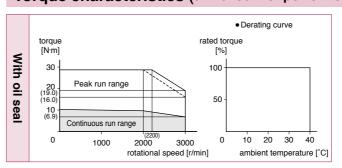
Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

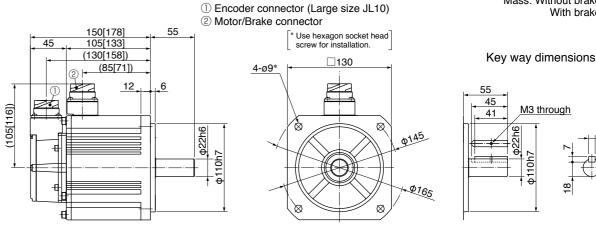
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



#### **Dimensions**



• Figures in [ ] represent the dimensions with brake.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

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[Unit: mm]

Mass: Without brake: 6.9 kg

With brake: 8.4 kg

# **Imformation**

Please contact us for more information

#### **Specifications**

				AC200 V
Motor model *1			IP67	MDMF302L1□□M
		Multi	function type	MFDLTA3SF
Applicable	Model No	RS485 communication type *2		MFDLNA3SG
driver		Basio	type *2	MFDLNA3SE
	Frame	sym	bol	F-frame
Power supply	capacity		(kVA)	4.5
Rated output			(W)	3000
Rated torque			(N·m)	14.3
Continuous sta	all torque	)	(N·m)	15.0
Momentary Ma	ax. peak	torqı	ue (N·m)	43.0
Rated current (A(rr		(A(rms))	16.4	
Max. current			(A(o-p))	70
Regenerative I	brake		Without option	No limit Note)2
frequency (time	es/min) N	ote)1	DV0P4285×2	No limit Note)2
Rated rotation	al speed		(r/min)	2000
Max. rotationa	l speed		(r/min)	3000
Moment of ine	rtia		Without brake	18.6
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	19.6
Recommended moment of inertia ratio of the load and the rotor				10 times or less
Rotary encode	er specifi	catio	ns*3	23-bit Absolute
	Res	olutic	on per single turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

Static friction torque (N·m)	22.0 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

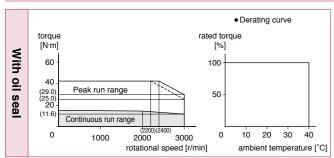
		Radial load P-direction (N)	980
During assembly	Thrust load A-direction (N)	588	
	Thrust load B-direction (N)	686	
	During operation	Radial load P-direction (N)	784
		Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

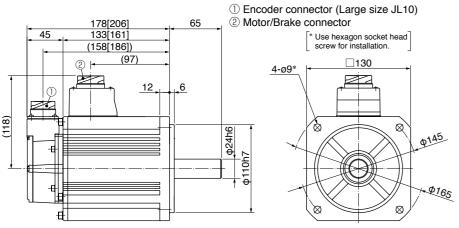
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

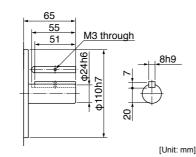


#### **Dimensions**



Mass: Without brake: 9.3 kg With brake: 10.9 kg

#### Key way dimensions



• Figures in [ ] represent the dimensions with brake.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

#### **Specifications**

Special Order Product

					AC200 V
Motor model *1	IP67				MDMF402L1□□M
		Multifunction type		MFDLTB3SF	
Applicable	Model No.	RS48	5 communication typ	e *2	MFDLNB3SG
driver	110.	Basic	type *2	MFDLNB3SE	
	Fram	e sym	bol		F-frame
Power supply	capacit	y	(kV	/A)	7.5
Rated output			(1	W)	4000
Rated torque			(N·	m)	19.1
Continuous sta	all torqu	е	(N·	m)	22.0
Momentary Ma	ax. peal	k torqı	ue (N·	m)	57.3
Rated current			(A(rm	s))	20.0
Max. current (A(o-p))				85	
Regenerative I	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285×2		No limit Note)2
Rated rotation	al spee	d	(r/m	in)	2000
Max. rotationa	l speed		(r/m	in)	3000
Moment of ine	rtia		Without brake		46.9
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake		52.3
Recommended moment of inertia ratio of the load and the rotor Note)3					10 times or less
Rotary encode	r speci		23-bit Absolute		
	Re	solutio	n per single turn		8388608

#### Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

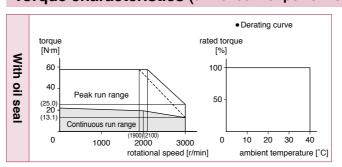
	Radial load P-direction (N)	1666
During assembly	Thrust load A-direction (N)	784
assembly	Thrust load B-direction (N)	980
During	Radial load P-direction (N)	784
operation	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

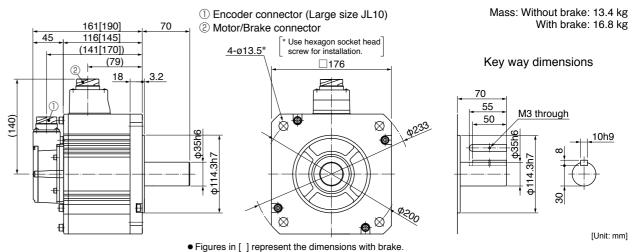
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



#### **Dimensions**



<Cautions>

Reduce the moment of inertia ratio if high speed response operation is required. Dimensions are subject to change without notice. Contact us or a dealer for the latest information. Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

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**Imformation** 

Please contact us for more information

#### **Specifications**

					AC200 V
Motor model*1			IP67		MDMF502L1□□M
		Multif	Multifunction type		MFDLTB3SF
Applicable	Model No.	RS48	communication t	/pe *2	MFDLNB3SG
driver		Basic	type *2		MFDLNB3SE
	Fram	e syml	ool		F-frame
Power supply	capacit	у	(1)	(AV	7.5
Rated output				(W)	5000
Rated torque			1)	√m)	23.9
Continuous sta	all torqu	ie	1)	√m)	26.3
Momentary Ma	ax. pea	k torqu	ie (1	√m)	71.6
Rated current (A(rms))			ns))	23.3	
Max. current			(A(d	p-p))	99
Regenerative	brake		Without option		No limit Note)2
frequency (time	es/min)	Note)1	DV0P4285×2		No limit Note)2
Rated rotation	al spee	d	(r/ı	min)	2000
Max. rotationa	l speed		(r/	min)	3000
Moment of ine	rtia		Without brake		58.2
of rotor ( $\times 10^{-4}$	kg·m²)		With brake		63.0
Recommended moment of inertia ratio of the load and the rotor				lote)3	10 times or less
Rotary encode	er speci	ficatio	ns *³		23-bit Absolute
	Re	solutio	n per single tur	n	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

· Please contact us for more information.

176 mm sq.

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

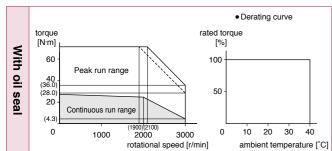
	During assembly  During operation	Radial load P-direction (N)	1666
		Thrust load A-direction (N)	784
		Thrust load B-direction (N)	980
		Radial load P-direction (N)	784
		Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

Detail of model designation, refer to P.116.

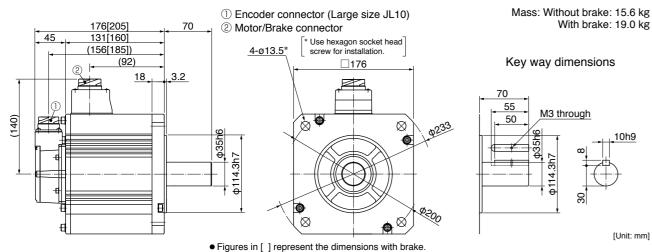
\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

## Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



#### **Dimensions**

<Cautions>



Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Special Order Product

#### **Specifications**

				AC200 V
Motor model *1	IP67			MGMF092L1□□M
		Multifunction type		MDDLT45SF
Applicable	Model No	HS48	communication type	MDDLN45SG
driver	140.	Basic	type *2	MDDLN45SE
	Fram	e syml	bol	D-frame
Power supply	capacit	y	(kVA	1.8
Rated output			(W	850
Rated torque			(N·m	5.41
Continuous sta	all torqu	ie	(N·m	5.41
Momentary Max. peak torque				14.3
Rated current			(A(rms)	5.9
Max. current			(A(o-p)	22
Regenerative brake			Without option	No limit Note)2
frequency (time	es/min)	Note)1	DV0P4284	No limit Note)2
Rated rotation	al spee	d	(r/min	1500
Max. rotationa	l speed		(r/min	3000
Moment of inertia			Without brake	6.18
of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )			With brake	7.40
Recommender ratio of the loa		10 times or less		
Rotary encode	er speci	23-bit Absolute		
	Re	8388608		

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

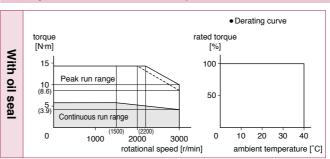
Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

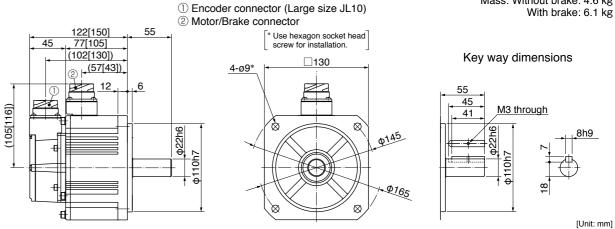
During assembly During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



#### **Dimensions**



• Figures in [ ] represent the dimensions with brake.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

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**Imformation** 

Mass: Without brake: 4.6 kg

With brake: 6.1 kg

Please contact us for more information

#### **Specifications**

					AC200 V
Motor model *1			IP67		MGMF132L1□□M
		Multi	function t	уре	MDDLT55SF
Applicable	Model No	RS48	RS485 communication type *2		MDDLN55SG
driver		Basic	type *2		MDDLN55SE
	Frame	sym	bol		D-frame
Power supply	capacity	/		(kVA)	2.3
Rated output				(W)	1300
Rated torque (N·m)			8.28		
Continuous sta	all torqu	е		(N·m)	8.28
Momentary Ma	ax. peak	torqu	ıe	(N·m)	23.3
Rated current (A(rms		(A(rms))	9.3		
Max. current (A(o-p))		(A(o-p))	37		
Regenerative I	brake		Without option		No limit Note)2
frequency (time	es/min) I	Note)1	DV0P4284		No limit Note)2
Rated rotation	al speed	d	·	(r/min)	1500
Max. rotationa	l speed			(r/min)	3000
Moment of ine	rtia		Withou	t brake	9.16
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )		With brake		10.4	
Recommended moment of inertia ratio of the load and the rotor			Note)3	10 times or less	
Rotary encode	er specif	icatio	ns <sup>*3</sup>		23-bit Absolute
	Res	solutio	n per sin	gle turn	8388608

#### • Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Middle inertia
Low speed/High torque type

· Please contact us for more information

L130 mm sq.

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

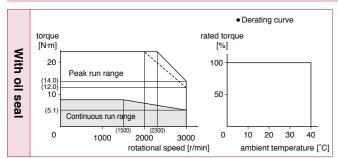
During assembly  During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.48.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

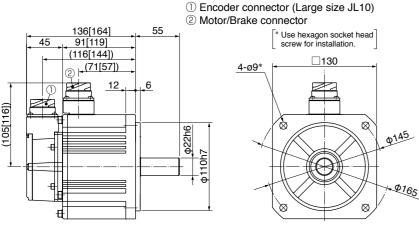
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)

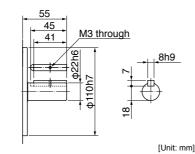


#### **Dimensions**



Mass: Without brake: 5.7 kg With brake: 7.5 kg

Key way dimensions



• Figures in [ ] represent the dimensions with brake.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Special Order Product

200 V MGMF 1.8 kW

#### **Specifications**

				AC200 V
Motor model *1			IP67	MGMF182L1□□M
		Multi	function type	MEDLT83SF
Applicable	Model No.	RS485 communication type *2		MEDLN83SG
driver	110.	Basic	type *2	MEDLN83SE
	Frame	e sym	bol	E-frame
Power supply	capacit	y	(kVA)	3.8
Rated output			(W)	1800
Rated torque			(N·m)	11.5
Continuous stall torque (N·m				11.5
Momentary Max. peak torque (N·m)				28.7
Rated current			(A(rms))	11.8
Max. current			(A(o-p))	42
Regenerative brake			Without option	No limit Note)2
frequency (times/min) Note)1		Note)1	DV0P4285×2	No limit Note)2
Rated rotation	al spee	d	(r/min)	1500
Max. rotationa	l speed		(r/min)	3000
Moment of inertia			Without brake	12.1
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake	13.3
Recommender ratio of the loa		10 times or less		
Rotary encoder specifications *3			23-bit Absolute	
	Re	solutio	n per single turn	8388608

#### • Brake specifications (For details, refer to P.167) This brake will be released when it is energized. Do not use this for braking the motor in motion.

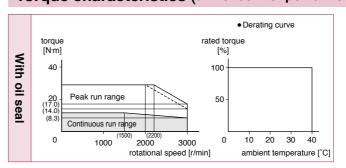
Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

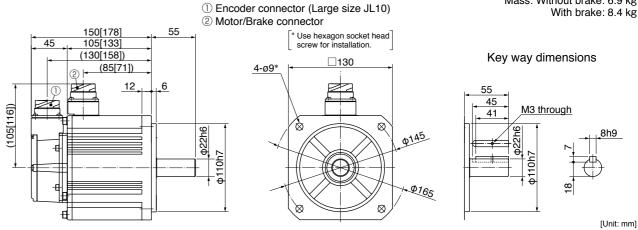
During assembly During operation	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".
- Detail of model designation, refer to P.116.
- \*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



#### **Dimensions**



• Figures in [ ] represent the dimensions with brake.

Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

MINAS A6 Family 156

[Unit: mm]

Mass: Without brake: 6.9 kg

· Please contact us for more information

#### **Specifications**

					AC200 V
Motor model*1			IP67		MGMF292L1□□M
		Multi	function type		MFDLTB3SF
Applicable	Model No.	RS48	5 communication ty	/pe *2	MFDLNB3SG
driver	140.	Basic type *2			MFDLNB3SE
	Fram	e sym	bol		F-frame
Power supply	capacit	y	(k	(AV	7.5
Rated output				(W)	2900
Rated torque			1)	l·m)	18.5
Continuous stall torque (N·m)			18.5		
Momentary Max. peak torque (N·m)			45.2		
Rated current (A(rm			ns))	19.3	
Max. current (A(o-p))			-p))	67	
Regenerative brake		Without option		No limit Note)2	
frequency (time	es/min)	Note)1	DV0P4285×2		No limit Note)2
Rated rotation	al spee	d	(r/r	nin)	1500
Max. rotationa	l speed		(r/r	nin)	3000
Moment of ine	rtia		Without brake		46.9
of rotor ( $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ )			With brake		52.3
Recommended moment of inertia ratio of the load and the rotor Note)3			lote)3	10 times or less	
Rotary encoder specifications *3				23-bit Absolute	
	Re	solutio	n per single turi	n	8388608

• Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

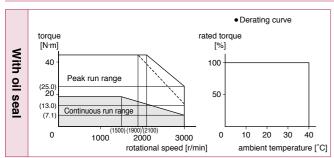
During assembly  During operation	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.165.
- · Dimensions of Driver, refer to P.49.
- \*1 in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

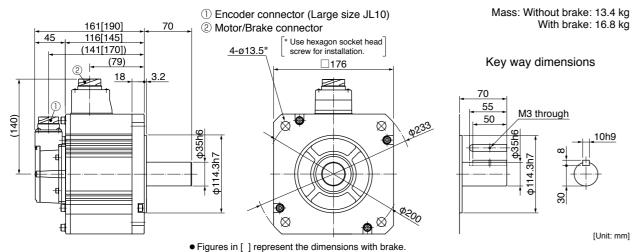
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage.>)



#### **Dimensions**



Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Special Order Product

200 V | **MGMF** 4.4 kW

176 mm sq.

Please contact us for more information

#### **Specifications**

				AC200 V
Motor model *1	IP67			MGMF442L1□□M
		Multi	function type	MFDLTB3SF
Applicable	Model No	RS48	5 communication type *2	MFDLNB3SG
driver	INO.	Basic	type *2	MFDLNB3SE
	Fram	e sym	bol	F-frame
Power supply	capacit	у	(kVA)	7.5
Rated output			(W)	4400
Rated torque			(N·m)	28.0
Continuous sta	all torqu	ie	(N·m)	28.0
Momentary Ma	ax. pea	k torqı	ue (N·m)	70.0
Rated current			(A(rms))	27.2
Max. current			(A(o-p))	96
Regenerative brake		Without option	No limit Note)2	
frequency (time	es/min)	Note)1	DV0P4285×2	No limit Note)2
Rated rotational speed		(r/min)	1500	
Max. rotational speed		(r/min)	3000	
Moment of inertia of rotor (×10 <sup>-4</sup> kg·m²)		Without brake	58.2	
		With brake	63.0	
Recommended moment of i ratio of the load and the rote				10 times or less
Rotary encode	r speci	ficatio	ns*3	23-bit Absolute
	Re	solutio	n per single turn	8388608

#### Brake specifications (For details, refer to P.167) /This brake will be released when it is energized.\ Do not use this for braking the motor in motion.

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29±10 %
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

#### • Permissible load (For details, refer to P.166)

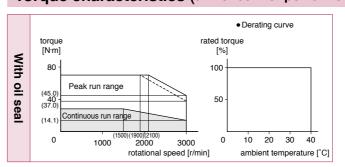
During assembly  During operation	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
	Radial load P-direction (N)	1470
	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.165.
- Dimensions of Driver, refer to P.49.
- \*1  $\square$  in the motor part number represents the motor specifications.
- \*2 Basic type and RS485 communication type are "Position control type".

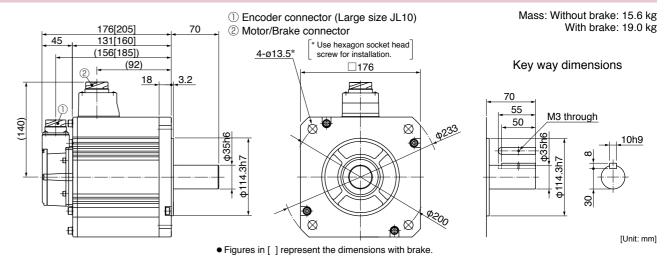
Detail of model designation, refer to P.116.

\*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

#### Torque characteristics (at AC200 V of power voltage < Dotted line represents the torque at 10 % less supply voltage. >)



#### **Dimensions**



Reduce the moment of inertia ratio if high speed response operation is required. <Cautions>

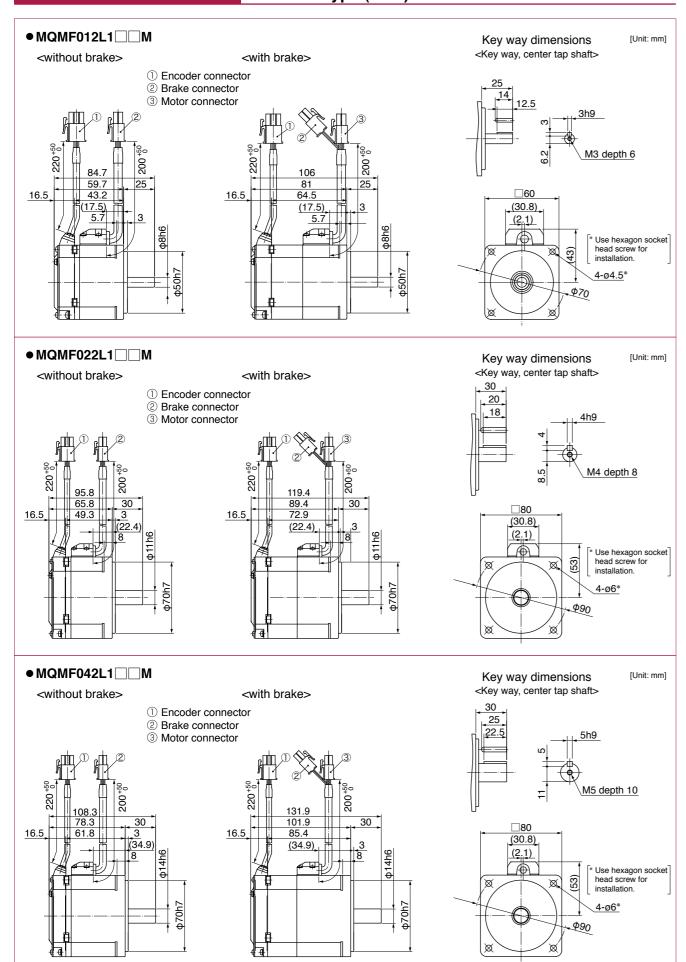
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

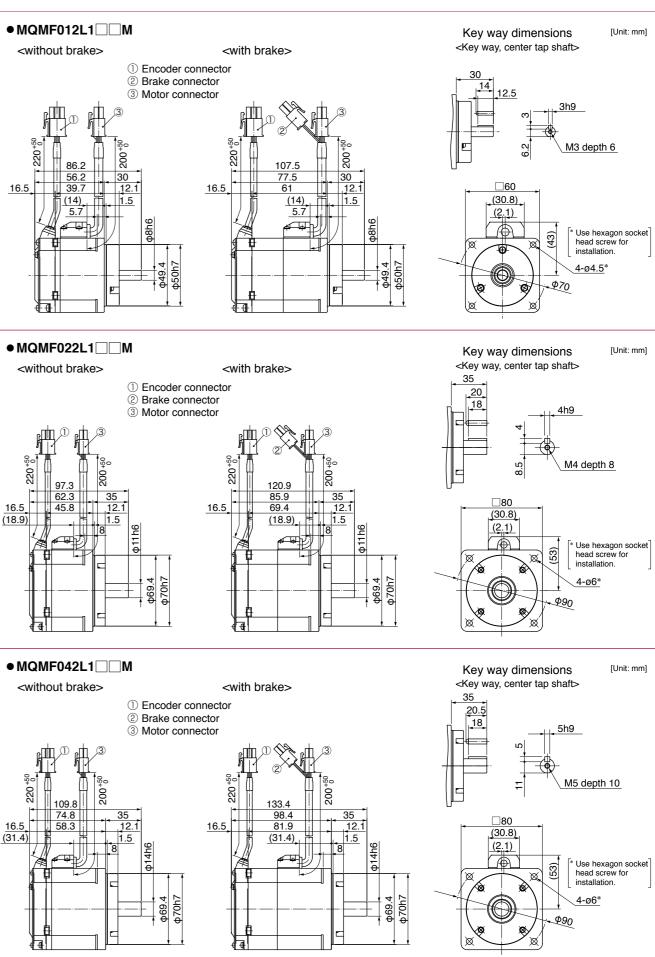
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan

**Dimensions** 

MQMF 100 W to 400 W Leadwire type (IP65) with oil seal



<sup>\*</sup> For motors specifications, refer to P.133 to P.135.



<sup>\*</sup> For motors specifications, refer to P.133 to P.135.

**Special Order Product** 

MHMF 400 W to 1000 W Leadwire type (IP65) with oil seal

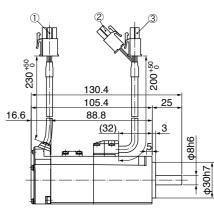
**Special Order Product** 

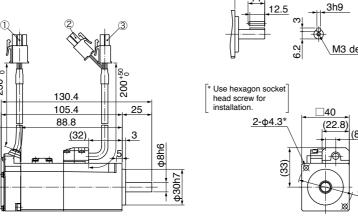
● MHMF5AZL1 □ □ M [Unit: mm] <without brake> Key way dimensions <with brake> <Key way, center tap shaft> ① Encoder connector ② Brake connector 3 Motor connector M3 depth 6 Use hexagon socket head screw for 116.4 57.5 25 91.4 25 40.9 74.8 (18) (18)● MHMF012L1 □ □ M [Unit: mm] Key way dimensions <without brake> <with brake> <Key way, center tap shaft>

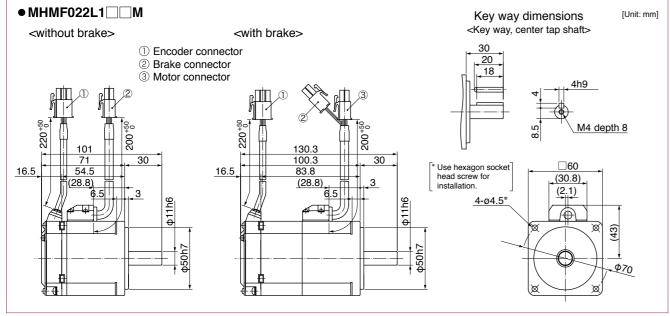
(3) Motor connector 130.4 71.5 105.4 54.9 (32)

① Encoder connector

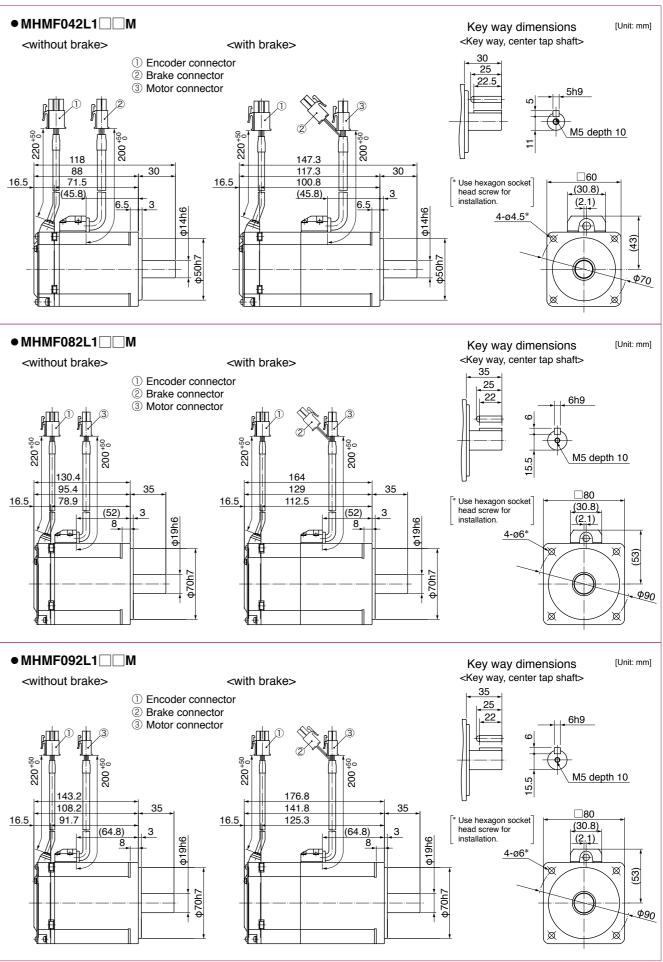
② Brake connector







<sup>\*</sup> For motors specifications, refer to P.136 to P.138.



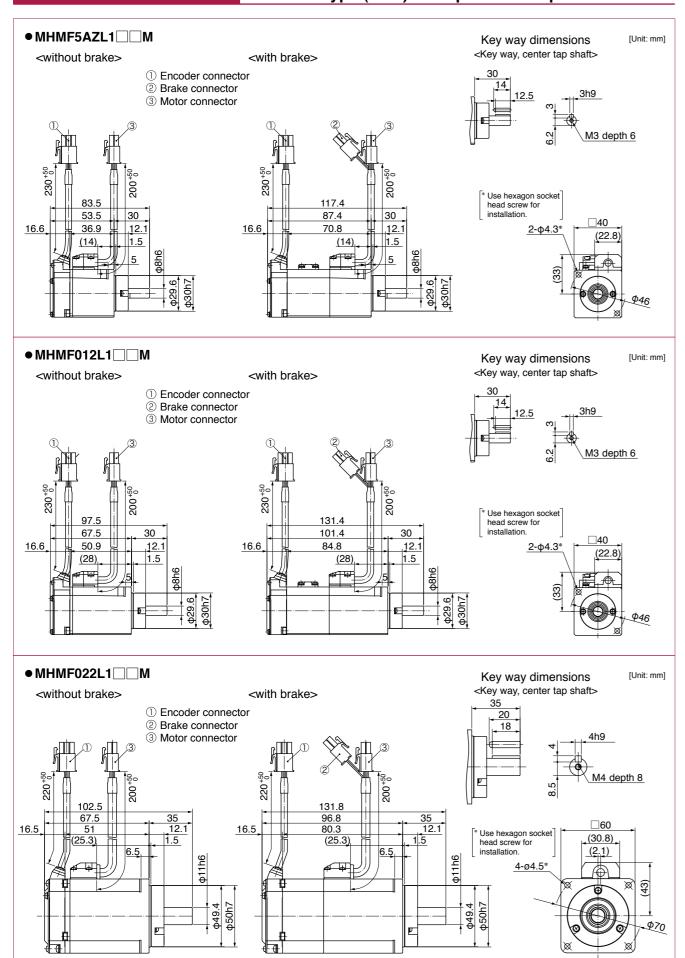
<sup>\*</sup> For motors specifications, refer to P.139 to P.141.

161 MINAS A6 Family MINAS A6 Family 162 MHMF 50 W to 200 W

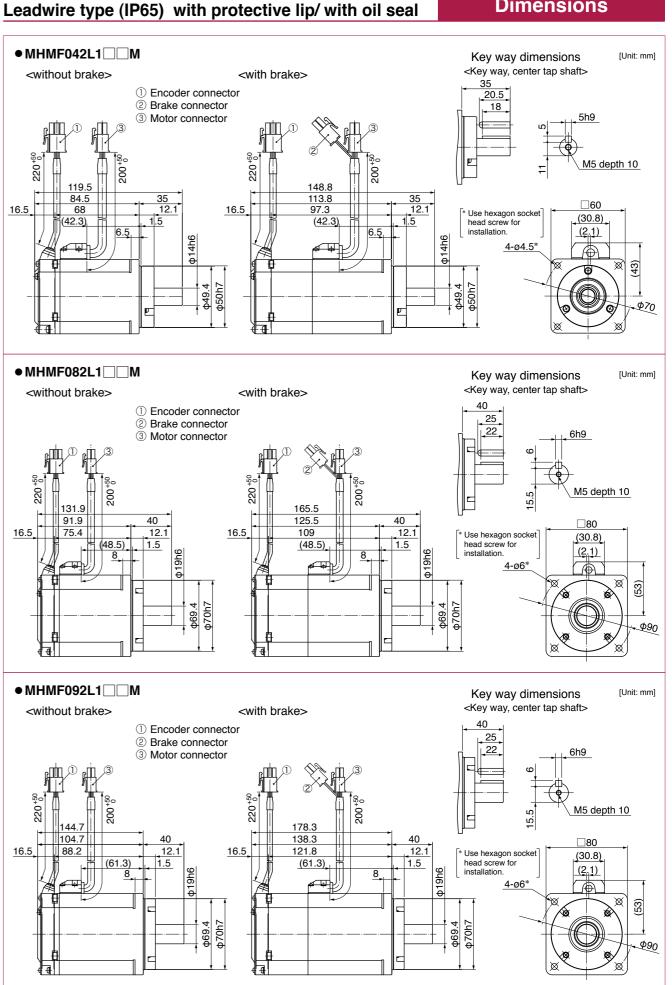
Leadwire type (IP65) with protective lip/ with oil seal

**Special Order Product** 





<sup>\*</sup> For motors specifications, refer to P.136 to P.138.



<sup>\*</sup> For motors specifications, refer to P.139 to P.141.

## **A6 Family**

# Motor Specification Description

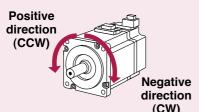
#### **Environmental Conditions**

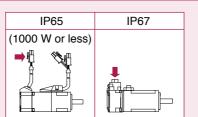
Item		Conditions	
Ambient temperature *1		0 °C to 40 °C (free from freezing)	
Ambient humidity		20 % to 85 % RH (free from condensation)	
Storage tem	nperature *2	-20 °C to 65 °C (Max.temperature guarantee: 80 °C for 72 hours free from condensation <sup>-5</sup> )	
Storage humidity		20 % to 85 % RH (free from condensation 5)	
Vibration Motor only		Lower than 49 m/s <sup>2</sup> (5 G) at running, 24.5 m/s <sup>2</sup> (2.5 G) at stall	
Impact	Motor only	Lower than 98 m/s <sup>2</sup> (10 G)	
Enclosure	IP65 <sup>*3</sup>	MSMF, MQMF, MHMF (except rotating portion of output shaft and leadwire end.)  (MSMF, MQMF, MHMF In case of leadwire type.)	
rating (Motor only)	IP67 *3*4	IP67 motor (except rotating portion of output shaft and connecting pin part of the motor connector and the encoder connector)	
Altitude		Lower than 1000 m	

- \*1 Ambient temperature to be measured at 5 cm away from the motor.
- \*2 Permissible temperature for short duration such as transportation.
- \*3 These motors conform to the test conditions specified in EN standards (EN60529, EN60034-5). Do not use these motors in application where water proof performance is required such as continuous wash-down operation.
- \*4 This condition is applied when the connector mounting screw are tightened to the recommended tightening torque.
- \*5 Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.

#### <Note>

Initial setup of rotational direction: positive = CCW and negative = CW. Pay an extra attention.





#### Notes on [Motor specification] page

#### Note) 1. [At AC100 V of power voltage]

Regenerative brake frequency represents the frequency of the motor's stops from the rated speed with deceleration without load.

- If the load is connected, frequency will be defines as 1/(m+1), where m=load moment of inertia/ rotor moment of inertia.
- When the motor speed exceeds the rated speed, regenerative brake frequency is in inverse proportion to the square of (running speed/rated speed).
- Power supply voltage is AC115 V (at 100 V of the main voltage).
   If the supply voltage fluctuates, frequency is in inverse proportion to the square of (Running supply voltage/115) relative to the value in the table.
- When regeneration occurs continuously such cases as running speed frequently changes or vertical feeding, consult us or a dealer.

#### [At AC200 V of power voltage]

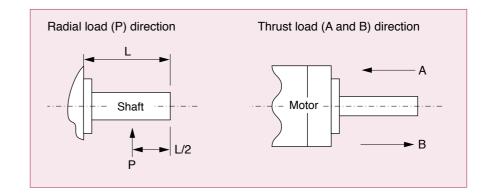
Regenerative brake frequency represents the frequency of the motor's stops from the rated speed with deceleration without load.

- If the load is connected, frequency will be defines as 1/(m+1), where m=load moment of inertia/ rotor moment of inertia.
- When the motor speed exceeds the rated speed, regenerative brake frequency is in inverse proportion to the square of (running speed/rated speed).
- Power supply voltage is AC230 V (at 200 V of the main voltage). If the supply voltage fluctuates, frequency is in inverse proportion to the square of (Running supply voltage/230) relative to the value in the table.
- When regeneration occurs continuously such cases as running speed frequently changes or vertical feeding, consult us or a dealer.
- Note) 2. If the effective torque is within the rated torque, there is no limit in generative brake.
- Note) 3. Consult us or a dealer if the load moment of inertia exceeds the specified value.
- Note) 4. Releasing time values represent the ones with DC-cutoff using a varistor.

#### **Permissible Load at Output Shaft**

The radial load is defined as a load applied to the output shaft in the right-angle direction. This load is generated when the gear head is coupled to the machine using a chain, belt, etc., but not when the gear head is directly connected to the coupling. As shown in the right figure, the permissible value is determined based on the load applied to the L/2 position of the output shaft. The thrust load is defined as a load applied to the output shaft in the axial direction.

Because the radial load and thrust load significantly affect the life of the bearing, take care not to allow the load during operation to exceed the permissible radial load and thrust load shown in the table below.



#### **Built-in Holding Brake**

In the applications where the motor drives the vertical axis, this brake would be used to hold and prevent the work (moving load) from falling by gravity while the power to the servo is shut off.

Use this built-in brake for "Holding" purpose only, that is to hold the stalling status. Never use this for "Brake" purpose to stop the load in motion.

#### · Output Timing of BRK-OFF Signal

- For the brake release timing at power-on, or braking timing at Servo-OFF/Servo-Alarm while the motor is in motion, refer to the Operating Instructions (Overall).
- With the parameter, Pr4.38 (Setup of mechanical brake action while the motor is in motion), you can set up a time between when the motor enters to a free-run from energized status and when BRK-OFF signal turns off (brake will be engaged), when the Servo-OFF or alarm occurs while the motor is in motion. For details, download a copy of the instruction manual from our website.

#### <Note>

- 1. The lining sound of the brake (chattering and etc.) might be generated while running the motor with built-in brake, however this does not affect any functionality.
- 2. Magnetic flux might be generated through the motor shaft while the brake coil is energized (brake is open). Pay an extra attention when magnetic sensors are used nearby the motor.

MINAS A6 Family

MINAS A6 Family

# A6 Family

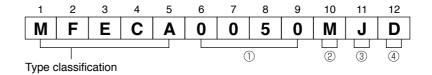
## **Options**

#### Specifications of Built-in Holding Brake

Motor series	Motor output	Static friction torque N·m	Rotor inertia × 10 <sup>-4</sup> kg·m²	Engaging time ms	Releasing time ms	Exciting current DC A (at cool-off)	Releasing voltage DC V Exciting voltage DC V	Permissible work (J) per one braking	Permissible total work × 10 <sup>3</sup> J	Permissible angular acceleration rad/s <sup>2</sup>
	50 W,100 W	0.294 or more	0.002	35 or less	20 or less	0.30		39.2	4.9	
	200 W,400 W	1.27 or more	0.018	50 or less	15 or less	0.36	1 or more	137	44.1	
MSMF (80 mm sq.) or less	750 W	2.45 or more					24±1.2	196	147	30000
( or less )	1000 W	3.80 or more	0.075	70 or less	20 or less	0.42	1 or more 24±2.4	185	80.0	
	1.0 kW, 1.5 kW, 2.0 kW	8.0 or more	0.175	50 or less	15 or less	0.81		600	50	
MSMF	3.0 kW	12.0 or more	0.175	80 or less	10 01 1633	±10 %	2 or more	000	900	10000
(100 mm sq.) or more	4.0 kW	16.2 or more				0.90	24±2.4	1470	2160	10000
	5.0 kW	22.0 or more	1.12	110 or less	50 or less	±10 %		1545	2000	
MQMF	100 W	0.39 or more	0.018	15 or less		0.30	1 or more	105	44.1	
$\begin{pmatrix} 80\text{mm}\text{sq.} \\ \text{or less} \end{pmatrix}$	200 W, 400 W	1.6 or more	0.075	70 or less	20 or less	0.36	24±2.4	185	80	30000
	50 W, 100 W	0.38 or more	0.002	35 or less	20 or less	0.30	1 or more 24±2.4	39.2	4.9	30000
MHMF (80 mm sq.)	200 W, 400 W	1.6 or more	0.018	50 or less		0.36		105	44.1	
or less /	750 W, 1000 W	3.8 or more	0.075	70 or less		0.42		185	80	
	1.0 kW, 1.5 kW	13.7 or more	1.12	100 or less	50 or less	0.79 ±10 %	2 or more 1800 24±2.4	2160	10000	
MHMF (100 mm sq.) or more	2.0 kW, 3.0 kW, 4.0 kW	25.0 or more	4.7	80 or less	25 or less	1.29		1800	3000	5440
	5.0 kW	44.1 or more	4.1	150 or less	30 or less	±10 %		1800	3100	5108
	1.0 kW, 1.5 kW, 2.0 kW	13.7 or more	1.10	100 or less	50	0.79 ±10 %		1470	2160	10000
MDMF	3.0 kW	22.0 or more	1.12	110 or less	50 or less	0.90 ±10 %	2 or more	1545	2000	10000
(100 mm sq.) or more	4.0 kW	25.0 or more	4.7	80 or less	25 or less	1.29	24±2.4	1000	3000	5440
	5.0 kW	44.1 or more	4.1	150 or less	30 or less	±10 %		1800	3100	5108
MGMF	0.85 kW, 1.3 kW, 1.8 kW	13.7 or more	1.12	100 or less	50 or less	0.79 ±10 %	2 or more	1470	2160	10000
(100 mm sq.) or more	2.9 kW	25.0 or more	4.7	80 or less	25 or less	1.29	24±2.4	1800	3000	5440
( or more /	4.4 kW	44.1 or more	3.93	150 or less	30 or less	±10 %	_ 17	1800	3100	5108

- Releasing time values represent the ones with DC-cutoff using a varistor.
- Above values (except static friction torque, releasing voltage and excitation current) represent typical values.
- Backlash of the built-in holding brake is kept ±1° or smaller at ex-factory point.
- Service life of the number of acceleration/deceleration with the above permissible angular acceleration is more than 10 million times. (Life end is defined as when the brake backlash drastically changes.)

#### **Encoder Cable**



(1) Cable length

MFECA: Encoder cable

· Cable longin			
0030	3 m		
0050	5 m		
0100	10 m		
0200	20 m		

Cable part No. Designation

② Cable type

Ε	PVC cable with shield by Oki Electric Cable Co., 0.20 mm <sup>2</sup> × 4P(8-wire), 3P(6-wire)
М	Hitachi Cable, Ltd. Highly bendable type
Т	Hitachi Cable, Ltd. Standard bendable type

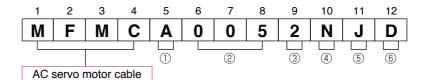
3 Cable end (Encoder side)

_	,	
Α	Tyco Electronics Japan G.K. connector	
J	Japan Aviation Electronics Industry, Ltd.	connector (Direction of motor shaft)
K	Japan Aviation Electronics Industry, Ltd.	connector (Opposite direction of motor shaft)
Р	Japan Aviation Electronics Industry, Ltd.	plug connector
S	"S" shaped cannonplug	
Т	Japan Aviation Electronics Industry, Ltd.	plug connector

4 Cable end (Driver side)

D	Connector (Without battery box)
Е	Connector (With battery box)

#### Motor Cable, Brake Cable



① Type classification ④ Cable type

Α	Standard	
В	Special	
÷	Design order	

(2) Cable length

E Cable leligili					
003	3 m				
005	5 m				
010	10 m				
020	20 m				

3 Sectional area of

cable core		
0 0.75 mm <sup>2</sup>		
1	1.25 mm <sup>2</sup>	
2	2.0 mm <sup>2</sup>	
3	3.5 mm <sup>2</sup>	

ROBO-TOP⊚ is a trade mark of DYDEN CORPORATION

	<b>21</b>
Е	ROBO-TOP <sub>®</sub> 4-wire by DYDEN CORPORATION
F	ROBO-TOP <sub>®</sub> 6-wire by DYDEN CORPORATION
G	ROBO-TOP <sub>®</sub> 2-wire by DYDEN CORPORATION
N	4-wire by Hitachi Cable, Ltd. (Highly bendable type)
R	2-wire by Hitachi Cable, Ltd. (Highly bendable type)
Р	4-wire by Hitachi Cable, Ltd. (Standard bendable type)
S	2-wire by Hitachi Cable, Ltd. (Standard bendable type)
U	4-wire for A6 series small motor* (Highly bendable type)
V	6-wire for A6 series small motor* (Highly bendable type)
W	4-wire for A6 series small motor* (Standard bendable type)
Х	6-wire for A6 series small motor* (Standard bendable type)

\* 80 mm sq. or less

5 Cable end at motor side

С	S type cannon plug	
Е	Tyco Electronics Japan G.K. connector	
F	Japan Aviation Electronics Industry, Ltd.	connector (Direction of motor shaft)
G	Japan Aviation Electronics Industry, Ltd.	connector (Opposite direction of motor shaft)
J	Japan Aviation Electronics Industry, Ltd.	connector (Direction of motor shaft)
K	Japan Aviation Electronics Industry, Ltd.	connector (Opposite direction of motor shaft)
U	Japan Aviation Electronics Industry, Ltd.	plug connector

6 Cable end at driver side

D	Rod terminal
Т	Clamp terminal

Connector

for encoder

Connector

Connector

for motor

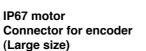
for brake

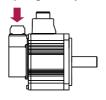
50 W to 1000 W 80 mm sq. or less

# 0.85 kW to 5.0 kW 100 mm sq. or more

• When the motors of <MSMF, MDMF, MGMF, MHMF> are used, they are connected as shown below. Connector: Made by Japan Aviation Electronics Industry, Ltd. (The figures below show connectors for the motor.)

#### Connector for encoder





IP67 motor Connector for encoder (Small size)



<Large size Encoder connector>



JL10-2A20-29P

23-bit Absolute

IN No.	Application	
Α	NC	
В	NC	
С	NC	
D	NC	
D E F	NC	
F	NC	
G	E0V	
Н	E5V	
J	FG(SHIELD)	
K	PS	
L	PS	
M	NC	
N	NC	<f< td=""></f<>
Р	NC	
R	NC	Do
S	BAT-*	* V

BAT+

<Small size Encoder connector>



23-bit Absolute

PIN No.	Application	
1	E0V	
2	NC	
3	PS	
4	E5V	
5	BAT-*	
6	BAT+*	
7	PS	
8	NC	
9	FG(SHIELD)	
10	NC	

#### Remarks>

To not connect anything to NC.

When using the motor as an incremental system, BAT+ and BAT- can be left unconnected.

# Connector: Tyco Electronics Japan G.K. (The figures below show connectors for the motor.)

[Connector for encoder]						
Γ	3	2	1		PIN No.	Application
	6	5	4		1	BAT+*
	9	8	7		2	BAT-*
			3	FG(SHIELD)		
172169-1					4	PS
23-bit Absolute					5	PS
					6	NC
				7	E5V	

E0V

NC

23-bit Absolute

RAT\_\*

E0V

PS

BAT+\*

E5V

PS

• When the motors of <MSMF, MQMF, MHMF (Leadwire type)> are used, they are connected as shown below.

Connector pin diagram is viewed from the direction of the arrow.

<Remarks> Do not connect anything to NC.

\* When using the motor as an incremental system BAT+ and BAT- can be left unconnected.

#### \* Connector pin diagram is viewed from the direction of the arrow.

[Connector for Brake]

 $\sim$ 

[Connector for motor]



4 3

172167-1





PIN No. Application

U-phase

V-phase

W-phase

Ground

is a nonpolar device.

\* Connector pin diagram is viewed from the direction

• When the motors of <MSMF, MQMF, MHMF (Connector type)> are used, they are connected as shown below. Connector: Made by Japan Aviation Electronics Industry, Ltd. (The figures below show connectors for the motor.)

Connector for encoder

JN6CR07PM4 'Top view of the motor

2 3 JN6CR07PM2 5 6

PIN No. Application Tightening torque of the screw (M2) 0.19 N·m to 0.21 N·m FG(SHIELD)

- \* Be sure to use only the screw supplied with the connector, to avoid damage.
- When using the motor as an incremental system. BAT+ and BAT- can be left unconnected

#### <MSMF>

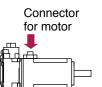


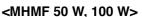
PIN No. Application U-phase V-phase W-phase PΕ Ground JN8AT04NJ1

Tightening torque of the screw (M2) 0.085 N·m to 0.095 N·m (screwed to plastic)

- \* Be sure to use only the screw supplied with the connector, to avoid damage.
- Secure the gasket in place without removing it from the connector.

\* Top view of the motor.







JN11AH06NN2 Top view of the motor.

<MQMF, MHMF 200 W to 1000 W>



JN11AH06NN1 Top view of the motor.

PIN No. Application PIN No. Application U-phase U-phase 2 V-phase V-phase W-phase W-phase 3 3 NC 4 Brake 5 NC 5 Brake PΕ Ground PΕ Ground

Tightening torque of the screw (M2) 0.085 N·m to 0.095 N·m

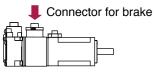
without Brake

- \* Electromagnetic brake is a nonpolar device.
- \* Be sure to use only the screw supplied with the connector, to avoid damage
- Secure the gasket in place without removing it from the connector.

<Remarks> Do not connect anything to NC.

with Brake

### [Motor with brake] < MSMF>





\* Top view of the motor

PIN No.	Application
1	Brake
2	Brake

- Tightening torque of the screw (M2) 0.19 N·m to 0.21 N·m
- \* Electromagnetic brake is a nonpolar device. \* Be sure to use only the screw supplied with
- the connector, to avoid damage Secure the gasket in place without removing
- it from the connector.

#### · Connector for motor/brake

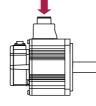
Table for motor connector and brake connector

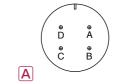
Motor	Matax autaut	200 V	
part No.	Motor output	without Brake	with Brake
MSMF	1.0 kW to 2.0 kW	Α	С
INIOINIE	3.0 kW to 5.0 kW	В	D
MDMF	1.0 kW to 2.0 kW	Α	С
MDML	3.0 kW to 5.0 kW	В	D

Motor	Matax autaut	200 V		
part No	Motor output	without Brake	with Brake	
140145	0.85 kW to 1.8 kW	Α	С	
MGMF	2.9 kW to 4.4 kW	В	D	
	1.0 kW to 1.5 kW	Α	С	
MHMF	2.0 kW to 5.0 kW	В	D	

\* Electromagnetic brake is a nonpolar device

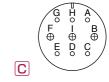






JL10-2E20-4PE-B B

JL10-2E22-22PE-B		
PIN No.	Application	
Α	U-phase	
В	V-phase	
С	W-phase	
D	Ground	



JL10-2E20-18PE-B

PIN No.	Application	
G	with Brake : Brake	
G	without Brake: NC	
н	with Brake : Brake	
П	without Brake: NC	
Α	NC	
F	U-phase	
- 1	V-phase	
В	W-phase	
E	Ground	
D	Ground	
С	NC	
	•	



PIN No.	Application	
Α	with Brake	:Brake
A	without Brak	e:NC
В	with Brake	: Brake
Ь	without Brak	e:NC
С	N	С
D	U-ph	ase
Е	V-ph	ase
F	W-ph	nase
G	Gro	und
Н	Gro	und
I	N	0

<Remarks> Do not connect anything to NC.

Part No.

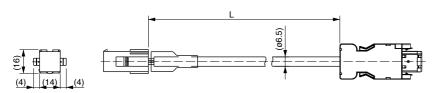
MFECA0 \* \* 0EAD

80 mm sq. or less Applicable model

MQMF 100 W to 400 W MSMF 50 W to 1000 W, MHMF 50 W to 1000 W

(Leadwire type)

Specifications 23-bit absolute encoder When used in incremental system (without battery box)



Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M
Shell kit	3E306-3200-008	(or equivalent)
Connector (Motor side)	172161-1	Tyco Electronics Japan
Connector pin	170365-1	G.K.
Cable	0.20 mm <sup>2</sup> ×3P (6-wire)	Oki Electric Cable Co., Ltd.

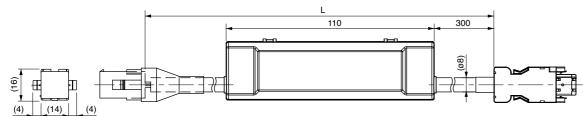
	L (m)	Part No.(ex.)
	3	MFECA0030EAD
	5	MFECA0050EAD
	10	MFECA0100EAD
	20	MFECA0200EAD
1		

P	Part No.	MFECA0 * * 0EAE	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W, MQMF 100 W to 400 W MHMF 50 W to 1000 W (Leadwire type)
Sp	ecifications	23-bit absolute encoder When used in absolute system (with battery box) *		

\* Battery is not included. Please buy the absolute encoder battery "DV0P2990" separately.

[Unit: mm]

[Unit: mm]

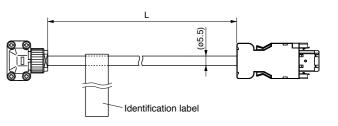


Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M
Shell kit	Shell kit 3E306-3200-008	
Connector (Motor side)	172161-1	Tyco Electronics Japan
Connector pin	Connector pin 170365-1	
Cable	•	

L (m)	Part No.(ex.)
3	MFECA0030EAE
5	MFECA0050EAE
10	MFECA0100EAE
20	MFECA0200EAE

Direction of motor shaft



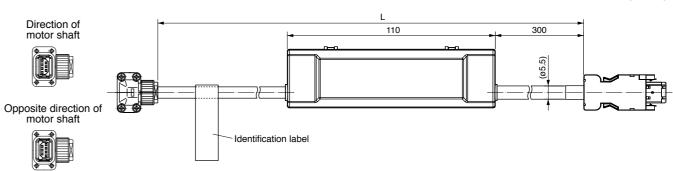


Title Part No.		Manufacturer	L (m)	Part No.(ex.)
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M	3	MFECA0030MJD
Shell kit	3E306-3200-008	(or equivalent)		MFECA0050MJD
Connector (Motor side)	JN6FR07SM1	Japan Aviation	10	MFECA0100MJD
Connector pin	LY10-C1-A1-10000	Electronics Ind.		MFECA0200MJD
Cable AWG24 4-wire, AWG22 2-wire (ø5.5) Hitachi Cable, Ltd.				

Part No.	MFECA0 * * 0MJE (Highly bendable type, Direction of motor shaft)  MFECA0 * * 0MKE (Highly bendable type, Opposite direction of motor shaft)  MFECA0 * * 0TJE (Standard bendable type, Direction of motor shaft)  MFECA0 * * 0TKE (Standard bendable type, Opposite direction of motor shaft)	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W MQMF 100 W to 400 W MHMF 50 W to 1000 W (Connector type)
Specifications	23-bit absolute encoder When used in absolute system (with battery box) *		

\* Battery is not included. Please buy the absolute encoder battery "DV0P2990" separately.

[Unit: mm]



Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M
Shell kit	3E306-3200-008	(or equivalent)
Connector (Motor side)	JN6FR07SM1	Japan Aviation
Connector pin	LY10-C1-A1-10000	Electronics Ind.
Cable	AWG24 4-wire、AWG22 2-wire (φ5.5)	Hitachi Cable, Ltd.

L (m)	Part No.(ex.)
3	MFECA0030MJE
5	MFECA0050MJE
10	MFECA0100MJE
20	MFECA0200MJE

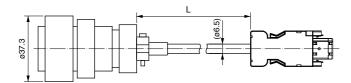
171 MINAS A6 Family MINAS A6 Family 172

[Unit: mm]

# **Encoder Cable**

\* It doesn't correspond to IP65 and IP67.

Part No.	MFECA0 * * 0EPD	100 mm sq. or more Applicable model	0.85 kW to 5.0 kW
Specifications	23-bit absolute encoder When used in incremental system (without battery box)		
орсынсацина	<large lock="" one-touch="" type=""></large>		

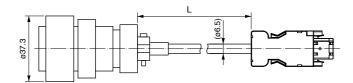


[Unit: mm]

Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M
Shell kit	3E306-3200-008	(or equivalent)
Connector (Motor side)	JL10-6A20-29S-EB	Japan Aviation
Cable clamp	JL04-2022CK(09)-R	Electronics Ind.
Cable	0.2 mm <sup>2</sup> ×3P (6-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030EPD
5	MFECA0050EPD
10	MFECA0100EPD
20	MFECA0200EPD

	Part No.	MFECA0 * * 0ESD	100 mm sq. or more Applicable model	0.85 kW to 5.0 kW
,	Specifications	23-bit absolute encoder V <large screwed="" type=""></large>	When used in incremental system (without battery box)	



[Unit: mm]

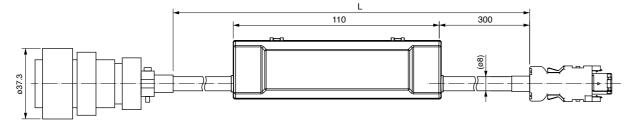
Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M
Shell kit	3E306-3200-008	(or equivalent)
Connector (Motor side)	N/MS3106B20-29S	Japan Aviation
Cable clamp	N/MS3057-12A	Electronics Ind.
Cable	0.2 mm <sup>2</sup> x3P (6-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030ESD
5	MFECA0050ESD
10	MFECA0100ESD
20	MFECA0200ESD

	Part No.	MFECA0 * * 0EPE	100 mm sq. or more Applicable model	0.85 kW to 5.0 kW (IP67 motor)
	Specifications	23-bit absolute encoder When used in absolute system (with battery box) *		
оросинались		<large lock="" one-touch="" p="" type<=""></large>	e>	

 $^{\star}$  Battery is not included. Please buy the absolute encoder battery "DV0P2990" separately.

[Unit: mm]



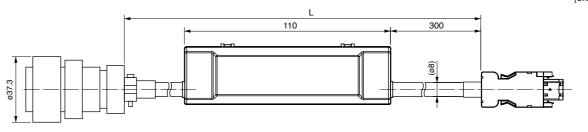
Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M
Shell kit	3E306-3200-008	(or equivalent)
Connector (Motor side)	JL10-6A20-29S-EB	Japan Aviation
Cable clamp	JL04-2022CK(09)-R	Electronics Ind.
Cable	0.2 mm <sup>2</sup> ×3P (6-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030EPE
5	MFECA0050EPE
10	MFECA0100EPE
20	MFECA0200EPE

Part No.	MFECA0 * * 0ESE	100 mm sq. or more Applicable model	0.85 kW to 5.0 kW (IP67 motor)
Specifications	23-bit absolute encoder When used in absolute system (with battery box) * <large screwed="" type=""></large>		solute system (with battery box) *

 $^{\star}$  Battery is not included. Please buy the absolute encoder battery "DV0P2990" separately.

г	Init:	

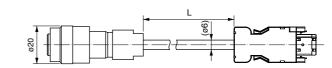


Title	Part No.	Manufacturer	L (m)	Part No.(ex.)
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M	3	MFECA0030ESE
Shell kit	3E306-3200-008	(or equivalent)	5	MFECA0050ESE
Connector (Motor side)	N/MS3106B20-29S	Japan Aviation	10	MFECA0100ESE
Cable clamp	N/MS3057-12A	Electronics Ind.	20	MFECA0200ESE
Cable	0.2 mm <sup>2</sup> ×4P (8-wire)	Oki Electric Cable Co., Ltd.		

Part No.	MFECA0 * * 0ETD	100 mm sq. or more Applicable model	0.85 kW to 5.0 kW (IP67 motor)
Specifications	23-bit absolute encoder When used in incremental system (without battery box) <small lock="" one-touch="" type=""></small>		

[Unit: mm]

Imformation

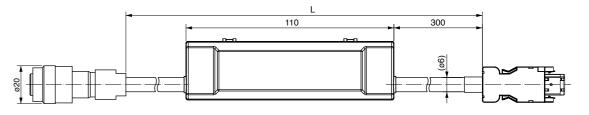


Title	Part No.	Manufacturer	L (m)	Part No.(ex.)
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M	3	MFECA0030ETD
Shell kit	3E306-3200-008	(or equivalent)	5	MFECA0050ETD
Connector (Motor side)	JN2DS10SL1-R	Japan Aviation	10	MFECA0100ETD
Connector pin	JN1-22-22S-PKG100	Electronics Ind.	20	MFECA0200ETD
Cable	0.2 mm <sup>2</sup> ×3P (6-wire)	Oki Electric Cable Co., Ltd.		

Part No.	MFECA0 * * 0ETE	100 mm sq. or more Applicable model	0.85 kW to 5.0 kW (IP67 motor)
Specifications	I	23-bit absolute encoder When used in absolute system (with battery box) * <small lock="" one-touch="" type=""></small>	

 $^{\star}$  Battery is not included. Please buy the absolute encoder battery "DV0P2990" separately.

[Unit: n



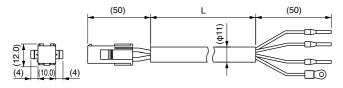
Title	Part No.	Manufacturer	L (m)	
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M	3	
Shell kit	3E306-3200-008	(or equivalent)	5	
Connector (Motor side)	JN2DS10SL1-R	Japan Aviation	10	
Connector pin	JN1-22-22S-PKG100	Electronics Ind.	20	
Cable	0.2 mm <sup>2</sup> x3P (6-wire)	Oki Electric Cable Co. Ltd.		

L (m)	Part No.(ex.)
3	MFECA0030ETE
5	MFECA0050ETE
10	MFECA0100ETE
20	MFECA0200ETE

# **Motor Cable (without Brake)**

\* It doesn't correspond to IP65 and IP67.

MSMF 50 W to 1000 W. MQMF 100 W to 400 W 80 mm sq. or less MFMCA0 \* \* 0EED MHMF 50 W to 1000 W Part No. Applicable model (Leadwire type)



Title	Part No.	Manufacturer
Connector	172159-1	Tyco Electronics Japan
Cable clamp	170366-1	G.K.
Rod terminal	AI0.75-8GY	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 0.75 mm <sup>2</sup> 4-wire	DYDEN CORPORATION

	L (m)	Part No.(ex.)
	3	MFMCA0030EED
	5	MFMCA0050EED
	10	MFMCA0100EED
	20	MFMCA0200EED
ı		

[Unit: mm]

[Unit: mm]

[Unit: mm]

David	MFMCA0 * * 0NJD (Highly bendable type, Direction of motor shaft)  MFMCA0 * * 0RJD (Standard bendable type, Direction of motor shaft)	80 mm sq.	MSMF 50 W to 1000 W (Connector type)
Part No.	MFMCA0 * * 0NKD (Highly bendable type, Opposite direction of motor shaft)	Applicable model	MSMF 200 W to 1000 W
	$\textbf{MFMCA0} \   \textbf{*} \   \textbf{*} \   \textbf{0RKD}  (\textbf{Standard bendable type, Opposite direction of motor shaft)}$		(Connector type)

Direction of motor shaft

Opposite direction of motor shaft



=\_\_\_ Identification label

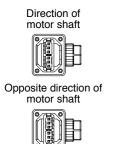
Motor cable for opposite direction of motor shaft cannot be used with a motor 50 W and 100 W.

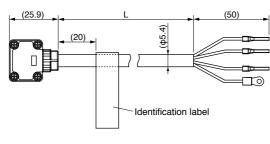
Title	Part No.	Manufacturer
Connector	JN8FT04SJ1	Japan Aviation
Cable clamp	ST-TMH-S-C1B-3500	Electronics Ind.
Rod terminal	AI0.75-8GY	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	AWG18 4-wire (φ6.7 mm)	Hitachi Cable, Ltd.

<Remarks>

L (m)	Part No.(ex.)
3	MFMCA0030NJD
5	MFMCA0050NJD
10	MFMCA0100NJD
20	MFMCA0200NJD

		/Movable/fixed common-use.)	80 mm sq.	
Part No.	MFMCA0 * * 7UFD	direction of motor shaft	or less	MHMF 50 W, 100 W
Part No.	MFMCA0 * * 7UGD	(Movable/fixed common-use, opposite directionof motor shaft)	Applicable model	(Connector type)





Title	Part No.	Manufacturer
Connector	JN11FH06SN2	Japan Aviation
Cable clamp	JN11S10K4A1	Electronics Ind.
Rod terminal	AI0.75-8GY	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	AWG22 6-wire (φ5.4 mm)	NIKKO ELECTRIC WIRE CO.,LTD

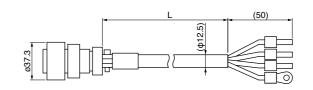
L (m)	Part No.(ex.)
3	MFMCA0037UFD
5	MFMCA0057UFD
10	MFMCA0107UFD
20	MFMCA0207UFD

Direction of motor shaft =10 Opposite direction of motor shaft Identification label

Part No.	Manufacturer	L (m)	Part No.(ex.)
JN11FH06SN1	Japan Aviation	3	MFMCA0030UFD
JN11S35H3A1	Electronics Ind.	5	MFMCA0050UFD
AI0.75-8GY	PHOENIX CONTACT	10	MFMCA0100UFD
N1.25-M4	J.S.T Mfg. Co., Ltd.	20	MFMCA0200UFD

NIKKO ELECTRIC WIRE CO.,LTD

Part No.	MFMCDO * * 2EUD	Abblicable model	MHMF	1.0 kW to 2.0 kW, 1.0 kW, 1.5 kW, ouch lock type>	 1.0 kW to 2.0 kW 0.85 kW to 1.8 kW



AWG18 6-wire (φ6.8)

Title

Connector

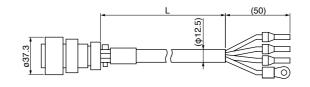
Cable clamp

Rod terminal Nylon insulated round terminal

Cable

Title	Part No.	Manufacturer	L (m)	Part No.(ex.)
Connector	JL10-6A20-4SE-EB	Japan Aviation	3	MFMCD0032EUD
Cable clamp	JL04-2022CK(14)-R	Electronics Ind.	5	MFMCD0052EUD
Rod terminal	NTUB-2	J.S.T Mfg. Co., Ltd.	10	MFMCD0102EUD
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.	20	MFMCD0202EUD
Cable	ROBO-TOP 600V 2.0mm <sup>2</sup> 4-wire	DYDEN CORPORATION		-

100 mm eg or more	MSMF 1.0 kW to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW, 1.5 kW, MGMF 0.85 kW to 1.8 kW <screwed type=""></screwed>
-------------------	--



Title	Part No.	Manufacturer	L (m)	Part No.(ex.)
Connector	JL04V-6A20-4SE-EB-R	Japan Aviation	3	MFMCD0032ECD
Cable clamp	JL04-2022CK(14)-R	Electronics Ind.	5	MFMCD0052ECD
Rod terminal	NTUB-2	J.S.T Mfg. Co., Ltd.	10	MFMCD0102ECD
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.	20	MFMCD0202ECD
Cable	ROBO-TOP 600V 2.0mm <sup>2</sup> 4-wire	DYDEN CORPORATION		

[Unit: mm]

Imformation

[Unit: mm]

MINAS A6 Family 176

[Unit: mm]

Part No. MFMCEO \* \* 2ECD

# **Motor Cable (with Brake)**

\* It doesn't correspond to IP65 and IP67.

A6 Family

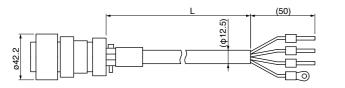
**Options** 

100 mm sq. or more Part No. MFMCEO \* \* 2EUD MHMF 2.0 kW <One-touch lock type> Applicable model

MHMF 2.0 kW <Screwed type>

**Motor Cable (without Brake)** 

\* It doesn't correspond to IP65 and IP67.



Title	Part No.	Manufacturer
Connector	JL10-6A22-22SE-EB	Japan Aviation
Cable clamp	JL04-2022CK(14)-R	Electronics Ind.
Rod terminal	NTUB-2	J.S.T Mfg. Co., Ltd.
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP DP6/2501 2.0 mm <sup>2</sup> 4-wire	DYDEN CORPORATION

100 mm sq. or more

	_				
	L (m)	Part No.(ex.)			
	3	MFMCE0032EUD			
	5	MFMCE0052EUD			
	10	MFMCE0102EUD			
	20	MFMCE0202EUD			
N					

[Unit: mm]

[Unit: mm]

[Unit: mm]

[Unit: mm]

Part No.(ex.)

MFMCE0032ECD

MFMCE0052ECD

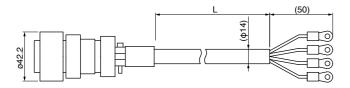
MFMCE0102ECD

MFMCE0202ECD

	Applicable illead.	
	L	(50)
8040.5	(412.5)	

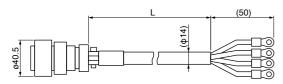
Title	Part No.	Manufacturer	L (m)	I
Connector	JL04V-6A22-22SE-EB-R	Japan Aviation	3	I
Cable clamp	JL04-2022CK(14)-R	Electronics Ind.	5	I
Rod terminal	NTUB-2	J.S.T Mfg. Co., Ltd.	10	Ī
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.	20	I
Cable	ROBO-TOP 600V 2.0 mm <sup>2</sup> 4-wire	DYDEN CORPORATION		

	Cable	ROBO-TOP	600V 2.0 mm <sup>2</sup> 4-	wire   DY	DEN CORPORATION		
Part N	o. MFMCAO * *	3EUT	100 mm sq. or more Applicable model	MHMF	3.0 kW to 5.0 kW, 3.0 kW to 5.0 kW, buch lock type>		3.0 kW to 5.0 kW 2.9 kW to 4.4 kW



Title	Part No.	Manufacturer	L (m)	Part No.(ex.)
Connector	JL10-6A22-11SE-EB	Japan Aviation	3	MFMCA0033EUT
Cable clamp	JL04-2022CK(14)-R	Electronics Ind.	5	MFMCA0053EUT
Nylon insulated round terminal	N5.5-5	J.S.T Mfg. Co., Ltd.	10	MFMCA0103EUT
Cable	ROBO-TOP DP6/2501 3.5 mm <sup>2</sup> 4-wire	DYDEN CORPORATION	20	MFMCA0203EUT

Part No.	MFMCAO * * 3ECT	100 mm sq. or more Applicable model	MHMF	3.0 kW to 5.0 kW, 3.0 kW to 5.0 kW,	
			<screw< th=""><th>ed type&gt;</th><th></th></screw<>	ed type>	



Title	Part No.	Manufacturer	L (n
Connector	JL04V-6A22-22SE-EB-R	Japan Aviation	3
Cable clamp	JL04-2022CK(14)-R	Electronics Ind.	5
Nylon insulated round terminal	N5.5-5	J.S.T Mfg. Co., Ltd.	10
Cable	ROBO-TOP 600V 3.5 mm <sup>2</sup> 4-wire	DYDEN CORPORATION	20

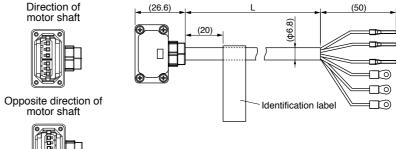
L (m)	Part No.(ex.)
3	MFMCA0033ECT
5	MFMCA0053ECT
10	MFMCA0103ECT
20	MFMCA0203ECT

80 mm sq. (Movable/fixed common-use, MFMCA0 \* \* 7VFD MHMF 50 W, 100 W direction of motor shaft or less Part No. **Applicable** /Movable/fixed common-use, (Connector type) MFMCA0 \* \* 7VGD opposite directionof motor shaft model

> Direction of motor shaft =130 Opposite direction of motor shaft =\_\_\_ =130

Title	Part No.	Manufacturer	L (m)	Part No.(ex.)
Connector	JN11FH06SN2	Japan Aviation	3	MFMCA0037VFD
Cable clamp	JN11S10K4A1	Electronics Ind.	5	MFMCA0057VFD
Rod terminal	AI0.75-8GY	PHOENIX CONTACT	10	MFMCA0107VFD
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.	20	MFMCA0207VFD
Cable	AWG22 6-wire (φ5.4 mm)	NIKKO ELECTRIC WIRE COLLTD		

	MFMCA0 * * 0VFD (Highly bendable type, Direction of motor shaft)	90 mm om		
Oart No	MFMCA0 ★ ★ 0VGD (Highly bendable type, Opposite direction of motor shaft)	80 mm sq. or less	MQMF 100 W to 400 W MHMF 200 W to 1000 W	
Part No.	MFMCA0 * * 0XFD (Standard bendable type, Direction of motor shaft)	Applicable model	(Connector type)	
	MFMCΔ0 * * 0XGD (Standard bendable type. Opposite direction of motor shaft)	illouci	` ,	



Title	Part No.	Manufacturer
Connector	JN11FH06SN1	Japan Aviation
Cable clamp	JN11S35H3A1	Electronics Ind.
Rod terminal	AI0.75-8GY	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	AWG18 6-wire (φ6.8 mm)	NIKKO ELECTRIC WIRE CO.,LTD

L (m)	Part No.(ex.)
3	MFMCA0030VFD
5	MFMCA0050VFD
10	MFMCA0100VFD
20	MFMCA0200VFD

[Unit: mm]

Imformation

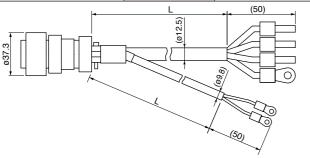
[Unit: mm]

177 MINAS A6 Family MINAS A6 Family 178

Imformation

100 mm sq. or more Applicable model

MSMF 1.0 kW to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW to 1.5 kW, MGMF 0.85 kW to 1.8 kW <One-touch lock type>



Title		Part No.	Manufacturer	
Connector		JL10-6A20-18SE-EB	Japan Aviation	
Cable clan	np	JL042022CK(14)-R	Electronics Ind.	
Rod termir	nal	NTUB-2	J.S.T Mfg. Co., Ltd.	
Nylon insulated	Earth	N2-M4	J.S.T Mfg. Co., Ltd.	
round terminal	Brake	N1.25-M4	J.S. I Wilg. Co., Ltd.	
Cable		ROBO-TOP 600V 2.0 mm <sup>2</sup> 4-wire ROBO-TOP 600V 0.75 mm <sup>2</sup> 2-wire	DYDEN CORPORATION	

L (m)	Part No.(ex.)
3	MFMCA0032FUD
5	MFMCA0052FUD
10	MFMCA0102FUD
20	MFMCA0202FUD

[Unit: mm]

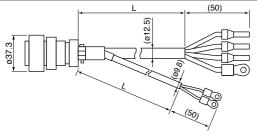
[Unit: mm]

[Unit: mm]

MFMCA0 \* \* 2FCD Part No.

100 mm sq. or more Applicable model

MSMF 1.0 kW to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW to 1.5 kW, MGMF 0.85 kW to 1.8 kW <Screwed type>



Title		Part No.	Manufacturer	
Connecto	r	JL04V-6A20-18SE-EB-R	Japan Aviation	
Cable clamp		JL04-2022CK(14)-R	Electronics Ind.	
Rod terminal		NTUB-2	J.S.T Mfg. Co., Ltd.	
Nylon insulated	Earth	N2-M4	J.S.T Mfg. Co., Ltd.	
round terminal	Brake	N1.25-M4	3.3.1 Wilg. Co., Ltd.	
Cable		ROBO-TOP 600V 2.0 mm <sup>2</sup> 4-wire	DYDEN CORPORATION	

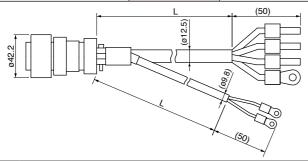
ROBO-TOP 600V 0.75 mm<sup>2</sup> 2-wire

L (m)	Part No.(ex.)
3	MFMCA0032FCD
5	MFMCA0052FCD
10	MFMCA0102FCD
20	MFMCA0202FCD

MFMCE0 \* \* 2FUD

100 mm sq. or more Applicable model

MHMF 2.0 kW <One-touch lock type>



Title		Part No.	Manufacturer	
Connecto	r	JL10-6A24-11SE-EB	Japan Aviation	
Cable clamp		JL04-2428CK(17)-R	Electronics Ind.	
Rod termin	nal	NTUB-2	J.S.T Mfg. Co., Ltd.	
Nylon insulated	Earth	N2-M4	J.S.T Mfg. Co., Ltd.	
round terminal	Brake	N1.25-M4	J.S.1 Wilg. Co., Ltd.	
Cable		ROBO-TOP DP6/2501 2.0 mm <sup>2</sup> 4-wire ROBO-TOP DP6/2501 0.75 mm <sup>2</sup> 2-wire	DYDEN CORPORATION	

L (m)	Part No.(ex.)
3	MFMCE0032FUD
5	MFMCE0052FUD
10	MFMCE0102FUD
20	MFMCE0202FUD

MFMCE0 \* \* 2FCD MHMF 2.0 kW <Screwed type> Applicable model

Part No.

100 mm sq. or more

Title		Part No.	Manufacturer	L (m)	Part No.
Connecto	or	JL04V-6A24-11SE-EB-R	Japan Aviation	3	MFMCE003
Cable clar	np	JL04-2428CK(17)-R	Electronics Ind.	5	MFMCE005
Rod terminal		NTUB-2	J.S.T Mfg. Co., Ltd.	10	MFMCE010
Nylon insulated	Earth	N2-M4	J.S.T Mfg. Co., Ltd.	20	MFMCE020
round terminal	Brake	N1.25-M4	J.S. Fivilg. Co., Ltd.		
Cable		ROBO-TOP 600V 2.0 mm <sup>2</sup> 4-wire ROBO-TOP 600V 0.75 mm <sup>2</sup> 2-wire	DYDEN CORPORATION		

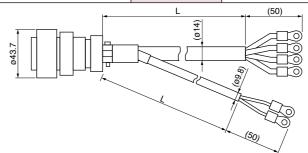
L (m)	Part No.(ex.)
3	MFMCE0032FCD
5	MFMCE0052FCD
10 MFMCE0102FCD	
20	MFMCE0202FCD

MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW 100 mm sq. or more Part No. MFMCA0 \* \* 3FUT MHMF 3.0 kW to 5.0 kW, MGMF 2.9 kW, 4.4 kW Applicable model <One-touch lock type> [Unit: mm]

l <del>a</del>	L	(50)
942.2	(614)	
		(50)

Title		Part No.	Manufacturer	L (m)	Part No.(ex.)
Connecto	r	JL10-6A24-11SE-EB	Japan Aviation	3	MFMCA0033FUT
Cable clan	пр	JL04-2428CK(17)-R	Electronics Ind.	5	MFMCA0053FUT
Nylon insulated	Earth	N5.5-5	J.S.T Mfg. Co., Ltd.	10	MFMCA0103FUT
round terminal	Brake	N1.25-M4	3.3.1 Wilg. Co., Ltd.	20	MFMCA0203FUT
Cable		ROBO-TOP DP6/2501 3.5 mm <sup>2</sup> 4-wire ROBO-TOP DP6/2501 0.75 mm <sup>2</sup> 2-wire	DYDEN CORPORATION		

MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW 100 mm sq. or more MHMF 3.0 kW to 5.0 kW, MGMF 2.9 kW, 4.4 kW Part No. MFMCA0 \* \* 3FCT Applicable model <Screwed type>



This product does not correspond to IP67.

Title		Part No.	Manufacturer	
Connecto	r	JL04V-6A24-11SE-EB-R	Japan Aviation	
Cable clamp		JL04-2428CK(17)-R	Electronics Ind.	
Nylon insulated	Earth	N5.5-5	LCTMfc Co. Ltd	
round terminal	Brake	N1.25-M4	J.S.T Mfg. Co., Ltd.	
Cable		ROBO-TOP 600V 3.5 mm <sup>2</sup> 4-wire ROBO-TOP 600V 0.75 mm <sup>2</sup> 2-wire	DYDEN CORPORATION	

L (m)	Part No.(ex.)
3	MFMCA0033FCT
5	MFMCA0053FCT
10	MFMCA0103FCT
20	MFMCA0203FCT

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[Unit: mm]

Part No.

## **Brake Cable**

[Unit: mm]

Part No.(ex.) MFMCB0030GET MFMCB0050GET

MFMCB0100GET

MFMCB0200GET

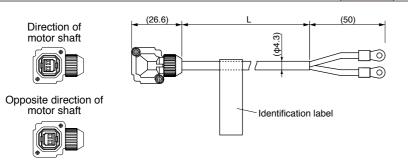
[Unit: mm]

\* It doesn't correspond to IP65 and IP67.

MSMF 50 W to 1000 W, MQMF 100 W to 400 W 80 mm sq. or less MFMCB0 \* \* 0GET MHMF 50 W to 1000 W Applicable model (Leadwire type)

Title	Part No.	Manufacturer		L (m
Connector	172157-1	Tyco Electronics Japan		3
Connector pin	170366-1, 170362-1	G.K.		5
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.		10
Cable	ROBO-TOP 600V 0.75 mm <sup>2</sup> 2-wire	DYDEN CORPORATION	ſ	20

	MFMCB0 * * 0PJT (Highly bendable type, Direction of motor shaft)	80 mm sq.	
Part No.	MFMCB0 * * 0PKT (Highly bendable type, Opposite direction of motor shaft)	or less	MSMF 50 W to 1000 W
Part No.	MFMCB0 * * 0SJT (Standard bendable type, Direction of motor shaft)	Applicable model	(Connector type)
	MFMCB0 * * 0SKT (Standard bendable type, Opposite direction of motor shaft)		



Title	Part No.	Manufacturer	L (m)	Part No.(ex.)
Connector	JN4FT02SJMR	Japan Aviation	3	MFMCB0030PJT
Connector pin	ST-TMH-S-C1B-3500	Electronics Ind.	5	MFMCB0050PJT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.	10	MFMCB0100PJT
Cable	AWG22 2-wire (64.3)	Hitachi Cable, Ltd	20	MEMCB0200P.IT

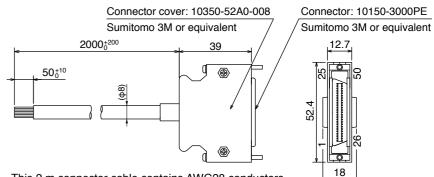
### **Interface Cable**

**Options** 

A6 Family

#### **Cable for Interface**

Part No. DV0P4360



This 2 m connector cable contains AWG28 conductors.

[Unit: mm]

#### · Table for wiring

Pin No.	color	Pin No.	color	Pin No.	color	Pin No.	color	Pin No.	color
1	Orange (Red1)	11	Orange (Black2)	21	Orange (Red3)	31	Orange (Red4)	41	Orange (Red5)
2	Orange (Black1)	12	Yellow (Black1)	22	Orange (Black3)	32	Orange (Black4)	42	Orange (Black5)
3	Gray (Red1)	13	Gray (Red2)	23	Gray (Red3)	33	Gray (Red4)	43	Gray (Red5)
4	Gray (Black1)	14	Gray (Black2)	24	Gray (Black3)	34	White (Red4)	44	White (Red5)
5	White (Red1)	15	White (Red2)	25	White (Red3)	35	White (Black4)	45	White (Black5)
6	White (Black1)	16	Yellow (Red2)	26	White (Black3)	36	Yellow (Red4)	46	Yellow (Red5)
7	Yellow (Red1)	17	Yel (Blk2)/Pink (Blk2)	27	Yellow (Red3)	37	Yellow (Black4)	47	Yellow (Black5)
8	Pink (Red1)	18	Pink (Red2)	28	Yellow (Black3)	38	Pink (Red4)	48	Pink (Red5)
9	Pink (Black1)	19	White (Black2)	29	Pink (Red3)	39	Pink (Black4)	49	Pink (Black5)
10	Orange (Red2)	20	-	30	Pink (Black3)	40	Gray (Black4)	50	Gray (Black5)

#### <Remarks>

Color designation of the cable e.g.) Pin-1 Cable color: Orange (Red1): One red dot on the cable The shield of this cable is connected to the connector shell but not to the terminal.

#### **Interface Conversion Cable**

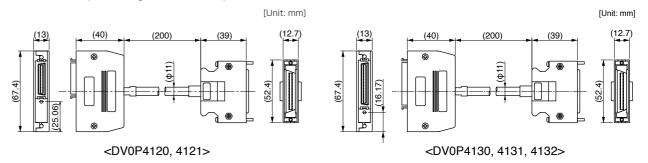
Part No. DV0P4120, 4121, 4130, 4131, 4132

Interface cables for old product (XX series or V series) can be connected to the current product by using the connector conversion cable shown below.

DV0P4120	MINAS XX → A6 series (A5II, A5, A4, A series) for position control/ velocity control
DV0P4121	MINAS XX → A6 series (A5II, A5, A4, A series) for torque control
DV0P4130	MINAS V → A6 series (A5II, A5, A4, A series) for position control
DV0P4131	MINAS V → A6 series (A5II, A5, A4, A series) for velocity control
DV0P4132	MINAS V → A6 series (A5II, A5, A4, A series) for torque control

\* For details of wiring, contact our sales department.

Converts 36-pin configuration to 50-pin.



A6 Family

Imformation

E Series

## Connector Kit for Communication Cable (for RS485, RS232) (Excluding A6 SE Series)

Part No. DV0PM20024

#### Components

Title	Part No. Manufacturer		Note	
Connector	2040008-1	Tyco Electronics Japan G.K.	For Connector X2 (8-pins)	

• Pin disposition of connector, connector X2

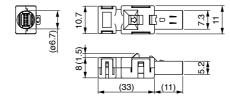
RXD 485+ 485+ NC Shell: FG GND 485-TXD Do not connect (Viewed from cable)

Dimensions

[Unit: mm]

[Unit: mm]

[Unit: mm]



#### Connector Kit for Safety (Excluding A6 SE, A6 SG Series)

Part No. DV0PM20025

#### Components

SF2+

EDM+

Title	Part No.	Manufacturer	Note	
Connector	2013595-1	Tyco Electronics Japan G.K.	For Connector X3 (8-pins)	

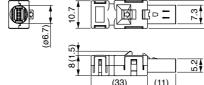
• Pin disposition of connector, connector X3



SF1+ Shell: FG SF1-

Do not connect

Dimensions



#### Safety bypass plug (Excluding A6 SE, A6 SG Series)

(Viewed from cable)

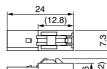
Part No. DV0PM20094

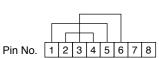
#### Components

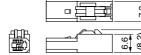
Title	Title Part No.		Note		
Connector	CIF-PB08AK-GF1R	J.S.T Mfg. Co., Ltd.	For Connector X3		

 Internal wiring (Wiring of the following has been applied inside the plug.)

· Dimensions (Resin color : black)







#### <Remarks>

• For crimp tool etc., necessary to produce a cable, access the web site of the manufacturer or consult with the manufacturer for details. For inquiries of manufacturer, refer to P.200 "List of Peripheral Equipments".

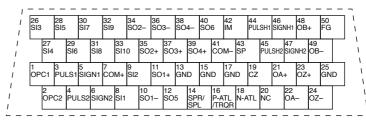
#### **Connector Kit for Interface**

Part No. DV0P4350

#### Components

Title	Part No.	Number	Manufacturer	Note
Connector	10150-3000PE	1	Sumitomo 3M	For Connector X4 (50-
Connector cover	10350-52A0-008	1	(or equivalent)	pins)

• Pin disposition (50 pins) (viewed from the soldering side)



- 1) Check the stamped pin-No. on the connector body while making a wiring.
- 2) For the function of each signal title or its symbol, refer to the operating manual.
- 3) Do not connect anything to NC pins in the above table.

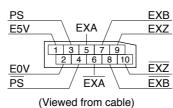
#### Connector Kit for External Scale (Excluding A6 SE, A6 SG Series)

#### Part No. DV0PM20026

#### · Components

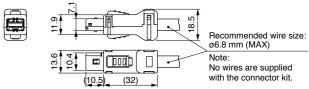
Title	itle Part No. Manufacturer		Note	
Connector	MUF-PK10K-X	J.S.T Mfg. Co., Ltd.	For Connector X5 (10-pins)	

• Pin disposition of connector, connector X5



Dimensions

[Unit: mm]



#### Connector Kit for Encoder

#### Part No. DV0PM20010

#### · Components

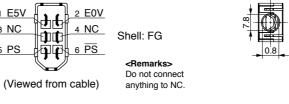
Title	Part No.	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M	For Connector X6
Shell kit	3E306-3200-008	(or equivalent)	

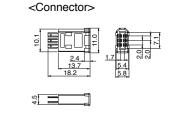
<Shell kit>

• Pin disposition of connector, connector X6

Dimensions

[Unit: mm]





#### <Remarks>

Connector X1: use with commercially available cable.

· Configuration of connector X1: USB mini-B



A6 Family

#### **Connector Kit for Power Supply Input**

Part No. DV0PM20032 (For A-frame to D-frame: Single row type)

#### Components

• Please refer to the Dimensions of driver P.47 for connector XA.

Title	Part No.	Number	Manufacturer	Note
Connector	05JFAT-SAXGF	1	J.S.T Mfg. Co., Ltd.	For Connector XA
Handle lever	J-FAT-OT	2		FOI COIIIIector XA

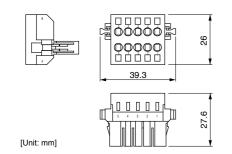
Connector Kit

#### Part No. DV0PM20033 (For A-frame to D-frame: Double row type)

#### Components

<u>-</u>				
Title	Part No.	Number	Manufacturer	Note
Connector	05JFAT-SAXGSA-C	1	LC T Mfg. Co. Ltd	For Connector VA
Handle lever	J-FAT-OT	2	J.S.T Mfg. Co., Ltd.	For Connector XA

#### Dimensions



\* When connection multiple axes in series, make sure the sum of the current value does not exceed the rated current (11.25 A) of DV0PM20033.

#### Remarks · 🔆

When using drivers MDDL \* 55 \* \* in single-phase power supply, do not use DV0PM20033.

Driver part No.	Power supply	Rated input current
MADL*01**	Single phase 100 V	1.7 A
MADL*11**	Single phase 100 V	2.0 A
MADL*05**	Single phase/3-phase 200 V	1.6 A/0.9 A
MADL*15**	Single phase/3-phase 200 V	2.0 A/1.1 A
MBDL*21**	Single phase 100 V	4.5 A
MBDL * 25 * *	Single phase/3-phase 200 V	3.7 A/2.1 A
MCDL*31**	Single phase 100 V	7.0 A
MCDL*35**	Single phase/3-phase 200 V	6.4 A/3.4 A
MDDL*45**	Single phase/3-phase 200 V	7.9 A/4.6 A
MDDL*55**	Single phase/3-phase 200 V	13.6 A/7.2 A

#### Part No. DV0PM20044 (For E-frame)

#### Components

Title	Part No.	Number	Manufacturer	Note
Connector	05JFAT-SAXGSA-L	1	LC T Mfg. Co. Ltd	For Connector XA
Handle lever	J-FAT-OT-L	2	J.S.T Mfg. Co., Ltd.	For Connector XA

#### **Connector Kit for Regenerative Resistor Connection**

Part No	DV0PM20045	(For F-frame)
Part No.	DVUPIVI20043	(FOI E-ITAILIE)

#### Components

•				
Title	Part No.	Number	Manufacturer	Note
Connector	04JFAT-SAXGSA-L	1	J.S.T Mfg. Co., Ltd.	200 V: For Connector XC
Handle lever	J-FAT-OT-L	2		* Jumper wire is included.

#### <Remarks>

• For crimp tool etc., necessary to produce a cable, access the web site of the manufacturer or consult with the manufacturer for details. For inquiries of manufacturer, refer to P.200 "List of Peripheral Equipments".

# **Connector Kit for Motor Connection (Driver side)**

all No.   DVUPINIZUU34 (FUI A-IIAIIIE IU D-IIAIIIE)	art No.	DV0PM20034	(For A-frame to D-frame)
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#### Components

• Please refer to the Dimensions of driver P.47 for connector XB

Manufacturer Title Part No. Number Note 06JFAT-SAXGF Connector For Connector XB J.S.T Mfg. Co., Ltd. \* Jumper wire is included. J-FAT-OT 2 Handle lever

#### Part No. DV0PM20046 (For E-frame)

• Please refer to the Dimensions of driver P.49 for connector XB.

#### Components

Title	Part No.	Number	Manufacturer	Note
Connector	03JFAT-SAXGSA-L	1	J.S.T Mfg. Co., Ltd.	For Connector XB
Handle lever	J-FAT-OT-L	2		For Connector XB

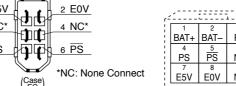
#### Connector Kit for Motor/Encoder Connection

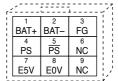
\* When IP65 or IP67 are necessary, the customer must give appropriate processing.

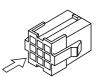
#### Components

Part No.	Number	Manufacturer	Note
3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
3E306-3200-008	1		
172161-1	1	Tyco Electronics Japan G.K.	For Encoder cable (9-pins)
170365-1	9		
172159-1	1	Tyco Electronics Japan G.K.	For Motor cable (4-pins)
170366-1	4		
	3E206-0100 KV 3E306-3200-008 172161-1 170365-1 172159-1	3E206-0100 KV 1 3E306-3200-008 1 172161-1 1 170365-1 9 172159-1 1	3E206-0100 KV 1 Sumitomo 3M 3E306-3200-008 1 (or equivalent) 172161-1 1 Tyco Electronics Japan 170365-1 9 G.K. 172159-1 1 Tyco Electronics Japan

· Pin disposition of connector, · Pin disposition of connector connector X6 for encoder cable









for motor cable

Pin disposition of connector



MINAS A6 Family 186

\* MSMF092L1 2, MHMF092L1 1

\* When you connect the battery for absolute encoder, refer to P.194, "When you make your own cable for 23-bit absolute encoder"

#### <Remarks>

• For crimp tool etc., necessary to produce a cable, access the web site of the manufacturer or consult with the manufacturer for details. For inquiries of manufacturer, refer to P.200 "List of Peripheral Equipments".

# MHMF 50 W, 100 W (Connector type IP67)

Manufacturer

Sumitomo 3M

(or equivalent)

Japan Aviation

Electronics Ind.

Japan Aviation

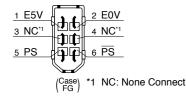
Electronics Ind.

#### 80 mm sq. or less DV0PM20035 Part No. MSMF 50 W to 1000 W \* (Connector type IP67) Applicable model

#### Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector Xo (6-pins)
Encoder connector	JN6FR07SM1	1	Japan Aviation	For Encoder cable
Socket contact	LY10-C1-A1-10000	7	Electronics Ind.	(7-pins)
Motor connector	JN8FT04SJ1	1	Japan Aviation	For Motor cable
Socket contact	ST-TMH-S-C1B-3500	4	Electronics Ind.	(4-pins)

• Pin disposition of connector • Pin disposition of connector connector X6



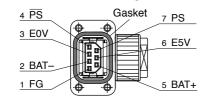
for encoder cable

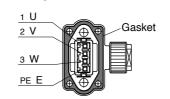
· Pin disposition of connector for motor cable

\* MSMF092L1 1

#### [Direction of motor shaft]

Connector Kit for Motor/Encoder Connection



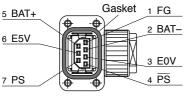


#### [Opposite direction of motor shaft]

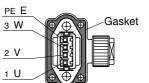
#### <Remarks>

Secure the gasket in place without removing it from the connector.

Otherwise, the degree of protection of IP67 will not be guaranteed.



\* Pins 2 and 5 are left unused (NC) when used in incremental system.



Secure the gasket in place

without removing it from the

protection of IP67 will not be

Otherwise, the degree of

DV0PM24581

Title

Connector (Driver side)

Shell kit

Encoder connector

Socket contact

Motor connector

Socket contact

Pin disposition of connector

\*1 NC: None Connect

Components

connector X6

3 NC\*1

<Remarks>

connector.

guaranteed.

Part No.

## 5 BAT+ 2 BAT-6 E5V 3 E0V \* Pins 2 and 5 are left unused (NC)

80 mm sq. or less

Applicable model

Number

1

1

7

6

Gasket

7 PS

6 E5V

5 BAT+

Part No.

3E206-0100 KV

3E306-3200-008

JN6FR07SM1

LY10-C1-A1-10000

JN11FH06SN2

JN11S10K4A1

3 E0V

2 BAT-

1 FG

for encoder cable

· Pin disposition of connector

when used in incremental system.

# · Pin disposition of connector

Note

For Connector X6 (6-pins)

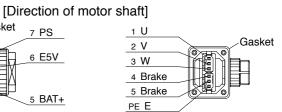
For Encoder cable

(7-pins)

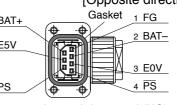
For Motor cable

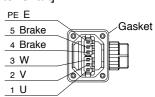
(6-pins)

for motor cable



#### [Opposite direction of motor shaft]





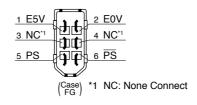
\* 4-pin and 5-pin are not used in case of no brake.

Part No. DV0PM24582 80 mm sq. or less Applicable mode	MQMF 100 W to 400 W, MHMF 200 W to 1000 W (Connector type IP67)
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#### Components

Title	Title Part No. Nu		Manufacturer	Note
Connector (Driver side)	3E206-0100 KV			For Connector X6 (6-pins)
Shell kit	3E306-3200-008			For Connector A6 (6-pins)
Encoder connector	or JN6FR07SM1		Japan Aviation	For Encoder cable
Socket contact	LY10-C1-A1-10000	7 Electronics Ind.		(7-pins)
Motor connector	Motor connector JN11FL06SN1		Japan Aviation	For Motor cable
Socket contact	contact JN11S35H3A1		Electronics Ind.	(6-pins)

connector X6

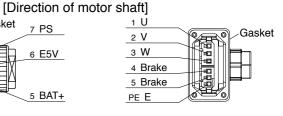


• Pin disposition of connector • Pin disposition of connector for encoder cable

 Pin disposition of connector for motor cable

#### Gasket 4 PS 7 PS 3 E0V 6 E5V 2 BAT-

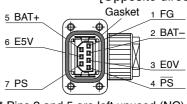
5 BAT+



#### <Remarks>

Secure the gasket in place without removing it from the connector.

Otherwise, the degree of protection of IP67 will not be guaranteed.



\* Pins 2 and 5 are left unused (NC) when used in incremental system.

#### [Opposite direction of motor shaft] PE E Gasket 5 Brake 4 Brake зW \_2\_V 1 U

\* 4-pin and 5-pin are not used in case of no brake.

#### <Remarks>

· For crimp tool etc., necessary to produce a cable, access the web site of the manufacturer or consult with the manufacturer for details. For inquiries of manufacturer, refer to P.200 "List of Peripheral Equipments".

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# Imformation

# **Connector Kit for Motor/Encoder Connection**

\* When IP65 or IP67 are necessary, the customer must give appropriate processing.

Without

brake

\* MSMF102L1 \_\_\_\_, MHMF102L1 \_\_\_\_

\* MSMF102L1 , MHMF102L1 .

(IP67 motor) Encoder JN2 <Small size connector> 100 mm sq. or more Part No. DV0PM24583 MSMF 1.0 kW \* to 2.0 kW, MDMF 1.0 kW to 2.0 kW Applicable model MHMF 1.0 kW \*, 1.5 kW, MGMF 0.85 kW to 1.8 kW \* MSMF102L1 , MHMF102L1 .

Components

Title	Part No.	Number	Manufacturer	Note	
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector X6 (6-pins)	
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector A6 (6-pins)	
Encoder connector	JN2DS10SL1-R	1	Japan Aviation	For Encoder cable	
Connector pin	JN1-22-22S-PKG100	5	Electronics Ind.	(One-touch lock type)	
Motor connector	JL10-6A20-4SE-EB	1	Japan Aviation	For Motor cable	
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)	

Part No.	DV0PM24585	100 mm sq. or more Applicable model	. $\mid$ MSMF 1.0 kW $^*$ to 2.0 kW. MDMF 1.0 kW to 2.0 kW $\mid$ .	With brake
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#### Components

Title Part No. Nu		Number	Manufacturer	Note	
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector X6 (6-pins)	
Shell kit	3E306-3200-008	1	(or equivalent)		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation	For Encoder cable	
Connector pin	JN1-22-22S-PKG100	5	Electronics Ind.	(One-touch lock type)	
Motor connector	JL10-6A20-18SE-EB	1	Japan Aviation	For Motor cable	
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)	

Part No.	DV0PM24587	100 mm sq. or more Applicable model	P67 motor) Encoder JL10 <lai ISMF 1.0 kW * to 2.0 kW, MI IHMF 1.0 kW *, 1.5 kW, Mo</lai 	•	Without brake
				* MSMF102L1 . MHMF10	2L1 🗆 🗆

#### Components

Title Part No. Nu		Number	Manufacturer	Note	
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	Far Oannastar VO (0 mins)	
Shell kit	3E306-3200-008	008 1 (or equivalent)		For Connector X6 (6-pins)	
Encoder connector	JL10-6A20-29S		Japan Aviation	For Encoder cable	
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)	
Motor connector	JL10-6A20-4SE-EB	4SE-EB 1 Japan Aviation		For Motor cable	
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)	

Part No.	ore MS		(IP67 motor) Encoder JL10 <large connector="" size=""> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW, MHMF 1.0 kW *, 1.5 kW, MGMF 0.85 kW to 1.8</large>	⊢⊓brai	
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#### Components

Title Part No. Nun		Number	Manufacturer	Note	
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector X6 (6-pins)	
Shell kit	3E306-3200-008 1 (or equiva		(or equivalent)	For Connector Ao (o-pins)	
Encoder connector	JL10-6A20-29S	1	Japan Aviation	For Encoder cable	
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)	
Motor connector	JL10-6A20-18SE-EB	1	Japan Aviation	For Motor cable	
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)	

#### <Remarks>

• For crimp tool etc., necessary to produce a cable, access the web site of the manufacturer or consult with the manufacturer for details. For inquiries of manufacturer, refer to P.200 "List of Peripheral Equipments".

Part No.	DV0PM24584	100 mm sq. or more	١ ١	notor) Encoder JN2 < 3.0 kW to 5.0 kW,	e connector> 3.0 kW to 5.0 kW	Withou
Part No.	DVUPIWI24584	Applicable model		2.0 kW to 5.0 kW,	2.9 kW, 4.4 kW	brake

#### Components

Title Part No. Nur		Number	Manufacturer	Note	
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector VC (C nine)	
Shell kit	3E306-3200-008	200-008 1 (or equivalent)		For Connector X6 (6-pins)	
Encoder connector	JN2DS10SL1-R	1	Japan Aviation	For Encoder cable	
Connector pin	JN1-22-22S-PKG100			(One-touch lock type)	
Motor connector	JL10-6A22-22SE-EB	1	Japan Aviation	For Motor cable	
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)	

Part No.	DV0PM24586	100 mm sq. or more Applicable model	MSMF	otor) Encoder JN2 < 3.0 kW to 5.0 kW, 2.0 kW to 5.0 kW.	MDMF	3.0 kW to 5.0 kW	With brake
Part No.	DV0PW24566	Applicable model		2.0 kW to 5.0 kW,		2.9 kW, 4.4 kW	brak

#### Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector VC (C nine)
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector X6 (6-pins)
Encoder connector	JN2DS10SL1-R	1	Japan Aviation	For Encoder cable
Connector pin	JN1-22-22S-PKG100	5	Electronics Ind.	(One-touch lock type)
Motor connector	JL10-6A24-11SE-EB	1	Japan Aviation	For Motor cable
Cable clamp	JL04-2428-CK(17)-R	1	Electronics Ind.	(One-touch lock type)

Part No. DV0PM24588	100 mm sq. or more Applicable model
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#### Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector VC (C nine)
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector X6 (6-pins)
Encoder connector	JL10-6A20-29S	1	Japan Aviation	For Encoder cable
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)
Motor connector	JL10-6A22-22SE-EB	1	Japan Aviation	For Motor cable
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)

Part No.	PM24590 100 mm sq. or mor Applicable mode	(IP67 motor) Encoder JL10 <large connector="" size=""> MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 2.0 kW to 5.0 kW, MGMF 2.9 kW, 4.4 kW</large>	With brake
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#### Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector Ao (o-pins)
Encoder connector	JL10-6A20-29S	1	Japan Aviation	For Encoder cable
Cable clamp	JL04-2022-CK(14)-R	1	Electronics Ind.	(One-touch lock type)
Motor connector	JL10-6A24-11SE-EB	1	Japan Aviation	For Motor cable
Cable clamp	JL04-2428-CK(17)-R	1	Electronics Ind.	(One-touch lock type)

#### <Remarks>

• For crimp tool etc., necessary to produce a cable, access the web site of the manufacturer or consult with the manufacturer for details. For inquiries of manufacturer, refer to P.200 "List of Peripheral Equipments".

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## **Connector Kit for Motor/Encoder Connection**

\* When IP65 or IP67 are necessary, the customer must give appropriate processing.

\* MSMF102L1 \_\_\_\_, MHMF102L1 \_\_\_\_

\* MSMF102L1 \_\_\_\_, MHMF102L1 \_\_\_\_

Part No. DV0PM20036 100 mm sq. or more Applicable model (IP67 motor) Encoder JN2 <Small size connector>
MSMF 1.0 kW \* to 2.0 kW, MDMF 1.0 kW to 2.0 kW MGMF 0.85 kW to 1.8 kW

\* MSMF102L1 □□, MHMF102L1 □□

#### Components

Title	Part No.	Number	Manufacturer	Note	
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector X6 (6-pins)	
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector X6 (6-pins)	
Encoder connector	JN2DS10SL1-R	1	Japan Aviation	For Encoder cable	
Connector pin	JN1-22-22S-PKG100	5	Electronics Ind.	(One-touch lock type)	
Motor connector	JL04V-6A20-4SE-EB-R	1	Japan Aviation	For Motor cable	
Cable clamp	JL04-2022CK(14)-R	1	Electronics Ind.	(Screwed type)	

art No. DV0PM20038 100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <small connector="" size=""> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW *. 1.5 kW, MGMF 0.85 kW to 1.8 kW</small>	With brake
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#### Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector V6 (6 pine)
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector X6 (6-pins)
Encoder connector	JN2DS10SL1-R	1	Japan Aviation	For Encoder cable
Connector pin	JN1-22-22S-PKG100	5	Electronics Ind.	(One-touch lock type)
Motor connector	JL04V-6A20-18SE-EB-R	1	Japan Aviation	For Motor cable
Cable clamp	JL04-2022CK(14)-R	1	Electronics Ind.	(Screwed type)

Part No.	DV0P4310	100 mm sq. or more Applicable model		Vithout brake
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#### Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector Ao (o-pins)
Encoder connector	N/MS3106B20-29S	1	Japan Aviation	For Encoder cable
Cable clamp	N/MS3057-12A	1	Electronics Ind.	(Screwed type)
Motor connector	N/MS3106B20-4S	1	Japan Aviation	For Motor cable
Cable clamp	N/MS3057-12A	1	Electronics Ind.	(Screwed type)

Part No.	DV0P4330	100 mm sq. or more Applicable model	MSMF	otor) Encoder JL10 < 1.0 kW * to 2.0 kW, 1.0 kW *, 1.5 kW,	MDMF		With brake
0					* M	SMF102L1□□, MHMF1	02L1 🗆 🗆

#### Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1	(or equivalent)	For Confidential Xo (o-pins)
Encoder connector	N/MS3106B20-29S	1	Japan Aviation	For Encoder cable
Cable clamp	N/MS3057-12A	1	Electronics Ind.	(Screwed type)
Motor connector	N/MS3106B20-18S	1	Japan Aviation	For Motor cable
Cable clamp	N/MS3057-12A	1	Electronics Ind.	(Screwed type)

#### <Remarks>

• For crimp tool etc., necessary to produce a cable, access the web site of the manufacturer or consult with the manufacturer for details. For inquiries of manufacturer, refer to P.200 "List of Peripheral Equipments".

Part No.	DV0PM20037	100 mm sq. or more Applicable model	MSMF 3.0 KW to 5.0 KW, MDMF 3.0 KW to 5.0 KW	/ithout orake
			MHMF 2.0 kW to 5.0 kW, MGMF 2.9 kW, 4.4 kW	, and

#### Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector V6 (6 nine)
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector X6 (6-pins)
Encoder connector	JN2DS10SL1-R	1	Japan Aviation	For Encoder cable
Connector pin	JN1-22-22S-PKG100	5	Electronics Ind.	(One-touch lock type)
Motor connector	JL04V-6A22-22SE-EB-R	1	Japan Aviation	For Motor cable
Cable clamp	JL04-2022CK(14)-R	1	Electronics Ind.	(Screwed type)

Part No.	DV0PM20039	100 mm sq. or more Applicable model	MSMF	otor) Encoder JN2 < 3.0 kW to 5.0 kW, 2.0 kW to 5.0 kW,	MDMF	3.0 kW to 5.0 kW	With brake
----------	------------	--	------	---	------	------------------	---------------

#### Components

Title	Part No.	Number	Manufacturer	Note	
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector VC (6 pine)	
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector X6 (6-pins)	
Encoder connector	JN2DS10SL1-R	1	Japan Aviation	For Encoder cable	
Connector pin	JN1-22-22S-PKG100	5	Electronics Ind.	(One-touch lock type)	
Motor connector	JL04V-6A24-11SE-EB-R	1	Japan Aviation	For Motor cable	
Cable clamp	JL04-2428CK(17)-R			(Screwed type)	

Part No. D	DV0P4320	100 mm sq. or more Applicable model	MSMF	otor) Encoder JL10 3.0 kW to 5.0 kW, 2.0 kW to 5.0 kW,	MDMF		Without brake
------------	----------	--	------	--	------	--	------------------

#### Components

Title	Part No.	Number	Manufacturer	Note	
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector V6 (6 pine)	
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector X6 (6-pins)	
Encoder connector	N/MS3106B20-29S	1	Japan Aviation	For Encoder cable	
Cable clamp	N/MS3057-12A	1	Electronics Ind.	(Screwed type)	
Motor connector	N/MS3106B22-22S	1	Japan Aviation	For Motor cable	
Cable clamp	N/MS3057-12A	1	Electronics Ind.	(Screwed type)	

Part No. DV0P4340	100 mm sq. or more	MSMF	otor) Encoder JL10 3.0 kW to 5.0 kW, 2.0 kW to 5.0 kW,	MDMF	3.0 kW to 5.0 kW	With brake
-------------------	--------------------	------	--	------	------------------	---------------

#### Components

Title	Part No.	Number	Manufacturer	Note	
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For Connector X6 (6-pins)	
Shell kit	3E306-3200-008	1	(or equivalent)	For Connector A6 (6-pins)	
Encoder connector	N/MS3106B20-29S	1	Japan Aviation	For Encoder cable	
Cable clamp	N/MS3057-12A	1	Electronics Ind.	(Screwed type)	
Motor connector	N/MS3106B24-11S	1	Japan Aviation	For Motor cable	
Cable clamp	N/MS3057-16A	1	Electronics Ind.	(Screwed type)	

#### <Remarks>

• For crimp tool etc., necessary to produce a cable, access the web site of the manufacturer or consult with the manufacturer for details. For inquiries of manufacturer, refer to P.200 "List of Peripheral Equipments".

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# **Battery for Absolute Encoder**

# **Connector Kit for Motor/Brake Connection**

Part No.	DV0PM20040	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W * (Connector type IP67)
----------	------------	---------------------------------------	---

#### Components

\* MSMF092L1 1

	Title	Part No.	Number	Manufacturer	Note	
	Connector	JN4FT02SJM-R	1	Japan Aviation	Far broke coble	
ĺ	Socket contact	ST-TMH-S-C1B-3500	2	Electronics Ind.	For brake cable	

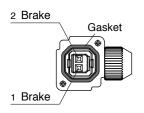
· Pin disposition of connector for brake cable

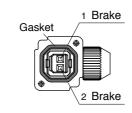
[Direction of motor shaft]

[Opposite direction of motor shaft]

Connector Kit for Motor/Brake Connection

\* When IP65 or IP67 are necessary, the customer must give appropriate processing.





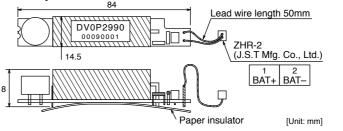
#### <Remarks>

Secure the gasket in place without removing it from the connector. Otherwise, the degree of protection of IP67 will not be guaranteed.

**Battery for Absolute Encoder** 

Part No. DV0P2990

· Lithium battery: 3.6 V 2000 mAh

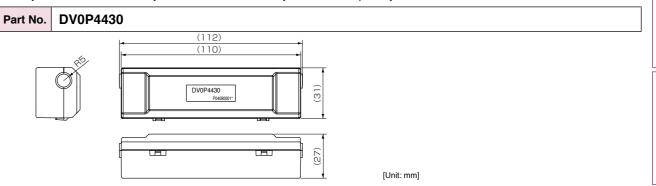


#### <Caution>

This battery is categorized as hazardous substance, and you may be required to present an application of hazardous substance when you transport by air (both passenger and cargo airlines).

#### Battery Box for Absolute Encoder \*

\* Battery is not included. Please buy the absolute encoder battery "DV0P2990" separately



#### When waking a cable for 23-bit absolute encoder by yourself

When you make your own cable for 23-bit absolute encoder, connect the optional battery for absolute encoder, DV0P2990 as per the wiring diagram below. Connector of the battery for absolute encoder shall be provided by customer as well.

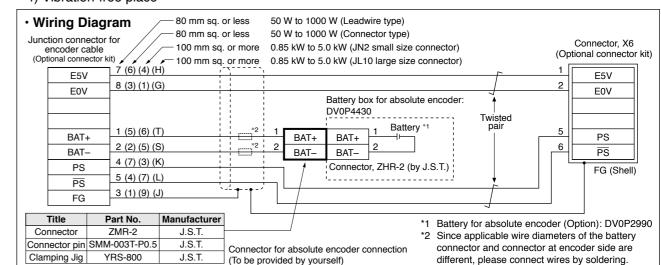
#### <Caution>

Install and fix the battery securely. If the installation and fixing of the battery is not appropriate, it may cause the wire breakdown or damage of the battery.

Refer to the instruction manual of the battery for handling the battery.

#### Installation Place of Battery

- 1) Indoors, where the products are not subjected to rain or direct sun beam.
- 2) Where the products are not subjected to corrosive atmospheres such as hydrogen sulfide, sulfurous acid, chlorine, ammonia, chloric gas, sulfuric gas, acid, alkaline and salt and so on, and are free from splash of inflammable gas, grinding oil, oil mist, iron powder or chips and etc.
- 3) Well-ventilated and humid and dust-free place.
- 4) Vibration-free place



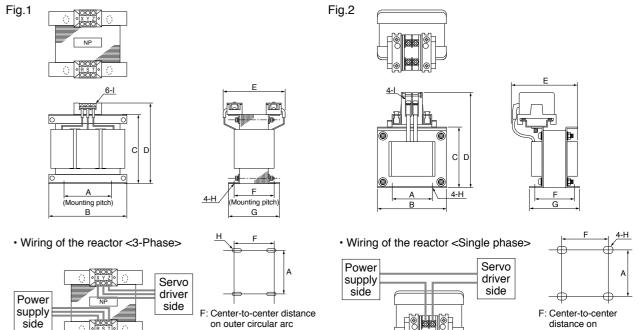
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Imformation

Part No.		ים	V0PM20101	Frame symbol of applicable driver D-frame		M	ounting screw	M4 × L6	Pan head 4pcs
	Dimension	Top side	05 /   <del>4  </del> 4	0.5	iece each	Bottom side	45 E S 33 4	40 9-5.2 20	1 piece each

**Mounting Bracket** 

Mounting screw M4 × L6 Pan head 4pcs



[Unit: mm]

slotted hole

												[Onit. min]
	Part No.	A	В	С	D	E(Max)	F	G	н	ı	Inductance (mH)	Rated current (A)
	DV0P220	65±1	125±1	(93)	136мах	155	70+3/-0	85±2	4-7φ×12	M4	6.81	3
	DV0P221	60±1	150±1	(113)	155мах	130	60+3/-0	75±2	4-7φ×12	M4	4.02	5
Eig 1	DV0P222	60±1	150±1	(113)	155мах	140	70+3/-0	85±2	4-7φ×12	M4	2	8
Fig.1	DV0P223	60±1	150±1	(113)	155мах	150	79+3/-0	95±2	4-7φ×12	M4	1.39	11
	DV0P224	60±1	150±1	(113)	160мах	155	84+3/-0	100±2	4-7φ×12	M5	0.848	16
	DV0P225	60±1	150±1	(113)	160мах	170	100+3/-0	115±2	4-7φ×12	M5	0.557	25
	DV0P227	55±0.7	80±1	66.5±1	110мах	90	41±2	55±2	4-5φ×10	M4	4.02	5
Fig.2	DV0P228	55±0.7	80±1	66.5±1	110мах	95	46±2	60±2	4-5φ×10	M4	2	8
	DV0PM20047	55±0.7	80±1	66.5±1	110мах	105	56±2	70±2	4-5φ×10	M4	1.39	11

<sup>\*</sup> For application, refer to P.23 to P.32 and P.117 to P.120 "Table of Part Numbers and Options".

#### Harmonic restraint

Harmonic restraint measures are not common to all countries. Therefore, prepare the measures that meet the requirements of the destination country.

When installing a product for Japan, refer to the instruction manual available on our website.

[Panasonic Corporation, Motor Business Unit web site]

http://industrial.panasonic.com/ww/products/motors-compressors/fa-motors

#### <Remarks>

When using a reactor, be sure to install one reactor to one servo driver.

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# **External Regenerative Resistor**

			Spec				
Part No.	Manufacturer's	Resistance	cable core	Weight	Rated power (reference)*1		Activation temperature of
Pait NO.	part No.	nesistance	diameter	weight	Free air	with fan 1 m/s <sup>2</sup>	built-in thermal protector
		Ω	mm	kg	W	W	
DV0P4280	RF70M	50		0.1	10	25	
DV0P4281	RF70M	100		0.1	10	25	140±5 °C B-contact
DV0P4282	RF180B	25	φ1.27 / AWG18 \	0.4	17	50	Open/Close capacity
DV0P4283	RF180B	50	stranded	0.2	17	50	(resistance load)
DV0P4284	RF240	30		0.5	40	100	1 A 125 VAC 6000 times 0.5 A 250 VAC 10000 times
DV0P4285	RH450F	20		1.2	52	130	

Manufacturer : Iwaki Musen Kenkyusho

\*1 Power with which the driver can be used without activating the built-in thermal protector.

A built-in thermal fuse and a thermal protector are provided for safety.

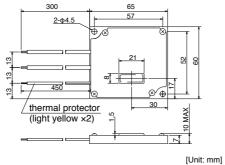
The circuit should be so designed that the power supply will be turned off as the thermal protector operates. The built-in thermal fuse blows depending on changes in heat dissipation condition, operating temperature limit, power supply voltage or load.

Mount the regenerative resistor on a machine operating under aggressive regenerating condition (high power supply voltage, large load inertia, shorter deceleration time, etc.) and make sure that the surface temperature will not exceed 100 °C.

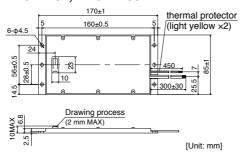
\*2 If the wind speed is 1m / s by the fan.

	Powe	er supply		
Frame	Single phase, 100 V	Single phase, 200 V 3-phase, 200 V		
А	DV0P4280	DV0P4281 (100 W or less) DV0P4283 (200 W)		
В	DV0P4283	DV0D4292		
С	DV0P4282	DV0P4283		
D		DV0P4284		
E		DV0P4284 × 2 in parallel or DV0P4285		
F	_	DV0P4285 × 2 in parallel		
G		DV0P4285 × 3 in parallel		
Н		DV0P4285 × 6 in parallel		

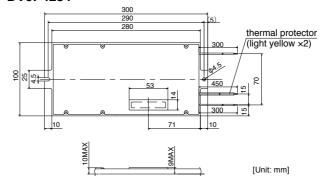
#### DV0P4280, DV0P4281



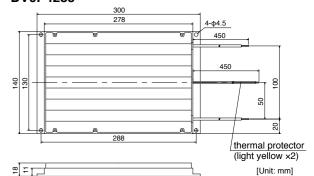
#### DV0P4282, DV0P4283



#### DV0P4284



#### DV0P4285



#### <Caution when using external regenerative resistor>

#### Regenerative resistor gets very hot.

Configure a circuit so that a power supply shuts down when built-in thermal protector of the regenerative resistor works. Because it is automatic reset thermal protector, please apply a self-holding circuit to the outside in order to maintain safety in case of sudden activation. During the failure of the driver, the surface temperature of the regenerative resistor may exceed the operating temperature before thermal protector starts to work.

Built-in thermal fuse of regenerative resistor is intended to prevent from ignition during the failure of the driver and not intended to suppress the surface temperature of the resistor.

- Be attached the regenerative resistance to non-combustible material such as metal.
- Built-in thermal fuse of regenerative resistor is intended to prevent from ignition during the failure of the driver and not intended to suppress the surface temperature of the resistor.
- Do not install the regenerative resistor near flammable materials.

# **List of Peripheral Equipments**

Imformation

## ■ Recommended components

	Motor	Part No.	Manufacturer
	50 W to 1000 W	TND15G271K	NIPPON CHEMI-CON CORPORATION
MSMF	1.0 kW to 3.0 kW	Z15D151	SEMITEC Corporation
	4.0 kW, 5.0 kW	TNR9G820K	NIPPON CHEMI-CON CORPORATION
MQMF	100W to 400 W	TND4500741/	NIPPON CHEMI-CON
	50 W to 1000 W	TND15G271K	CORPORATION
MHMF	1.0 kW, 1.5 kW	TNR9G820K	NIPPON CHEMI-CON CORPORATION
	2.0 kW to 4.0 kW	Z15D151	SEMITEC Corporation
	5.0 kW	NVD07SCD082	KOA Corporation
	1.0 kW to 3.0 kW	TNR9G820K	NIPPON CHEMI-CON CORPORATION
MDMF	4.0 kW	Z15D151	SEMITEC Corporation
	5.0 kW	NVD07SCD082	KOA Corporation
	0.85 kW to 1.8 kW	TNR9G820K	NIPPON CHEMI-CON CORPORATION
MGMF	2.9 kW	Z15D151	SEMITEC Corporation
	4.4 kW	NVD07SCD082	KOA Corporation

**Surge Absorber for Motor Brake** 

Manufacturer	Tel No. / Home Page	Peripheral components				
Panasonic Corporation Eco Solutions Company	http://panasonic.net/es/	Circuit breaker				
Panasonic Corporation Automotive & Industrial Systems Company	http://panasonic.net/id/	Surge absorber Switch, Relay				
Iwaki Musen Kenkyusho Co., Ltd.	+81-44-833-4311 http://www.iwakimusen.co.jp/	Regenerative resistor				
KOA Corporation	+81-42-336-5300 http://www.koanet.co.jp/en/index.htm					
NIPPON CHEMI-CON CORPORATION	+81-3-5436-7711 http://www.chemi-con.co.jp/e/index.html	Surge absorber for holding brake				
SEMITEC Corporation	+81-3-3621-2703 http://www.semitec.co.jp/english2/	3				
KK-CORP.CO.JP	+81-184-53-2307 http://www.kk-corp.co.jp/					
MICROMETALS (Nisshin Electric Co., Ltd.)	+81-4-2934-4151 http://www.nisshin-electric.com/	Ferite core for signal lines				
TDK Corporation	+81-3-5201-7229 http://www.global.tdk.com/					
Okaya Electric Industries Co. Ltd.	+81-3-4544-7040 http://www.okayaelec.co.jp/english/index.html	Surge absorber Noise filter				
Japan Aviation Electronics Industry, Ltd.	+81-3-3780-2717 http://www.jae.co.jp/e-top/index.html					
Japan Molex Inc.	+81-462-65-2313 http://www.molex.co.jp					
J.S.T. Mfg. Co., Ltd.	+81-45-543-1271 http://www.jst-mfg.com/index_e.php	Connector				
Sumitomo 3M	+81-3-5716-7290 http:/solutions.3m.com/wps/portal/3M/ja_JP/ WW2/Country/					
Tyco Electronics Japan G.K.	+81-44-844-8052 http://www.te.com/ja/home.html					
DYDEN CORPORATION	+81-3-5805-5880 http://www.dyden.co.jp/english/index.htm	Cable				
DR. JOHANNES HEIDENHAIN GmbH	+81-3-3234-7781 http://www.heidenhain.de/de_EN/company/contact/					
Fagor Automation S.Coop.	+34-943-719-200 http://www.fagorautomation.com					
Magnescale Co., Ltd.	+81-463-92-7971 http://www.mgscale.com/mgs/language/english/					
Mitutoyo Corporation	+81-44-813-8234 http://www.mitutoyo.co.jp/eng/	External scale				
Nidec Sankyo Corporation	+81-3-5740-3006 http://www.nidec-sankyo.co.jp/					
Renishaw plc	+44 1453 524524 www.renishaw.com					
Schaffner EMC, Inc.	+81-3-5712-3650 http://www.schaffner.jp/					
TDK-Lambda Corporation	+81-3-5201-7140 http://www.tdk-lambda.com/	Noise filter				

<sup>\*</sup> The above list is for reference only. We may change the manufacturer without notice.

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# Compact Servo Only for Position Control.

Ultra compact position control type

# MINAS E Series



#### **Best Fit to Small Drives**

- Further evolution in down-sizing, by 47 % in size. (Note)
- Exclusively designed for position control.

(Note) Compared to MUDS043A1

# 2

### Easy to Handle, Easy to Use

- DIN-rail mounting unit (option) improves handling/installation.
- User-friendly Console makes the setup easy.
- High functionality Real-Time Auto-Gain Tuning enables adjustment-free operation.



# High-Speed Positioning with Resonance Suppression Filters

- Built-In notch filter suppresses resonance of the machine.
- Built-in adaptive filter detect resonance frequency and suppress vibration.

# 4

## **Smoother operation for Low Stiffness Machine**

Damping control function suppresses vibration during acceleration/deceleration

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# MINAS E series Features

# **Lasy to Handle, Easy to Use**

#### High-functionality Real-Time Auto-Gain Tuning (Note 1)

- Offers real automatic gain tuning for low and high stiffness machines with a combination of an adaptive filter.
- Supports the vertical axis application where the load torque is different in rotational direction.

#### **DIN-rail mounting unit (option)**

- DIN-rail mounting unit allows parallel mounting with small control devices such as PLC.
- Easy to mount and easy to dismount.

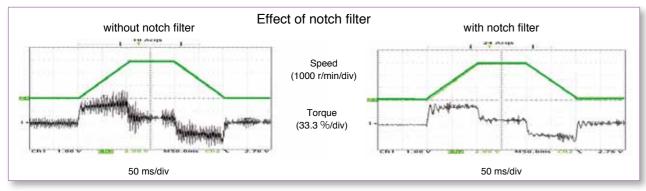
# **?**. Further Reduction of Vibration

#### Adaptive filter (Note1)

- Makes the notch filter frequency automatically follow the machine resonance frequency in real-time auto-gain tuning.
- Suppression of "Judder" noise of the machine, which is caused by variation of the machines or resonance frequency due to aging, can be expected.

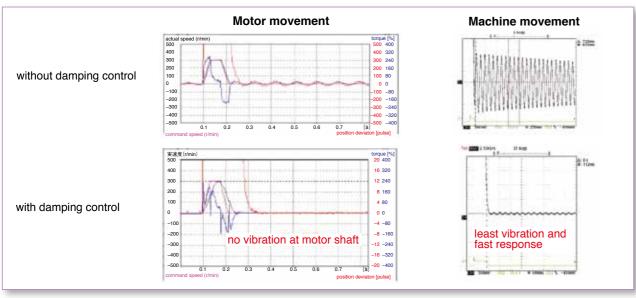
#### Notch filter (Note1)

- 1-channel notch filter is equipped in the driver independent from adaptive filter.
- Each of 2 filters can set up frequency and notch width, and frequency in 1Hz unit. Suppression of "Judder" noise of the machine which has multiple resonance points can be expected.



#### Damping control (Note1)

You can suppress vibration occurring at both starting and stopping in low stiffness machine, by manually setting up vibration frequency in 0.1 Hz unit. Note) Only applies to manual adjustment



(Note1) Select at positioning action mode

- At high speed positioning mode (Pr02=0) Select either one of notch filter, damping control or high-functionality real-time auto- gain tuning.
   Not possible to use them all at the same time.
   Adaptive filter cannot be used
- At high-functionality positioning mode (Pr02=1) All of notch filter, damping control, high-functionality real-time auto-gain tuning and adaptive filter can be used at the same time.

# 3. Further Flexibility and Multiplicity

#### Console (Option)

- You can set up parameters, copy and make a JOG run.
- Convenient for maintenance at site.
- Refer to P.227, Options.

#### **Command control modes**

- Offers 2 command modes, "Position control" and "Internal velocity control".
- You can make a 4-speed running at preset values with parameter at internal velocity control mode.

#### Inrush current suppressing function

- Inrush suppressing resistor, which prevent the circuit breaker shutdown of the power supply caused by inrush current at power-on, is equipped in this driver.
- Prevents unintentional shutdown of the power supply circuit breaker in multi axis application and does not give load to the power line.

#### Regeneration discharging function

- Discharges the regenerative energy with external resistor, where energy is generated while stopping the load with large moment of inertia, or use in up-down operation, and is returned to the driver from the motor.
- No regenerative resistor is installed in the driver.
- It is highly recommended to install an external regenerative resistor (option).

#### Built-in dynamic brake

- You can select the dynamic brake action which short the servo motor windings of U, V and W, at Servo-OFF, CW/ CCW over- travel inhibition, power shutdown and trip.
- You can select the action sequence depending on the machine requirement.

#### **Setup support software** (Option)

With the setup support software, "PANATERM" via RS232 / RS485 communication port, you can monitor the running status of the driver and set up parameters.

Note) Refer to P.222 for setup support software.

#### Key-way shaft and tapped shaft end

- Easy pulley attachment and easy maintenance
- Attache screw to the tapped shaft to prevent key or pulley from being pulled out.

#### **Wave-form graphic function**

- With the setup support software, "PANATERM", you can monitor the "Command speed", "Actual speed", "Torque", "Position deviation" and "Positioning complete signal".
- Helps you to analyze the machine and shorten the setup time.

Note) Refer to P.222 for setup support software.

#### Frequency analyzing function

- You can confirm the response frequency characteristics of total machine mechanism including the servo motor with the setup support software, "PANATERM".
- Helps you to analyze the machine and shorten the setup time

Note) Refer to P.222 for setup support software.

#### **Torque limit switching function**

- You can select 2 preset torque limit value from external input.
- Use this function for tension control or press-hold control.

#### **Conformity to CE and UL Standards**







Subject		Standard conformed	
Motor	IEC60034-1	IEC60034-5 UL1004 CSA22.2 No.100	Conforms to Low-Voltage
	EN50178	UL508C CSA22.2 No.14	Directives
	EN55011	Radio Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment	
	EN61000-6-2	Immunity for Industrial Environments	
Motor	EC61000-4-2	Electrostatic Discharge Immunity Test	
and driver	IEC61000-4-3	Radio Frequency Electromagnetic Field Immunity Test	Conforms to references
unver	IEC61000-4-4	Electric High-Speed Transition Phenomenon/Burst Immunity Test	by EMC Directives
	IEC61000-4-5	Lightening Surge Immunity Test	
	IEC61000-4-6	High Frequency Conduction Immunity Test	
	IEC61000-4-11	Instantaneous Outage Immunity Test	

IEC : International Electrotechnical Commission

EN : Europaischen Normen

EMC : Electromagnetic Compatibility

UL : Underwriters Laboratories

CSA: Canadian Standards Association

Pursuant to at the directive 2004/108/EC,article 9(2)

Panasonic Testing Centre

a division of Panasonic Marketing Europe GmbH Winsbergring 15.22525 Hamburg F.R.Germany

\* When exporting this product, follow statutory provisions of the destination country

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## **Motor Line-up**

			Rated rotational	Rotary e	encoder	Brake	Gear				
	Motor series	Rated output (kW)	speed (Max.) (speed) (r/min)	2500 P/r incremental	17bit absolute/ incremental	Holding	High precision	UL/ CSA	Enclosure	Features	Applications
	MUMA										
Ultra low inertia		0.05 to 0.4 0.05 0.1 0.2 0.4	3000 (5000)	0	-	0	0	0	IP65 Except shaft throughhole and connector	Small capacity Ultra low inertia	SMT machines Inserters High repetitive positioning application



### **Model Designation**

#### Servo Motor



**Motor rated output** 

Symbol

Symbol	Rated outpu
5A	50 W
01	100 W
02	200 W
04	400 W

**Voltage specifications** Symbol Specifications

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

\* Motor with oil seal is manufactured by order.

Key-way,

center tap

**Design order** 

S

Т

Symbol	Specifications
1	Standard

**Rotary encoder specifications** 

Symbol	Format	Pulse counts	Resolution	Wires
Р	Incremental	2500 P/r	10000	5

See P.213 for motor specifications

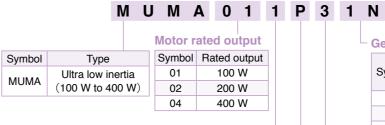
without with

•

Oil seal

without with\*

#### ■ Motor with gear reducer



**Voltage specifications** Symbol Specifications 100 V

200 V

Hotary encoder specifications								
Symbol	Format	Pulse counts	Resolution	Wires				
Р	Incremental	2500 P/r	10000	5				

2

Gear reduction ration, gear type

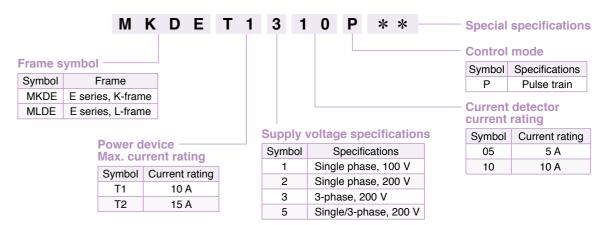
		Gear	Moto			
	Symbol	reduction ratio	100	200	400	Gear type
	1N	1/5	•	•	•	Fau biab
	2N	1/9	•	•	•	For high accuracy
	4N	1/25	•	•	•	accuracy

**Motor structure** 

Cymbol	Shaft	Holding	g brake
Symbol	Key-way	without	with
3	•	•	
4	•		•

See P.218 for motor with gear reducer specifications

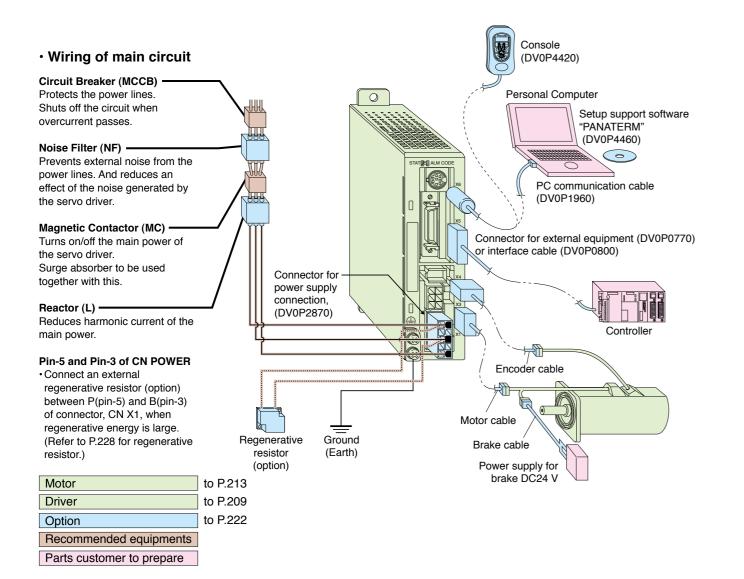
#### Servo Driver



See P.209 for driver specifications

205 MINAS E Series

# **Overall Wiring/ Driver and List of Applicable Peripheral Equipments**



#### List of recommended peripheral equipments

_	Мо	tor	Power			Magnetic	
Power supply	Series	Output	(at rated) output	Circuit Breaker (Rated current)	Noise Filter	Contactor (Contact Composition)	Wire diameter (L1, L2, L3, U, V and W)
Single		50 W	0.3 kVA	(5 A)		40.4	
phase,		100 W	0.4 kVA	(5 A)		10 A (3P+1a) 15 A (3P+1a)	0.75 mm <sup>2</sup> to 0.85 mm <sup>2</sup> AWG18
100 V	-	200 W	0.5 kVA	(10 A)			
		50 W	0.3 kVA	(5 A)			
Single		100 W	U.S KVA				
phase, 200 V	MUMA	200 W	0.5 kVA		DV0P4160		
		400 W	0.9 kVA	(10 A)			
		50 W	0.01970				
3-phase		100 W	0.3 kVA	(5 A)		10 A	
200 V		200 W	0.5 kVA			(3P+1a)	
		400 W	0.9 kVA	(10 A)			

- \* Select the single and 3-phase common specifications corresponding to the power supplies.
- To conform to EC Directives, install a circuit breaker which conforms to IEC and UL Standards (Listed, (9) marked) between noise filter and power supply.
- For details of the noise filters, refer to P.240.

#### <Remarks>

· Use a copper conductor cables with temperature rating of 60 °C or higher for main power connector and ground

Use a cable for ground with diameter of 2.0 mm<sup>2</sup> (AWG14) or larger.

Carrying p	age	Э			
	Opt	ions	•	Part No.	Carrying page
Console				DV0P4420	227
Setup Support Software, PANATERM			Japanese English	DV0P4460	222
RS232 Commu (for Connection			Cable	DV0P1960	227
Interface Cable	)			DV0P0800	227
Connector Kit f	or E	xter	nal Equipment	DV0P0770	226
Connector Kit f	DV0P3670	225			
Connector Kit f	DV0P2870	225			
Encoder Cable MFECA0 * *				0EAM	224
Motor Cable			MFMCA0 * *	224	
Brake Cable			MFMCB0 * *	224	
Cable Set (3 m	) <sup>(Not</sup>	te 3)	DV0P37300	224	
Cable Set (5 m	) <sup>(Not</sup>	te 3)	DV0P39200	224	
DIN Rail Moun	t Un	it	DV0P3811	228	
External	10	0 V	50 Ω 10 W	DV0P2890	228
Regenerative Resistor	20	0 V	100 Ω 10 W	DV0P2891	220
			100 V	DV0P227	
Reactor				DV0P228	229
			200 V	DV0P220	
Noise Filter	Noise Filter			DV0P4160	240
			gle phase 0 V, 200 V	DV0P4190	240
		3-p	hase 200 V	DV0P1450	
Ferite core for	Sigr	nal lir	nes	DV0P1460	240

(Note 3) Cable set (3 m) contains,

- 1) Interface cable: DV0P0800
- 2) Encoder cable (3 m): MFECA0030EAM
- 3) Motor cable (3 m) : MFMCA0030AEB
- 4) Connector kit for driver power supply connection : DV0P2870 Cable set (5 m) contains,
- 1) Interface cable: DV0P0800
- 2) Encoder cable (5 m): MFECA0050EAM
- 3) Motor cable (5 m): MFMCA0050AEB
- 4) Connector kit for driver power supply connection : DV0P2870

# ■ Table of Part Numbers and Options

MINAS E Series

	Output (W)	2500P/r, Incremental			Option													
Power supply		Motor Note) 1	Rating/Spec. (page)	Driver	Dimensions (Frame (symbol)	Encoder Cable Note) 2	Motor Cable		Brake Cable	External Regenerative Resistor	Reactor	Noise Filter						
Single	50	MUMA5AZP1 □	213	MKDET1105P	212 (K)						DV0P227							
phase	100	MUMA011P1 🗌	213	MKDET1110P	212 (K)				DV0P2890	D V 01 ZZ1								
100 V	200	MUMA021P1 🗌	213	MLDET2110P	212 (L)	MFECA0 * * 0EAM				DV0P228								
	50	MUMA5AZP1	215	MKDET1505P	212 (K)													
Single	100	MUMA012P1	215	MKDET1505P	212 (K)													
phase 200 V	200	MUMA022P1	215	MLDET2210P	212 (L)							DV0D4460						
	400	MUMA042P1	215	MLDET2510P	212 (L)		MI MIFMICAU * * UAEB	MFMCB0 * * 0GET			DV0P4160							
	50	MUMA5AZP1 □	215	MKDET1505P	212 (K)		- - -					(K)				DV0P2891	DV0P220	
	100	MUMA012P1	215	MKDET1505P	212 (K)													
3-phase 200 V	200	MUMA022P1	215	MKDET1310P	212 (K)			1										
200 7	400	MUMAO40D1	015	MLDET2510P	212 (L)													
	400 MUMA042P1	MUMA042P1 ☐ 215 N	MLDET2310P	212 (L)														

- Note) 1 Motor model number suffix:
  - S: Key way with center tap, without brake
  - T: Kew way with center tap, with brake
- Note) 2 \*\* represents cable length. For details, refer to P.223.

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Standard	Wiring	Example	of	Main	Circuit/
<b>Encorder</b>	Wiring	Diagram			

E Series

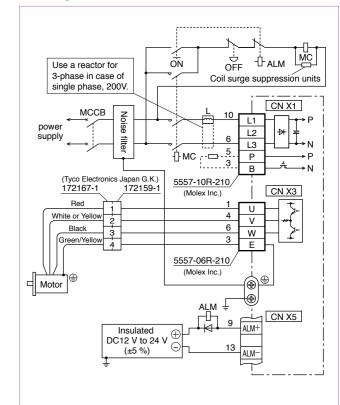
**Wiring Diagram** 

#### **Standard Wiring Example of Main Circuit**

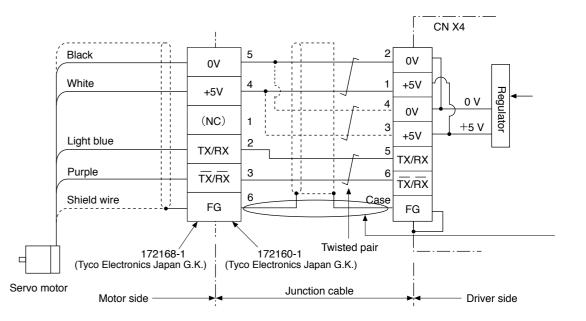
#### 3-Phase, 200 V

## HALM ME Coil surge suppression units CN X1 . Вмс --⊡--<u>ў</u> (Tyco Electronics Japan G.K.) 172167-1 172159-1 5557-10R-210/ CN X3 (Molex Inc.) Red White or Yellow 2 Black 5557-06R-210/ (Molex Inc.) Motor CN X5 Insulated DC12 V to 24 V (±5 %) ALM-

#### Single Phase, 100 V / 200 V



#### **Encorder Wiring Diagram**



#### When you make your own junction cable for encoder (Refer to P.225, P.226 "Options" for connector.)

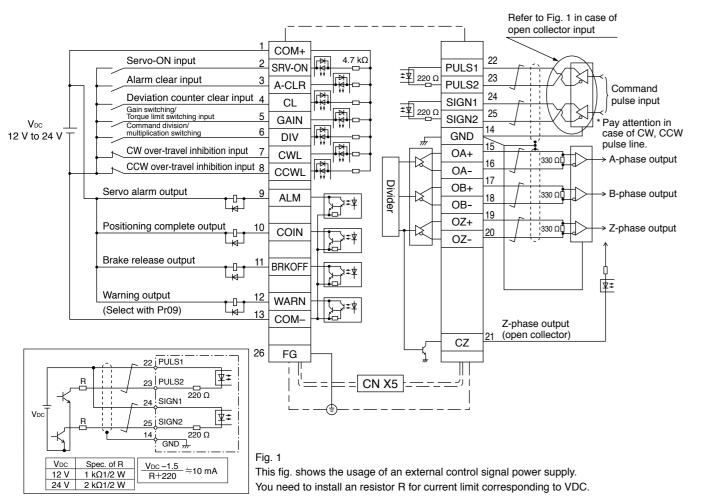
- 1) Refer the wiring diagram.
- 2) Use the twisted pair wire with shield, with core diameter of 0.18 mm<sup>2</sup> (AWG24) or larger, with higher bending resistance.
- 3) Use the twisted pair wire for the corresponding signal and power supply.
- 4) Shielding

Connect the shield of the driver to the case of CN X4. Connect the shield of the motor to Pin-6.

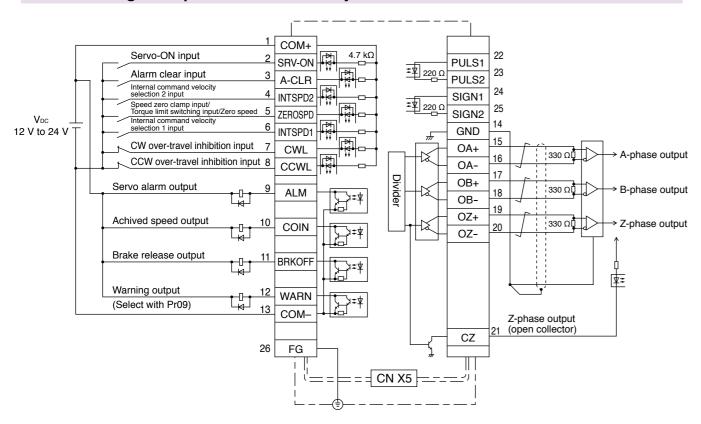
			Specificatio				
	lnp	Single phase, 100 V		Single phase, 100 V to 115 V +10 % 50 Hz/60 Hz			
	Input power	Sing	le phase, 200 V	Single phase, 200 V to 240 V <sup>+10</sup> % 50 Hz/60 Hz			
	/er	3-ph	ase, 200 V	3-phase, 200 V to 240 V <sup>+10</sup> % 50 Hz/60 Hz			
	En	Tem	perature	Operating: 0 °C to 55 °C, Storage: -20 °C to 65 °C (Max.temperature guarantee 80 °C for 72 hours <nomal temperature="">)</nomal>			
	Environment	Hum	idity	Both operating and storage : 90 %RH or less (free from condensation)			
	ımer	Altitu	ıde	1000 m or lower			
	7	Vibra	ation	5.88 m/s² or less, 10 Hz to 60 Hz (No continuous use at resonance frequency)			
	With	stand	voltage	Should be 1500 VAC (Sensed current: 20 mA) for 1 minute between Primary and Ground.			
o grid	Cont	rol me	ethod	IGBT PWM Sinusoidal wave drive			
	Enco	der fe	eedback	2500 P/r (10000 resolution) incremental encoder			
.   4	တ္ လ	Inpu	t	7 inputs (1) Servo-ON, (2) Alarm clear and other inputs vary depending on the control mode.			
2	Control signal	Output		4 outputs (1) Servo alarm, (2) Alarm, (3) Release signal of external brake and other outputs vary depending on the control mod			
,	σπ	Input		2 inputs Supports both line driver I/F and open collector I/F.			
2	Pulse signal	Outp	out	4 outputs Feed out the encoder pulse (A, B and Z-phase) in line driver.  Z-phase pulse is also feed out in open collector.			
	Com	munic	cation function RS232	1 : 1 communication to a host with RS232 interface is enabled.			
	Disp	ay LE	:D	(1) Status LED (STATUS), (2) Alarm code LED (ALM-CODE)			
	Rege	enerat	ion	No built-in regenerative resistor (external resistor only)			
	Dyna	ımic b	rake	Built-in			
	Control mode		ode	3 modes of (1) High-speed position control, (2) Internal velocity control and (3) High-functionality positioning control are selectable with parameter.			
	Control inp		trol input	(1) CW over-travel inhibition, (2) CCW over-travel inhibition, (3) Deviation counter clear, (4) Gain switching, (5) Electronic gear switching			
	Position control	Control output		(1) Positioning complete (In-position)			
		Max. command pulse frequency		Line driver : 500 kpps, Open collector : 200 kpps			
		Pulse input	Type of input pulse train  Electronic gear  (Division/Multiplication)	Differential input. Selectable with parameter, ((1) CW/CCW, (2) A and B-phase, (3) Command and Direction)  Setup of electronic gear ratio Setup range of (1-10000) × 2 <sup>(0-17)</sup> /(1-10000)			
		-	(of command pulse ) Smoothing filter	Primary delay filter or FIR type filter is selectable to the command input.			
	Inte	Control input		(1) CW over-travel inhibition, (2) CCW over-travel inhibition, (3) Selection 1 of internal command speed, (4) Selection 2 of internal command speed, (5) Speed zero clamp			
	erna	Cont	trol output	(1) Speed arrival (at-speed)			
	spe		nal speed command	Internal 4-speed is selectable with control input.			
	Internal speed control	Soft-start/down function		Individual setup of acceleration and deceleration are enabled, with 0 s to 10 s/1000 r/min. Sigmoid acceleration/deceleration is also enabled.			
	<u>ro</u>	Zero	-speed clamp	0-clamp of internal speed command with speed zero clamp input is enabled.			
		Auto-ga	Real-time	Estimates the load inertia in real-time in actual operation and sets up the gain automatically corresponding to the machine stiffness. Useable at (1) High-response position control, (2) Internal speed control and (3) High-functionality position control.			
		Auto-gain tuning	Normal mode	Estimates the load inertia with an action command inside of the driver, and sets up the gain automatically corresponding to setup of the machine stiffness. Useable at (1) High-response position control, (2) Internal speed control and (3) High-functionality position control.			
		Mas inpu	king of unnecessary t	Masking of the following input signal is enabled. (1) Over-travel inhibition, (2) Speed zero clamp, (3) Torque limit switching			
	Common	puls	sion of encoder feedback e	1 P/r to 2500 P/r (encoder pulses count is the max.).			
	on	Protective function	Hardware error	Over-voltage, under-voltage, over-speed over-load, over-heat, over-current and encoder error etc.			
	-		Software error	Excess position deviation, command pulse division error, EEPROM error etc.			
			eability of alarm data	Traceable up to past 14 alarms including the present one.			
			iping control function	Manual setup with parameter			
		Setup	Manual	Console			
- 1		등	Setup support software	PANATERM (Supporting OS: Windows98, Windows ME, Windows2000, and WindowsXP)			

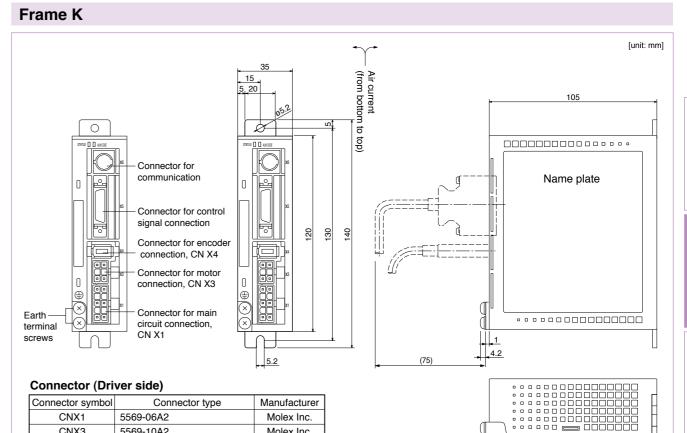
209 MINAS E Series

## **Control Circuit Standard Wiring Example**



#### **CN X 5 Wiring Example at Internal Velocity Control Mode**





Molex Inc.

Molex Inc.

10226-52A11L(or equivalent) | Sumitomo 3M

#### Frame L

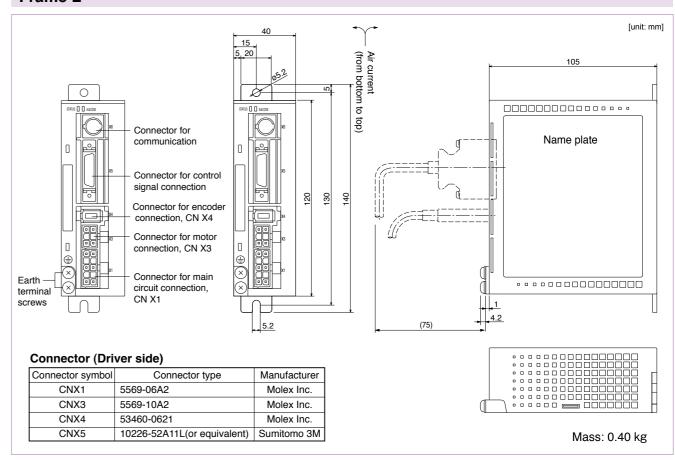
CNX3

CNX4

CNX5

5569-10A2

53460-0621



211 MINAS E Series MINAS E Series 212

Mass: 0.35 kg

100 V **MUMA** 50 W to 200 W

#### **AC100 V** 5AZP1 021P1 MUMA 011P1 Motor model Model No. MKDET1105P MKDET1110P MLDET2110P Applicable driver Frame symbol Frame K Frame L Power supply capacity (kVA) 0.5 0.3 0.4 50 Rated output (W) 100 200 Rated torque (N·m) 0.16 0.32 0.64 Momentary Max. peak torque (N·m) 0.48 0.95 1.91 Rated current (Arms) 2.5 1.0 1.6 Max. current (Ao-p) 4.3 6.9 11.7 Regenerative brake Without option No limit Note)2 frequency DV0P2890 No limit Note)2 Rated rotational speed (r/min) 3000 Max. rotational speed (r/min) 5000 Moment of inertia Without brake 0.021 0.032 0.10 of rotor (×10<sup>-4</sup> kg·m<sup>2</sup>) 0.026 0.036 0.13 Recommended moment of inertia ratio 30 times or less of the load and the rotor Note)3 2500 P/r Rotary encoder specifications Incremental 10000 Resolution per single turn Protective enclosure rating IP65 (except rotating portion of output shaft and lead wire end) 0 °C to 40 °C (free from freezing), Storage : –20 °C to 65 °C Ambient temperature (Max.temperature guarantee 80 °C for 72 hours <nomal humidity>) 85 %RH or lower (free from condensing) Ambient humidity Environment Indoors (no direct sunlight), free from corrosive gas, inflammable gas, oil mist and dust Installation location 1000 m or lower Altitude 49 m/s2 or less Vibration resistance Mass (kg), ( ) represents holding brake type 0.4 (0.6) 0.5 (0.7) 0.96 (1.36)

Brake specifications (This brake will be released when it is energized. Do not use this for braking the motor in motion.)							
Static friction torque (N m)	0.29	1.27					
Engaging time (ms)	25	50					
Releasing time (ms) Note)4	20 (30)	15 (100)					
Exciting current (DC) (A)	0.26	0.36					
Releasing voltage	DC 1 V or more						
Exciting voltage	DV 24 V ±10 %						

Permissible load							
	Radial load P-direction (N)	147	392				
During assembly	Thrust load A-direction (N)	88	147				
-	Thrust load B-direction (N)	117	196				
	Radial load P-direction (N)	68	245				
During operation	Thrust load A-direction (N)	58	98				
	Thrust load B-direction (N)	58	98				

For motor dimensions, refer to P.217, and for the diver, refer to P.212.

#### **Model Designation**

#### Design order Symbol Type 1 : Standard Ultra low inertia MUMA (50 W to 200 W)

Motor rated output Symbol Rated output 5A 50 W 01 100 W

200 W

02

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

Voltage specifications

Motor structure

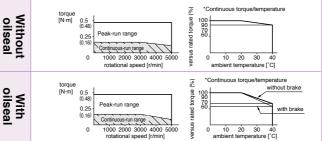
ymbol	Shaft	Holding	brake	Oil s	eal
	Key-way, center tap	without	with	without	with
S	•	•		•	
Т	•		•	•	

Rotary encoder specifications

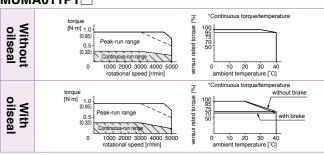
Symbol	Format	Pulse counts	Resolution	Wires
Р	Incremental	2500 P/r	10000	5

#### Torque Characteristics [at AC100 V of power voltage (Dotted line represents the torque at 10 % less supply voltage.)]

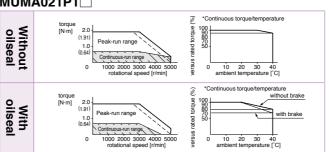
# MUMA5AZP1



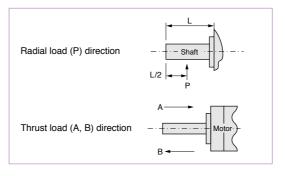
MUMA011P1



MUMA021P1



\*When you lower the torque limit setup (Pr5E and 5F), running range at high speed might be lowered as well. Running range (Torque limit setup: 300 %) Running range (Torque limit setup: 200 %) Running range (Torque limit setup : 100 %



- Note) 1. Regenerative brake frequency represents the frequency of the motor's stops from the rated speed with deceleration without load.
  - If the load is connected, frequency will be defined as 1/(m+1), where m =(load moment of inertia) / (rotor moment of inertia).
  - · When the motor speed exceeds the rated speed, regenerative brake frequency is in inverse proportion to the square of (running speed/rated
  - Power supply voltage is AC115 V (at 100 V of the main voltage).
  - If the supply voltage fluctuates, frequency is in inverse proportion to the square of (Running supply voltage/115) relative to the value in the table.
  - · When regeneration occurs continuosly such cases as running speed frequently changes or vertical feeding, consult us or a dealer.
  - 2. If the effective torque is within the rated torque, there is no limit in regenerative brake
  - 3. Consult us or a dealer if the load moment of inertia exceeds the specified
  - 4. Specified releasing time is obtained with the use of surge absorber for brake (Z15D151 by SEMITEC Corporation or equivalent).
  - ( ) represents the actually measured value using a diode (200 V, 1 A or equivalent)

213 MINAS E Series MINAS E Series 214 **Motor Specifications** 

200 V **MUMA** 50 W to 400 W

Low inertia

#### **AC200 V** 5AZP1 012P1 022P1 042P1 MUMA Motor model MKDET1310P MLDET2310P Model No MKDET1505P MKDET2210P MLDET2510P Applicable driver Frame K Frame symbol Frame K Frame L Frame L 0.3 0.3 0.5 0.9 Power supply capacity (kVA) 100 50 200 400 Rated output (W) 0.16 0.32 0.64 1.3 Rated torque (N · m) 0.48 0.95 1.91 3.8 Momentary Max. peak torque (N · m) 1.0 1.0 1.6 25 Rated current (Arms) 4.3 7.5 Max. current (Ao-p) 4.3 11.7 Regenerative brake Without option No limit Note)2 frequency (times/min) DV0P2891 No limit Note)2 Note)1 Rated rotational speed (r/min) 3000 Max. rotational speed (r/min) 5000 Moment of inertia Without brake 0.021 0.032 0.10 0.17 of rotor With brake 0.026 0.036 0.13 0.20 (×10<sup>-4</sup> kg·m<sup>2</sup>) Recommended moment of inertia ratio 30 times or less of the load and the rotor Note)3 2500 P/r Rotary encoder specifications Incremental Resolution per single turn 10000 Protective enclosure rating IP65 (except rotating portion of output shaft and lead wire end) 0 $^{\circ}$ C to 40 $^{\circ}$ C (free from freezing), Storage : –20 $^{\circ}$ C to 65 $^{\circ}$ C Ambient temperature (Max.temperature guarantee 80 °C for 72 hours <nomal humidity>) Ambient humidity 85 %RH or lower (free from condensing) Environment Installation location Indoors (no direct sunlight), free from corrosive gas, inflammable gas, oil mist and dust Altitude 1000 m or lower Vibration resistance 49 m/s2 or less Mass (kg), ( ) represents holding brake type 0.4 (0.6) 0.5 (0.7) 1.5 (1.9) 0.96 (1.36)

Brake specifications (This brake will be released when it is energized. Do not use this for braking the motor in motion.)										
Static friction torque (N · m)	0.29	1.27								
Engaging time (ms)	25	50								
Releasing time (ms) Note)4	20 (30)	15 (100)								
Exciting current (DC) (A)	0.26	0.36								
Releasing voltage	DC 1 V	or more								
Exciting voltage	DV 24	V ±10 %								

Permissible I	Permissible load									
	Radial load P-direction (N)	147	392							
During assembly	Thrust load A-direction (N)	88	147							
,	Thrust load B-direction (N)	117	196							
	Radial load P-direction (N)	68	245							
During operation	Thrust load A-direction (N)	58	98							
οροιαιίοπ	Thrust load B-direction (N)	58	98							

For motor dimensions, refer to P.217, and for the driver, refer to P.212.

Note) Driver for 50 W and 100 W has a common power supply of single phase and 3-phase 200 V.

Driver for 200 W, the upper row is the power supply of 3-phase 200 V, and lower is the power supply of single-phase 200 V.

Driver for 400 W, the upper row is the power supply of 3-phase 200 V, and lower is the common power supply of single-phase and 3-phase 200 V.

#### **Model Designation**

#### M Symbol Type Ultra low inertia MUMA (50 W to 400 W) Motor rated output Voltage specifications

Symbol Rated output 5A 50 W 01 100 W 02 200 W 04 400 W

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

Design order 1 : Standard

S

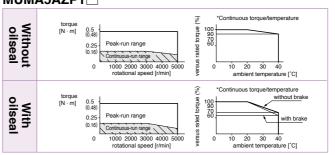
WIOLOI OLI	violor diradiaro										
	Shaft	Holding	brake	Oil seal							
Symbol	Key-way, center tap	without	with	without	with						
S	•	•		•							
Т	•		•	•							

Rotary encoder specifications

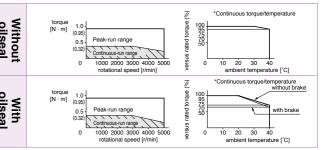
Symbol	Format	Pulse counts	Resolution	Wires
Р	Incremental	2500 P/r	10000	5

#### Torque Characteristics [at AC200 V of power voltage (Dotted line represents the torque at 10 % less supply voltage.)]

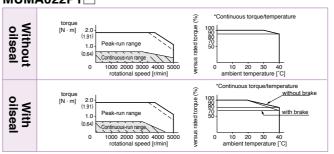
#### MUMA5AZP1



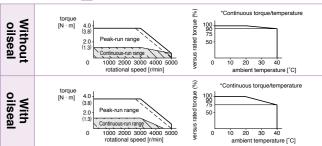
#### MUMA012P1

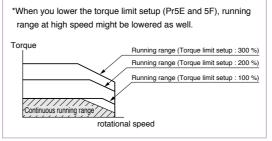


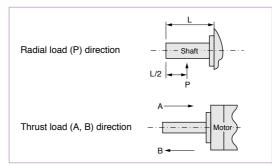
#### MUMA022P1



#### MUMA042P1







- Note) 1. Regenerative brake frequency represents the frequency of the motor's stops from the rated speed with deceleration without load.
  - If the load is connected, frequency will be defined as 1/(m+1), where m =(load moment of inertia) / (rotor moment of inertia).
  - · When the motor speed exceeds the rated speed, regenerative brake frequency is in inverse proportion to the square of (running speed/rated
  - Power supply voltage is AC240 V (at 200 V of the main voltage).
  - If the supply voltage fluctuates, frequency is in inverse proportion to the square of (Running supply voltage/240) relative to the value in the table.
  - · When regeneration occurs continuosly such cases as running speed frequently changes or vertical feeding, consult us or a dealer.
  - 2. If the effective torque is within the rated torque, there is no limit in regenerative brake
  - 3. Consult us or a dealer if the load moment of inertia exceeds the specified
  - 4. Specified releasing time is obtained with the use of surge absorber for brake (Z15D151 by SEMITEC Corporation or equivalent).
  - ( ) represents the actually measured value using a diode (200 V. 1 A or equivalent)

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# [Unit: mm] Encoder Motor connector connector LL LR LE Brake connector (Key way dimensions) □LC

**MUMA 50 W to 400 W** 

						[Unit: mm]						
			MUMA series (Ultra low inertia)									
Motor outpu	ut		50 W	100 W	200 W	400 W						
Motor mode	əl	MUMA	5A□P1□	01□P1□	02□P1□	04□P1□						
Rotary encoder specifications		ifications	2500 P/r Incremental	2500 P/r Incremental	2500 P/r Incremental	2500 P/r Incremental						
LL		Without brake	75.5	92.5	96	123.5						
		With brake	107	124	129	156.5						
	LR		24	24	30	30						
S		8	8	11	14							
LA			48	48	70	70						
LB			22	22	50	50						
LC		42	42	60	60							
	LE		2	2	3	3						
	LF		7	7	7	7						
	LH		34	34	43	43						
	LZ		3.4	3.4	4.5	4.5						
	LW		14	14	20	25						
	LK		12.5	12.5	18	22.5						
Kayyyay	ΚW		3h9	3h9	4h9	5h9						
Key way	КН		3	3	4	5						
	RH		6.2	6.2	8.5	11						
	TP		M3 × 6 (depth)	M3 × 6 (depth)	M4 × 8 (depth)	M5 × 10 (depth)						
Maga (kg)		Without brake	0.40	0.50	0.96	1.5						
Mass (kg)		With brake	0.60	0.70	1.36	1.9						
Connector/	Plug spec	eifications	refer to Options, P.225, P.226.									

#### <Cautions>

Reduce the moment of inertia ratio if high speed response operation is required.

Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

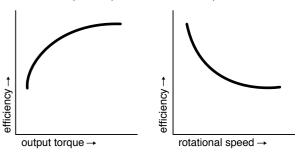
\* Dimensions are subject to change without notice. Contact us or a dealer for the latest information

# **MINAS E Series Motors with Gear Reducer**

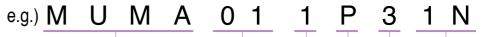
#### **Motor Types with Gear Reducer**

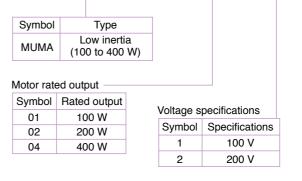
	Reduction ratio	Мо	Motor output (W)								
		100	200	400	reducer						
	1/5	•	•	•							
	1/9	•	•	•	For high precision						
	1/25	•	•	•	precision						

Efficiency of the gear reducer shows the following inclination in relation to output torque and rotational speed.



#### Model No. Designation





2500 P/r

		2	200 V	
Rotary en	coder specifications			
Symbol	Format	Pulse counts	Pulse counts	Wire

10000

Motor types with gear reducer Type of Reduction 100 200 400 ratio 1/5 For High 2N 1/9 4N 1/25

#### Motor structure

Symbol	Shaft	Holding brake							
	Key-way	without	with						
3	•	•							
4	•		•						

#### **Specifications of Motor with Gear Reducer**

	Motor type	MUMA						
	Backlash	3 minutes or smaller (initial value) at output shaft of the reducer						
	Composition of gear	Planetary gear						
	Gear efficiency	65 % to 85 %						
0	Rotational direction at output shaft (of reducer)	Same direction as the motor output shaft						
Gear reducer	Composition of gear	Planetary gear						
	Mounting method	Flange mounting						
	Permissible moment of inertia of the load	10 times or smaller than rotor moment of inertia of the motor						
	(conversion to the motor shaft)							
	Protective structure	IP44 (at gear reducer)						
	Ambient temperature	0 °C to 40 °C						
<b>-</b>	Ambient humidity	85 %RH (free from condensation) or less						
Environment	Vibration resistance	49 m/s <sup>2</sup> or less (at motor frame)						
	Impact resistance	98 m/s² or less						

5

**Motors with Gear Reduce** 

# **Torque Characteristics**

**E Series** 

# Table of Motor with Gear Reducer Specifications

	Motor					М	JMA with g	ear reduc	er				
Model	Output	Reduction	Output	Rated speed	Max. speed		Peak max.	Moment of inertia (motor + reducer/converted) to motor shaft		•		Permissible radial load	Permissible thrust load
		ratio	-			torque	torque	w/o brake	w/ brake	w/o brake	w/ brake	raulai ioau	iiiusi lodu
	(W)		(W)	(r/min)	(r/min)	(N·m)	(N·m)	J ( × 10	⁴kg·m²)	(kg)		(N)	(N)
MUMA01□P□1N		1/5	75	600	1000	1.18	3.72	0.072	0.076	1.05	1.25	490	245
MUMA01□P□2N	100	1/9	80	333	555	2.25	6.86	0.0663	0.0703	1.05	1.25	588	294
MUMA01□P□4N		1/25	80	120	200	6.27	19.0	0.0645	0.0685	2.20	2.40	1670	833
MUMA02□P□1N		1/5	170	600	1000	2.65	8.04	0.218	0.248	1.68	2.08	490	245
MUMA02□P□2N	200	1/9	132	333	555	3.72	11.3	0.368	0.398	2.66	3.06	1180	588
MUMA02□P□4N		1/25	140	120	200	11.1	33.3	0.388	0.418	2.66	3.06	1670	833
MUMA042P□1N		1/5	340	600	1000	5.39	16.2	0.533	0.563	3.2	3.6	980	490
MUMA042P□2N	400	1/9	332	333	555	9.51	28.5	0.438	0.468	3.2	3.6	1180	588
MUMA042P□4N		1/25	332	120	200	26.4	79.2	0.470	0.500	4.7	5.1	2060	1030

**Table of Motor Specifications/** 

The Combination of the Driver and the Motor

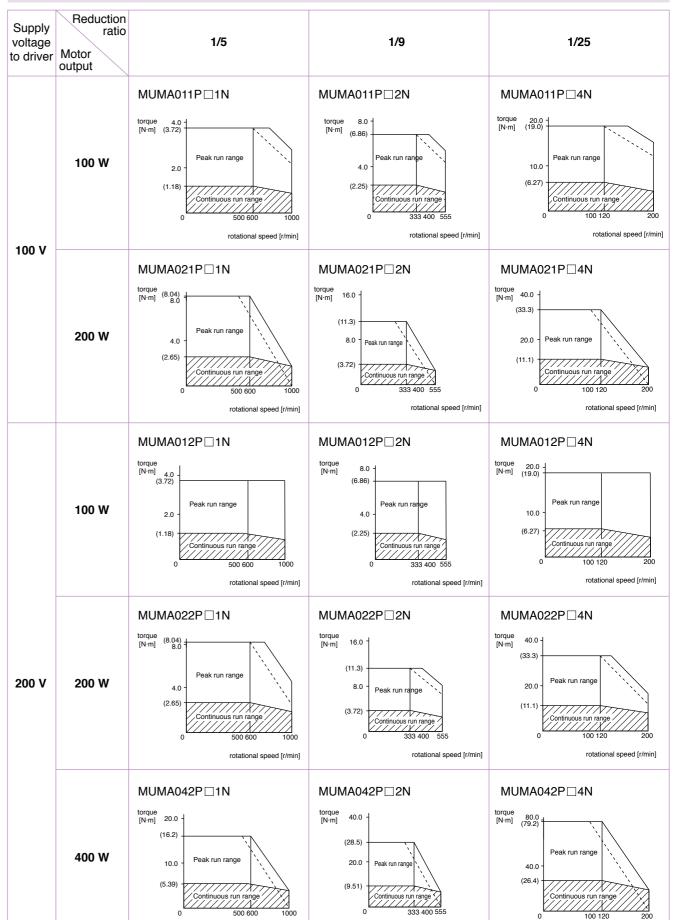
For dimensions, refer to P.221.

#### The Combination of the Driver and the Motor with Gear Reducer

Combination w	ith driver	10	0 V	200 V				
Encoder	Motor	Part No. of motor	Single phase, 100 V	Part No. of motor	3-phase, 200 V	Single phase, 200 V		
Liicodei	output	with gear reducer	Part No. of driver	with gear reducer	Part No. of driver	Part No. of driver		
	100 W	MUMA011P□□N	MKDET1110P	MUMA012P□□N	MKDET1505P	MKDET1505P		
2500 P/r	200 W	MUMA021P□□N	MLDET2110P	MUMA022P□□N	MKDET1310P	MLDET2210P		
Incremental	nental 400 W _			MUMA042P□□N	MLDET2510P	MLDET2510P		
	400 00	_	_	MUMAU42PULIN	MLDET2310P	WILDE 12510P		

For dimensions, refer to P.212.

#### For High Precision (MUMA Series 100 W to 400 W)

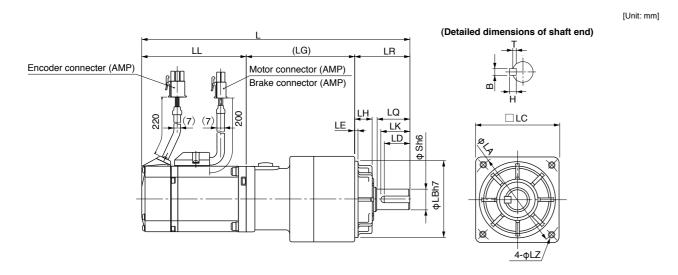


Dotted line represents the torque at 10 % less supply voltage.

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#### **Setup Support Software**

#### **MUMA** series with Gear Reducer



**Motor Dimensions** 

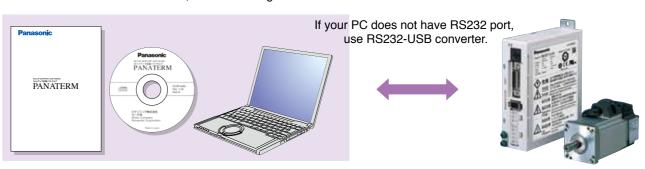
#### 2500 P/r Encoder

																[U	Jnit: mm]
Model	Motor output	Reduction ratio	L	LL	LR	LQ	LC	LB	LA	s	LH	LZ	LK	(LG)	LE	Key way B×H×LD	Т
MUMA01□P□1N		1/5	192	92.5													
MOMAGILIFLIN		173	223.5	124	32	20	52	50	60	12	10	M5	18	67.5		4×4×16	2.5
MUMA01□P□2N	100 W	1/9	192	92.5	32	20	52	30	00	12	10	(Depth: 12)	10	07.5		484810	2.5
WOWAUT	100 00	VV 179	223.5	124													
MUMA01□P□4N		1/25	234.5	92.5	50	30	78	70	90	19	17	M6	26	92	3	6×6×22	3.5
WOWAUTET EN		1/23	266	124	30 30	00 76	70	30	10	17	(Depth: 20)	20	92	٥	0.00.22	3.5	
MUMA02\[P\]1N	1/5	200.5	96	32 20	20 52	50	60	12	10	M5	18	72.5		4×4×16	2.5		
		173	233.5	129	32	20	52	30	00	12	10	(Depth: 12)	10	12.5		484810	2.5
MUMA02 P 2N	200 W	00 W 1/9	235.5	96										89.5	5		
WOWAUZ I I ZIN	200 W	173	268.5	129										09.5			
MUMA02□P□4N		1/25	246	96										100			
WOWAUZ II II 414		1/25	279	129	50	30	78	70	90	19	17	M6	26	100		6×6×22	3.5
MUMA042P□1N		1/5	263	123.5	30	30	70	/0	30	19	17	(Depth: 20)	20			0x0x22	3.5
WOWA042F TN		173	296	156.5										89.5			
MI IMAGASP SNI	400 W	1/9	263	123.5										89.5			
MUMA042P□2N 400 W	400 W 1/9	296	156.5														
MUMA042P□4N		1/25	288.5	123.5	61	40		-	445 04	24 1	18	M8	35	104	_	0700	
		1/25	321.5	156.5	וסו	40	98	90	115	24	18	(Depth: 20)	35	104	5	8×7×30	4

Upper column : without brake Lower column : with brake

Part No. DV0P4460 (Japanese/English version)

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 A4 series, E series through the RS232 serial interface.



#### **Basic Function**

#### Parameter setup

- After a parameter is defined on the screen, it will be sent to the driver immediately.
- Once you register parameters you frequently use, they can be easily set up on the screen.

#### **Monitoring Control Conditions**

#### Monitor

- · Control conditions: Control mode, velocity, torque, error and warning
- Driver input signal
- · Load conditions: Total count of command/feedback pulses, Load ratio, Regenerative resistor load ratio

#### Alarm

- · Displays the numbers and contents of the current alarm and up to 14 error events in the past.
- · Clears the numbers and contents of the current alarm and up to 14 error events in the past.

#### Setup

#### Auto tuning

· Gain adjustment and inertia ratio measurement

#### Graphic waveform display

• The graphic display shows command velocity, actual velocity, torque, and error waveforms.

#### Absolute encoder setup

- · Clears absolute encoder at the origin.
- · Displays single revolution/multi-revolution data.
- · Displays absolute encoder status.

#### **Analysis of Mechanical Operation Data**

#### Frequency analysis

• Measures frequency characteristics of the machine, and displays

Bode diagram.

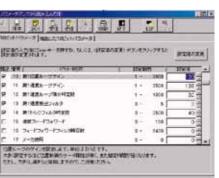
#### ■ Can not use with A5, A6 family.

[Personal computer] • CPU : Pentium 100MHz or more • Memory : 16 MB or more (32 MB recommended)

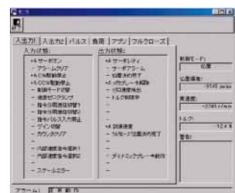
- · Hard disk capacity (vacancy of 25 MB or more recommended) · OS: Windows® 98, Windows® Me, Windows® 2000, Windows® XP (US version)
- Communication speed of serial communication port : 2400 bps or more (The software may not operate normally using USB-to-Serial adapter.)

[Display] • Resolution : 640\*480 (VGA) or more (desirably 1024\*768) • Number of colors : 256 colors or more

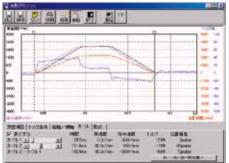
[CD-ROM drive] · CD-ROM drive operable on the above-mentioned personal computer



Parameter

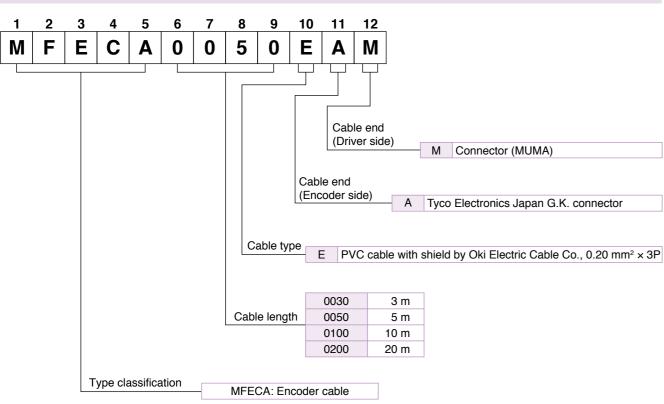


Monitor



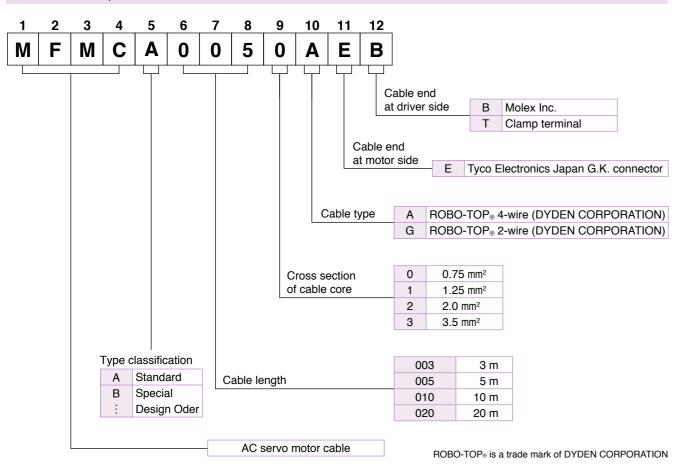
Graphic waveform display

### Cable



**Cable part No. Designation** 

#### Motor Cable, Brake Cable



#### Cable Set (3 m)

#### Part No. DV0P37300

- 1) Interface cable: DV0P0800
- 2) Encoder cable (3 m): MFECA0030EAM
- 3) Motor cable (3 m): MFMCA0030AEB
- Connector kit for driver power supply connection : DV0P2870

#### Cable Set (5 m)

#### Part No. DV0P39200

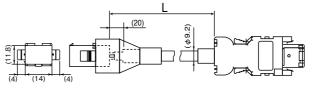
- 1) Interface cable : DV0P0800
- 2) Encoder cable (5 m): MFECA0050EAM
- 3) Motor cable (5 m): MFMCA0050AEB
- 4) Connector kit for driver power supply connection : DV0P2870

#### **Encoder Cable**

#### Part No. MFECA0 \* \* 0EAM

Part No. MFMCA0 \* \* 0AEB

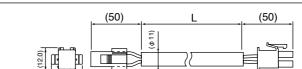
[Unit: mm]



Title	Part No.	Manufacturer	L (m)	Part No.
Connector (Driver side)	3E206-0100KV	Sumitomo 3M	3	MFECA0030EAM
Shell kit	3E306-3200-008	or equivalent	5	MFECA0050EAM
Connector	172160-1	Type Fleetrenies	10	MFECA0100EAM
Connector Pin	170365-1	Tyco Electronics	20	MFECA0200EAM
Cable	0.20 mm <sup>2</sup> × 3P	Oki Electric Cable Co., Ltd.		

#### Motor Cable (ROBO-TOP® 105 °C 600 V. DP)

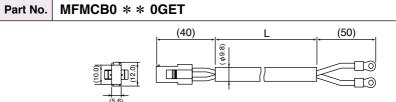
ROBO-TOP<sub>®</sub> is a trade mark of DYDEN CORPORATION



Title	Part No.	Manufacturer	L (m)	Part No.
Connector	172159-1	Tugo Flootronico	3	MFMCA0030AEB
Connector Pin	170362-1, 170366-1	Tyco Electronics	5	MFMCA0050AEB
Connector	5557-06R-210	Molex Inc	10	MFMCA0100AEB
Connector Pin	5556T	Molex IIIC	20	MFMCA0200AEB
Cable	ROBO-TOP 600 V 0.75 mm <sup>2</sup>	Daiden Co.,Ltd.		

#### Brake Cable (ROBO-TOP<sub>®</sub> 105 °C 600V . DP)

 $\ensuremath{\mathsf{ROBO\text{-}TOP}}\xspace_{\otimes}$  is a trade mark of DYDEN CORPORATION



Title	Part No.	Manufacturer	L (m)	Part No.
Connector	172157-1	Tugo Floatronico	3	MFMCB0030GET
Connector Pin	170362-1, 170366-1	Tyco Electronics	5	MFMCB0050GET
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.	10	MFMCB0100GET
Cable	ROBO-TOP 600 V 0.75 mm <sup>2</sup>	Daiden Co.,Ltd.	20	MFMCB0200GET

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[Unit: mm]

[Unit: mm]

#### . . .

#### **Connector Kit for Power Supply Connection**

Part No. DV0P2870

Parts composition

Title	Part No.	Number	Manufacturer	Note
Connector (10 pins)	5557-10R-210	1	Molex Inc.	For connector, CN X1
Connector pin	5556PBTL	6	iviolex IIIC.	(10 pins)

Pin configuration of connector CN X1

/					
10	9	8	7	6	1:
L1	(NC)	L2	(NC)	L3	H
5	4	3	2	1	1 :
Р	(NC)	В	(NC)	E	H.



Connector Kit

 Recommended manual crimping tool (to be prepared by customer)

Part No.	Cable material
57026-5000	UL1007
57027-5000	UL1015

#### <Cautions>

- 1. The above pin disposition is shown when viewed from the terminal inserting direction. Make a correct wiring by checking the stamped pin numbers on the connector itself.
- 2. Refer to P.210 for wiring and connection.
- 3. Do not connect anything to pins marked "NC".

#### **Connector Kit for Motor/Encoder Connection**

Part No. DV0P3670 (Incremental 2500 pulse, 5-wire)

This option is required when you make your own encoder cable and motor cable. (Brake cable is required for brake.)

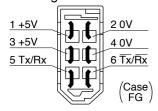
#### Parts composition

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M	For connector, CN X4
Shell kit	3E306-3200-008	1	or equivalent	(6 pins)
Connector (6 pins)	172160-1	1	Tugo Floatronico	For junction to encoder cable
Connector pin	170365-1	6	Tyco Electronics	(6 pins)
Connector (4 pins)	172159-1	1	Tuga Flactronica	For junction to motor power cable
Connector pin	170366-1	4	Tyco Electronics	(4 pins)
Connector (6 pins)	5557-06R-210	1	Molex Inc.	For connector, CN X3
Connector pin	5556PBTL	4	Molex IIIC.	(6 pins)

#### <Remarks>

We may use parts equivalent to the above for shell and connector cover.

Pin configuration of connector CN X4 plug



Recommended manual crimping tool (to be prepared by customer)

Title	Part No.	Manufacturer	Cable material
For encoder cable junction	755330-1	Type Floatronice	
For motor power cable junction	755331-1	Tyco Electronics	_
For Connector CN X3	57026-5000	Molex Inc.	UL1007
For Connector CiviA3	57027-5000	Willex IIIC.	UL1015

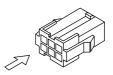
#### <Remarks>

- 1. The above pin configuration is shown when viewed from the pin-soldering direction. Make a correct wiring by checking the stamped pin numbers on the connector itself.
- 2. Connect the shield of the wire to the case (FG) without fail.
- 3. For wiring and connection, refer to P.210.

1 2 <u>3</u>

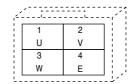
NC TX/RX TX/RX
4 5 6

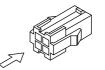
+5V 0V FG



Pin configuration of motor power cable junction

Pin configuration of encoder cable junction





Pin configuration of mating connector to CN X3 connector

	1
5	4
(NC)	V
2	1
(NC)	U
	(NC)



#### <Cautions>

- 1. The above pin configuration is shown when viewed from the terminal inserting direction. Make a correct wiring by checking the stamped pin numbers on the connector itself.
- 2. Refer to P.210 for wiring and connection.

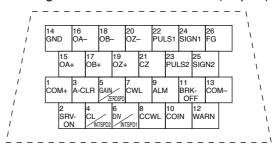
#### **Connector Kit for External Peripheral Equipment**

Part No.	DV0P0770	

Parts composition

Title	Part No.	Number	Manufacturer	Note
Connector	10126-3000PE	1	Sumitomo 3M	For connector, CN X5
Connector cover	10326-52A0-008	1	or equivalent	(26 pins)

Pin configuration of connector CN X5 (26 pins) (viewed from the soldering side)



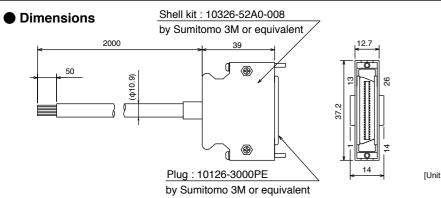
#### <Cautions>

- 1. Make a correct wiring by checking the stamped pin numbers on the connector itself.
- 2. Refer to P.211 for symbols and functions of the above signals.

## **DIN Rail Mounting Unit/ External Regenerative Resistor**

**Communication Cable/ Console** 

**Interface Cable/** 



#### Wiring table

Pin No.	Title of signal	Color or cable	Pin No.	Title of signal	Color or cable	Pin No.	Title of signal	Color or cable
1	COM+	Orange (Red 1)	10	COIN	Pink (Black 1)	19	OZ+	Pink (Red 2)
2	SRV-ON	Orange (Black 1)	11	BRK-OFF	Orange (Red 2)	20	OZ-	Pink (Black 2)
3	A-CLR	Gray (Red 1)	12	WARN	Orange (Black 2)	21	CZ	Orange (Red 3)
4	CL/INTSPD2	Gray (Black 1)	13	COM-	Gray (Red 2)	22	PULS1	Gray (Red 3)
5	GAIN/ZEROSPD	White (Red 1)	14	GND	Gray (Black 2)	23	PULS2	Gray (Black 3)
6	DIV/INTSPD1	White (Black 1)	15	OA+	White (Red 2)	24	SIGN1	White (Red 3)
7	CWL	Yellow (Red 1)	16	OA-	White (Black 2)	25	SIGN2	White (Black 3)
8	CCWL	Yellow (Black 1)	17	OB+	Yellow (Red 2)	26	FG	Orange (Black 3)
9	ALM	Pink (Red 1)	18	OB-	Yellow (Black 2)			

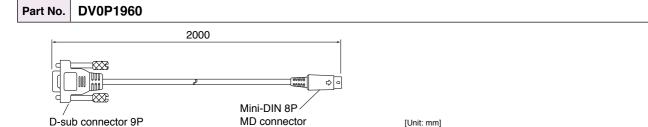
#### <Notes>

e. g. of Pin No. designation: Pin No. 1 ..... Wire color is orange, and one red dot.

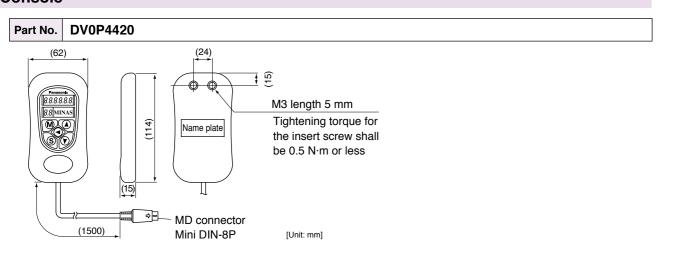
Pin No. 12 ... Wire color is orange, and two black dot.

The shield of this cable is not connected to a connector pin. To connect the shield to FG or GND at the driver side, use a connector kit for external device connection.

#### **Communication Cable (For Connection with PC)**



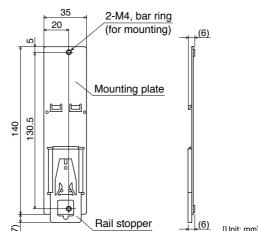
#### Console



#### **DIN Rail Mounting Unit**

Part No. DV0P3811

#### Dimensions

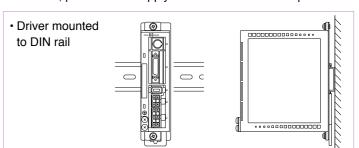


#### <Notes>

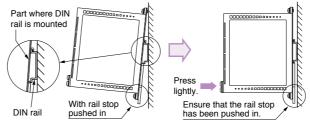
2 mounting screws (M4 X L8, Pan head) are attached. Rail stopper can be extended to max. 10 mm.

#### <Cautions>

Please read carefully operation manual before using this product. In addition, please do not apply excessive stress to the product.

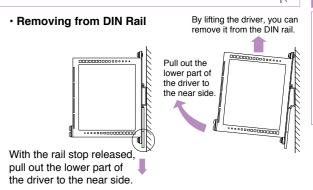


#### · How to Install



Hook the upper side of DIN rail mounting part on the DIN rail.

#### Press lightly the lower part of the main body of driver.



#### **External Regenerative Resistor**

			Specifi		
Part No.	Manufacturer's Part No.	Resistance	Rated power	Activation temperature of built-in fuse	Note (Input Power of drive)
		Ω	W	°C	
DV0P2890	45M03	50	10	<b>137</b> <sup>+3</sup> <sub>-2</sub>	Single phase, 100 V
DV0P2891	45M03	100	10	<b>137</b> <sup>+3</sup> <sub>-2</sub>	Single/3-phase, 200 V

Manufactured by Iwaki Musen Kenkyuusho Co., Ltd.

#### Dimensions

# Mating terminal 5556PBTL (or 5556PBT)

#### <Caution of when using external regeneration resistor>

Since it becomes high temperature, external regeneration resistor must be installed according to the contents shown below.

- · Attach to incombustibles, such as metal.
- · Install in the place which cannot touch directly by covering with incombustibles etc.
- · Do not install near the combustibles.

Although the thermal cutoff is built in external regeneration resistor, the skin temperature of regeneration resistor may become high exceeding the operating temperature of thermal cutoff by the time the thermal cutoff operates in driver failure. The thermal cutoff is for preventing ignition of the regeneration resistor in driver failure, and is not for controlling the skin temperature of resistor.

#### <Remarks>

Thermal fuse is installed for safety.

The thermal fuse may blow due to heat dissipating condition, working temperature, supply voltage or load fluctuation. Make it sure that the surface temperature of the resistor may not exceed 100 °C at the worst running conditions with the machine, which brings large regeneration (such case as high supply voltage, load inertia is large or deceleration time is short) Please carry out air cooling if needed.

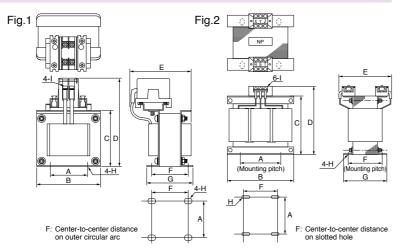
227 MINAS E Series MINAS E Series 228

# **List of Peripheral Components**

**E Series** 

#### Reactor

Frame symbol of driver	Power supply specifications	Rated output	Part No.	Fig.
	Single phase, 100 V	50 W to 100 W	DV0P227	1
MKDE	Single phase, 200 V	50 W to 100 W	DV0P220	2
	3-phase, 200 V	50 W to 200 W	DV0P220	
	Single phase, 100 V	200 W	DV0P228	1
MLDE	Single phase, 200 V	200 W to 400 W	DV0P220	2
	3-phase, 200 V	400 W		



**Surge Absorber for Motor Brake** 

Unit: mm]

	Part No.	А	В	С	D	E(Max)	F	G	н	ı	Inductance (mH)	Rated current (A)
Fig. 1	DV0P227	55±0.7	80±1	66.5±1	110 Max	90	41±2	55±2	4-5φ×10	M4	4.02	5
Fig.1	DV0P228	55±0.7	80±1	66.5±1	110 Max	95	46±2	60±2	4-5φ×10	M4	2	8
Fig.2	DV0P220	65±1	125±1	(93)	136 Max	155	70+3/-0	85±2	4-7φ×12	M4	6.81	3

#### **Harmonic restraint**

Harmonic restraint measures are not common to all countries. Therefore, prepare the measures that meet the requirements of the destination country.

When installing a product for Japan, refer to the instruction manual available on our website.

[Panasonic Corporation, Motor Business Unit web site]

http://industrial.panasonic.com/ww/products/motors-compressors/fa-motors

Reactor/

#### <Remarks>

When using a reactor, be sure to install one reactor to one servo driver.

#### **■** Recommended components

#### **Surge Absorber for Motor Brake**

Motor	Surge absorber for motor brake			
Motor	Part No. (Manufacturer's)	Manufacturer		
MUMA 50 W to 400 W	Z15D151	SEMITEC Corporation		

#### **List of Peripheral Components**

Manufacturer	Tel No. / Home Page	Peripheral components	
Panasonic Corporation Eco Solutions Company	http://panasonic.net/es/	Circuit breaker	
Panasonic Corporation Automotive & Industrial Systems Company	http://panasonic.net/id/	Surge absorber Switch, Relay	
Iwaki Musen Kenkyusho Co., Ltd.	+81-44-833-4311 http://www.iwakimusen.co.jp/	Regenerative resistor	
SEMITEC Corporation	+81-3-3621-2703 http://www.semitec.co.jp/english2/	Surge absorber for motor brake	
TDK Corporation	+81-3-5201-7229 http://www.global.tdk.com/	Ferite core for signal lines	
Okaya Electric Industries Co. Ltd.	+81-3-4544-7040 http://www.okayaelec.co.jp/english/index.html	Surge absorber Noise filter	
Sumitomo 3M	+81-3-5716-7290 http:/solutions.3m.com/wps/portal/3M/ja_JP/ WW2/Country/		
Tyco Electronics Japan G.K.	+81-44-844-8052 http://www.te.com/ja/home.html	Connector	
Japan Molex Inc.	+81-462-65-2313 http://www.molex.co.jp		
DYDEN CORPORATION	+81-3-5805-5880 http://www.dyden.co.jp/english/index.htm	Cable	

<sup>\*</sup> The above list is for reference only. We may change the manufacturer without notice.

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MEMO

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#### **EU Directives**

The EU Directives apply to all such electronic products as those having specific functions and have been exported to EU and directly sold to general consumers. Those products are required to conform to the EU unified standards and to furnish the CE marking on the products.

However, our AC servos meet the relevant EU Directives for Low Voltage Equipment so that the machine or equipment comprising our AC servos can meet EU Directives.

#### **EMC Directives**

MINAS Servo System conforms to relevant standard under EMC Directives setting up certain model (condition) with certain locating distance and wiring of the servo motor and the driver. And actual working condition often differs from this model condition especially in wiring and grounding. Therefore, in order for the machine to conform to the EMC Directives, especially for noise emission and noise terminal voltage, it is necessary to examine the machine incorporating our servos.

#### **Conformity to UL Standards**

Observe the following conditions of (1) and (2) to make the system conform to UL508C (E164620).

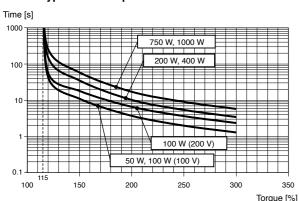
- (1) Use the driver in an environment of Pollution Degree 2 or 1 prescribed in IEC60664-1. (e.g. Install in the control box with IP54 enclosure.)
- (2) Make sure to install a circuit breaker or fuse which are UL recognized (Listed (h) marked) between the power supply and the noise filter.
  - For rated current of circuit breaker and fuse, refer to P.21 "Driver and List of Applicable Peripheral Equip-
  - Use a copper cable with temperature rating of 75 °C or higher.
- (3) Over-load protection level

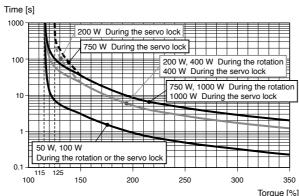
Over-load protective function will be activated when the effective current exceeds 115 % or more than the rated current based on the time characteristics (see the graph). Confirm that the effective current of the driver does not exceed the rated current.

Set up the peak permissible current with Pr0.13 (Setup of 1st torque limit) and Pr5.22 (Setup 2nd torque

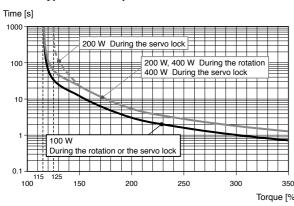
#### ■ Overload protection time characteristics

#### · Motor type: 80 mm sq. or less MSMF

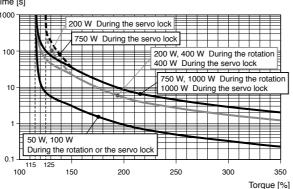




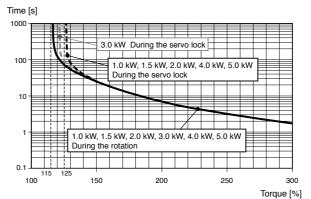
#### · Motor type: 80 mm sq. or less MQMF



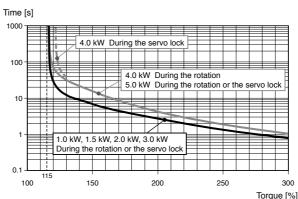
#### · Motor type: 80 mm sq. or less MHMF



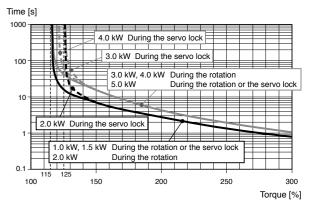
#### · Motor type: 100 mm sq. or more MSMF



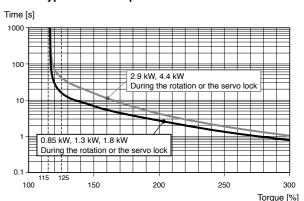
#### · Motor type: 100 mm sq. or more MDMF



#### · Motor type: 100 mm sq. or more MHMF



#### · Motor type: 100 mm sq. or more MGMF



#### **Conformed Standards**

		Driver	Motor
	EMC Directives	EN55011 EN61000-6-2 EN61000-6-4 EN61800-3	_
EU Directives Low-Voltage		EN61800-5-1 EN50178	EN60034-1 EN60034-5
	Machinery Directives Functional safety 11	ISO13849-1(PL e, Cat.3) EN61508(SIL3) EN62061(SILCL 3) EN61800-5-2(SIL3, STO) IEC61326-3-1 IEC60240-1	_
UL Standards CSA Standards Radio Waves Act (South Korea) (KC) '2		UL508C (E164620)	UL1004-1, UL1004-6 (E327868)
		C22.2 No.14	C22.2 No.100-4
		KN11 KN61000-4-2,3,4,5,6,8,11	_

: International Electrotechnical Commission

FΝ : Europaischen Normen **EMC**: Electromagnetic Compatibility UI : Underwriters Laboratories CSA: Canadian Standards Association Pursuant to the directive 2004/108/EC, article 9(2)

Panasonic Testing Centre

Panasonic Service Europe, a division of Panasonic Marketing Europe GmbH

Winsbergring 15, 22525 Hamburg, F.R. Germany

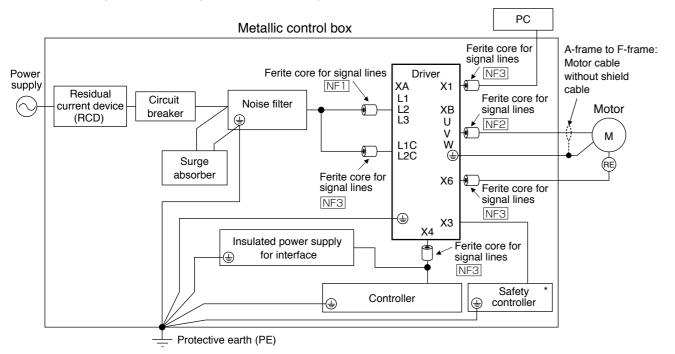
- When export this product, follow statutory provisions of the destination
- \*1 A6 SE, A6 SG series doesn't correspond to the functional safety standard
- \*2 Information related to the Korea Radio Law This servo driver is a Class A commercial broadcasting radio wave generator not designed for home 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)

#### **Installation Environment**

Use the servo driver in the environment of Pollution Degree 1 or 2 prescribed in IEC-60664-1 (e.g. Install the driver in control panel with IP54 protection structure.)



For NF1 to NF3, refer to the Table "Ferite core for Signal Line" (P.238).

\* A6 SE, A6 SG is not provided with X3 terminal.

#### <Caution>

Use options correctly after reading Operating Instructions of the options to better understand the precautions. Take care not to apply excessive stress to each optional part.

#### **Power Supply**

100 V type (A-frame to C-frame)	Single phase, 100 V $^{+10}_{-15}\%$ to 120 V $^{+10}_{-15}\%$	50 Hz/60 Hz
200 V type (A-frame to D-frame)	Single/3-phase, 200 V +10 % to 240 V +10 % -15 %	50 Hz/60 Hz
200 V type (E-frame, F-frame)	3-phase, 200 V <sup>+10</sup> / <sub>-15</sub> % to 240 V <sup>+10</sup> / <sub>-15</sub> %	50 Hz/60 Hz

- (1) This product is designed to be used in over-voltage category (installation category) 
   of EN 61800-5-1:2007.
- (2) Use an insulated power supply of DC12 V to 24 V which has CE marking or complies with EN60950.

#### **Circuit Breaker**

Install a circuit breaker which complies with IEC Standards and UL recognized (Listed and marked) between power supply and noise filter.

The short-circuit protection circuit on the product is not for protection of branch circuit.

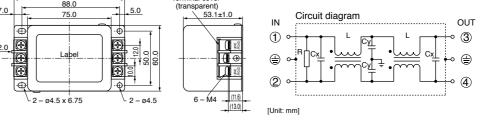
The branch circuit should be protected in accordance with NEC and the applicable local regulations in your area.

#### **Noise Filter**

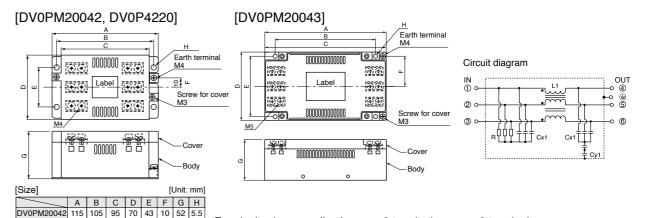
When you install one noise filter at the power supply for multi-axes application, contact the manufacturer of the noise filter. If noise margin is required, connect 2 filters in series to emphasize effectiveness.

#### Options

Option part No.	Voltage specifications for driver	Manufacturer's part No.	Applicable driver (frame)	Manufacturer
DV0P4170	Single phase 100 V, 200 V	SUP-EK5-ER-6	A-frame and B-frame	Okaya Electric Ind.
7.0 88.0 75.0	Terminal cover (transparent) 53.1±1.0	Circuit diagram	OUT OUT OUT	

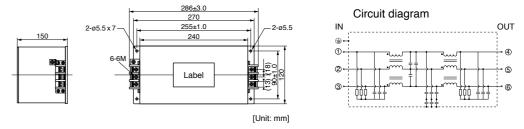


Option part No.	Voltage specifications for driver	Manufacturer's part No.	Applicable driver (frame)	Manufacturer
	3-phase 200 V		A-frame and B-frame	
DV0PM20042	Single phase 100 V, 200 V 3-phase 200 V	3SUP-HU10-ER-6	C-frame	Okaya Electric Ind.
DV0P4220	Single/3-phase 200 V	3SUP-HU30-ER-6	D-frame	
DV0PM20043	3-phase 200 V	3SUP-HU50-ER-6	E-frame	



For single phase application, use 2 terminals among 3 terminals, leaving the remaining terminal unconnected.

Option part No.	Voltage specifications for driver	Manufacturer's part No.	Applicable driver (frame)	Manufacturer
DV0P3410	3-phase 200 V	3SUP-HL50-ER-6B	F-frame	Okaya Electric Ind.



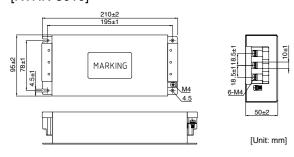
#### <Remarks>

- Select a noise filter of capacity that exceeds the capacity of the power source (also check for load condition).
- For detailed specification of the filter, contact the manufacturer.

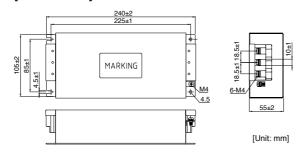
#### Recommended components

Part No.	Voltage specifications for driver	Current rating (A)	Applicable driver (frame)	Manufacturer
RTHN-5010		10	A-frame to C-frame	
RTHN-5030	Single phase 100 V, 200 V 3-phase 200 V	30	D-frame	TDK-Lambda Corp.
RTHN-5050	5 priase 200 v	50	E-frame and F-frame	

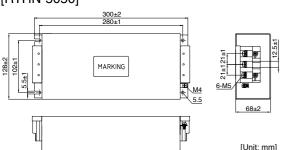
#### [RTHN-5010]



#### [RTHN-5030]



#### [RTHN-5050]



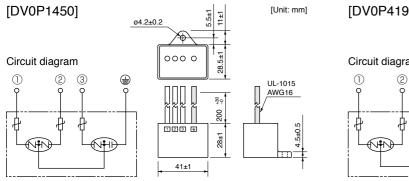
#### <Remarks>

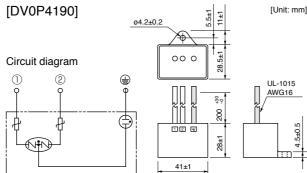
- Select a noise filter of capacity that exceeds the capacity of the power source (also check for load condition).
- · For detailed specification of the filter, contact the manufacturer.
- · When two or more servo drivers are used with a single noise filter at the common power source, consult with the noise filter manufacturer.

#### **Surge Absorber**

Provide a surge absorber for the primary side of noise filter.

Option part No.	Option part No. Voltage specifications for driver		Manufacturer
DV0P1450	3-phase 200 V	R·A·V-781BXZ-4	Okaya Electric Ind.
DV0P4190	Single phase 100 V, 200 V	R·A·V-781BWZ-4	Okaya Electric iriu.





#### <Remarks>

Remove this surge absorber when you perform dielectric test on the machine, or surge absorber might be damaged.

#### Ferite core for Signal Lines

Install ferite core for signal lines to all cables (power cable, motor cable, encoder cable and interface cable)

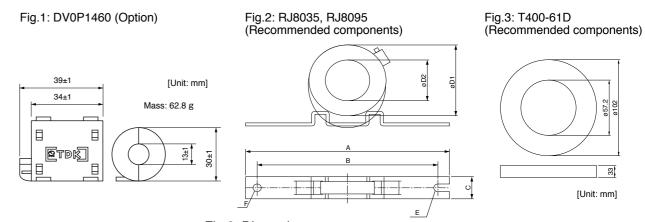
Symbol*1	Cable Name	100 V/200 V Driver frame symbol	Option part No.	Manufacturer's part No.	Manufacturer	Qty.
		A, B, C, D	DV0P1460	ZCAT3035-1330	TDK Corp.	4
NF1	Power cable	E, F	Recommended components	RJ8035	KK-CORP.CO.JP	1
NF2	Motor cable	A, B, C, D, E, F	DV0P1460	ZCAT3035-1330	TDK Corp.	4
NF3	<ul><li>24 V Power cable</li><li>Encoder cable</li><li>Interface cable</li><li>USB cable</li><li>Control power cable</li></ul>	Common (to all frames)	DV0P1460	ZCAT3035-1330	TDK Corp.	4

<sup>\*1</sup> For symbols, refer to the Block Diagram "Installation Environment" (P.235).

To connect the ferite core to the connector XB connection cable, adjust the sheath length at the tip of the cable, as required.

#### <Caution>

Fix the signal line ferite core in order to prevent excessive stress to the cables.



<Fig.2: Dimensions>

Part No.	Size [Unit: mm]									
Fait No.	Current	(μH)	Α	В	С	D1	D2	Core thickness	Е	F
RJ8035	35 A	9.9±3	170	150	23	80	53	24	R3.5	7
RJ8095	95 A	7.9±3	200	180	34	130	107	35	R3.5	7

#### **Residual Current Device**

Install a type B Residual current device (RCD) at primary side of the power supply.

Type B: Residual current device which detects a direct-current ingredient.

#### Grounding

- (1) Connect the protective earth terminal ((1)) of the driver and the protective earth terminal (PE) of the control box without fail to prevent electrical shocks.
- (2) Do not make a joint connection to the protective earth terminals ( ). 2 terminals are provided for protective earth.

#### <Note>

For driver and applicable peripheral equipments, refer to P.21 "Driver and List of Applicable Peripheral Equipments".

# A6 Family

When you install one noise filter in the power supply for multi axis application, consult with the manufacture of the filter.

**Composition of Peripheral Components** 

**Conformity to UL Standards** 

Option part No.	Part No.	Manufacturer
DV0P4160	3SUP-HU10-ER-6	Okaya Electric Industries Co.

# [Unit: mm

#### **EMC Directives**

**EU Directives** 

MINAS Servo System conform to relevant standard under EMC Directives setting up certain model (condition) with certain locating distance and wiring of the servo motor and the driver. And actual working condition often differs from this model condition especially in wiring and grounding. Therefore, in order for the machine to conform to the EMC Directives, especially for noise emission and noise terminal voltage, it is necessary to examine the machine incorporating our servos.

The EU Directives apply to all such electronic products as those having specific functions and have been exported to EU and directly sold to general consumers. Those products are required to conform to the EU unified standards and to furnish the CE marking on the products. MINAS AC Servos conforms to the EU Directives for Low Voltage Equipment so that the

machine incorporating our servos has an easy access to the conformity to relevant EU Directives for the machine.

#### **Conformed Standards**

Subject	Conformed Standard						
Motor	IEC60034-1	IEC60034-5 UL1004 CSA22.2 No.100	Conforms to				
	EN50178	UL508C CSA22.2 No.14	Low- Voltage Directives				
	EN55011	Radio Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment					
	EN61000-6-2	Immunity for Industrial Environments	]				
Motor	IEC61000-4-2	Electrostatic Discharge Immunity Test	Conforms to references				
and driver	IEC61000-4-3	Radio Frequency Electromagnetic Field Immunity Test					
unver	IEC61000-4-4	Electric High-Speed Transition Phenomenon/Burst Immunity Test	by EMC Directives				
	IEC61000-4-5	5 Lightening Surge Immunity Test					
	IEC61000-4-6	High Frequency Conduction Immunity Test	1				
	IEC61000-4-11	Instantaneous Outage Immunity Test	1				

Compliance to EU and EMC Directives

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

Pursuant to at the directive 2004/108/EC, article 9(2)

- Panasonic Testing Centre
- Panasonic Service Furone
- a division of Panasonic Marketing Europe GmbH Winsbergring 15,22525 Hamburg, F.R. Germany

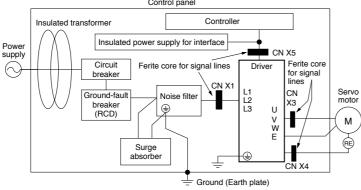
#### Composition of Peripheral Components

#### <Pre><Pre>cautions in using options>

Use options correctly after reading operation manuals of the options to better understand the precautions. Take care not to apply excessive stress to each optional part. Control pane

#### **Installation Environment**

Use Minas driver in environment of Pollution Degree 1 or 2 prescribed in IEC-60664-1 (e.g. Install the driver in control panel with IP54 protection structure.)



#### **Power Supply**

100 V system	Single phase, 100 V $^{+10~\%}_{-15~\%}$ to 115 V $^{+10~\%}_{-15~\%}$	50 Hz/60 Hz
200 V system	Single phase, 200 V $^{+10~\%}_{-15~\%}$ to 240 V $^{+10~\%}_{-15~\%}$	50 Hz/60 Hz
200 V system	3-phase, 200 V $^{+10}_{-15}\%$ to 240 V $^{+10}_{-15}\%$	50 Hz/60 Hz

- (1) Use the power supply under an environment of Overvoltage Category II specified in IEC60664-1.
- (2) For a interface power supply, use the insulated one with 12 VDC to 24 VDC which conforms to CE Marking or EN Standards (EN60950).

#### Circuit Breaker

Connect a circuit breaker which conforms to IEC standards and is UL recognized (UL Listed, (n) marked), between the power supply and the noise filter.

Noise Filter

Option part No.	Part No.	Manufacturer		
DV0P4160	3SUP-HU10-ER-6	Okaya Electric Industries Co.		

#### Surge Absorber

Install a surge absorber at primary side of the noise filter.

Option part No.	Driver voltage spec	Part No.	Manufacturer	Option part No.	Driver voltage spec	Part No.	Manufacturer
DV0P1450	3-phase, 200 V	R·A·V-781BXZ-4	Okaya Electric	DV0P4190	Single phase, 100 V, 200 V	R·A·V-781BWZ-4	Okaya Electric
Circuit diagr		1#1 1#1 1#1 1#1 1#1 1#1 1#1 1#1	[Unit: mm]	Circuit diagr		75.002 141±1 41±1	UL-1015 AWG16

#### <Remarks>

Remove this surge absorber when you perform dielectric test on the machine, or surge absorber might be damaged.

#### Ferite core for Signal Lines

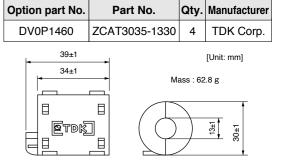
Install ferite core for signal lines to all cables (Power line, motor cable, encoder cable, interface cable)

#### <Caution>

- Please fix a line ferite core to avoid excessive stress to the cable.
- · When using multiple axes, noise generated from each driver might influence driver and peripheral equipment and result to

Please insert line ferite core between driver and motor wires (U, V, W but grounding).

(Please refer to P.239 "Composition of Peripheral Components".)



#### Grounding

- (1) Connect the protective earth terminal of the driver ((1) and protective earth terminal of the control panel (PE) without fail to prevent electrical shocks.
- (2) Do not co-clamp to the ground terminals ( $(\perp)$ ). Two ground terminals are provided.

#### **Ground-Fault Breaker**

Install a ground fault curcuit braker (RCD) to the primary side of the power supply.

Please use B-type (DC sensitive) ground fault circuit breakers defined in IEC60947-2, JISC8201-2-2.

#### Conformity to UL Standards

Observe the following conditions of (1) and (2) to make the system conform to UL508C (File No. E164620).

- (1) Use the driver in an environment of Pollution Degree 2 or 1 prescribed in IEC60664-1. (e.g. Install in the control box with IP54 enclosure.)
- (2) Install a circuit breaker or fuse which are UL recognized (LISTED (1) marked) between the power supply and the noise filter without fail.

## **AC Servo Motor Capacity Selection Software Option Selection Software for AC Servo Motor**

#### **AC Servo Motor Capacity Selection Software**

We have prepared PC software "M-SELECT" for AC servo motor capacity selection. Consult our sales representative or authorized distributor.

#### Three-step selection

1. Select components and specified values Select appropriate mechanical parameter items and fill them with parameter values derived from

the real machine. To simulate the target machine as practical as possible, use maximum number of parameters available.



#### 2. Enter operation pattern

Input the planned operation pattern that will contain [speed and rotation standard] or [absolute position

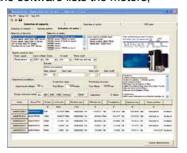
standard] with optional settings such as S-acceleration/de celeration.



#### 3. Select the motor

When the data required in step 1 and 2 above have been input, the software lists the motors,

which will be appropriate to use with your machine. Select the motor that is best suitable for your machine application.



#### Details of motor

Once the motor is selected, specifications of the motor and driver, and details of reason for

determination are displayed and may be printed out.



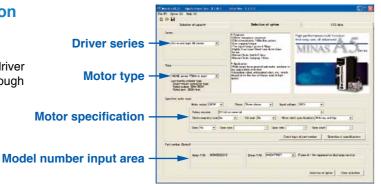
#### **Option Selection Software for AC Servo Motor**

We have prepared PC software to enable fast, easy, and correct option selection, a complicated job without the software.

#### Two procedures for option selection

1. Selection according to driver series and motor type

Suitable option can be selected by selecting driver series, motor type and motor specification through pulldown menu.



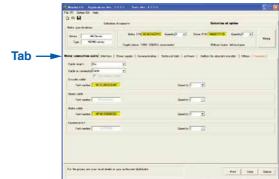
#### 2. Entry of model number

If you know the model number based on the servo motor and driver currently used, enter the model number.

#### Result of selection

Tab sheet specific to each of option model numbers is used for easier identification of the desired option.

\* When you are using the motor capacity selection software, simply press [Option Selection] tab and the screen as shown right will appear.



Please download from our web site and use after install to the PC. http://industrial.panasonic.com/ww/products/motors-compressors/fa-motors

#### - Table 5 : Prefix SI unit — (Multiples of 10) Table1: Basic unit Table 2: Auxiliary unit Derived unit Table 4: Unit combined Table 3: Derived unit with Other derived unit with SI unit proper name

#### Table1: Basic unit

Quantity	Name of unit	Symbol of unit	
Length	meter	m	
Weight	kilogram	kg	
Time	second	s	
Current	ampere	Α	
Thermodynamic temperature	kelvin	K	
Amount of substance	mol	mol	
Luminous intensity	candela	cd	

**Organization of the System of Units** 

#### **Table 2: Auxiliary unit**

Quantity	Name of unit	Symbol of unit		
Plane angle	radian	rad		
Solid angle	steradian	sr		

#### Table 3: Major derived unit with proper name

Quantity	Name	Symbol of unit	Derivation from basic unit, auxiliary unit or other derived unit
Frequency	hertz	Hz	1 Hz = 1 s <sup>-1</sup>
Force	newton	N	1 N = 1 kg·m/s <sup>2</sup>
Pressure, Stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>
Energy, Work, Amount of heat	joule	J	1 J = 1 N·m
Amount of work, Work efficiency, Power, Electric power	watt	W	1 W = 1 J/s
Electric charge, Amount of electricity	coulomb	С	1 C = 1 A·s
Electric potential, Potential difference, Voltage, Electromotive force	volt	V	1 V = 1 J/C
Electrostatic capacity, Capacitance	farad	F	1 F = 1 C/V
Electric resistance	ohm	Ω	1 Ω = 1 V/A
Electric conductance	siemens	S	1 S = 1 Ω <sup>-1</sup>
Magnetic flux	weber	Wb	1 Wb = 1 V·s
Magnetic flux density, Magnetic induction	tesla	Т	1 T = 1 Wb/m <sup>2</sup>
Inductance	henry	Н	1 H = 1 Wb/A
Degree centigrade (Celsius)	degree centigrade (Celsius) / degree	°C	t °C = (t+273.15) K
Luminous flux	lumen	lm	1 lm = 1 cd·sr
Illuminance	lux	lx	1 lx = 1 lm/m <sup>2</sup>

#### Table 4: Unit combined with SI unit

Quantity	Name	Symbol of unit
	minute	min
Time	hour	h
	day	d
	degree	0
Plane angle	minute	,
	second	n n
Volume	liter	I, L
Weight	ton	t

**Table 5: Prefix** 

Multiples powered	Pr	efix
to unit	Name	Symbol
10 <sup>18</sup>	exa	E
10 <sup>15</sup>	peta	Р
10 <sup>12</sup>	tera	Т
10 <sup>9</sup>	giga	G
10 <sup>6</sup>	mega	M
10 <sup>3</sup>	kilo	k
10 <sup>2</sup>	hecto	h
10	deca	da
10 <sup>-1</sup>	deci	d
10 <sup>-2</sup>	centi	С
10 <sup>-3</sup>	milli	m
10 <sup>-6</sup>	micro	μ
10 <sup>-9</sup>	nano	n
10 <sup>-12</sup>	pico	р
10 <sup>-15</sup>	femto	f
10 <sup>-18</sup>	atto	a

# mrormation

# Major Compatible Unit

Quantity	Symbol of	Symbol of SI unit and	Conversion value
Quantity	conventional unit	compatible unit	Conversion value
Length	μ (micron)	μm	1 μ = 1 μm (micrometer)
Acceleration	Gal	m/s <sup>2</sup>	1 Gal = 10 <sup>-2</sup> m/s <sup>2</sup>
	G	m/s <sup>2</sup>	1 G = 9.80665 m/s <sup>2</sup>
Frequency	c/s, c	Hz	1 c/s = Hz
Revolving speed, Number of revolutions	rpm	s <sup>-1</sup> or min <sup>-1</sup> , r/min	1 rpm = 1 min <sup>-1</sup>
Weight	kgf	_	1 -
Mass	_	kg	Same value
Weight flow rate	kgf/s	_	1,
Mass flow rate	_	kg/s	Same value
Specific weight	kgf/m <sup>3</sup>	_	1
Density	_	kg/m³	Same value
Specific volume	m³/kgf	m³/kg	Same value
Load	kgf	N	1 kgf = 9.80665 N
Force	kgf	N	1 kgf = 9.80665 N
	dyn	N	1 dyn = 10 <sup>-5</sup> N
Moment of force	kgf∙m	N∙m	1 kgf·m = 9.806 N·m
Pressure	kgf/cm <sup>2</sup>	Pa, bar <sup>(1)</sup> or kgf/cm <sup>2</sup>	1 kgf/cm <sup>2</sup> = 9.80665 x 10 <sup>4</sup> Pa
1.0004.0	1,6,,,,,,	r a, bar or ngrom	= 0.980665 bar
	at (Engineering atmospheric pressure)	Pa	1 at = 9.80665 x 10 <sup>4</sup> Pa
	atm (Atmospheric pressure)	Pa	1 atm = 1.01325 x 10 <sup>5</sup> Pa
	mH <sub>2</sub> O, mAq	Pa	1 mH <sub>2</sub> O = 9.80665 x 10 <sup>3</sup> Pa
	mmHg	Pa or mmHg <sup>(2)</sup>	1 mmHg = 133.322 Pa
	Torr	Pa	1 1111111g 100.02E 1 u
Stress	kgf/mm²	Pa or N/m <sup>2</sup>	1 kgf/mm <sup>2</sup> = 9.80665 x 10 <sup>6</sup> Pa
Oll 633	1,6,7,1111	1 4 51 14111	=9.80665 x 10 <sup>6</sup> N/m <sup>2</sup>
	kgf/cm <sup>2</sup>	Pa or N/m <sup>2</sup>	1 kgf/cm <sup>2</sup> = 9.80665 x 10 <sup>4</sup> Pa
	Kgi/Giii	1 a 01 14/111	= 9.80665 x 10 <sup>4</sup> N/m <sup>2</sup>
Elastic modulus	kgf/m²	Pa or N/m <sup>2</sup>	1 kgf/m <sup>2</sup> = 9.80665 Pa = 9.80665 N/m <sup>2</sup>
Liastic modulus	Kgi/III	I a of Ivill	1 kgf/cm <sup>2</sup> = 9.80665 x 10 <sup>4</sup> N/m <sup>2</sup>
Energy, Work	kgf⋅m	J (joule)	1 kg·m = 9.80665 J
Energy, Work		J (Joule)	1 erg = 10 <sup>-7</sup> J
Work efficiency, Power	erg	W (watt)	1 kgf·m/s = 9.80665 W
Work efficiency, Fower	kgf·m/s PS	w (waii)	1 PS = 0.7355 kW
Viagositu	PP		1 P = 0.1 Pa·s
Viscosity		Pa·s	10 <sup>-2</sup> St = 1 mm <sup>2</sup> /s
Kinetic viscosity	St	mm²/s	
Thermodynamic temperature	K	K (kelvin) K <sup>(3)</sup>	1 K = 1 K 1 deg = 1 K
Temperature interval	deg		1 cal = 4.18605 J
Amount of heat	cal	J	
Heat capacity	cal/°C	J/K <sup>(3)</sup>	1 cal/°C = 4.18605 J/K
Specific heat, Specific heat capacity	cal/ (kgf·°C)	cal/ (kgf·K) <sup>(3)</sup>	1 cal/ (kgf·°C) = 4.18605 J/ (kg·K)
Entropy	cal/K	J/K	1 cal/K = 4.18605 J/K
Specific entropy	cal/ (kgf⋅K)	J/(kg⋅K)	1 cal/ (kgf·K) = 4.18605 J/ (kg·K)
Internal energy (Enthalpy)	cal	J	1 cal = 4.18605 J
Specific internal energy (Specific enthalpy)	cal/kgf	J/kg	1 cal/kgf = 4.18605 J/kg
Heat flux	cal/h	W	1 kcal/h = 1.16279 W
Heat flux density	cal/ (h·m²)	W/m <sup>2</sup>	1 kcal/ (h·m²) = 1.16279 W/m²
Thermal conductivity	cal/ (h·m·°C)	W/ (m·K) <sup>(3)</sup>	1 kcal/ (h·m·°C) = 1.16279 W/ (m·K)
Coefficient of thermal conductivity	cal/ (h·m²·°C)	W/ (m <sup>2</sup> ·K) <sup>(3)</sup>	1 kcal/ (h·m²·°C) = 1.16279 W/ (m²·K)
Intensity of magnetic field	Oe	A/m	1 Oe = $10^3 / (4\pi) \text{ A/m}$
Magnetic flux	Mx	Wb (weber)	1 Mx = 10 <sup>-8</sup> Wb
Magnetic flux density	Gs,G	T (tesla)	1 Gs = 10 <sup>-4</sup> T

#### Note

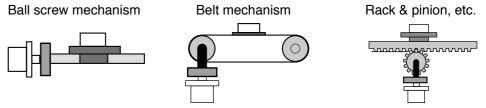
- (1) Applicable to liquid pressure. Also applicable to atmospheric pressure of meteorological data, when "bar" is used in international standard.
- (2) Applicable to scale or indication of blood pressure manometers.
- (3) "°C" can be substituted for "K".

#### Flow of Motor Selection

#### 1. Definition of mechanism to be driven by motor.

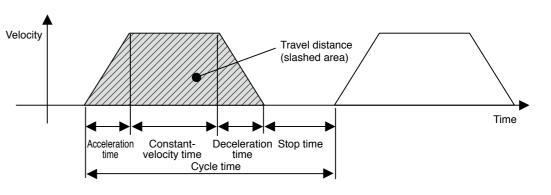
Define details of individual mechanical components (ball screw length, lead and pulley diameters, etc.)

#### <Typical mechanism>



#### 2. Definition of operating pattern.

Acceleration/deceleration time, Constant-velocity time, Stop time, Cycle time, Travel distance



Note) Selection of motor capacity significantly varies depending on the operating pattern.

The motor capacity can be reduced if the acceleration/deceleration time and stop time are set as long as possible.

#### 3. Calculation of load inertia and inertia ratio.

Calculate load inertia for each mechanical component. (Refer to "General inertia calculation method" described later.)

Divide the calculated load inertia by the inertia of the selected motor to check the inertia ratio. For calculation of the inertia ratio, note that the catalog value of the motor inertia is expressed as " $\times$  10<sup>-4</sup> kg·m<sup>2</sup>".

#### 4. Calculation of motor velocity

Calculate the motor velocity from the moving distance, acceleration / deceleration time and constant-velocity time.

#### 5. Calculation of torque

Calculate the required motor torque from the load inertia, acceleration/deceleration time and constant-velocity time.

#### 6. Calculation of motor

Select a motor that meets the above 3 to 5 requirements.

#### **Description on the Items Related to Motor Selection**

#### **Description on the Items Related to Motor Selection**

#### 1. Torque

#### (1) Peak torque

Indicate the maximum torque that the motor requires during operation (mainly in acceleration and deceleration steps). The reference value is 80% or less of the maximum motor torque. If the torque is a negative value, a regenerative discharge resistor may be required.

#### (2) Traveling torque, Stop holding torque

Indicates the torque that the motor requires for a long time. The reference value is 80% or less of the rated motor torque. If the torque is a negative value, a regenerative discharge resistor may be required.

#### Traveling torque calculation formula for each mechanism

#### **Ball screw mechanism**

W: Weight [kg] P:Lead [m]

F: External force [N]

 $\mathsf{Tf} = \frac{\mathsf{P}}{2\pi\,\eta}\,(\mu\mathsf{g}\mathsf{W} + \mathsf{F})$ Traveling torque

η: Mechanical efficiency

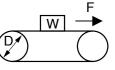
μ: Coefficient of friction

g: Acceleration of gravity 9.8[m/s<sup>2</sup>]

#### **Belt mechanism**

Traveling torque

 $\mathsf{Tf} = \frac{\mathsf{D}}{2\pi\,\eta}\,(\mu\mathsf{g}\mathsf{W}\!+\!\mathsf{F})$ 



W: Weight [kg]

P : Pulley diameter [m]

F: External force [N]

η: Mechanical efficiency

μ: Coefficient of friction

g: Acceleration of gravity 9.8[m/s2]

#### (3) Effective torque

Indicates a root-mean-square value of the total torque required for running and stopping the motor per unit time. The reference value is approx. 80% or less of the rated motor torque.

$$Trms = \sqrt{\frac{Ta^2 x ta + Tf^2 x tb + Td^2 x td}{tc}}$$

Ta: Acceleration torque [N·m]

ta: Acceleration time [s]

tc: Cycle time [s]

Tf: Traveling torque [N·m] Td: Deceleration torque [N·m]

tb: Constant-velocity time [s] td: Deceleration time [s]

(Run time + Stop time)

#### 2. Motor velocity

#### Maximum velocity

Maximum velocity of motor in operation: The reference value is the rated velocity or lower value. When the motor runs at the maximum velocity, you must pay attention to the motor torque and temperature rise. For actual calculation of motor velocity, see "Example of motor selection" described later.

#### 3. Inertia and inertia ratio

Inertia is like the force to retain the current moving condition.

Inertia ratio is calculated by dividing load inertia by rotor inertia.

Generally, for motors with 750 W or lower capacity, the inertia ratio should be "20" or less. For motors with 1000 W or higher capacity, the inertia ratio should be "10" or less.

If you need quicker response, a lower inertia ratio is required.

/ For example, when the motor takes several seconds in acceleration step, the inertia ratio can be further \increased.

#### General inertia calculation method

Shape	J calculation formula	Shape	J calculation formula
Disk	$J = \frac{1}{8} WD^{2} [kg \cdot m^{2}]$ $W : Weight [kg]$ $D : Outer diameter [m]$	Hollow cylinder	$J = \frac{1}{8} W(D^2 + d^2) [kg \cdot m^2]$ $W : Weight [kg]$ $D : Outer diameter [m]$ $d : Inner diameter [m]$
Prism	$J = \frac{1}{12} W (a^2 + b^2) [kg \cdot m^2]$ $W : Weight [kg]$ $a, b, c : Side length [m]$	Uniform rod	$J = \frac{1}{48} W (3D^2 + 4L^2)_{[kg \cdot m^2]}$ $W : Weight [kg]$ $D : Outer diameter [m]$ $L : Length [m]$
Straight rod	$J = \frac{1}{3} WL^{2} [kg \cdot m^{2}]$ $W : Weight [kg]$ $L : Length [m]$	Separated rod	$J = \frac{1}{8} WD^2 + WS^2 [kg \cdot m^2]$ $W : Weight [kg]$ $D : Outer diameter [m]$ $S : Distance [m]$
Reduction gear	Inertia on shaft "a" $J = J_1 + (\frac{n_2}{n_1})^2 J_2[\mathrm{kg} \cdot \mathrm{m}^2]$ $n_1 : \text{A rotational speed of a shaft } [\mathrm{r/min}]$ $n_2 : \text{A rotational speed of b shaft } [\mathrm{r/min}]$		
Conveyor	$J = \frac{1}{4} WD^2 [kg \cdot m^2]$	Ball screw	$J = J_B + \frac{W \cdot P^2}{4\pi^2} [kg \cdot m^2]$
	W: Workpiece weight on conveyor [kg] D: Drum diameter [m] * Excluding drum J	W F	W: Weight [kg] P: Lead JB: J of ball screw

If weight (W [kg]) is unknown, calculate it with the following formula:

Weight W[kg]=Density  $\rho$  [kg/m<sup>3</sup>] x Volume V[m<sup>3</sup>]

Density of each material

Iron  $\rho = 7.9 \times 10^3 [kg/m^3]$ 

Aluminum  $\rho = 2.8 \times 10^{3} \, [kg/m^{3}]$ 

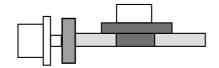
Brass  $\rho = 8.5 \times 10^3 \, [kg/m^3]$ 

#### **Selecting Motor Capacity**

#### To Drive Ball Screw Mechanism

1. Example of motor selection for driving ball screw mechanism

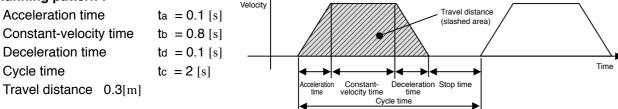
Workpiece weight WA = 10 [kg]Ball screw length BL = 0.5 [m]Ball screw diameter BD = 0.02 [m]Ball screw lead BP = 0.02 [m]Ball screw efficiency  $B\eta = 0.9$ 



Travel distance 0.3[m]

Coupling inertia  $Jc = 10 \times 10^{-6} [kg \cdot m^2]$  (Use manufacturer-specified catalog value, or calculation value.)

2. Running pattern :



3. Ball screw weight

Bw = 
$$\rho \times \pi \times \left(\frac{BD}{2}\right)^2 \times BL = 7.9 \times 10^3 \times \pi \times \left(\frac{0.02}{2}\right)^2 \times 0.5$$
  
= 1.24 [kg]

4. Load inertia

$$\begin{aligned} JL &= JC \, + \, JB = JC \, + \, \frac{1}{8}BW \, \times \, BD^2 \, + \, \frac{WA \cdot BP^2}{4\pi^2} \\ &= 0.00001 \, + \, \left(1.24 \times 0.02^2\right) / \, 8 \, + \, 10 \, \times \, 0.02^2 \, / \, 4\pi^2 \\ &= 1.73 \, \times \, 10^{-4} \, [\, \mathrm{k}\, \mathrm{g} \cdot \mathrm{m}^2] \end{aligned}$$

5. Provisional motor selection

In case of MSMF 200 W motor :  $JM = 0.14 \times 10^{-4} \, [kg \cdot m^2]$ 

6. Calculation of inertia ratio

JL / JM = 
$$1.73 \times 10^{-4}$$
 /  $0.14 \times 10^{-4}$  Therefore, the inertia ratio is "12.3" (less than "30") (In case of MSMF 100 W motor: JM =  $0.048 \times 10^{-4}$  Therefore, the inertia ratio is "36.0".)

7. Calculation of maximum velocity (Vmax)

$$\frac{1}{2}$$
 × Acceleration time × Vmax + Constant-velocity time × Vmax +  $\frac{1}{2}$  × Deceleration time × Vmax = Travel distance  $\frac{1}{2}$  × 0.1 × Vmax + 0.8 × Vmax +  $\frac{1}{2}$  × 0.1 × Vmax = 0.3 0.9 × Vmax = 0.3

$$0.9 \times \text{Vmax} = 0.3$$
  
 $\text{Vmax} = 0.3 / 0.9 = 0.334 \text{ [m/s]}$ 

8. Calculation of motor velocity (N [r/min]) Ball screw lead per resolution: Bp = 0.02 [m]

$$N = 0.334 / 0.02 = 16.7 [r/s]$$
  
= 16.7 × 60 = 1002 [r/min] < 3000 [r/min] (Rated velocity of MSMF 200 W motor)

9. Calculation of torque

Traveling torque 
$$T_f = \frac{BP}{2\pi B \, \eta} \ (\mu gWA + F) = \frac{0.02}{2\pi \, x \, 0.9} \ (0.1 \times 9.8 \times 10 + 0)$$

$$= 0.035 \ [\text{N·m}]$$
Acceleration torque 
$$T_a = \frac{(\text{JL + JM}) \times 2\pi \text{N}[\text{r/s}]}{\text{Acceleration time [s]}} + \text{Traveling torque}$$

$$= \frac{(1.73 \times 10^{-4} + 0.14 \times 10^{-4}) \times 2\pi \times 16.7}{0.1} + 0.035$$

$$= 0.196 + 0.035 = 0.231 \ [\text{N·m}]$$

# To Drive Ball Screw Mechanism **Example of Motor Selection**

Deceleration torque  $Td = \frac{(JL + JM) \times 2\pi N[r/s]}{Deceleration time [s]}$  - Traveling torque  $=\frac{(1.73\times10^{-4}+0.14\times10^{-4})\times2\pi\times16.7}{0.1}-0.035$  $= 0.196 - 0.035 = 0.161 [N \cdot m]$ 

10. Verification of maximum torque

Acceleration torque =  $Ta = 0.231 [N \cdot m] < 1.91 [N \cdot m]$  (Maximum torque of MSMF 200 W motor)

11. Verification of effective torque

Trms = 
$$\sqrt{\frac{\text{Ta}^2 \times \text{ta} + \text{Tf}^2 \times \text{tb} + \text{Td}^2 \times \text{td}}{\text{tc}}}$$
  
=  $\sqrt{\frac{0.231^2 \times 0.1 + 0.035^2 \times 0.8 + 0.161^2 \times 0.1}{2}}$   
= 0.067 [N·m] < 0.64 [N·m] (Rated torque of MSMF 200 W motor)

12. Judging from the inertia ratio calculated above, selection of 200 W motor is preferable, although the torque margin is significantly large.

#### **Example of Motor Selection**

Example of motor selection for timing belt mechanism

1.Mechanism Workpiece weight WA = 2[kg] (including belt)

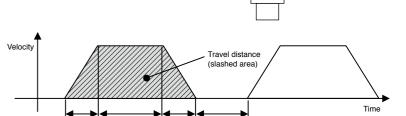
> Pulley diameter PD = 0.05[m]

Pulley weight WP= 0.5[kg] (Use manufacturer-specified catalog value, or calculation value.)

Mechanical efficiency  $B\eta = 0.8$ 

Coupling inertia Jc = 0 (Direct connection to motor shaft)

Belt mechanism inertia Pulley inertia



Constant- Deceleration Stop time velocity time time Cycle time

2. Running pattern

Acceleration time ta = 0.1[s]Constant-velocity time tb = 0.8[s]Deceleration time td = 0.1[s]Cycle time tc = 2[s]Travel distance 1[m]

3. Load inertia JL = JC + JB + JP

= JC + 
$$\frac{1}{4}$$
WA × PD<sup>2</sup> +  $\frac{1}{8}$ WP × PD<sup>2</sup> × 2  
= 0 +  $\frac{1}{4}$  × 2 × 0.05<sup>2</sup> +  $\frac{1}{8}$  × 0.5 × 0.05<sup>2</sup> × 2  
= 0.00156 = 15.6 × 10<sup>-4</sup> [kg·m<sup>2</sup>]

4. Provisional motor selection

In case of MSMF 750 W motor :  $JM = 0.96 \times 10^{-4} \, [kg \cdot m^2]$ 

5. Calculation of inertia ratio

JL / JM =  $15.6 \times 10^{-4} / 0.96 \times 10^{-4}$  Therefore, the inertia ratio is "16.3" (less than "20")

#### 6. Calculation of maximum velocity (Vmax)

$$\frac{1}{2}$$
 × Acceleration time×Vmax+Constant-velocity time×Vmax+  $\frac{1}{2}$  × Deceleration time×Vmax=Travel distance  $\frac{1}{2}$  × 0.1 × Vmax + 0.8 × Vmax +  $\frac{1}{2}$  × 0.1 × Vmax = 1 0.9 × Vmax = 1 Vmax = 1 / 0.9 = 1.111[m/s]

#### 7. Calculation of motor velocity (N [r/min])

A single rotation of pulley : 
$$\pi \times PD = 0.157[m]$$
  
N = 1.111 / 0.157 = 7.08[r/s]  
= 7.08 × 60 = 424.8[r/min] < 3000[r/min] (Rated velocity of MSMF 750 W motor)

#### 8. Calculation of torque

Traveling torque 
$$T_f = \frac{PD}{2\,\eta} (\mu gWA + F) = \frac{0.05}{2\,\times\,0.8} \ (0.1\,\times\,9.8\,\times\,3 + 0)$$

$$= 0.061[N \cdot m]$$
Acceleration torque 
$$T_a = \frac{(JL + JM) \times 2\pi N[r/s]}{Acceleration time[s]} + Traveling torque$$

$$= \frac{(15.6 \times 10^{-4} + 0.87 \times 10^{-4}) \times 2\pi \times 7.08}{0.1} + 0.061$$

$$= 0.751 + 0.061 = 0.812[N \cdot m]$$
Deceleration torque 
$$T_d = \frac{(JL + JM) \times 2\pi N[r/s]}{Deceleration time[s]} - Traveling torque$$

$$= \frac{(15.6 \times 10^{-4} + 0.87 \times 10^{-4}) \times 2\pi \times 7.08}{0.1} - 0.061$$

$$= 0.751 - 0.061 = 0.69[N \cdot m]$$

#### 9. Verification of maximum torque

Acceleration torque  $Ta = 0.812[N \cdot m] < 7.1[N \cdot m]$  (Maximum torque of MSMF 750 W motor)

#### 10. Verification of effective torque

Trms = 
$$\sqrt{\frac{Ta^2 \times ta + Tf^2 \times tb + Td^2 \times td}{tc}}$$
  
=  $\sqrt{\frac{0.812^2 \times 0.1 + 0.061^2 \times 0.8 + 0.69^2 \times 0.1}{2}}$   
= 0.241 [N·m] < 2.4 [N·m] (Rated torque of MSMF 750 W motor)

#### 11. Judging from the above calculation result, selection of MSMF 750W motor is acceptable.

#### **Request Sheet for Motor Selection**

#### Request for motor selection I: Ball screw drive

#### 1. Driven mechanism and running data

13) Lead of the ball screw

1)	Travel distance of the work load per one cycle	ℓ₁:	mm	
2)	Cycle time	to:	S	Running pattern
	(Fill in items 3) and 4) if required.)			Aelocity for the second
3)	Acceleration time	ta:	s	Ψ
4)	Deceleration time	td:	S	ta to time
5)	Stopping time	ts:	s	
6)	Max. velocity	V:	mm/s	F ~ .
7)	External force	F:	N	Wa
8)	Positioning accuracy of the work load	±	mm	
9)	Total weight of the work load and the table	W <sub>A</sub> :	kg	
10)	Power supply voltage		V	
11)	Diameter of the ball screw		mm	<u> </u>
12)	Total length of the ball		mm	

2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

14) Traveling direction (horizontal, vertical etc.)

Company name :
Department/Section :
Name :
Address :
Tel:
Fax:
E-mail address:

mm

### **Request Sheet for Motor Selection**

# Request for motor selection II: Timing pulley + Ball screw drive

#### 1. Driven mechanism and running data

41	Travel distance of the work
1)	load per one cycle

2) Cycle time

Travel distance of the work	
load per one cycle	

$\ell_1$ :	mm	15)	D

15)	Diameter	of th	e pulley
-----	----------	-------	----------

s 16) Weight of the pulley

s 17) Width of the pulley

18) Material of the pulley

	MOIOI	side	Ball SC	rew side
y	D₁:	mm	D <sub>2</sub> :	mm
		_		

mm

(Fill in items 3) and 4) if required.)

(or item 17) and 18))

Acceleration time	ta:
<ol> <li>Deceleration time</li> </ol>	td:

td:	S	

+	
ιs.	5

5) Stopping time	ts:	
6) May velocity	V:	mm/

External force	F:	
	External force	External force F:

8)	Positioning accuracy of the work load	±	mn
	Total weight of the work load		

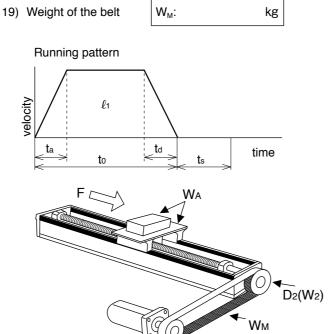
9)	and the table	W <sub>A</sub> :

10)	Fower supply voltage	

11) Diameter of the ball screw	mm	

12)	Total length of the ball screw	111111

13)	Lead of the ball screw	
14)	Traveling direction (horizontal, vertical etc.)	



#### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

mm

Company name :
Department/Section :
Name :
Address :
Tel:
Fax :
E-mail address:

### **Request Sheet for Motor Selection**

#### Request for motor selection III: Belt drive

#### 1. Driven mechanism and running data

12) Diameter of the driving pulley

13) Total weight of the pulley

•••		α,	y aata	
1)	Travel distance of the work load per one cycle	ℓ₁:	mm	Running pattern
2)	Cycle time	to:	s	
	(Fill in items 3) and 4) if required.)			Vijoola / la
3)	Acceleration time	ta:	S	ta to
4)	Deceleration time	td:	S	
5)	Stopping time	ts:	S	
6)	Max. velocity	V:	mm/s	Lı
7)	External force	F:	N	
8)	Positioning accuracy of the work load	±	mm	
9)	Total weight of the work load	W <sub>A</sub> :	kg	
10)	Power supply voltage		V	(or item 14) and 15))
11)	Weight of the belt	W <sub>M</sub> :	kg	14) Width of the pulley

D<sub>1</sub>:

15)	Material of the pulley

16)	Traveling direction
10)	(horizontal, vertical etc.)

# time

.1	
	D <sub>1</sub>
	W <sub>1</sub>

	2	Other data (Fill the	ne details on	specific mechanism	and its o	configurations	in the following blank
--	---	----------------------	---------------	--------------------	-----------	----------------	------------------------

mm

kg

Company name :
Department/Section :
Name :
Address:
Tel:
Fax :
E-mail address:

pcs

# **Request Sheet for Motor Selection**

#### Request for motor selection IV: Timing pulley + Belt drive

#### 1. Driven mechanism and running data

1) Iravel distance of the work load per one cycle	ℓ₁:	mm
2) Cycle time	to:	s

mm	16)
	l

16)	Diameter of the pulley
,	, ,

	N	Notor side	Belt	side
6) Diameter of th	e pulley D <sub>3</sub>	: mm	D <sub>4</sub> :	m
			Ī	

(or item 18) and 19))

3)	Acceleration time	ta:	s
۸)	Deceleration time	td.	

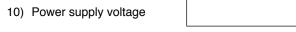
(Fill in items 3) and 4) if required.)

td:	s

5) Stopping time	ts:	
6) Max. velocity	\/·	mm/

7) External force	F:	N
8) Positioning accuracy of the	±	mm

8) Positioning accuracy of the work load	±	mm
9) Total weight of the work	W <sub>A</sub> :	kg



11) Weight of motor side belt	W <sub>M</sub> : kg
-------------------------------	---------------------

	Mot	or side	Ве	elt side
Diameter of the pulley	D <sub>1</sub> :	mm	D <sub>2</sub> :	mm
Weight of the pulley	W <sub>1</sub> :	kg	W <sub>2</sub> :	kg

(or item 14) and 15))

pulley

14) Width of the belt	L1:	m
15) Material of the		

10)	Diamotor of the paney	D <sub>3</sub> .		D4.	••••
17)	Weight of the pulley	W <sub>3</sub> :	kg	W <sub>4</sub> :	ŀ

18) Width of the pulley	L2:	m
-------------------------	-----	---

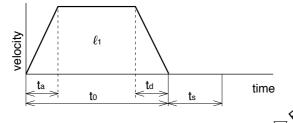
19)	Material of the pulley
-----	------------------------

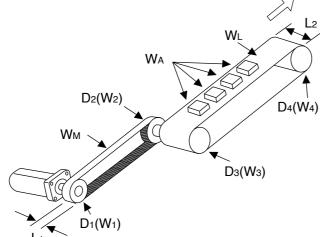
'		
	W <sub>L</sub> :	kg

21)	Traveling direction
۷١)	(horizontal, vertical etc.)

Running	nattern

20) Weight of the belt





#### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

Company name :
Department/Section :
Name :
Address:
Tel:
Fax:
E-mail address:

### **Request Sheet for Motor Selection**

#### Request for motor selection V: Turntable drive

#### 1. Driven mechanism and running data

1)	Travel distance of the work load per one cycle	d <sub>1</sub> :	deg	1
2)	Cycle time	to:	s	
	(Fill in items 3) and 4) if requi	red.)		
3)	Acceleration time	ta:	s	1
4)	Deceleration time	td:	s	
5)	Stonning time	te:	s	

6) Max. rotational speed of the table	v: d	
(or)	V:	

7)	Positioning accuracy of the work load	±	de

 $W_1$ :

Weight of one work load	*A-
Driving radius of the center	

-,	of gravity of the work	-
10)	Diameter of the table	D <sub>1</sub> :

11)	Mass of the table	
11,	Mass of the table	

12)	Diameter of the table
	support

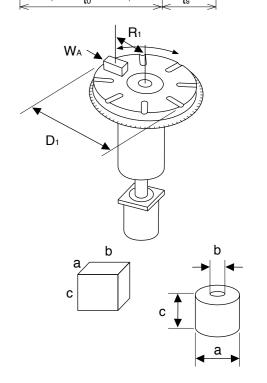
<ol><li>Power supply volta</li></ol>
--------------------------------------

14)	Dimensions of th
	work load

	Prism		Cylinder
a:	mm	a:	mm
b:	mm	b:	mm
		_	
c:	mm	c:	mm

15) Number of work loads

Rur	nning pat	tern		
velocity		d <sub>1</sub>		
	<b>t</b> a		<b>t</b> d	time



#### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

mm

kg

 $\mathsf{mm}$ 

Company name :
Department/Section :
Name :
Address :
Tel:
Fax:
E-mail address:

# **Request Sheet for Motor Selection**

#### Request for motor selection VII: Roller feed drive

#### 1. Driven mechanism and running data

-		anning data			
1)	Travel distance of the work load per one cycle	$\ell_1$ : mm	Running pattern		
2)	Cycle time	to: s	/		
	(Fill in items 3) and 4) if required.)		λ(s) la		
3)	Acceleration time	ta: s	$t_a$ $t_b$	time	
4)	Deceleration time	td: s	k	<del>&lt; &gt;</del>	
5)	Stopping time	ts: S			
6)	Max. velocity	v: mm/s		F	
7)	External pulling force	F: N		Lı	
8)	Positioning accuracy of the work load	± mm		D <sub>1</sub> (W <sub>1</sub> )	
9)	Number of rollers	pcs			
0)	Power supply voltage	V	(or item 13) and 14))		
11)	Diameter of the roller	D <sub>1</sub> : mm	13) Width of the roller	L <sub>1</sub> : r	nm
2)	Mass of the roller	W <sub>1</sub> : kg	14) Material of the roller		

# **Request Sheet for Motor Selection**

### Request for motor selection VI: Timing pulley + Turntable drive

#### 1. Driven mechanism and running data

			•	
1)	Travel distance of the work load per one cycle	d <sub>1</sub> :	deg	10
2)	Cycle time	to:	s	17
	(Fill in items 3) and 4) if requi	red.)		
3)	Acceleration time	ta:	s	18
4)	Deceleration time	td:	s	19
5)	Stopping time	ts:	s	20
6)	Max. rotational speed of the table	v:	deg/s	
	(or)	V:	r/s	
7)	Positioning accuracy of the work load	±	deg	
8)	Weight of one work load	W <sub>A</sub> :	kg	
9)	Driving radius of the center of gravity of the work	R <sub>1</sub> :	mm	
10)	Diameter of the table	D <sub>1</sub> :	mm	
11)	Mass of the table	<b>W</b> <sub>1</sub> :	kg	
12)	Diameter of the table support	T <sub>1</sub> :	mm	

(Prism)

b:

mm | a:

mm b:

mm c:

	mm	
	kg	
	mm	
	V	D
(Cylind	ler)	
:	mm	
:	mm	
	mm	

16) Diameter of the pulley	D <sub>2</sub> :	mm	D <sub>3</sub> :	mm
17) Weight of the pulley	W <sub>2</sub> :	kg	W <sub>3</sub> :	kg
(or item 18) and 19))				
18) Width of the pulley		L1:		mm
19) Material of the pulley				
20) Weight of the belt		W <sub>M</sub> :		kg
Running pattern  Ation of the state of the s	td	ts	->	time
D2(W2)	VA DI	Ri		D3(W3)

Turntable side

Motor side

#### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

pcs

Company name :
Department/Section :
Name :
Address :
Tel:
Fax:
E-mail address:

#### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

Company name :
Department/Section :
Name :
Address:
Tel:
Fax:
E-mail address:

13) Power supply voltage

14) Dimension of the work load

15) Number of work loads

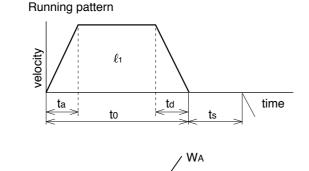
#### **Request Sheet for Motor Selection**

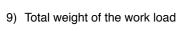
#### Request for motor selection III: Driving with Rack & Pinion

#### 1. Driven mechanism and running data

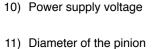
Travel distance of the work load 1) per one cycle mm 2) Cycle time to:

	(Fill in items 3) and 4) if required.)		
3)	Acceleration time	ta:	\$
4)	Deceleration time	td:	\$
5)	Stopping time	ts:	5
6)	Max. velocity	V:	mm/s
7)	External force	F:	N
8)	Positioning accuracy of the work load	±	mm





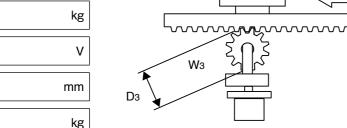




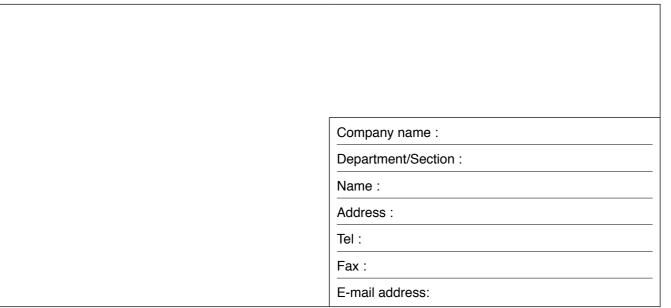
D <sub>3</sub> :	mm
W <sub>3</sub> :	kg

Mass	of the	pinion
	Mass	Mass of the

٥١	Traveling direction
3)	(horizontal, vertical, etc.)

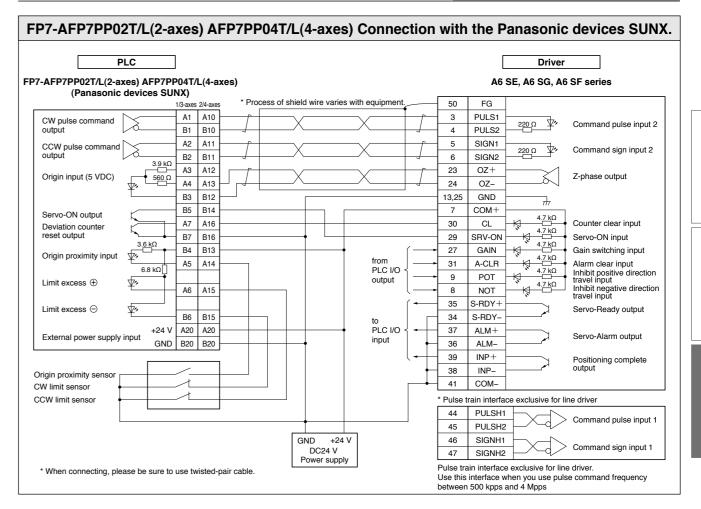


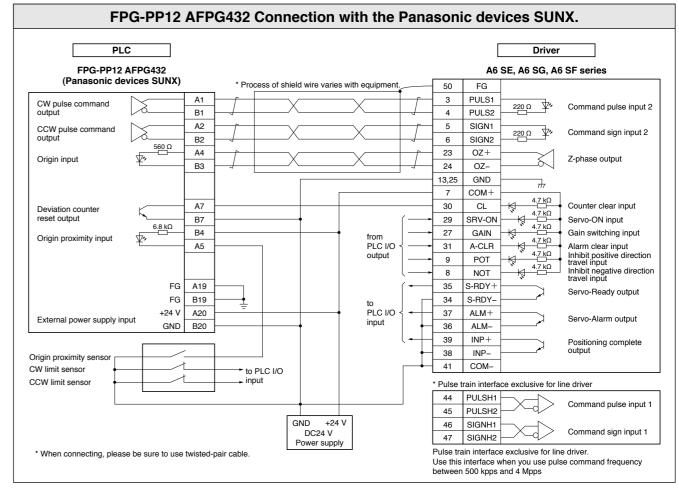
#### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

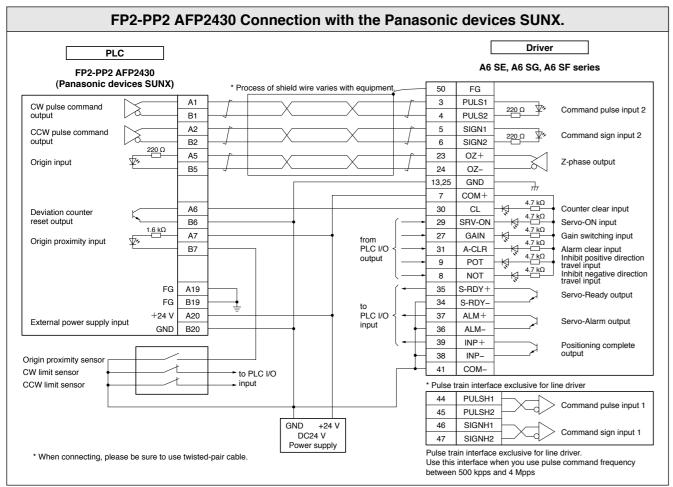


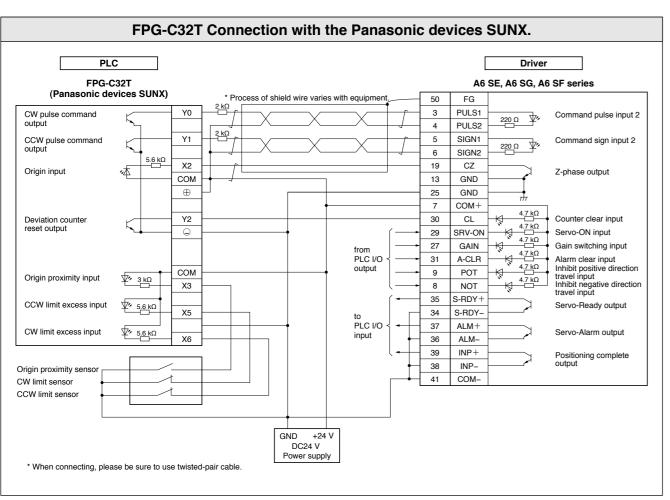
#### **Connection Between Driver and Controller**

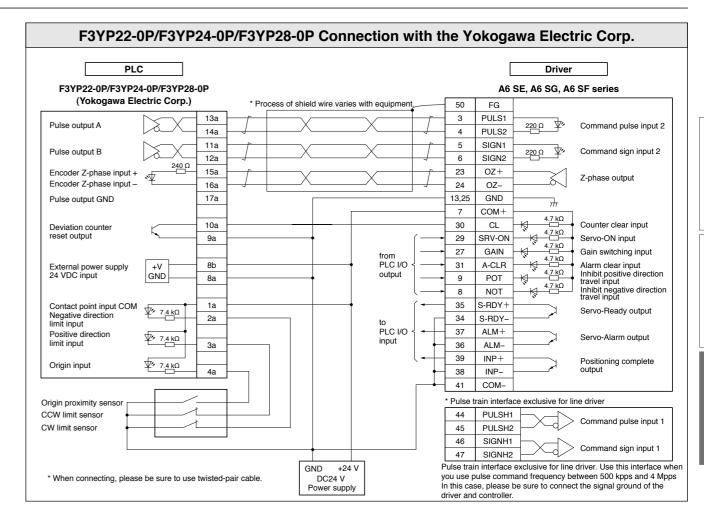
**Connection Between Driver and Controller** 

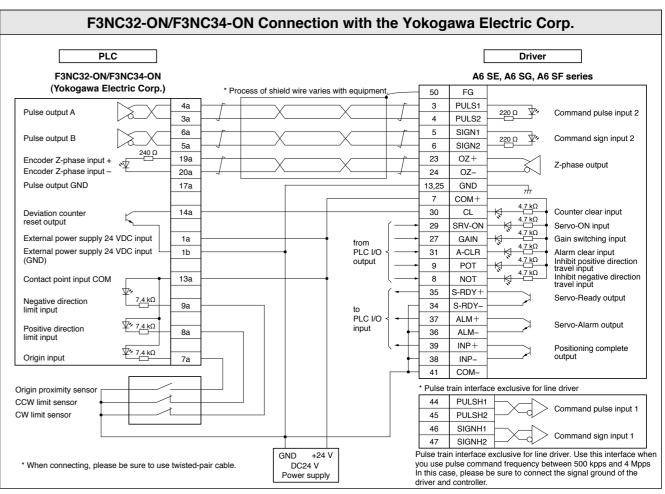


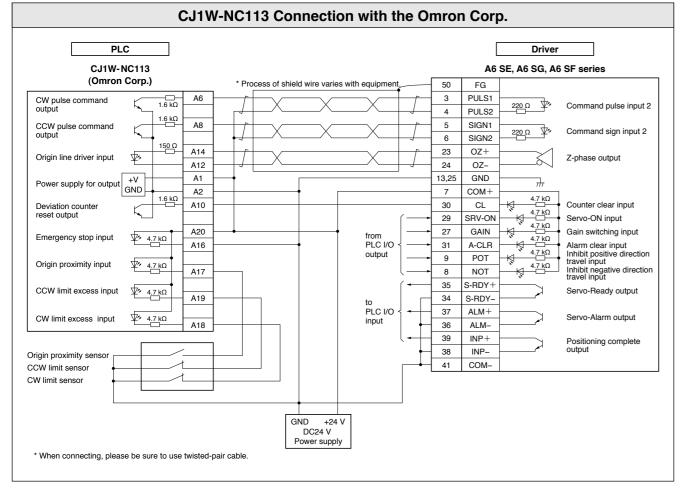


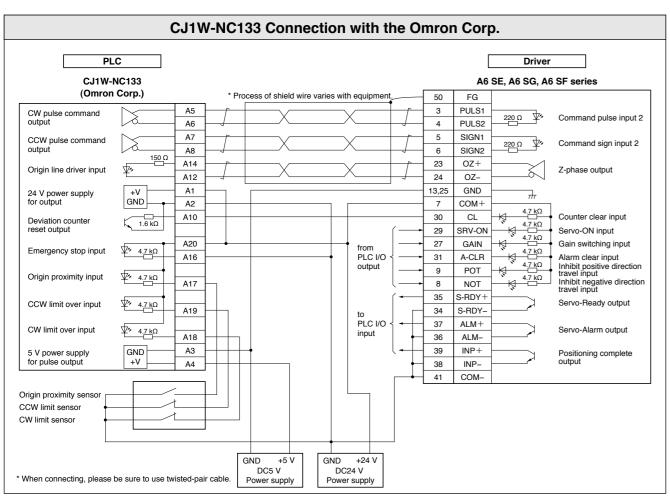


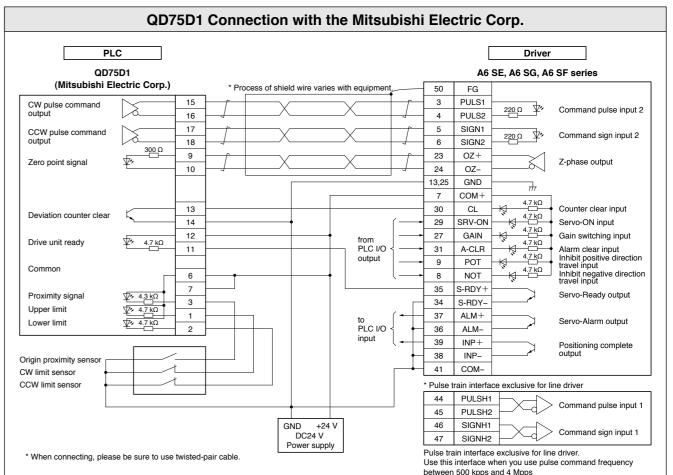


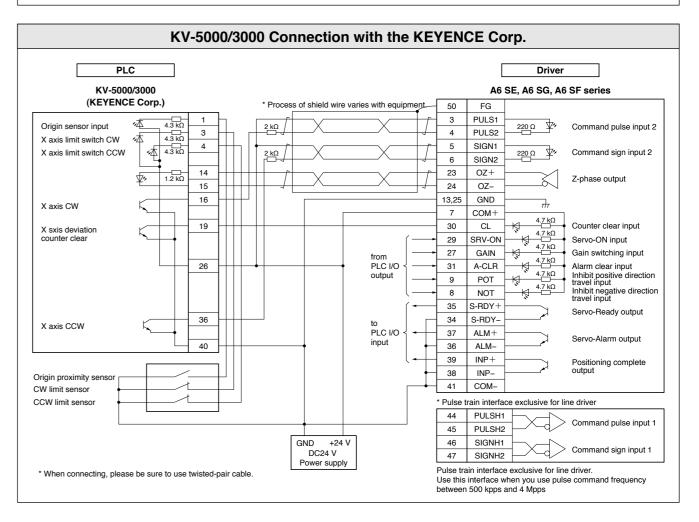






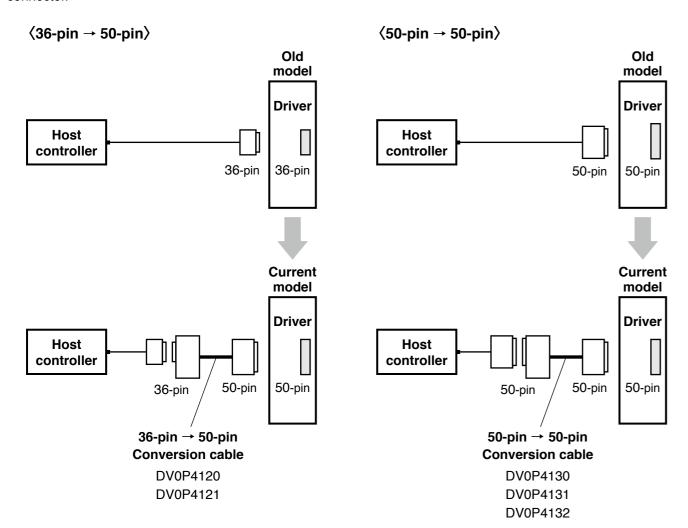






# **Replacing Old Model Servo Driver** with MINAS A6 series

For easier replacement of old driver (MINAS X/XX/V series) with A6 series, use the interface conversion connector.



When selecting the cable, refer to the table below because the part number of the cable is specific to the control mode of the old model.

Old model	Control mode	Conversion cable part No.	Conversion wiring table
X series XX series	Position/velocity control	DV0P4120	P.264
(36-pin)	Torque control	DV0P4121	F.204
	Position control	DV0P4130	P.265
V series (50-pin)	Velocity control	DV0P4131	F.203
	Torque control	DV0P4132	P.266

<sup>\*</sup> For external dimensions, refer to P.182.

#### **Conversion Wiring Table**

		DV0P4120 DV0P4121				
Pin No. on Old Model	Pin No. on Current Model	Signal Name	Symbol	Pin No. on Current Model	Signal Name	Symbol
1	23	Z-phase output	OZ+	23	Z-phase output	OZ+
2	24	Z-phase output	OZ-	24	Z-phase output	OZ-
3	13	Signal ground	GND	13	Signal ground	GND
4	19	Z-phase output	CZ	19	Z-phase output	CZ
5	4	Command pulse input 2	PULS2	4	Command pulse input 2	PULS2
6	3	Command pulse input 2	PULS1	3	Command pulse input 2	PULS1
7	6	Command pulse sign input 2	SIGN2	6	Command pulse sign input 2	SIGN2
8	5	Command pulse sign input 2	SIGN1	5	Command pulse sign input 2	SIGN1
9	33	Command pulse inhibition input	INH	33	Command pulse inhibition input	INH
10	26	Speed zero clamp input	ZEROSPD	26	Speed zero clamp input	ZEROSPD
11	7	Power supply for control signal (+)	COM+	7	Power supply for control signal (+)	COM+
12	29	Servo-ON input	SRV-ON	29	Servo-ON input	SRV-ON
13	30	Deviation counter clear input	CL	30	Deviation counter clear input	CL
14	14	Speed command input	SPR	NC		
15	15	Signal ground	GND	15	Signal ground	GND
16	43	Speed monitor output	SP	43	Speed monitor output	SP
17	25	Signal ground	GND	25	Signal ground	GND
18	50	Frame ground	FG	50	Frame ground	FG
19	21	A-phase output	OA+	21	A-phase output	OA+
20	22	A-phase output	OA-	22	A-phase output	OA-
21	48	B-phase output	OB+	48	B-phase output	OB+
22	49	B-phase output	OB-	49	B-phase output	OB-
23	NC			NC		
24	NC			NC		
25	39	Positioning complete output Speed arrival output	COIN+ AT-SPEED+	39	Positioning complete output Speed arrival output	COIN+ AT-SPEED+
26	37	Servo-Alarm output	ALM+	37	Servo-Alarm output	ALM+
27	35	Servo-Ready output	S-RDY+	35	Servo-Ready output	S-RDY+
	34	Positioning complete output (–) Speed arrival output (–)	COIN- AT-SPEED-	34	Positioning complete output (–) Speed arrival output (–)	COIN- AT-SPEED-
28	36	Servo-Alarm output (–)	ALM-	36	Servo-Alarm output (-)	ALM-
	38	Servo-Ready output (-)	S-RDY-	38	Servo-Ready output (–)	S-RDY-
	41	Power supply for control signal (-)	COM-	41	Power supply for control signal (-)	COM-
29	8	CW over-travel inhibit input	CWL	8	CW over-travel inhibit input	CWL
30	9	CCW over-travel inhibit input	CCWL	9	CCW over-travel inhibit input	CCWL
31	31	Alarm clear input	A-CLR	31	Alarm clear input	A-CLR
32	32	Control mode switching input	C-MODE	32	Control mode switching input	C-MODE
33	18	CW direction torque limit input	CWTL	18	CW direction torque limit input	CWTL
34	16	CCW direction torque limit input	CCWTL	14	Torque command input	TRQR
35	17	Signal ground	GND	17	Signal ground	GND
36	42	Torque monitor output	IM	42	Torque monitor output	IM

<sup>\* &</sup>quot;NC" is no connect.

# A6 Family Connection Between Driver and Controller

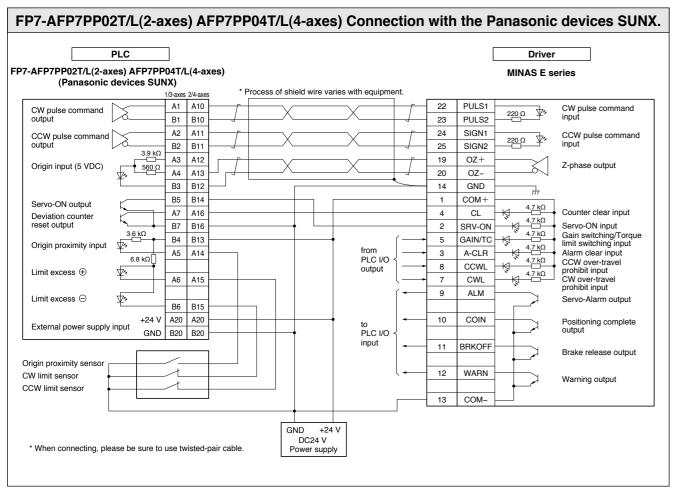
# Replacing Old Model Servo Driver with MINAS A6 series

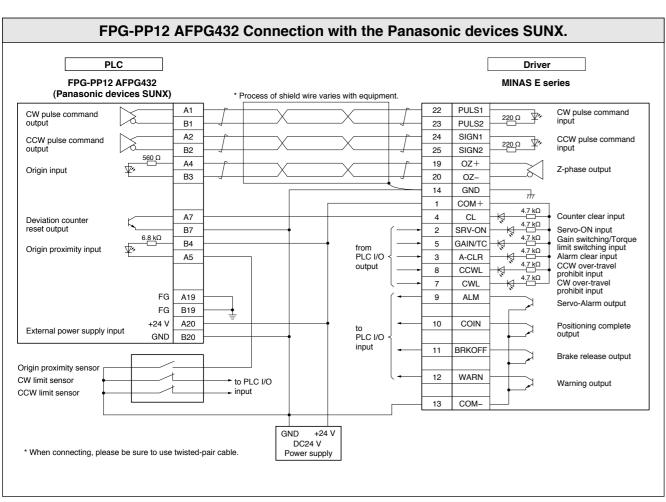
		DV0P4130 DV0P4131				
Pin No.	Pin			Pin		
on Old Model	No. on Current Model	Signal Name	Symbol	No. on Current Model	Signal Name	Symbol
1	8	CW over-travel inhibit input	CWL	8	CW over-travel inhibit input	CWL
2	9	CCW over-travel inhibit input	CCWL	9	CCW over-travel inhibit input	CCWL
3	3	Command pulse input 2	PULS1	NC		
4	4	Command pulse input 2	PULS2	NC		
5	5	Command pulse sign input 2	SIGN1	NC		
6	6	Command pulse sign input 2	SIGN2	NC		
7	7	Power supply for control signal (+)	COM+	7	Power supply for control signal (+)	COM+
8	NC			NC		
9	NC			NC		
10	NC			NC		
11	11	External brake release signal	BRK-OFF+	11	External brake release signal	BRK-OFF+
12	12	Zero-speed detection output signal	ZSP	12	Zero-speed detection output signal	ZSP
13	13	Torque in-limit signal output	TLC	13	Torque in-limit signal output	TLC
14	NC			14	Speed command input	SPR
15	15	Signal ground	GND	15	Signal ground	GND
16	16	CCW direction torque limit input	CCWTL	16	CCW direction torque limit input	CCWTL
17	17	Signal ground	GND	17	Signal ground	GND
18	18	CW direction torque limit input	CWTL	18	CW direction torque limit input	CWTL
19	19	Z-phase output	CZ	19	Z-phase output	CZ
20	NC			NC		
21	21	A-phase output	OA+	21	A-phase output	OA+
22	22	A-phase output	OA-	22	A-phase output	OA-
23	23	Z-phase output	OZ+	23	Z-phase output	OZ+
24	24	Z-phase output	OZ-	24	Z-phase output	OZ-
25	50	Frame ground	FG	50	Frame ground	FG
26	26	Speed zero clamp input	ZEROSPD	26	Speed zero clamp input	ZEROSPD
27	27	Gain switching input	GAIN	27	Gain switching input	GAIN
28	NC			33	Selection 1 input of internal command speed	INTSPD1
29	29	Servo-ON input	SRV-ON	29	Servo-ON input	SRV-ON
30	30	Deviation counter clear input	CL	NC		
31	31	Alarm clear input	A-CLR	31	Alarm clear input	A-CLR
32	32	Control mode switching input	C-MODE	32	Control mode switching input	C-MODE
33	33	Command pulse inhibition input	INH	NC		
34	NC			NC		
35	35	Servo-Ready output	S-RDY+	35	Servo-Ready output	S-RDY+
36	NC			NC		
37	37	Servo-Alarm output	ALM+	37	Servo-Alarm output	ALM+
38	NC			NC		
39	39	Positioning complete output	COIN+	39	Speed arrival output	AT-SPEED+
40	40	Torque in-limit signal output	TLC	40	Torque in-limit signal output	TLC
	10	External brake release signal (–)	BRK-OFF-	10	External brake release signal (–)	BRK-OFF-
	34	Positioning complete output (–)	COIN-	34	Speed arrival output (–)	AT-SPEED-
41	36	Servo-Alarm output (–)	ALM-	36	Servo-Alarm output (–)	ALM-
	38	Servo-Ready output (–)	S-RDY-	38	Servo-Ready output (–)	S-RDY-
	41	Power supply for control signal (–)	COM-	41	Power supply for control signal (–)	COM-
42	42	Torque monitor output	IM	42	Torque monitor output	IM
43	43	Speed monitor output	SP	43	Speed monitor output	SP
44	25	Signal ground	GND	25	Signal ground	GND
45	25	Signal ground	GND	25	Signal ground	GND
45	25	Signal ground	GND	25	Signal ground	GND
46	NC	olgital ground	GIND	NC	Olginal giroutiu	GIND
		R-phase output	OB+		R-phase output	OB+
48	48	B-phase output		48	B-phase output	
49	49	B-phase output	OB-	49	B-phase output	OB-
50	50	Frame ground	FG	50	Frame ground	FG

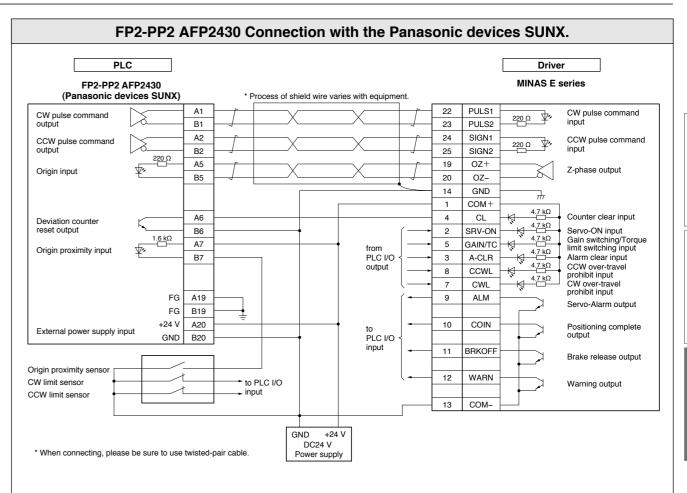
*	"NC"	is	no	connect.
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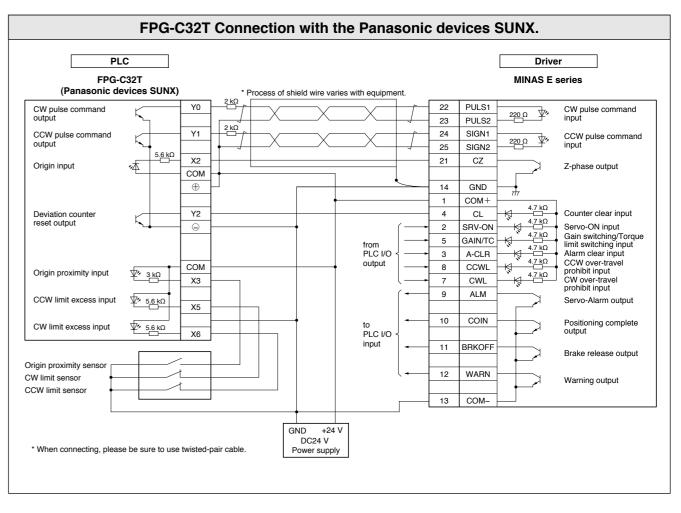
		DV0P4132	
Pin No. on Old Model	Pin No. on Current Model	Signal Name	Symbol
1	8	CW over-travel inhibit input	CWL
2	9	CCW over-travel inhibit input	CCWL
3	NC		
4	NC		
5	NC		
6	NC		
7	7	Power supply for control signal (+)	COM+
8	NC		
9	NC		
10	NC		
11	11	External brake release signal	BRK-OFF+
12	12	Zero-speed detection output signal	ZSP
13	13	Torque in-limit signal output	TLC
14	NC		
15	15	Signal ground	GND
16	16	Torque command input	TRQR
17	17	Signal ground	GND
18	18	CW direction torque limit input	CWTL
19	19	Z-phase output	CZ
20	NC		
21	21	A-phase output	OA+
22	22	A-phase output	OA-
23	23	Z-phase output	OZ+
24	24	Z-phase output	OZ-
25	50	Frame ground	FG
26	26	Speed zero clamp input	ZEROSPD
27	27	Gain switching input	GAIN
28	NC		
29	29	Servo-ON input	SRV-ON
30	NC		
31	31	Alarm clear input	A-CLR
32	32	Control mode switching input	C-MODE
33	NC		
34	NC		
35	35	Servo-Ready output	S-RDY+
36	NC	, ,	
37	37	Servo-Alarm output	ALM+
38	NC	•	
39	39	Speed arrival output	AT-SPEED+
40	40	Torque in-limit signal output	TLC
	10	External brake release signal (–)	BRK-OFF-
	34	Speed arrival output (–)	AT-SPEED-
41	36	Servo-Alarm output (–)	ALM-
**	38	Servo-Ready output (–)	S-RDY-
	41	Power supply for control signal (–)	COM-
42	42	Torque monitor output	IM
43	42	Speed monitor output	SP
43		Signal ground	
	25		GND
45	25	Signal ground	GND
46	25	Signal ground	GND
47	NC		
48	48	B-phase output	OB+
49	49	B-phase output	OB-
50	50	Frame ground	FG

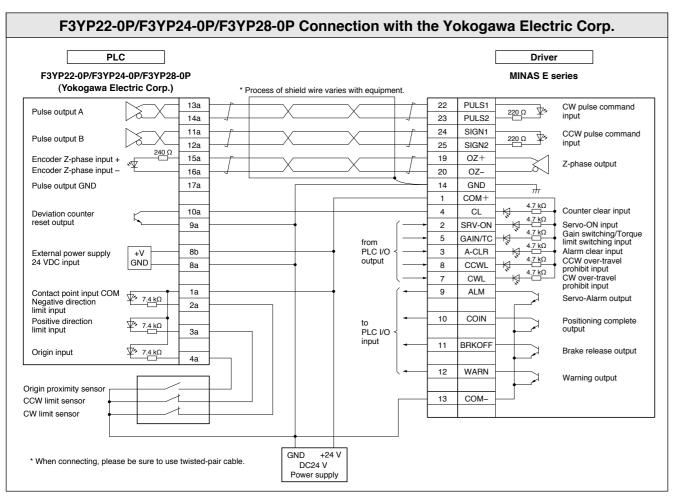
<sup>\* &</sup>quot;NC" is no connect.

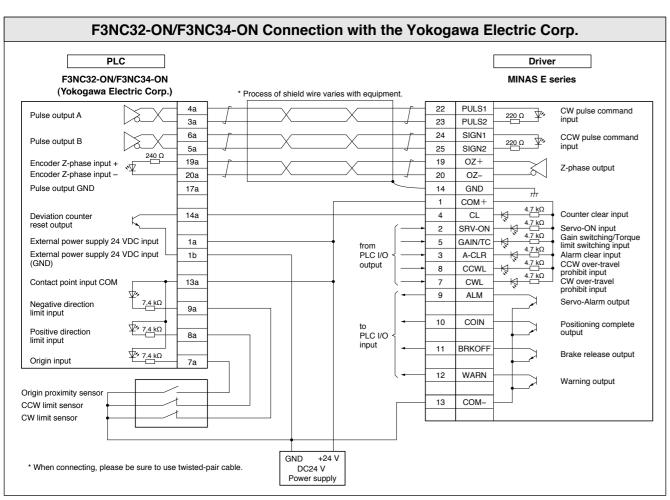


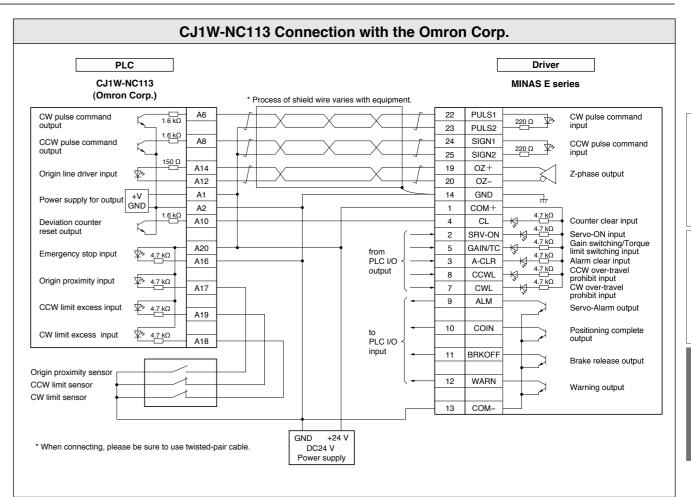


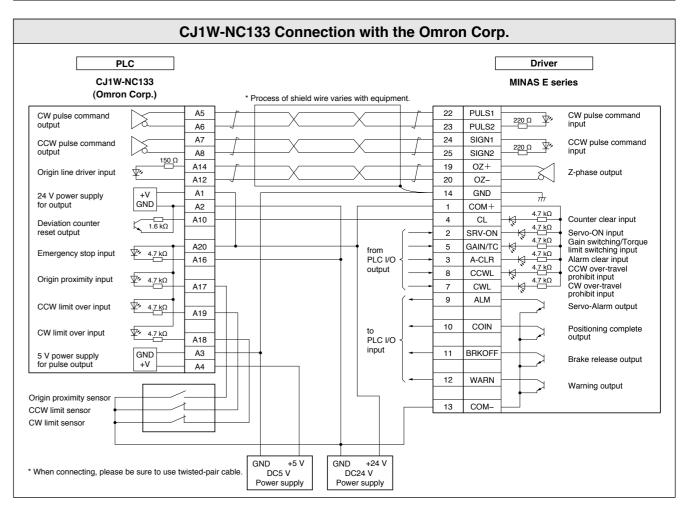




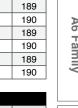








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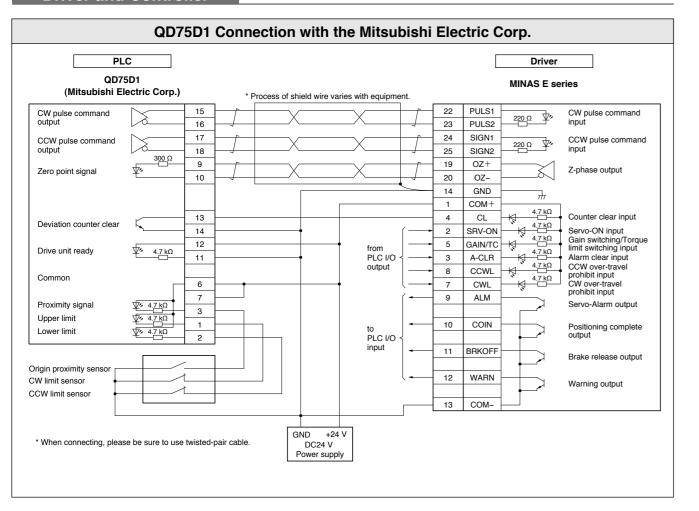
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MDMF152L1G6         MDMF 1.5 kW Absolute encoder         149           MDMF152L1G6M         MDMF 1.5 kW Absolute encoder         149           MDMF152L1G8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1G8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1BM         MDMF 1.5 kW Absolute encoder         149           MDMF152L1HS         MDMF 1.5 kW Absolute encoder         90           MDMF152L1HB         MDMF 1.5 kW Absolute encoder         90           MDMF202L1C5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91<			-
MDMF152L1G6M         MDMF 1.5 kW Absolute encoder         90           MDMF152L1G8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1G8M         MDMF 1.5 kW Absolute encoder         149           MDMF152L1H5         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6M         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         90           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91 <td></td> <td></td> <td>_</td>			_
MDMF152L1G8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H5         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6         MDMF 1.5 kW Absolute encoder         149           MDMF152L1H8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         91           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         149           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         91           MDMF102L1C5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91 </td <td></td> <td></td> <td></td>			
MDMF152L1G8M         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6M         MDMF 1.5 kW Absolute encoder         149           MDMF152L1H8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         91           MDMF202L1C5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1B6         MDMF 2.0 kW Absolute encoder         9			
MDMF152L1H5         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H6         MDMF 1.5 kW Absolute encoder         149           MDMF152L1H7         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         149           MDMF202L1C5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1B8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91 <td>MDMF152L1G8</td> <td>MDMF 1.5 kW Absolute encoder</td> <td>90</td>	MDMF152L1G8	MDMF 1.5 kW Absolute encoder	90
MDMF152L1H6         MDMF 1.5 kW Absolute encoder         149           MDMF152L1H6M         MDMF 1.5 kW Absolute encoder         149           MDMF152L1H7         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         149           MDMF202L1C5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91 <td>MDMF152L1G8M</td> <td>MDMF 1.5 kW Absolute encoder</td> <td>149</td>	MDMF152L1G8M	MDMF 1.5 kW Absolute encoder	149
MDMF152L1H6M         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H7         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         149           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1DB         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1B8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91<			
MDMF152L1H7         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         149           MDMF202L1C5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         150           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91			
MDMF152L1H8         MDMF 1.5 kW Absolute encoder         90           MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         149           MDMF202L1C5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91<			-
MDMF152L1H8M         MDMF 1.5 kW Absolute encoder         91           MDMF202L1C5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1B8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91			
MDMF202L1C5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91 <td></td> <td></td> <td></td>			
MDMF202L1C6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1B8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         91 <td></td> <td></td> <td></td>			
MDMF202L1C7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         150           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91	MDMF202L1C6	MDMF 2.0 kW Absolute encoder	91
MDMF202L1C8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         150           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91	MDMF202L1C6M	MDMF 2.0 kW Absolute encoder	150
MDMF202L1C8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91			-
MDMF202L1D5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1G5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         92           MDMF302L1C6         MDMF 3.0 kW Absolute encoder         92 <td></td> <td></td> <td>_</td>			_
MDMF202L1D6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         150           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G5         MDMF 2.0 kW Absolute encoder         150           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         92           MDMF302L1C5         MDMF 3.0 kW Absolute encoder         92			_
MDMF202L1D6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1G5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1G7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8M         MDMF 2.0 kW Absolute encoder         92           MDMF302L1C5         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C6M         MDMF 3.0 kW Absolute encoder         9			
MDMF202L1D8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1D8M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1G5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1G7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         150           MDMF202L1H7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         92           MDMF302L1C5         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C6         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C6         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C8         MDMF 3.0 kW Absolute encoder         92 </td <td></td> <td></td> <td></td>			
MDMF202L1D8M         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1G7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1H5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1H7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8M         MDMF 2.0 kW Absolute encoder         92           MDMF302L1C5         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C6         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C6M         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C8M         MDMF 3.0 kW Absolute encoder         92           MDMF302L1D8         MDMF 3.0 kW Absolute encoder	MDMF202L1D7	MDMF 2.0 kW Absolute encoder	91
MDMF202L1G5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1G7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1H5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1H7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8M         MDMF 2.0 kW Absolute encoder         92           MDMF302L1C5         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C6         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C6M         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C8M         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C8M         MDMF 3.0 kW Absolute encoder         92           MDMF302L1D6         MDMF 3.0 kW Absolute encoder	MDMF202L1D8	MDMF 2.0 kW Absolute encoder	91
MDMF202L1G6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1G7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1G8M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1H5         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H6M         MDMF 2.0 kW Absolute encoder         150           MDMF202L1H7         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8         MDMF 2.0 kW Absolute encoder         91           MDMF202L1H8M         MDMF 2.0 kW Absolute encoder         150           MDMF302L1C5         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C6         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C6M         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C7         MDMF 3.0 kW Absolute encoder         92           MDMF302L1C8M         MDMF 3.0 kW Absolute encoder         92           MDMF302L1D6         MDMF 3.0 kW Absolute encoder         92           MDMF302L1D6         MDMF 3.0 kW Absolute encoder			150
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MQMF012L1C4M		0 V Absolute encoder	133
MQMF012L1D1		0 V Absolute encoder	68
MQMF012L1D2		0 V Absolute encoder	68
MQMF012L1D2M		0 V Absolute encoder	133
MQMF012L1D3		0 V Absolute encoder	68
MQMF012L1D4		0 V Absolute encoder	68
MQMF012L1D4M	MQMF 100 W 20	0 V Absolute encoder	133
MQMF012L1S1	MQMF 100 W 20	0 V Absolute encoder	68
MQMF012L1S2	MQMF 100 W 20	0 V Absolute encoder	68
MQMF012L1S2M	MQMF 100 W 20	0 V Absolute encoder	133
MQMF012L1T1	MQMF 100 W 20	0 V Absolute encoder	68
MQMF012L1T2	MQMF 100 W 20	0 V Absolute encoder	68
MQMF012L1T2M		0 V Absolute encoder	133
MQMF012L1U1	MQMF 100 W 20	0 V Absolute encoder	68
MQMF012L1U2		0 V Absolute encoder	68
MQMF012L1U2M		0 V Absolute encoder	133
MQMF012L1U3		0 V Absolute encoder	68
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MQMF012L1V1		0 V Absolute encoder	68
MQMF012L1V2		0 V Absolute encoder	68
MQMF012L1V2M		0 V Absolute encoder	133
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MQMF021L1A1 MQMF021L1A2 MQMF021L1B1 MQMF021L1B2 MQMF021L1C1	MQMF 200 W 100 MQMF 200 W 100		_

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MQMF022L1C3	MQMF 200 W 200 V Absolute encoder	70
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MQMF042L1C3         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1C4         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1C4M         MQMF 400 W 200 V Absolute encoder         135           MQMF042L1D1         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1D2         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1D3         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1D4         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1D4         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1D4         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1D4         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1D4         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1S2         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1S2         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1T1         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1T2         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1U1         MQMF 400 W 200 V Absolute encoder         72           MQMF042L1U2         MQMF 400 W 200 V Absolute encoder         72 <t< td=""><td>MQMF042L1C2</td><td>MQMF 400 W 200 V Absolute encoder</td><td>72</td></t<>	MQMF042L1C2	MQMF 400 W 200 V Absolute encoder	72
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	[Distributors]			http://www.lunabearings.com	
	<u> </u>			ot No.74, Shree Ganesh Complex,	.01.0500.001000
	Vashi Electricals Pvt. Ltd.		Behind Gupta Compound, Dapole Road,		+91-2522-661600
	[Distributors]	Maharashtra	Mankol Bhiwan	i Naka, di - 421305, Maharashtra, India	+91-2522-661620
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