Panasonic

No. SR-DSV12498

SPECIFICATIONS

M/S

MODEL AC Servo Motor. MINAS A6 Series
MDMF (23bit,Absolute)

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Received by

Date:

Industrial Device Solution Business Unit, Industrial Device Business Division
Industrial Solutions Company, Panasonic Corporation

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If you have any questions, please contact the seller (Sales office or Distributor) of the product.

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Motor
DEC. 27. 2019
Panasonic Corporation

REVISIONS

No SR-DSV12498

Date	Page	Sym.	REVISION	Signed
2019.7.9			NEWLY ISSUED	S.OMURA
2019.9.2	SR-DSV1249801-02		Correct an encoder connector specification.	S.OMURA
2019.12.2	PAGE 2		Correct Vibration resistance.	
	SR-DSV1249801-02		Add Precaution for use of O-ring to Connector specification.	R.YANO

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1. Scope

This specification relates to the servo motor of an AC servo system manufactured and delivered by Industrial Device Solution Business Unit, Industrial Device Business Division, Industrial Solutions Company, Panasonic Corporation.
This product is intended for industrial equipment. It cannot be used for any other Purposes (e.g. for household).

2. Applicable models, Specifications, Outside drawings.

Applicable model	Specification	Outside drawings
MDMF104L1□△M	SR-DSV12498 7-2	SR-DSV1249801
MDMF154L1□△M	7-3	↑
MDMF204L1□△M	7-4	↑
MDMF304L1□△M	7-5	↑
MDMF404L1□△M	7-6	SR-DSV1249802
MDMF504L1□△M	7-7	↑

*□ shows motor structure

		Shaft	
		Straight	With key
Motor brake	Without	C	G
	With	D	H

*△ shows motor structure

Oil Seal	Exist	9
	Exist(with protection lip)	A

3. Serial numbers (Production numbers)

The serial number of a motor nameplate means as follows:

Ex.: SER No. 19 12 0001
Christian year Production month Serial number

4. Performance and Environmental condition

Performance	(1) Insulation resistance	Motor unit : 20 MΩ or more when cool by DC500 V megger. (Between motor frame and motor lead wire)
	(2) Dielectric strength	Motor unit : To withstand AC1800 V for 1 minute. (Between motor frame and motor lead wire) Brake unit : To withstand AC1000 V for 1 minute. (Between motor frame and brake lead wire)
	(3) Allowable maximum rotating speed	120 % continuous of maximum speed. (100 % of utility speed)
	(4) Vibration resistance *3	Motor unit : 49 m/s^2 or less X,Y,Z directions But when the motor doesn't operate, 24.5 m/s^2 or less. (At center of frame, 20～3000 Hz, with not more than 1.5 mm amplitude) Encoder connector unit and Motor connector unit : Acc. EN60068-2-6 98 m/s^2 X, Y, Z directions (At mounting position, with the connectors mated) Frequency : 50~ 2000 Hz Frequency change speed : 1 Octave/min Test duration : 10 cycles each X, Y, Z directions
	(5) Impact resistance	98 m/s^2 in X,Y,Z directions ; 3 times each (Flange mounting position)
	(6) Dust-proof & Drip-proof *1	Equivalent of IP67 (In combination with designated connector. However, except for cable connection part of connectors, servo driver side of cables and output shaft through section)
Environmental condition	(7) Heat resistance *2	Allowable ambient temperature (Except for motor temperature rise) Operating 0 °C～+40 °C Storing: -20 °C～+65 °C (The maximum storing temperature:80 °C, accumulation 72 hours, normal humidity)
	(8) Humidity resistance *2	Operating and storing 20～85 %RH (Not to condensation)
	(9) Altitude	1000 m or less above sea level

*1 IP67 is one of the designations that mean classification of degrees of protection defined IEC60529 standard.
It means that the test has been performed to check and the motor passed the test as a result.
It does not guarantee to maintain the IP grade in the actual use.

*2 Condensation is likely to occur if the temperature decreases.

*3 After mounting the device, ensure that the vibration resistance performance of the motor and connector meets the defined requirements.

5. Assembling precision

(1) In accordance with the outline drawings.
- The axial runout is measured in the lateral direction of the shaft.
- The flange surface squareness and spigot eccentricity are measured in the vertical direction of the shaft.

(2) End play (axial play) : 0.3 mm or less. (Reference value)

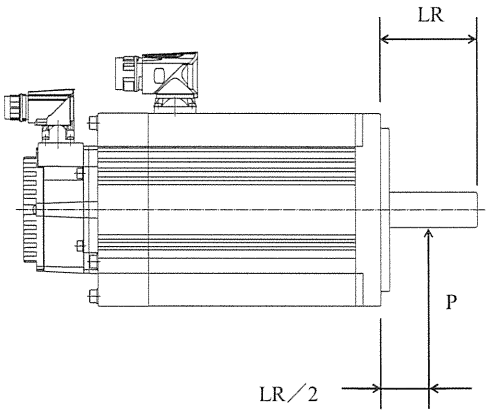
6. Shaft allowable load

Unit : [N]

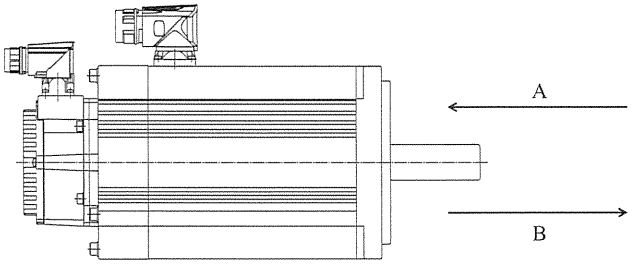
Motor	When assembling			When operating	
	Radial load	Thrust load		Radial load	Thrust load
		Direction A	Direction B		
MDMF104, MDMF154 MDMF204	980	588	686	490	196
MDMF304	↑	↑	↑	784	343
MDMF404, MDMF504	1666	784	980	↑	↑

Please refer to the outline drawings for dimensions LR.

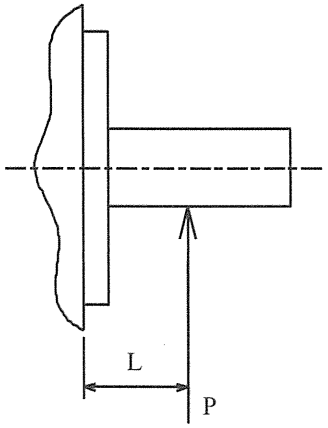
Radial load (P) position



Thrust load direction



When a load position is changed, calculate allowable radial load P by the following relational expression, using load position's distance L from the mounting flange surface , and set the load below a value resulting from such calculation.



Unit : P [N], L [mm]

Applicable models	Relational expression of load and load position
MDMF104, MDMF154 MDMF204	$P=\frac{19110}{L+11.5}$
MDMF304	$P=\frac{34496}{L+11.5}$
MDMF404, MDMF504	$P=\frac{42336}{L+19}$

7. Rotary encoder specification

· Absolute encoder 23bit

· In accordance with the specification No.SX-DSV02998

· Precautions for battery exchange in the case of absolute encoder

When you exchange the battery, please hold the main power of encoder in the ON position (as supplying the encoder with 5 V) and exchange the battery.

Please notice that all data in the encoder would be disappeared if you exchange the battery with the main power of encoder being OFF.

8. Motor brake specification

Items	Units	Applicable motor			
		MDMF104 MDMF154 MDMF204	MDMF304	MDMF404	MDMF504
Static friction torque *1	N·m	13.7 or more	22.0 or more	25.0 or more	44.1 or more
Rotary part inertia *2	10^{-4} kg·m^2	1.12	1.12	4.7	4.1
Armature pull in time *2	ms	100 or less	110 or less	80 or less	150 or less
Armature release time *2	ms	50 or less ※4	←	25 or less ※3	30 or less ※5
Release voltage *1	DC,V	2 or more	←	←	←
Suction voltage *1	DC,V	24±2.4	←	←	←
Rated current (at DC24 V) *2	DC,A	0.79±10 %	0.90±10 %	1.29±10 %	←
Allowable braking energy ; 1 time each *2	J	1470	1545	1800	←
All allowable braking Energy *2	J	2.16×10^6	2.0×10^6	3.0×10^6	3.1×10^6
Allowable angular acceleration *2	rad/s^2	10000	←	5440	5108

*1 Value of our delivery inspection.

*2 Representative value at 20 °C.

*3 By varistor (Z15D151 made by SEMITEC Corporation.)

*4 By varistor (TNR9G820K made by Nippon Chemi-con Corporation.)

*5 By varistor (NVD07SCD082 made by KOA Corporation.)

(1) This brake is non-excited operation type brake.

(2) Armature pull in time and Armature release time are delay time of brake operation. Please confirm these by actual machine when motor is used.

(3) When the motor was forwarded, the brake's backlash is 2 ° or less.

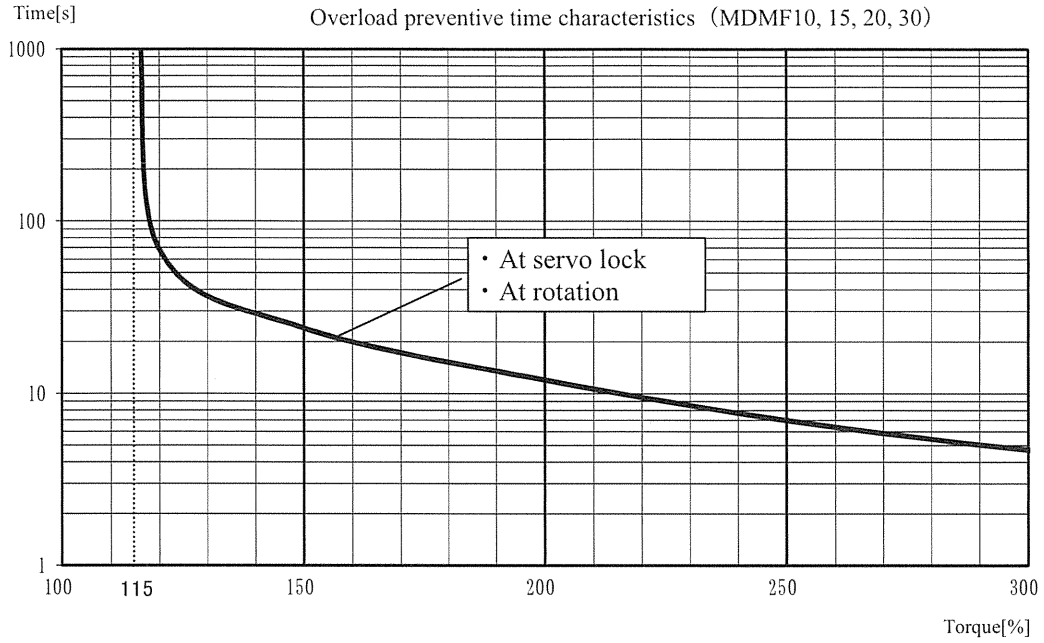
(4) Power supply for motor brake must be prepared by user side. (Either way of connection for polarity would be acceptable)

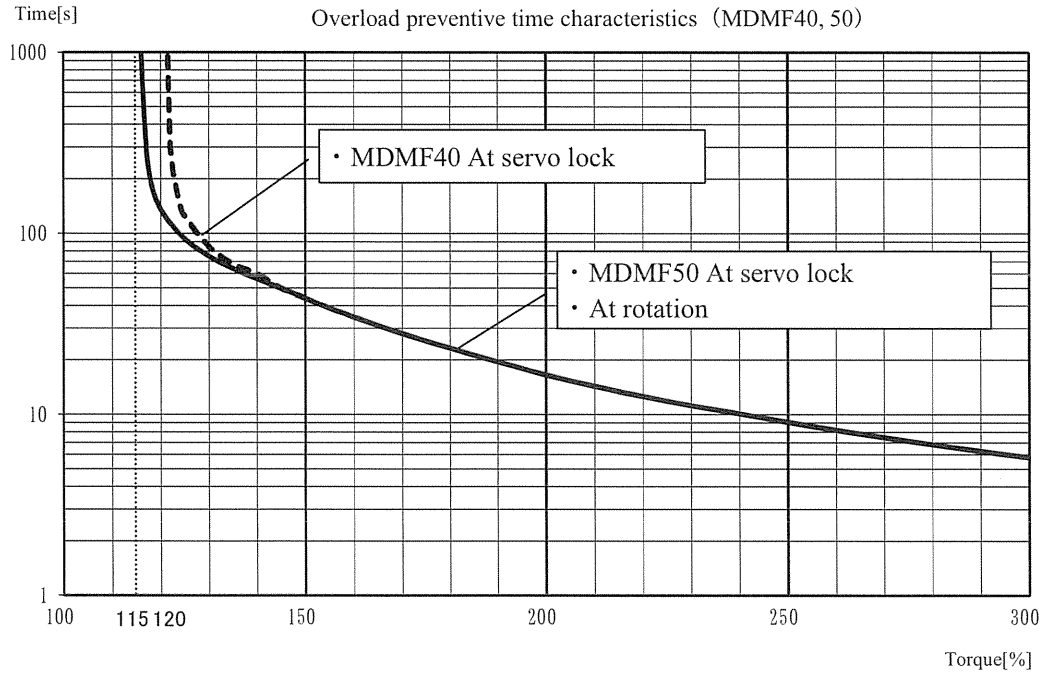
(5) The above-mentioned all allowable braking energy shall be braking energy complying with the brake specification (Braking energy capable of performing a suction motion in consideration of brake temperature increases).

(6) The motor life with the repetitions of acceleration and deceleration at the above allowable angular acceleration : 10 million times. (The number of acceleration-deceleration cycles until brake's backlash changes rapidly)

(7) The series connection of the protection parts such as fuses is recommended in the case of the use with varistor.

9. Time characteristics (our standard servo driver)





Please use the motor under conditions limiting effective torque within continuous duty zone of Speed – Torque characteristic.

About the Speed – Torque characteristic, please confirm each motor specification.

When anything other than our standard driver is used, be sure of setting its overload to the below time of the above.

As for the time characteristics of specific models, contact us to make an inquiry.

10. Compliance with the international standards

		Standards numbers
Compliance with CE	Applicable standards EN	EN 60034－1：2010 EN 60034－5：2001+A1:2007
Applicable standards UL		UL 1004-1, UL 1004-6（ File No. E327868）
Applicable standards CSA		CSA C22.2, No. 100

Safety precautions

11. Safety Precautions

■The degree of the injury or damage caused when using the product improperly is categorized and an explanation is provided.

⚠ Danger	Indicates "actions carrying a significant risk of death or serious injury."
⚠ Caution	Indicates "actions carrying the risk of the occurrence of minor injury or property damage."

■The actions to be observed are explained with the following symbols.

⊘	Indicates actions that must not be performed.
❗	Indicates actions that must be performed without fail.

⚠ Danger

⊘

(1) Use the product in an environment of pollution degree 2 or 1 (a place where the product will not come in contact with foreign matter such as dust, metal particles and oil mist, or liquids such as water, oil and polishing liquid). Avoid using the product near flammable objects, in an atmosphere of corrosive gas (such as H_2S, SO_2, NO_2, Cl_2) or storing or using the product in an atmosphere of flammable gas.

(2) Do not place inflammable material near a motor, a servo driver, or a regenerative resistance.

(3) Do not drive the motor with external torque. Motor generates electricity by external torque. Dynamic brake circuit will be damaged and it is possible that short-circuit current cause smoke or combustion.

(4) Do not damage the cable nor place too much stress or heavy object on the cable. Do not pinch the cable.

(5) Do not operate the product while the cable is dipped in oil or water.

(6) Do not install the equipment near a heating object such as a heater or a large wire-wound resistor. (Install a thermal shield, etc. to avoid the influences of heating object.)

(7) Do not connect the motor to the commercial power source directly.

(8) Do not use the equipment under conditions subject to strong vibrations or an impact shock. Please attach the anti-vibration equipment to servo driver mounting surface if you install the servo driver in the vicinity of the vibration source.

(9) Be sure not to touch the rotating part of the motor during operation.

(10) Do not touch the key way of the output shaft of the motor with bare hands.

(11) Be sure not to insert your hand into the servo driver.

(12) Do not touch the motor, the heat sink of the driver nor the surrounding equipment since they will be hot.

(13) Do not perform wiring nor operate the product with wet hand.

(14) Be sure that the wiring task is performed by electrical engineer.

(15) There is no protective device attached to the motor other than the specified ones. Please protect them with an overcurrent protective device, a ground-fault circuit interrupter, an over temperature preventing device, an emergency stop device, and the like.

Safety precautions

Danger

(16) When starting operation of the servo driver after an earthquake, please make sure that there is no abnormality as to the installation condition of the servo driver and the motor and the safety of the machine before starting operation.

(17) After turning off the power, the inside circuit remains charged at a high voltage for a while. When moving, wiring or inspection the equipment, completely shut off the power supply input outside the servo driver and leave for 15 minutes or longer before working.

(18) To prevent causing fire or accident resulting in injury or death due to improper installation or mounting at the occurrence of earthquake, please install or mount the device securely.

(19) Install an external emergency shutoff circuit to stop operation and interrupt power immediately upon emergency. Emission of smoke or dust may occur due to a fault of a motor or a servo driver used in combination. For example, if the system is energized with the regenerative control power transistor shorted by failure, overheating of a regenerative resistor installed outside the servo driver may occur and it may emit smoke and dust. If a regenerative resistor is connected outside a servo driver, provide a means of detecting overheating such as a thermal protector to shut off power upon detecting abnormal heating.

(20) Install the motor, the servo driver, and the surrounding devices on nonflammables such as metal.

(21) Perform wiring correctly and securely. Insecure and incorrect wiring may be the cause of abnormal motor operation and its damage by fire.
Also, please make sure that no electrical conducting material such as a scrap of electric wire get inside the servo driver at the time of performing installation and wiring task.

(22) Connect the cables securely, and firmly insulate the current-carrying part with insulating material.

(23) When using a bundling wire is inserted into the metal ducts, because burning for wire allowable current is decreased by the temperature rise.

(24) Be sure to install a fuseless breaker in a power supply. Be sure to connect grounding terminals and grounding wires. To prevent an electric shock and malfunction, grounding resistance at 100 Ω or lower is recommended.

(25) Tighten terminal for power supply lines, grounding screw, terminal box plate mounting bolt for connection securely at appropriate torque shown in the specifications. Please confirm that there is no screw looseness.

(26) When building a system by using the safety feature, design it by fully understanding and being compliant with the related safety standards and items described in our operation manual or technical reference.

Caution

(27) When transferring the product, do not hold the cable or the shaft of the motor.

(28) Do not adjust or modify the gain of the servo driver extremely, nor let the operation or movement of the machine be unstable.

(29) After recovering from power failure, do not get close to the machine because there is a possibility that the machine restarts suddenly.
Setting must be made to the machine so that safety for the worker is ensured when the machine restarted suddenly.

(30) When the equipment is energized, keep away from the motor and mechanism driven by the motor in case of malfunction.

(31) Do not apply strong shock to the shaft of the motor.

(32) Be sure not to start or stop the motor with the electromagnetic contactor installed on the main power source side.

(33) Do not switch on or off the main power supply of the servo driver frequently.

(34) Since the brake built in the motor is used for maintenance, do not use it as a stopping device (braking) to ensure the safety of the machine.

(35) Be careful not to drop or to topple over the product when transferring or performing installation task.

(36) Do not clime on the motor or place heavy object on the motor.

(37) Do not cover the louver on the servo driver nor insert foreign matter.

(38) Do not use the product in an area exposed to direct sunlight. And when storing the product, avoid direct sunlight and keep the temperature and the humidity within the range specified for when the product is in use.

Safety precautions

Caution

(39) Never overhaul or modify the motor.
Overhauling will be performed at our company or at the retailers approved by customer.

(40) Do not start/stop the product by the turning on/off the servo ON command (SRV-ON).
Otherwise the dynamic brake circuit built in the servo driver may get dameged.

(41) Use the motor and the servo driver in the combination specified by customer. Please confirm the performance and the safety at customer when the motor is used in combination with another servo driver.

(42) Due to the trouble with the motor or the servo driver combined, the motor may be damaged by fire, or smoking or dusting might occur. Please consider these possibilities when they are to be used in a clean room or the like.

(43) Perform proper installation which is in proportion to the output and the weight of the main body.

(44) Keep the ambient temperature and humidity of the installed motor within the range of allowable temperature and humidity.

(45) Observe the specified installation method and the orientation of the product.

(46) Keep a space as specified between the servo driver and the inner surface of the control panel, or between the servo driver and the other devices when installing the product.

(47) Use eye bolts attached to motor only for lifting the motor, but not for lifting the equipment.
And do not use them with the speed reducer or heat sink attached to the motor.

(48) Eye bolts are not completely tightened. Before lifting the motor, confirm the screwing state of eye bolts and the lifting direction of eye bolts. Also, do not tighten eye bolts tightly using tools.

(49) Install a relay used to break the circuit at the time of emergency stop in series with the relay used to control the brake.

(50) Fix the motor at the time of test run, and confirm its movement after isolating it from the mechanical system, and then mount it on the machine.

(51) Verify that an input power supply voltage satisfies the servo driver specifications before turning on the power and start operation.
An input voltage higher than rated may cause ignition and smoking in the servo driver, which may cause malfunction or burning of a motor in some cases.

(52) When an alarm status occurs, remove a cause of the problem before restarting.
Careless restarting without removing a cause of problem may cause malfunction or burning of a motor.

(53) The brake built in the motor may not be maintained due to its life span, the mechanical structure, and so on. Please install a stopping device to ensure the safety on the machine side.

(54) The servo driver generates heat by operating a motor. A servo driver used in a sealed box may cause an extreme rise of temperature. Consider cooling so that an ambient temperature around the servo driver satisfies an operating range.

(55) Maintenance should be performed by the specialist.

(56) If the product is not to be used for a long period of time, be sure to turn off the power.

(57) Allow approx. 10 minutes pause when the dynamic brake is activated during high-speed running.
Resistor is damaged and the dynamic brake might not work when using it under more critical operating condition.

(58) Fix the cable so that stress is not applied to the connection parts such as the connector and terminal block.

Please be sure to read the instruction manual (the safety section) before use

Since the possibility of the occurrence of the product's abnormal behavior not in accordance with the setting still exists due to the unexpectedly strong exogenous noise (including radiation and the like), the application of static electricity, or the rare event such as abnormality in the input power source, the wiring, and the parts, we ask our customers to take measures against the occurrence of unexpected behavior to fully ensure the safety.

12. Life and standard time for replacement (This is not a guarantee.)

(1) Expected basic rating life of bearing (calculated value)
Fatigue life at reliability 90% under the allowable shaft load after statistically correcting variance: 20,000 hours or more at continuous rated load.
Avoid oscillating and repeated sliding movement with the motor shaft at a rotational angle 45 degree or lower, which may cause a fretting phenomenon.

(2) Expected life of rotary encoder
Life satisfying the specification of the rotary encoder (until a half-life period of light intensity): 30,000 hours or more at continuous rated load

(3) Standard time for replacement of oil seals (only for models with oil seals)
5,000 hours at continuous rated load (variable depending on the environment and operation)

13. Warranty

(1) Warranty period
The manufacturer warrants the quality of its product for one year after purchasing by a customer or one and a half year after the month of production at our factory. However, in case of a motor with braking functions, our warranty period does not exceed the maximum time of acceleration and deceleration of the shaft. In addition, consumables (oil seals) are exempted (only for models with oil seal). The warranty, however, is not applicable to the following, even within the period of warranty:

(1) Failures due to wrong use, inappropriate repair or modifications.
(2) Failures due to falling after purchase and damages during transportation.
(3) Failures due to the use out of product specifications.
(4) Failures due to fire, earthquake, lightning strike, wind and flood damage, salt pollution, abnormal voltage, and other natural disasters and accidents.
(5) Failures due to penetration of water, oil, metal, or any other foreign materials.
(6) Failures of internal components, which exceeded their described standard life.

(2) Warranty scope
During the warranty period, we will only replace or repair the defective single product we delivered, if the failure is caused due to our fault. In the above, our responsibility is limited to the replacement or repair of the above single product we delivered. We are not liable for any damage to you or a third party, caused in association with the failure of the product we delivered. Further, we are not liable for any failure and damage to you or a third party, caused by the above (1) exemptions and any one of the following.

(1) Failures due to the mounting or use of our product against the instructions and warnings described in this specification.
(2) Failures due to the combination of our product and the equipment that mounted our product.
(3) Failures due to your negligence of our instructions described in this specification.
(4) Other equipment failures not attributable to our responsibility.

(3) Warranty service
Please contact your dealers when you need to apply for warranty, including investigation of failure cause and request for repair. If you return our product directly to Panasonic Motor, after obtaining an approval from your dealer, please obtain the application form for repair and investigation from your dealer, enter the necessary information on it, and attach it to our product. In principle, you need to pay the transportation cost.

14. Other cautions

(1) Precautions for export of this product and the equipment incorporating this product.
If the end user or end purpose of this product relates to military affairs, armament and so on, this product may be subject to the export regulations prescribed in "Foreign Exchange and Foreign Trade Control Law." To export this product, take thorough examination, and follow the required export procedure.

(2) This product was designed to be used with general industrial products or the like. It is not designed to be used with a device dealing with human life or as a device to be used in unusual circumstances such as nuclear power management, use with aerospace instruments, use in transportation, use with medical equipment, use with various types of safety devices, or use with a device for which high level of cleanliness is required.

(3) Please make the final decision at customer as to the specification of the completed product, compliance with laws and regulations, and its compatibility with the equipment and parts attached by customer in respects such as the structure, dimensions, service life, and characteristics.

(4) This complete equipment at customer's site may malfunction due to a failure of this product. Therefore, take precautions by providing fail-safe design at customer's site, and ensure safety within the operating range of the work place.

(5) Since excessive loading of the product may be the cause of load collapsing, follow the instructions indicated.

(6) In the case of a shaft with a key, it should be fixed not only with the key but also with a set of screws or the like, and a grease to prevent fretting should be applied to the joining section with the axis of the motor.

(7) When the motor is to be operated without electrically connecting the shaft of the motor to the ground, depending on the actual equipment and the installing environment, problems such as the bearing sound will be louder may occur due to the occurrence of electrical corrosion at the motor bearing. So please confirm and verify the matter at customer.

(8) Please confirm the strength of the shaft at customer.
(There should be no load heavier than the allowable weight on the shaft during operation.)

(9) 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.

(10) An amount of grease (Albania No. 2: produced by Showa Shell Sekiyu) is applied to the end of the shaft of this motor. Please consider its influence on materials such as plastic.

(11) If a seal is required when mounting a device of customer on the mounting surface of our motor, please address the matter at customer.

(12) When the specification of the device of customer is to be changed, please carefully consider the compatibility with our motor.

(13) When discarding the motor, dispose it as an industrial waste.

(14) When discarding the battery, isolate the battery with a tape or the like, and discard it according to the regulations of the local government.

(15) Some of the parts or the like may be modified to improve the performance, but the improvement will be implemented within the range of satisfying the items in this specification.

(16) The specification change of the motor shall be implemented with the specification delivered customer or a document specified by customer. And when the functions or characteristics are affected, the specification will be changed after being verified and confirmed with a prototype.

(17) When the specification is changed, the price may also be changed in some cases.

(18) If there is an item other than the items described in this specification and needs to be specified, please notify us beforehand.

(19) If malfunctioning has occurred, the matter shall be addressed by discussing the matter with both parties according to the items indicated in this specification.

(20) 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.

(21) Do not use benzene, thinner, alcohol, and acid or alkaline detergent, because they can discolor and damage the motor.

15. Other

For safety precautions and other cautions, we assume the use of our standard servo driver and motor in combination.
Please confirm the safety at customer when the motor is used in combination with customer servo driver.

16. Notice about China Rare earth magnet for this motor

This motor uses the Chinese rare earth magnet. The patent's licenser limits the magnet and it's motor's distributed region. In order to avoid the license infringement, please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

Reliability evaluation items

The contents of this evaluation only covers items used for the design verification of selective models at the initial development stage, and do not guarantee all items from regular production.

(Basic evaluation conditions)

Evaluation items	Evaluation conditions	Evaluation result
Vibration resistance / heat cycle test	20～3000 Hz 49 m/s^2, with not more than 1.5 mm amplitude 8 hours each for X, Y and Z directions –30/+80 °C 1 cycle	No abnormality in outside appearance, structure and functions
Resonant point vibration endurance test	49 m/s^2 each for X, Y and Z directions Number of cycles : 10 million cycles	No abnormality in outside appearance, structure and functions
High temperature & high humidity electric conduction test	60 °C 95 %RH 72-hour	No abnormality in outside appearance, structure and functions
Heat shock resistance test	-20/+80 °C 50 cycles	No abnormality in outside appearance, structure and functions
Impact resistance test	196 m/s^2 with L flange mounted 3 cycles each for X, Y and Z directions	No abnormality in outside appearance, structure and functions
Rotor's high-speed rotation test	After 50 cycles of –20/80 °C, rotate a motor for 10 seconds at the speed of 10000 r/min at 100 °C. (As for items with the rated rotating speed of 3000 r/min., use the speed of 12000 r/min.)	No abnormality in outside appearance, structure and functions
Burnout test	Apply the maximum current to let a motor burn out. (Situation where the overload is negated.)	No ignition Not more than specified amount of smoke

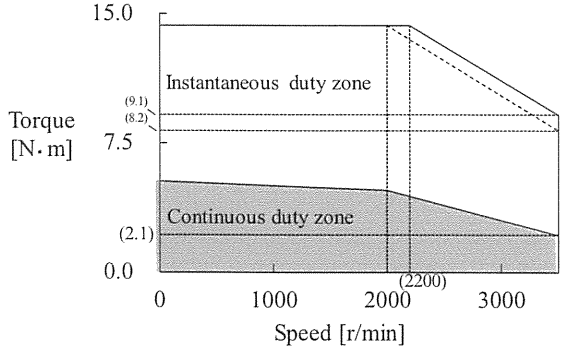
Delivery inspection items

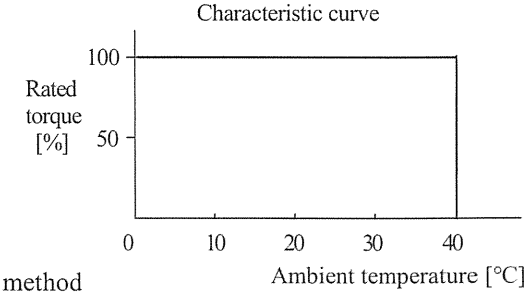
Inspection items	Inspection methods	Quantity
Outside appearance	Visual inspection	All
Dimensions	Slide gauge, Gauge	Sampling
Withstand voltage	Withstand voltage tester	All
Insulation resistance	Insulation resistance meter	All
Induced voltage constant	Automatic tester	All
Armature resistance	Ohm meter	All
Encoder test and driver combination test	Automatic tester	All
Brake static friction torque	Spring scale	All
Brake suction / release voltage	Voltmeter	All

AC Servo Motor Specification

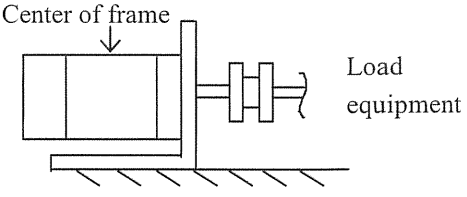
Items	Units	MDMF104L1□△M (Without brake)	MDMF104L1□△M (With brake)	Remarks
Rated output	kW	1.0	←	
Rating	%	100	←	
Number of poles	—	10	←	
Rated speed	r/min	2000	←	
Max. speed	r/min	3500	←	
Rated torque	N·m	4.77	←	
Continuous stall torque	N·m	5.25	←	
Max. torque	N·m	14.3	←	
Rated current	A(rms)	(2.7)	←	
Stall current	A(rms)	(3.0)	←	
Rotor inertia	$\times 10^{-4}$ kg·m^2	6.18	7.40	
Electrical time constant	ms	8.06	←	
Mechanical time constant	ms	1.53	1.83	
Power rate	kW/s	36.8	30.7	
Momentary max. current	A(0-p)	(11.4)	←	
Demagnetization current	A(0-p)	17.2	←	
Voltage constant per phase	$\times 10^{-3}$ V(rms)/min^{-1}	64.1±10 %	←	
Excitation voltage constant	$\times 10^{-3}$ V(0-p)/min^{-1}	136±10 %	←	
Torque constant	N·m/A(rms)	1.84±10 %	←	
	N·m/A(0-p)	1.30±10 %	←	
Phase resistance	Ω	2.78±8 %	←	
Phase inductance	mH	(22.4)	←	Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Black	←	
Mass	kg	4.6	6.1	
Structure	—	Totally-enclosed self-cooled type	←	With oil seal
Servo driver power supply voltage	V AC	400	←	

· This specification is guaranteed after combining and adjusting with the servo driver. (Representative value at 20 °C)
· Rated torque is the result that have been considered dispersions of motor specification under our measurement method.
· Set the temperature of center of frame to 75 °C or less. (When ambient temperature is 40 °C)
· Speed - Torque characteristic (Representative value)
Servo driver power supply voltage: at AC 400 V
Dotted line indicates fall of servo driver power supply voltage by 10 %





Test method

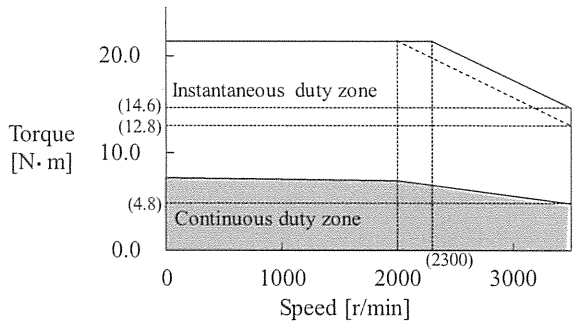


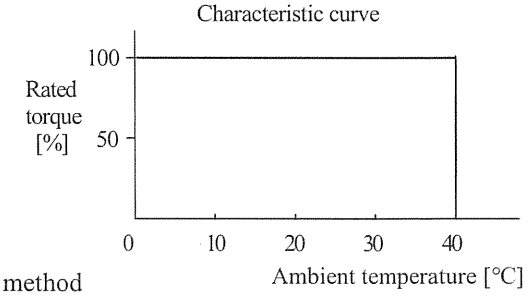
·Flange size 275×260×t15 (Aluminum)

AC Servo Motor Specification

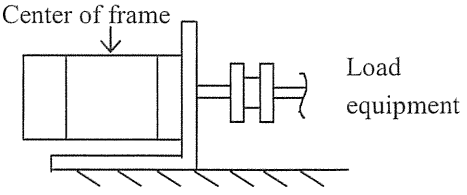
Items	Units	MDMF154L1□△M (Without brake)	MDMF154L1□△M (With brake)	Remarks
Rated output	kW	1.5	←	
Rating	%	100	←	
Number of poles	—	10	←	
Rated speed	r/min	2000	←	
Max. speed	r/min	3500	←	
Rated torque	N·m	7.16	←	
Continuous stall torque	N·m	7.52	←	
Max. torque	N·m	21.5	←	
Rated current	A(rms)	(4.0)	←	
Stall current	A(rms)	(4.2)	←	
Rotor inertia	$\times 10^{-4}$ kg·m^2	9.16	10.40	
Electrical time constant	ms	9.50	←	
Mechanical time constant	ms	1.27	1.44	
Power rate	kW/s	56.0	49.3	
Momentary max. current	A(0-p)	(17.0)	←	
Demagnetization current	A(0-p)	26.0	←	
Voltage constant per phase	$\times 10^{-3}$ V(rms)/min^{-1}	63.4±10 %	←	
Excitation voltage constant	$\times 10^{-3}$ V(0-p)/min^{-1}	135±10 %	←	
Torque constant	N·m/A(rms)	1.82±10 %	←	
	N·m/A(0-p)	1.28±10 %	←	
Phase resistance	Ω	1.52±8 %	←	
Phase inductance	mH	(14.4)	←	Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Black	←	
Mass	kg	5.7	7.2	
Structure	—	Totally-enclosed self-cooled type	←	With oil seal
Servo driver power supply voltage	V AC	400	←	

· This specification is guaranteed after combining and adjusting with the servo driver. (Representative value at 20 °C)
· Rated torque is the result that have been considered dispersions of motor specification under our measurement method.
· Set the temperature of center of frame to 85 °C or less. (When ambient temperature is 40 °C)
· Speed - Torque characteristic (Representative value)
Servo driver power supply voltage: at AC 400 V
Dotted line indicates fall of servo driver power supply voltage by 10 %





Test method

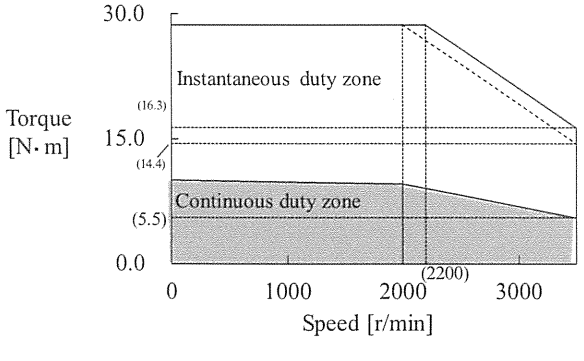


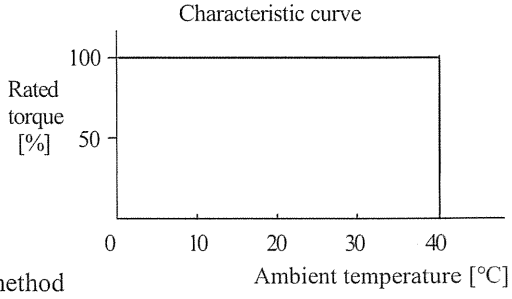
·Flange size 275×260×t15 (Aluminum)

AC Servo Motor Specification

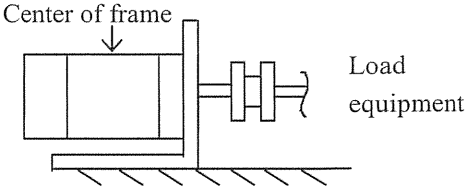
Items	Units	MDMF204L1□△M (Without brake)	MDMF204L1□△M (With brake)	Remarks
Rated output	kW	2.0	←	
Rating	%	100	←	
Number of poles	—	10	←	
Rated speed	r/min	2000	←	
Max. speed	r/min	3500	←	
Rated torque	N·m	9.55	←	
Continuous stall torque	N·m	10.0	←	
Max. torque	N·m	28.7	←	
Rated current	A(rms)	(5.1)	←	
Stall current	A(rms)	(5.4)	←	
Rotor inertia	$\times 10^{-4}$ kg·m^2	12.1	13.3	
Electrical time constant	ms	10.40	←	
Mechanical time constant	ms	1.04	1.15	
Power rate	kW/s	75.4	68.6	
Momentary max. current	A(0-p)	(21.6)	←	
Demagnetization current	A(0-p)	32.4	←	
Voltage constant per phase	$\times 10^{-3}$ V(rms)/min^{-1}	67.7±10 %	←	
Excitation voltage constant	$\times 10^{-3}$ V(0-p)/min^{-1}	144±10 %	←	
Torque constant	N·m/A(rms)	1.94±10 %	←	
	N·m/A(0-p)	1.37±10 %	←	
Phase resistance	Ω	1.08±8 %	←	
Phase inductance	mH	(11.2)	←	Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Black	←	
Mass	kg	6.9	8.4	
Structure	—	Totally-enclosed self-cooled type	←	With oil seal
Servo driver power supply voltage	V AC	400	←	

· This specification is guaranteed after combining and adjusting with the servo driver. (Representative value at 20 °C)
· Rated torque is the result that have been considered dispersions of motor specification under our measurement method.
· Set the temperature of center of frame to 90 °C or less. (When ambient temperature is 40 °C)
· Speed - Torque characteristic (Representative value)
Servo driver power supply voltage: at AC 400 V
Dotted line indicates fall of servo driver power supply voltage by 10 %





Test method



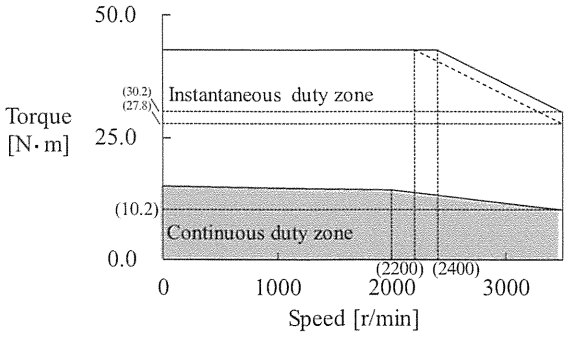
·Flange size 275×260×t15 (Aluminum)

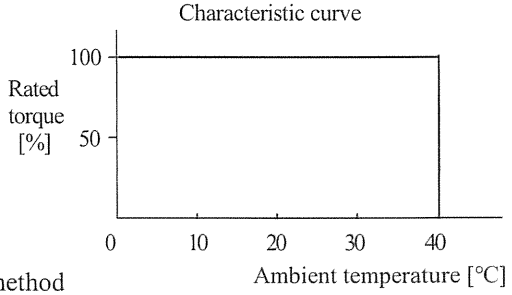
AC Servo Motor Specification

Items	Units	MDMF304L1□△M (Without brake)	MDMF304L1□△M (With brake)	Remarks
Rated output	kW	3.0	←	
Rating	%	100	←	
Number of poles	—	10	←	
Rated speed	r/min	2000	←	
Max. speed	r/min	3500	←	
Rated torque	N·m	14.3	←	
Continuous stall torque	N·m	15.0	←	
Max. torque	N·m	43.0	←	
Rated current	A(rms)	(8.6)	←	
Stall current	A(rms)	(9.0)	←	
Rotor inertia	$\times 10^{-4}$ kg·m^2	18.6	19.6	
Electrical time constant	ms	12.30	←	
Mechanical time constant	ms	0.95	1.00	
Power rate	kW/s	110.2	104.6	
Momentary max. current	A(0-p)	(36.4)	←	
Demagnetization current	A(0-p)	55.0	←	
Voltage constant per phase	$\times 10^{-3}$ V(rms)/min^{-1}	61.1±10 %	←	
Excitation voltage constant	$\times 10^{-3}$ V(0-p)/min^{-1}	130±10 %	←	
Torque constant	N·m/A(rms)	1.75±10 %	←	
	N·m/A(0-p)	1.24±10 %	←	
Phase resistance	Ω	0.520±8 %	←	
Phase inductance	mH	(6.4)	←	Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Black	←	
Mass	kg	9.3	10.9	
Structure	—	Totally-enclosed self-cooled type	←	With oil seal
Servo driver power supply voltage	V AC	400	←	

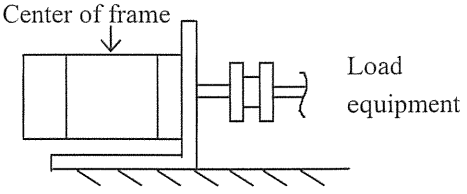
· This specification is guaranteed after combining and adjusting with the servo driver. (Representative value at 20 °C)
· Rated torque is the result that have been considered dispersions of motor specification under our measurement method.
· Set the temperature of center of frame to 95 °C or less. (When ambient temperature is 40 °C)
· Speed - Torque characteristic (Representative value)

Servo driver power supply voltage: at AC 400 V
Dotted line indicates fall of servo driver power supply voltage by 10 %





Test method

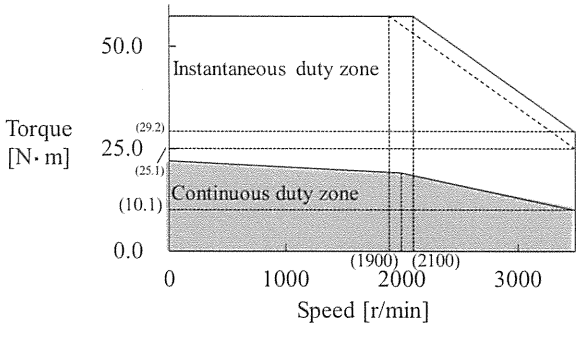


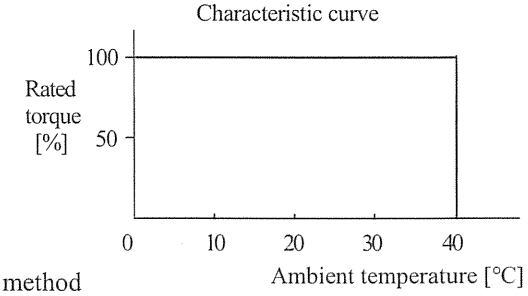
·Flange size 380×350×t30 (Aluminum)

AC Servo Motor Specification

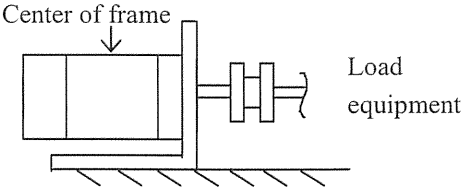
Items	Units	MDMF404L1□△M (Without brake)	MDMF404L1□△M (With brake)	Remarks
Rated output	kW	4.0	←	
Rating	%	100	←	
Number of poles	—	10	←	
Rated speed	r/min	2000	←	
Max. speed	r/min	3500	←	
Rated torque	N·m	19.10	←	
Continuous stall torque	N·m	22.0	←	
Max. torque	N·m	57.3	←	
Rated current	A(rms)	(10.0)	←	
Stall current	A(rms)	(11.5)	←	
Rotor inertia	$\times 10^{-4}$ kg·m^2	46.9	52.3	
Electrical time constant	ms	21.30	←	
Mechanical time constant	ms	1.22	1.36	
Power rate	kW/s	77.8	69.8	
Momentary max. current	A(0-p)	(42.5)	←	
Demagnetization current	A(0-p)	64.0	←	
Voltage constant per phase	$\times 10^{-3}$ V(rms)/min^{-1}	67.1±10 %	←	
Excitation voltage constant	$\times 10^{-3}$ V(0-p)/min^{-1}	142±10 %	←	
Torque constant	N·m/A(rms)	1.92±10 %	←	
	N·m/A(0-p)	1.36±10 %	←	
Phase resistance	Ω	0.320±8 %	←	
Phase inductance	mH	(6.8)	←	Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Black	←	
Mass	kg	13.4	16.8	
Structure	—	Totally-enclosed self-cooled type	←	With oil seal
Servo driver power supply voltage	V AC	400	←	

· This specification is guaranteed after combining and adjusting with the servo driver. (Representative value at 20 °C)
· Rated torque is the result that have been considered dispersions of motor specification under our measurement method.
· Set the temperature of center of frame to 85 °C or less. (When ambient temperature is 40 °C)
· Speed - Torque characteristic (Representative value)
Servo driver power supply voltage: at AC 400 V
Dotted line indicates fall of servo driver power supply voltage by 10 %





Test method

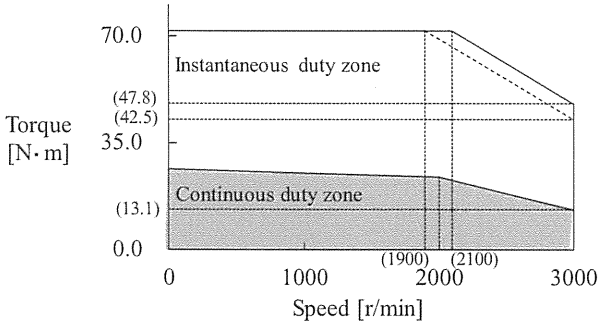


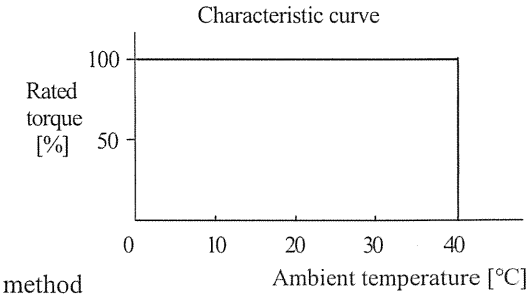
·Flange size 470×440×t30 (Aluminum)

AC Servo Motor Specification

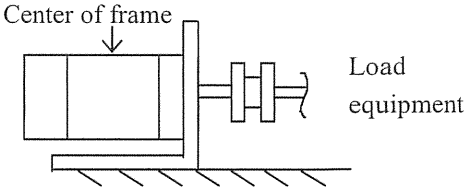
Items	Units	MDMF504L1□△M (Without brake)	MDMF504L1□△M (With brake)	Remarks
Rated output	kW	5.0	←	
Rating	%	100	←	
Number of poles	—	10	←	
Rated speed	r/min	2000	←	
Max. speed	r/min	3000	←	
Rated torque	N·m	23.87	←	
Continuous stall torque	N·m	26.3	←	
Max. torque	N·m	71.6	←	
Rated current	A(rms)	(12.0)	←	
Stall current	A(rms)	(13.2)	←	
Rotor inertia	$\times 10^{-4}$ kg·m^2	58.2	63.0	
Electrical time constant	ms	24.30	←	
Mechanical time constant	ms	1.13	1.23	
Power rate	kW/s	97.9	90.4	
Momentary max. current	A(0-p)	(51.0)	←	
Demagnetization current	A(0-p)	76.0	←	
Voltage constant per phase	$\times 10^{-3}$ V(rms)/min^{-1}	72.5±10 %	←	
Excitation voltage constant	$\times 10^{-3}$ V(0-p)/min^{-1}	154±10 %	←	
Torque constant	N·m/A(rms)	2.08±10 %	←	
	N·m/A(0-p)	1.47±10 %	←	
Phase resistance	Ω	0.280±8 %	←	
Phase inductance	mH	(6.8)	←	Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Black	←	
Mass	kg	15.6	19.0	
Structure	—	Totally-enclosed self-cooled type	←	With oil seal
Servo driver power supply voltage	V AC	400	←	

· This specification is guaranteed after combining and adjusting with the servo driver. (Representative value at 20 °C)
· Rated torque is the result that have been considered dispersions of motor specification under our measurement method.
· Set the temperature of center of frame to 90 °C or less. (When ambient temperature is 40 °C)
· Speed - Torque characteristic (Representative value)
Servo driver power supply voltage: at AC 400 V
Dotted line indicates fall of servo driver power supply voltage by 10 %





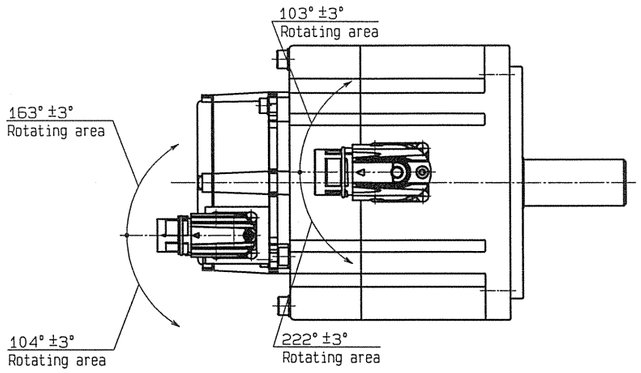
Test method

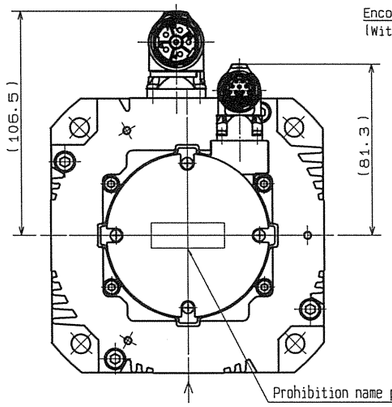


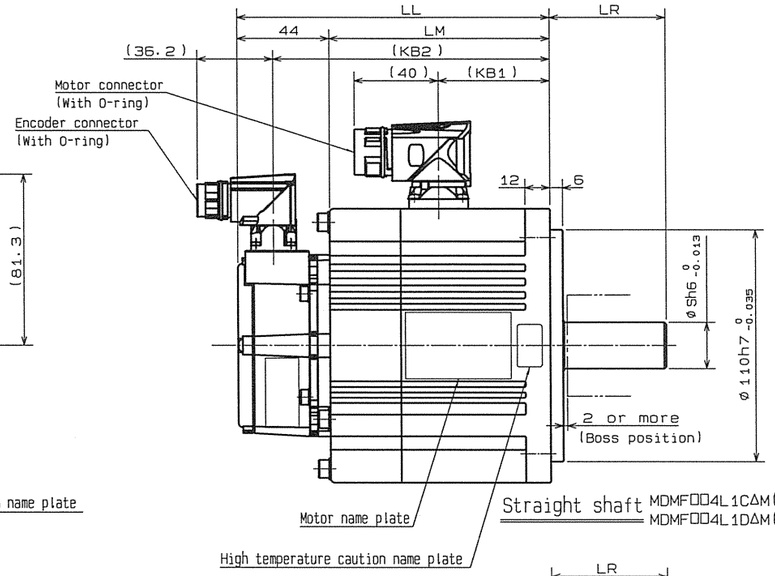
·Flange size 470×440×t30 (Aluminum)

SR-DSV1249801

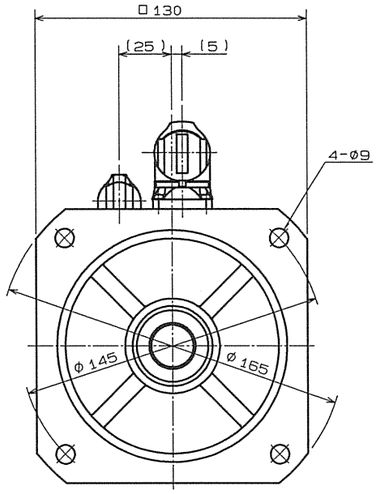
Do NOT scale the drawings.
Instead rely on the dimensions and their definitions.

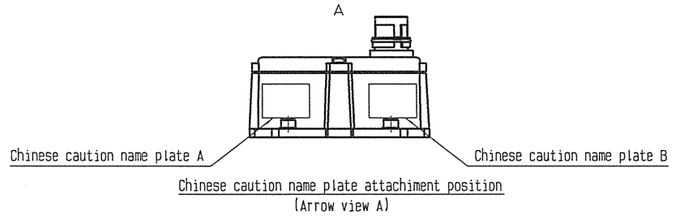


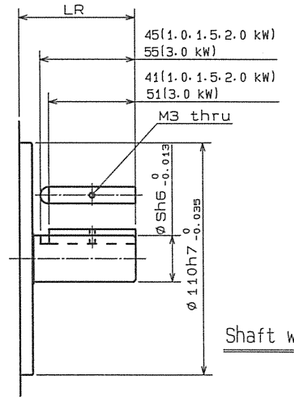


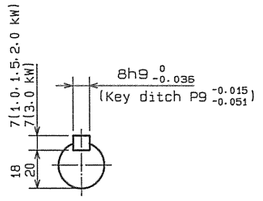


Straight shaft MDMF□□4L1C△M(Without brake)
MDMF□□4L1D△M(With brake)

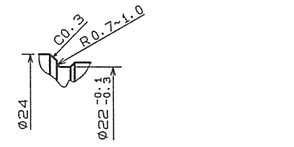




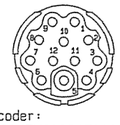




Shaft with key MDMF□□4L1G△M(without brake)
MDMF□□4L1H△M(with brake)

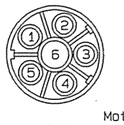


Detail of shaft step part(without 3.0kW)
(S=Free)



Encoder:
AGC047N0000150A000(TE)

Pin No.	Signal
1	E0 V
2	E5 V
3	PS(SD)
4	$\overline{PS(SD)}$
5	NC
6	NC
7	BAT -
8	BAT +
9	FG
10	NC
11	NC
12	NC



Motor:
BGC106N00001200000(TE)
(without brake)

Pin No.	Signal
1	NC
2	NC
3	E
4	U
5	V
6	W

Motor:
BGC106N00001200000(TE)
(with brake)

Pin No.	Signal
1	Brake
2	Brake
3	E
4	U
5	V
6	W

Connector specification

Precautions for use of O-ring:
The connector type on the cable determines whether an O-ring is required on the connector or must be removed.
For more details, please check with your connector manufacturer.

	Encoder specification	Model	Output (kW)	Dimension LL	LR	LM	S	KB1	KB2
Without brake	23bit absolute	MDMF104L1□△M	1.0	121	55	77	22	53	104
		MDMF154L1□△M	1.5	135	↑	91	↑	67	118
		MDMF204L1□△M	2.0	149	↑	105	↑	81	132
		MDMF304L1□△M	3.0	177	65	133	24	109	160
With brake	23bit absolute	MDMF104L1□△M	1.0	149	55	105	22	53	132
		MDMF154L1□△M	1.5	163	↑	119	↑	67	146
		MDMF204L1□△M	2.0	177	↑	133	↑	81	160
		MDMF304L1□△M	3.0	205	65	161	24	109	188

NOTES
1. The assembling precision conforms to the Japan Machine Tool Association Standard (MAS402-1981). (TIR value)
   ·Shaft end runout: 0.015 (shaft exit middle)
   ·Squareness of flange face to shaft: 0.04
   ·Eccentricity of flange fitting outside diameter to shaft: 0.03 (middle of spigot)
2. For flange mounting bolts, use hexagonal socket head bolts.

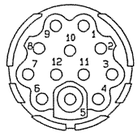
Scale	Panasonic Corporation			Agreement
	3rd Angle System Unit:mm			
Designed	Drawn	Checked	Checked	Checked
YANO	YANO	OKUNO		OGAWA
2019/12/02	2019/12/02	2019/12/02		2019/12/02

Model	MDMF Series □130
Name	OUTLINE DRAWING
No.	SR-DSV1249801

MERCHAND	SVM
CLASS	E
TRACE	

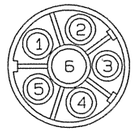
SR-DSV1249802

Do NOT scale the drawings.
instead rely on the dimensions and their definitions.



Encoder:
AGC047N0000150A000(TE)

Pin No.	Signal
1	E0 V
2	E5 V
3	PS(SD)
4	$\overline{PS(SD)}$
5	NC
6	NC
7	BAT -
8	BAT +
9	FG
10	NC
11	NC
12	NC

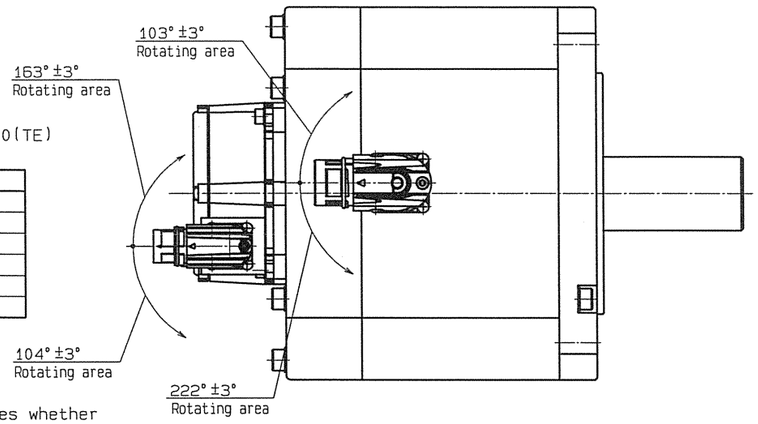


Motor:
BGC106N00001200000(TE)
(without brake)

Pin No.	Signal
1	NC
2	NC
3	E
4	U
5	V
6	W

Motor:
BGC106N00001200000(TE)
(with brake)

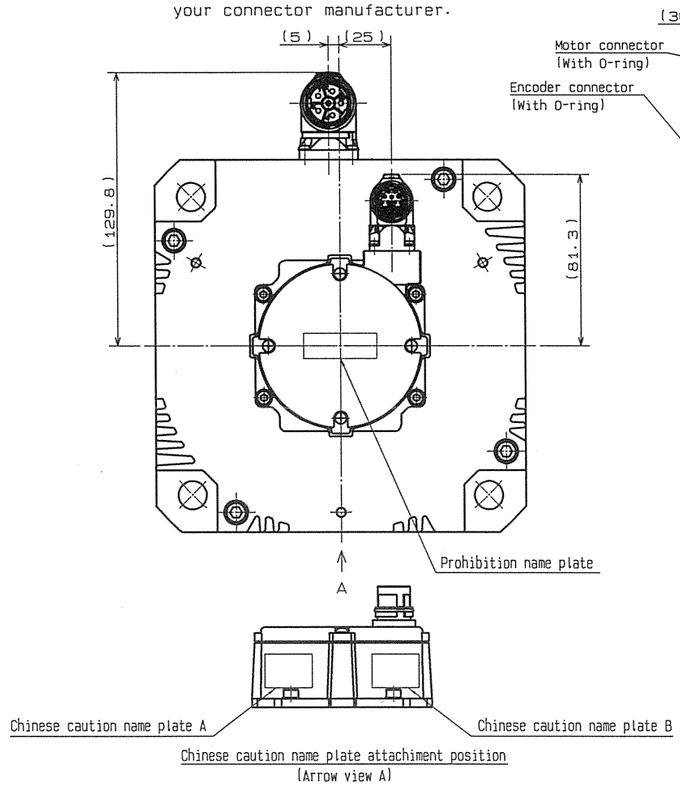
Pin No.	Signal
1	Brake
2	Brake
3	E
4	U
5	V
6	W

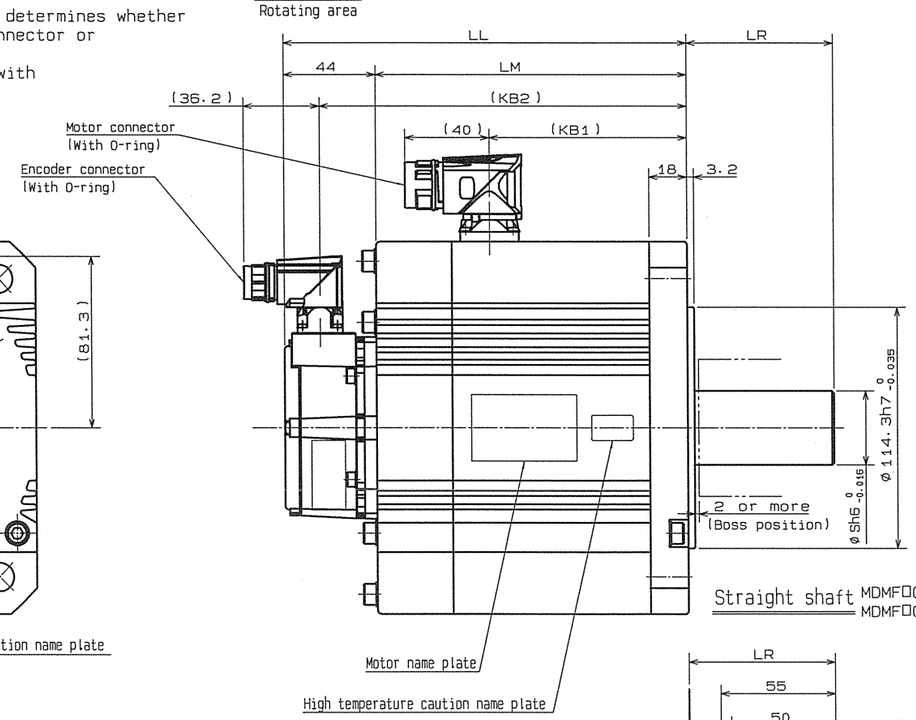


NOTES
1. The assembling precision conforms to the Japan Machine Tool Association Standard (MAS402-1981). (TIR value)
   ·Shaft end runout: 0.015 (shaft exit middle)
   ·Squareness of flange face to shaft: 0.04
   ·Eccentricity of flange fitting outside diameter to shaft: 0.03 (middle of spigot)
2. For flange mounting bolts, use hexagonal socket head bolts.

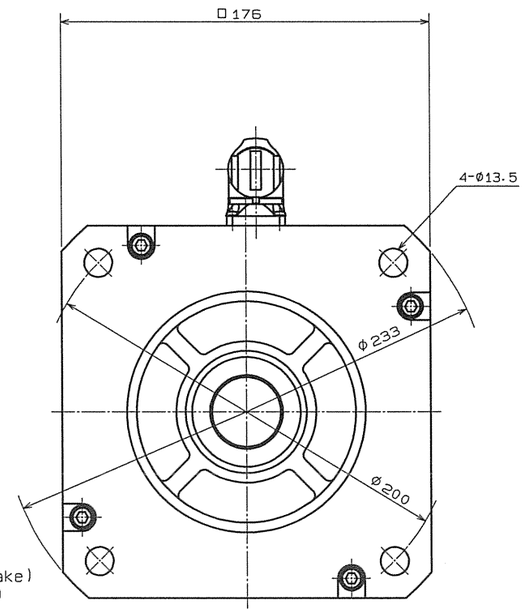
Connector specification

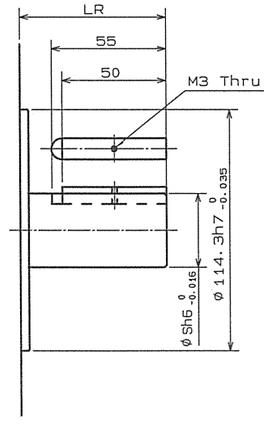
Precautions for use of O-ring:
The connector type on the cable determines whether an O-ring is required on the connector or must be removed.
For more details, please check with your connector manufacturer.

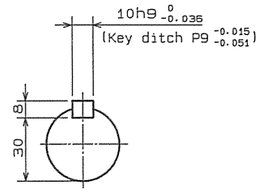




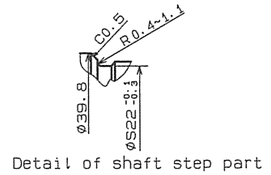
Straight shaft MDMF□04L1C△M(Without brake)
MDMF□04L1D△M(With brake)







Shaft with key MDMF□04L1G△M(without brake)
MDMF□04L1H△M(with brake)



Detail of shaft step part
(S=Free)

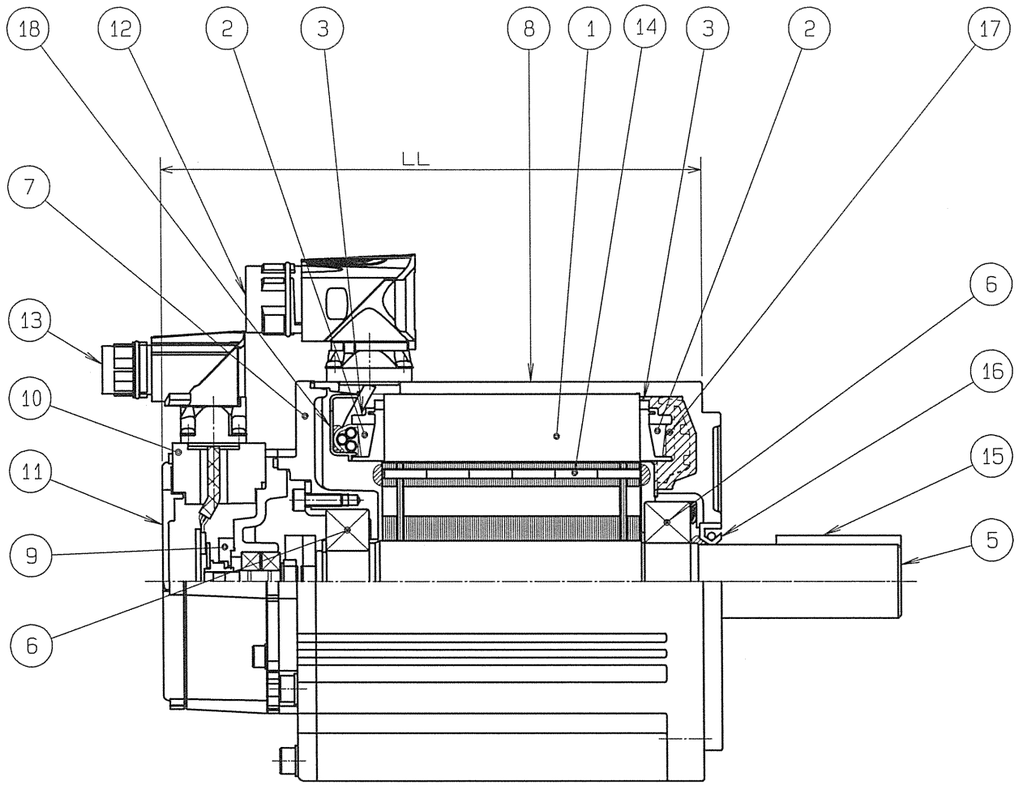
	Encoder specification	Model	Output (kW)	Dimension					
				LL	LR	LM	S	KB1	KB2
Without brake	23bit absolute	MDMF404L1□△M	4.0	163	70	119	35	94	146
		MDMF504L1□△M	5.0	178	1	134	1	109	161
With brake	23bit absolute	MDMF404L1□△M	4.0	192	70	148	35	94	175
		MDMF504L1□△M	5.0	207	1	163	1	109	190

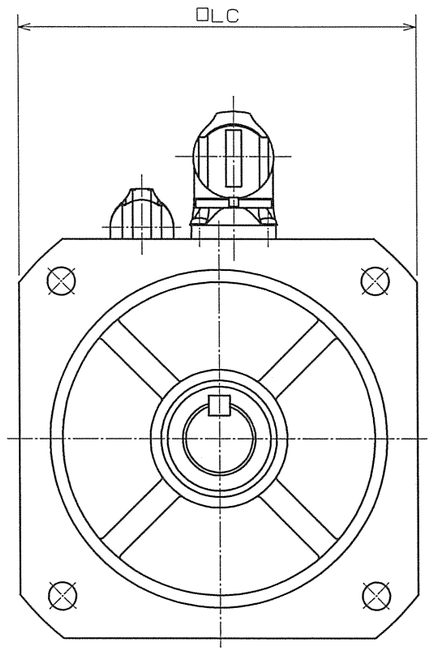
MERCHAND		TRACE				
CLASS	E					
SVM						

Scale	Panasonic Corporation			Agreement	Model	MDMF Series □180
1	3rd Angle System	Unit:mm			Name	OUTLINE DRAWING
Designed	Drawn	Checked	Checked	Checked	No.	SR-DSV1249802
YANO	YANO	OKUNO		OGAWA		
2019/12/02	2019/12/02	2019/12/02		2019/12/02		

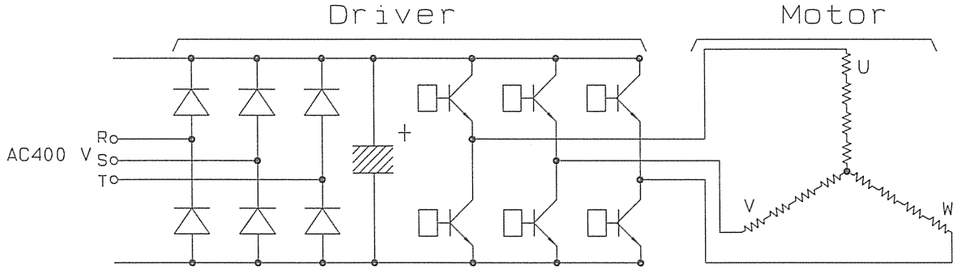
SR-DSV1249803

Do NOT scale the drawings.
Instead refer to the dimensions
and their definitions





Model	LC	LL
MDMF104L1□AM	130	121
MDMF154L1□AM	130	135
MDMF204L1□AM	130	149
MDMF304L1□AM	130	177
MDMF404L1□AM	176	163
MDMF504L1□AM	176	178



No.	Name	Material	Qt.
18	Coil end cover	Polyethylene terephthalate	1
17	Potting	Epoxy resin	
16	Oil seal	Nitrile rubber,Fluoro rubber(with protection lip)	1
15	Key	S45C	1
14	Permanent magnet	Rare earth magnet	
13	Encoder connector	AGC874N0000150A000(TE) or equivalent model	1
12	Motor connector	BGC106N00001200000(TE) or equivalent model	1
11	RE cover B	Polyamide	1
10	RE cover A	Polyamide	1
9	Encoder	23bit absolute	1
8	Frame	Alminium	1
7	End bracket	Alminium	
6	Ball bearing	Bearing steels	2
5	Motor shaft	S45C or SCM435	1
4	Slot insulator	Aramid paper	24
3	End insulator	Polyethylene terephthalate	24
2	Winding	Polyester(-nylon) enameled copper wire	
1	Stator core	Electrical steel	

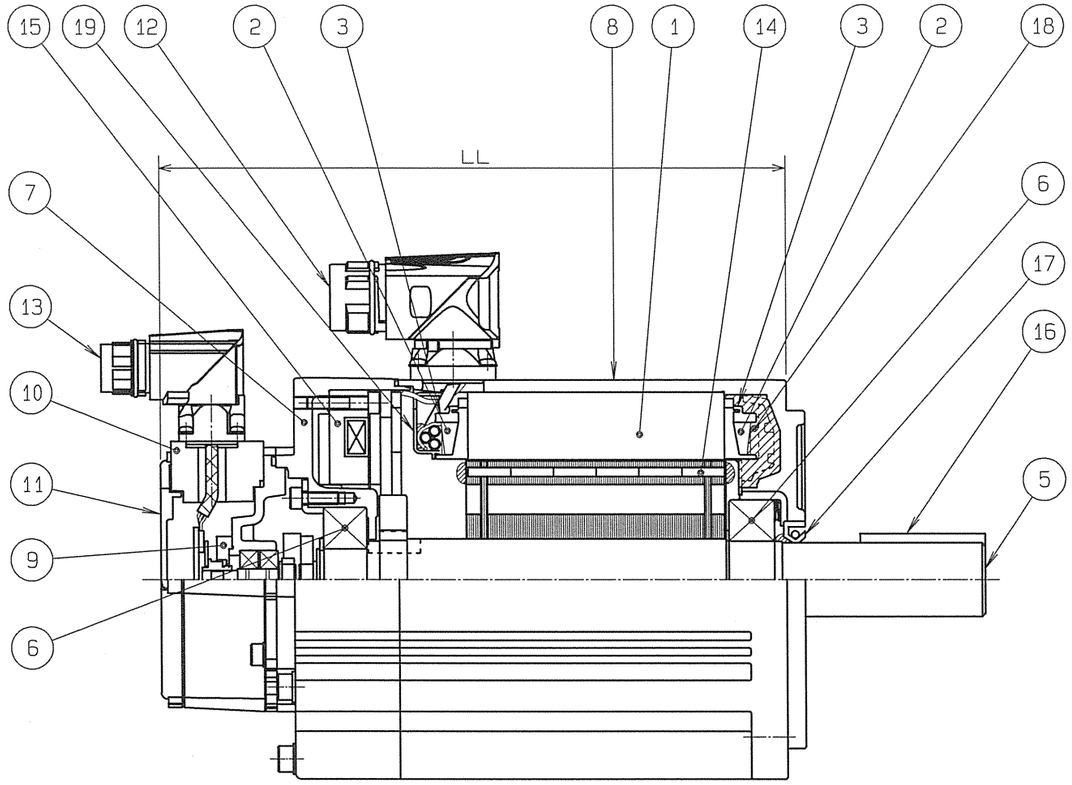
Scale	Panasonic Corporation			Agreement
1	3rd Angle System Unit:mm			
Designed	Drawn	Checked	Checked	Checked
OMURA	OMURA	OKUNO		OGAWA
2019/07/09	2019/07/09	2019/07/09		2019/07/09

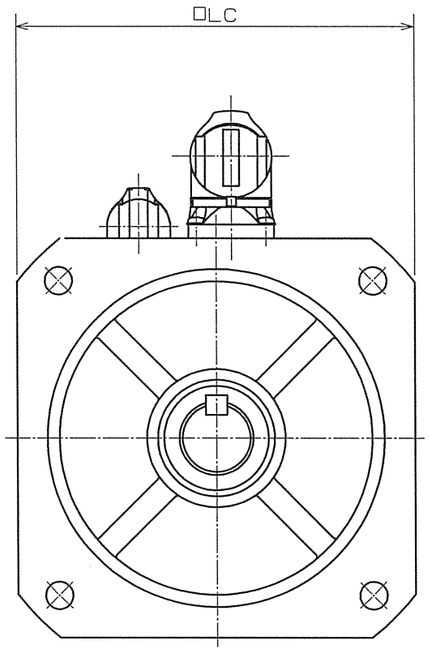
Model	MDMF Series
Name	STRUCTURE SECTION VIEW DRAWING (WITHOUT BRAKE)
No.	SR-DSV1249803

MERCHAND G	CLASS	TRACE
SVM	E	

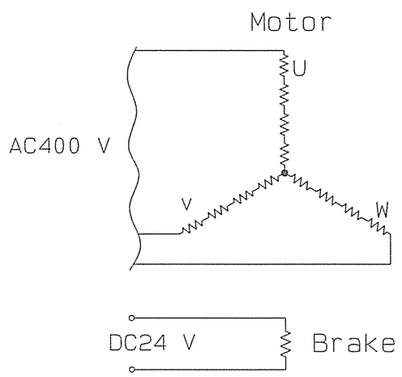
SR-DSV1249804

Do NOT scale the drawings.
instead rely on the dimensions
and their definitions





Model	LC	LL
MDMF104L1ΩAM	130	149
MDMF154L1ΩAM	130	163
MDMF204L1ΩAM	130	177
MDMF304L1ΩAM	130	205
MDMF404L1ΩAM	176	192
MDMF504L1ΩAM	176	207



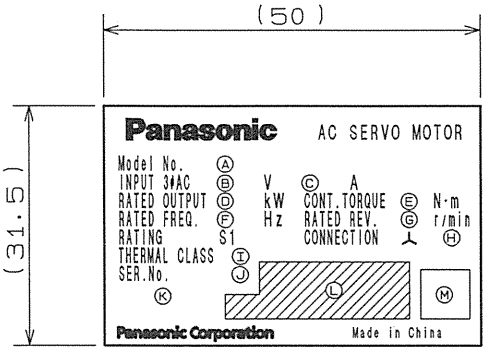
No.	Name	Material	Qt.
19	Coil end cover	Polyethylene terephthalate	1
18	Potting	Epoxy resin	
17	Oil seal	Nitrile rubber.Fluoro rubber(with protection lip)	1
16	Key	S45C	1
15	Brake	Non excited actuating type brake DC24 V	1
14	Permanent magnet	Rare earth magnet	
13	Encoder connector	AGC874N0000150A000(TE) or equivalent model	1
12	Motor connector	BGC106N00001200000(TE) or equivalent model	1
11	RE cover B	Polyamide	1
10	RE cover A	Polyamide	1
9	Encoder	23bit absolute	1
8	Frame	Alminium	1
7	End bracket	Alminium	
6	Ball bearing	Bearing steels	2
5	Motor shaft	S45C or SCM435	1
4	Slot insulator	Aramid paper	24
3	End insulator	Polyethylene terephthalate	24
2	Winding	Polyester(-nylon) enameled copper wire	
1	Stator core	Electrical steel	

Scale	Panasonic Corporation			Agreement
1	3rd Angle System Unit:mm			
Designed	Drawn	Checked	Checked	Checked
OMURA	OMURA	OKUNO		OGAWA
2019/07/09	2019/07/09	2019/07/09		2019/07/09

Model	MDMF Series
Name	STRUCTURE SECTION VIEW DRAWING (WITH BRAKE)
No.	SR-DSV1249804

MERCHAND G	CLASS	TRACE
SVM	E	

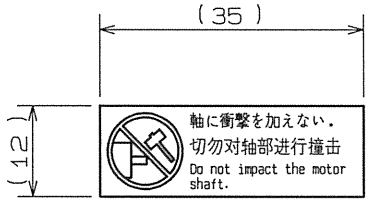
SR-DSV1249805



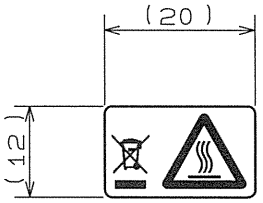
Motor name plate

Motor name plate described contents

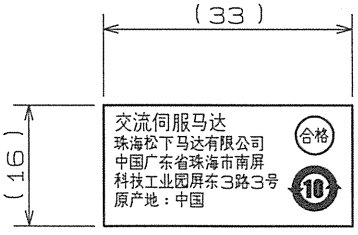
- Ⓐ Model name
- Ⓑ Rated voltage
- Ⓒ Rated current
- Ⓓ Rated output
- Ⓔ Rated torque
- Ⓕ Rated frequency
- Ⓖ Rated speed
- Ⓗ Dust-proof & Drip-proof
- Ⓘ Thermal class
- Ⓙ Serial No.
- Ⓚ Production date
- Ⓛ Standard mark
- Ⓜ QR code



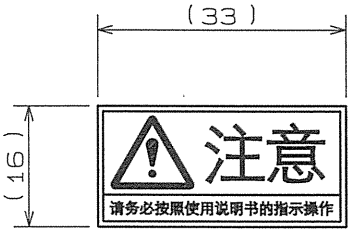
Prohibition name plate



High temperature caution name plate



Chinese caution name plate A



Chinese caution name plate B

Do NOT scale the drawings.
instead rely on the dimensions
and their definitions

MERCHAND	G	TRACE
SVM	CLASS	E

Scale	Panasonic Corporation			Agreement
1	3rd Angle System	Unit:mm		
Designed	Drawn	Checked	Checked	Checked
OMURA	OMURA	OKUNO		OGAWA
2019/07/09	2019/07/09	2019/07/09		2019/07/09

Model	MDMF Serise □130、□176
Name	NAME PLATE DESCRIPTION
No.	SR-DSV1249805