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Classification : ☐ New ☒ Change

# REFERENCE SPECIFICATIONS

Product Name : Brushless Motor  
Product Series Name : GV Series (DC 24 V)  
Product Model Number : MBMU5ACA□

Motion Control Business Unit, Industrial Device Business Division  
Panasonic Industry Co., Ltd.  
7-1-1 Morofuku, Daito—City, Osaka 574-0044, Japan

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

**Panasonic**

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. OUTLINE DRAWING .....	No. SX-DSB0039301~02

## 1. Scope of Application

The specifications are the brushless motor (MBMU) GV series manufactured and delivered by Motion Control Business Unit, Panasonic Industry Co., Ltd.

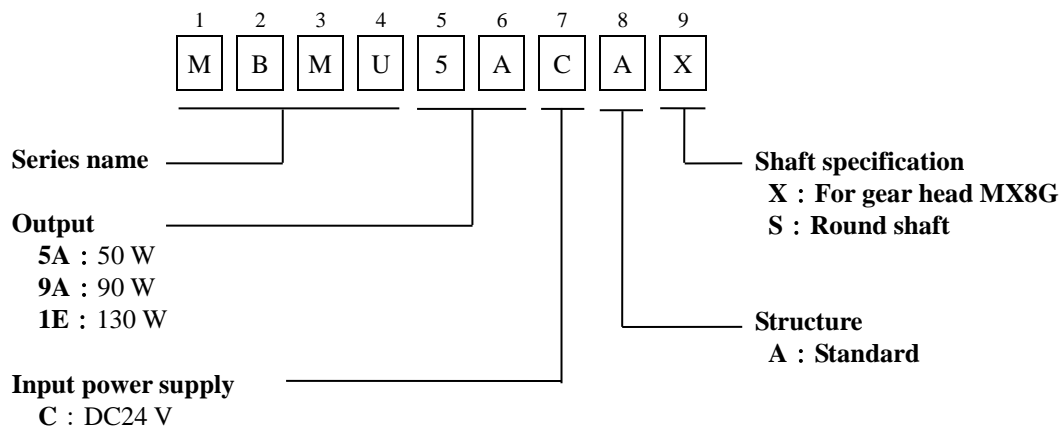
This product is for industrial equipment.

Don't use this product at general household.

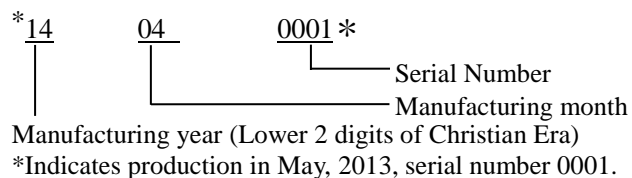
## 2. Overview

**2.1 Type of motor** Brushless motor

**2.2 Model Name**



**2.3 Serial Number**



## 3. Model list

Model name	Rated output	Input voltage of the Amplifier	Outer dimension drawing No.	Applicable Amplifier	Applicable gear head
MBMU5ACAX	50 W	DC24 V	SX-DSB0039301	MBEG5ACACV	MX8G□B*
MBMU5AZAS	50 W	DC24 V	SX-DSB0039302	MBEG5ACACV	— (Round shaft)

\*A figure representing reduction ratio in e.g.) Part number of MX type gear head with reduction ratio 10 and mounting angle size □80 is MX8G10B.

## 4. Specification

### 4.1 General specification

Basic specification	Allowed range of supply voltage fluctuation		±10 %
	Power supply frequency		50 / 60 Hz
	Control method		Position control by CS signal, PWM sine wave driving system,
	Bearing		Ball bearing
	Ambient conditions	Ambient temperature	-10 - +40 °C (free from freezing)
		Ambient humidity	85 % RH or below (free from condensation)
		Location	Indoor (No corrosive gas, A place without garbage, and dust)
		Altitude	Not greater than 1000 m
		Storage temperature	Not greater than 4.9 m/s² (10-60 Hz)
		Storage humidity	Normal temperature *1
	Cooling system		Self cooling
Heat resistance class		B (Applies for A to UL.)	
Time rating		Continuous (Continuous regenerative operation is not allowed when motor shaft is rotated from load side, such as lowering load operation.)	
Protection structure		This motor conforms to test condition specified in EN standard (EN60529 and EN60034-5). This motor is not applicable to the use which requires long-term waterproof performance, such as the case where the motor is always washed with water.	

\*1 Temperature which is acceptable for a short time, such as during transportation is -20 °C to 60 °C (free from freezing)

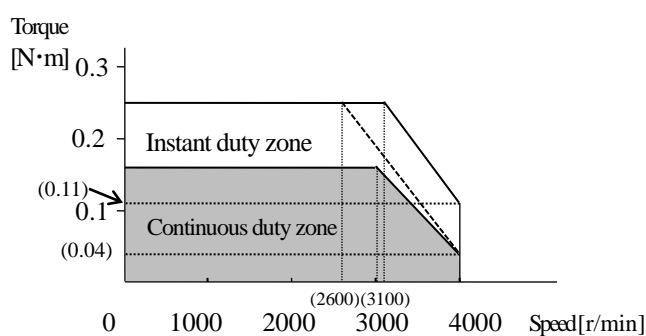
- |            |                              |                                                                      |
|------------|------------------------------|----------------------------------------------------------------------|
| <b>4.2</b> | <b>Shaft deflection</b>      | Deflection of shaft tip is under 0.05 mm<br>(at 3 mm from Shaft tip) |
| <b>4.3</b> | <b>Insulation resistance</b> | More than DC500 V 20 MΩ<br>(Between a power supply and earth)        |
| <b>4.4</b> | <b>Isolation voltage</b>     | Between a power supply and earth<br>AC1500 V 1 minute                |

#### 4.5 Typical characteristics

Model name	MBMU	5AC			
Rated output	W	50			
Input voltage of the amplifier	V	DC24			
Number of polarities	P	8			
Rated	%	100 % continuous			
Rated rotation speed	r/min	3000			
Max. rotation speed	r/min	4000			
Rated torque	N·m	0.16			
Starting torque *1	N·m	0.24			
Rated input current	Arms	3.2			
Rotor inertia	$\times 10^{-4} \text{ kg} \cdot \text{m}^2$	0.12			
Mass	kg	0.7			

\*1 Starting torque is a typical value.

- Standard measurement condition of typical characteristics is the temperature of 25 °C, and the humidity of 65 %RH. However, in case of no doubt on its characteristics, it is possible to execute test under normal temperature (5 – 35 °C) and normal humidity (45 – 85 %).
- The S-T characteristic is shown below. (Typical value, the dash line shows value at 10 % down of input voltage)
- Continuation torque is shown below.



## 5. Appearance

### 5.1 Outer dimension

The outer dimension is shown in dimensional outline drawings.

### 5.2 Painting

Painting color is dark brown.

## 6. Reliability

### 6.1 Standard life

Standard life is 5000 hours for the motor equipped with gear head (MX8G and MZ9G) in the case of motor rotation speed "3000 r/min Less". Standard life refers to design life for operation 8 hours per day (service factor:  $S_f = 1.0$ ) at a normal temperature and humidity, under uniform load (permissible shaft torque of gear head and rated torque of motor).

※ Standard life is calculated by the next expression in the case of motor rotation speed "3000~4000 r/min".

Standard life (hours) =  $5000 \text{ (hours)} \times 3000 \text{ (r/min)} / \text{Motor rotation speed to use (r/min)}$

Standard life is the same 10000 hours for motor alone (round shaft). (Standard life of sealing performance of oil seal is 5000 hours.)

### 6.2 Service factor (Sf)

Service factor ( $S_f$ ) depends on the magnitude of shock of load or operating time. Service factor is shown below for different load conditions:

Type of load	Example of load	Service factor		
		5 hours/day	8 hours/day	24 hours/day
Uniform load	One direction continuous operation	1.0	1.0	1.5
Light shock	Start, stop, or cam shock	1.2	1.5	2.0
Middle shock	Instantaneous rotation/reverse rotation and instantaneous stop	1.5	2.0	2.5
Heavy shock	Middle shock at a high frequency	2.5	3.0	3.5

### 6.3 Permissible shaft torque

Required shaft torque  $T_A$  of gear head can be obtained from service factor and actual load torque  $T_1$ .

$T_A = T_1 \times S_f$

Select a gear head and motor to ensure that required torque (continuous) is within permissible shaft torque in the table below. Here, the torque  $T_1$  must not exceed permissible shaft torque  $T_A$  irrespective of  $S_f$ .

#### ■ Motor rotation speed : 3000 r/min Less


Unit : Nm

Model name	Reduction ratio	3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	50	60	75	90	100	120	150	180	200
MBMU5ACAX MX8G□B		0.39	0.46	0.64	0.77	0.96	1.16	1.29	1.61	1.92	2.33	2.59	3.23	3.61	4.33	5.93	7.29	7.84	7.84	7.84	7.84	7.84	7.84	–

#### ■ Motor rotation speed : 3000 to 4000 r/min

Unit : Nm

Model name	Reduction ratio	3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	50	60	75	90	100	120	150	180	200
MBMU5ACAX MX8G□B		0.29	0.35	0.48	0.58	0.72	0.87	0.97	1.21	1.44	1.75	1.94	2.42	2.71	3.25	4.45	5.47	6.84	7.84	7.84	7.84	7.84	7.84	–

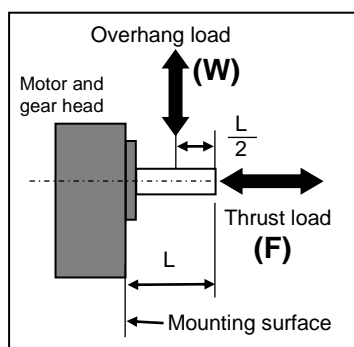
※ Rotation direction is the same  as that of motor in shaded portion, and reverse for others.

<Information>

- in the part name of motor represents either 1 or 2 which indicates supply voltage.
- in the part name of gear head represents a figure which indicates reduction ratio.

## 6.4 Permissible shaft load

Type	Model name	Permissible overhang load (W)	Permissible thrust load (F)
Gear head	MX8G type	294N	49N
Motor (Round shaft)	MBMU5ACAS	100N	10N



## 6.5 Permissible load inertia moment

Apply permissible load inertia moment within the value shown below:

### ■ Gear head

Unit :  $\times 10^{-4} \text{ kg} \cdot \text{m}^2$

Model name	Reduction ratio	3	36	5	6	75	9	10	125	15	18	20	25	30	36	50	60	75	90	100	120	150	180	200
MBMU5ACAX MX8G□B		125	179	342	49	772	112	138	216	306	452	558	869	127	183	342	342	342	342	342	342	342	342	-

### ■ Motor (Round shaft)

Unit :  $\times 10^{-4} \text{ kg} \cdot \text{m}^2$

Model name	
MBMU5ACAS	0.87

<Information>

- □ in the part name of motor represents either 1 or 2 which indicates supply voltage.
- □ in the part name of gear head represents a figure which indicates reduction ratio.

## 7. Compliance with safety standards

### 7.1 Compliance with UL standards

Applicable standards UL 1004

### 7.2 Compliance with CE

Applicable standards EN 60034-1 : 2010

EN 60034-5/A1 : 2007

When you sell this product in China, you need disclosure of " Toxic substance content information on electronic information products."

・電子電気製品の有害物質含有情報

产品中有害物质的名称及含量

构成部位	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
框架	×	○	○	○	○	○
定子组装	×	○	○	○	○	○
转子	×	○	○	○	○	○
转子组装	×	○	○	○	○	○
托架	×	○	○	○	○	○
基板完成品	×	○	○	○	○	○
垫圈	○	○	○	○	○	○
螺丝	○	○	○	○	○	○
引线固定器	○	○	○	○	○	○
引线	×	○	○	○	○	○
连接器	×	○	○	○	○	○
油封	○	○	○	○	○	○

本表格依据 SJ/T11364 的规定编制。

○ ：表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。

×

Other information

・ Producer's name

松下机电株式会社

日本大阪府门真市大字门真 1006 番地

・ Country of origin

中国

・ Product Name

无刷电动机

・ Company standard number

无刷电动机 Q/PMRZ 9





# Safety precautions

## 8. Safety Precautions

- The seriousness of injury or damage caused by using the product improperly without observing the indicated description is categorized using the signs below and the meaning is explained.

<b>Danger</b>	The section with this sign contains items which are “assumed to cause imminently dangerous situation such as death or seriously injury if ignored.”
<b>Caution</b>	The section with this sign contains items which are “assumed to cause injury or property damage only if ignored.”

- The type of description to be observed is categorized with the signs below and the meaning is explained.

	This sign shows that the item is “prohibited” to perform.
	This sign shows that the item is a “compulsory” to be performed without fail.



## Danger



- (1) Be sure not use the product in a place where the product may come in contact with foreign matter such as liquid like grinding oil, oil mist, and file dust, nor in an atmosphere of corrosive gas (such as H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, Cl<sub>2</sub>) or flammable gases, nor in a place near inflammable material.
- (2) Do not place inflammable material near a motor, a amplifier, or a regenerative resistance.
- (3) Do not drive the motor with external power.
- (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 console near heating element such as a heater or a large-sized wire wound resistor.
- (7) Do not connect the motor to the commercial power source directly.
- (8) Do not use the product in a place where strong vibration or shock may be experienced.
- (9) Be sure not to touch the rotating part of the motor during operation.
- (10) Do not touch the keyway of the output axis of the motor with bare hands.
- (11) Be sure not to insert your hand into the amplifier.
- (12) Do not touch the motor, the heat sink of the amplifier nor the surrounding equipments since they will be hot.
- (13) Do not perform wiring nor operate the product with wet hand.



# Safety precautions



## Danger



- (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 overtemperature preventing device, an emergency stop device, and the like.
- (16) When starting operation of the amplifier after an earthquake, please make sure that there is no abnormality as to the installation condition of the amplifier and the motor and the safety of the machine before starting operation.
- (17) When relocating, wiring, or checking the amplifier, leave it for the period of time indicated on the main body or longer after switching off the power, and confirm that there is no danger of electric shock, and then perform the task.
- (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) In order to be able to stop operating the device immediately and to cut off the device from the power source, install an external emergency stop circuit.
- (20) Install the motor, the amplifier, 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 amplifier 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) Be sure to install a no-fuse breaker to the power source.  
Also, make sure to connect the ground terminal or the ground lead to the ground.  
(In order to prevent electric shock and abnormal operation, the class D grounding  
(Grounding resistance: 100  $\Omega$  or lower) or higher is recommended.)



## Caution



- (24) When transferring the product, do not hold the cable or the axis of the motor.
- (25) Do not adjust or modify the gain of the amplifier extremely, nor let the operation or movement of the machine be unstable.
- (26) 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.
- (27) Do not apply strong shock to the axis of the motor.
- (28) Do not apply strong shock to the product.
- (29) Be sure not to start or stop the motor with the electromagnetic contactor installed on the main power source side.
- (30) Do not switch on or off the main power supply of the amplifier frequently.
- (31) Be careful not to drop or to topple over the product when transferring or performing installation task.
- (32) Do not climb on the motor or place heavy object on the motor.
- (33) Do not cover the louver on the amplifier nor insert foreign matter.
- (34) 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.
- (35) Never overhaul or modify the motor.  
Overhauling will be performed at our company or at the retailers approved by our company.



# Safety precautions



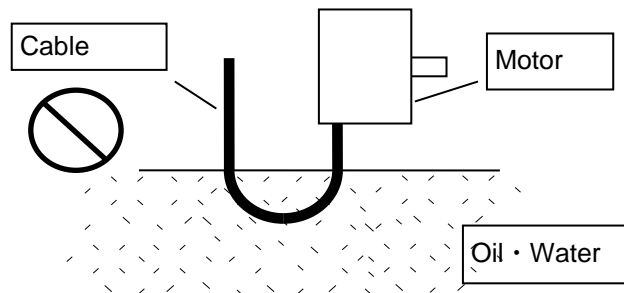
- (36) Use the motor and the driver in the combination specified by our company. Please confirm the performance and the safety at your company when the motor is used in combination with another amplifier.
- (37) Due to the trouble with the motor or the driver combined, the motor may be damaged by fire, or smoking or dusting might occur. Please consider these possibilities when they are to be used in a clean room or the like.
- (38) Perform proper installation which is in proportion to the output and the weight of the main body.
- (39) Keep the ambient temperature and humidity of the installed motor within the range of allowable temperature and humidity.
- (40) Observe the specified installation method and the orientation of the product.
- (41) Keep a space as specified between the driver and the inner surface of the control panel, or between the amplifier and the other devices when installing the product.
- (42) 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.  
(The motor should rotate smoothly at 30 r/min or so by the amplifier driving.)
- (43) Confirm that the power source specification is normal.
- (44) When an error has occurred, remove the cause and ensure the safety first, and after releasing the error, restart the machine.
- (45) Do not place obstacles around the motor, the amplifier, and the surrounding devices in order to keep an adequate amount of ventilation.
- (46) Maintenance should be performed by the specialist.
- (47) If the product is not to be used for a long period of time, be sure to turn off the power.
- (48) Idling and lock by gear tooth damage, grease leakage and so on will expectedly happen at the life end of motor. Install safety equipment to take safety step when it will be failed by any chance.
  - 1) Install drop protection at lifter and so on by gear tooth damage.
  - 2) Install the release equipment as lock protection by gear tooth damage in application like the door open and close.
  - 3) Consider to install the oil pan to avoid oil leakage to the food machine, textile machine and so on.
  - 4) Don't mount the encoder, sensor, contact point and so on near the gear. Take action for grease leakage protection in case mounting them near by.
  - 5) Execute the terminal check to avoid accident.

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

We have been putting maximum effort to ensure the quality of this product. But 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.

## 9. Precautions in use

- (1) Don't make overload running with exceeding motor rated output, or it may cause its damage or short lifetime.
- (2) Don't dismantle motor, otherwise it may cause abnormal noise.
- (3) Don't hit shaft during mounting the pulley, sprocket and so on. Otherwise it may cause abnormal noise.
- (4) Oil • Water proof
  - ① Keep direction of cable outlet as low as possible for oil and water proof.
  - ② Don't use motor in working condition that it is all time exposed to oil and water.
  - ③ Don't use cables in condition that they get oil and water.



- (5) Stress to cable
  - ① Don't let the outlet and connection of cable get stress by its bending and gravity.
  - ② Avoid stress to cable by its bending as much as possible by fixing cable and storing extension cables and
  - ③ Keep the bending diameter of cable as large as possible.
- (6) Contact us in case of using motor in special circumstance like unclear control, machine for space, facilities of travel, medical equipment, safety equipment.
- (7) The bearing noise may get increased by the electric corrosion, based upon the actual machine and mounting condition like fan driving. Therefore, confirm and verify it in your side.

## 10. Confirmed items

- (1) You are responsible for judging whether or not the machine and component match to the structure, dimension, service life, characteristics directive and so on.
- (2) Remark in case of exporting this product and the machine which has it  
Take full examination and necessary exporting procedure when exporting this product since [Foreign exchange and Foreign exchange control law] may be applied in case the end user and application are related to the military, weapon and so on.
- (3) Make sure that your machine matches this product when changing the specification of yours to be used with it.
- (4) You are responsible for judging the conformity of this product with your machine to be used with it in terms of the regulation and directive.
- (5) The grease is applied inside of gear head.  
Insure its influence to the plastic and so on.
- (6) The cutting portions in motor cables have no treatment for waterproof. Add waterproof treatment when it is needed in application that they get water.

## 11. Other remarks

- (1) Don't use this product in the place where it is exposed to direct sunshine and oil.
- (2) Don't use this product in the place with sever vibration, impact force and a lot of dust, an also in such corrosive circumstance as hydrogen sulfide, sulfur dioxide, erosive gas, chlorine, ammonia, sulfur, gas chloride, gas sulfide, acid, alkali, salt and so on.
- (3) Don't use this product in the place where it is exposed to gliding oil, oil mist, steel powder and cutting waste.
- (4) Don't store this product in the place where it is exposed to rain water, water drop, harmful gas or liquid.
- (5) Store this product in the place where there is no sunlight, under control with a certain range of temperature.
- (6) Don't take out the nameplate.
- (7) Confirm whether or not it is requested after receiving it.

## 12. General precautions

- (1) This product is standard.  
Our changing specification may be done without notification.
- (2) Be careful that we can't guarantee this product when exceeding the range of specification.

## 13. Warranty period

### (1)Warranty period

Warranty period is a year after buying this product or one and half year after production month.  
However, respective life shall not be exceeded as for standard life describing items.

(See 6. Reliability" on page 5)

Also the following cases are excluded even within warranty period.

- ① In case of using this product incorrectly and being by inappropriate repair and modification
- ② In case of being by falling it down after purchasing and damage during transportation.
- ③ In case of being by excess of specified range condition.
- ④ In case of being by fire, earthquake, thunderbolt, damage from wind and water, damage from salt, abnormal voltage and natural disaster.
- ⑤ In case of being by invasion of water, oil, piece of metal and other foreign object.

### (2) Warranty range

We are responsible for only replacement or repair for defective part of this product when it is failed by our fault. We are not responsible for damage triggered by this product failure.

SX-DSB0039301

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

MERCHAND G CLASS	TRACE
SVM	E

CONNECTION OF THE LEAD WIRE

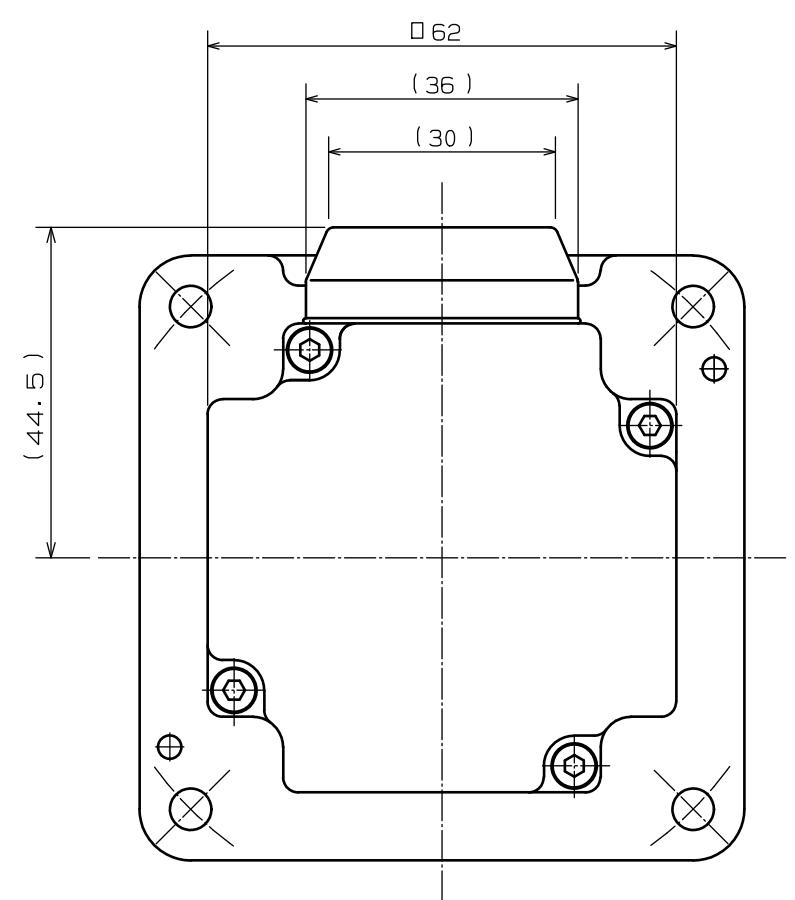
PIN No.	LEAD COLOR	SIZE	SIGNAL
1	BLACK	AWG20	W
2	-	-	-
3	WHITE	AWG20	V
4	-	-	-
5	RED	AWG20	U
6	WHITE	AWG26	Vcc
7	BLACK	AWG26	0V
8	RED	AWG26	CS1
9	BLUE	AWG26	CS2
10	YELLOW	AWG26	CS3

Connector

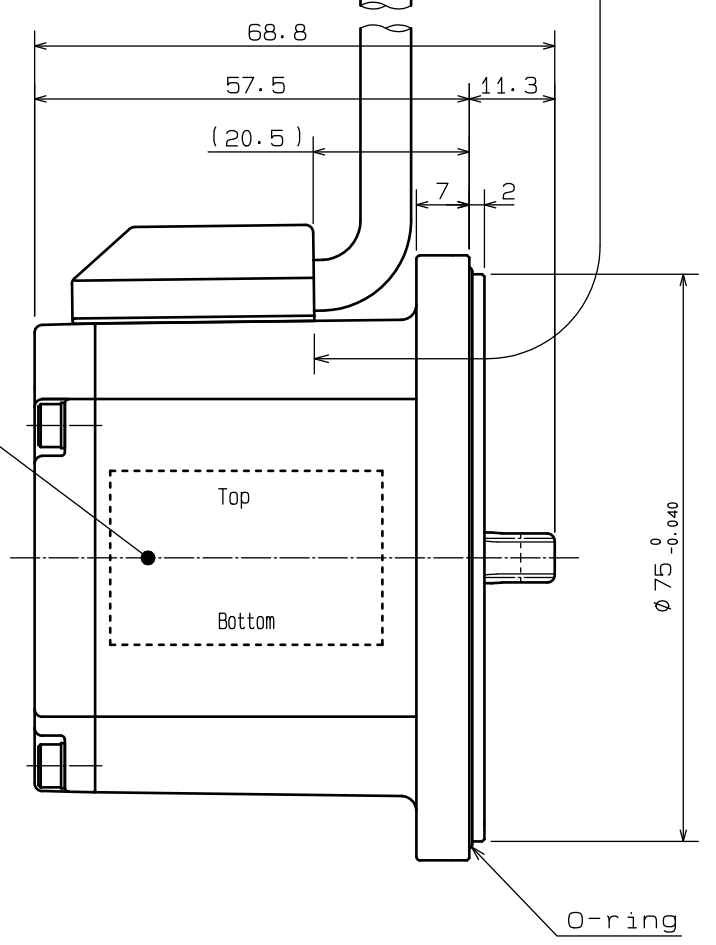
AMP  
Housing 1-171822-0  
Terminal 170262-1 (Motor wire)  
170263-1 (CS wire)

Cable

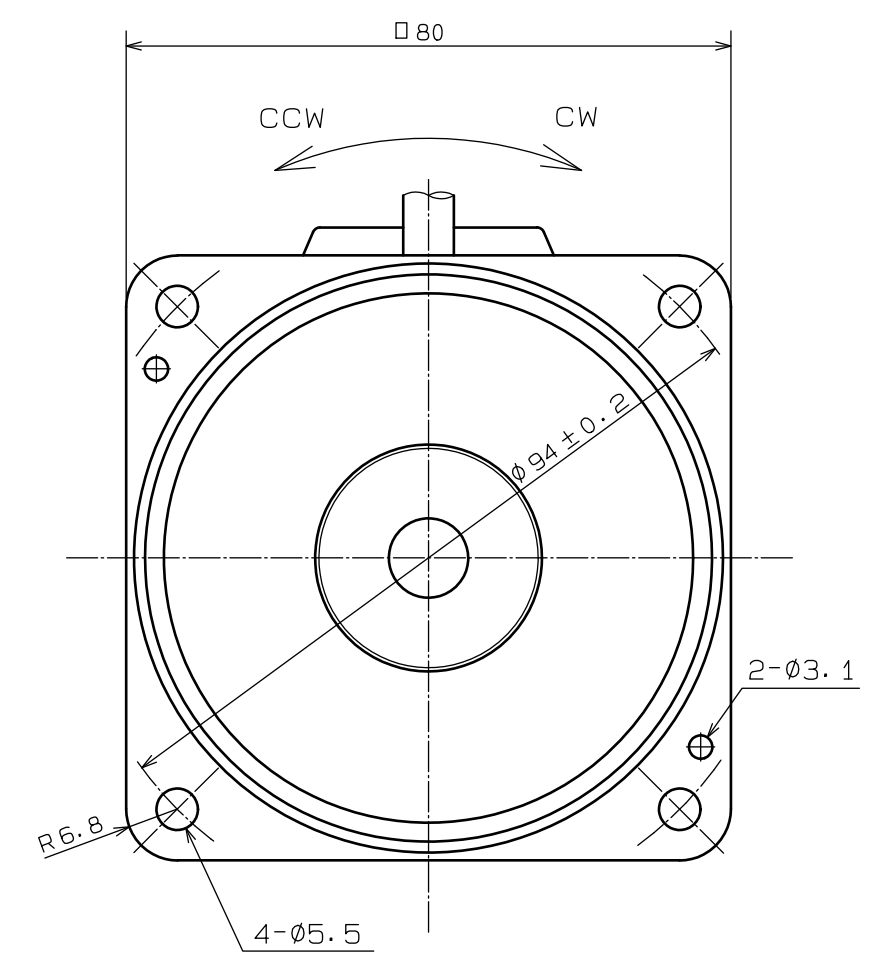
AWG20 (motor wire)  
AWG26 (CS wire)



Name plate



Model	Voltage (Vdc)	Rated speed (r/min)	Rated output (W)	Applicable Gear head
MBMU5ACAX	24	3000	50	MX8G□B



Scale	Panasonic Industry Co., Ltd.	Agreement	Model	MBMU5ACAX □80
1 : 1	3rd Angle System	Unit:mm	Name	OUTLINE DRAWING
Designed	Drawn	Checked	Checked	Checked
SHIMIZU	SHIMIZU		TAKEUCHI	
2013/05/10	2013/05/10		2013/05/10	
No.	SX-DSB0039301			

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

SX-DSB0039302

MERCHAND G CLASS	TRACE
SVM	E

CONNECTION OF THE LEAD WIRE

PIN No.	LEAD COLOR	SIZE	SIGNAL
1	BLACK	AWG20	W
2	-	-	-
3	WHITE	AWG20	V
4	-	-	-
5	RED	AWG20	U
6	WHITE	AWG26	Vcc
7	BLACK	AWG26	0V
8	RED	AWG26	CS1
9	BLUE	AWG26	CS2
10	YELLOW	AWG26	CS3

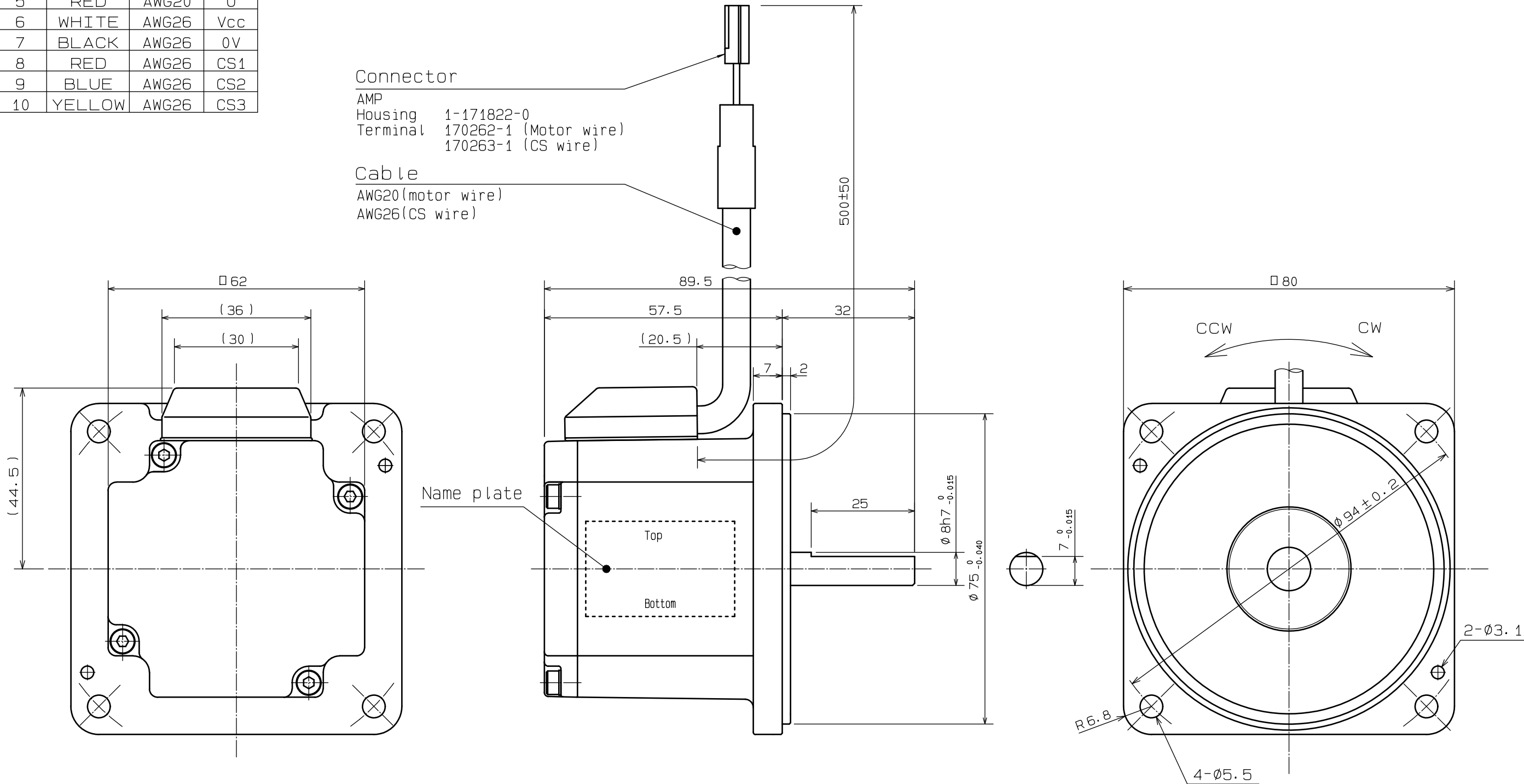
Connector

AMP  
Housing 1-171822-0  
Terminal 170262-1 (Motor wire)  
170263-1 (CS wire)

Cable

AWG20 (motor wire)  
AWG26 (CS wire)

Model	Voltage (Vdc)	Rated speed (r/min)	Rated output (W)
MBMU5ACAS	24	3000	50



Scale	Panasonic Industry Co., Ltd.	Agreement	Model	MBMU5ACAS □80
1 : 1	3rd Angle System	Unit:mm	Name	OUTLINE DRAWING
Designed	Drawn	Checked	Checked	Checked
SHIMIZU	SHIMIZU		TAKEUCHI	
2013/05/10	2013/05/10		2013/05/10	
No.	SX-DSB0039302			