

TSUBAKI

Gear Motors

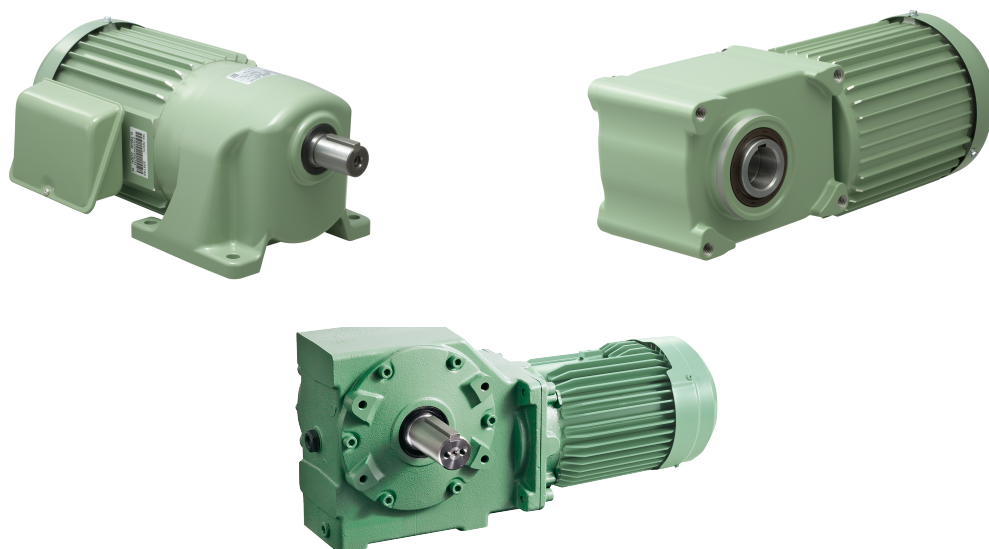
Hypoid Motors

Croise Motors

3 Phase AC motor for EW(J)M/SW(J)M Series

< TR Series >

HIGH EFFICIENCY (IE3) 3 Phase 0.2kW,0.4kW Global Series Instruction Manual



☐ Thank you for choosing Tsubaki gearing products.

In order to fully demonstrate the characteristics of the high efficiency (IE3) motor, this instruction manual obtains the following information. Please refer to the attached manual for the operation of the reducer.

Please carefully read the instruction manual and use it for installation, and inspection.
Provide the instruction manual at a location that is accessible to the operator.
Keep the instruction manual in a safe place for easy reference before using the product.

TSUBAKIMOTO CHAIN CO.

Table of Contents

【1】	Checking the Contents	3
1-1.	Notice	3
1-2.	Notice for adoption to the premium efficiency motor(IE3)	3
(1)	The motor size is larger than IE1 motor.....	3
【2】	Nomenclature	4
2-1.	Model Number	4
2-2.	CE Marking Motor	4
2-3.	China High Efficiency (GB3) motor	4
【3】	Wiring	5
3-1.	Connection	5
3-2.	Wiring a 3-phass motor with brake (400V class)	5
3-3.	Dimentions of terminal box	6
【4】	Operation	7
4-1.	Inverter driving	7
4-2.	Wiring foe 3 Phase brake tyype driven by inverter	9
【5】	SLB brake (0.2kW to 0.4kW with brake) specification	11
5-1.	SLB Brake Specification.....	11
5-2.	Reference of Braking Time	11
【6】	CE Marking Motor.....	12
【7】	Motors for China	14
【8】	China RoHS Instruction.....	15

【1】 Checking the Contents

1-1. Notice

In the instruction manual, only the differences between 0.2kW and 0.4kW high efficiency motors are recorded. Please use it together with the following standard manual.

SERIES	MANUALS NUMBER
GMTR, HMTR, CSMR, HCMR	TA01.00TS-* (Gear motor Instruction Manual)
EW(J)MR, SW(J)MR	EW00.00TS-* (worm reducer Instruction Manual) + B5FTA. 00TS-*(flange motor Instruction Manual)

1-2. Notice for adoption to the premium efficiency motor(IE3)

- (1) The motor size is larger than IE1 motor.

Please confirm the dimensions of the combination and the interference with the peripheral equipment during installation.

- (2) The rated speed of the motor increases.

When replacing the current product, the rated speed of the motor increases depending on the purpose of use, so the power consumption tends to increase. (When the motor is operated directly by commercial power supply.)

- (3) The starting current tends to be larger.

To recheck the capacity of electrical devices, such as circuit breaker, magnetic contactor, relay, and so on, may be needed.

- (4) The torque generated by motor tends to be larger.

Recheck the strength of customer's equipment, due to increasing potential motor output power.

- (5) In the case of any load fluctuation, such as compressor, textile machine, etc.

The generation of heat tends to be larger by the rotational speed fluctuation. The inertia of driven equipment including load fluctuation should be reconsidered.

- (6) Regarding the motor

- Motor rotational speed

The rated rotational speed of the motor will be higher than the previous IE1 motor, because the premium efficiency motor (IE3) has low slip due to controlling the loss on the motor.

Ex) The rated rotational speed: from 1710 to 1740 r/min

- Motor current

The starting torque and starting current on the premium efficiency motor (IE3) will increase compare with previous IE1 motor, because the coil resistance is designed at lower for dropping copper loss. Therefore, redesigning of device in the control box, such as the circuit breaker, and size change of reducer capacity may be needed.

- Energy consumption

The energy consumption may be increased, because the motor output power is increasing, though the motor efficiency is high.

Ex) The motor output power will be increasing, in the case of such as the load in the pump application. (The load using pump for liquid will increase proportional to cube of rotational speed) Because the rotational speed of motor will increase by replacing to the premium efficiency motor.

- (7) Please check the following points, when the motor is operated directly by commercial power supply. In the case of inverter operation, can be used as before.

- Check the gear ratio, when the actual speed on previous IE1 motor cannot be increased.
- Check the service factor and reducer size, in case of frequent starting and stopping application.
- Check the motor capacity, in the case of continuous operation with light loads.

【2】 Nomenclature

2-1. Model Number

GMTR 020 - □□ □ □□ □ □□□ □□
 HMTR 020 - □□ □ □□ □ □ □□□ □□
 CSMR 020 - □□ □ □ □□ □ □ □□□ □□
 EW(J)MR □□□ □ □□ □ 020 □
 SW(J)MR □□□ □ □□ □ 020 □

Series There is "R" attached to the end of the series of high efficiency motor	GMTR HMTR CSMR HCMR EW(J)MR SW(J)MR	Gearmotor IE3 Class Hypoid Motor IE3 Class Single reduction type with IE3 motor Double reduction type with IE3 motor Worm power drive with IE3 motor* Worm power drive with IE3 motor
Motor power	020 040	3 phase 0.2kW 3 phase 0.4kW

Please refer to the instructions for specification symbols, dimensions, selection symbols, etc. other than the above.

In EWJMR and SWJMR, the "S" attached to the end of the motor capacity disappears.

2-2. CE Marking Motor

		200V class				400V class			
Option code		N		WN		VN		WVN	
Type		Indoor		Outdoor		Indoor		Outdoor	
Brake		Non- Brake Type	Brake Type	Non- Brake Type	Brake Type	Non- Brake Type	Brake Type	Non- Brake Type	Brake Type
Degree of protection		IP44	IP20	IP55		IP44	IP20	IP55	
Thermal Class	Motor	155(F)							
	Brake	-	B	-	B	-	B	-	B
0.2kW	Voltage	200/200/220				380/400/400/440			
	Frequency	50/60/60				50/50/60/60			
0.4kW	Voltage	200/200/220				380/400/400/440			
	Frequency	50/60/60				50/50/60/60			
Time rating		S1(Continuous Rating)							
Efficiency		IE3							

2-3. China High Efficiency (GB3) motor

		200V class				400V class			
Option code		N3		WN3		VN3		WVN3	
Type		Indoor		Outdoor		Indoor		Outdoor	
Brake		Non- Brake Type	Brake Type	Non- Brake Type	Brake Type	Non- Brake Type	Brake Type	Non- Brake Type	Brake Type
Degree of protection		IP44	IP23	IP55		IP44	IP23	IP55	
Thermal Class	Motor	F							
	Brake	-	B	-	B	-	B	-	B
0.2kW	Voltage	200/220/200/220				380			
	Frequency	50/50/60/60				50			
0.4kW	Voltage	200/200/220				380			
	Frequency	50/60/60				50			
Time rating		S1(Continuous Rating)							
Efficiency		GB3(=IE3)							

【3】 Wiring

3-1. Connection

Supply power as specified on the nameplate.

Please refer to a standard instruction manual for the 200V class.

3-2. Wiring a 3-phass motor with brake(400V class)

Purpose		0.2kW 0.4kW
AC internal wiring	- For general purpose - Standard specification for shipment	
AC external wiring	- To shorten the stopping time - To install phase advance condenser	
Ac external operation	In case an external brake operation is to be performed	
DC external wiring	In case an elevator and stopping accuracy is required	

M: Motor B: Brake MC: Magnetic contactor Mca: Auxiliary relay OCR: Overcurrent relay
DM400D : DC Module

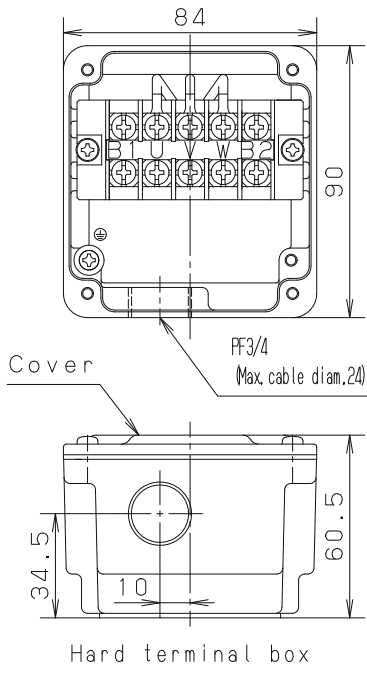
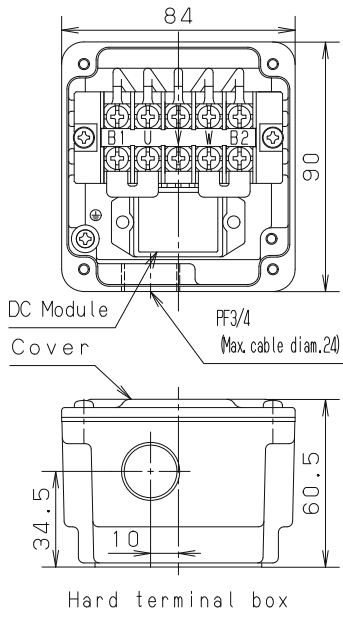
(Note1) Since DM400D has the varistor inside, to install the varistor in the circuit diagram is not needed.

(Note2) Use the auxiliary relay (Mca) of contact rating AC400-440V,1A inductive load *1.

(Note3) Use two or three auxiliary relays (Mca) in series AC400 to 440V contact voltage, over and 1A inductive load at *2.

3-3. Dimentions of terminal box

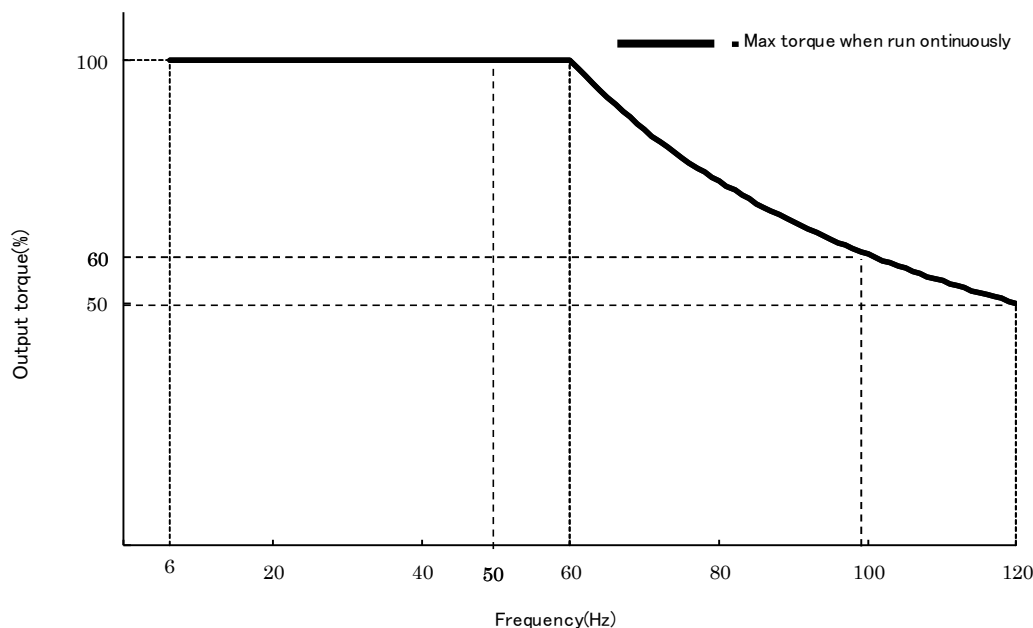
•Terminal box specifications

Output	Classification		Dimensions
0.2kW 0.4kW	No Breake	Outdoor Indoor	 1. Material: Aluminum die-cast 2. Terminal screw size: M4 Tightening torque: 1. $8\text{N}\cdot\text{m}$ {Ref 0. $18\text{kgf}\cdot\text{m}$ } 3. Compatible crimp-on terminal Naked round type (R type) ... 1. 25-4 2-4 Round type with insulating coating ... 1. 25-4 2-4 4. Terminal box can be turned 90 degrees. 5. When shipping, the terminal box outlet is facing downwards. 6. When using outdoors, tighten the ground with the specified tightening torque. 7. Ground terminal screw size M4 Tightening torque: 1. $2\text{N}\cdot\text{m}$ { Ref 0. $12\text{kgf}\cdot\text{m}$ }
0.2kW 0.4kW	With Brake	Outdoor Indoor	 1. Material: Aluminum die-cast 2. Terminal screw size: M4 Tightening torque 1. $8\text{N}\cdot\text{m}$ {Ref 0. $18\text{kgf}\cdot\text{m}$ } 3. Compatible crimp-on terminal Naked round type (R type) ... 1. 25-4 2-4 Round type with insulating coating ... 1. 25-4 2-4 4. Terminal box can be turned 90 degrees. 5. When shipping, the terminal box outlet is facing downwards. 6. DM200D, DC Power Supply for brake, is built in the terminal box with AC Internal. Wiring Refer to page 17,18 for the detail of wiring. 77. The size of DC module for 400V class is different from 200V class. 8. Ground terminal screw size M4 1. $2\text{N}\cdot\text{m}$ {Ref0. $12\text{kgf}\cdot\text{m}$ }

【4】 Operation

4-1. Inverter driving

(1) Standard motor driven by inverter (V/F control) continuously (Based on 60Hz)

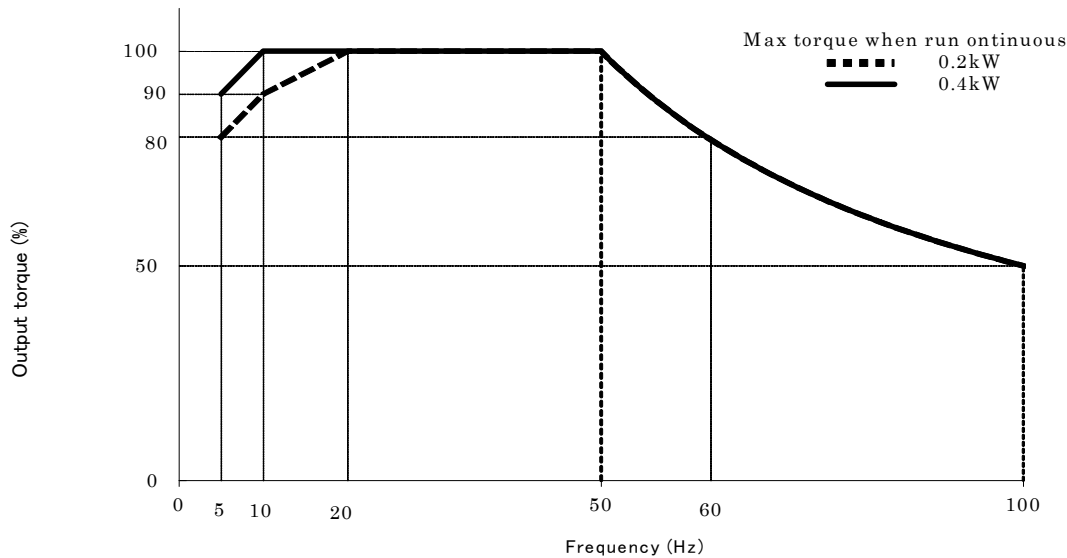


Output torque (%):100% is the torque of motor rated at 60Hz
(Base frequency:60Hz)

Can be used at continuously with 100% torque at 60Hz in the range of 6-60Hz. Please set the base frequency voltage to 200V for 200V motor and 400V for 400V motor.

- ① Allowable torque is reduced at 60Hz through 120Hz. Please be carefully for the load torque.
- ② Set the parameter of base voltage and frequency to match with each parameter shown on the nameplate.
- ③ The base frequency on inverter should be 60Hz.
- ④ Please use the function of torque boost in the inverter, if 100% torque is needed at the low frequency. Be carefully for long time operation with much enough torque boost, it may cause over heat on the motor.
- ⑤ The motor may vibrate sympathetically, due to the specific frequency. In the case of continuously operation, should avoid to use in the range of resonance frequency by changing carrier frequency and/or so on.
- ⑥ Under low load in the test run as example, the motor current may be shown at higher value. It may cause from motor characteristic and it is not abnormal. The motor current can be lower by changing the parameter on inverter, such as decreasing the torque boost, decreasing V/F, and/or using vector control.
- ⑦ In order to protect the motor from overheating, use electronic thermal and set as done for standard motor or install thermal relay between inverter and motor.
- ⑧ For brake type, refer to the wiring diagrams on pages5(3-2). Activation of brake greater than 60 Hz, can damage the brake lining.
- ⑨ Torque characteristics shown here are only for the motor itself. The efficiency of the worm gear must be taken into consideration particularly when using a Croise motor.
- ⑩ When using a VFD with a 400V class motor, high voltage spikes (micro surges) occur as the VFD switches, which can result in insulation failure. Because the motor must be protected against micro surges, Tsubakimoto Chain provides protection against micro surges for all standard 400V class motors, even if not instructed to do so. However, if the level exceeds 1250V, install suppression filters and reactors on the inverter side.
- ⑪ Temperature rise, noise, and vibration levels will be higher than when using mains service power.

(2) Standard motor driven by inverter (V/F control) continuously (Based on 50Hz)



Output torque(%):Output torque 100% is based on motor rated at 50Hz
(Base frequency to be set at 50Hz)

0.2 kW motor; the output torque is limited as 80% at 5Hz, and as 90% at 10Hz. It can operate with 100% of torque from 20 to 50Hz.

0.4kW motor; the output toque is limited as 90% at 5Hz and, it can operate with 100% of torque from 10 to 50Hz.

When the output torque is required 100% , the function of automatic torque boost of inverter or vector control VFD can be used, Base frequency on inverter to be set as 200V for the 200V motor, and set as 400V or 380V for the 400V.

- ① Allowable torque is reduced at 50Hz through 100Hz. Please be carefully for the load torque.
- ② Set the parameter of base voltage and frequency to match with each parameter shown on the nameplate.
- ③ The base frequency on inverter should be 50Hz.
- ④ Please use the function of torque boost in the inverter, if 100% torque is needed at the low frequency. Be carefully for long time operation with much enough torque boost, it may cause over heat on the motor.
- ⑤ The motor may vibrate sympathetically, due to the specific frequency. In the case of continuously operation, should avoid to use in the range of resonance frequency by changing carrier frequency and/or so on.
- ⑥ Under low load in the test run as example, the motor current may be shown at higher value. It may cause from motor characteristic and it is not abnormal. The motor current can be lower by changing the parameter on inverter, such as decreasing the torque boost, decreasing V/F, and/or using vector control.
- ⑦ In order to protect the motor from overheating, use electronic thermal and set as done for standard motor or install thermal relay between inverter and motor.
- ⑧ For brake type, refer to the wiring diagrams on page 5,3 - 2. Activation of brake greater than 50 Hz, can damage the brake lining.
- ⑨ Torque characteristics shown here are only for the motor itself. The efficiency of the worm gear must be taken into consideration particularly when using a Croise motor.
- ⑩ When using a VFD with a 400V class motor, high voltage spikes (micro surges) occur as the VFD switches, which can result in insulation failure. Because the motor must be protected against micro surges, Tsubakimoto Chain provides protection against micro surges for all standard 400V class motors, even if not instructed to do so.
However, if the level exceeds 1250V, install suppression filters and reactors on the inverter side.
- ⑪ Temperature rise, noise, and vibration levels will be higher than when using mains service power.

4-2. Wiring foe 3 Phase brake ttype driven by inverter

(1) 200V Class

	Purpose	0.2kW 0.4kW
AC external operation	•General inverter drive Note: Use auxiliary relays (MCa) of contact rating over and AC200V7A (resistance load).	※1 Set the supply voltage to the brake, AC200V—AC220V.
DC external wiring + AC external operation	•In case an elevator and stopping accuracy is required Note: Use MCa of contact rating over and AC200V7A (resistance load), while MCb of contact rating over and AC200V10A (resistance load).	※1 Set the supply voltage to the brake, AC200V—AC220V

M: Motor B: Brake MC: Magnetic contactor MCa/MCb: Auxiliary relay
OCR: Overcurrent relay DM200D/PM180B: DC Module -N-: Varistor

Note 1) Brake voltage is DC90V (when AC200V is supplied to DC module)

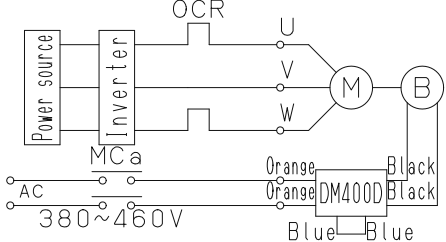
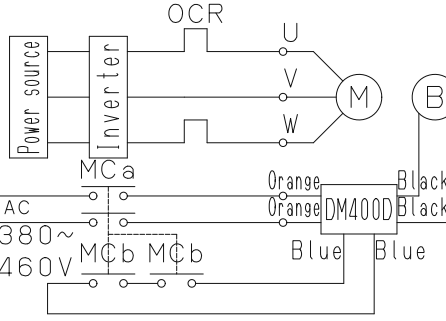
Note 2) For DC external wiring, connect varistor (surge absorption device). --- refer to p.19

Note 3) Be sure the power source for the brake is from the input side of the inverter and synchronize brake operation and motor ON/OFF.

Note 4) Closing or opening MCa requires interlock with the inverter. Refer to the instruction manual for the inverter.

Note 5) PM180B is used for 5.5kW. Due to built-in relays, DC external wiring is prohibited.

(2) 400V class

	Purpose	0.2kW to 0.4kW
AC external operation	General inverter drive	 Use auxiliary relays (MCa) of contact voltage AC400v to AC440v and inductive load 1A and more.
DC external wiring + AC external operation	In case an elevator and stopping accuracy is required	 Use auxiliary relays (MCa) of contact voltage AC400v to AC440v and inductive load 1A and more. Connect in series two or three auxiliary relays (MCb) of contact voltage AC400Vto AC440V and inductive load 1A and more.

M: Motor B: Brake MC: Magnetic contactor MCa, MCb: Auxiliary relay
OCR: Overcurrent relay DM400D MH1: DC Module

Note 1) Be sure the power source for the brake is from the primary side of the inverter and synchronize brake operation and motor ON/OFF.

Note 2) Closing or opening MCa requires interlock with the inverter. Refer to the instruction manual for the inverter.

【5】 SLB brake (0.2kW to 0.4kW with brake) specification

5-1. SLB Brake Specification

Brake		Engaged when de-energized, DC electromagnetic brake			
Motor Capacity		0.2kW		0.4kW	
Voltage		200V	400V	200V	400V
Brake model number		SLB02	SLB02V 180V	SLB04E	SLB04E 180V
DC module voltage		DM200D	DM400D	DM200D	DM400D
Rated static friction torque	N·m	1.96		3.92	
Rated static friction torque	N·m	1.57		3.14	
DC module voltage		DC90V	DC180V	DC90V	DC180V
Amperage (A)20°C		0.178	0.083	0.179	0.101
Capacity (W)20°C		16.0	15.0	16.1	18.2
Total brake duty	x10 ⁷ J	18.5	18.5	36.6	36.6

5-2. Reference of Braking Time

Switch off to Braking time (second)

(Different from braking time)

	0.2 kW	0.4kW
AC internal wiring	0. 20~0. 24	0. 30~0. 45
AC external wiring	0. 10~0. 13	0. 12~0. 15
AC external operation	0. 10~0. 13	0. 12~0. 15
DC wxternal wiring	0. 04~0. 06	0. 04~0. 06

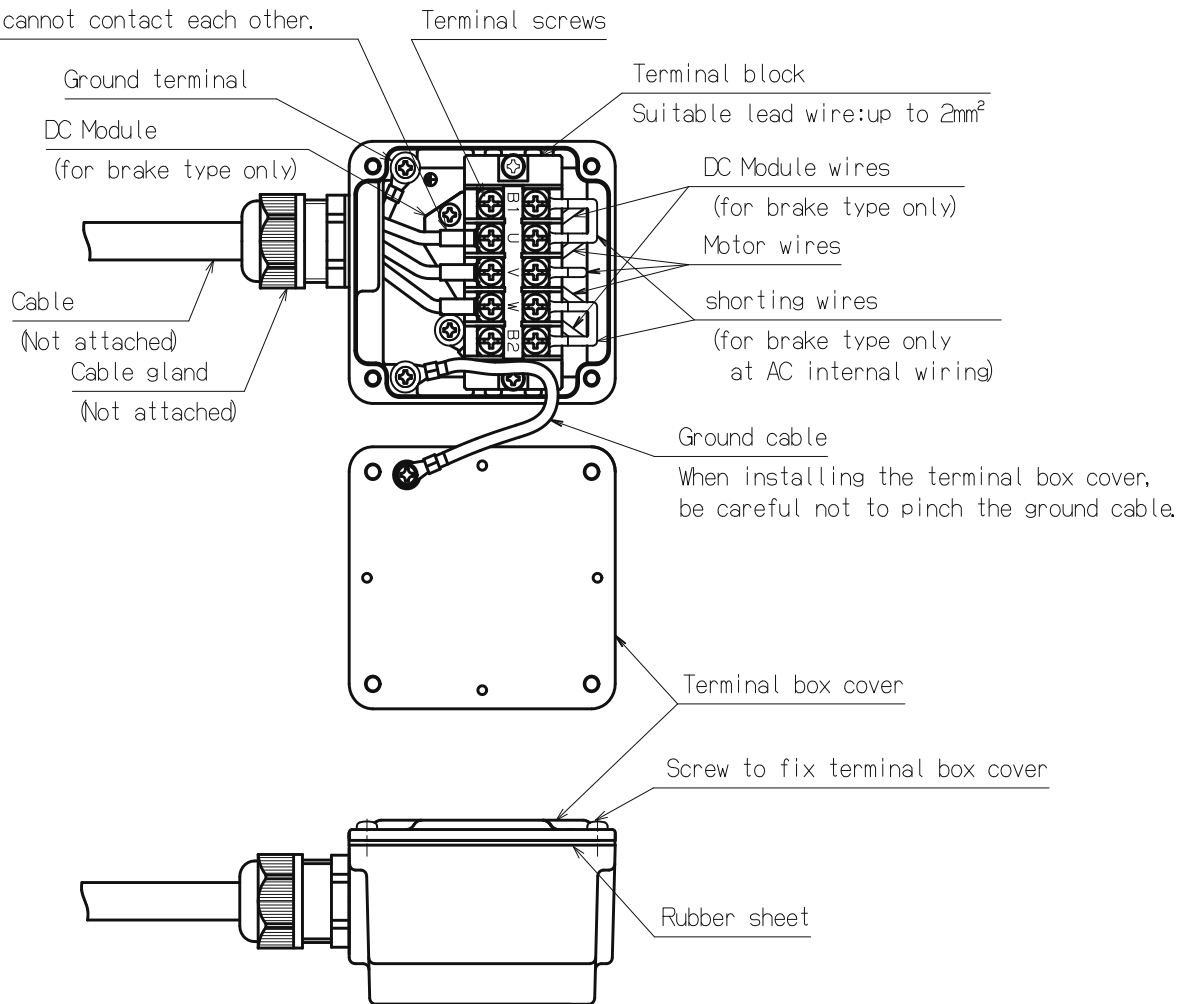
【6】 CE Marking Motor

When using this product, please pay close attention to the following as well as to the explanations in Sections 1 to 5.

(1) Specifications of terminal box

Material: Aluminum die-casting

Insulate here with mark tube, etc. so that the terminals cannot contact each other.



	Tightening torque	
	N・m	kgf・m
Terminal screws	1.8	0.18
Screws for Ground terminal	1.2	0.12
Screws for Terminal box cover	1.2	0.12

(2) Wiring for motor/brake

Refer to standard type.

(3) Motor rotation direction

The motor rotational direction is clockwise, view from the counter load side, TA series Instruction Manual (TA01.00TS E-*) in wiring at the chart 6 (page16). (The motor rotational direction is the same as the standard.)

(4) Overload (overheat) protection device

Install the thermal relay certified in Europe. Set the thermal within rated current printed on the nameplate.

(5) Grounding

Make sure to connect to ground using the ground terminal.

Please note that a ground cable is attached to the terminal box and cover. There is a risk of electric shock when a ground cable is not attached to the terminal box and cover and start the operation.

Applying an excessive force may damage the cover and cable.

When putting on the cover to the box, make sure that all the wires are set inside the box and do not stick out and the cover lays flat. There is a risk of electric shock, injury, or fire when the wires are stuck out.

(6) Application

The Gearmotor/Hypoid Motor/Croise motor is designed for Over voltage Category III. Degree of Pollution defined by IEC664.

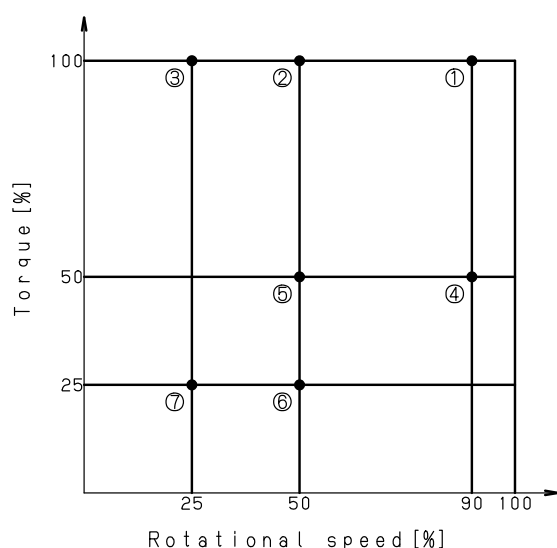
Supply power to the motor via transformer.

May use inverter to drive. However inverter drive is not recognized by EN Standards.

(7) Losses at 7 operating points, (EU) 2019/1781

Please refer to the material in below link.

<https://tt-net.tsubakimoto.co.jp/tecs/pdct/gen/pdf/TA40.00TS.pdf>



【7】 Motors for China

※CCC compliant.

Please take into consideration the following items in addition to sections 1 to 5 when using the product.

(1) Terminal box specifications

Same as specifications for standard terminal box on page 6.

Note: Insulate wiring with marked tubes to prevent terminals from directly touching each other.

(2) Motor/brake wiring

Refer to standard type.

(3) Direction of rotation of motor

When using the wiring configurations shown TA series Instruction Manual (TA01.00TS E-*) in Fig. 6 (pages 16), the direction of rotation of the motor is clockwise when viewed from the opposite side of the load. (The direction of rotation of the motor is the same as standard motors.)

(4) Overload (overheat) protection device

Be sure to install a thermal relay to protect against motor burnout.

Use the amperage listed on the nameplate for the thermal setting.

(5) Grounding

An ground terminal is provided, so be sure to ground the product.

【8】 China RoHS Instruction

本资料是中国ROHS的必备资料 (China RoHS requisite document)

GMTR、HMTR

零部件名称 (Part Name)	有害有毒物质或者元素 (Hazardous Substances or Elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电动机 (Motor)	×	○	○	○	○	○
铝制减速机箱体 (Aluminum Reducer Case)	×	○	○	○	○	○

本表格依据SJ/T 11364 的规定编制
(This document is prepared in conformity with SJ/T11364.)

○：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下
(Shows that the concentration of the hazardous substance does not exceed the concentration limits specified in GB/T26572.)

×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求
(Shows that the concentration of the hazardous substance exceeds the concentration limits specified in GB/T26572.)

本资料是中国ROHS的必备资料(China RoHS requisite document)

CSMR、HCMR

零部件名称 (Part Name)	有害有毒物质或者元素 (Hazardous Substances or Elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电动机 (Motor)	×	○	○	○	○	○
铝制减速机箱体 (Aluminum Reducer Case)	×	○	○	○	○	○
蜗轮 (Worm Wheel)	×	○	○	○	○	○

本表格依据SJ/T 11364 的规定编制。
(This document is prepared in conformity with SJ/T11364.)

○：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下
(Shows that the concentration of the hazardous substance does not exceed the concentration limits specified in GB/T26572.)

×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求
(Shows that the concentration of the hazardous substance exceeds the concentration limits specified in GB/T26572.)



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