ITOH DENKI

POWER MOLLER® 24!

DC brushless motorized roller with integral driver card

XE/XP series Handling instructions

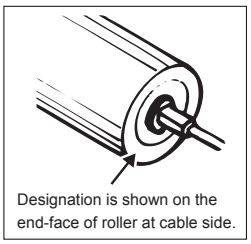
Applicable models : PM486XE/XP, PM500XE/XP, PM570XE/XP, PM605XE/XP

We thank you for your purchase of our Power Moller or Motorised drum.
Please read this handling instructions first to understand the product, safety information and cautions before using the product.
Keep this handling instructions readily accessible for reference.

After opening the package

Make sure whether the product you received complies to your purchase order, with its designation, specifications and operating voltage.

ex. PM486XE －17－400－D－024－DR－C 007－NN－VG

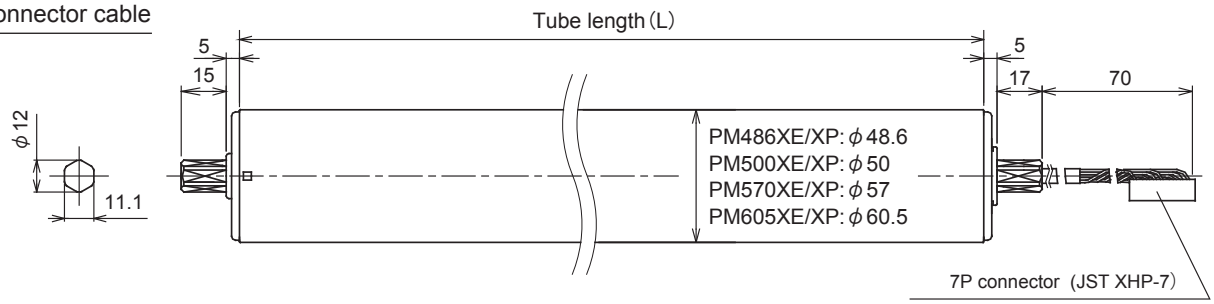


Designation is shown on the end-face of roller at cable side.

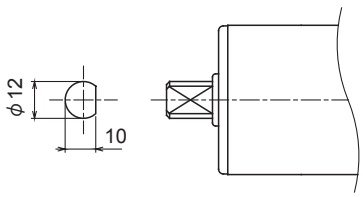
- Nominal speed
- Tube length
- Operation voltage
- Options①
  - DR ：Dripproof
  - WH：IP66 Version (Available only for Hex shaft) (Available only for PM486XE/XP)
  - JD ：D-shaped shaft
- Cable
  - C：Power cable
  - M：M8 connector cable (5P)
- Cable length (cm)
  - ex. ：007＝7cm（70㎜）
  - 030＝30cm（300㎜）
  - 100＝1m（1000㎜）
- Input/Output signal
  - NN：NPN input/output
  - NP：NPN input PNP output
- Options②
  - VG：V- ribbed pulley
  - P2：Double grooved tube

Dimensions

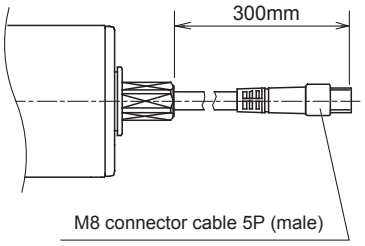
・JST connector cable



・D-shaped shaft



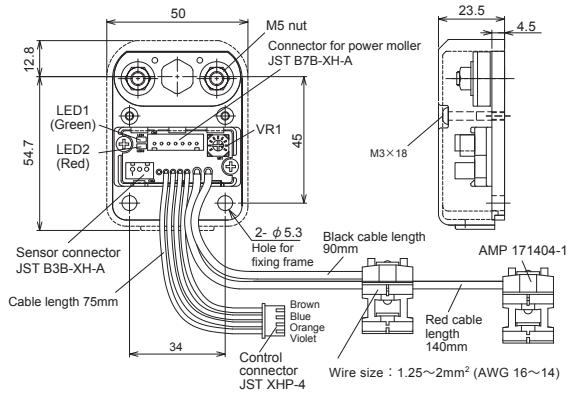
・Dripproof ／IP66 Version ／M8 5P Connector cable



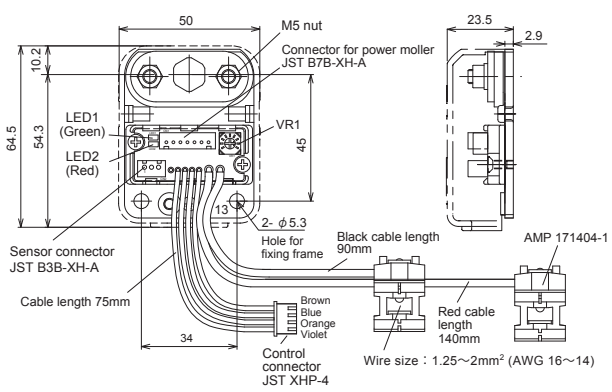
No.467

Mounting bracket

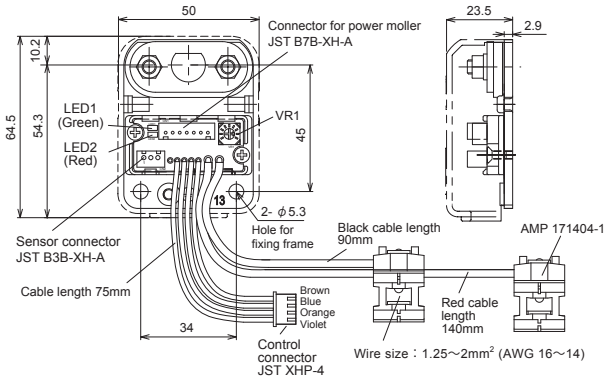
I/O Terminal Bracket (For Hex shaft) No.MBB-A80-G【Option】



I/O Terminal Bracket (For Hex shaft) No.A-A80-G【Option】

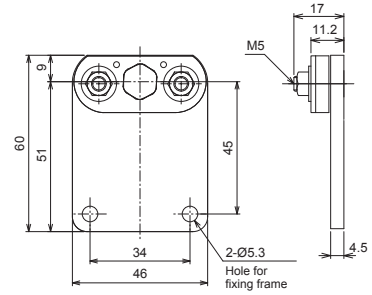


I/O Terminal Bracket (For D-shaped shaft) No.A-A00-G【Option】

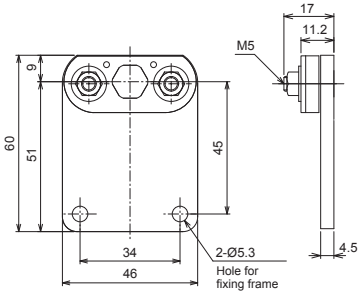


＜Dripproof／M8 5P connector cable＞

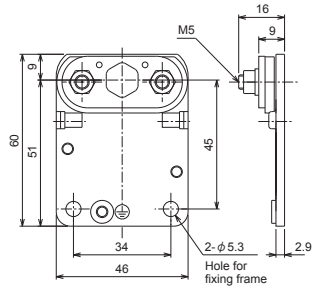
For Hex shaft No.MBB-081【Option】



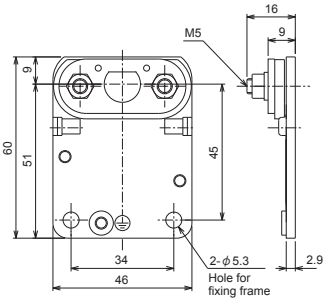
For Hex shaft No.MBB-071【Option】



For Hex shaft No.A-081-G【Option】

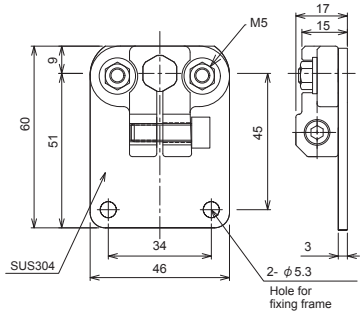


For D-shaped shaft No.A-001【Option】



＜IP66 Version＞

For Hex shaft No.MBD-081-D【Standard】



To use the product properly and safety

In this handling instructions, safety instructions are classified into "Danger" and "Warning" as per below description, to ensure the proper use of the product.

⚠ **WARNING**	Failure to comply with instruction may cause death or serious injury.
⚠ **CAUTION**	Failure to comply with instruction may cause injury, disability or physical damage.

Installation / Wiring

⚠ WARNING

- Make sure the operating voltage and wiring diagrame to ensure the correct wiring, to avoid electrical shock and fire.
- Respect the procedure and make sure the connection and wiring for the product.
- Do not use the product in explosive, ignitable gas, corrosive, watery environment, or around flammable products.
- Switch off the power, when conveyor removal, wiring or maintenance is done, otherwise you have a risk of electrical shock or injury.
- Respect the electrical regulations of the site or the equipment, where the product is installed. (Labour safety and sanitary regulations, electrical equipment technical standard, etc)

⚠ CAUTION

- Make sure the Power Moller is tightly fixed in place before operation, (Use the proper fixing bracket we specify)to avoid injury or damage to the equipment.
- Make sure the rotating direction of the Power Moller before installation to the conveyor frame , to avoid injury or damage to the equipment.
- Make sure not to damage a cable sheath when it goes through the conveyor frame.
- Make sure the Power Moller and fixing bracket is properly fixed in the frame at our specified fastening torque.
- Mount leaving about 2-5mm between the Power Moller and the flame.
- Adjust the horizontal level of the Power Moller and adjacent idler rollers so that the load will be applied evenly to each rollers.
- Make sure the conveyor frame is grounded.
- A device should be set up so that all of the Power Moller starting are monitered from the operation position.
- Do not pull (force > 1N), damage, twist, modify, or forcibly bend the power cable or leadwires. Do not stack, put heavy load on the power cable or sandwich it. There will cause for serious electric hazard, fire or motor failure.
- This XE/XP series Power Moller is integral motor driver type. Do not give strong impact load to the Power Moller such as drop, strike, so as not to damage the unit.

Operation

⚠ WARNING

- Do not operate the product with "live" electrical part exposed to avoid electric hazard.
- Turn the RUN/STOP switch to STOP in case of electricity failure, to avoid the risk of injury by the possible sudden restart .
- For accident avoidance, the only person designated by the employer with the training on the operation and maintenance method is allowed to operate.
- The failure of the driver card can make the input/output ON or OFF.
  In the place where the accident could happen the monitoring control equipment should be set up outside so as to respond immediately.

⚠ CAUTION

- Make sure the product specifications to ensure the correct operating, to avoid electrical shock, injury, fire, or damage to the equipment.
- Do not ride on the conveyor where the Power Moller is installed, to avoid injury or damage to the equipment.
- At the time of the startup, please confirm the safety and make sure that nobody touches the Power Moller.
- An emergency stop button should be ready before starting the operation, to avoid injury or damage to the equipment.
- Switch off the power immediately if abnormal situation arises, to avoid electrical shock, injury, or fire,
- Keep your hand or body away from the Power Moller no matter how the unit is powered or unpowered, to avoid a risk of finger trap or heat injury,
- Keep clean around the Power Moller. The packing materials twining around the Power Moller causes an unexpected accident.
- Make sure to load homogeneously. (There is a risk that the Power Moller get broken and its product lifetime decreases.)
- Never start up and shut down the Power Moller with PS. (There is a risk that the Power Moller get broken and its product lifetime decrease.)
- Do not switch on/off the relay or the contactor. It makes a loud noise to cause the machine blunder.
- The input signal should last longer than 15ms. Otherwise no reaction or the machine malfunction is caused.
- After power-on the Power Moller won't start for a second.
- Do not force the Power Moller to turn. It may cause of damage to the driver card or shorten its life cycle.

Transport

⚠ CAUTION

- Do not hang the product from the power cable, or motor shaft when carrying the product, to avoid injury caused by dropping the product or electrical shock by disconnection.

Other

⚠ CAUTION

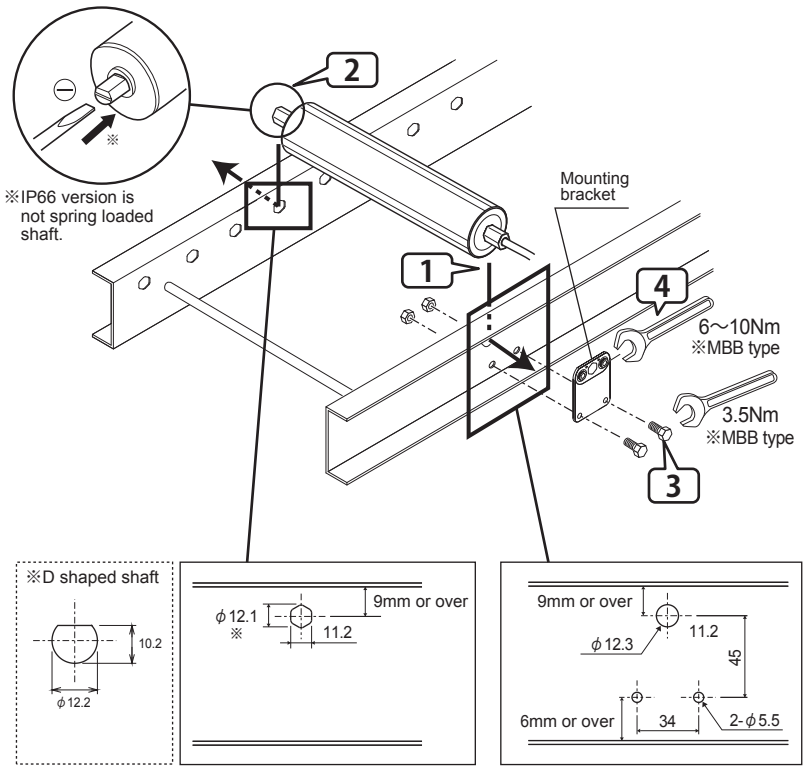
- Do not disassemble, repair not modify the product (for which we do not warrant). It might be the cause of electrical shock, injury or fire.
- Make sure rent out or transfer of this product should be accompanied by this manual.
- Dispose this product in industrial waste.
- At the time of the maintenance, make sure the main power is switched off prohibiting the machine to operate.

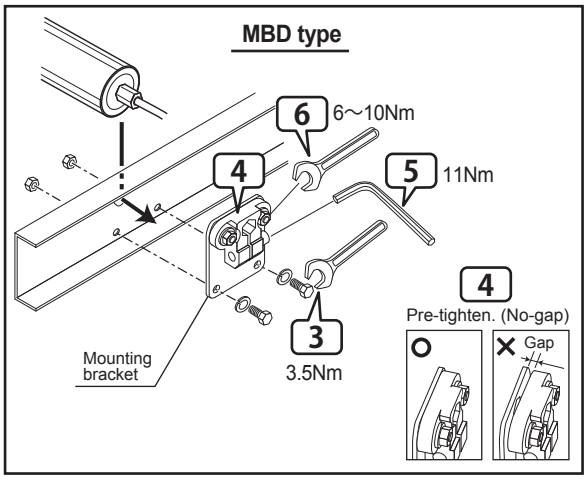
Power supply

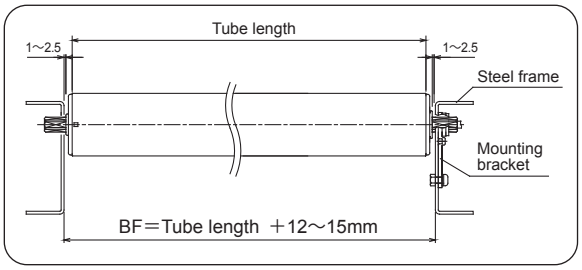
Battery （ 24VDC ）
Switching power supply （ XP：24VDC・over 4A　XE：24VDC・over 2A ）
Smoothed and rectified power supply
（ w/ smoothing capacitor, 24VDC ripple less than 10% ）

⚠ CAUTION	The power supply should not be affected by peak current 20A for 1msec.

Installation





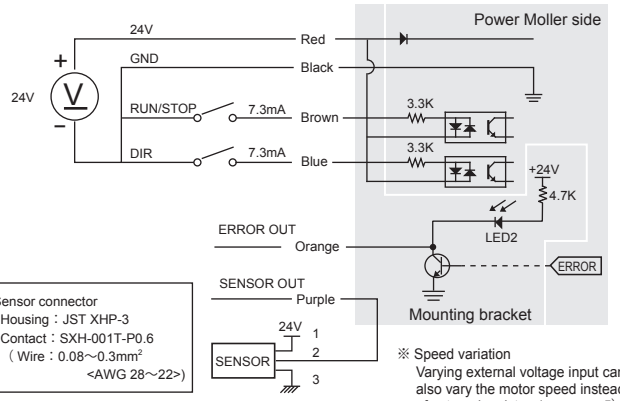


Wiring

＜In case I/O Terminal Bracket (No.MBB-A80-G/ No.A-A80-G/ No.A-A00-G) is used ＞

NPN input

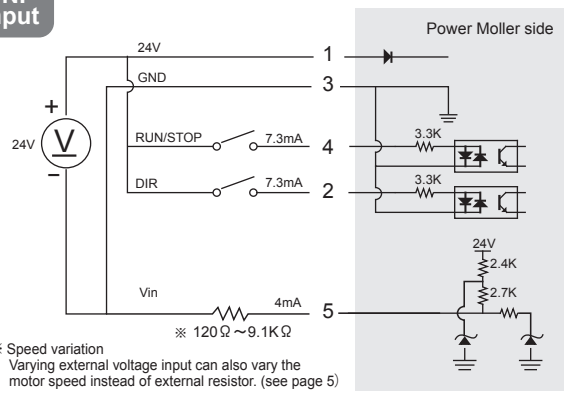
⚠ CAUTION In the case the specified I/O unit is not used, cut and remove the connector (JST XHP-4) for direct wiring.



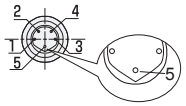
※ Speed variation
Varying external voltage input can also vary the motor speed instead of external resistor. (see page 5)

＜Dripproof ／IP66 Version ／M8 5P connector cable＞

PNP input



※ Speed variation
Varying external voltage input can also vary the motor speed instead of external resistor. (see page 5)

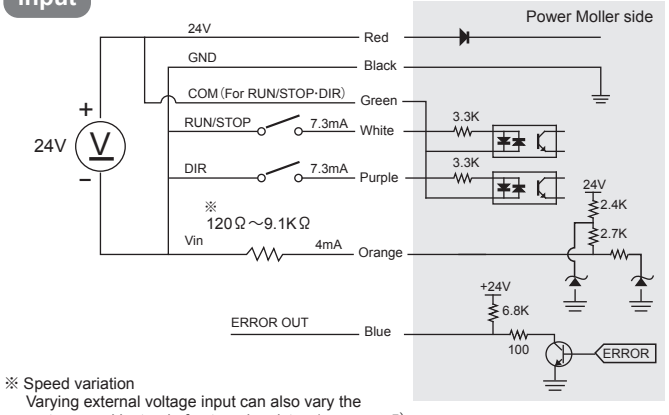


＊ Refer to the picture on the left and carefully plug in. Otherwise malfunction, or damages to other devices will be caused.

＜In case I/O Terminal Bracket (No.MBB-A80-G/ No.A-A80-G/ No.A-A00-G) is not used ＞

NPN input

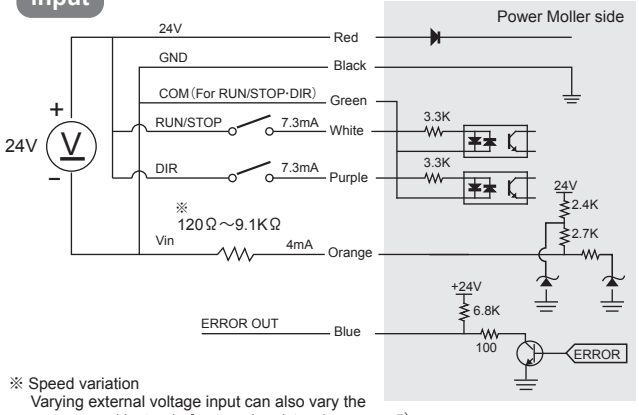
● When using 0V Input for RUN/STOP and DIR selection



※ Speed variation
Varying external voltage input can also vary the motor speed instead of external resistor. (see page 5)

PNP input

● When using 24V Input for RUN/STOP and DIR selection

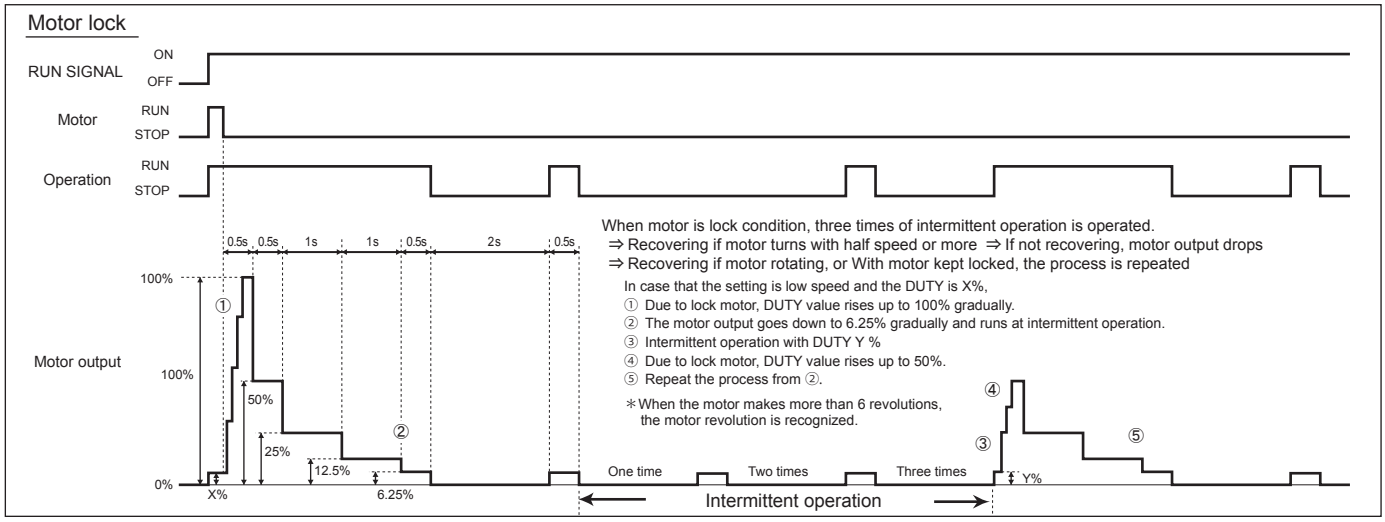


※ Speed variation
Varying external voltage input can also vary the motor speed instead of external resistor. (see page 5)

Operation

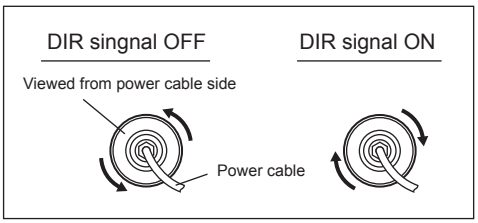
RUN/STOP

- Power Moller will run and stop by RUN/STOP signal.
- When motor is locked, motor output goes slowly down and runs at intermittent operation. (Error output is not discharged.)

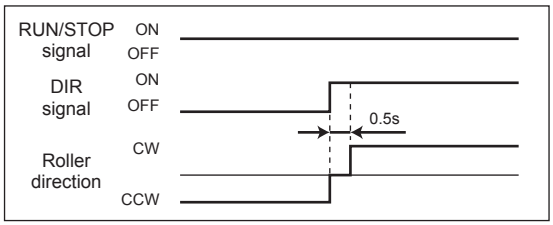


Rotation direction

- Switch the rotation direction by DIR signal.



- DIR signal can be permitted while motor is running



Speed variation

- Speed of the Power Moller can be varied either by adjustment of external resistor or by external voltage input.

PM486XE/XP

Speed Level	※External Voltage	※External Resistor (Ω)	Nominal Speed 100m/min	Nominal Speed 60m/min	Nominal Speed 30m/min	Nominal Speed 17m/min
10	9.3～10 or No input voltage	9.1K or over or Open	101.1	60	28.4	16.9
9	8.5±0.2	6.2K	92.7	55	26.0	15.5
8	7.5±0.2	4.3K	75.8	45	21.3	12.7
7	6.5±0.2	3.3K	67.4	40	18.9	11.3
6	5.5±0.2	2.2K	59.0	35	16.6	9.9
5	4.5±0.2	1.8K	50.6	30	14.2	8.4
4	3.5±0.2	1.2K	33.7	20	9.5	5.6
3	2.5±0.2	750	25.3	15	7.1	4.2
2	1.5±0.2	430	16.9	10	4.7	2.8
1	0～0.9	120 or less or Short	12.6	7.5	3.6	2.1

※ When the mounting bracket with I/O terminal is mounted, adjust at a pot on the drive card.

PM500XE/XP

Speed Level	※External Voltage	※External Resistor (Ω)	Nominal Speed 100m/min	Nominal Speed 60m/min	Nominal Speed 30m/min	Nominal Speed 17m/min
10	9.3～10 or No input voltage	9.1K or over or open	104.0	61.7	29.2	17.4
9	8.5±0.2	6.2K	95.4	56.6	26.8	15.9
8	7.5±0.2	4.3K	78.0	46.3	21.9	13.0
7	6.5±0.2	3.3K	69.4	41.2	19.5	11.6
6	5.5±0.2	2.2K	60.7	36.0	17.0	10.1
5	4.5±0.2	1.8K	52.0	30.9	14.6	8.7
4	3.5±0.2	1.2K	34.7	20.6	9.7	5.8
3	2.5±0.2	750	26.0	15.4	7.3	4.3
2	1.5±0.2	430	17.3	10.3	4.9	2.9
1	0～0.9	120 or less or Short	13.0	7.7	3.7	2.2

※ When the mounting bracket with I/O terminal is mounted, adjust at a pot on the drive card.

PM570XE/XP

Speed Level	※External Voltage	※External Resistor (Ω)	Nominal Speed 100m/min	Nominal Speed 60m/min	Nominal Speed 30m/min	Nominal Speed 17m/min
10	9.3～10 or No input voltage	9.1K or over or open	118.6	70.4	33.3	19.8
9	8.5±0.2	6.2K	108.7	64.5	30.5	18.2
8	7.5±0.2	4.3K	88.9	52.8	25.0	14.9
7	6.5±0.2	3.3K	79.1	46.9	22.2	13.2
6	5.5±0.2	2.2K	69.2	41.0	19.5	11.6
5	4.5±0.2	1.8K	59.3	35.2	16.7	9.9
4	3.5±0.2	1.2K	39.5	23.5	11.1	6.6
3	2.5±0.2	750	29.6	17.6	8.3	5.0
2	1.5±0.2	430	19.8	11.7	5.5	3.3
1	0～0.9	120 or less or Short	14.8	8.8	4.2	2.5

※ When the mounting bracket with I/O terminal is mounted, adjust at a pot on the drive card.

PM605XE/XP

Speed Level	※External Voltage	※External Resistor (Ω)	Nominal Speed 100m/min	Nominal Speed 60m/min	Nominal Speed 30m/min	Nominal Speed 17m/min
10	9.3～10 or No input voltage	9.1K or over or open	125.9	74.7	35.4	21.0
9	8.5±0.2	6.2K	115.4	68.5	32.4	19.3
8	7.5±0.2	4.3K	94.4	56.0	26.5	15.8
7	6.5±0.2	3.3K	83.9	49.8	23.5	14.0
6	5.5±0.2	2.2K	73.4	43.6	20.7	12.3
5	4.5±0.2	1.8K	62.9	37.3	17.7	10.5
4	3.5±0.2	1.2K	42.0	24.9	11.8	7.0
3	2.5±0.2	750	31.5	18.7	8.8	5.3
2	1.5±0.2	430	21.0	12.4	5.9	3.5
1	0～0.9	120 or less or Short	15.7	9.3	4.5	2.6

※ When the mounting bracket with I/O terminal is mounted, adjust at a pot on the drive card.

Error output

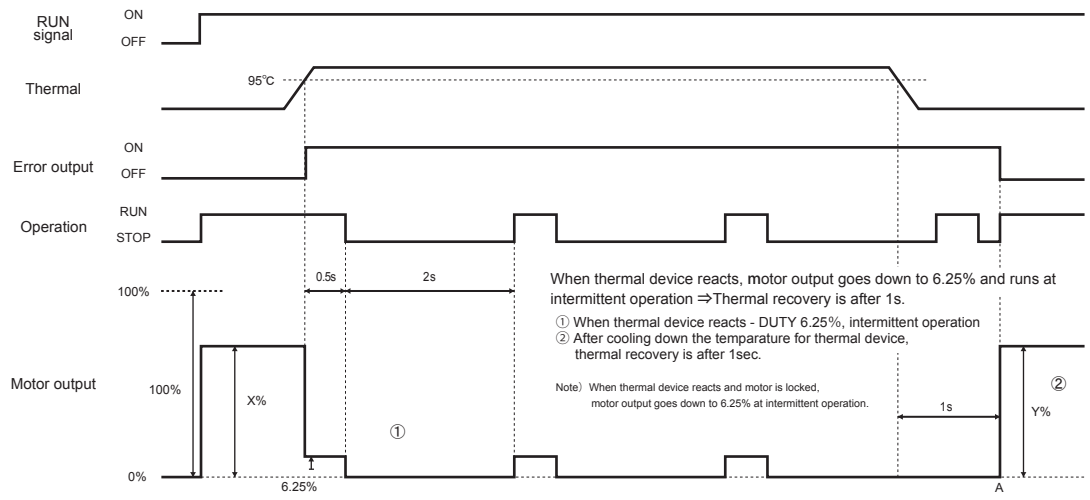
- Thermal error／ Low voltage error／ EMF error

  ＊ Error output is not applicable for Dripproof, IP66 version, and 5 pin connector cable.

Thermal error

- Error signal is discharged when thermal protector reacts at 95℃ on the PCB inside of the motor
- Motor output goes down to 6.25% for cool down and runs at intermittent operation 0.5s ON / 2s OFF when thermal protector device reacts.
- Thermal error is automatically reset when temperature on circuit board becomes under 95℃.

Thermal operation

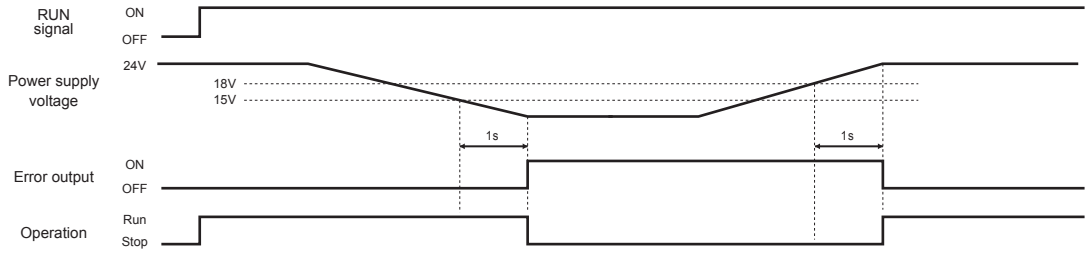


Low voltage error

- Error signal is discharged and Power Moller stops when voltage drops down to 15V or less continuously for 1 second.
- Low voltage error is automatically discharged when voltage raises 18V or over continuously for 1 second.

caution) When voltage becomes under 8V, Power Moller makes unexpected operation such as no error discharges.

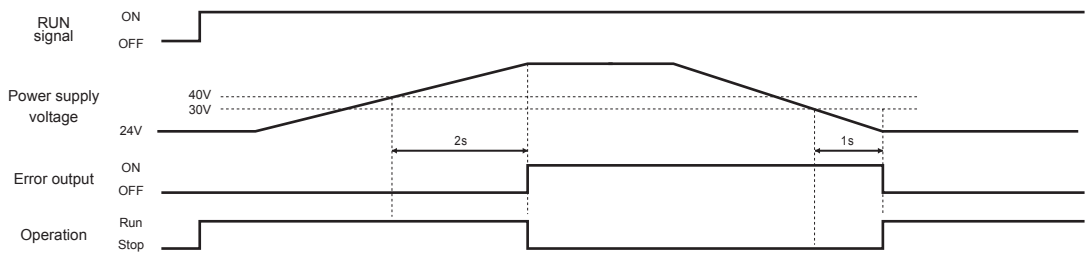
Low voltage error operation



EMF error

- Error signal is discharged and Power Moller stops when motor voltage on a circuit board reaches 40V due to generated EMF continuously for 2 seconds.
- EMF error is automatically reset when motor voltage becomes under 30V continuously for 1 second.

EMF error



Specification

Operation

Input voltage		DC24V(±10%)
Starting current		XE series：2.0±0.2 A　XP series： 4.0±0. 2 A
Maximum current		10A　≦1msec
Static current		0.02A
Error output ※		NPN open Colletor Pulled up with 6.8KΩ resistor
Protection		Diode to protect from reverse polarity wiring 5A fuse
Insulation class		class E
Rated current (max. speed)		XE series : 1.7A　　XP series : 2.0A
Time delay		Initial reset : ≦ 1sec
Reaction time to start motor		≦ 50msec
Thermal overload protection		reacts at 95℃ (inside of the motor)
Brake		Electrical Brake（No retentivity） 10msec delay between stop signal and mechanical brake activation
Protection		IP50（Dripproof type: IP54）(IP66 version: IP66)
Environment	Ambient temperature	0～40℃
	Ambient humidity	≦ 90%RH（no condensation）
	Atmosphere	No coorrosive gas
	Vibration	≦0.5G

※ not applicable to the roller with M8 connector cable

Cable

Standard: with JST 7P connector

Motor cable side		Connector side	
Color	Description	Pin No.	Remarks
Red	+ 24V	1	Housing JST # XHP-7 Contact JST # SXH-001T-P0.6
Black	GND	2	
Green	COMMON	3	
White	RUN	4	
Violet	DIR	5	
Orange	External speed variation	6	
Blue	ERROR	7	

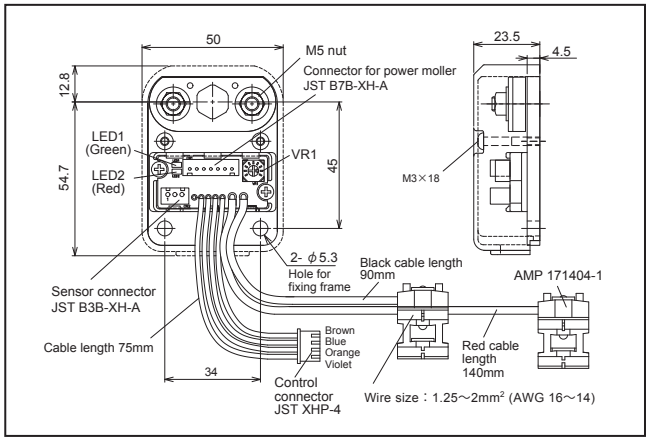
NPN error signal internally pulled up with 6.8KΩ resistor.

for Dripproof／IP66 Version／ M8 connector cable

Motor cable side		Connector side	
Color	Description	Pin No.	Remarks
Brown	+24V	1	M8 Connector 5P　(male)
White	DIRECTION (PNP)	2	
Blue	0V	3	
Black	RUN (PNP)	4	
Gray	SPEED VARIATION	5	

I/O Terminal Bracket【Option】

＊ I/O Terminal Bracket is not applicable for Dripproof, IP66 version, and 5 pin connector cable.



・Sensor connector（CN2）

Pin No.	Description	Connector	Suitable female connector
1	Power（＋24V）	Pin No. 1 2 3 JST-B3B-XH-A	Housing JST XHP-3 Contact SXH-001T-P0.6 Wire 0.08～0.3mm² （AWG 28～22）
2	Output		
3	Power（0V ＜GND＞）		

・Control connector（CN3）

Color	Description	Remarks
Brown	RUN / STOP	Connector : JST XHP-4
Blue	Direction	
Orange	Error output	
Violet	Sensor output	

Error signal : NPN output,　24V, pulled up with 4.7kΩ

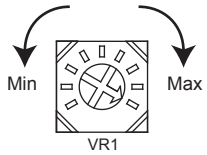
・Power cable

Color	Description	Connector No.
Red	＋24V	Cable tap　171404-1（AMP） Wire：1.25～2mm²　（AWG 16～14）
Black	0V	

・LED

LED1（Green）	Illuminates with 24VDC Power
LED2（Red）	Illuminates with error output / motor unplugged

・VR1



Speed variation: 10 steps
Default setting: Max

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Specifications are subject to change without prior notice.

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