



Driver for small type 2 phase stepping motor and applicable motor

IMS201 series

【 User's manual 】

MYCOM

MYCOM, INC.

Attention on safety

Please read this operation manual thoroughly before starting any operation. This manual will guide the customers for proper use and avoid any mis-operation. This manual if properly read, will protect the users as well as other people from possibilities physical injuries, property damage and other serious accidents.



DANGER

This danger shows the possibility that the user may die or get serious injures by fire or electrical shock and the contents which are high emergency of caution when danger is occurred if this warning is neglected and operated.



WARNING

This warning shows the possibility that the user may die or get serious injures, fire or electrical shock if this warning is neglected and operated.



CAUTION

This caution shows the possibility that the user may be injured by electrical shock or the contents which expect to issue physical damage if this caution is neglected and operated.



Danger

- Do not operate this product if it is damaged or disassembled. Otherwise, it may cause fire or electrical shock.
- In any case, do not attempt to repair or modify this product as it may cause fire, electrical shock or serious injuries.
- Do not use this product, in a place where the air includes a corrosive gas, inflammable gas, or any type of explosive gas, or the water or oil splashes, or it is near a flammable material. Otherwise, it may cause fire or electrical shock.
- Leave works such as installation, wiring, operation, checking and maintenance to experts who have enough knowledge on this product. Operation without knowledge may cause electrical shock and other serious physical or property damages.
- Keep the power supply within the rated voltage range. Otherwise, it may cause fire or other damages.
- Make sure all the connections correctly done referring to the wiring diagram shown in this user's manual. Otherwise, it may cause fire or other damages.
- Do not, in any circumstances, touch the terminal block while the power is on as there are some terminals which high voltage appeared. Otherwise, it may cause electrical shock.
- Do not touch or place objects such as metals or foreign substance on the board. Otherwise, it may cause fire or electrical shock.
- Do not bend, pull or place the power or motor lines by the extreme force. Otherwise, it may cause fire or electrical shock.
- Do not make a mistake connecting the motor output terminals to protective earth or power supply. Otherwise, it may cause fire.
- Do not do the driver's installation preventing ventilation. Otherwise, it may cause fire.
- Please stop operation soon in case that more than 60 heat generates or HEAT(over heat) function, if the device has HEAT function, acts on during operation. This is cause of fire or accident.



Warning

- Do not operate to move, wire, maintain and test etc. during power on. After power-off and ten seconds pass, please start to operate. It may cause electric shock.
- Do not touch the unit with wet hand by no means during power on. There is a reason of electric shock.
- Connect the protective earth (PE) with the protective earth terminal by no means. It may cause electric shock.
- Do not use driver outside of control box. It may cause electric shock and injure.
- Fix the driver tightly when installing. It may cause injury.
- Do not touch the driver during operation and for the time being after stop. Because the surface of driver is hot depending of operating condition, it may cause injury.
- Use power isolated from dangerous voltage. It may cause electric shock



Caution

- Avoid using or storing the unit where air is dusty. It may cause malfunctions.
- Do not give a large shock. It may cause malfunctions.
- Do not use or store this unit in a place of high or low temperature, extreme high or low humidity. It may cause a short circuit or malfunctions.
- Avoid dews to form. It may cause a short circuit or malfunctions.
- We do not have the responsibility about user's repair and modification because it is out of our guarantee.
- When abandoning the driver, treat it as industrial wastes.
- Do not leave the name plate.

If necessary, we would ask the trading company or distributor to translate this manual into the importer's mother language.

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Chapter of driver

1 . Model number

1 - 1 . Model number of driver

IMS 201 -	20	
Series name	Additional function	F: Function added CE:CE marking approved
	Power voltage	2:DC24V
	Driving current	1:Max. 1.2A/phase 2:Max. 2.0A/phase

1 - 2 . Model number of set

IMS 201 -	220F -	265A
Series name	Extension of set	

List of motor and driver combination

Extension of set	Motor model	Output current (A/phase)	Model number
243A(B)	PF243-A(B)	0.9	IMS201-120CE
244A(B)	PF244-A(B)	1.2	IMS201-120F
245A(B)	PF245-A(B)	1.2	IMS201-120
264A(B)	PF264-A(B)	2.0	IMS201-220CE
265A(B)	PF265-A(B)	2.0	IMS201-220F
268A(B)	PF268-A(B)	2.0	IMS201-220

(Remark) We cannot deliver driver alone in principal if the driver is CE marking approved.

The set of motor and driver will be delivered together.

Please contact us when driver is required alone.

Please use the motor after full evaluation and confirmation of features in usable circumstance and condition if other motor than out specific motor is used.

2 . Driver specification

Model number	IMS201-120	IMS201-120F	IMS201-120CE	IMS201-220	IMS201-220F	IMS201-220CE
Power supply	DC24V \pm 10%					
Power consumption	30W			40W		
Driving type	Bi-polar constant current type					
Driving current	Max. 1.2A (Total output current)			Max. 2.0A (Total output current)		
Correspondence motor current	Uni-polar type :Max. 1.2A/phase Bi-polar type :Max. 0.6A/phase			Uni-polar type :Max. 2.0A/phase Bi-polar type :Max. 1.0A/phase		
Basic step	1.8°					
Resolution	1/1,1/2,1/4,1/8					
Function	Standard	<ul style="list-style-type: none"> • Driving current adjustment • Auto-current down 				
	Append	/	<ul style="list-style-type: none"> • Excitation home signal (MONI) output • Power protection circuit • Power LED (Power indicator) 	/	<ul style="list-style-type: none"> • Excitation home signal (MONI) output • Power protection circuit • Power LED (Power indicator) 	
	Safety		<ul style="list-style-type: none"> • Over current protection device (Type FFx1) 		<ul style="list-style-type: none"> • Over current protection device (Type FFx1) 	
Input pulse	<ul style="list-style-type: none"> • Standard type : 2 pulses (CW, CCW) • Special type : 1 pulse(PULSE, CW/CCW) Please specify the type of input pulse when ordering.					
Signal input	<ul style="list-style-type: none"> • Photo-coupler input; Input resistance 390 • Input signal voltage: L : 0 - +0.5V, H : +4 - +5V 					
Excitation home signal output (MONI output)	/	<ul style="list-style-type: none"> • Photocoupler open-collector output, Limited capacity 25V 10mA or less 	/	<ul style="list-style-type: none"> • Photocoupler open-collector output, Limited capacity 25V 10mA or less 	/	
Insulation Resistance	There is 100M or higher when DC500V is applied at the below sections in normal temperature and humidity. <ul style="list-style-type: none"> • Power input/Motor output terminal – PE terminal • Power input/Motor output terminal – Signal I/O terminal 					
Operating environment temperature	0 to +40			No freezing		
Operating environment humidity	Less than 80%, No condensation					

Model number	IMS201-120	IMS201-120F	IMS201-120CE	IMS201-220	IMS201-220F	IMS201-220CE
Storing environment temperature	-10 to +60 No freezing					
Storing humidity	Less than 80% No condensation					
Operating height	Less than 1,000m from sea level					
Atmosphere	In the room without corrosive gas, inflammable gas and dust. Without splashing water and oil					
CE marking	Not approved		approved	Not approved		approved
Weight	56 g			57 g		
Externals size	81×51×24mm (The heat sink is contained)					
Accessories	User's manual (1 copy by package of 10 pcs.)					
Applicable motor	PF243-A(B),PF244-A(B),PF245-A(B)			PF264-A(B),PF265-A(B),PF268-A(B)		

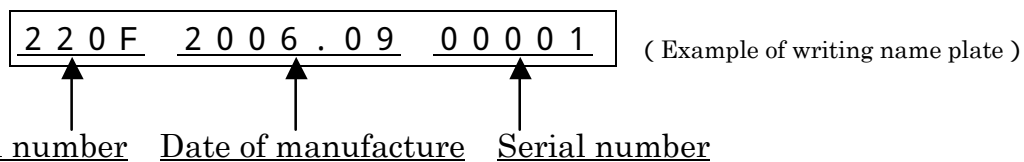
3 . Default

3-1 . Factory default

Model number		IMS201 -120	IMS201 -120F	IMS201 -120CE	IMS201 -220	IMS201 -220F	IMS201 -220CE
Phase current	Delivery by driver only	Max. 1.2A/phase			Max. 2.0A/phase		
	Delivery by set of motor and driver	PF243-A(B) : 0.9A/phase PF244-A(B) : 1.2A/phase PF245-A(B) : 1.2A/phase			PF264-A(B) : 2.0A/phase PF265-A(B) : 2.0A/phase PF268-A(B) : 2.0A/phase		
Resolution		1/8					
Input type		2 pulse type					

3-2 . Driver name plate

Do not remove the name plate(model number, date of manufacture and serial number) which is attached at the back of driver.



The above plate shows “Model number:IMS201-220F, manufacturing year: September, 2006 and Serial number:00001”.

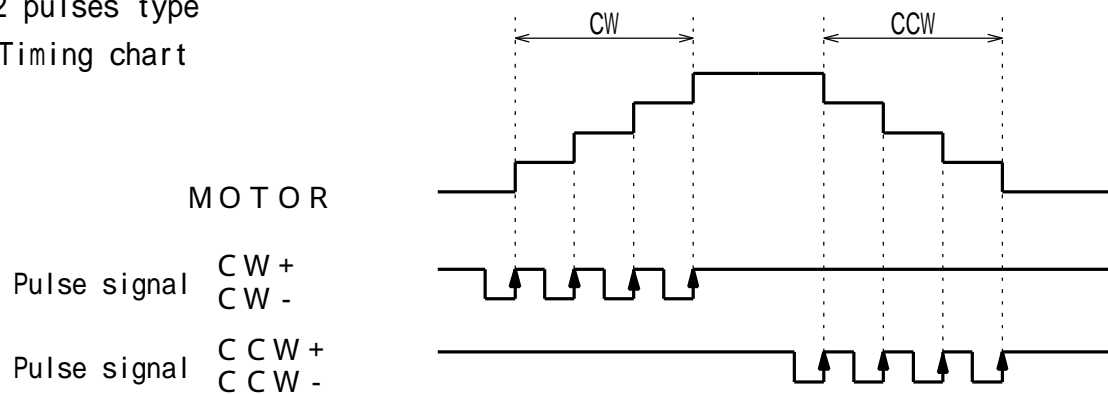
Marking item	Characters	Explanation of item
Model number	3 - 5 characters	IMS201-120 (marking:120) IMS201-120F (marking:120F) IMS201-120CE (marking:120CE) IMS201-220 (marking:220) IMS201-220F (marking:220F) IMS201-220CE (marking:220CE)
Date of manufacture	7 characters	The christian era(4 digits) month(2 digits)
Serial number	5 characters	Sequential number for each product model(00001-)

4 . Pulse signal

4-1 . Input pulse type

• 2 pulses type

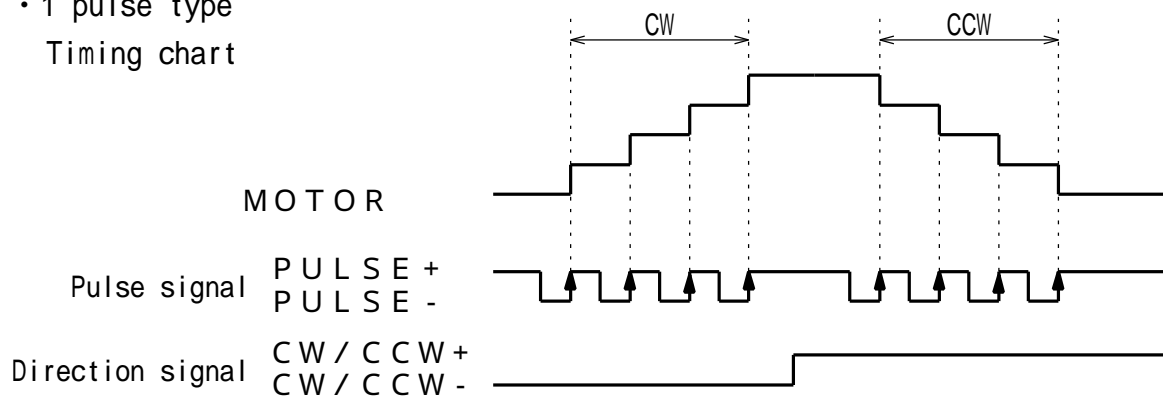
Timing chart



Motor starts to rotate by rising edge() of CCW or CW signal.

• 1 pulse type

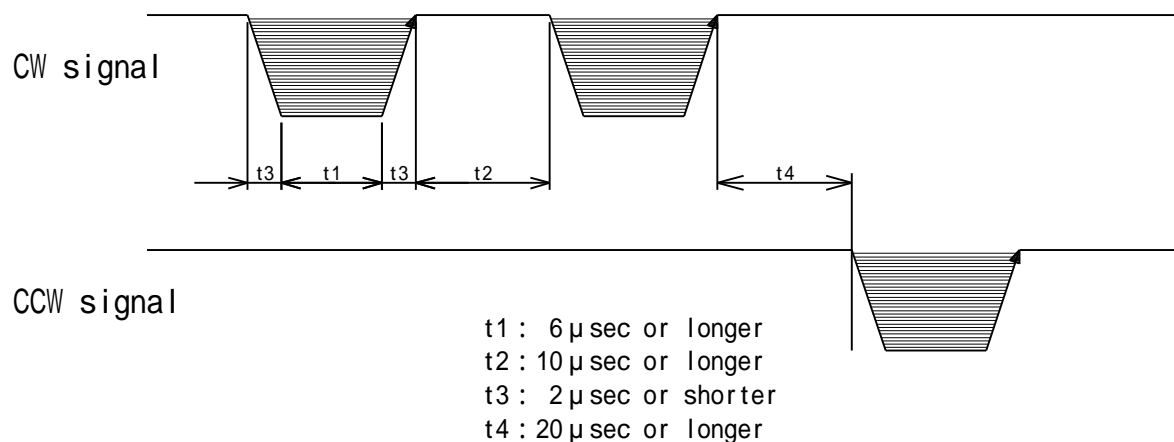
Timing chart




Motor starts to rotate by rising edge() of Pulse signal.

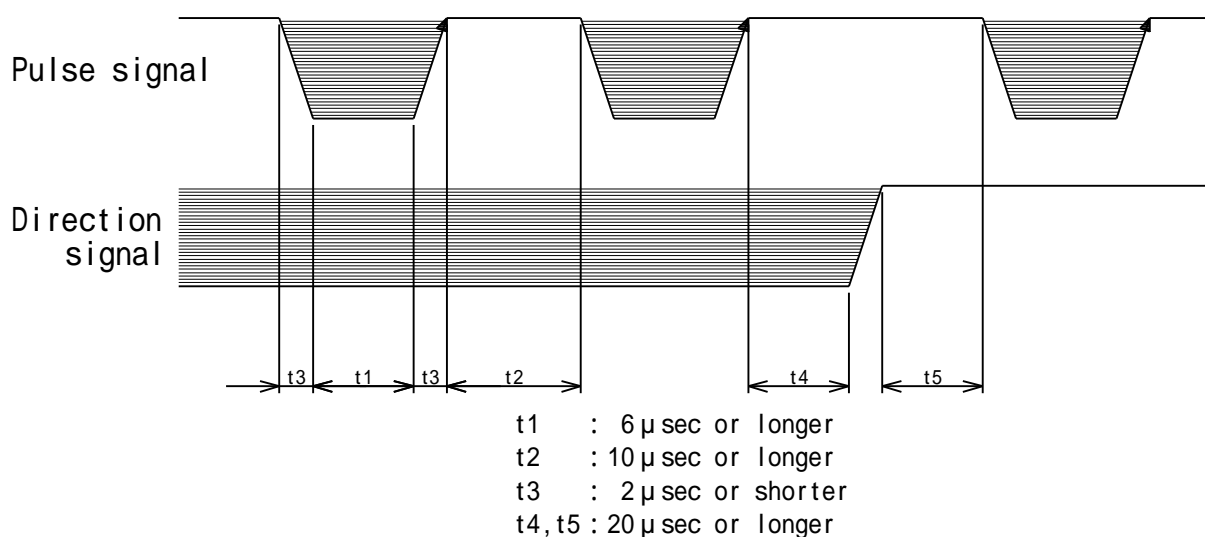
4-2 . Wave of pulse


• 2 pulses type



-  section shows ON status(turn on of photo coupler) of input circuit photo coupler.
- Motor starts to rotate by rising edge() of CCW or CW signal.

• 1 pulse type



-  section shows ON status(turn on of photo coupler) of input circuit photo coupler.
- Motor starts to rotate by rising edge() of pulse signal.
- Direction signal input is to rotate CW direction by inputting pulse signal at ON status. Also if pulse is inputted at OFF status, motor rotates to CCW direction.
- Signal name of product uses pulse signal as CW input and direction signal as CCW input.

Attention

- 1 . If the signal exceeds the voltage of DC5V in use, please insert the series resistor near to output terminal(connector) of using controller so that 10mA current pass.

$$\text{Value of resistor to be inserted()} = \frac{\text{Input voltage} - 5V}{10\text{mA}} - \text{Register value of wiring()}$$

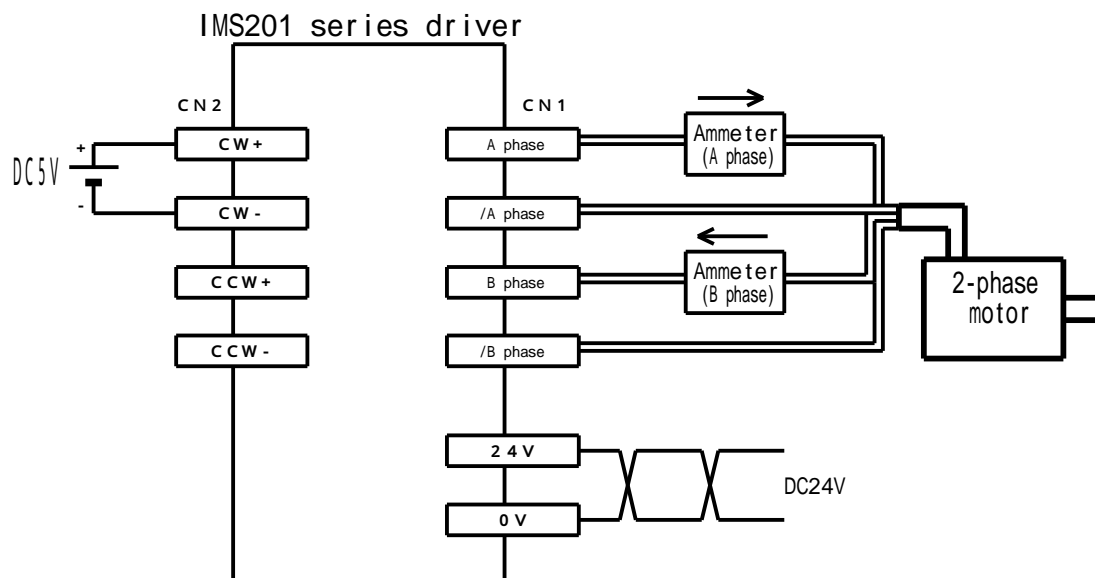
- 2 . Current down function is invalid if the photo coupler of pulse input keeps ON status at stopping.

**Attention**

5 . How to adjust driving current

Please adjust the current if other motor than Mycom brand motor is set.

Connect the ammeter with A phase and B phase of the driver as below figure.



(The arrow on the ammeter indicates the direction of the current immediately after the power supply turning on.)

Set the resolution 1/1(Both JP3 and JP4 set 1-2), confirm the position which is end of counter clock wise of C.ADJ volume(VR1), then power on driver.

Release auto-current down.(Supply DV5V between CW+ and CW- of CN2)

Adjust motor driving current by C.ADJ volume.

Turn the volume to become the total of ammeters which are connected with each phase to motor rated current .

When uni-polar motor is used, each phase is set 1/2 of motor rated current.

(Ex)

Variety of motors	Motor rated current	Figure of ammeter of each phase
Uni-polar	2.0A	1.0A
Uni-polar	1.2A	0.6A
Bi-polar	1.0A	1.0A

Valid auto-current down.(Stop supplying DC5V between CW+ and CW- of CN2.)

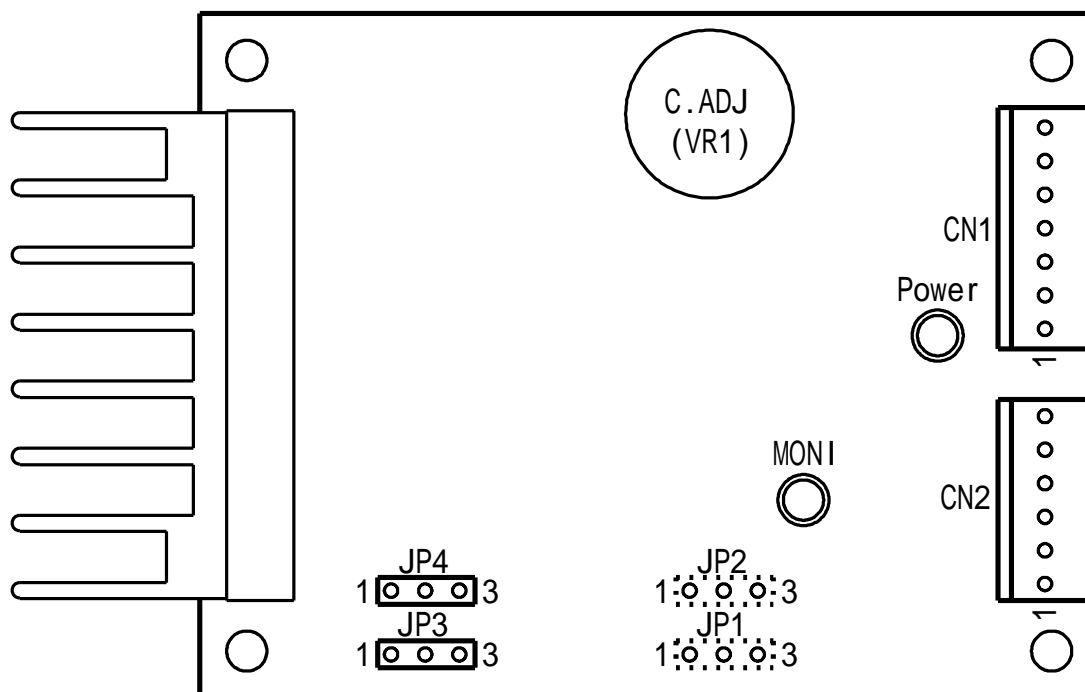


Attention

- Confirm the effective indication of the ammeter then connect.
- There is a possibility to flow over current than motor rated current if volume is turned into the end position(MAX) of clockwise direction.
- In case that the load is extremely small or vibration issues during driving, use the driver by decreasing current below motor rated current(rotate C.ADJ volume (VR1) counter-clock-wise).
- Please turn the volume under torque of $2.94 \sim 29.4\text{mN} \cdot \text{m}$ ($30 \sim 300\text{gf} \cdot \text{cm}$).

6 . Each part name and functions

6 - 1 . Each part name



Externals and arrangement chart

6 - 2 . Description of function

LED Power display LED IMS201-120F/120CE,IMS201-220F/220CE only
This lights on during power on.

LED MONI display LED IMS201-120F/120CE,IMS201-220F/220CE only
When output excitation pattern is excitation home, this LED lights on.
Then signal outputs to MONI output of CN2.

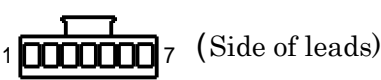
Resolution select switch (JP3, JP4)

This selects the resolution of micro stepping.

Setting	Type of excitation	Step angle	JP3	JP4	Ref.
	2 phase excitation	1/1	1 - 2	1 - 2	
	1-2 phase excitation	1/2	2 - 3	1 - 2	
	W1-2 phase excitation	1/4	1 - 2	2 - 3	
	2W1-2 phase excitation	1/8	2 - 3	2 - 3	Default setting

Motor, power and protective earth terminal(CN1)

Connect power, protective earth terminal of the device and motor leads.

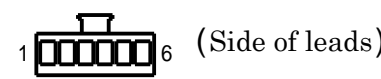
CN1	 (Side of leads)
1	A phase
2	/A phase
3	B phase
4	/B phase
5	DC24V
6	0V(GND)
7	protective earth (PE)

Name	Model	Memo
PinHeader	IL-7P-S3EN2	
Socket Housing	IL-7S-S3L-N	Accessory
Socket Contact	IL-C2-0001	Accessory

- Please use DC24V power source and AWG22 (0.5mm²) for power line.
- Please use bigger or equal cable to AWG22(0.25mm²) if motor cables are extended.
- Use bigger wire for PE line than or equal to power line for safety.
- Circuit GND and PE are separated therefore connect them with external wiring if necessary.

Signal input/output connector(CN2)

This is connected with various input pulse signal.

CN2	 (Side of leads)	
	1 pulse type	2 pulses type
1	PULSE +	CW +
2	PULSE -	CW -
3	CW/CCW +	CCW +
4	CW/CCW -	CCW -
5	MONI +	
6	MONI -	

Name	Model	Memo
PinHeader	IL-6P-S3EN2	
Socket Housing	IL-6S-S3L-N	Accessory
Socket Contact	IL-C2-0001	Accessory

Driving current adjustment volume(C.ADJ(VR1))

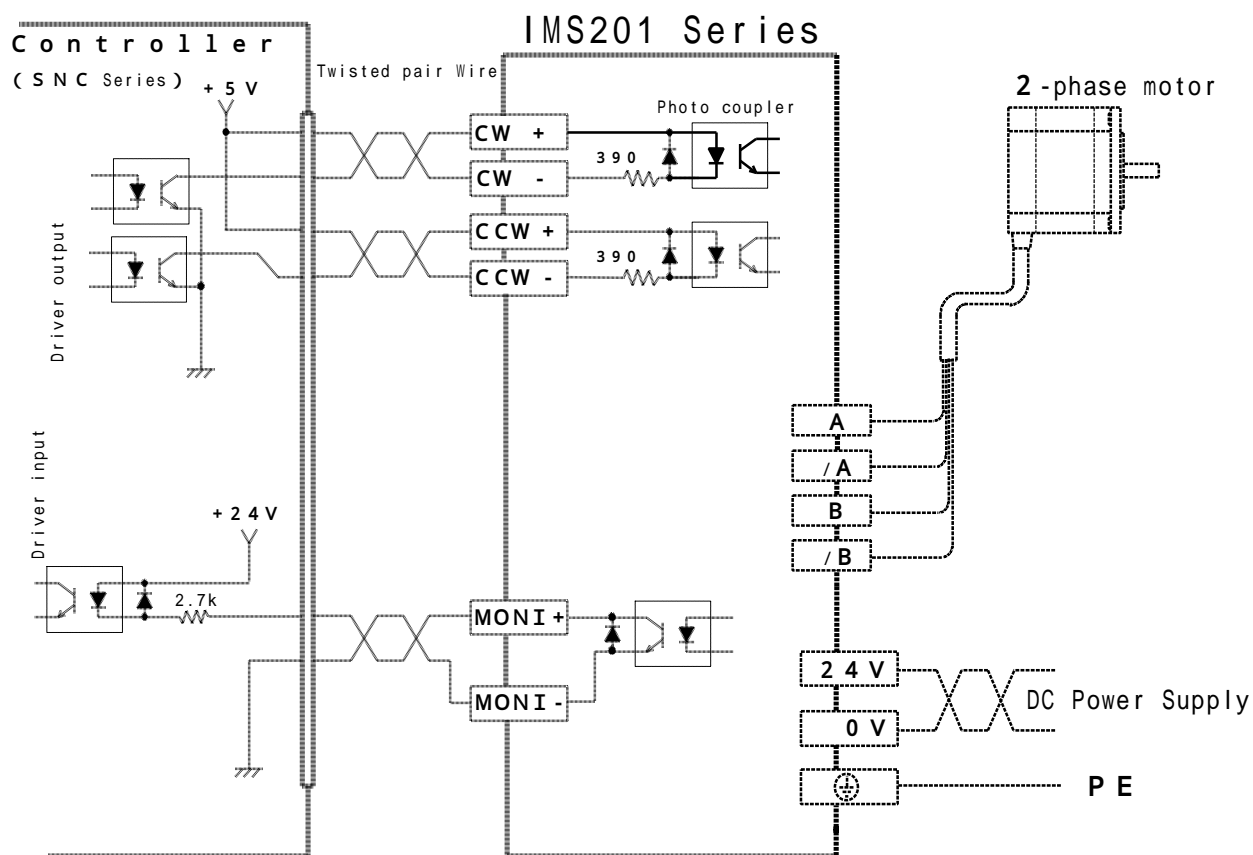
This adjusts motor rated driving current.



Attention

- Please turn the volume under torque of 2.94 ~ 29.4mN · m(30 ~ 300gf · cm).

7 . Example of connection



Please separate A-COM from B-Com and use in non-connection condition when uni-polar motor is used.

8 . Wiring and Install condition

8 - 1 . Wiring for motor lines and power lines

- The radiation noise can be depressed by using bigger of equal sealed cable to AWG22(0.5mm²) in case that motor cable is longer.
- Install noise filter at power input where noise sources exist near the driver.
- Wrong connection with power input and motor output cause over current and it is very dangerous.

8 - 2 . Wiring of signal line

- Using shield wire can depress the wrong operation by noise in case that input signal wires is long.

8 - 3 . Applicable tool

- Use CT150-1C-IL of JAE brand to cramp socket contact(IL-C2-0001)

8 - 4 . Install condition

- Do not use driver outside of control box. This unit is designed for the following condition.

Over voltage category: Category II, Material group III

Pollution degree: Class 2

Protection structure: IP20

Protection against electric shock: Class III component

- Put 3cm or more space between each driver and fix the drivers when multiple drivers are arranged.
- It is suggested to use shield twisted pair wires for signal cable of this device.
- There is a possibility that heat sink temperature exceeds 60 depending on load or other environmental condition. In case that it is used in hard condition, please cool the heat sink by cooling fan.
- Put this device taking more than 5mm space from solder side of the board, cover this device by material which does not intercept ventilation and take the safety measures by no means.

9 . Noise measures

(To the user who uses IMS201-120CE and IMS201-220CE)

The target for EMC directive of CE marking is whole components including our products. This device is designed to depress unnecessary radiant noise and not to be affected easily by external noise but noise measures may be required depending on the condition of usage (installation and wiring). In such case please take noise measures referring below method.

1.Prevent driver mis-operation

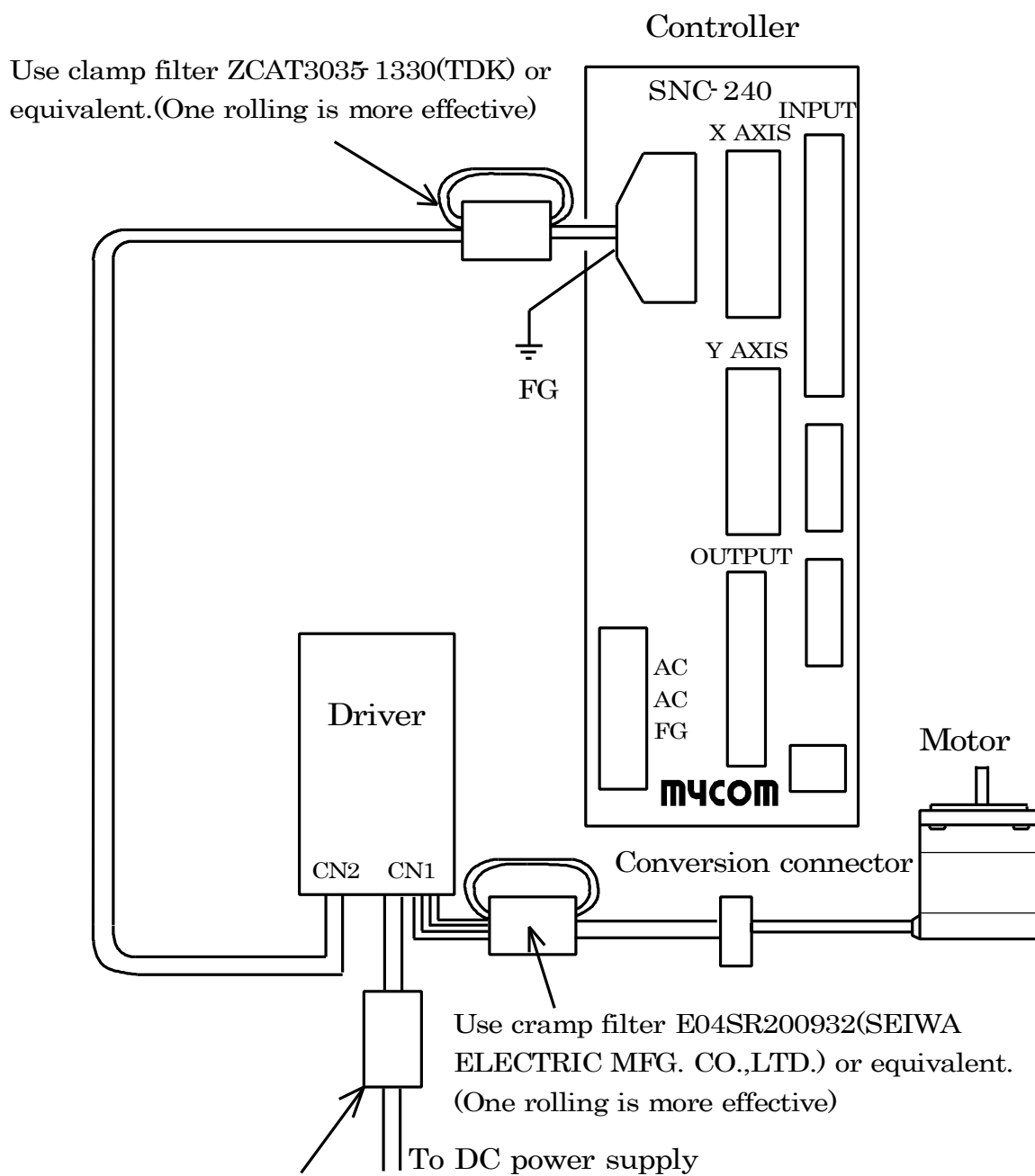
Please use shielded cable for signal line between controller and driver if the position become off during operation by external noise. These measures are also effective to decrease radiant noise.

2. Decrease radiant noise

- Insert clamp filter (toroidal core) among motor wirings(driver side).
- Insert clamp filter on power line(power side).

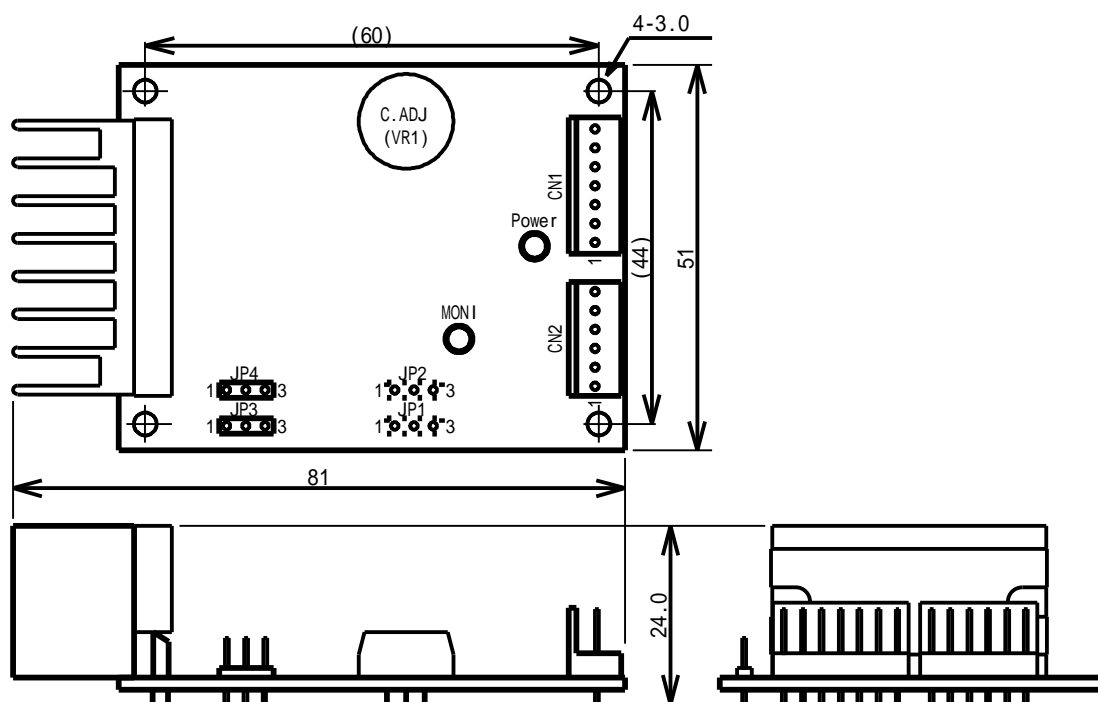
3. Decrease conductive noise

- Insert noise filter on power line(power side).



- Use noise filter to depress noise on DC power supply line.
- Use clamp filter to depress radiant noise ZCAT3035 1330(TDK) or equivalent.(Twice rolling is more effective)

10 . Dimension of IMS201-220F/CE



() The numerical value in the inside is a driver substrate installation size.

unit=mm (Projection of jumper line and leads do not include)

11 . Period of product warranty

11- 1 . Guarantee period

One year from delivery.

In case that the device becomes out of order by our responsibility within the guarantee period, we will repair the parts of trouble or replace by our responsibility. However the damage which malfunction of products of supply cause is out of target of this warranty.

11- 2 . Out of warranty

Below case is out of warranty even if guarantee period.

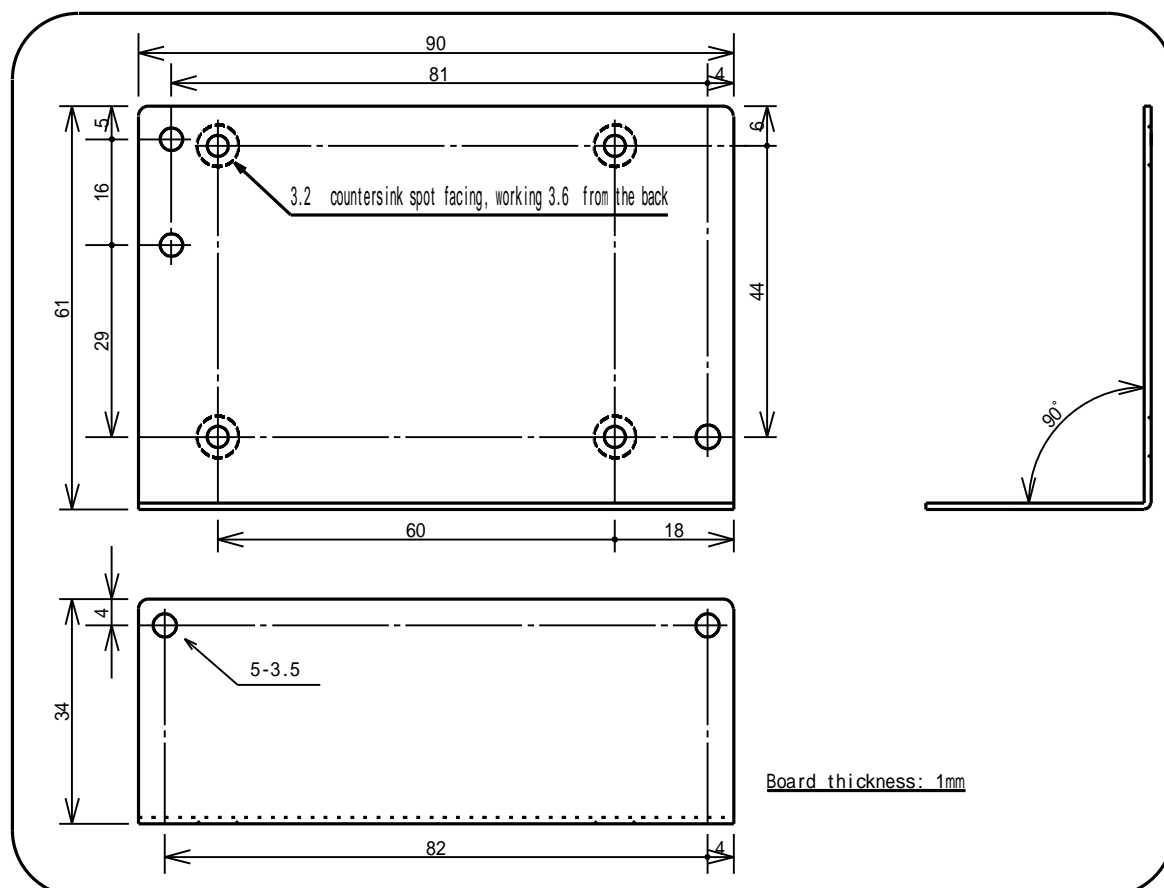
- Malfunction or damage by wrong usage, modification or unreasonable repair.
- Malfunction or damage by transportation, carry or falling after delivery.
- Malfunction or damage by unsuitable maintenance, keeping or storage.
- Malfunction or damage by abnormal voltage, power supply out of appointment (Voltage or Frequency).
- Malfunction or damage by fire, earthquake, flooding, lightning, other disaster, pollution, smoke pollution or gas pollution(sulfuration gas, etc.)
- Other malfunction or damage which is not considered as our responsibility.

12 . Optional accessories

Parts name	Model number	Specifications
Connector set	OCN-IL6/7	Applicable connector and pin for CN1 and CN2
L Bracket	OMP-LB	Available to install with bracket by four screws. Available to install with device by two screws.
Power & Motor Cable	OMPC-IL7P15	1.5m Loose wire for CN1 (Power & Motor Cable)
Signal Cable	OSC-IL6P15	1.5m Twisted pair wire for CN2(Signal Cable)

Connector set (Model number:OCN-IL6/7)

- 6P Connector Housing:IL-6S-S3L-N (1pc.)
- 7P Connector Housing:IL-7S-S3L-N (1pc.)
- Contact:IL-C2-0001 (13pcs.)



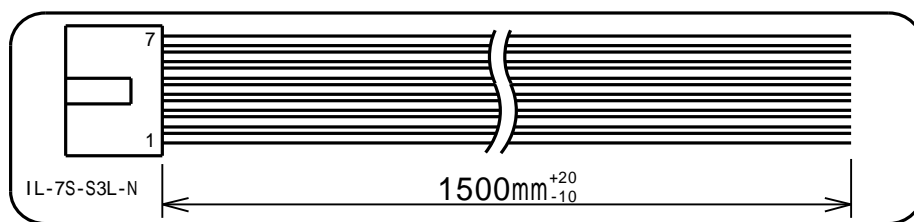
L Bracket (Model number: OMP-LB)

- L Bracket (1pc.)
- Round type midair brass Spasar:4mm (4pcs.)
- Round Catahira washer:M4 (4pcs.)
- Hex nut:M3 (4pcs.)
- Plate machine screw:M3 x 15 (4pcs.)

CN1:Power & Motor Cable(Model number: OMPC-IL7P15)

Connector : IL-7S-S3L-N^{*1}

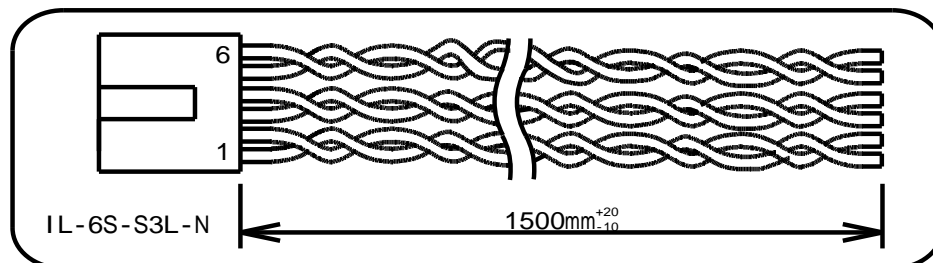
Cable : AWG22 Loose cable 1.5m



CN2:Signal Cable(Model number: OSC-IL6P15)

Connector : IL-6S-S3L-N^{*1}

Cable : AWG22 Twisted pair wire 1.5m



*1 Housing of JAE brand (Contact, IL-C2-0001is used)

Chapter of motor

1 . Model number of set

IMS201 - 220F - 265A

Series name

Extension of set

List of motor and driver combination

Extension of set	Motor model	Output current (A/phase)	Model number
243A(B)	PF243-A(B)	0.9	IMS201-120CE
244A(B)	PF244-A(B)	1.2	IMS201-120F
245A(B)	PF245-A(B)	1.2	IMS201-120
264A(B)	PF264-A(B)	2.0	IMS201-220CE
265A(B)	PF265-A(B)	2.0	IMS201-220F
268A(B)	PF268-A(B)	2.0	IMS201-220

(Remark) We cannot deliver driver alone in principal if the driver is CE marking approved.

The set of motor and driver will be delivered together.

Please contact us when driver is required alone.

Please use the motor after full evaluation and confirmation of features in usable circumstance and condition if other motor than out specific motor is used.

2 . Motor specification and externals

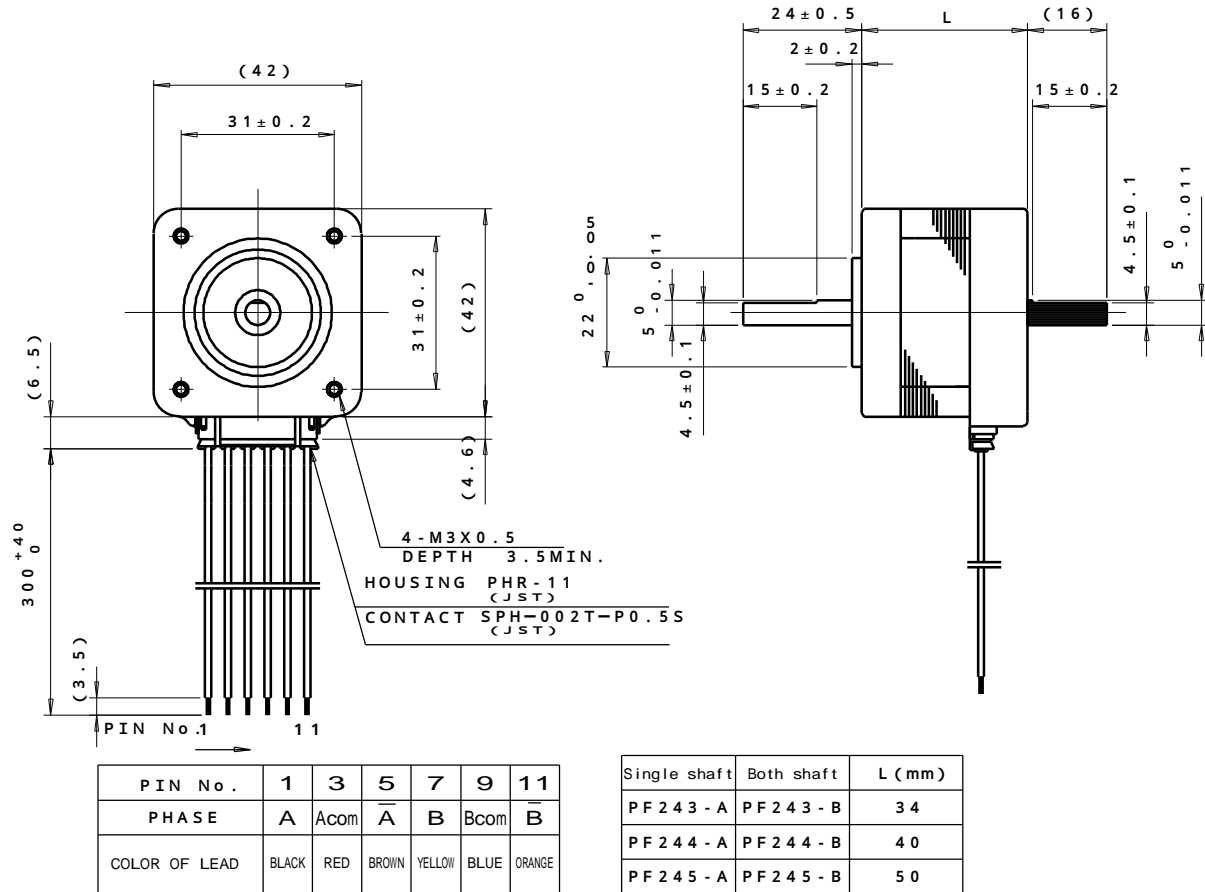
2 - 1 . Specification of Motor

Motor model	Single shaft	P F 2 4 3 - A	P F 2 4 4 - A	P F 2 4 5 - A
	Both shaft	P F 2 4 3 - B	P F 2 4 4 - B	P F 2 4 5 - B
Max. holding torque		1.4 kgf·cm 0.14 N·m	2.4 kgf·cm 0.236 N·m	3.5 kgf·cm 0.34 N·m
Rotor inertia		38 gcm ² 38x10 ⁻⁷ kg·cm ²	56 gcm ² 56x10 ⁻⁷ kg·cm ²	85 gcm ² 85x10 ⁻⁷ kg·cm ²
Step angle		1.8°		
Phase current		0.9 A/phase	1.2 A/phase	
Withstand voltage		In normal temperature and humidity , even if 50Hz, 0.5kV is inputted for one minute between motor coil and case , no abnormality is detected.		
Insulation class		E Class equivalent		
Insulation resistance		100M or more with DC500V megger applied in normal temperature and humidity between motor coil and case.		
Operating environment temperature		0 ~ +50		
Weight		0.2 kg	0.26 kg	0.36 kg

Motor model	Single shaft	P F 2 6 4 - A	P F 2 6 5 - A	P F 2 6 8 - A
	Both shaft	P F 2 6 4 - B	P F 2 6 5 - B	P F 2 6 8 - B
Max. holding torque		4.3 kgf·cm 0.422 N·m	8.5 kgf·cm 0.834 N·m	13.5 kgf·cm 1.324 N·m
Rotor inertia		115 gcm ² 115x10 ⁻⁷ kg·cm ²	188 gcm ² 188x10 ⁻⁷ kg·cm ²	269 gcm ² 269x10 ⁻⁷ kg·cm ²
Step angle		1.8°		
Phase current		2.0 A/phase		
Withstand voltage		In normal temperature and humidity , even if 50Hz, 0.5kV is inputted for one minute between motor coil and case , no abnormality is detected.		
Insulation class		E Class equivalent		
Insulation resistance		100M or more with DC500V megger applied in normal temperature and humidity between motor coil and case.		
Operating environment temperature		0 ~ +50		
Weight		0.4 kg	0.65 kg	1.0 kg

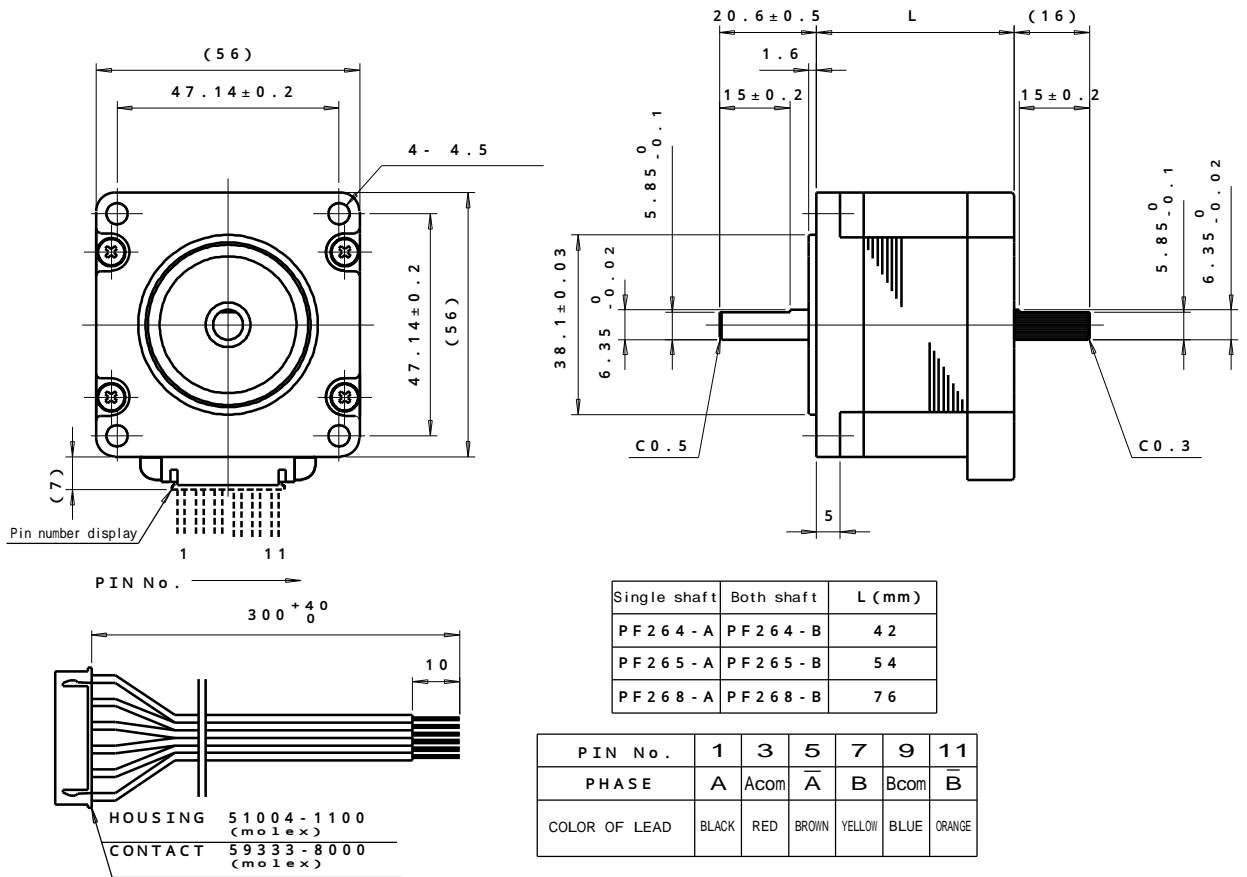
2 - 2 . Externals of Motor

PF243-A(B),PF244-A(B),PF245-A(B)



(This dimension is for both shaft. Single shaft does not have behind shaft which is painted by black.)

PF264-A(B),PF265-A(B),PF268-A(B)



(This dimension is for both shaft. Single shaft does not have behind shaft which is painted by black.)

Please understand that we may make modifications to our products without notification in order to improve the capabilities and external appearance of our products.

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