

⚠ Safety Precautions

- Important Notes on exporting this product or equipment containing this product;
If the end-user or application of this product is related to military affairs or weapons, its export may be controlled by "Foreign Exchange and Foreign Trade Control Law" of Japan where export license will be required before product can be exported from Japan.
- This product is designed and manufactured for use in General Purpose Industrial Equipment and it is not intended to be used in equipment or system that may cause personal injury or death.
- All servicing such as installation, wiring, operation, maintenance and etc., should be performed by qualified personnel only.
- Tighten mounting screws with an adequate torque by taking into consideration strength of the screws and the characteristics of material to which the product will be mounted. Over tightening can damage the screw and/or material; under tightening can result in loosening.
- Install safety equipment to prevent serious accidents or loss that is expected in case of failure of this product.
- Consult us before using this product under such special conditions and environments as nuclear energy control, aerospace, transportation, medical equipment, various safety equipments or equipments which require a lesser air contamination.
- We have been making the best effort to ensure the highest quality of our products, however, some applications with exceptionally large external noise disturbance and static electricity, or failure in input power, wiring and components may result in unexpected action. It is highly recommended that you make a fail-safe design and secure the safety in the operative range.
- If the motor shaft is not electrically grounded, it may cause an electrolytic corrosion to the bearing, depending on the condition of the machine and its mounting environment, and may result in the bearing noise. Checking and verification by customer is required.
- Failure of this product depending on its content may generate smoke of about one cigarette. Take this into consideration when the application of the machine is clean room related.
- Please be careful when using the product in an environment with high concentrations of sulfur or sulfuric gases, as sulfuration can lead to disconnection from the chip resistor or a poor contact connection.
- Do not input a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may lead to damage of the internal parts, causing smoke and/or fire and other troubles.
- The user is responsible for matching between machine and components in terms of configuration, dimensions, life expectancy, characteristics, when installing the machine or changing specification of the machine. The user is also responsible for complying with applicable laws and regulations.
- Manufacturer's warranty will be invalid if the product has been used outside its stated specifications.
- Component parts are subject to minor change to improve performance.
- Read and observe the instruction manual to ensure correct use of the product.

Repair	Consult to the dealer from whom you have purchased this product for details of repair work. When the product is incorporated to the machine you have purchased, consult to the machine manufacturer or its dealer
URL	Electronic data of this product (Instruction Manual, CAD data) can be downloaded from the following web site; https://industry.panasonic.com/global/en/

● Contact to : _____

Panasonic
INDUSTRY

Panasonic Industry Co., Ltd.,
Industrial Device Business Division
1-1 Morofuku 7-chome, Daito, Osaka 574-0044, Japan



Panasonic
INDUSTRY

Servo System
MINAS A7 Family

MINAS A7 Options part

**IN Better
Solution**



Motor connector specifications 50 W to 1000 W 80 mm sq. or less

- The connections when using a <MHMG (lead wire type)> motor are as follows.

Connector: Manufactured by Tyco Electronics Japan (The figure below shows the connector coming out of the motor.)

[Encoder connector]

Encoder connector
Brake connector
Motor connector

172169-1
27-bit Absolute

* The connector pins are shown as seen from this side.

* When using a battery-less absolute encoder or an absolute encoder as incremental system, it is not necessary to connect BAT+ and BAT-.

[Motor connector]

172167-1

* The connector pins are shown as seen from this side.

PIN No.	Purpose
1	BAT+*
2	BAT-*
3	FG(Shield)
4	PS
5	PS
6	NC
7	E5V
8	E0V
9	NC

<Caution>
Do not connect anything to NC.

[Brake connector]

172165-1

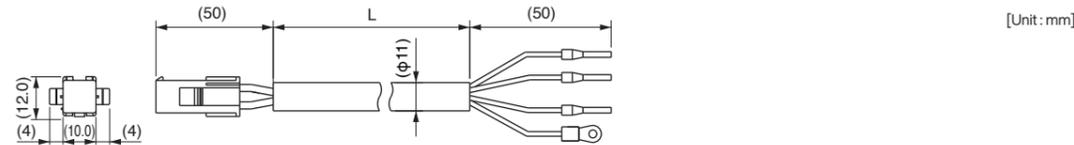
* The connector pins are shown as seen from this side.

PIN No.	Purpose
1	Brake
2	Brake

* The electromagnetic brake has no polarity.

Motor cable * Not compatible for IP65

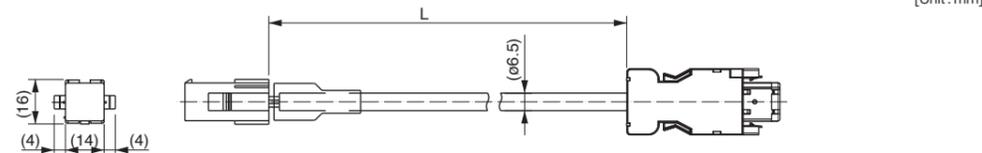
Part number	MFMCA0 ** OEED	80 mm sq. or less Applicable model	MHMG 50 W to 1000 W (Lead wire type)
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Name	Part number	Manufacturer	L(m)	Part number
Connector	172159-1	Tyco Electronics Japan G.K.	3	MFMCA0030EED
Connector pin	170366-1		5	MFMCA0050EED
Bar terminal	AI0.75-8GY	PHOENIX CONTACT	10	MFMCA0100EED
Round terminal with nylon insulation	N1.25-M4	J.S.T Mfg. Co., Ltd.	20	MFMCA0200EED
Cable	ROBO-TOP 600V 0.75 mm ² 4-wire	DYDEN CORPORATION		

Encoder cable * Not compatible for IP65

Part number	MFECA0 ** OEAD	80 mm sq. or less Applicable model	MHMG 50 W to 1000 W (Lead wire type)
Specifications	27 bit absolute encoder for incremental system (without battery box)		



Name	Part number	Manufacturer	L(m)	Part number
Connector (driver side)	3E206-0100 KV	3M Japan or equivalent	3	MFECA0030EAD
Shell kit	3E306-3200-008		5	MFECA0050EAD
Connector (motor side)	172161-1	Tyco Electronics Japan G.K.	10	MFECA0100EAD
Connector pin	170365-1			
Cable	0.20 mm ² ×3P (6-wire)	Ok Electric Cable Co., Ltd.		

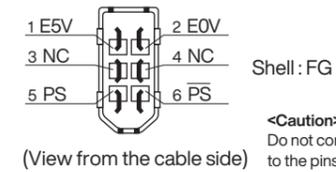
Connector Kit for Encoder

Part number	DV0PM20010
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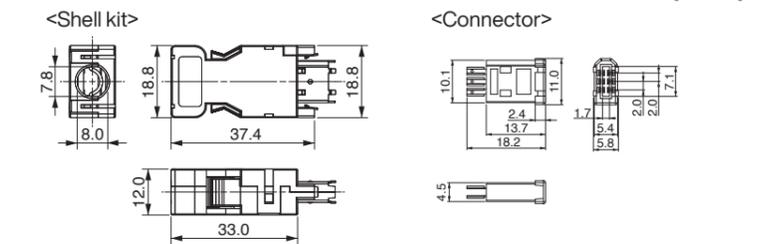
- Component parts

Name	Part number	Manufacturer	Remarks
Connector (driver side)	3E206-0100 KV	3M Japan or equivalent	For Connector X6
Shell kit	3E306-3200-008		

- Connector X6 pin assignment

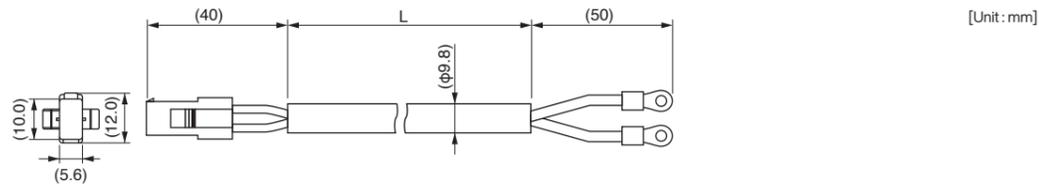


- Dimensions



Brake cable * Not compatible for IP65

Part number	MFMCB0 ** OGET	80 mm sq. or less Applicable model	MHMG 50 W to 1000 W (Lead wire type)
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Name	Part number	Manufacturer	L(m)	Part number
Connector	172157-1	Tyco Electronics Japan G.K.	3	MFMCB0030GET
Connector pin	170366-1, 170362-1		5	MFMCB0050GET
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.	10	MFMCB0100GET
Cable	ROBO-TOP 600V 0.75 mm ² 2-wire	DYDEN CORPORATION	20	MFMCB0200GET

Connector kit for motor/encoder connection

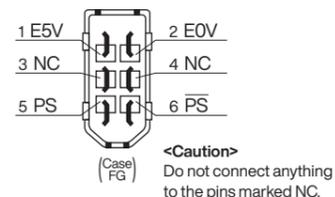
* If IP65 is required, appropriate processing by the customer is required.

Part number	DVOP4290	80 mm sq. or less Applicable model	MHMG 50 W to 1000 W (Lead wire type IP65)
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● Component parts

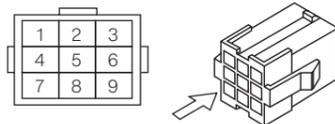
Name	Part number	Number of pieces	Manufacturer	Remarks
Connector (driver side)	3E206-0100 KV	1	3M Japan or equivalent	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Connector	172161-1	1	Tyco Electronics Japan G.K.	For Encoder cable (9-pins)
Connector pin	170365-1	9		
Connector	172159-1	1	Tyco Electronics Japan G.K.	For Motor cable (4-pins)
Connector pin	170366-1	4		

● Connector X6 pin assignment



<View from the cable side>

● Pin disposition of connector for encoder cable



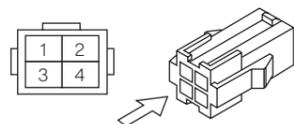
* The connector pins are shown as seen from this side.

PIN No.	Purpose
1	BAT+ *
2	BAT- *
3	FG(Shield)
4	PS
5	PS
6	NC
7	E5V
8	E0V
9	NC

* When using the motor as an incremental system, BAT+ and BAT- can be left unconnected.

<Caution>
Do not connect anything to the pins marked NC.

● Pin disposition of connector for motor cable



* The connector pins are shown as seen from this side.

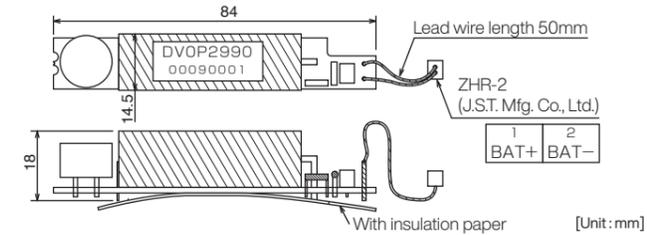
PIN No.	Purpose
1	U phase
2	V phase
3	W phase
4	Earth

* If a battery for an absolute encoder is connected, please refer to page 5 "If a battery for an absolute encoder is connected, please refer to page 5 "When making cable for 27 bit absolute encoder by customers".

Battery for absolute encoder

Part number	DVOP2990
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● Lithium battery : 3.6 V 2000 mAh



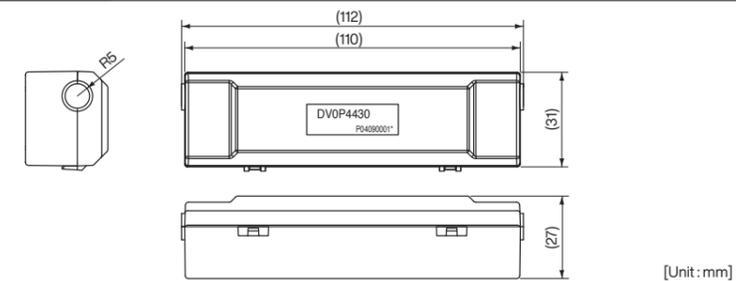
<Caution>

When transporting by aircraft (both passenger planes and cargo planes), it may be necessary to apply for dangerous goods. When requesting air transportation, please contact the transportation company (airline company).

Battery box for absolute encoder *

* Batteries are not included. Absolute encoder battery "DVOP2990" is required.

Part number	DVOP4430
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When making cable for 27 bit absolute encoder by customers

If you create your own cable for the 27-bit absolute encoder, connect the absolute encoder battery DVOP2990 as shown in the wiring diagram. Please prepare the battery connector for the absolute encoder.

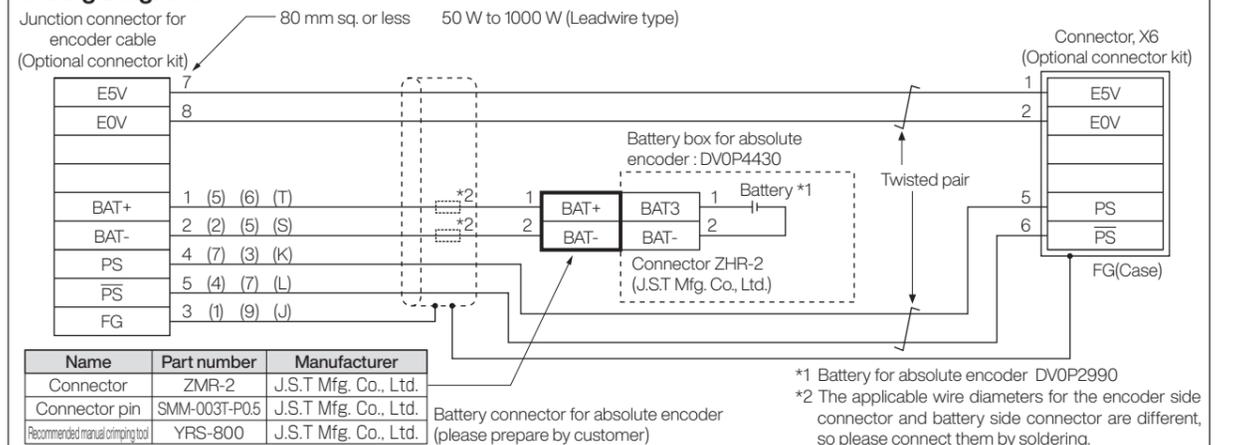
<Caution>

Please securely secure and install the battery by customers. Please note that if the battery is not secured or installed properly, there is a risk of wire breakage or battery damage. For battery handling, please refer to the battery instruction manual.

■ Battery installation location

- Indoors away from rainwater and direct sunlight
- Locations that are not exposed to corrosive atmospheres such as hydrogen sulfide, sulfurous acid, chlorine, ammonia, sulfur, chloride gases, sulfide gases, acids, alkalis, and salts, flammable gases, polishing fluids, oil mist, iron powder, and cutting chips.
- A well-ventilated place with low humidity, dirt, and dust.
- A place free from vibrations.

Wiring Diagram



Power input connector kit

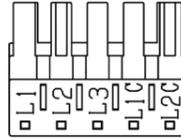
Part number **DV0PM24685** (For A frame to D frame: 1 row type) **<Coming soon>**

● For connector XA, please refer to pages 16 to 17 of "Specifications part".

● Component parts

Name	Part number	Number of pieces	Manufacturer	Remarks
Connector	05JFAT-SAXGSAK-KM7.5(LA)	1	J.S.T Mfg. Co., Ltd.	For Connector XA
Lever	J-FAT-OT-EXL	1		

● 5 pole product



Motor connection connector kit (driver side connector)

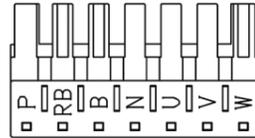
Part number **DV0PM24687** (For A frame to D frame) **<Coming soon>**

● For connector XB, please refer to pages 16 to 17 of "Specifications part".

● Component parts

Name	Part number	Number of pieces	Manufacturer	Remarks
Connector	07JFAT-SAXGSAK-KM7.5(LA)	1	J.S.T Mfg. Co., Ltd.	For Connector XB * Jumper wires are also included.
Lever	J-FAT-OT-EXL	1		

● 7 pole product



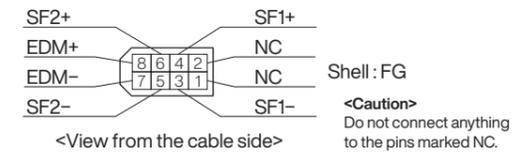
Safety connector kit

Part number **DV0PM20103**

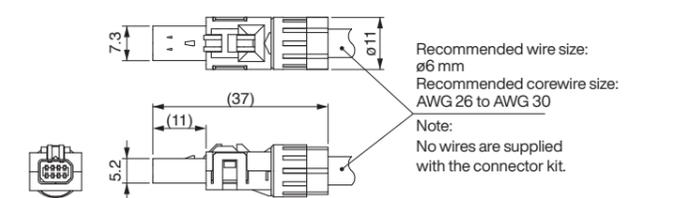
● Component parts

Name	Part number	Manufacturer	Remarks
Connector	CIF-PCNS08KK-071R	J.S.T Mfg. Co., Ltd.	For Connector X3 (8-pins)

● Connector X3 pin assignment



● Dimensions



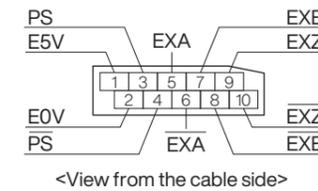
Connector kit for external scale (unable to use for A7SE, A7NE, A7BE types)

Part number **DV0PM20026**

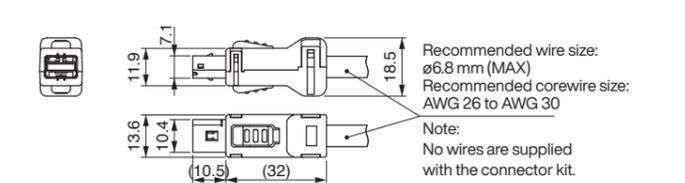
● Component parts

Name	Part number	Manufacturer	Remarks
Connector	MUF-PK10K-X	J.S.T Mfg. Co., Ltd.	For Connector X5 (10-pins)

● Connector X5 pin assignment



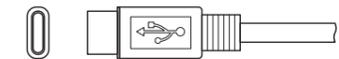
● Dimensions



<Remarks>

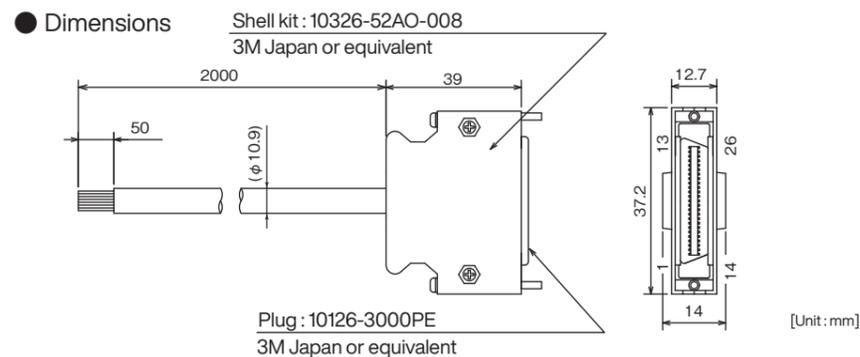
Please use a commercially available cable for connector X1 by purchasing it at an electronics store.

● Connector X1 shape (USB Type-C)



Interface cable

Part number	DV0PM24679 <Coming soon>	2 m wires are connected with core wire AWG26.
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● Table for wiring (PIN name : in case of A7N)

PIN No.	Signal name	Core wire color	PIN No.	Signal name	Core wire color	PIN No.	Signal name	Core wire color
1*	BRK-OFF+	Orange (Red1)	10*	HOME	Pink (Black1)	19	OB-/OCMP2-	Pink (Red2)
2*	BRK-OFF-	Orange (Black1)	11*	EXT2	Orange (Red2)	20	OB+/OCMP2+	Pink (Black2)
3*	ALM+	Gray (Red1)	12*	EXT3	Orange (Black2)	21	OCMP3+	Yellow (Red3)
4*	ALM-	Gray (Black1)	13*	SI-MON4	Gray (Red2)	22	OCMP3-	Yellow (Black3)
5*	SI-MON5	White (Red1)	14	BTP-I	Gray (Black2)	23	AIN(NC)	Pink (Red3)
6	SI-COM	White (Black1)	15	BTN-I	White (Red2)	24	GND(NC)	Pink (Black3)
7*	POT	Yellow (Red1)	16	GND	White (Black2)	25*	EX-OUT1+	Orange (Red4)
8*	NOT	Yellow (Black1)	17	OA+/OCMP1+	Yellow (Red2)	26*	EX-OUT1-	Orange (Black4)
9*	SI-MON1	Pink (Red1)	18	OA-/OCMP1-	Yellow (Black2)			

The signal assignments for pin numbers marked with * in the table are the factory settings.

<Note>

To read the core wire colors, for pin No. 1, orange...the color of the lead wire, (red 1)...shows one red dot mark.

<Caution>

The shield of this cable is not connected to the connector terminals.

The cable's shield wire is connected to the cable's connector shell and connected to the FG through the driver side connector shell. If you want to connect the cable shield wire to GND, please use the interface connector kit DV0P0770. Please note that when the shield and cable side connector shell are connected and processed, FG and GND will be connected.

- In the table above, the 23-pin analog input (AIN) and 24-pin ground connection (GND) are only compatible with the application specialized type. Do not connect the standard type or multi-function type (NC).

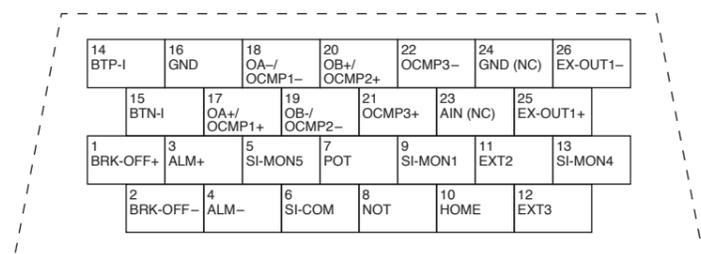
Connector kit for interface connection

Part number	DV0P0770
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● Component parts

Name	Part number	Number of pieces	Manufacturer	Remarks
Connector	10126-3000PE	1	3M Japan or equivalent	For Connector X4 (26-pins)
Connector cover	10326-52AO-008	1		

● Pin disposition: Connector X4 (26 pins) (View from the cable side)

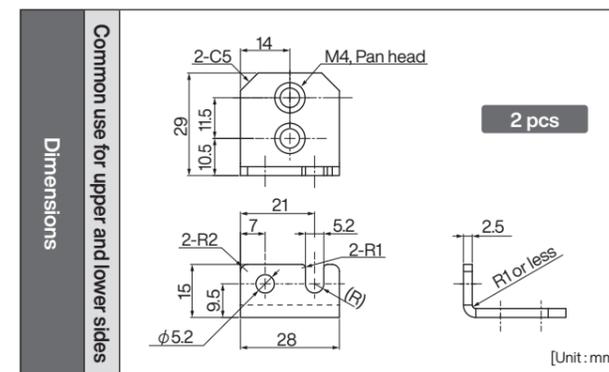


<Caution>

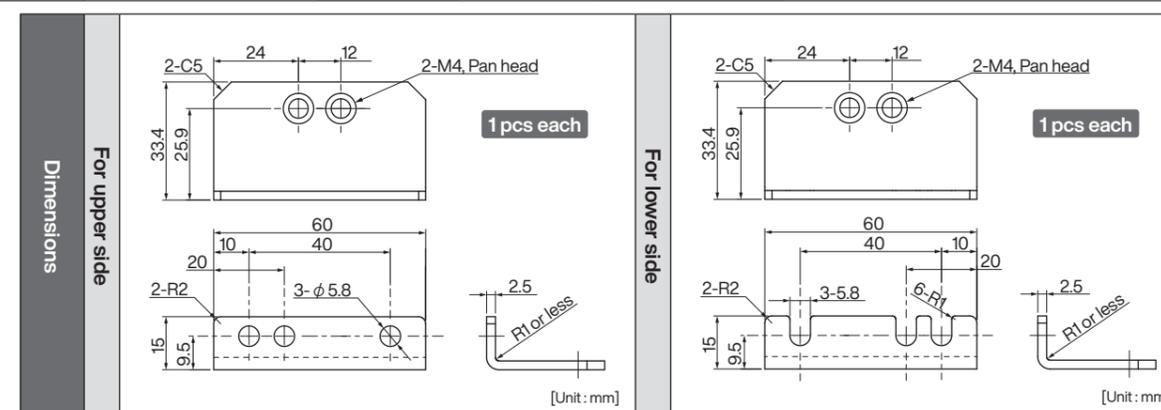
1. When wiring, check the pin number stamped on the connector body too.
 2. Please refer to the instruction manual for the symbols indicating the signal names in the diagram on the left or the functions of the signals.
- In the figure on the left, the 23-pin analog input (AIN) and 24-pin ground connection (GND) are only compatible with the application specialized type. Do not connect the standard type or multi-function type (NC).

Mounting bracket

Part number	DV0PM24689 <Coming soon>	Applicable driver frame symbol	A frame B frame	Mounting screws (included)	M4 x length 6 flat head machine screws 4 pcs
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Part number	DV0PM24690 <Coming soon>	Applicable driver frame symbol	C frame D frame	Mounting screws (included)	M4 x length 6 flat head machine screws 4 pcs
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External regenerative resistor

Part number	Manufacturer part number	Specification					Built-in thermal protector operating temperature
		Resistance value	Core wire outer diameter	Mass	Rated power (reference value) *1		
					Free air	Using fan *2	
Ω	mm	kg	W	W			
DV0P4280	RF70M	50	$\phi 1.27$ (AWG18 twisted wire)	0.1	10	25	140±5 °C B-contact ON/OFF capacity (resistive load) 1 A 125 VAC 6000 times 0.5 A 250 VAC 10000 times
DV0P4281	RF70M	100		0.1	10	25	
DV0P4282	RF180B	25		0.4	17	50	
DV0P4283	RF180B	50		0.2	17	50	
DV0P4284	RF240	30		0.5	40	100	

Manufacturer : Iwaki Musen Kenkyusho

* 1 Power that can be used without the built-in thermal protector operating.

For safety, it has a built-in thermal fuse and thermal protector.

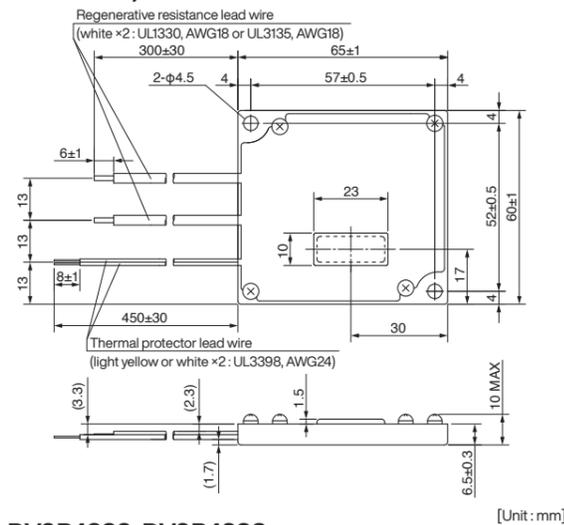
The built-in thermal fuse may break depending on heat dissipation conditions, operating temperature range, power supply voltage, and load fluctuations.

Regeneration is likely to occur, and under poor conditions (high power supply voltage, large load inertia, short deceleration time, etc.), please confirm with the actual machine that the surface temperature of the regenerative resistor is lower than 100 °C.

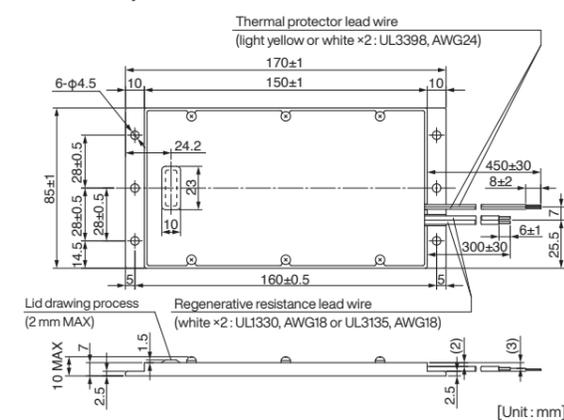
* 2 When a fan is used so that the wind speed is 1 m/s or more.

Part No. of driver	Driver voltage specifications	Regenerative resistor
		Option part No.
MADN061□□	Single phase 100 V	DV0P4280
MADN081□□		DV0P4283
MBDN121□□		DV0P4282
MCDN201□□		DV0P4281
MADN065□□	Single Phase/ Three Phase 200 V	DV0P4281
MADN085□□		DV0P4283
MBDN125□□		
MCDN205□□		
MDDN405□□		DV0P4284

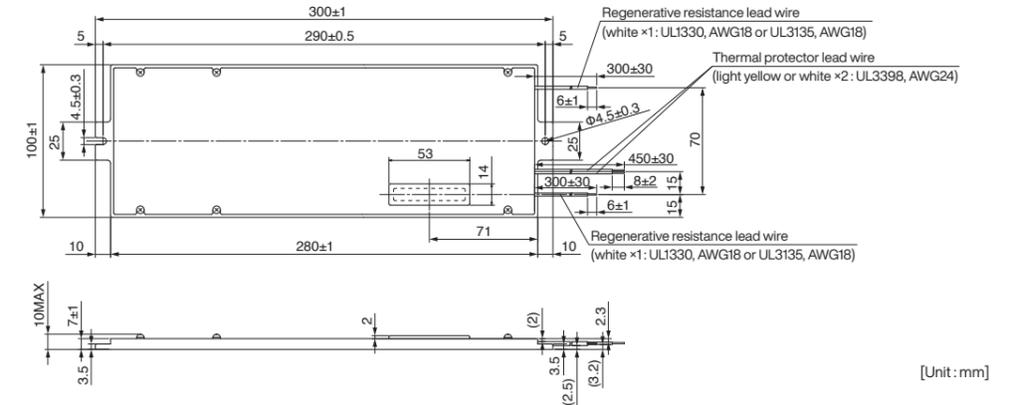
DV0P4280, DV0P4281



DV0P4282, DV0P4283



DV0P4284



[Unit: mm]

<Precautions when using external regenerative resistor>

The regenerative resistor becomes hot.

The thermal protector is an automatic reset type, so install an external self-holding circuit to prevent unsafe conditions caused by sudden activation.

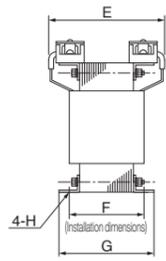
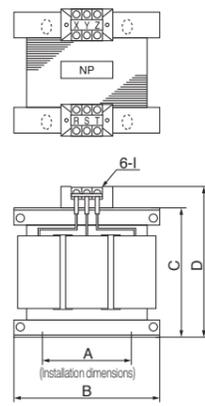
In the event of a driver failure, the surface temperature of the regenerative resistor may exceed the operating temperature before the thermal protector operates.

The thermal fuse built into the regenerative resistor is intended to prevent the regenerative resistor from igniting at a driver failure, and is not intended to suppress the surface temperature of the resistor.

- Attach the regenerative resistor to nonflammable material such as metal.
- Install the regenerative resistor in a location where it cannot be touched directly, such as by covering it with nonflammable material.
- Do not install the regenerative resistor near flammable materials.

Reactor

Fig.1



Wiring example (for three-phase power supply)

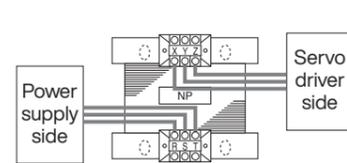
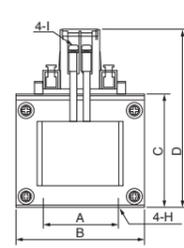
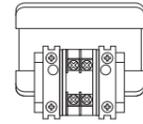
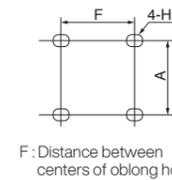
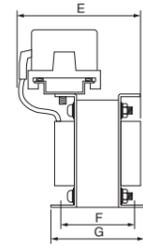
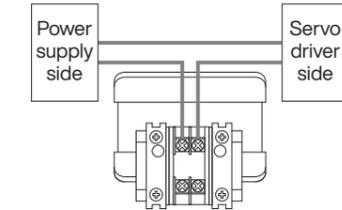


Fig.2



Wiring example (For single phase power supply)



Name	Fig.	Option part No.	A (mm)	B (mm)	C (mm)	D (mm)	E (Max) (mm)	F (mm)	G (mm)	H (mm)	I (mm)	Inductance (mH)	Rated current (A)
Reactor	Fig.1	DV0P220	65±1	125±1	(93)	136 _{Max}	155	70+3/-0	85±2	4-7φ×12	M4	6.81	3
		DV0P222	60±1	150±1	(113)	155 _{Max}	140	70+3/-0	85±2	4-7φ×12	M4	2	8
	Fig.2	DV0P227	55±0.7	76.5±1	66.5±1	110 _{Max}	90	43.6±2	56±2	4-5φ×10	M3.5	4.02	5
		DV0P228	55±0.7	76.5±1	66.5±1	110 _{Max}	95	48.0±2	61±2	4-5φ×10	M3.5	2	8

Part No. of driver	Voltage specification	Motor rated output	Part No.
MADN061□□	Single phase 100 V	50 W	DV0P227
MADN081□□		100 W	
MBDN121□□		200 W	
MCDN201□□		400 W	
MADN065□□	Single phase 200 V	50 W	DV0P227
MADN065□□		100 W	
MADN085□□		200 W	
MBDN125□□		400 W	
MCDN205□□	Three phase 100 V	750 W	DV0P228
MDDN405□□		1000 W	
MADN065□□		50 W	
MADN065□□	Three phase 100 V	100 W	DV0P220
MADN085□□		200 W	
MBDN125□□		400 W	

Regarding higher harmonic wave suppression measures

Harmonic suppression measures vary by country. Please install according to the regulations of each country. For products destined for Japan, please refer to the instruction manual posted on the website for installation.

[Panasonic Industry Co., Ltd. web site]
industrial.panasonic.com/ac/

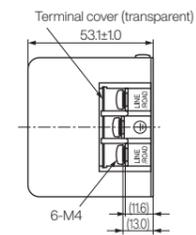
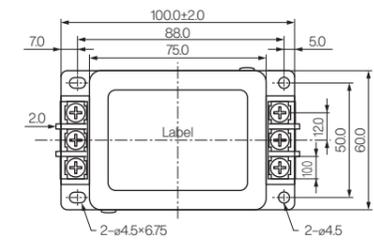
<Caution>

When using reactors, be sure to install one reactor for each servo driver.

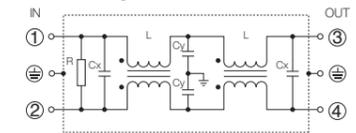
Noise filter

When using multiple drivers and installing a single noise filter in the power supply part, consult the noise filter manufacturer. If a noise margin is required, connect two in series. It may cause good result.

Part No. of driver	Voltage specifications for driver	Noise filter		
		Option part No.	Manufacturer's part No.	Manufacturer
MADN061□□	Single phase 100 V	DV0PM4170	SUP-EK5-ER-6	Okaya Electric Ind.
MADN081□□				
MBDN121□□				
MCDN201□□				
MADN065□□	Single Phase/ Three Phase 200 V	DV0PM4170 or DV0PM20042	SUP-EK5-ER-6 or 3SUP-HU10-ER-6	
MADN085□□				
MBDN125□□				
MCDN205□□				
MDDN405□□		DV0P4220	3SUP-HU30-ER-6	

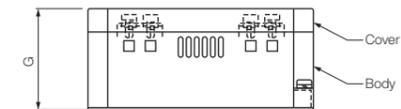
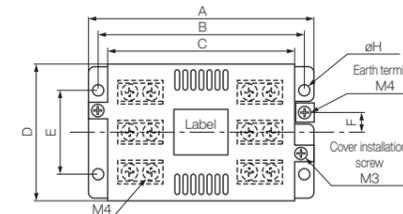


Circuit diagram



[Unit: mm]

<DV0PM20042, DV0P4220>



[Size]	A	B	C	D	E	F	G	H
DV0PM20042	115	105	95	70	43	10	52	5.5
DV0P4220	145	135	125	70	50	10	52	5.5

[Unit: mm]

Ferrite core

Required number of ferrite cores

Symbol *1	Place of use	Applicable driver frame	Option part No.	Manufacturer's part No.	Manufacturer	Required number
NF1	Power cable	—	DV0P1460	ZCAT3035-1330	TDK Corp.	0
NF2	Motor cable	A, B, C, D	DV0P1460	ZCAT3035-1330	TDK Corp.	1

*1 See Fig.2 for symbols.

● All turns are 1 time.

● NF1 for A frame, B frame, C frame, and D frame is not required.

<Caution>

When installing on the connector XB connection cable, adjust the jacket length at the end of the cable as necessary.

<Caution>

Secure the ferrite core to prevent excessive stress to the cable.

Fig.1: DV0P1460(Option) 4 pieces

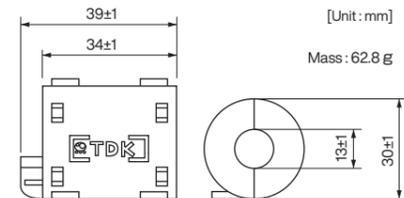
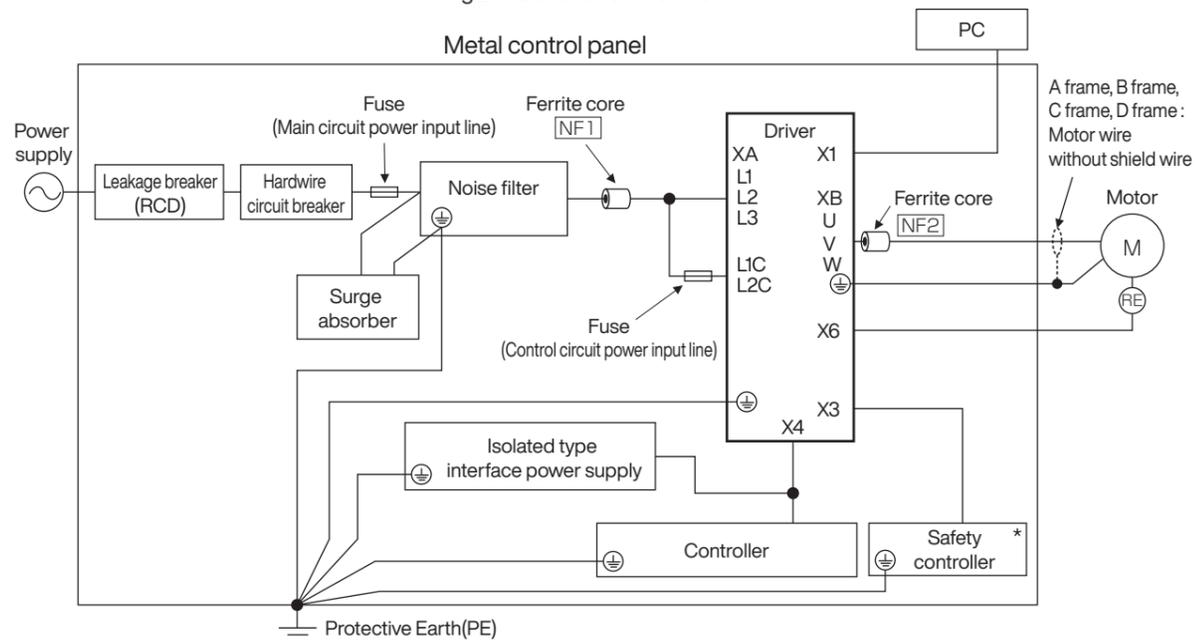


Fig.2 : Installation environment



* A7SE, A7NE, A7BE types do not have X3.

Recommended parts

Surge absorber for motor brake

Motor	Manufacturer's part No.	Manufacturer
MHMG 50 W to 1000 W	TND14V-271K	NIPPON CHEMI-CON CORPORATION

Surge absorber

Install a surge absorber on the primary side of the noise filter.

Voltage specifications for driver	Manufacturer's part No.	Manufacturer
Three phase 200 V	RSPD-250-U4	Okaya Electric Ind.
Single phase 100 V/200 V	RSPD-250-Q4	