

I/O Command Type Servo Motor Inherits Strongest Servo Core

MINAS A4P Series



Achieves System Simplification and Cost Reduction

1. Built-in NC Functions

- NC functions allow positioning by I/O command only.
- A target can be positioned (by teaching) without complicated pulse calculations.
- In addition to travel distances, point tables combine 16 types of preset speeds, linear acceleration/deceleration or S-shaped acceleration/deceleration, and 4 types of acceleration and deceleration.
- Two types of continuous operations are available depending on required machine specifications; continuous positioning with a temporary stop at any point and a combined block operation without a temporary stop.
- Sequential operation can be set to execute a maximum of 60 positioning points automatically.
- 8 types of homing operation modes are available. If a bumping homing is selected, simplified return-to-origin can be executed without any origin sensor.

2. Neither a positioning unit nor a pulse generator is required

- A maximum of 60 positioning points can be stored. No complicated programming is required as before.
- Positioning points can be specified as absolute positions or relative positions.
- Positioning can be performed directly at an absolute position without requiring homing operation by using the MINAS A4P as an absolute encoder in combination with a motor equipped with a 17-bit absolute/incremental encoder.

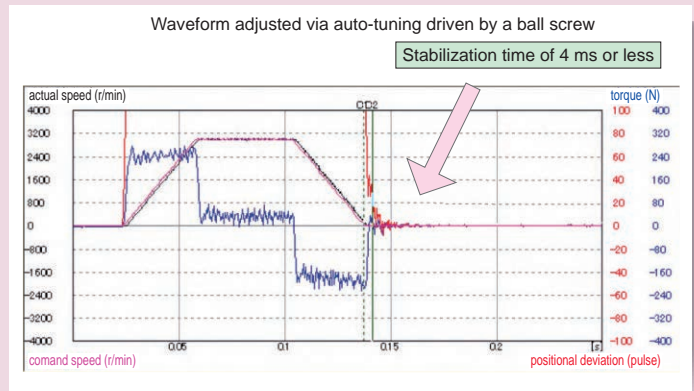
Details of Features

Inherits high performance and advanced functioning

1. Further Adjustment-Free Operation

High-functionality Real-Time Auto-Gain Tuning

- Corresponds to even variation of load inertia. Offers real automatic gain tuning to low and high stiffness machines with a combination of an adaptive filter.
- Supports the vertical axis application where the load torque is different in rotational direction.
- Prevents the machine from over-traveling during automatic gain tuning with software limit protective function.

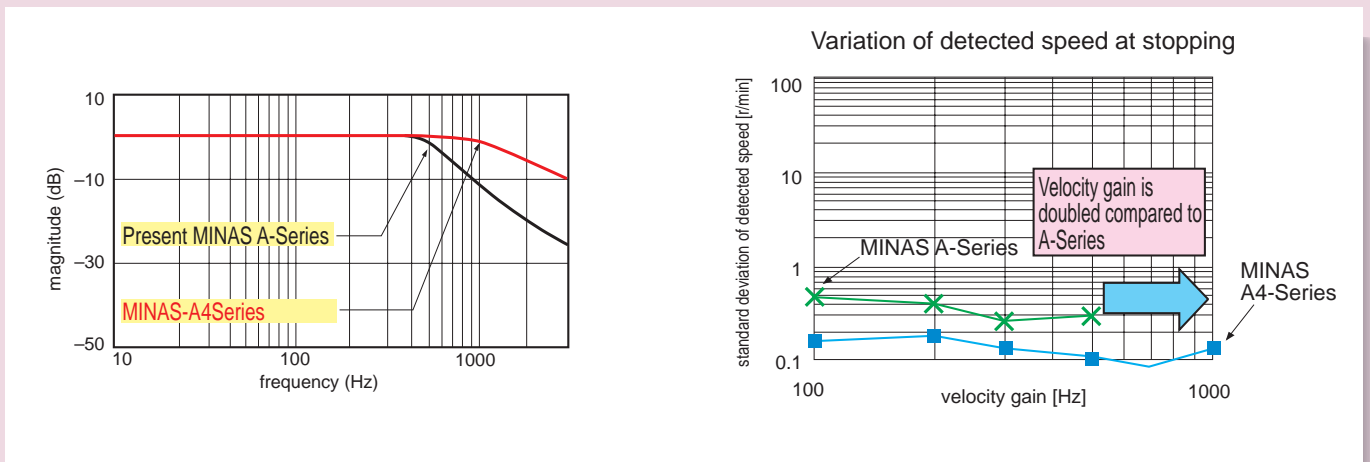


2. Further High-Speed and High-Response

Velocity response (bandwidth) of 1kHz

- Implementation of Instantaneous Velocity Observer realizes a detection of motor speed with higher speed and higher resolution.

*) In case of high stiffness machine



High-functionality Real-Time Auto-Gain Tuning

- Supports the low stiffness machine of belt-driven and the high stiffness machine of short stroke ball screw driven, and enables to realize high-speed positioning with high-functionality real-time auto-gain tuning.

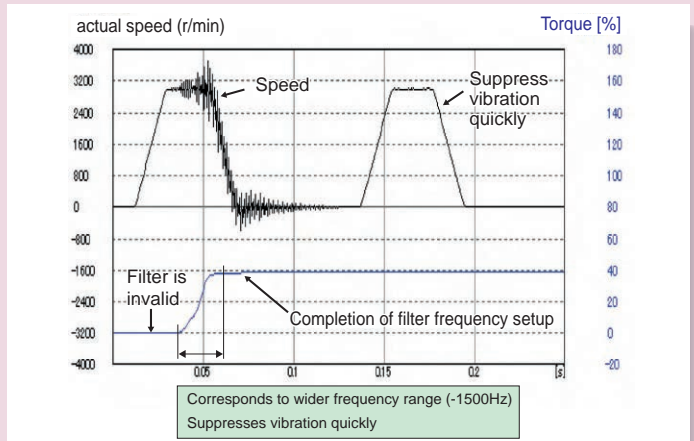
3. Further Reduction of Vibration

Adaptive filter

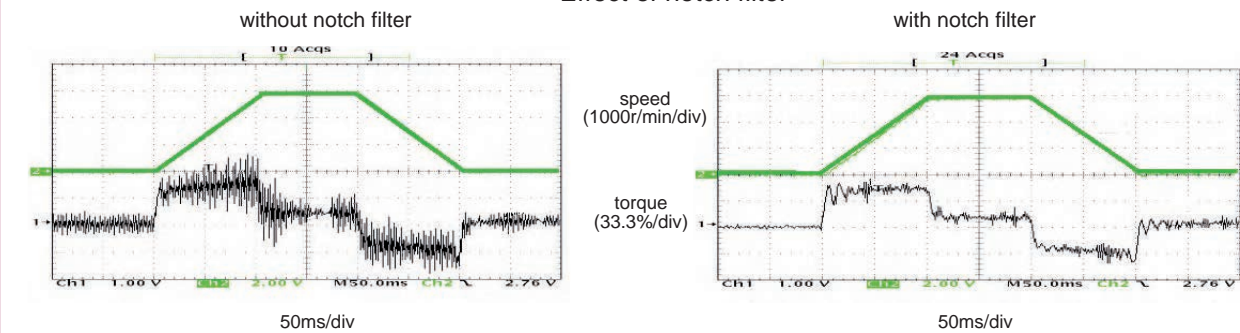
- Makes the notch filter frequency automatically follow the machine resonance frequency.
- Suppression of "Judder" noise of the machine can be expected which is caused by variation of the machines or resonance frequency due to aging.

2-channel notch filters

- 2-channel notch filters are equipped in the driver independent from adaptive filter.
- You can set up both frequency and width for each of 2 filters, and set up frequency in unit of 1Hz.
- Suppression of "Judder" noise of the machine which has multiple resonance points can be expected



Effect of notch filter

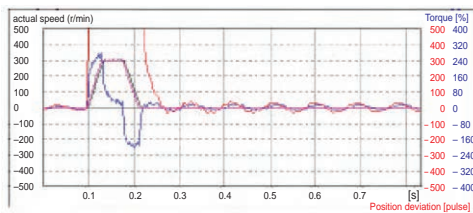


Damping control

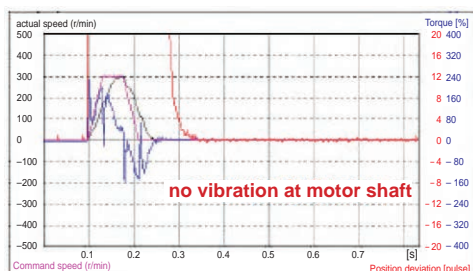
- 2-channel damping filters are equipped in this driver. You can suppress vibration occurring at both starting and stopping in low stiffness machine, by manually setting up vibration frequency in 0.1Hz unit.
- You can also switch the vibration frequency set by 2-channel with rotating direction or with an external input to correspond to the variation of vibration frequency caused by the machine position.
- Easy setup with entry of only frequency and filter value. Improper setup values do not result in unstable operation

motor movement

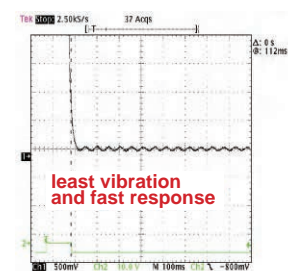
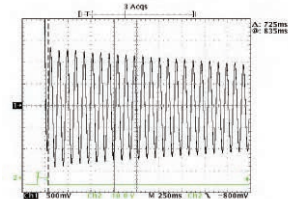
without damping control



with damping control



machine movement



4. Further Flexibility and Multiplicity

Dedicated Console (DV0P4420)

- Enables easy parameter setting/changing, control state monitoring, status/error log viewing, and parameter saving/loading.
- Makes it easy to move a target position, set a positioning point and perform teaching.
- Can select and display 16 types of operation data including motor rotational speed and torque in the monitor mode.

Control Mode

- Makes it possible to select position control via the motor's internal encoder or fully-closed control based on an feedback scale.

Analog Monitor Terminal

- "Motor rotational speed", "Command speed", "torque command" and "positional deviation" can be observed by oscilloscope through the analog monitor pin at the front panel of the driver.

Trial run (JOG)

- Features the function for trial (JOG) run through console (option) without connecting to a host controller.
- You can shorten the machine setup time.

Full-closed control (High precision positioning)

- Features the full-closed control of position and velocity, using the signals from feedback scale installed on the load side and high resolution encoder.

Note) Applicable feedback scales are as follows,

- Made by Mitsutoyo

	Resolution(μm)	Max. Speed*(m/s)
ABS AT573A Series	0.05	2
ABS ST771A Series	0.5	5
ABS ST773A Series	0.1	4
ABS ST771AL Series	0.5	5
ABS ST773AL Series	0.1	4

(* The maximum speed depends on the driver performance.
(It is limited by the machine configuration and system configuration.)

- Best suits to high precision machines.

Inrush current suppressing function

- Inrush suppressing resistor is equipped in this driver, which prevents the circuit breaker shutdown of the power supply caused by inrush current at power-on.
- Prevents unintentional shutdown of the power supply circuit breaker in multi-axes application and does not give load to the power line.

Regeneration discharging function

- Discharges the regenerative energy with resistor, which energy is generated while stopping the load with large moment of inertia, or use in up-down operation, and is returned to the driver from the motor.
- No regeneration discharge resistor is built-in to Frame A driver (MADDT1105P type.) and Frame B driver (MBDDT2210P type.), and we recommend you to connect optional regenerative resistor.
- Regenerative resistor is built-in to Frame C to F drivers, however, connection of the optional regenerative resistor bring you further regenerative capability.

Built-in dynamic brake

- You can select the dynamic brake action which short the servo motor windings of U, V and W, at Servo-OFF, CW/CCW over-travel inhibition, power shutdown and trip.
- You can select the action sequence setup depending on the machine requirement.

Setup support software

- With the setup support software, "PANATERM" via RS232 communication port, you can monitor the running status of the driver and set up parameters.

Wave-form graphic function

- With the setup support software, "PANATERM", you can monitor the "Command speed", "Actual speed", "Torque", "Position deviation" and "Positioning complete signal".
- Helps you to analyze the machine and shorten the setup time
* Note) Refer to page "F2" for setup support software.

Selectable Torque Limit Value

- A torque limit can be set for each rotational direction.
- According to the specification of the machine, a maximum torque can be set for each rotational direction as necessary.

Built in sequence of bumping homing

- You can select 8 kind of homing mode.
 - Home sensor (based on the front end)
 - Home sensor + Z phase (based on the front end)
 - Home sensor + Z phase (based on the rear end)
 - Limit sensor
 - Limit sensor + Z phase
 - Z phase homing
 - Bumping homing
 - Data set

SEMI F47 voltage sag immunity

- Features the function which complies to voltage sag immunity standard of SEMI F47 at no load or light load.
- Useful for semiconductor industry.

Notes)

- 1) Not applicable to single phase, 100V type.
- 2) Verify with the actual machine condition to F47, voltage sag immunity standard.

Frequency analyzing function

- You can confirm the response frequency characteristics of total machine mechanism including the servo motor with the setup support software, "PANATERM"
- Helps you to analyze the machine and shorten the setup time
*Note) Refer to page "F2" for setup support software.

Applicable overseas safety standards










Subject	Standard conformed	
Motor	IEC60034-1 IEC60034-5 UL1004 CSA22.2 No.100	Conforms to Low-Voltage Directives
	EN50178 UL508C CSA22.2 No.14	
Motor and driver	EN55011	Conforms to references by EMC Directives
	EN61000-6-2	
	IEC61000-4-2	
	IEC61000-4-3	
	IEC61000-4-4	
	IEC61000-4-5	
	IEC61000-4-6	
	IEC61000-4-11	

I E C : International Electrotechnical Commission Pursuant to at the directive 2004/108/EC,article 9(2)
 E N : Europaischen Normen
 EMC : Electromagnetic Compatibility Panasonic Testing Centre
 U L : Underwriters Laboratories Panasonic Service Europe,
 CSA : Canadian Standards Association a division of Panasonic Marketing Europe GmbH
 Winsbergring 15,22525 Hamburg,F.R.Germany

* When export this product, follow statutory provisions of the destination country.

Motor Line-up

	Motor series *	Rated output (kW)	Rated rotational speed (Max. speed) (r/min)	Rotary encoder		Brake	Gear	CE/UL	Enclosure	Features	Applications
				2500P/r incremental	17bit absolute/incremental	Holding	High precision				
Ultra low inertia	MAMA	0.1-0.75 4 models 0.1, 0.2, 0.4 and 0.75	5000 (6000)	○	○	○	—	○	IP65 (Except shaft through hole and connector)	·Small capacity ·Suitable for the machines directly coupled with high speed ball screw and high stiffness and high repetitive application	·SMT machines ·Inserters ·High repetitive positioning application
											
Low inertia	MSMD	0.05-0.75 5 models 0.05, 0.1, 0.2, 0.4 and 0.75	3000 (5000) *For 400W/100V and 750W 3000 (4500)	○	○	○	○	○	IP65 (Except shaft through hole and connector)	·Small capacity ·Suitable for all applications	·Inserters ·Belt driven machines ·Unloading robot
											
	MQMA (Cube type)	0.1-0.4 3 models 0.1, 0.2, and 0.4	3000 (5000) *For 400W/100V 3000 (4500)	○	○	○	—	○	IP65 (Except shaft through hole and connector)	·Small capacity ·Suitable for flat type and low stiffness machines with belt driven	·SMT machines ·Inserters ·Belt driven machines ·Unloading robot
											
	1.0-5.0 6 models 1.0,1.5,2.0, 3.0,4.0 and 5.0	3000 (5000) *For 4kW and 5kW 3000 (4500)	○	○	○	—	○	IP65 (Except cannon plug/connector pins)	·Middle capacity ·Suitable for the machines directly coupled with ball screw and high stiffness and high repetitive application	·SMT machines ·Inserter ·Food machines	
Middle inertia	MDMA	1.0-5.0 6 models 1.0,1.5,2.0, 3.0,4.0 and 5.0	2000 (3000)	○	○	○	—	○	IP65 (Except cannon plug/connector pins)	·Middle capacity ·Suitable for low stiffness machines with belt driven	·Belt driven machines ·Conveyers ·Robots
											
	MGMA (Low speed/High torque type)	0.9-4.5 4 models 0.9,2.0,3.0 and 4.5	1000 (2000)	○	○	○	—	○	IP65 (Except cannon plug/connector pins)	·Middle capacity ·Suitable for machines requiring low speed with high torque	·Belt driven machines ·Conveyers ·Robots
											
	0.4-4.5 4 models 0.4,1.5, 2.5 and 4.5	2000 (3000)	○	○	○	—	○	IP65 (Except cannon plug/connector pins)	·Middle capacity ·Flat type and suitable for machines with space limitation	·Robots ·Food machines	
High inertia	MHMA	0.5-5.0 7 models 0.5,1.0,1.5, 2.0,3.0,4.0 and 5.0	2000 (3000)	○	○	○	—	○	IP65 (Except cannon plug/connector pins)	·Middle capacity ·Suitable for low stiffness machines with belt driven, and large load moment of inertia	·Belt driven machines ·Conveyers ·Robots

* Motor is sharing with A4/A4F series

Model Designation

• Servo Motor

M S M D 5 A Z S 1 S * *

Special specifications

Symbol	Type
MAMA	Ultra low inertia (100W-750W)
MSMD	Low inertia (50W-750W)
MQMA	Low inertia (100W-400W)
MSMA	Low inertia (1.0kW-5.0W)
MDMA	Middle inertia (1.0kW-5.0kW)
MGMA	Middle inertia (900W-4.5kW)
MFMA	Middle inertia (400W-4.5kW)
MHMA	High inertia (500W-5.0kW)

Design order
1 : Standard

Rotary encoder specifications

Symbol	Format	Pulse counts	Resolution	Wires
P	Incremental	2500P/r	10000	5
S	Absolute/ Incremental common	17bit	131072	7

Voltage specifications

Symbol	Specifications
1	100V
2	200V
Z	100V/200V common(50W only)

Motor rated output

Symbol	Rated output	Symbol	Rated output
5A	50W	15	1.5kW
01	100W	20	2.0kW
02	200W	25	2.5kW
04	400W	30	3.0kW
05	500W	40	4.0kW
08	750W	45	4.5kW
09	900W	50	5.0kW
10	1.0kW		

Motor structure
MSMD(standard stock), MQMA(build to order)

Symbol	Shaft		Holding brake		Oil seal	
	Round	Key-way, center tap	without	with	without	with*
A	●		●		●	
B	●			●	●	
S		●	●		●	
T		●		●	●	

*Motor with oil seal is manufactured by order.
MSMA, MDMA, MGMA, MFMA, MHMA

Symbol	Shaft		Holding brake		Oil seal	
	Round	Key-way	without	with	without	with
C	●		●			●
D	●			●	●	
G		●	●			●
H		●		●		●

Products are standard stock items or build to order items. See index (page F31).

MAMA

Symbol	Shaft		Holding brake		Oil seal	
	Round	Key-way	without	with	without	with
A	●		●		●	
B	●			●	●	
E		●	●		●	
F		●		●	●	

Products are standard stock items or build to order items. See index (page F31).
See page, A4-77 for motor specifications

• Motor with reduction gear

M S M D 0 1 1 P 3 1 N

Symbol	Type
MSMD	Low inertia (100W-750W)

Motor rated output

Symbol	Rated output
01	100W
02	200W
04	400W
08	750W

Voltage specifications

Symbol	Specifications
1	100V
2	200V

Rotary encoder specifications

Symbol	Format	Pulse counts	Resolution	Wires
P	Incremental	2500P/r	10000	5
S	Absolute/ Incremental common	17bit	131072	7

Motor structure

Symbol	Shaft		Holding brake	
	Key-way		without	with
3	●		●	
4	●			●

Gear reduction ration, gear type

Symbol	Gear reduction ratio	Motor output (W)				Gear type
		100	200	400	750	
1N	1 / 5	●	●	●	●	For high accuracy
2N	1 / 9	●	●	●	●	
3N	1 / 15	●	●	●	●	
4N	1 / 25	●	●	●	●	

See page, A4-133 for motor with gear reducer specifications

• Servo Driver

M A D D T 1 2 0 5 P * *

Special specifications

Frame symbol

Symbol	Frame
MADD	A4 series, Frame A
MBDD	A4 series, Frame B
MCDD	A4 series, Frame C
MDDD	A4 series, Frame D
MEDD	A4 series, Frame E
MFDD	A4 series, Frame F

Power device Max. current rating

Symbol	Power device Max. current rating
T1	1 0A
T2	1 5A
T3	3 0A
T5	5 0A
T7	7 5A
TA	1 0 0A
TB	1 5 0A

Supply voltage specifications

Symbol	Specifications
1	Single phase, 100V
2	Single phase, 200V
3	3-phase, 200V
5	Single/3-phase, 200V

Current detector current rating

Symbol	Current detector, current rating
05	5A
07	7.5A
10	1 0A
20	2 0A
30	3 0A
40	4 0A
64	6 4A
90	9 0A
A2	1 2 0A

Interface

Symbol	Specifications
P	I/O Operation

See page, A4-67 for driver specifications

Wiring example

Driver Frame Type Symbol (Frame A, B, C, D)

For details, refer to the Instruction Manual.

• Wiring of main circuit

Circuit Breaker (NFB)

Protects the power lines.
Shuts off the circuit when overcurrent passes.

Noise Filter (NF)

Prevents external noise from the power lines.
And reduces an effect of the noise generated by the servo driver.

Magnetic Contactor (MC)

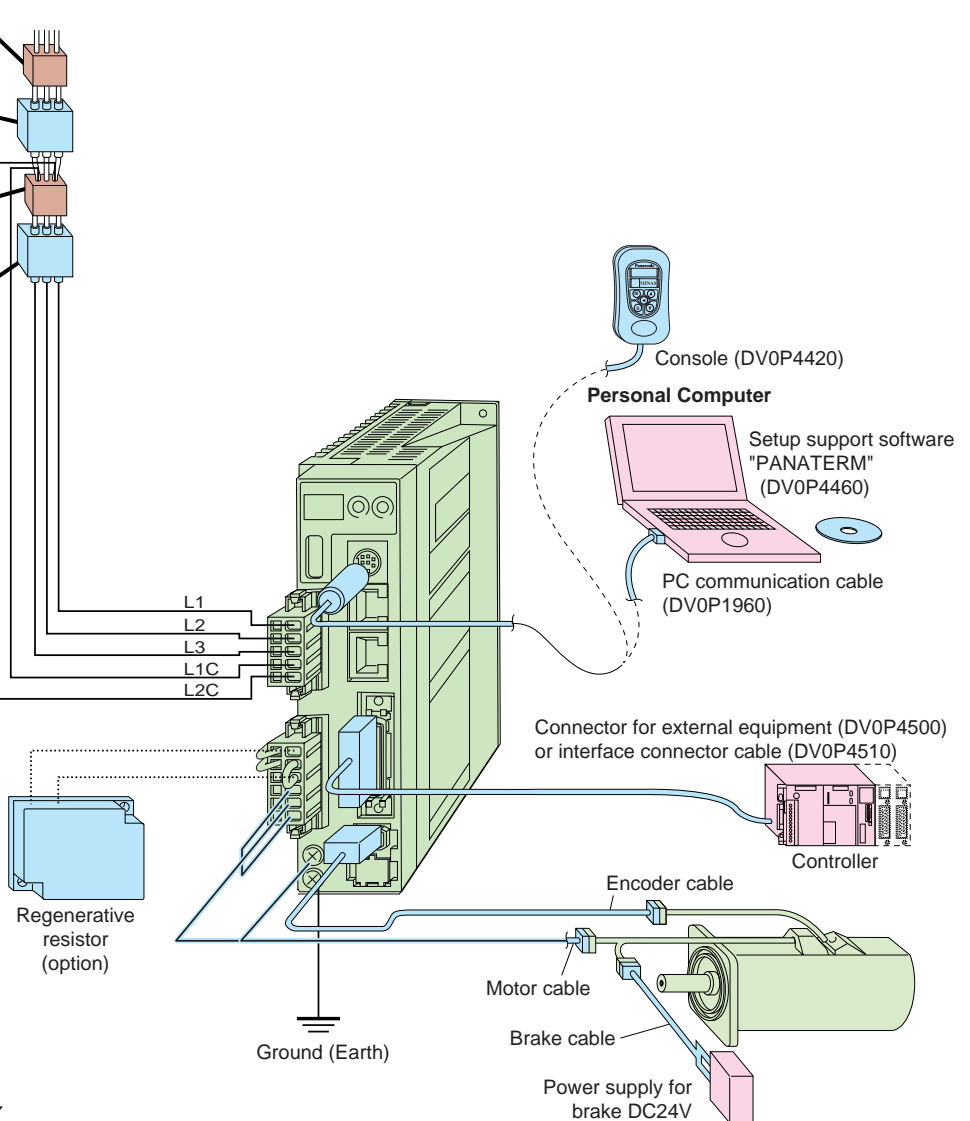
Turns on/off the main power of the servo driver.
Surge absorber to be used together with this.

Reactor (L)

Reduces harmonic current of the main power.

Pin RB, RB2 and RB3 ...

- RB2 and RB3 to be kept shorted for normal operation.
- When the internal regenerative resistor capacity has shortage, disconnect between RB2 and RB3, then connect an external regenerative resistor between RB1 and RB2. (Note: that no regenerative resistor is equipped in Frame A and B type.)



Motor to page A4-77

Driver to page A4-67

Option to page A4-141

Recommended equipments to page A4-64

Parts customer to prepare

Driver Frame Type Symbol (Frame E, F)

For details, refer to the Instruction Manual.

• Wiring of main circuit

Circuit Breaker (NFB)

Protects the power lines.
Shuts off the circuit when overcurrent passes.

Noise Filter (NF)

Prevents external noise from the power lines.
And reduces an effect of the noise generated by the servo driver.

Magnetic Contactor (MC)

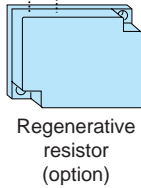
Turns on/off the main power of the servo driver.
Surge absorber to be used together with this.

Reactor (L)

Reduces harmonic current of the main power.

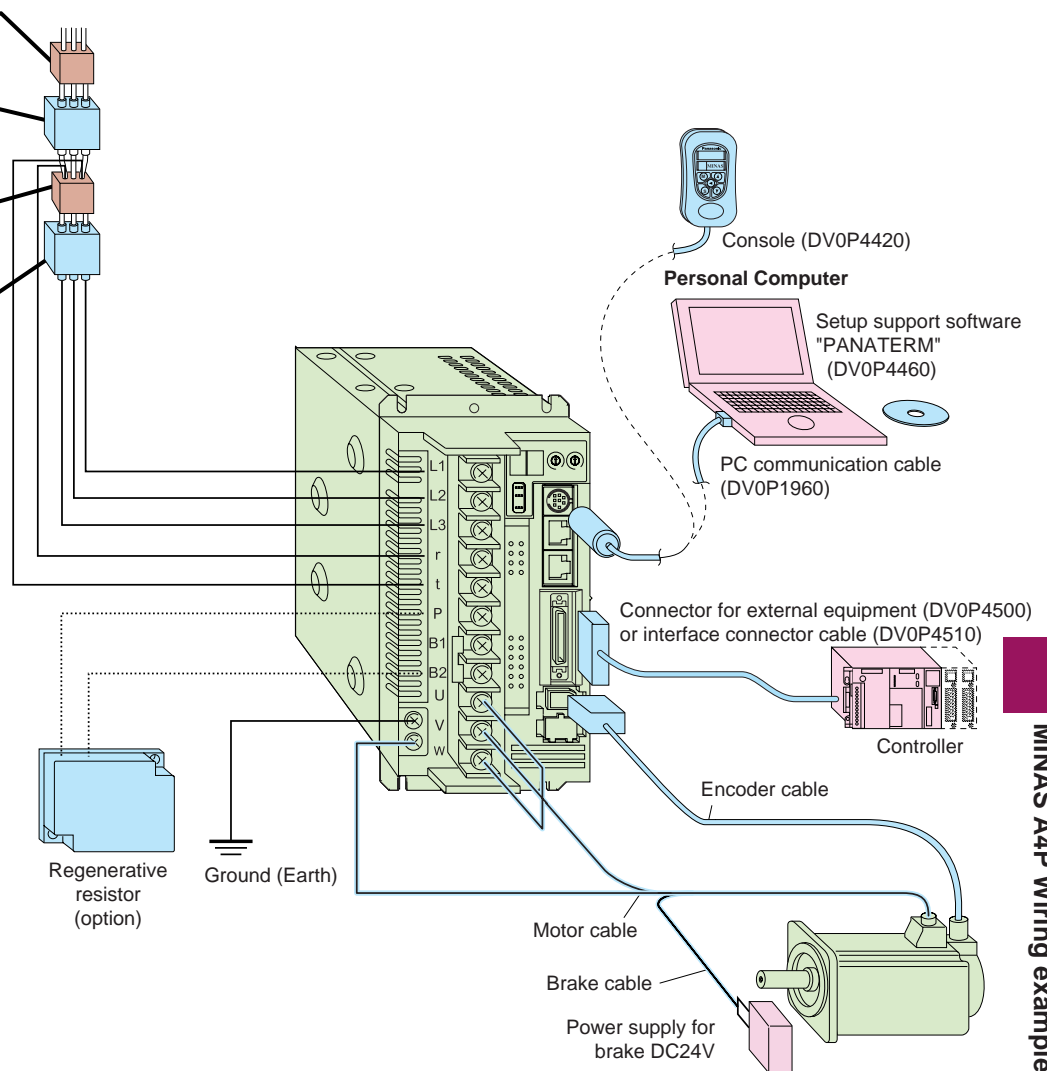
Pin P, B1 and B2 ...

- B1 and B2 to be kept shorted for normal operation.
- When the internal regenerative resistor capacity has shortage, disconnect between B1 and B2, then connect an external regenerative resistor between P and B2.



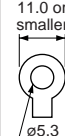
Ground (Earth)


- Motor to page A4-77
- Driver to page A4-67
- Option to page A4-141
- Recommended equipments to page A4-64
- Parts customer to prepare



Wiring example

● List of recommended peripheral equipments

Power supply voltage	Applicable motor		Power capacity (at rated load)	Circuit breaker (rated current)	Noise filter	Surge absorber	Noise filter (signal)	Magnetic contactor (Contact)	Cable diameter (Main circuit)	Cable diameter (control circuit)	Connector					
	Series	Output														
Single phase, 100V	MSMD	50W	Approx. 0.4kVA		DVOP4170			BMFT61041N (3P+1a)	0.75mm ² to 2.0mm ² AWG14 to 18		Connection to exclusive connector					
	MSMD	100W														
	MQMA	200W	Approx. 0.5kVA													
		400W	Approx. 0.9kVA													
Single phase, 200V	MSMD	50W	Approx. 0.5kVA		BBW2102 (10A)			DVOP4170				DVOP4190	BMFT61542N (3P+1a)			
		100W	Approx. 0.3kVA													
	MAMA	100W														
	MQMA		200W													
	MAMA	200W		Approx. 0.5kVA												
	MSMD		400W	Approx. 0.9kVA												
MQMA																
Single/ 3-phase, 200V	MAMA	400W	Approx. 0.9kVA	BBW3152 (15A)	DVOP4180	DVOP1460	BMFT61842N (3P+1a)	2.0mm ² AWG14	0.75mm ² AWG18							
	MFMA															
	MHMA	500W	Approx. 1.1kVA													
	MSMD	750W	Approx. 1.3kVA													
	MAMA		Approx. 1.6kVA													
	MDMA	1.0kW	Approx. 1.8kVA	BBW3202 (20A)	DVOP4220											
	MHMA															
	MGMA	900W	Approx. 2.3kVA													
MSMA	1.0kW															
3-phase, 200V	MSMA	2.0kW	Approx. 3.3kVA	BBW3302 (30A)	DVOP4220	DVOP1450	BMF6352N (3P+2a2b)	3.5mm ² AWG12		Terminal block M5 11.0 or smaller 						
	MDMA															
	MHMA															
	MFMA	2.5kW	Approx. 3.8kVA													
	MGMA	2.0kW														
	MSMA	3.0kW	Approx. 4.5kVA													
	MDMA															
	MHMA															
	MGMA	4.0kW	Approx. 6.0kVA	BBW350S (50A)	DVOP3410											
	MSMA															
	MDMA	4.5kW	Approx. 6.8kVA													
	MHMA															
MSMA	5.0kW	Approx. 7.5kVA														
MDMA																
MHMA																

- Select a single and 3-phase common specifications corresponding to the power supplies.
- Listed circuit breaker and magnetic contactor are manufactured by Panasonic Electric Works.
To conform to EC Directives, install a circuit breaker which conforms to IEC and UL Standards (Listed,  marked) between noise filter and power supply without fail.
- For details of noise filter, refer to Page A4-138.

<Remarks>

- Select a circuit breaker and noise filter which match to the capacity of power supply (including a load condition).
- Terminal block and earth terminals
 - Use a copper conductor cables with temperature rating of 60°C or higher.
 - Earth terminals for Frame A to D are M4 and M5 for Frame E, F.
 - Larger tightening torque for screws than the max.value (M4 : 1.2 N·m, M5 : 2.0 N·m) may damage the terminal block.
 - Mounting screws on the cover of terminal block for frames E, F should be tightened with 0.2 N·m torque.
Application of torque larger than 0.2 N·m may damage the thread on the driver.
- Use an earth cable with the same diameter as that of the main circuit cable.
If the diameter of the main circuit cable is 1.6mm² or less, use an earth cable with a diameter of 1.6mm² (AWG14).
- Use the attached exclusive connector for A to D-frame, and maintain the peeled off length of 8 to 9mm.
- Tighten the screws of the connector, CN X5 for the host controller with the torque of 0.3 to 0.35 N·m.
- Larger torque than 0.35N·m may damage the connector at the driver side.

<Caution>

Do not turn on power without first positively tightening all terminal block screws, otherwise, loose contacts may generate heat (smoking, firing).

Table of Part Numbers and Options

Motor series	Power supply	Rated rotational speed (r/min)	Output (W)	2500P/r, Incremental			17bit, Absolute/Incremental common				2500P/r and 17bit common					
				Motor Note) 1	Rating/Spec. (page)	Encoder cable Note) 2	Motor Note) 1	Rating/Spec. (page)	Encoder cable Note) 2	Encoder cable Note) 2	Driver	Frame symbol				
MAMA [Ultra low inertia]	Single phase 200V	5000	100	MAMA012P1		MFECA 0**0EAM	MAMA012S1		MFECA 0**0EAE	MFECA 0**0EAD	MADDT1207P	A-frame				
			200	MAMA022P1			MAMA022S1				MBDDT2210P	B-frame				
			400	MAMA042P1	A4-77		MAMA042S1	A4-77			MCDDT3520P	C-frame				
			750	MAMA082P1			MAMA082S1				MDDDT5540P	D-frame				
	3-phase, 200V	5000	400	MAMA042P1			MAMA042S1				MCDDT3520P	C-frame				
			750	MAMA082P1			MAMA082S1				MDDDT5540P	D-frame				
MSMD [low inertia]	Single phase 100V	3000	50	MSMD5AZP1	A4-79	MFECA 0**0EAM	MSMD5AZS1	A4-79	MFECA 0**0EAE	MFECA 0**0EAD	MADDT1105P	A-frame				
			100	MSMD011P1			MSMD011S1				MADDT1107P					
			200	MSMD021P1	A4-81		MSMD021S1	A4-81			MBDDT2110P	B-frame				
			400	MSMD041P1			MSMD041S1				MCDDT3120P	C-frame				
	Single phase 200V	3000	50	MSMD5AZP1	A4-83		MSMD5AZS1	A4-83			MADDT1205P					
			100	MSMD012P1			MSMD012S1				MADDT1205P	A-frame				
			200	MSMD022P1			MSMD022S1				MADDT1207P					
			400	MSMD042P1	A4-85		MSMD042S1	A4-85			MBDDT2210P	B-frame				
	3-phase, 200V	3000	750	MSMD082P1			MSMD082S1				MCDDT3520P					
			750	MSMD082P1			MSMD082S1				MCDDT3520P	C-frame				
	MQMA [Low inertia Cube type]	Single phase 100V	3000	100	MQMA011P1			MFECA 0**0EAM			MQMA011S1		MFECA 0**0EAE	MFECA 0**0EAD	MADDT1107P	A-frame
				200	MQMA021P1		A4-87				MQMA021S1	A4-87			MBDDT2110P	B-frame
400				MQMA041P1		MQMA041S1			MCDDT3120P	C-frame						
Single phase 200V		3000	100	MQMA012P1		MQMA012S1			MADDT1205P	A-frame						
			200	MQMA022P1	A4-89	MQMA022S1	A4-89		MADDT1207P							
			400	MQMA042P1		MQMA042S1			MBDDT2210P	B-frame						
MSMA [low inertia]	Single phase 200V	3000	1000	MSMA102P1		MFECA 0**0ESD	MSMA102S1		MFECA 0**0ESE	MFECA 0**0ESD	MDDDT5540P					
			1500	MSMA152P1			MSMA152S1				MDDDT5540P	D-frame				
	3-phase, 200V	3000	1000	MSMA102P1	A4-91		MSMA102S1	A4-91			MDDDT5540P					
			1500	MSMA152P1			MSMA152S1				MDDDT5540P					
			2000	MSMA202P1			MSMA202S1				MEDDT7364P	E-frame				
			3000	MSMA302P1			MSMA302S1				MFDDTA390P					
			4000	MSMA402P1	A4-93		MSMA402S1	A4-93			MFDDTB3A2P	F-frame				
5000	MSMA502P1		MSMA502S1		MFDDTB3A2P											
MDMA [Middle inertia]	Single phase 200V	2000	1000	MDMA102P1		MFECA 0**0ESD	MDMA102S1		MFECA 0**0ESE	MFECA 0**0ESD	MDDDT3530P					
			1500	MDMA152P1	A4-95		MDMA152S1	A4-95			MDDDT5540P	D-frame				
	3-phase, 200V	2000 Note)3	1000	MDMA102P1			MDMA102S1				MDDDT3530P					
			1500	MDMA152P1			MDMA152S1				MDDDT5540P					
			2000	MDMA202P1	A4-97		MDMA202S1	A4-97			MEDDT7364P	E-frame				
			3000	MDMA302P1			MDMA302S1				MFDDTA390P					
			4000	MDMA402P1	A4-99		MDMA402S1	A4-99			MFDDTB3A2P	F-frame				
			5000	MDMA502P1			MDMA502S1				MFDDTB3A2P					
MGMA [Middle inertia Low speed/High torque]	Single phase 200V	1000	900	MGMA092P1		MFECA 0**0ESD	MGMA092S1		MFECA 0**0ESE	MFECA 0**0ESD	MDDDT5540P	D-frame				
			900	MGMA092P1	A4-101		MGMA092S1	A4-101			MDDDT5540P					
	3-phase, 200V	1000	2000	MGMA202P1			MGMA202S1				MFDDTA390P					
			3000	MGMA302P1			MGMA302S1				MFDDTB3A2	F-frame				
			4500	MGMA452P1	A4-103		MGMA452S1	A4-103			MFDDTB3A2P					
MFMA [Middle inertia Flat type]	Single phase 200V	2000	400	MFMA042P1		MFECA 0**0ESD	MFMA042S1		MFECA 0**0ESE	MFECA 0**0ESD	MCDDT3520P	C-frame				
			1500	MFMA152P1	A4-105		MFMA152S1	A4-105			MDDDT5540P	D-frame				
	3-phase, 200V	2000 Note)3	400	MFMA042P1			MFMA042S1				MCDDT3520P	C-frame				
			1500	MFMA152P1			MFMA152S1				MDDDT5540P	D-frame				
			2500	MFMA252P1	A4-107		MFMA252S1	A4-107			MEDDT7364P	E-frame				
			4500	MFMA452P1			MFMA452S1				MFDDTB3A2P	F-frame				
MHMA [High inertia]	Single phase 200V	2000	500	MHMA052P1		MFECA 0**0ESD	MHMA052S1		MFECA 0**0ESE	MFECA 0**0ESD	MCDDT3520P	C-frame				
			1000	MHMA102P1			MHMA102S1				MDDDT3530P					
			1500	MHMA152P1	A4-109		MHMA152S1	A4-109			MDDDT5540P	D-frame				
	3-phase, 200V	2000 Note)3	500	MHMA052P1			MHMA052S1				MCDDT3520P	C-frame				
			1000	MHMA102P1			MHMA102S1				MDDDT3530P	D-frame				
			1500	MHMA152P1			MHMA152S1				MDDDT5540					
			2000	MHMA202P1			MHMA202S1				MEDDT7364P	E-frame				
			3000	MHMA302P1	A4-111		MHMA302S1	A4-111			MFDDTA390P					
			4000	MHMA402P1			MHMA402S1				MFDDTB3A2P	F-frame				
			5000	MHMA502P1			MHMA502S1				MFDDTB3A2P					

Optional parts								
Motor cable Note) 2	Motor cable (with brake) Note) 2	Brake cable Note) 2	Regenerative resistor	Reactor	Noise filter			
MFMC A 0**0EED	—	MFMC B 0**0GET	DV0P4283	DV0P220	DV0P4170			
			DV0P4284	DV0P221	DV0P4180			
			DV0P4283	DV0P220	DV0P4180			
			DV0P4284	DV0P221	DV0P4220			
MFMC A 0**0EED	—	MFMC B 0**0GET	DV0P4280	DV0P227	DV0P4170			
			DV0P4283	DV0P228				
			DV0P4282		DV0P4180			
			DV0P4281	DV0P220				
					DV0P4170			
			DV0P4283	DV0P221	DV0P4180			
MFMC A 0**0EED	—	MFMC B 0**0GET	DV0P4280	DV0P227	DV0P4170			
			DV0P4283	DV0P228		DV0P4180		
			DV0P4282	DV0P220				
			DV0P4281		DV0P4170			
			DV0P4283	DV0P221	DV0P4180			
MFMC D 0**2ECD	MFMC A 0**2FCD	—	DV0P4284	DV0P222	DV0P4220			
			MFMC D0**2ECT	MFMC A0**2FCT	DV0P4285	DV0P223		
					DV0P4285	DV0P224	DV0P3410	
			MFMC A 0**3ECT	MFMC A 0**3FCT		—		
MFMC D 0**2ECD	MFMC A 0**2FCD	—	DV0P4284	DV0P222	DV0P4220			
			MFMC D0**2ECT	MFMC A0**2FCT	DV0P4285	DV0P223		
					DV0P4285	DV0P224	DV0P3410	
			MFMC A 0**3ECT	MFMC A 0**3FCT		—		
MFMC D 0**2ECD	MFMC A 0**2FCD	—	DV0P4284	DV0P222	DV0P4220			
			DV0P4285	DV0P223				
MFMC A 0**3ECT	MFMC A 0**3FCT	—	DV0P4285	DV0P224	DV0P3410			
				—				
MFMC A 0**2ECD	MFMC A 0**2FCD	—	DV0P4283	DV0P220	DV0P4180			
			DV0P4284	DV0P222	DV0P4220			
			DV0P4283	DV0P220	DV0P4180			
			DV0P4284	DV0P222	DV0P4220			
			DV0P4285	DV0P224				
			MFMC D 0**3ECT	MFMC A 0**3FCT		DV0P3410		
MFMC D 0**2ECD	MFMC A 0**2FCD	—	DV0P4283	DV0P220	DV0P4180			
			DV0P4284	DV0P222	DV0P4220			
			DV0P4283	DV0P220	DV0P4180			
			DV0P4284	DV0P222	DV0P4220			
			DV0P4285	DV0P224				
			MFMC A 0**3ECT	MFMC A 0**3FCT		DV0P3410		
MFMC D 0**2ECD	MFMC A 0**2FCD	—	DV0P4283	DV0P220	DV0P4180			
			DV0P4284	DV0P222	DV0P4220			
			DV0P4283	DV0P220	DV0P4180			
			DV0P4284	DV0P222	DV0P4220			
			DV0P4285	DV0P223				
			MFMC A 0**3ECT	MFMC A 0**3FCT		DV0P3410		

● Carrying page

Options	Part No.	Carrying page	
Technical reference	Japanese	DV0P4480	—
	English	DV0P4490	—
Console		DV0P4420	A4-152
Setup support software, PANATERM	Japanese	DV0P4460	A4-151
	English		
RS232 communication cable (for connection with PC)		DV0P1960	A4-147
Interface cable		DV0P4510	A4-147
Connector kit for external equipment		DV0P4500	A4-146
Connector kit for motor and encoder		DV0P4290	A4-148
		DV0P4380	
		DV0P4310	A4-149
		DV0P4320	
		DV0P4330	
		DV0P4340	
Battery for absolute encoder		DV0P2990	A4-154
Mounting bracket	Frame A	DV0P4271	A4-151
	Frame B	DV0P4272	
	Frame C	DV0P4273	
	Frame D	DV0P4274	
Encoder cable	MFECA0**0EAD	A4-143	
	MFECA0**0EAE		
	MFECA0**0EAM		
	MFECA0**0ESD		
	MFECA0**0ESE		
Motor cable	MFMC A0**0EED	A4-144	
	MFMC A0**2ECD		
	MFMC A0**3ECT		
	MFMC D0**2ECD		
	MFMC D0**2ECT		
	MFMC D0**3ECT		
Motor cable (with brake)	MFMC A0**2FCD	A4-145	
	MFMC A0**2FCT		
	MFMC A0**3FCT		
Brake cable	MFMC B0**0GET	A4-145	
Regenerative resistor	50 Ω , 25W	DV0P4280	A4-153
	100 Ω , 25W	DV0P4281	
	25 Ω , 50W	DV0P4282	
	50 Ω , 50W	DV0P4283	
	30 Ω , 100W	DV0P4284	
	20 Ω , 130W	DV0P4285	
Reactor		DV0P220	A4-152
		to DV0P228	
Noise filter		DV0P4170	A4-138
		DV0P4180	
		DV0P4220	
		DV0P3410	
Surge absorber	Single phase 100V, 200V	DV0P4190	A4-139
	3-phase 200V	DV0P1450	
Noise filter for signal wire		DV0P1460	A4-139

Note) 1. □ represents the motor structure.

Note) 2. ** represents the cable length (specified value)

For details, refer to cable specifications (A4-141).