Parker Automation
Compumotor Division

DYNASERV DM/DR Series
Drive MII (DrvMII) Drive/controller

1.2 About the DrvMII Type Driver

The DrvMII type driver is a multipurpose driver with a built-in controller developed as the successor to the conventional M type driver. Not only have the functions been improved, but also the driver box volume has been made smaller, and it can support the DYNASERV rotation type motors, as well as the LINEARSERV series motors that are of the direct drive type.

The features include the following:

(1) In addition to the contact I/O, <DeviceNet>, <CC-Link>, and <ProfiBus> can be selected as interfaces from the field bus. Also, <CANopen> is under development.
(2) With the built-in controller function, the size of the driver is reduced to approximately half of the previous size (comparison within our company).
(3) The resolution is increased by a factor of four for the DM series and a factor of two for the DR series.
(4) It can now support most of the models of the DYNASERV and LINEARSERV series.
(5) A sophisticated utility is now available and an oscilloscope function has been included as well.

10.1 Standard Specifications

(1) DM Series Motor

Item			Unit	A Series			
				DM1200A 00*1	DM1150A 00*1	DM1100A 00*1	DM1050A 00*1
Motor + driver	Maximum output torque		N·m (kgf·m)	200 (20)	150 (15)	100 (10)	50 (5.0)
	Rated number of revolutions (100/200V)		rps	0.5/1.0		1.0/1.0	
	Rotational positioning	Encoder resolution	p/rev	4,096,000			
		Repeatability accuracy	Sec	±1			
		Absolute accuracy	Sec	±15			
Motor	Rotor inertia		$kg \cdot m^2$	167×10^{-3}	142×10^{-3}	119×10^{-3}	96×10^{-3}
	Allowable axial load	Positive	N (kgf)	4×10^4 (4×10^3)			
		Negative		2×10^4 (2×10^3)			
	Allowable moment load		N·m (kgf·m)	400 (40)			
	Axial displacement rigidity	Positive	mm/N (mm/kgf)	2×10^{-6} (2×10^{-5})			
		Negative		3×10^{-6} (3×10^{-5})			
	Moment displacement rigidity		rad/ N·m (rad/kgf·m)	4×10^{-7} (4×10^{-6})			
	Mass		kg	29	24	19	14.5
	Height (refer to dimension diagram)		mm	188	163	138	113

Item			Unit	B Series				
				DM1075B 00*1	DM1060B 00*1	DM1045B 00*1	DM1030B 00*1	DM1015B 00*1
Motor + driver	Maximum output torque		N·m (kgf·m)	75 (7.5)	60 (6.0)	45 (4.5)	30 (3.0)	15 (1.5)
	Rated number of revolutions (100/200V)		rps	1.0/2.0	1.0/1.5	1.0/2.0	1.5/2.0	2.0/2.0
	Rotational positioning	Encoder resolution	p/rev	2,621,440				
		Repeatability accuracy	Sec	±1				
		Absolute accuracy	Sec	±15				
Motor	Rotor inertia		$kg \cdot m^2$	27×10^{-3}	23×10^{-3}	19×10^{-3}	15×10^{-3}	12×10^{-3}
	Allowable axial load	Positive	N (kgf)	3×10^4 (3×10^3)				
		Negative		1×10^4 (1×10^3)				
	Allowable moment load		N·m (kgf·m)	200 (20)				
	Axial displacement rigidity	Positive	mm/N (mm/kgf)	2.5×10^{-6} (2.5×10^{-5})				
		Negative		3×10^{-6} (3×10^{-5})				
	Moment displacement rigidity		rad/ N·m (rad/kgf·m)	1×10^{-6} (1×10^{-5})				
	Mass		kg	14	12	9.5	7.5	5.5
	Height (refer to dimension diagram)		mm	194	168	143	118	92.5

Motor model name	DM1004B0F-2*1	DM1004C0F-2*1
Maximum torque (N·m)	4	
Maximum number of revolutions (rps)	2.5	
Encoder resolution (p/rev)	2,621,440	
Absolute accuracy (sec)	±20	± 60
Repeatability accuracy (sec)	±3	
Axial rotational deflection $(\mu m)_{p\text{-}p}$	10	
Radial rotational deflection $(\mu m)_{p\text{-}p}$	10	
Rotor inertia ($kg \cdot m^2$)	5.5×10^{-3}	2.5×10^{-3}
Withstand load (N)	50	
Mass (kg)	3	3

(2) DR Series Motor

Item			Unit	A Series					
				DR1400 A00*1	DR1300 A00*1	DR1200 A00*1	DR1150 A00*1	DR1100 A00*1	DR1050 A00*1
Motor + driver	Maximum output torque		N·m (kgf·m)	400 (40)	300 (30)	200 (20)	150 (15)	100 (10)	50 (5.0)
	Rated number of revolutions (100/200V)		rps	0.25/0.5		0.5/1.0		1.0/1.0	1.5/1.5
	Rotational positioning	Encoder resolution	p/rev	1,638,400					
		Repeatability accuracy	Sec	±3					
		Absolute accuracy	Sec	±30					
Motor	Rotor inertia		$kg \cdot m^2$	400×10^{-3}	340×10^{-3}	285×10^{-3}	230×10^{-3}	200×10^{-3}	180×10^{-3}
	Allowable axial load	Positive	N (kgf)	4×10^4 (4×10^3)					
		Negative		2×10^4 (2×10^3)					
	Allowable moment load		N·m (kgf·m)	400 (40)					
	Axial displacement rigidity	Positive	mm/N (mm/kgf)	2×10^{-6} (2×10^{-5})					
		Negative		3×10^{-6} (3×10^{-5})					
	Moment displacement rigidity		rad/ N·m (rad/kgf·m)	4×10^{-7} (4×10^{-6})					
	Mass		kg	65	55	45	36	31	26
	Height (refer to dimension diagram)		mm	358	304	250	212	185	158

Item			Unit	B Series				
				DR1060 B00*1	DR1045 B00*1	DR1030 B00*1	DR1015 B00*1	DR1008 B00*1
Motor + driver	Maximum output torque		N·m (kgf·m)	60 (6.0)	45 (4.5)	30 (3.0)	15 (1.5)	8 (0.8)
	Rated number of revolutions (100/200V)		rps	1.0/1.5	1.0/2.0	1.5/2.0	2.0/2.0	
	Rotational positioning	Encoder resolution	p/rev	1,015,808				
		Repeatability accuracy	Sec	±3				
		Absolute accuracy	Sec	±45				
Motor	Rotor inertia		$kg \cdot m^2$	33×10^{-3}	26×10^{-3}	24×10^{-3}	21×10^{-3}	15×10^{-3}
	Allowable axial load	Positive	N (kgf)	3×10^4 (3×10^3)				
		Negative		1×10^4 (1×10^3)				
	Allowable moment load		N·m (kgf·m)	200 (20)				
	Axial displacement rigidity	Positive	mm/N (mm/kgf)	3×10^{-6} (3×10^{-5})				
		Negative		4×10^{-6} (4×10^{-5})				
	Moment displacement rigidity		rad/ N·m (rad/kgf·m)	2×10^{-6} (2×10^{-5})				
	Mass		kg	15.5	13.0	11.0	9.0	6.0
	Height (refer to dimension diagram)		mm	207	179	151	123	85

Item			Unit	E Series				
				DR1250E 00*1	DR1220E 00*1	DR1160E 00*1	DR1130E 00*1	DR1100E 00*1
Motor + driver	Maximum output torque		N·m (kgf·m)	250 (25)	220 (22)	160 (16)	130 (13)	100 (10)
	Rated number of revolutions (100/200V)		rps	0.5/1.0				1.0/1.5
	Rotational positioning	Encoder resolution	p/rev	1,228,800				
		Repeatability accuracy	Sec	±3				
		Absolute accuracy	Sec	±45				
Motor	Rotor inertia		$kg \cdot m^2$	185×10^{-3}	170×10^{-3}	140×10^{-3}	125×10^{-3}	100×10^{-3}
	Allowable axial load	Positive	N (kgf)	4×10^4 (4×10^3)				
		Negative		2×10^4 (2×10^3)				
	Allowable moment load		N·m (kgf·m)	400 (40)				
	Axial displacement rigidity	Positive	mm/N (mm/kgf)	2×10^{-6} (2×10^{-5})				
		Negative		3×10^{-6} (3×10^{-5})				
	Moment displacement rigidity		rad/ N·m (rad/kgf·m)	4×10^{-7} (4×10^{-6})				
	Mass		kg	48	44	36	32	26
	Height (refer to dimension diagram)		mm	355	327	271	243	210

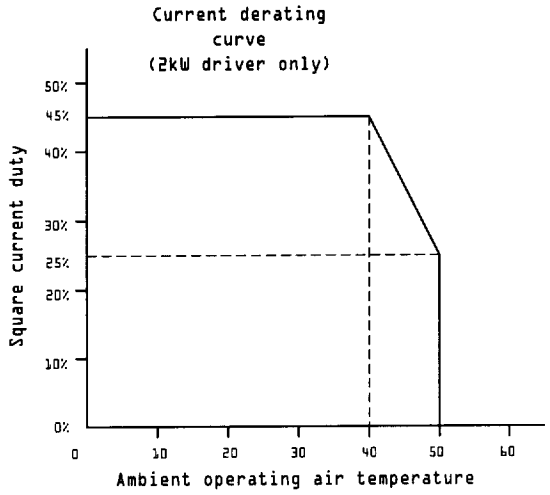
Item			Unit	E Series	
				DR1070E 00*1	DR1030E 00*1
Motor + driver	Maximum output torque		N·m (kgf·m)	70 (7.0)	30 (3.0)
	Rated number of revolutions (100/200V)		rps	1.5/2.0	1.5/2.0
	Rotational positioning	Encoder resolution	p/rev	1,228,800	
		Repeatability accuracy	Sec	±3	
		Absolute accuracy	Sec	±45	
Motor	Rotor inertia		$kg \cdot m^2$	85×10^{-3}	72×10^{-3}
	Allowable axial load	Positive	N (kgf)	4×10^4 (4×10^3)	
		Negative		2×10^4 (2×10^3)	
	Allowable moment load		N·m (kgf·m)	400 (40)	
	Axial displacement rigidity	Positive	mm/N (mm/kgf)	2×10^{-6} (2×10^{-5})	
		Negative		2×10^{-6} (3×10^{-5})	
	Moment displacement rigidity		rad/ N·m (rad/kgf·m)	4×10^{-7} (4×10^{-6})	
	Mass		kg	22	18
	Height (refer to dimension diagram)		mm	183	156

(3) DR/5000 Series Motor

Item			Unit	5000 E Series		5000 B Series		
				DR5100E 00*1	DR5070E 00*1	DR5070B 00*1	DR5050B 00*1	DR5030B 00*1
Motor + driver	Maximum output torque		N·m (kgf·m)	100 (10)	70 (7.0)	70 (7.0)	50 (5.0)	30 (3.0)
	Rated number of revolutions (100/200V)		rps	/2.0		/4.0		
	Rotational positioning	Encoder resolution	p/rev	638,976		557.056		
		Repeatability accuracy	Sec	±4		±5		
		Absolute accuracy	Sec	±90		±90		
Motor	Rotor inertia		$kg \cdot m^2$	125×10^{-3}	100×10^{-3}	37×10^{-3}	34×10^{-3}	27×10^{-3}
	Allowable axial load	Positive	N (kgf)	4×10^4 (4×10^3)		3×10^4 (3×10^3)		
		Negative		2×10^4 (2×10^3)		1×10^4 (1×10^3)		
	Allowable moment load		N·m (kgf·m)	400 (40)		200 (20)		
	Axial displacement rigidity	Positive	mm/N (mm/kgf)	2×10^{-6} (2×10^{-5})		3×10^{-6} (3×10^{-5})		
		Negative		3×10^{-6} (3×10^{-5})		4×10^{-6} (4×10^{-5})		
	Moment displacement rigidity		rad/ N·m (rad/kgf·m)	4×10^{-7} (4×10^{-6})		2×10^{-6} (2×10^{-5})		
	Mass		kg	32	26	18.0	16.0	13.5
	Height (refer to dimension diagram)		mm	243	210	240	212	184

(4) Motor Environment Specification

		Motor	Comment
Ambient operating conditions	Temperature	0 to 45°C	
	Humidity	20 to 85% R.H	Should have no condensation.
Ambient storage conditions	Temperature	-20 to 85°C	
	Humidity	20 to 85% R.H	Should have no condensation.
Operating environment		No corrosive gases and dust should be present.	



(5) Driver Part (General Specifications)

Type	500W type		2kW type			
Model name	U□□□□□□□AD-*□□_ U□□□□□□□BD-*□□_		U□□□□□□□KD-*□□_		U□□□□□□□LD-*□□_	
Input power supply voltage	100 to 115V AC + 10%, -15% 50Hz/60Hz	200 to 230V AC + 10%, -15% 50Hz/60Hz	100 to 115V AC + 10%, -15% 50Hz/60Hz	200 to 230V AC + 10%, -15% 50Hz/60Hz	100 to 115V AC + 10%, -15% 50Hz/60Hz	200 to 230V AC + 10%, -15% 50Hz/60Hz
Maximum current consumption (KVA)	0.8		3.4		3.4	
Ambient operating air temperature and humidity	0 to 50°C, 20 to 90% RH, without condensation					
Ambient storage air temperature and humidity	-20 to 85°C, 20 to 90% RH, without condensation					
Operating environment	No corrosive gases and dust should be present.					
Mass (kg)	1.7		3.6		3.2	

* Input voltage 100 to 115V AC: 1, 200 to 230V AC: 2

(6) Driver Function Specifications

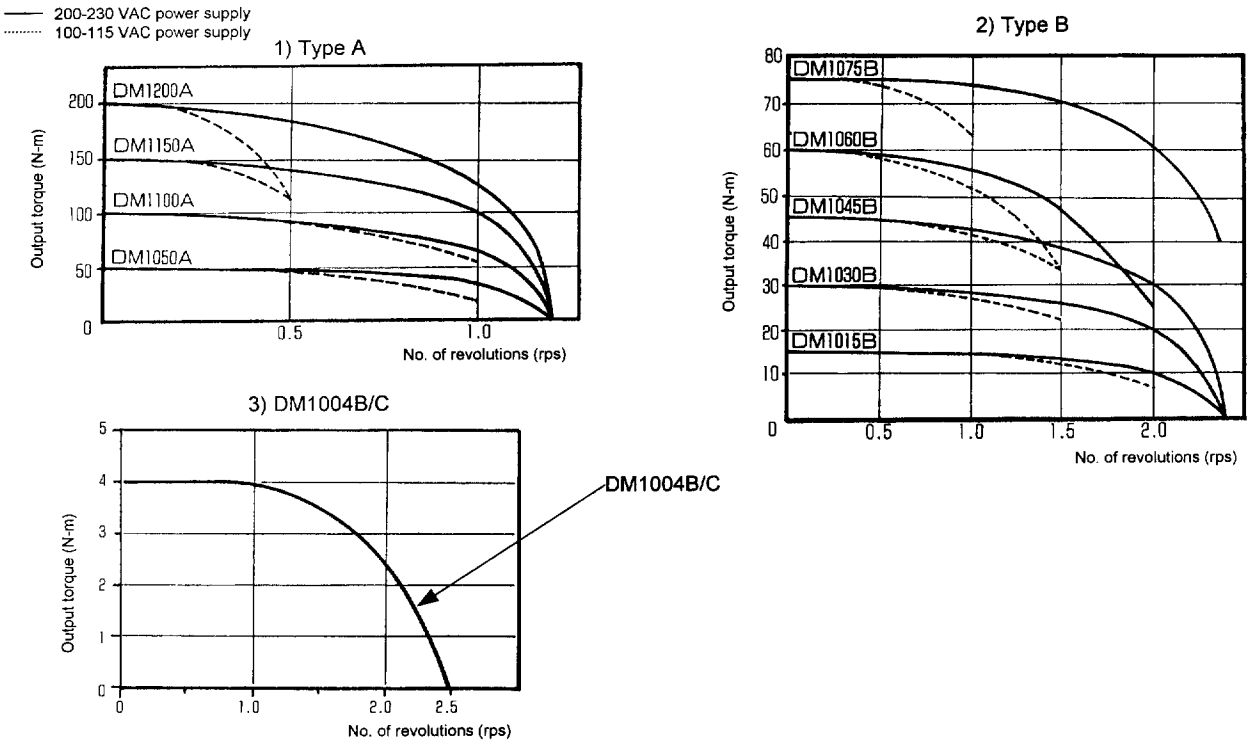
Item		Specifications
Higher interface		RS232C interface (single channel communication, multi-channel communication) PLC interface (can be selected from the following four types at ordering: contact I/O, PROFIBUS-DP, CC-LINK, DeviceNet)
Input signal	Control input signal	Emergency stop, servo command, start, stop, operation number, code input (BCD 2-digit), error reset, integral position control operation disable, interlock, velocity override selection, jog (+) command, job (–) command, M answer input etc.
	Mechanical input signal	Homing signal, (+) direction hardware over-travel signal, (-) direction hardware over-travel signal
Output signal	Control input signal	CPU ready, servo ready, operation under execution, error status, alarm status, position settling status, area signal 0, area signal 1, M code enable, code output (BCD 2-digit) etc.
	Mechanical input signal	Brake signal
Position detector resolution		Rotating type: Standard DMA series: 4096000 pls/rev, standard DMB series: 2621440 pls/rev, small-diameter/flat: 2621440 pls/rev Standard DRA series: 1638400 pls/rev, standard DRB series: 1015808 pls/rev, standard DRE series: 1228800 pls/rev High-speed DRB series: 557056 plc/rev, high-speed DRE series: 638976 pls/rev Linear: Standard, high-stiffness series: 0.25 μm, high-speed, high-speed/high-stiffness series: 0.5 μm,
Coordinate system		Either rotational coordinates or linear coordinates can be selected. Command unit coordinate (rotating type): pulse, angle (1/100, 1/1000, 1/10000 degree), user setting unit (linear): pulse, angle (10μm, 1μm, 0.1μm), user setting units Operation unit: command unit, index Type A, index Type B
Control part	Method	I-PD position control (position: integral proportional control, velocity: proportional control) Various feed forward functions (position, velocity, acceleration) Various standard filters (velocity command filter, velocity feedback filter, first order delay filter) Optional filter (notch filter 2 channels)
	Adjustment	Position control bandwidth:1 Hz to 32Hz, velocity control loop width: 5Hz to 200Hz Position integral limiter setting Various feed forward percentages (position, velocity, acceleration) Various standard filter settings (velocity command filter bandwidth, velocity feedback filter enable/disable, bandwidth, first order delay filter setting) Optional filter setting (notch filter bandwidth) *1) Calculates proportional gain and acceleration feed forward gain of the velocity control part automatically based on measurement by the auto-tuning operation or manual setting of the load inertia/weight with respect to the settings of velocity control bandwidth and acceleration feed forward percentage. *2) Calculates position control bandwidth, velocity control loop bandwidth, and position integral limiting value automatically during execution of the auto-tuning operation or by manual setting of the servo stiffness.
Acceleration/deceleration control		Trapezoidal move: Acceleration curve and deceleration curve can be selected individually. Acceleration time or deceleration time can be selected individually (with respect to the maximum velocity). Cam profile move: Cam profile selection (8 standard parts and 8 user parts) Acceleration curve or deceleration curve at velocity override change can be selected individually. Acceleration time or deceleration time at velocity override change can be selected individually (ratio to override is 100%). Feed time setting or maximum velocity setting *3) Real time override possible, interlock possible
Operation function		Jog move operation, test operation, auto-tuning operation, homing operation, signal search operation, index operation A, index operation B, table reference operation, program operation, MDI operation
	Program operation	No. of program blocks:1000, No. of programs:100 (including 10 fixed programs) Possible to change parameters and reference monitors in a program. IF statements, FOR statements, WHILE statements, and subprogram calls are possible. Possible to write programs that use variables (50 registration variables and 50 volatile variables). Step execution and repetitive execution are possible.

Specifications

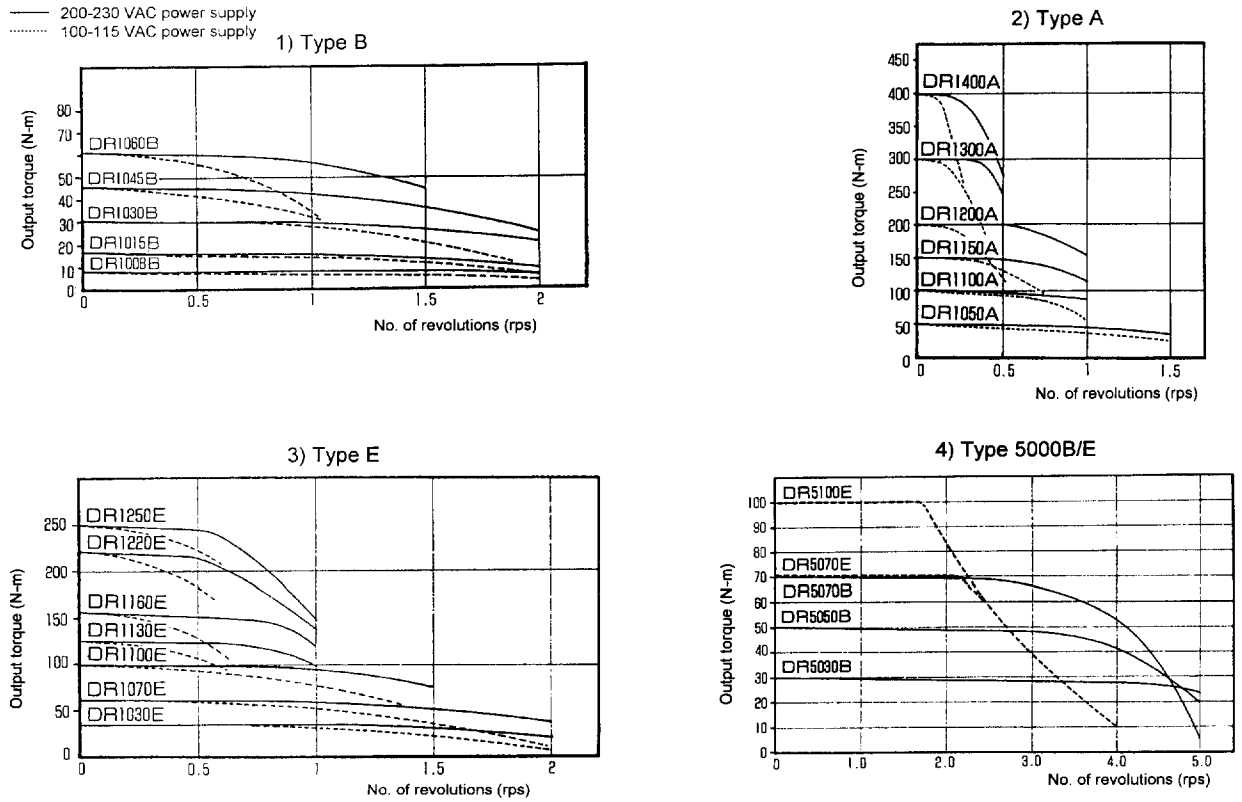
Item	Specifications
Protection functions	Encoder/resolver error, power module error (over-voltage and over current), main power supply error, overload, maximum velocity, excessive position deviation, hardware over-travel, software over-travel (only for linear coordinate)
Others	M function (2-digit) Support software PC utility running under Windows (optional) Possible to connect the operation display pendant (optional)
Monitor	Analogue signal monitor (velocity, general, torque/thrust command) For general monitoring, what is shown by the monitor can be selected by setting (position error, test operation response, position command value, current position value, position command differential value) Digital signal monitor (settling signal) Monitoring internal information by higher interface

10.2 Torque - Speed Characteristics

(1) DM Series



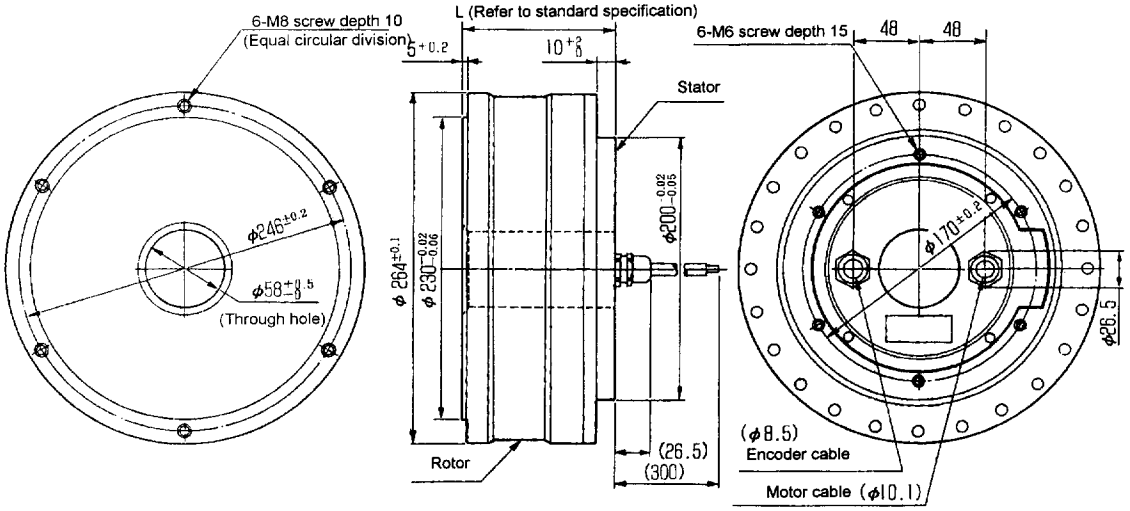
(2) DR Series



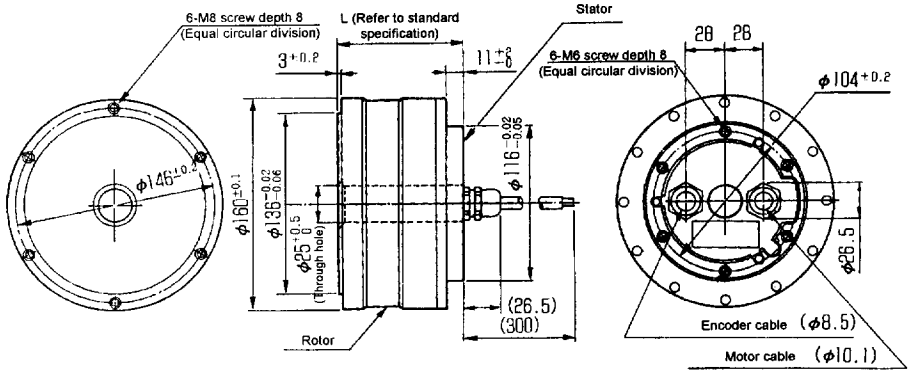
10.3 External Dimensions (Unit: mm)

(1) DM Series Motor

1) Type A

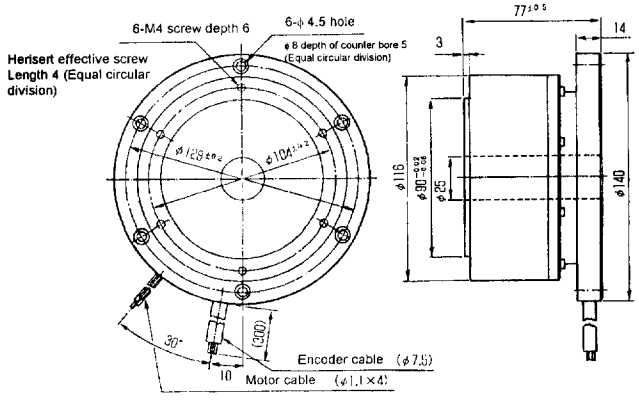


2) Type B



3) DM1004B/C

<DM1004C>



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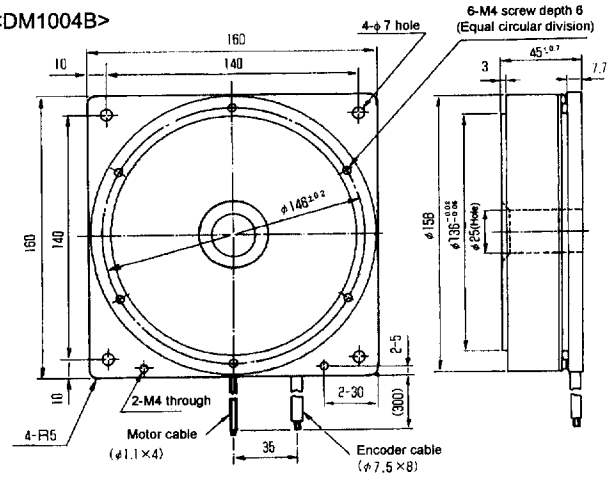
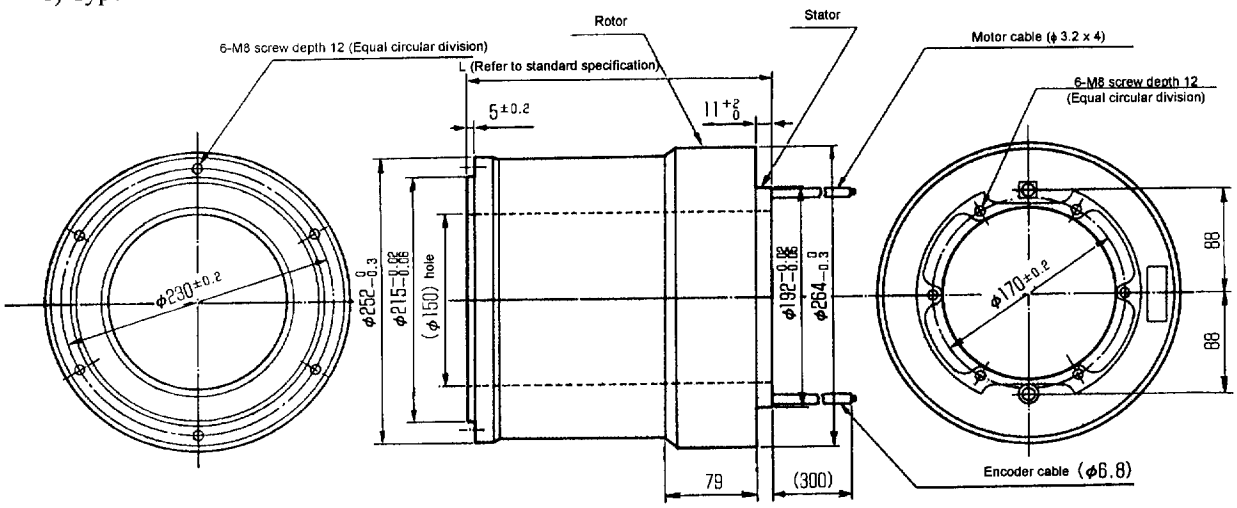
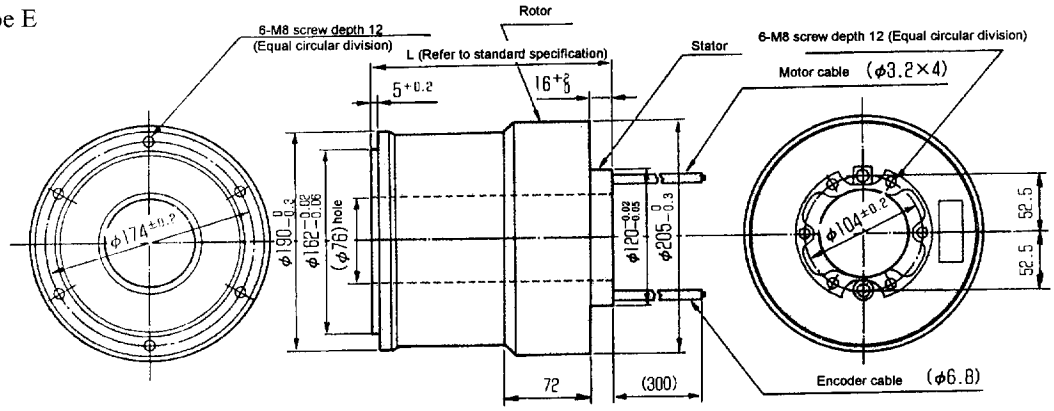


(2) DR Series Motor

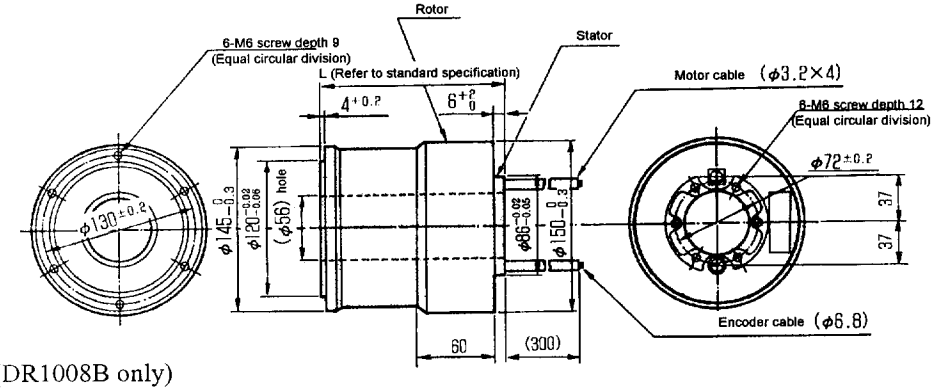
1) Type A



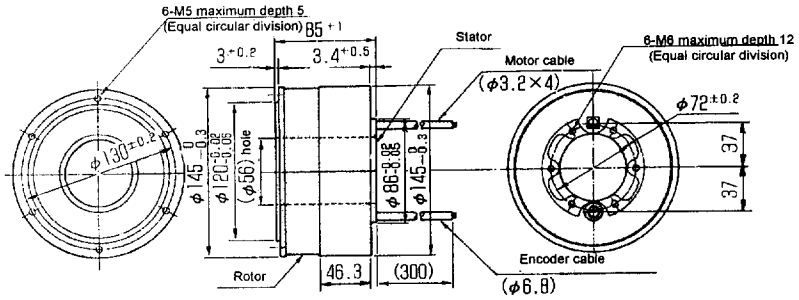
2) Type E



3) Type B

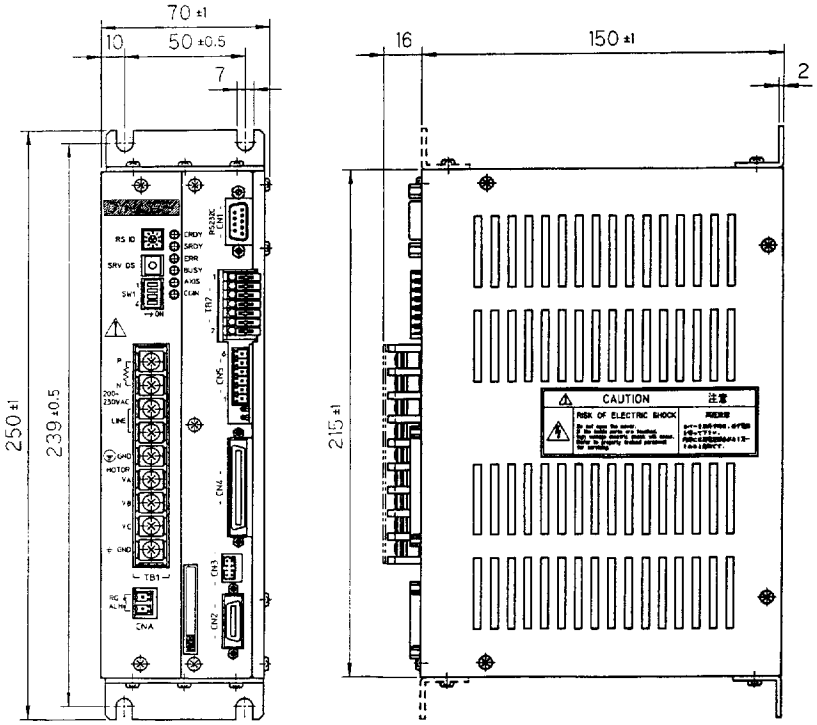


4) Type B (DR1008B only)

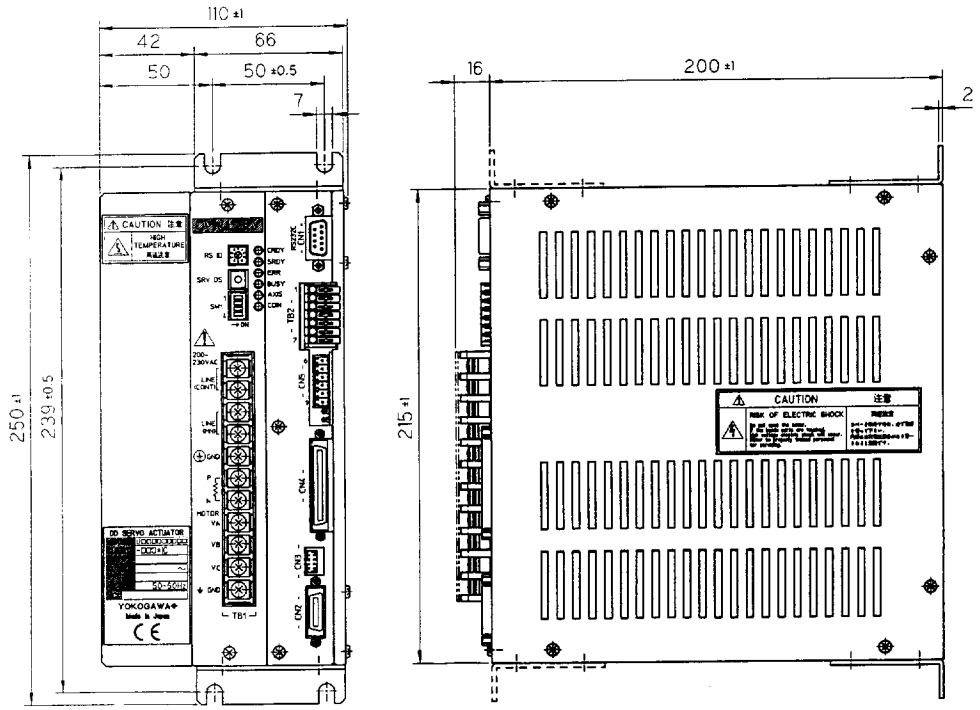


(3) Driver Section

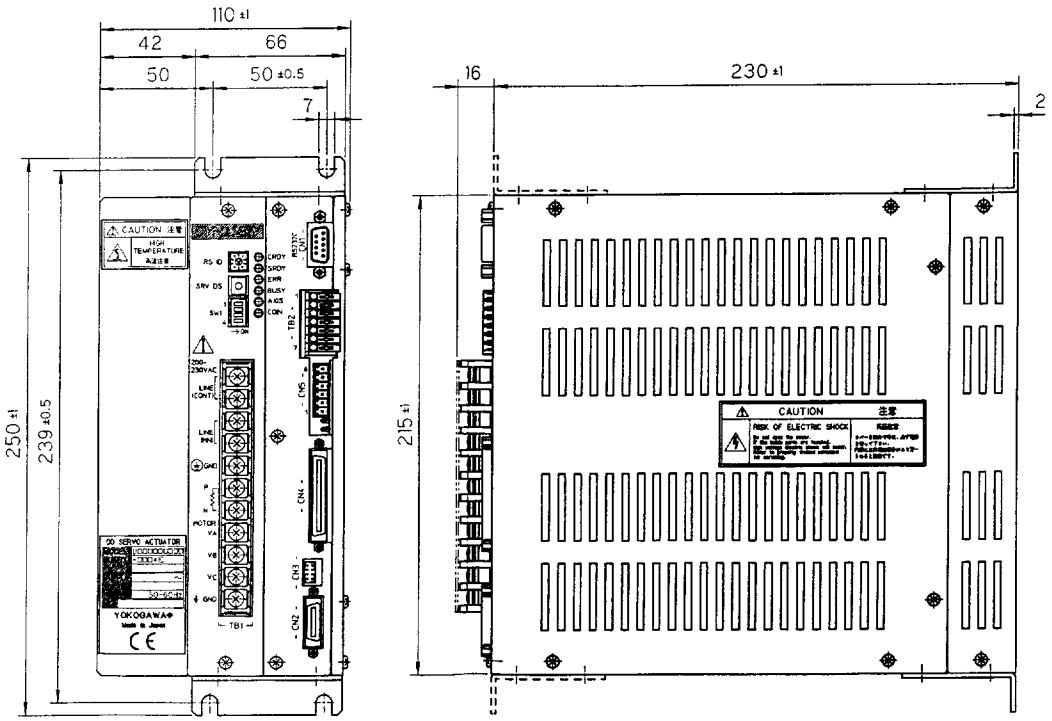
1) U□□□□□□□□A/B
(500W, Type B is shown in the figure.)



2) U□□□□□□□□L
(2kW type without regenerative unit)



3) U□□□□□□□K
(2kW type with regenerative unit)



3.5 Wiring of Encoder Cable

(1) DM1004B/C motor

Pin #	Signal name	Pin #	Signal name
1	+ 10 V	11	-
2	-	12	GND
3	θSIG 0	13	-
4	-	14	GND
5	θ SIG 1	15	-
6	-	16	GND
7	ECLK+	17	-
8	-	18	ECLK-
9	-	19	-
10	-	20	-
		Chassis ground	Shielded cable

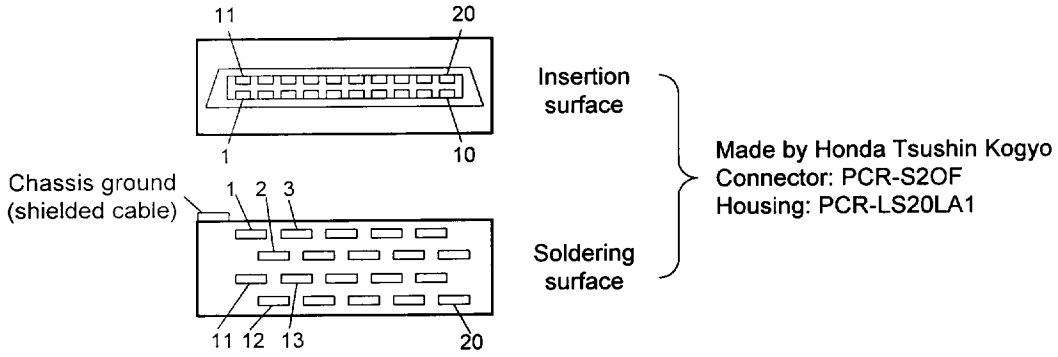
(2) DM series motor (other than the one described to the left)

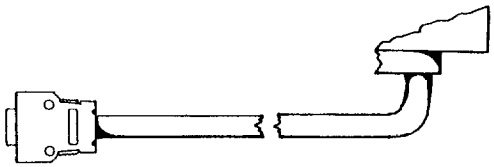
Pin #	Signal name	Pin #	Signal name
1	+ 10 V	11	-
2	-	12	GND
3	θSIG 0	13	ECLK-
4	ECLK+	14	GND
5	θSIG 1	15	-
6	-	16	GND
7	-	17	-
8	-	18	-
9	ZERO+	19	ZERO-
10	-	20	-
		Chassis ground	Shielded cable

(3) DR series motor

Pin #	Signal name	Pin #	Signal name
1	-	11	+S180
2	+S0	12	-
3	-	13	-
4	-	14	-
5	-	15	-S180
6	-S0	16	-
7	-	17	-C180
8	-C0	18	-
9	-	19	-
10	+C0	20	+C180
		Chassis ground	FG
			Shielded cable

Terminal for <CN2>



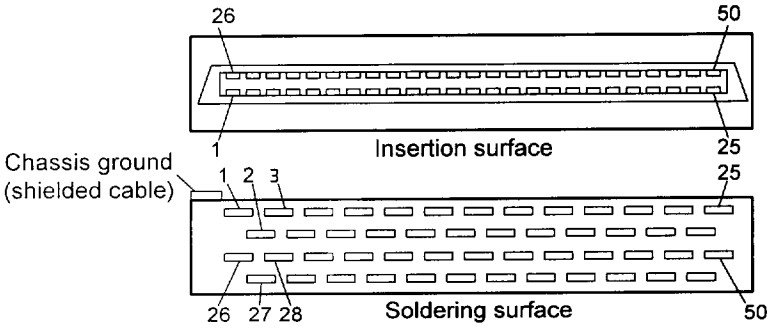
Electric wire specification	■ 0.2 mm² multiple-core twisted pair batch shielded cable, 10 m or less in length		
Optional cable			
	DM1004B/C	DM series motor (other than the ones described to the left)	DR series motor
	CE7900C-□□□	CE7900M-□□□	CE7900R-□□□

3.6 Wiring of Contact I/O (1) Cable

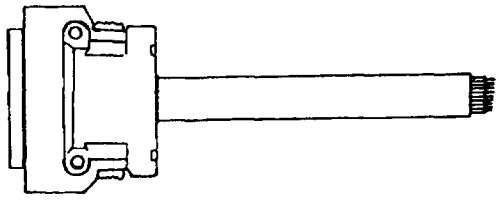
<CN4> terminal

Pin #	Signal name	Pin #	Signal name	Pin #	Signal name	Pin #	Signal name	Pin #	Signal name
1	COMP1	11	IN_CODE.1	21	IN_ERR_RESET	31	IN_ROTDIR_STR_OPT.1	41	(RESERVE)
2	IN_EMG	12	IN_CODE.2	22	IN_M_ANS	32	IN_ABS_STR_OPT	42	OUT_CODE.0
3	IN_SERVO	13	IN_CODE.3	23	IN_ERRCODE_REQ	33	(RESERVE)	43	OUT_CODE.1
4	IN_MODE_START	14	IN_CODE.4	24	(RESERVE)	34	OUT_CPURDY	44	OUT_CODE.2
5	IN_MODE_STOP	15	IN_CODE.5	25	IN_POS_INH	35	OUT_SRDY	45	OUT_CODE.3
6	IN_MODE.0	16	IN_CODE.6	26	IN_JOG_UP	36	OUT_MODE_EXE	46	OUT_CODE.4
7	IN_MODE.1	17	IN_CODE.7	27	IN_JOG_DN	37	OUT_ERR	47	OUT_CODE.5
8	IN_MODE.2	18	IN_PRG_REWIND	28	IN_OVERRIDE_SEL	38	OUT_ALARM	48	OUT_CODE.6
9	IN_MODE.3	19	IN_INTERLOCK	29	IN_SIGN_INDEX	39	OUT_M_EN	49	OUT_CODE.7
10	IN_CODE.0	20	In_ABORT	30	IN_ROTDIR_STR_OPT.0	40	OUT_ERRCODE OUT	50	COMN1

Terminal for <CN4>
Made by Honda Tsushin Kogyo
Connector: PCR-S50FS
Housing: PCR-LS50LA



Electric wire specification	■ 0.2 to 0.5 mm^2 or more, multiple-core batch shielded cable, 3 m or less in length ■ Optional cable: CP7802S-□□□



3.7 Wiring of Contact I/O (2) Cable

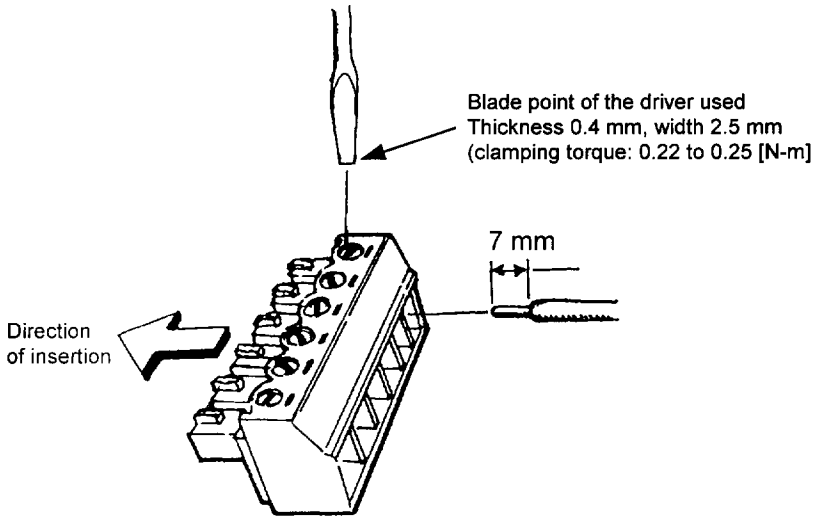
Pin #	Signal name
6	COMN2
5	OUT_AREA
4	OUT_AREA0
3	(reserve)
2	OUT_COIN
1	COMP2

Electric wire specification	■ 0.2 to 1.5 mm^2 or more, multiple-core batch shielded cable ■ Do not solder the core wire (twisted wire). It may cause a contact problem.

See the panel surface of the driver for pin numbers.

<CN5>

Made by Phoenix Contact
(plug: MC1, 5/6-ST-3, 81)



3.8 Wiring of Sensor Brake Terminal

Pin #	Signal name
7	XBRKN
6	XBRKP
5	(NC)
4	XOTU
3	XOTD
2	XORG
1	COMP0

Electric wire specification	■ 0.3 to 0.75 mm², electric wire coating with 10 mm of the core exposed at the tip ■ If a twisted wire is used, the diameter of the strand should be ϕ 0.18 or larger.

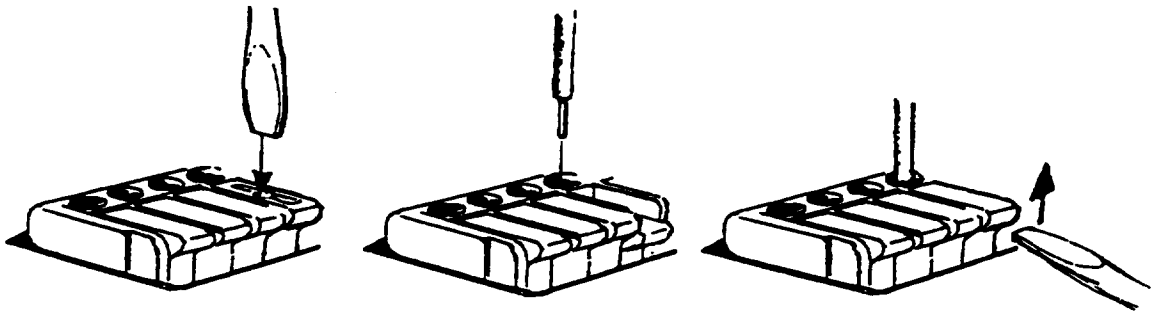
See the panel surface of the driver for the pin numbers.

<TB2> Made by Sato Parts (ML1900H)

1) Push down the lever with a screwdriver.

2) Insert the wire deeply.

3) Push up the lever (until you hear the click)

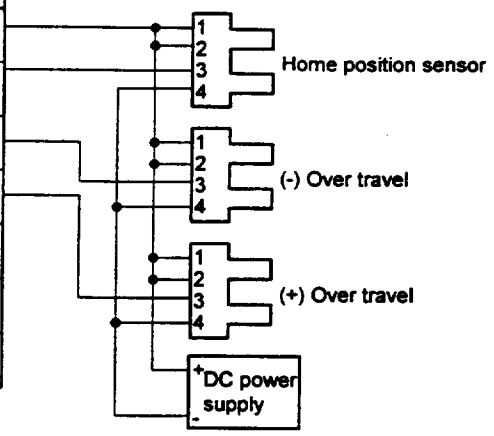


Example of sensor connection (sensor: EE-SX670 manufactured by Omron)

The recommended sensor logic is B contact. NORMALLY CLOSED

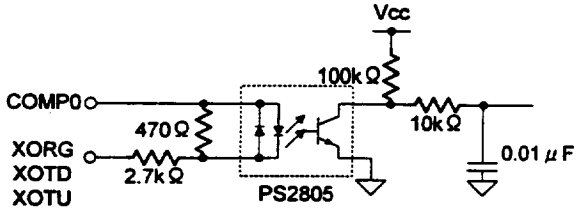
Set the sensor to OFF when the light is shielded. The sensor described above will be set to OFF when the light is shielded by the following result.

Signal name	Pin #
COMP0	1
XORG	2
XOTD	3
XOTU	4
(NC)	5
XBRKP	6
XBRKN	7



[Electrical specifications]

Input specifications	
Rated voltage	12~24VDC (±10%)
Rated input current	4.1 mA/point (at 12 VDC) 8.5 mA/point (at 24 VDC)
Input impedance	3.0kΩ
Operating voltage (relative to COMP*)	At OFF: 3.0 VDC or less At ON: 9.0 VDC or more
Allowable leakage current	OFF is guaranteed at 1.0 mA or less.

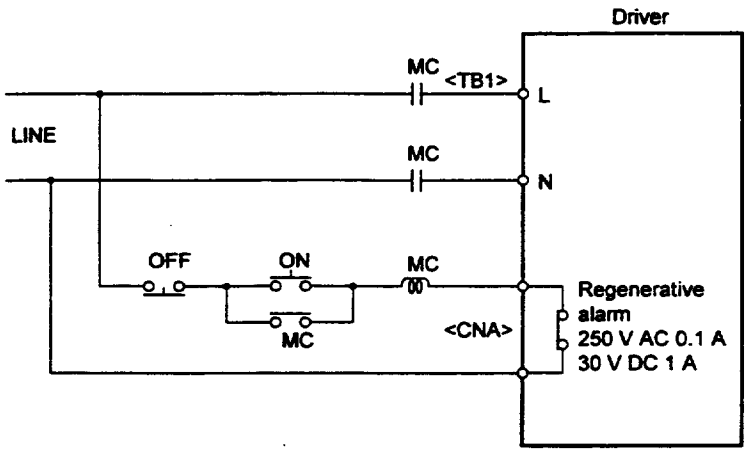


3

3.9 Wiring of Regenerative Alarm Contact <CNA> (For 500W Type Drive Only)

This driver (with regenerative terminal) is equipped with a regenerative circuit failure detection circuit. When connecting the regenerative circuit, build a sequence circuit as shown in the figure below in order to prevent burnout incidents.

Note: Build a sequence circuit so that it will turn off the power supply at alarm operation.



<CNA>
Made by Phoenix Contact
(plug: MC1, 5/2-ST-5, 08)