

ADLEEPOWER[®]

INSTRUCTION MANUAL

SERVOMOTOR AND DRIVES D310, MB SERIES



**THANK YOU VERY MUCH FOR YOUR PURCHASE
ADLEE PRODUCTS.
PLEASE READ THIS INSTRUCTION MANUAL
BEFORE INSTALLATION.**

PREFACE

This D310 drive and brushless servomotor made by ADLEE Powertronic CO., Ltd.

Read this instruction manual thoroughly before operation.

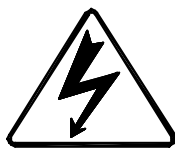
This manual will be helpful in the installation, parameter setting and troubleshooting of the AC servomotors and drives. To guarantee safe operation of the equipment, read the following safety guidelines before connecting power to the drives. Keep this operating manual handy and distribute to all users for reference.

A. General Precaution

1. There are some covers and shields on this drive. Make sure all covers and shields are replaced before operating this product.
2. This manual may be modified when necessary because of improvement of the product or changes in specification.
3. Contact your ADLEE representative to order a copy of this manual, if your manual has been damaged or lost.
4. ADLEE is not responsible for any modification of the product made by the user, since that will void your guarantee.

B. Safety symbols

Symbols which may appear on the manual



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to personnel and damage to equipment.

RECEIVING



CAUTION

- * Do not install or operate the drive and servomotor which is damaged or has missing parts.
Failure to observe this caution may result in personal injury or equipment damage.

INSTALLATION



WARNING

- * Wiring should be performed by qualified personnel only.
Failure to observe this warning may result in an electrical shock or a fire.
- * Only commence wiring after verifying that the power supply is turned OFF.
Failure to observe this warning may result in an electrical shock or a fire.
- * Make sure to ground the ground terminal.
Ground resistance : 100 Ohm or less.
Failure to observe this warning may result in an electrical shock or a fire.
- * Never touch any rotating servomotor parts while the servomotor is running.
Failure to observe this warning may result in injury.



CAUTION

- * Don' t hold the product by the cables or servomotor shaft while transporting it.
Failure to observe this caution may damaged the products.
- * Mount the drive on nonflammable material. (i.e. metal)
Failure to observe this caution may result a fire.



CAUTION

- * When mounting units in an enclosure, install a fan or other cooling drive to keep the intake air temperature below 45 °C .
Overheating may cause a fire or damage to the drive.
 - * High leakage current : Use second ground terminal $\oplus$.
 - * Verify that the drive rated voltage considers with the AC power supply voltage.
Failure to observe this caution may result in personal injury or a fire.
 - * Do not perform a withstand voltage test of the drive.
It may cause semi-conductor elements to be damaged.
 - * To connect a braking resistor, follow in APPENDIX .
Improper connection may cause the unit damaged or a fire.
 - * Tighten terminal screws.
Failure to observe this caution may result a fire.
 - * Never connect the AC main circuit power supply to output terminals U, V and W.
The drive will be damaged and invalidate the guarantee.
-

OPERATION



WARNING

- * Only turn ON the input power supply after replacing the front cover.
Do not remove the cover while current is flowing.
Failure to observe this warning may result in an electrical shock.



CAUTION

- * Since it is easy to change. Operation speed from low to high speed, verify the safe working speed range of the servomotor and machine before operation.
Failure to observe this caution may result in personal injury and machine damage.
- * All the contents of the drive have been preset at the factory.
Do not change the settings unnecessary.

MAINTENANCE AND INSPECTION



WARNING

- * Only authorized personnel should be permitted to perform installation, maintenance, inspections or parts replacement.
Failure to observe this warning may result in an electrical shock.
- * Never touch high-voltage terminals in the drive.
Failure to observe this warning may result in an electrical shock.
- * Replace all protective covers before powering up the drive.
To remove the cover, make sure to shut OFF the molded-case circuit breaker.
Failure to observe this warning may result in an electrical shock.
- * Never perform maintenance or inspection for five minutes, after the main circuit power supply is turned OFF.
The capacitors are still charged and can be dangerous and cause electrical shock.



CAUTION

- * The control PC board employs CMOS ICs. Do not touch the CMOS elements by hand.
They are easily damaged by static electricity.
- * Do not connect or disconnect wires or connectors while power is applied to the circuit.
Failure to observe this caution may result in personal injury.

OTHERS



WARNING

- * Never modify the product.
Failure to observe this warning may result in an electrical shock or personal injury and will invalidate the guarantee.

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1. RECEIVING

This D310 series servomotor drive and MB series brushless servomotor have gone through rigorous quality control tests at the factory before shipment. After receiving the servomotor and drive , please check for the following:

- (1) No damage is found on each product after receiving.
- (2) The product is as ordered (check the nameplate, voltage and rated current).
- (3) A set of drive unit and instruction manual is contained in the package.
For any irregularity, contact the agent where you purchased immediately.
- (4) The drive has been designed for use in combination with the specified servomotors only. Check if the specifications of drive and servomotor are in a set.
- (5) Check if the brushless servomotor' s shaft can be rotated smoothly by hand.

(6) Description of nameplate

D310 drive

		ADLEEPower®			
		MATCHSERVO MTR DRIVE			
Model No.		D310-120M			
Input Voltage & Frequency	Input phase & Rated Input Current	INPUT	OUTPUT		
		200~240V 50/60Hz 1PH 1.4A	0~240V 0.12KW	0~200Hz 0.6A	Output Voltage & Frequency Rated Output power & Rated Current
		ADLEE POWERTRONIC CO., LTD.			

D310(R) - $\frac{2}{①}$ MB - $\frac{120}{②}$ $\frac{M}{③}$

①: Rated speed : 1:110V, 2:220V.

②: Rated power : 120:120W, 200:200W, 400:400W.

③: Rated speed : L:2000RPM, M:3000RPM.

Brushless servomotor

Model No.	ADLEEPOWER® MATCHSERVO MOTOR				Rated torque
Rated power	MODEL MB-120M	TORQUE 0.12 KW	VOLTS 220 V	INS. Class 130(B)	Input voltage
Rated current					Insulation grade
Rated speed					Ambient temperature
	AMP.S 0.84 A	INS. Class 130(B)	AMB. 45		
	R.P.M 3000				
	ADLEE POWERTRONIC CO., LTD.				

MB $\frac{2}{①}$ - $\frac{120}{②}$ $\frac{M}{③}$

①: Rated voltage : 2:220V.

②: Rated power : 120:120W, 200:200W, 400:400W.

③: Rated speed : L:2000RPM, M:3000RPM.

2. SPECIFICATIONS

(1) D310-MB drive

Rated power (W)		120	200	400
Drive No.		D310		
Motor No.		MB2-120L/M	MB2-200L/M	MB2-400L/M
Input voltage		110VAC± 10% 1 / 220VAC± 10% 1		
Input frequency		50~60HZ		
Rated output current (Arms)		0.84/0.84	1.39/1.39	2.6/2.69
Max. output current (Arms)		2.52/2.52	4.17/4.17	8.07/8.07
Encoder type and resolution		A,B,Z,HU,HV,HW open collector, (A, B phase is 128PPR)		
ACC. DEC. time		0.1~60.0Sec		
Speed regulation	Load	± 0.3% Below (0~rated torque at rated speed)		
	Voltage	± 0.3% Below (Source voltage± 10% at rated speed no load)		
	Temperature	± 0.3% Below (-10~45 /32~113 at rated speed no load)		
Type of control		Sin PWM		
Mode of control		1.Speed mode 2.Torque mode 3.Position mode		
Input signal	Analog	1.Vref, Tref ± 10V analog input 2.Panel VR 0~5V analog input		
	Digital	DI0~DI4 and COM common, Input impedance 4.7KΩ to common		
Output signal		DOx open collector (x=0~1), External voltage (48VDC, 50mA below).		
Protection		Overload, Over current, Over voltage, Over heat, Encoder abnormal, Short circuit		
Drive enclosure IP rating		IP20		
Dimension Fig.		1		
Drive Weight (kg)		0.7		

(2) MB servomotor

Rated power (W)	120W	200W	400W
Voltage	220Vac		
Servomotor No.	MB2-120L/M	MB2-200L/M	MB2-400L/M
Rated torque (N.m)	0.57/0.38	0.96/0.64	1.91/1.27
Max. torque (N.m)	1.71/1.14	2.88/1.92	5.72/3.81
Rated current (Arms)	0.84/0.84	1.39/1.39	2.60/2.69
Max. current (Arms)	2.52/2.52	4.17/4.17	8.07/8.07
Rated speed (RPM)	L:2000 / M:3000		
Torque constant-KT (N.m/Arms)	0.75/0.51	0.73/0.53	0.88/0.58
Rotor moment of inertia $10^{-4} \cdot \text{kgm}^2$	0.27/0.19	0.33/0.27	0.64/0.64
Mechanical time constant (ms)	3.62/3.37	3.44/2.50	2.59/1.67
Electric time constant (ms)	4.5/3.46	4.12/3.80	5.40/4.79
Motor insulation grade	Class 130(B)		
Motor enclosure IP rating	IP40		
Dimension Fig.	1	2	3
Servomotor Weight (kg)	1.4/1.4	1.6/1.6	2.6/2.6

3. DIMENSION DRAWINGS

3-1. D310 drive dimensions

Unit : mm

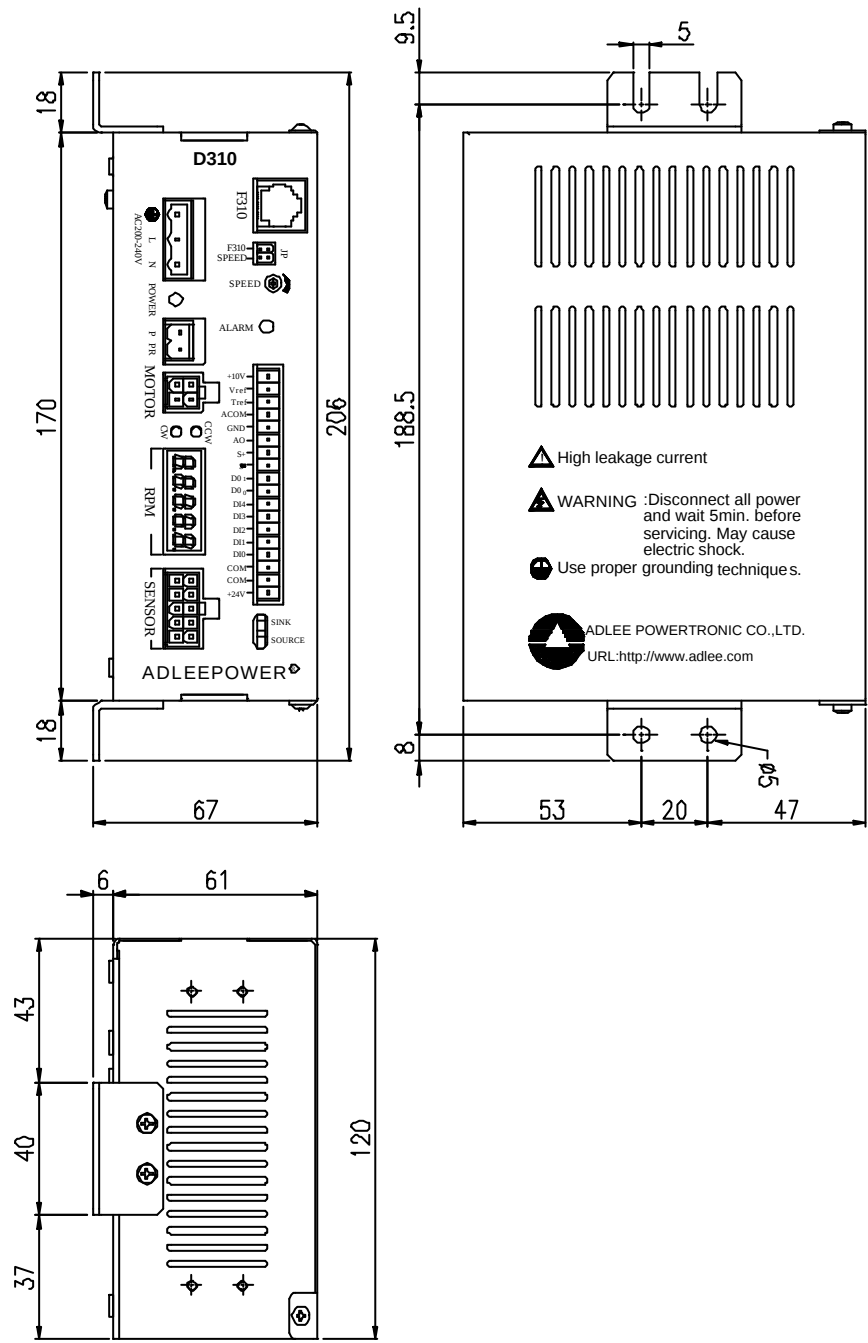


Fig 1

3-2. Brushless servomotor - MB series

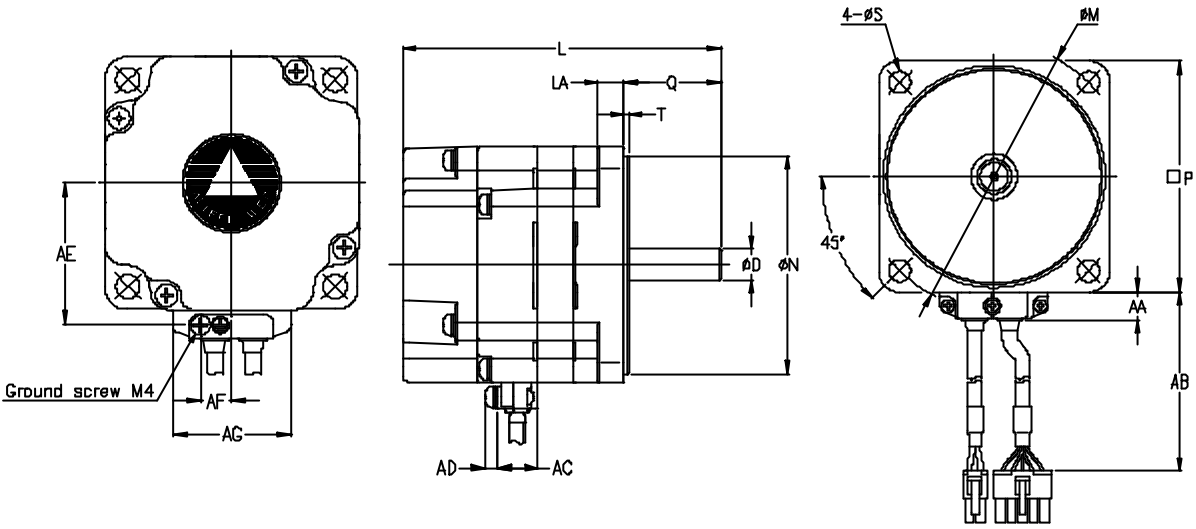
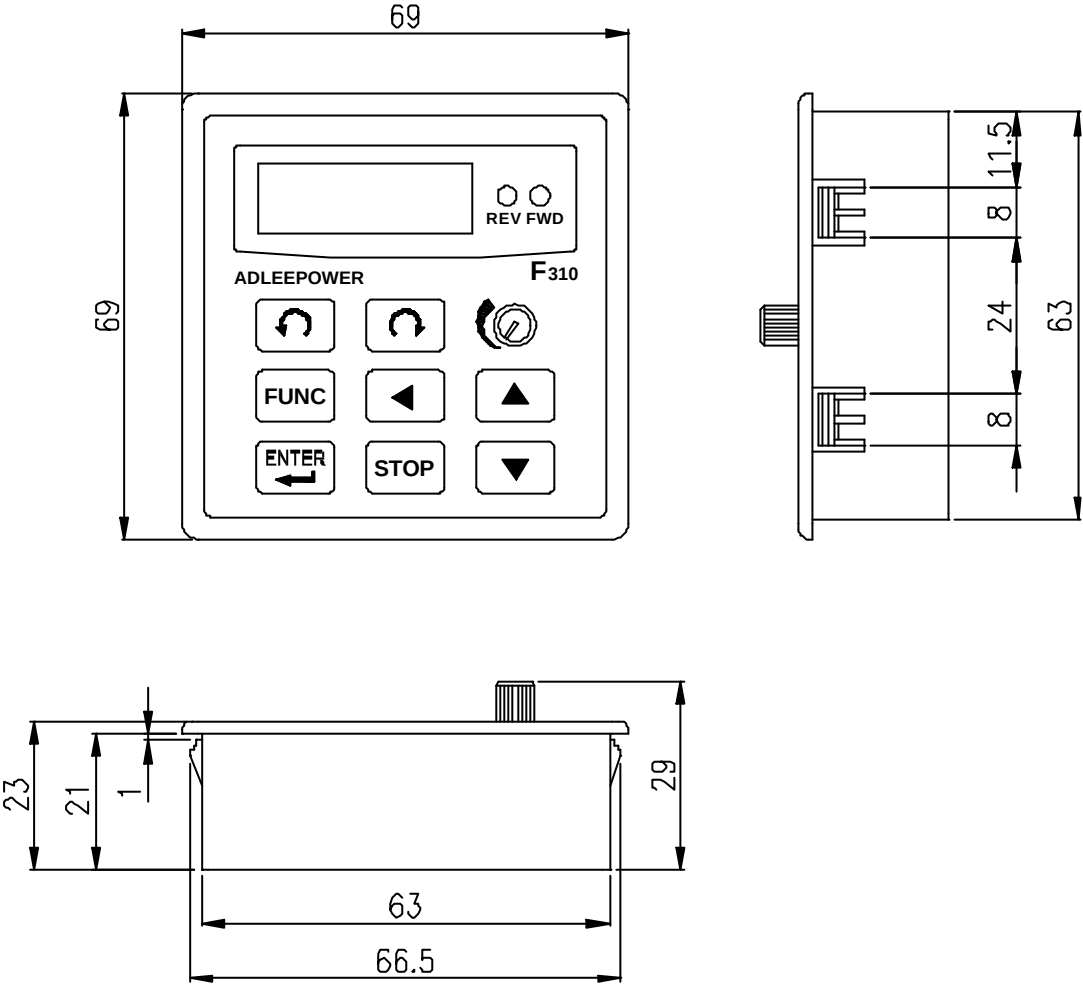


Fig No.	□P	M	S	N	T	Q	D	L	LA	AA	AB	AC	AD	AE	AF	AG
1	90	104	8.5	83	2	37	12	115.9	10	11	1000	15	5	50.5	11	42
2								120.8								
3								144.6								

3-4. F310



4. INSTALLATION

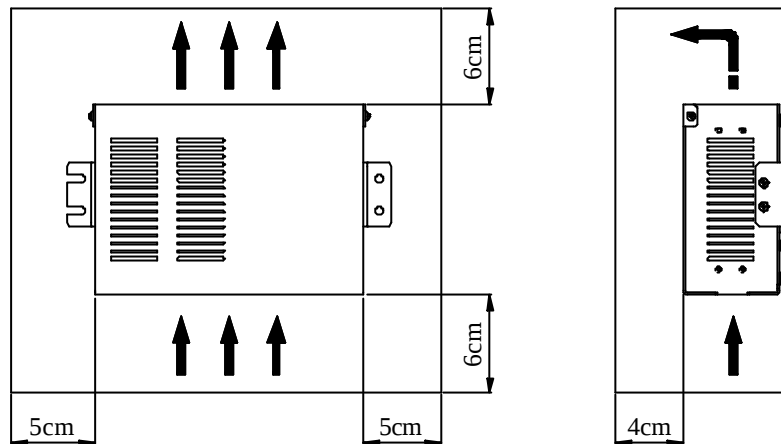
4-1. Servomotor drive

Inadequate environment around installation site and installation surface can result in damage to the drive.

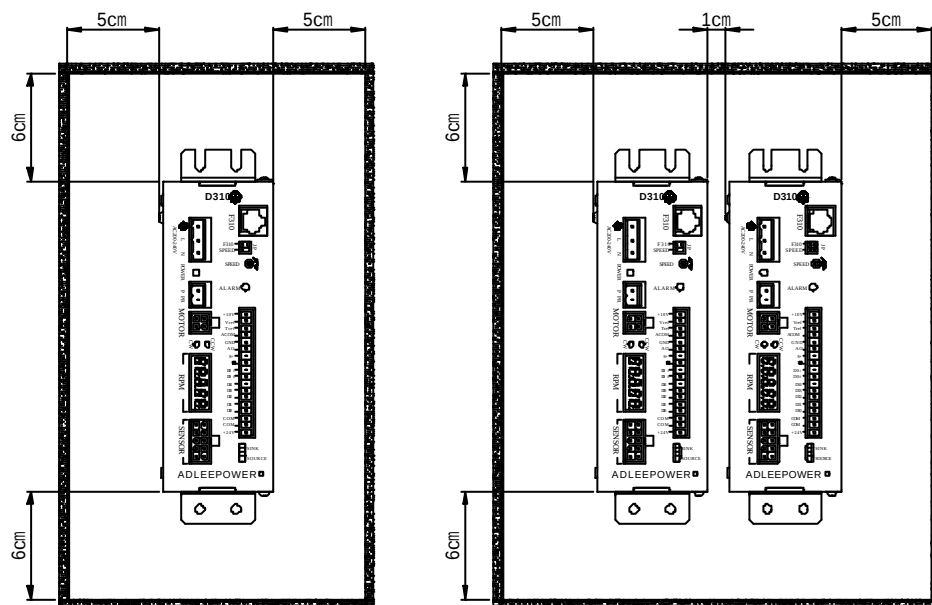
Before operating the D310 series drive, please check the following points :

- (1) Avoid high temperature, high humidity, easy-to-dew ambient environment. Don 't expose to dust or dirt, corrosive gas, and coolant mist, and direct sunlight. Place the unit in a well-ventilated room.
- (2) Avoid a place subjected to substantial vibration.
- (3) When installing the unit within the cabinet. Please pay attention to ventilation and limit the ambient temperature in between -10 ~ 45 . (14 ~ 113).
- (4) Use a nonflammable material, such a steel sheet on the wall for installation. (The rear side will generate heat)

(5) Install the unit always vertically with a marginal spacing around.

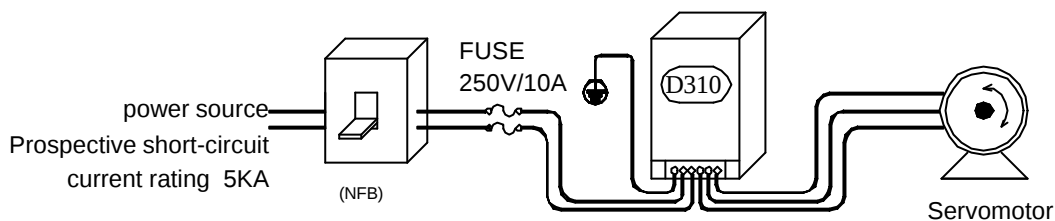


← AIR FLOW

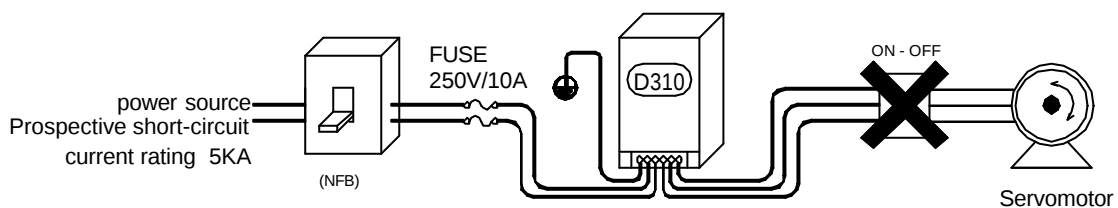


(6) The drive must be installed in the control box.

- (7) Please confirm power source voltage to drive input rated voltage.
- (8) Please make sure the wiring is correct when drive adds a braking resistor.
- (9)  is grounding symbols. Be sure ground both the drive and servomotor.
- (10) Be sure to connect the power source to L, N (input terminals) and the servomotor to U.V.W. (output terminals). (Wrong connection will damage the drive.)
- (11) Do not install relay between power source and drive for operating start and stop.
- (12) Do not put the advance phase capacitor between the drive and motor.



- (13) For operating motor “start” and “stop” should use keypad or terminal to control these functions.



- (14) Power source must be fitted with a fuse (250V/10A) to prevent internal short circuit problems.

4-2. Brushless servomotor

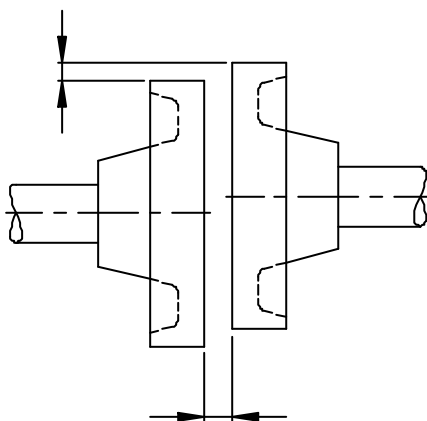
(1) Environmental requests

Air temperature	-10~45 (14~113)
Air pressure	86~106kPa
Attitude	Under 1000 meters
Vibration	Less than 20HZ : maximum 9.86m/s ² 20~50HZ : maximum 5.88m/s ²
Humidity	Less than 90%, no frosting
Pollution Degree	2

- * Free of corrosive or explosive gases.
- * Well-ventilated and free of dust and moisture.

(2) Alignment

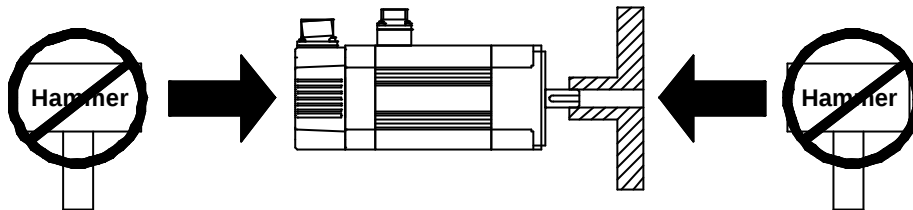
Take care alignment before connecting shafts between servomotor and equipment. Vibration may occur and damage the bearings and encoder if the shafts are not correctly aligned.



Measure these distances at four different positions on the circumference. The difference between the maximum and minimum measurements must be 0.03mm (0.0012in) or less. (Turn together with coupling.)

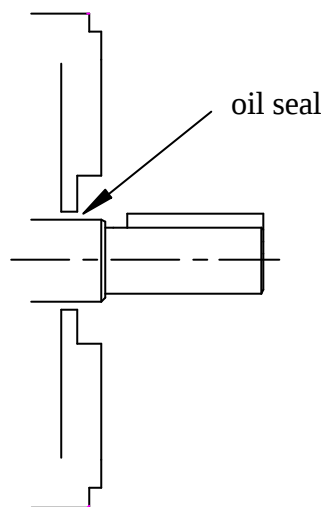
(3) Install motor and coupling

Don' t use Hammer to handle the motor while installing or removing it . Otherwise, the motor parts will be damaged.



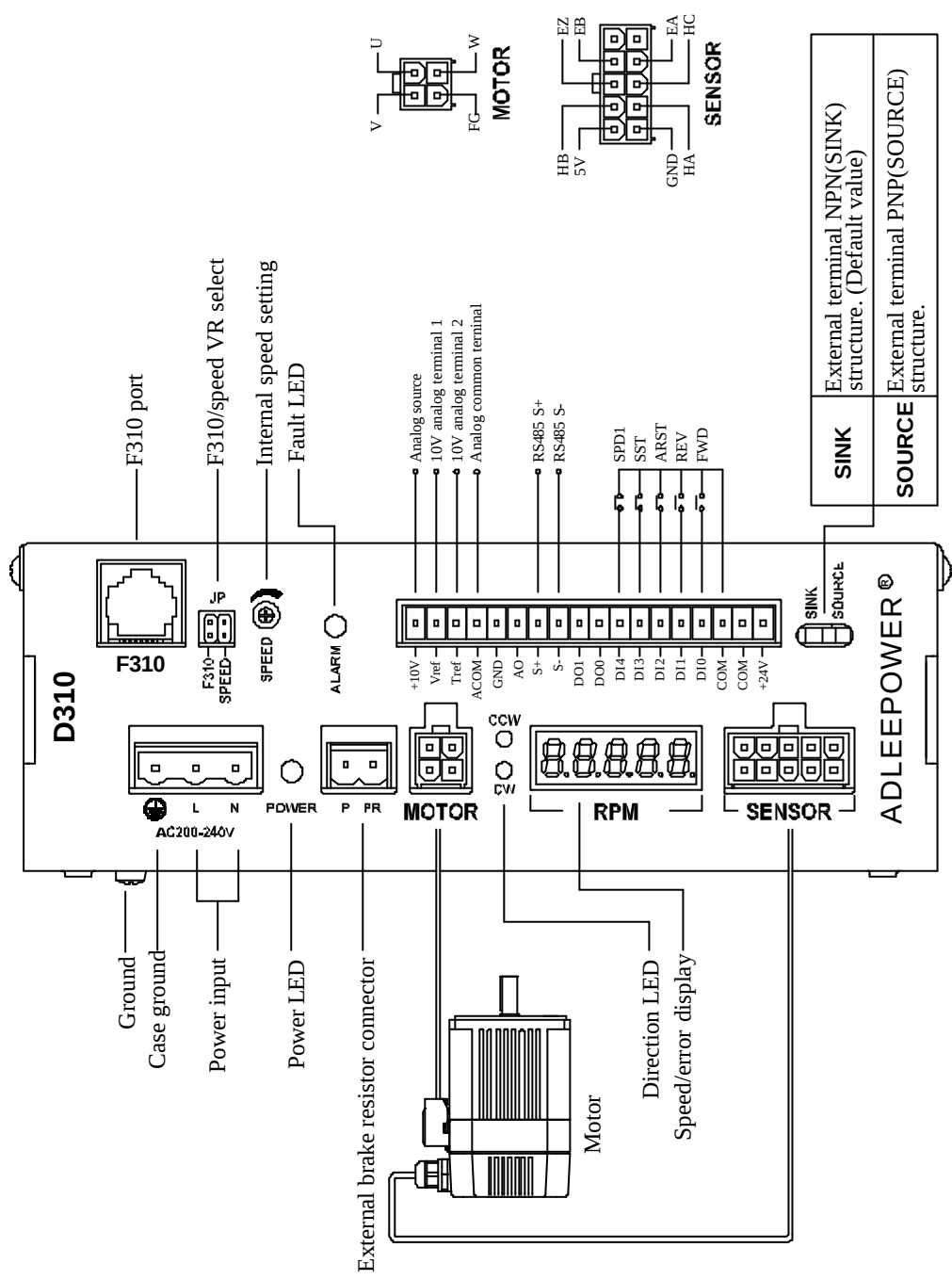
(4) Handling oil and water

Servomotor needs to install oil seal to seal the through shaft section, if it locates at water drop or oil mist environment.



5. DESCRIPTION OF TERMINALS

(1) Main circuit connection diagram



(2) Main circuit terminals

	Cable size	Cable specification	Skew torque
Input power (L, N, $\oplus$)	14AWG ~ 16AWG (2.0mm ² ~ 1.3mm ²)	Stranded copper only (300V/80)	8Kg-cm (6.95lb-in)
Control terminal	24AWG (0.2mm ²)	Stranded copper only (300V/80)	5Kg-cm (4.34lb-in)
Grounding skew(M4)	14AWG ~ 16AWG (2.0mm ² ~ 1.3mm ²)	Stranded copper only (300V/80)	8Kg-cm (6.95lb-in)

(3) F310 panel

Power on F310 at speed command status, press  key 1 time display change to actual speed, press  key again display change to current, press  key again display change to speed command.

Note 1 : Current means peak value of sine wave of current.

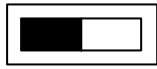
Note 2 :  key in operation mode : display item selection.

 key in parameter setting : shift key.

Symbol	Terminal name	Description
DI0	Multi-function input terminal 0	See functions description (Pn010)
DI1	Multi-function input terminal 1	See functions description (Pn011)
DI2	Multi-function input terminal 2	See functions description (Pn012)
DI3	Multi-function input terminal 3	See functions description (Pn013)
DI4	Multi-function input terminal 4	See functions description (Pn014)
DO0	Multi-function output terminal 0	See functions description (Pn026)(max. 50mA)
DO1	Multi-function output terminal 1	See functions description (Pn027)(max. 50mA)
COM	Common terminal	Common terminal of DO and DI control terminals
+24V	+24V output	Max. 20mA to COM
10V	Analog source	Power source +10V of analog terminals
ACOM	Analog common terminal	Common terminal of free analog terminals
Tref	Torque analog command terminal	Torque analog command input 10V
Vref	Speed analog command terminal	Speed analog command input 10V
GND	Encoder power supply GND	Encoder power supply GND
AO	Encoder output signal terminal	Encoder A signal output (128PPR)
S+	RS485 TXD	Communication port
S-	RS485 RXD	Communication port

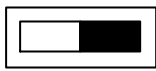
(4) S1 switch terminal control structure

SINK SOURCE



Sink : External terminal NPN (SINK) structure.
(Default value)

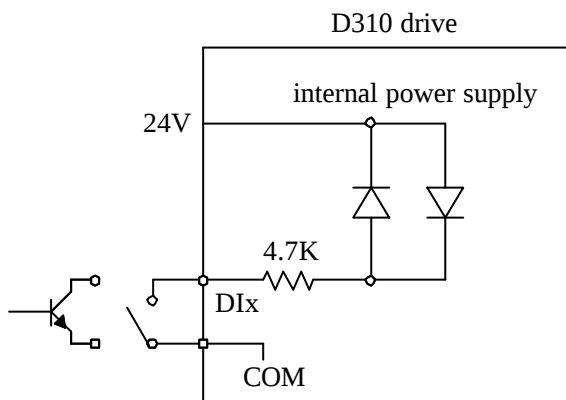
SINK SOURCE



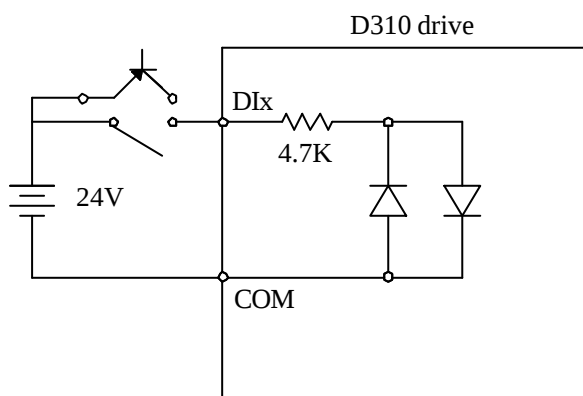
Source : External terminal PNP (SOURCE) structure.

(5) Wiring diagrams of DI terminals (DI0~DI4)

A. Relay, Switch, NPN, use of internal power supply(S1:Sink)

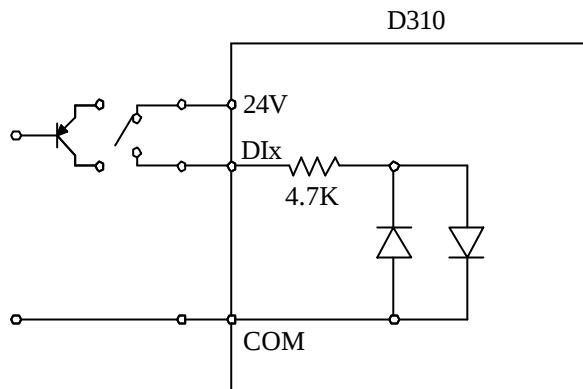


B. Relay, Switch, PNP, use of external power supply (S1:Source)



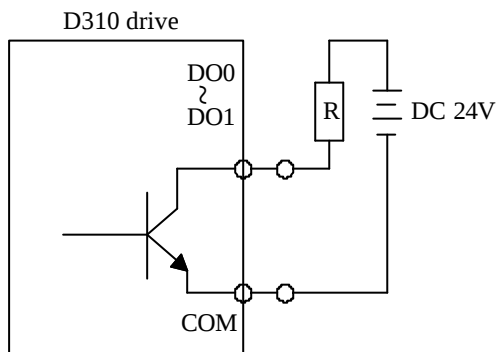
Note : Drive will damage if +24V terminal connects to external +24V power supply.

C. Relay, Switch, PNP, use of internal power supply (S1:Source)



(6) Wiring diagram of DO terminals (DO0~DO1)

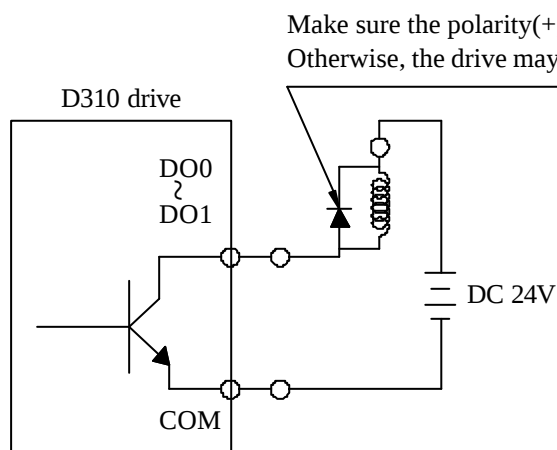
A. General load



Note :

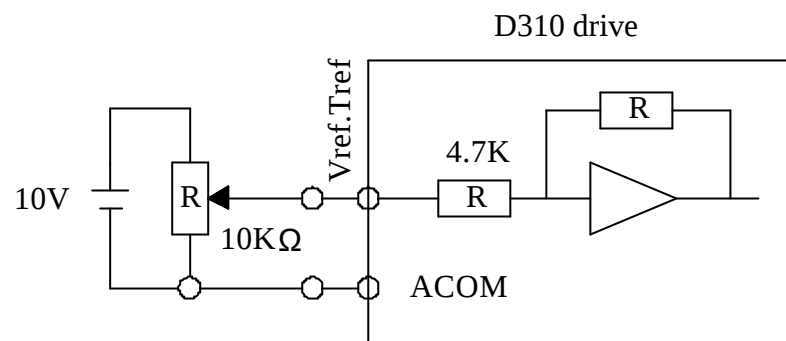
1. Maximum voltage of DO terminals are 48VDC.
2. Maximum current of DO0~DO1 terminals are 50mA.

B. Inductive load



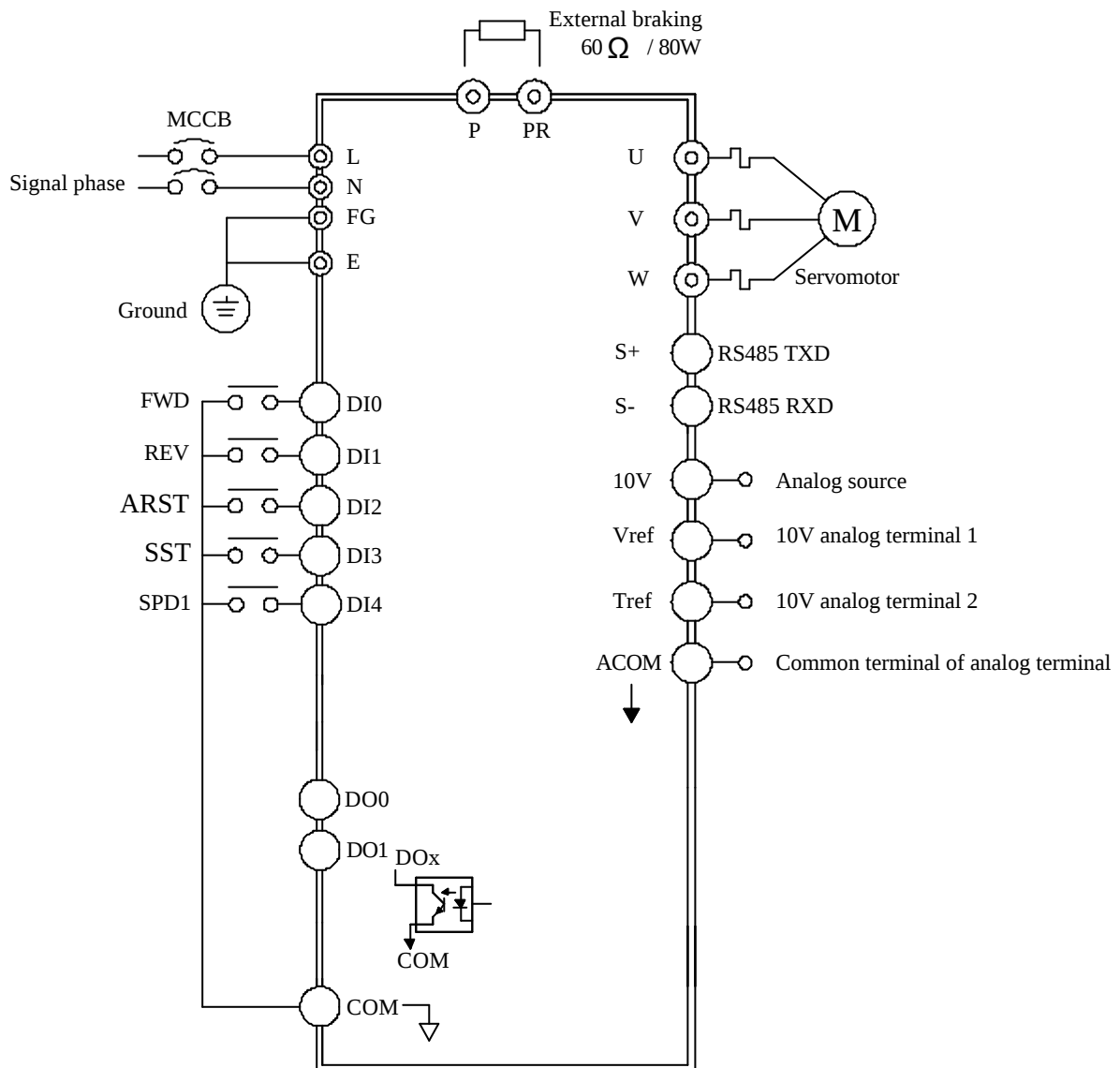
Make sure the polarity(+,-) of the diode is correct.
Otherwise, the drive may damage.

(7) Analog input (Vref, Tref)

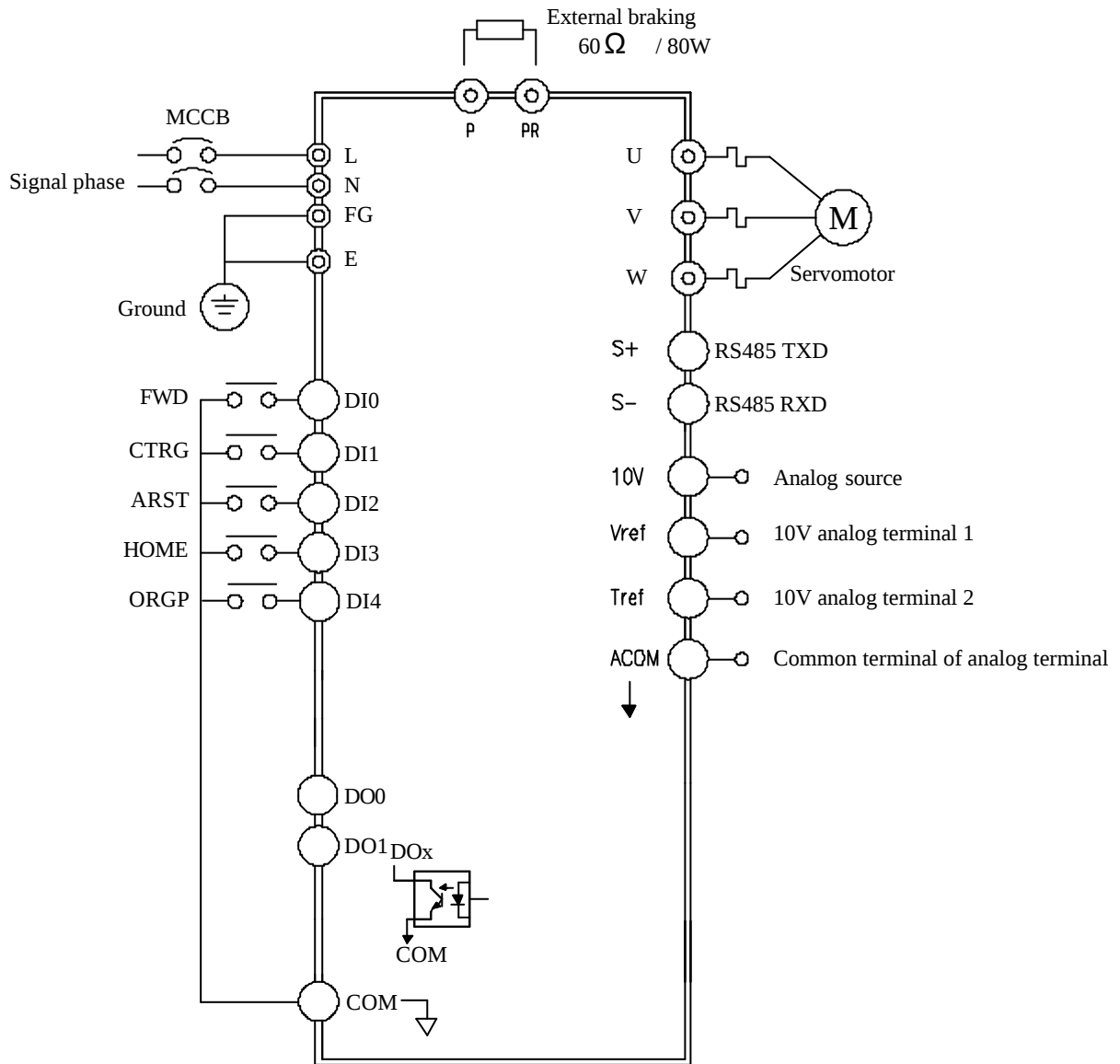


(8) Wiring

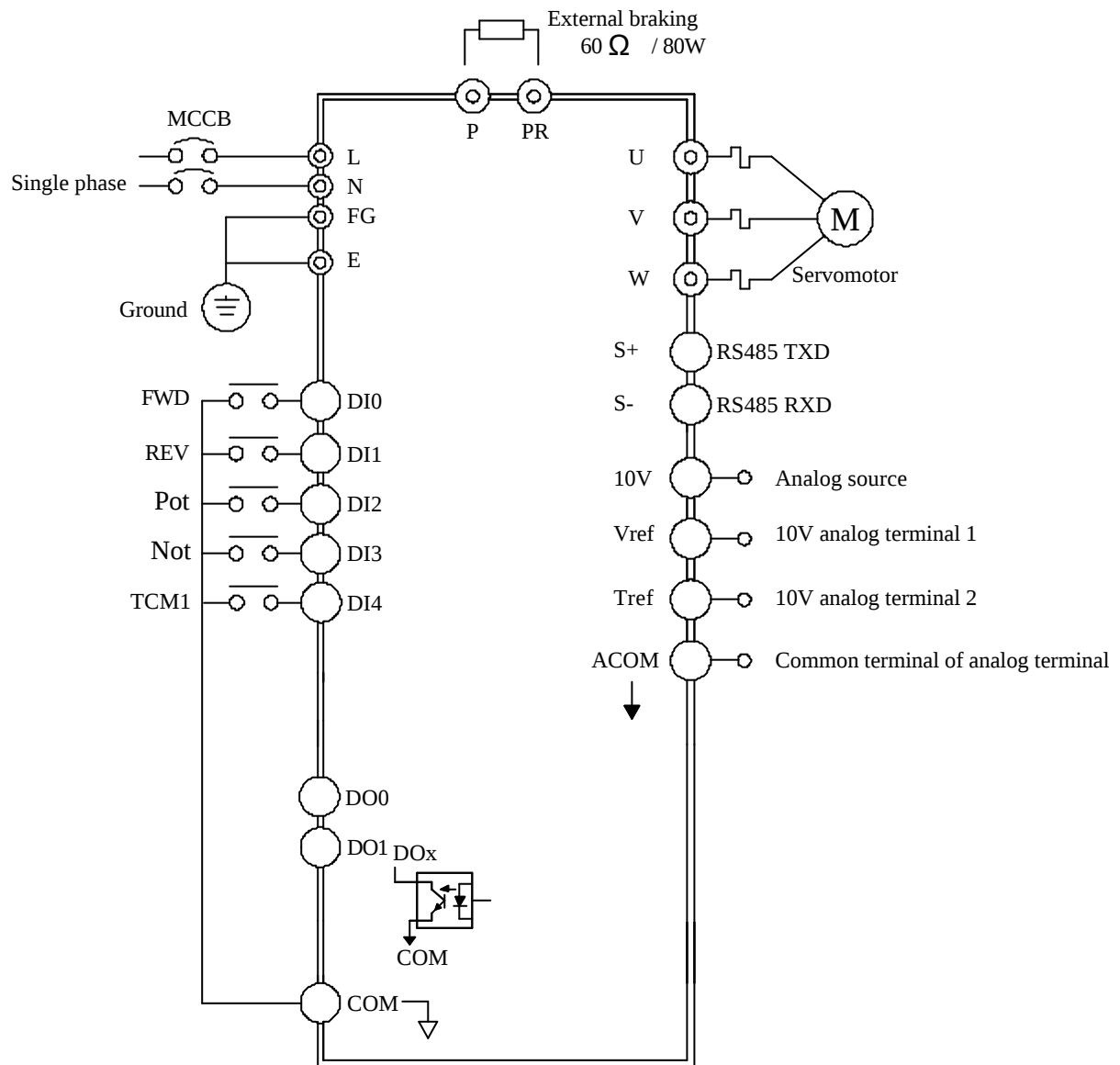
Terminals wiring diagram - speed control



Terminals wiring diagram - position control (register)



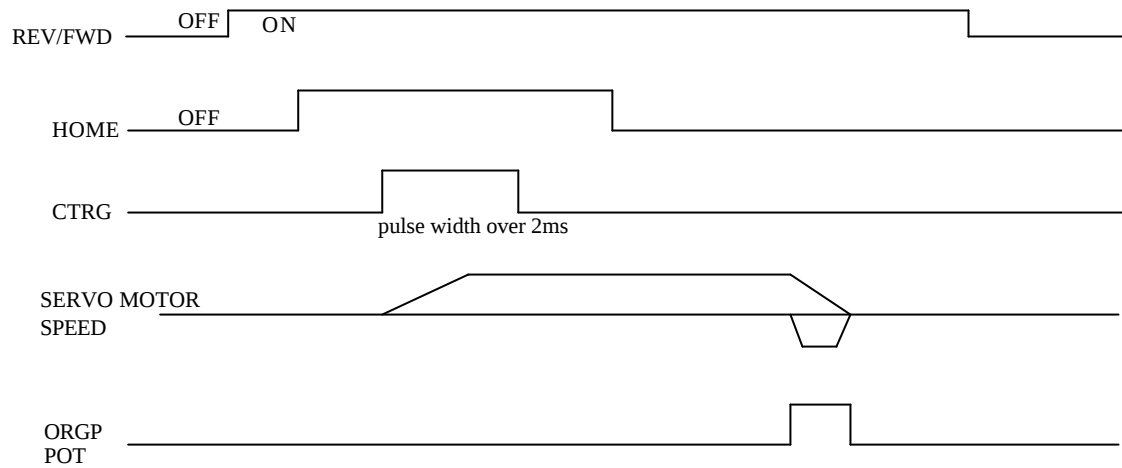
Terminals wiring diagram - torque control



(9) Time chart of control

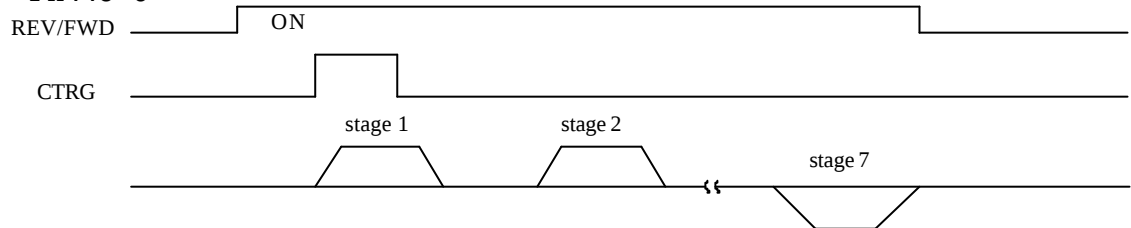
A. Position mode

1.HOME

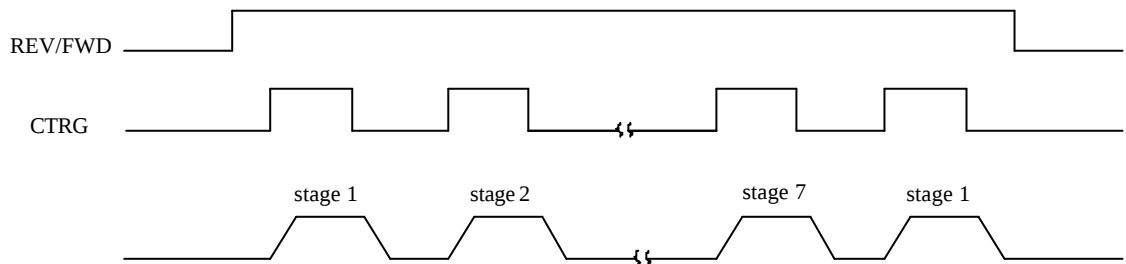


2. Run

Pn446=0

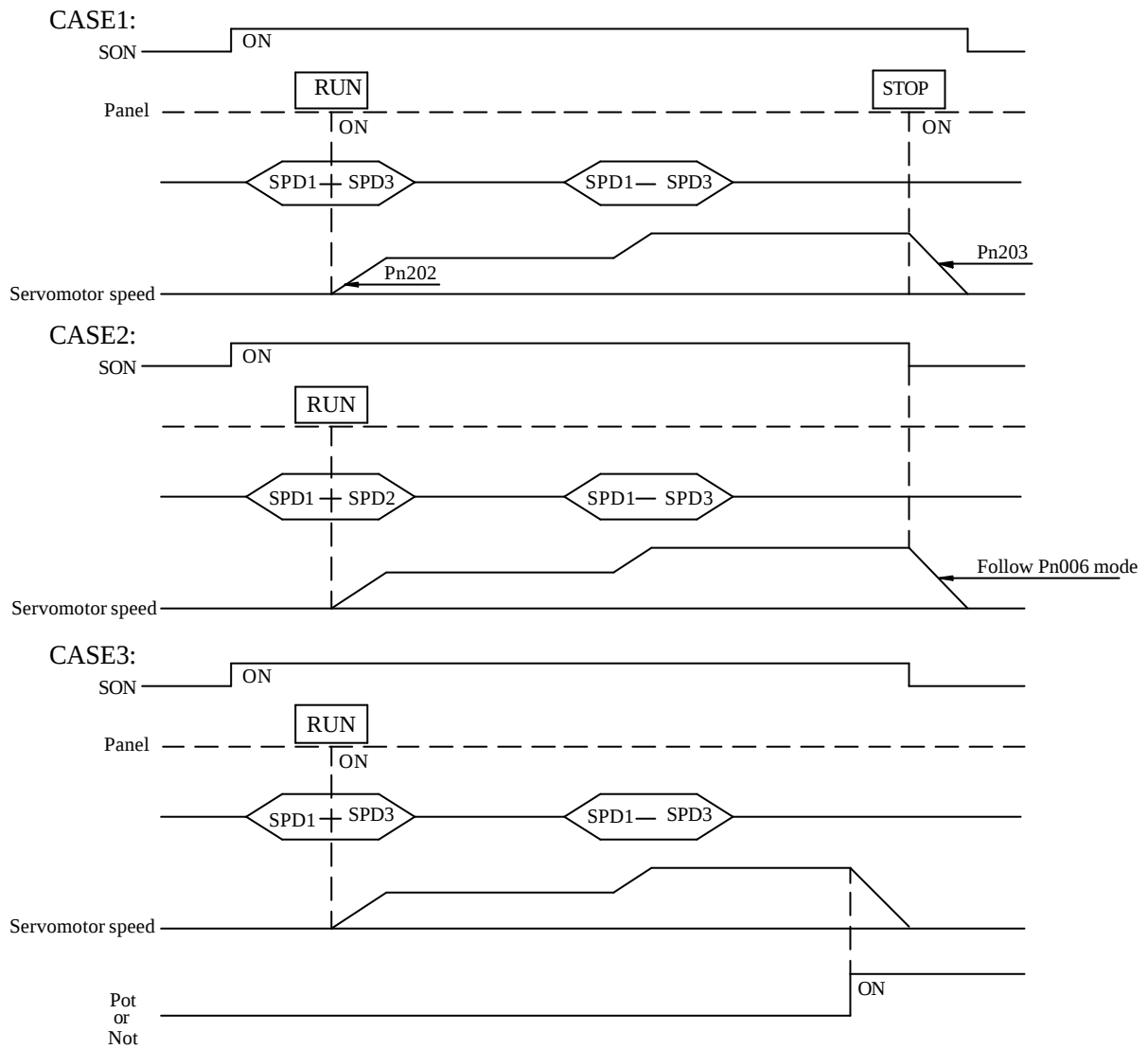


Pn446=1

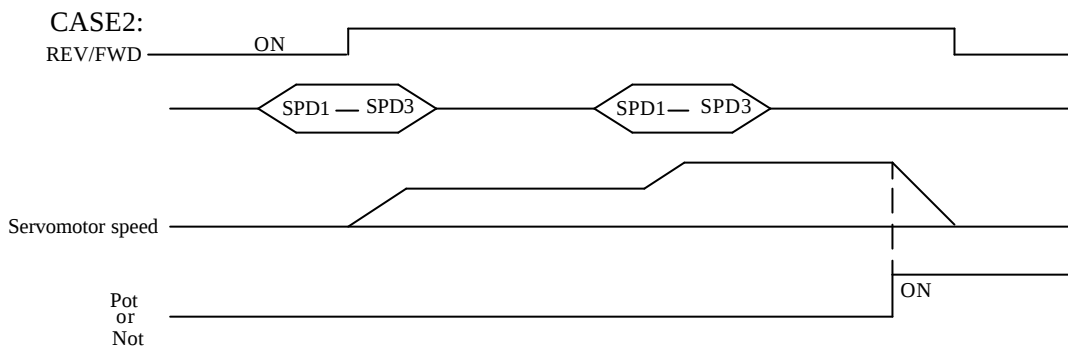
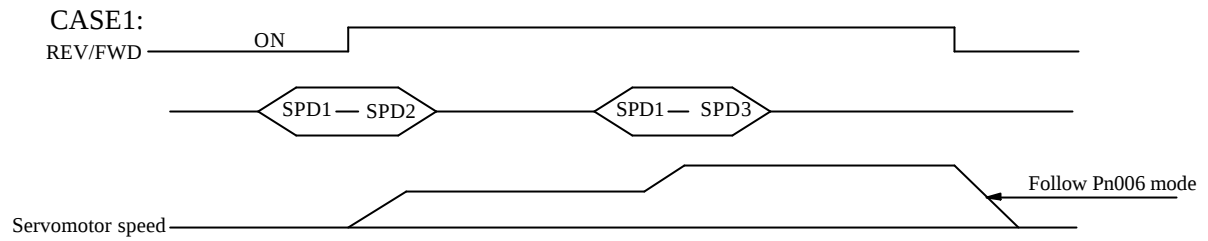


B. Speed control mode

1. Panel control

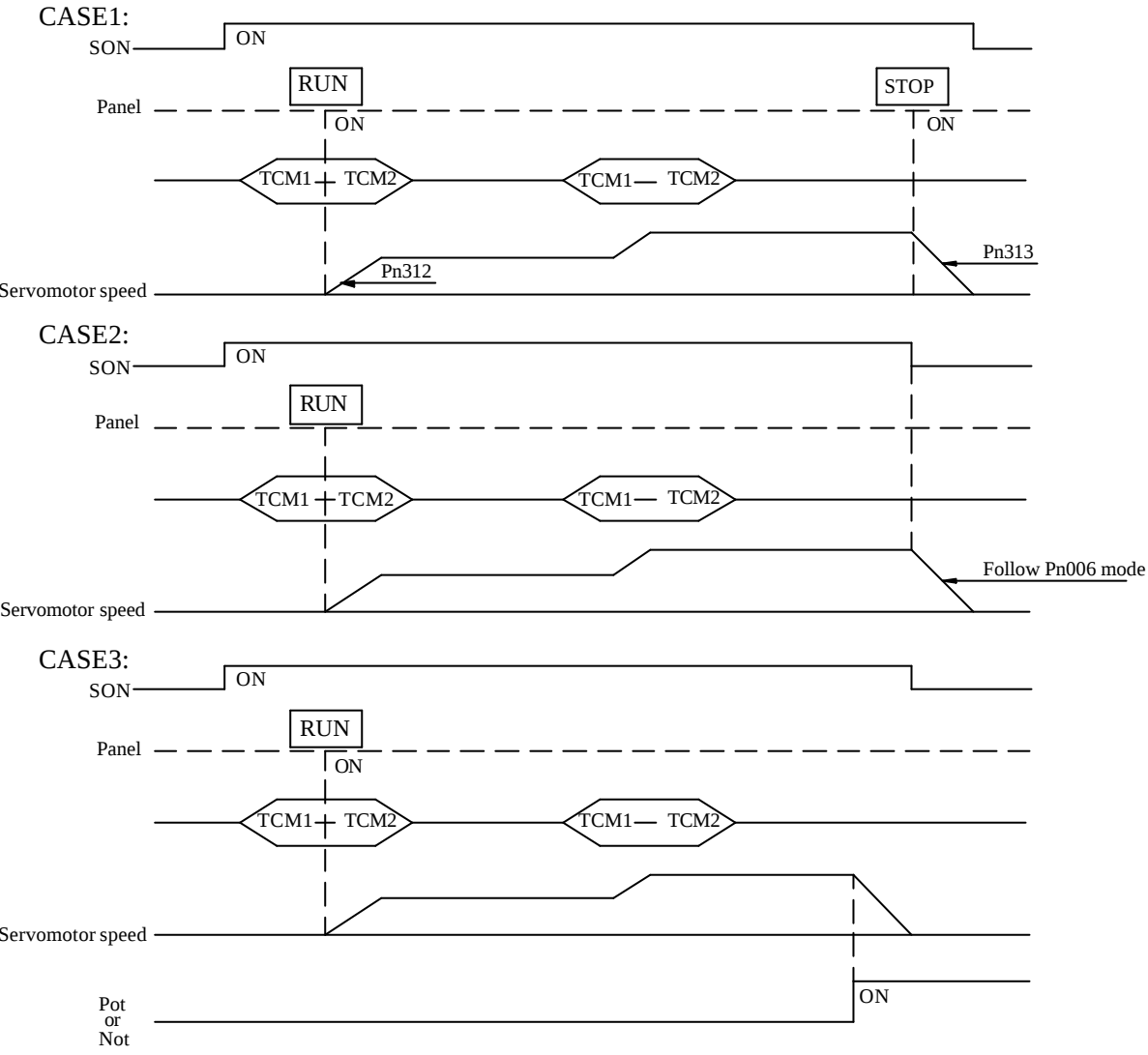


2. Terminal control

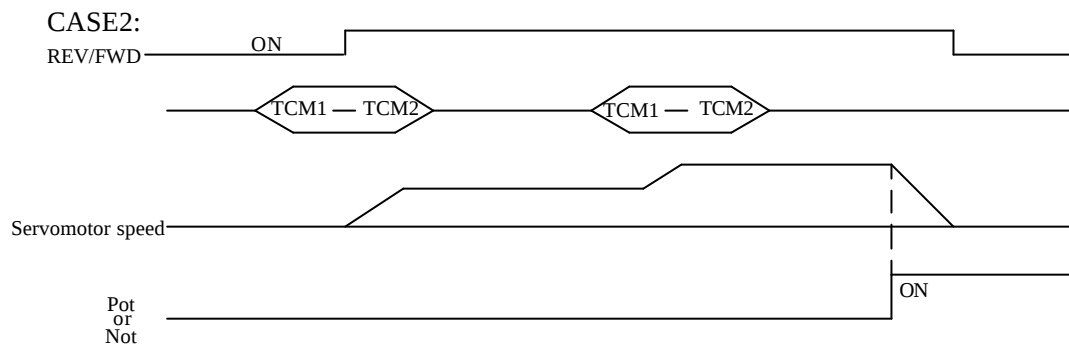
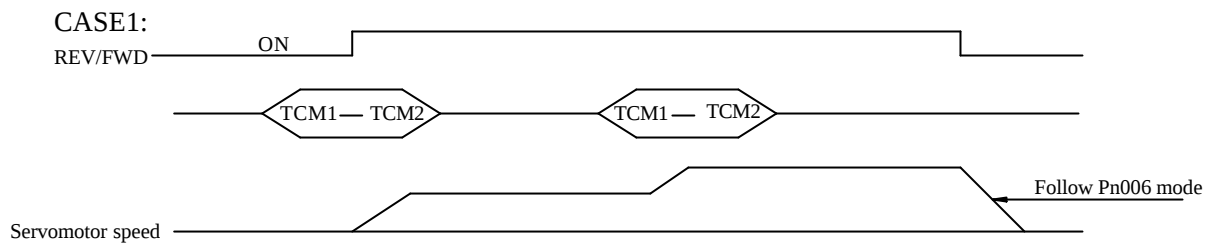


C. Torque control mode

1. Panel control



2. Terminal control



(10) Wiring compoments

Select the wiring equipment and wiring size, refer to the table below.

1. On the input power side, a molded case circuit breaker (MCCB) to protect drive primary wiring should be installed.
2. A leakage current breaker threshold of 200mA and above, or of driver use is recommended.
3. Use of input side magnetic contactor. An input MC can be used to prevent an automatic restart after recovery from an external power loss during remote control operation. However, do not use the MC reduced reliability.
4. In general, magnetic contactors on the output of the drive can not be used for motor control. Starting a motor with the drive running will cause large surge currents and the drive overcurrent protector to trigger.

Model	D310-MB series		
Model No	120	200	400
Circuit Breaker (MCCB)(A)	10	10	15
Electro-Magnetic Contactor (A)	6	6	9

(11) Surge absorber

In order to prevent malfunction, provide the surge absorber on the coils of the electromagnetic contactors, relays and other devices which are to be used adjacent of the drive.

(12) Wiring and cautionary points

A. Main circuit

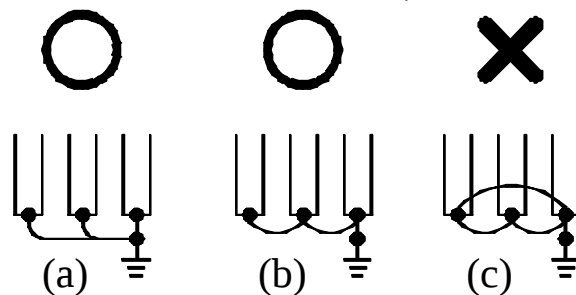
1. Don't connect the cables of the power supply side (L1, L2) to the U, V and W output terminals for the motor.
2. Don't connect any electromagnetic contactor between the drive and servomotor.
3. Don't put the advance phase capacitor between the drive and servomotor.
4. Put MCCB in the input power supply.

B. Control signal circuit

1. Separate the power cables of main circuit etc. from the control cables of the sequence and analog signals by passing the cables through the different ducts for 30cm distance away.
2. Use twisted pair shielded wire for control signal and connect the shield to earth terminal at the end. Leave the other end of shielding open.
3. Avoid common Ground leads between high and low level voltage equipment.

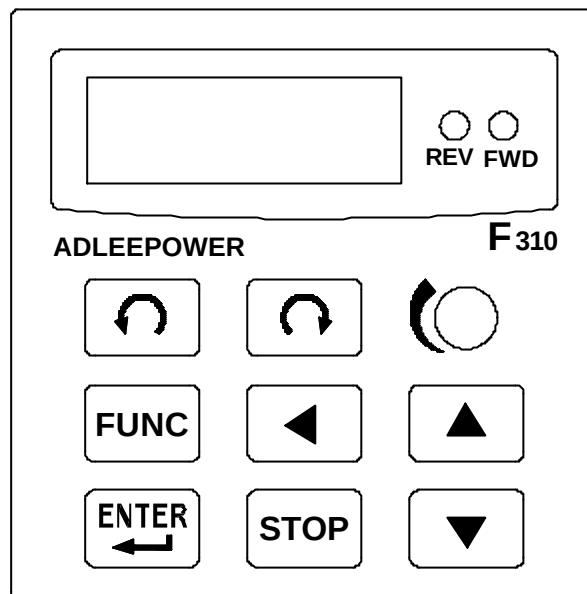
C. Grounding

1. Be sure ground both the drive and servomotor.
2. Keep grounded leads as short as possible.
3. Shield cables use to protect low-level signal leads should grounded at one end point.
4. Provide class 3 grounding ($100\ \Omega$ or less) for a terminal.
5. When grounding several drive, make connections as shown below, no loop is produced as shown in FIG a, FIG b.



6. DISPLAY AND OPERATION

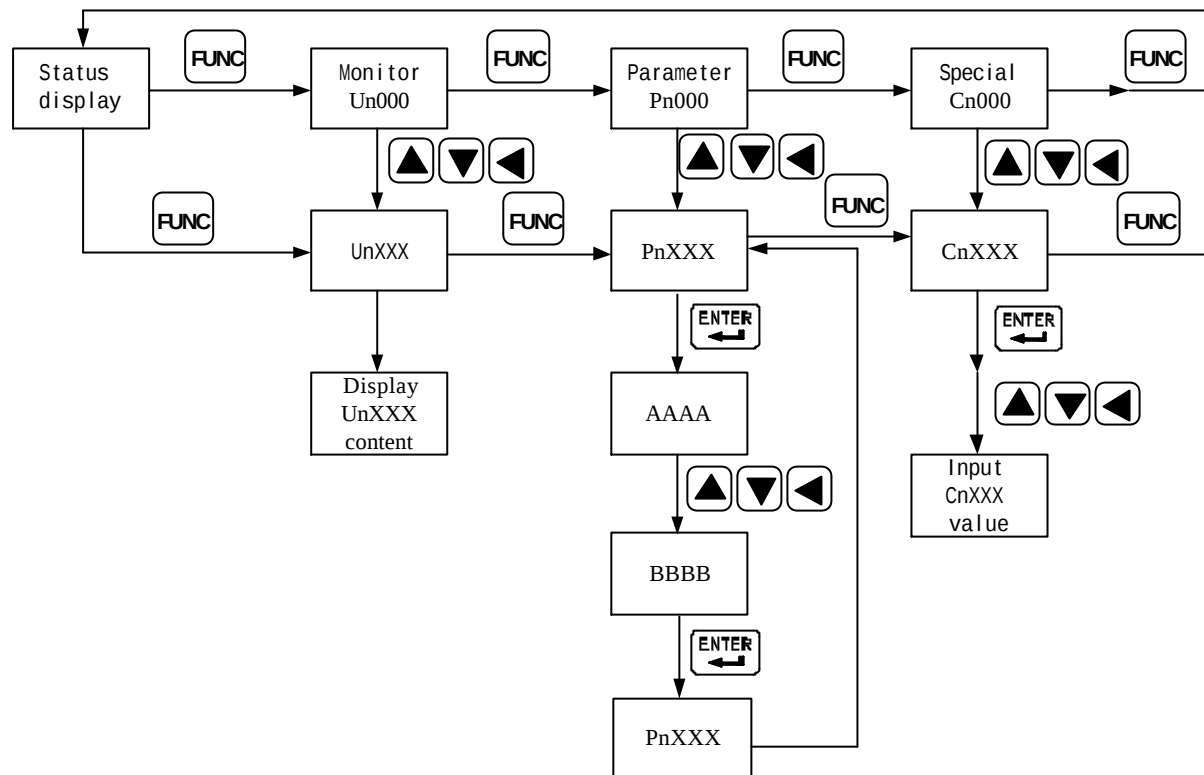
6-1. Digital panel



Keypad	Function	Description
	Shift	Select the digit
	Down	Decrease the parameter value 9~0
	Up	Increase the parameter value 0~9
	Enter	Save the setting parameter value
	Function	Select function
 	FWD / REV Run	Panel operation "FWD Run" Panel operation "REV Run"
	Stop	Panel operation "Stop"

6-2. Operation flowchart

(1) Panel operation flowchart



6-3. Status display

Display status such as SOFF, SON, Pot, Not, Err03.

An ellipsis	Show content
S.O.F.F.	Servo OFF
S.O.n.	Servo ON
P.o.t.	Forward run inhibit
n.o.t.	Reverse run inhibit
E.r.r.0.3.	Alarm code refer to below list

Alarm code

1. ERR01 : EEPROM error.
2. ERR02 : ADC fail.
3. ERR03 : Over voltage.
4. ERR04 : Low voltage.
5. ERR05 : Over current.
6. ERR06 : Over load.
7. ERR07 : Over target speed 25%.
8. ERR08 : Encoder error.
9. ERR09 : Drive over heat.
10. ERR10 : Excessive following position deviation range.
11. ERR11 : Pot or Not action. For position mode only. There is no error 11 in speed and torque mode, but servomotor stops also.

6-4. Monitor function UnXXX

(1) Keypad operating procedure

When power ON, display shows SOFF normally.

Example : Set display show motor speed.

Setting sequence	Display indicator	Description
		Power on
		Press  key, display Un000(speed)
		Press  key, when stop show 00000 When running display motor speed

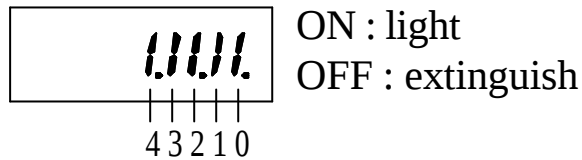
(2) Monitor function list

Monitor function	Function name	Unit	Note
Un000	Servomotor speed	RPM	
Un001	Drive speed command	RPM	
Un002	Servomotor torque	A	
Un003	Torque command	A	
Un004	Stage of multi-stages		
Un005	Digital input monitor		
Un006	Digital output monitor		
Un007	Error code display		
Un008	Last 1 error recode		
Un009	Last 2 error recode		
Un010	Last 3 error recode		
Un011	Last 4 error recode		
Un012	Software version		
Un013	Servomotor position	pulse	
Un014	Servomotor position	rev	number of rotation
Un015	Drive position command	pulse	
Un016	Drive position command	rev	number of rotation
Un017	Following position deviation	pulse	
Un018	Operation status		1 : FWD 2 : REV 3 : STOP

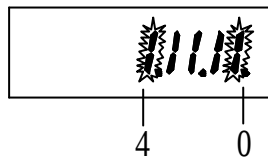
Note : Display ratio Pn008 is available at Un000 only.

Un005 : Digital input monitor

0~6 : according to DI0~DI4

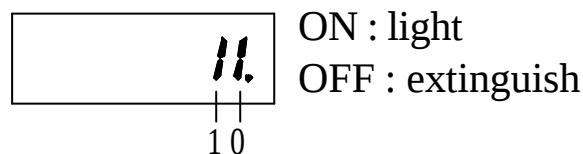


Example : DI0 “ ON” , DI4 “ ON” , other input “ OFF”



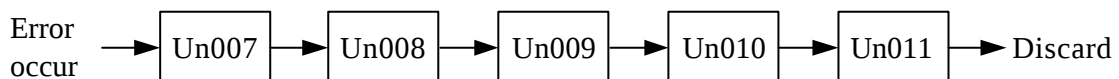
Un006 : Digital output signal

0~1 : according to DO0~DO1



Un007~Un011 : Error code

Errors record flowchart when Error occur. The new content will shift the other contents to one higher Un code and the highest one will be discarded.



Un013~Un016 : Position

Example : Un013=256, Un014=2000, means 2000 turns and 256 pulses.

Note : Reverse position is a “ -” number.

Note : 1. Forward run “ +” , reverse run “ -” .

2. Press  for 2 seconds to clear Un013~Un016 numbers.

Un017 : Position deviation between servomotor position and drive position command.

6-5. Parameter function PnXXX

Parameter key-in sequence

Example : Pn200(Source of speed command) Vref change to panel VR, then modify Pn223(Torque limit command source) digital torque limit change to analog torque limit Tref.

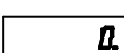
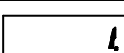
Setting sequence	Display indicator	Description
	S.O.F.F.	Power on
 	Pn000	Press  key 2 times, display Pn000
 	Pn000	Press  key 2 times
 	Pn000	Press  key 2 times
	0	Press  keys ,then display 0
	1	Press  keys ,then display 1
	Pn200	Press  key, then display Pn200
  	Pn200	Press  key 3 times, then display Pn203
	Pn203	Press  key, display Pn203
 	Pn203	Press  key 2 times, then display Pn223
	0	Press  key, then display 0
	1	Press  key, then display 1
	Pn223	Press  key, then display Pn223
	Cn000	Press  key, then display Cn000
	S.O.F.F.	Press  key, back to status

6-6. CnXXX Special function

Special function		Content
Cn000	Password input	
Cn001	Default	0 : No function 1 : Default(Effective after repower "ON")
Cn002	Clear error records	0 : No function 1 : Clear error records
Cn003	JOG	0 : Normal 1 : Enable JOG function

Note : Remove password effective by turn OFF and turn ON power source.

JOG function description

Setting sequence	Display indicator	Description
		Press  key, display Un000
		Press  key, display Pn000
		Press  key, display Cn000
  		Press  key 3 times, display Cn003
		Press  key, display 0
		Press  key, display 1
		Press  key enable JOG function
 		Press  or  key, JOG SERVO ON
		Press  key, forward run speed and torque controlled by panel VR at torque and speed mode. Position mode is operated as speed mode.
		Press  key, reverse run speed and torque controlled by panel VR at torque and speed mode. Position mode is operated as speed mode.
		Press  key, JOG SERVO OFF

Note : JOG function is available on all control modes.

7. DRIVE PARAMETERS

(1) Parameter summary

General Use Parameter

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn000	Password	
Pn002	Drive Model Code	
Pn003	Control Mode	0
Pn004	Operation Command Source	1
Pn005	Direction Definition	0
Pn006	Stop type of Servo Off	1
Pn007	FWD & REV all on	0
Pn008	Display Ratio	100
Pn009	Direction Limit	0
Pn010	DI0 Multi-function Signal Input	0
Pn011	DI1 Multi-function Signal Input	1
Pn012	DI2 Multi-function Signal Input	2
Pn013	DI3 Multi-function Signal Input	6
Pn014	DI4 Multi-function Signal Input	7
Pn026	DO0 Multi-function Signal Output	0
Pn027	DO1 Multi-function Signal Output	4
Pn034	Servo HOLD Time	0
Pn035	BRKR Brake Active Delay Time	0
Pn036	BRKR Brake Release Delay Time	0

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
		ALL	Write only
		Display	Read only
0~2		ALL	
0~2		ALL	
0~1		ALL	
0~2		S	
0~1		S, T	
1~300	%	ALL	
0~2		ALL	
00~17		ALL	FWD
00~17			REV
00~17			ARST
00~17			SST
00~17			SPD1
0~13		ALL	ALRM
0~13			TSPD
0~300	100ms	S	
0~1000	ms	ALL	
0~1000	ms	ALL	

Speed Mode Parameter

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn200	Source of Speed Command	0
Pn201	Maximum Speed Limited	3000
Pn202	Acceleration Time 1	100
Pn203	Deceleration Time 1	100
Pn206	Acceleration Time 2	100
Pn207	Deceleration Time 2	100
Pn208	Ki Percentage	100
Pn209	Speed Loop Proportional Gain	Motor No.
Pn211	Speed Loop Integral Gain	Motor No.
Pn212	Speed Command 1	0
Pn213	Speed Command 2	0
Pn214	Speed Command 3	0
Pn215	Speed Command 4	0
Pn216	Speed Command 5	0
Pn217	Speed Command 6	0
Pn218	Speed Command 7	0
Pn219	Speed Command 8	0
Pn221	Speed Arrival Detect Range	100
Pn222	Zero Speed Level	30
Pn223	Torque Limit Command Source	0
Pn224	Forward Torque Limit	300%

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
0~3		S	
30~3000	RPM	S, P	
1~600	0.1Sec	S, P	
1~600	0.1Sec	S, P	
1~600	0.1Sec	S	
1~600	0.1Sec	S	
0~100	%	P	
1~500		S, P	
10~500	ms	S, P	
0~3000	RPM	S, P	
0~3000	RPM	S, P	
0~3000	RPM	S, P	
0~3000	RPM	S, P	
0~3000	RPM	S, P	
0~3000	RPM	S, P	
0~3000	RPM	S, P	
0~3000	RPM	S, P	
0~3000	RPM	S	
0~3000	RPM	ALL	
30~200	RPM	ALL	
0~1		S, P	
0~300%	%	S, P	

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn225	Reverse Torque Limit	300%
Pn226	Analog Speed Command Reference 1	3000
Pn227	Analog Speed Command Offset	0
Pn228	Zero Speed Command Voltage	100
Pn229	Zero Speed Definition	30
Pn230	Analog Speed Command Reference 2	3000
Pn231	Minimum Speed Limited	0

Torque Mode Parameter

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn300	Source of Torque Command	0
Pn301	Speed Limit Command Source	0
Pn303	Torque Command 1	100
Pn304	Torque Arrival Detect Range	10
Pn305	Analog Torque Command Reference	300
Pn306	Analog Torque Command Offset	0
Pn307	Torque Command 2	100
Pn308	Torque Command 3	100
Pn309	Torque Command 4	100
Pn310	Forward Speed Limit	3000

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
0~300%	%	S, P	
30~3000	RPM	S	
-500~500	mV	S	
0~500	mV	S	
0~300	RPM	S	
30~3000	RPM	S	
0~3000	RPM	S	

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
0~3		T	
0~1		T	
0~300	%	T	
0~100	%	T	
0~300	%	S, T	
-100~100	mV	T	
0~300	%	T	
0~300	%	T	
0~300	%	T	
30~3000	RPM	T	

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn311	Reverse Speed Limit	3000
Pn312	Acceleration Time	2
Pn313	Deceleration Time	2
Pn411	Following Position Deviation Range	2048
Pn412	Position 1 Rotation Number	0
Pn413	Position 1 Pulse Number	0
Pn414	Position 2 Rotation Number	0
Pn415	Position 2 Pulse Number	0
Pn416	Position 3 Rotation Number	0
Pn417	Position 3 Pulse Number	0
Pn418	Position 4 Rotation Number	0
Pn419	Position 4 Pulse Number	0
Pn420	Position 5 Rotation Number	0
Pn421	Position 5 Pulse Number	0
Pn422	Position 6 Rotation Number	0
Pn423	Position 6 Pulse Number	0
Pn424	Position 7 Rotation Number	0
Pn425	Position 7 Pulse Number	0
Pn426	Homing Offset Pulse Number	512
Pn428	Position 1 Stop Time	0
Pn429	Position 2 Stop Time	0

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
30~3000	RPM	T	
0~600	A/10mS	T	
0~600	A/10mS	T	
1~4096	pulse	P	
-3000~+3000	rev	P	
-511~+511	pulse	P	
-3000~+3000	rev	P	
-511~+511	pulse	P	
-3000~+3000	rev	P	
-511~+511	pulse	P	
-3000~+3000	rev	P	
-511~+511	pulse	P	
-3000~+3000	rev	P	
-511~+511	pulse	P	
-3000~+3000	rev	P	
-511~+511	pulse	P	
-3000~+3000	rev	P	
-511~+511	pulse	P	
-3000~+3000	rev	P	
-511~+511	pulse	P	
0~9999	pulse	P	
0~1200	0.1Sec	P	
0~1200	0.1Sec	P	

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn430	Position 3 Stop Time	0
Pn431	Position 4 Stop Time	0
Pn432	Position 5 Stop Time	0
Pn433	Position 6 Stop Time	0
Pn434	Position 7 Stop Time	0
Pn436	Position Loop Proportional Gain	30
Pn438	Position Loop Feed Forward Gain	20
Pn439	Homing Mode	2
Pn444	High Speed of Homing	300
Pn445	Low Speed of Homing	60
Pn446	AUTO RUN Operation Mode	0

Communication Parameter

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn500	Communication Address Setting	1
Pn501	Transmission Speed	3
Pn502	Communication Potocol	4

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
0~1200	0.1Sec	P	
0~1200	0.1Sec	P	
0~1200	0.1Sec	P	
0~1200	0.1Sec	P	
0~1200	0.1Sec	P	
1~200	rad/s	P	
0~100	%	P	
0~3		P	
30~3000	RPM	P	
30~500	RPM	P	
0~1		P	

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
1~255		ALL	
0~3		ALL	
0~7		ALL	

Communication Write Address

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn600	Password	
Pn601	Reset to Default	0
Pn602	Clear Error Records	0
Pn609	Operation Command	0
Pn610	Error Reset	0
Pn611	Drive Speed Command	
Pn612	Drive Torque Command	

Communication Read Address

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn700	Servomotor Speed	
Pn701	Servomotor Speed Command	
Pn702	Servomotor Torque	
Pn703	Drive Torque Command	
Pn704	Stage of Multi-stages	
Pn705	DI Input Status	
Pn706	DO Output Status	
Pn707	Error Display	
Pn708	The Last 1 Error Recode	
Pn709	The Last 2 Error Recode	

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
		ALL	Write only
0~1		ALL	Write only
0~1		ALL	Write only
0~3			
0~1			
0~3000	RPM	S	Write only
0~300	%	T	Write only

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
	RPM	ALL	Read only
	RPM	S	Read only
	0.01A	ALL	Read only
	0.01A	T	Read only
		ALL	Read only
		ALL	Read only
		ALL	Read only
		ALL	Read only
		ALL	Read only
		ALL	Read only

DISPLAY CODE	FUNCTION	DEFAULT VALUE
Pn710	The Last 3 Error Recode	
Pn711	The Last 4 Error Recode	
Pn712	Software Version	
Pn713	Servomotor Position	
Pn714	Servomotor Position	
Pn715	Drive Position Command	
Pn716	Drive Position Command	
Pn717	Following Position Deviation	
Pn718	Operation Status	
Pn719	Machine Code	

Note : Pn000~Pn502 overwrite over 1 million times may cause EEPROM error.

ADJUST RANGE	UNIT	APPLIED CONTROL MODE	NOTE
		ALL	Read only
		ALL	Read only
		ALL	Read only
	pulse	ALL	Read only
	rev	ALL	Read only
	pulse	P	Read only
	rev	P	Read only
	pulse	P	Read only
		ALL	Read only

(2) Quick start of basic parameter setting

1. Mode selection Pn003, default value:speed mode

- 0 : Speed mode.
- 1 : Torque mode.
- 2: Position mode.

Note : It must be repower ON to effect new setting mode.

2. Operation command source Pn004, default value:terminal

- 0 : Panel control ( or  /  key).
- 1 : Terminal.
- 2 : RS485.

3. Source of command

A. Source of speed command Pn200

- 0 : Vref analog input 10V correspond to 3000RPM.
- 1 : Panel VR, 0~3000RPM .
- 2 : Digital input selected by SPD1~SPD3 terminals, speed setting at Pn212~Pn219.
- 3 : Communication command at address Pn610.

B. Source of torque command Pn300

- 0 : Tref analog input 10V correspond 300% rate torque.
- 1 : Panel VR, 0~+300% .
- 2 : Digital input selected by TCM1, TCM2 terminals, torque setting at Pn303 Pn307~Pn309.
- 3 : Communication command at address Pn611.

4. Limit

A. Speed mode torque limit

Torque limit command source Pn223, default value:digital

- 0 : Digital torque limit (Setting at Pn224/Pn225).
- 1 : Analog torque limit Tref terminal.

B. Torque mode speed limit

Speed limit command source Pn301, default value:analog

- 0 : Analog speed limit Vref.
- 1 : Digital speed limit (Setting at Pn310/Pn311).

(3) Parameter description

A. General Use Parameter

Password
Pn000

Adjust Range	0000~FFFF(H)
Default Value	0000

Set password to prevent parameter change by operator careless pressing. Key in password at Cn000 to release parameter lock. There is no parameter lock if set password at 00000. This is a hexadecimal number.

Drive Model Code
Pn002

Standard drive model code. (110V/220V)

	D310-MB series		
Drive 1	120W	200W	400W
Servomotor	120W	200W	400W
Model code	0	1	2

Control Mode
Pn003

Adjust Range	0~2
Default Value	0

0 : Speed mode.

1 : Torque mode.

2 : Position mode.

Note : Repower "ON" to effect new setting.

Operation Command Source
Pn004

Adjust Range	0~2
Default Value	1

0 : Panel control by ( or  /  key).

Press  or  key to start “RUN”, press  key to STOP.

1 : Terminal. (Control by FWD / REV terminal)

2 : RS485. (Control by address Pn609)

Direction Definition
Pn005

Adjust Range	0~1
Default Value	0

0 : Forward is counter clockwise (CCW), viewed from the shaft end.

1 : Forward is clockwise (CW), viewed from the shaft end.

STOP type of Servo Off
Pn006

Adjust Range	0~2
Default Value	1

0 : Fast stop.

1 : Deceleration stop.

2 : Free run stop.

FWD & REV all on
Pn007

Adjust Range	0~1
Default Value	0

0 : Motor REV run.

1 : Motor deceleration stop.

Display Ratio
Pn008

Adjust Range	1~300%
Default Value	100%

Display = Actual / Display ratio.

Available at speed mode only and do not effect at Un000 and Pn700.

Display to the first digit after the decimal point.

Direction Limit
Pn009

Adjust Range	0~2
Default Value	0

0 : Forward and reverse.

1 : Forward only.

2 : Reverse only.

DIO Multi-function Signal Input
Pn010

Adjust Range	0~17
Default Value	0 : FWD

0 : FWD.

1 : REV.

2 : ARST, alarm reset. Not effect at encoder error (Err08)

3 : Not, reverse inhibit. Servomotor reverse operation inhibit and forward operation permit, when terminal "ON".

4 : Pot, forward inhibit. Servomotor forward operation inhibit and reverse operation permit, when terminal "ON".

5 : Reserved.

6 : SST, select the 2nd acceleration time Pn206 and 2nd deceleration time Pn207 when terminal "ON".

7 : Multi stages speed terminal SPD1.

8 : Multi stages speed terminal SPD2.

9 : Multi stages speed terminal SPD3.

SPD3	SPD2	SPD1	Speed command
OFF	OFF	OFF	Pn212
OFF	OFF	ON	Pn213
OFF	ON	OFF	Pn214
OFF	ON	ON	Pn215
ON	OFF	OFF	Pn216
ON	OFF	ON	Pn217
ON	ON	OFF	Pn218
ON	ON	ON	Pn219

10 : Multi stages torque terminal TCM1.

11 : Multi stages torque terminal TCM2.

TCM2	TCM1	Torque command
OFF	OFF	Pn303
OFF	ON	Pn307
ON	OFF	Pn308
ON	ON	Pn309

12 : HOME (return to reference original point).

13 : CTRG (multi-stages trigger to run).

14 : ORGP (reference original point).

15 : HOLD (position hold).

16 : CCRL (clear following position deviation).

17 : AUTORUN (multi-stages positions autorun).

Note 1 : The DI function is activated on last DI terminal if the DI terminal functions are duplicate.

Note 2 : All multi-functions set at “ OFF” if functions do not set at DI terminals.

Note 3 : Please refer to time chart of control at terminals description chapter.

DI1 Multi-function Signal Input
Pn011

Adjust Range	0~17
Default Value	1 : REV

DI2 Multi-function Signal Input
Pn012

Adjust Range	0~17
Default Value	2 : ARST

DI3 Multi-function Signal Input
Pn013

Adjust Range	0~17
Default Value	6 : SST

DI4 Multi-function Signal Input
Pn014

Adjust Range	0~17
Default Value	7 : SPD1

Multi-function Signal Output DO0
Pn026

Adjust Range	0~13
Default Value	0 : ALRM

0 : ALRM, alarm. when error code appear.

1 : SRDY, servo ready.

2 : ZSPD, zero speed, refer to Pn222.

3 : TARR, torque arrival, refer to Pn304.

4 : TSPD, speed arrival, refer to Pn221.

6 : RUN :

a. FWD or REV terminal “ON” in terminal control will output Run signal.

b. Press  or  key in panel control will output Run signal.

7 : TQL, at torque limit condition, speed mode only.

8 : BRKR, servomotor mechanical brake output signal, set BRKR at DO3 terminal (Pn029) for maximum 50mA and 48VDC.

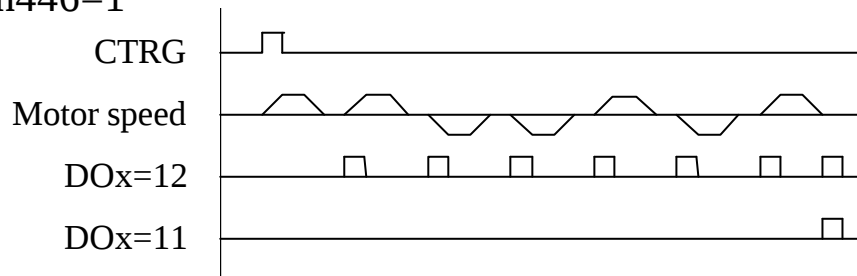
9 : Servomotor running direction output REV=H, FWD=L.

10 : HOME, return to reference original point.

11 : 7 stage complete output.

12 : Each stage complete output.

Pn446=1



Note :

DOx=11, 7 stages complete (include the last stage STOP time) “ON” 10ms.

DOx=12, each stage complete (include STOP time) “ON” 10ms.

13 : Low voltage alarm output.

Multi-function Signal Output DO1
Pn027

Adjust Range	0~13
Default Value	4 : TSPD

Servo HOLD Time
Pn034

Adjust Range	0~300
Default Value	0
Unit	100ms

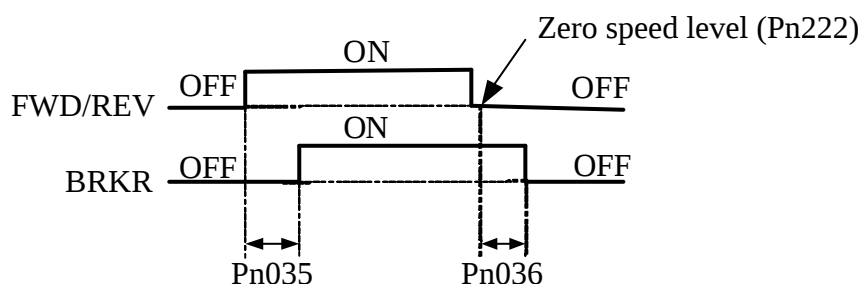
Motor deceleration to STOP, then enter “SERVO HOLD” status. After servo hold time complete, motor shaft become free.

Note : Pn034 function is effective, if Pn006=0 or 1.

BRKR Brake Active Delay Time
Pn035

Adjust Range	0~1000ms
Default Value	0ms

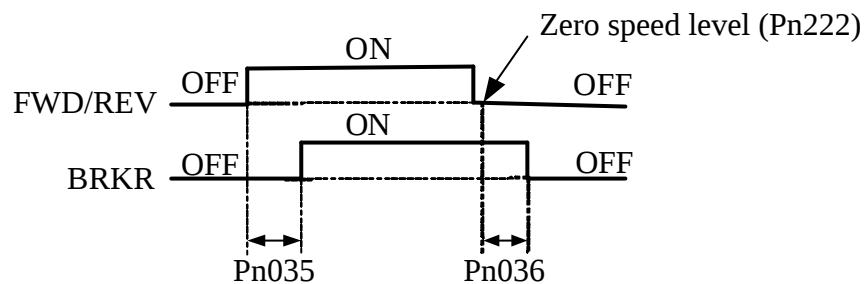
The delay time of BRKR terminal output signal “ON” when FWD or REV terminal “ON”. Or delay time by panel  or  command in panel control.



BRKR Brake Release Delay Time
Pn036

Adjust Range	0~1000ms
Default Value	0ms

When servo OFF, Delay time of BRKR brake terminal output signal “OFF” when servomotor speed reach zero speed level (Pn222 define).



B. Speed Mode Parameter

Source of Speed Command
Pn200

Adjust Range	0~3
Default Value	0

0 : Vref analog command input 0~10V.

1 : Panel VR analog command input 0~5V.

2 : Digital speed command input (1~8 stage speed) (refer to Pn212~Pn219).

3 : Communication speed command input address Pn611.

Maximum Speed Limited
Pn201

Adjust Range	30~3000RPM
Default Value	3000RPM

Limit maximum speed.

Acceleration Time 1
Pn202

Adjust Range	1~600
Default Value	100(10.0Sec)
Unit	0.1Sec

Acceleration time from 0 to rated speed 3000RPM.

Example : Pn202=2, speed=1500, 0 to 1500RPM need 0.1sec.

Deceleration Time 1
Pn203

Adjust Range	1~600
Default Value	100(10.0Sec)
Unit	0.1Sec

Deceleration time from rated speed 3000RPM to 0.

Example : Pn203=2, speed=1500, 1500RPM to 0 need 0.1sec to STOP.

Acceleration Time 2
Pn206

Adjust Range	1~600
Default Value	100(10.0Sec)
Unit	0.1Sec

Acceleration time from 0 to rated speed 3000RPM.

Use SST of DI terminal "ON" to active acceleration time 2.

Deceleration Time 2
Pn207

Adjust Range	1~600
Default Value	100(10.0Sec)
Unit	0.1Sec

Deceleration time from rated speed 3000RPM to 0.

Use SST of DI terminal "ON" to active deceleration time 2.

Ki Percentage
Pn208

Adjust Range	0~100%
Default Value	100%

Final Ki = Pn211 × Pn208.

Speed Loop Proportional Gain
Pn209

Adjst Range	1~500
Default Value	Motor No.

Set higher value to have fast response, it may cause vibration if the value is too high.

Speed Loop Integral Gain
Pn211

Adjst Range	10~500ms
Default Value	Motor No.

Set lower value to have fast response, it may cause vibration if the value is too low.

	P209 (KP)	P211 (TI)
L series	50	50
M series	100	100

Speed Command 1
Pn212

Adjst Range	0~3000RPM
Default Value	0RPM

SPD3	SPD2	SPD1	SPEED COMMAND
OFF	OFF	OFF	Pn212
OFF	OFF	ON	Pn213
OFF	ON	OFF	Pn214
OFF	ON	ON	Pn215
ON	OFF	OFF	Pn216
ON	OFF	ON	Pn217
ON	ON	OFF	Pn218
ON	ON	ON	Pn219

Speed Command 2
Pn213

Adjst Range	0~3000RPM
Default Value	0RPM

Speed Command 3
Pn214

Adjst Range	0~3000RPM
Default Value	0RPM

Speed Command 4
Pn215

Adjst Range	0~3000RPM
Default Value	0RPM

Speed Command 5
Pn216

Adjst Range	0~3000RPM
Default Value	0RPM

Speed Command 6
Pn217

Adjst Range	0~3000RPM
Default Value	0RPM

Speed Command 7
Pn218

Adjst Range	0~3000RPM
Default Value	0RPM

Speed Command 8
Pn219

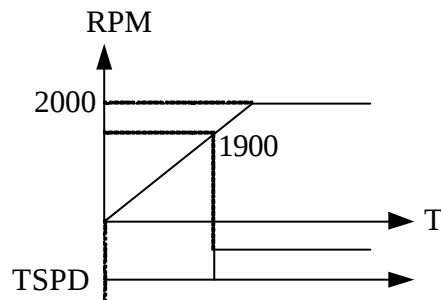
Adjst Range	0~3000RPM
Default Value	0RPM

Speed Arrival Detect Range
Pn221

Adjst Range	0~3000RPM
Default Value	100RPM

Set speed arrival detect range. TSPD of DO terminal output “ON” if speed is within the setting range.

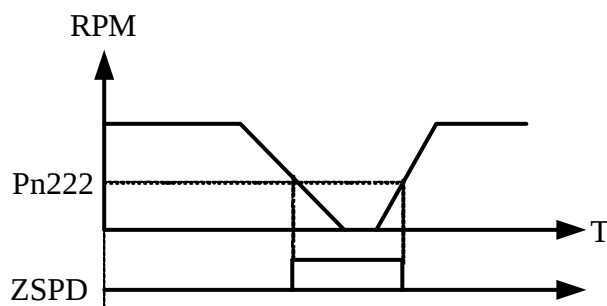
Example : speed command : 2000RPM, Pn221=100RPM.



Zero Speed Level
Pn222

Adjst Range	30~200RPM
Default Value	30RPM

ZSPD of DO terminal out “ON” if speed is under setting speed.



Torque Limit Command Source
Pn223

Adjst Range	0~1
Default Value	0

0 : Digital torque limit (Pn224 / Pn225).

1 : Analog torque limit by Tref terminal.

Forward Torque Limit
Pn224

Adjst Range	0~300%
Default Value	300%

Position mode and speed mode are effective.

Forward torque limit = rated torque $\times$ Pn224.

Reverse Torque Limit
Pn225

Adjst Range	0~300%
Default Value	300%

Position mode and speed mode are effective.

Reverse torque limit = rated torque $\times$ Pn225.

Analog Speed Command Reference 1
Pn226

Adjst Range	30~3000RPM
Default Value	3000RPM

At speed mode, set analog 10V corresponding to speed command.

At position mode or torque mode, analog 10V corresponding to speed limit.

Example : Pn226=1500RPM, means 10V correspond to 1500RPM.

Note : 0.1V corresponding to 0RPM.

Analog Speed Command Offset
Pn227

Adjst Range	-500~500mV
Default Value	0mV

Analog signal Vref and panel VR effective.

At speed mode, use this parameter to stop servomotor if speed command is zero, but servomotor speed is not zero. Adjust the speed command offset to opposite servomotor running direction to stop servomotor.

Example : Set Pn227=-XXmV to stop servomotor, when command is zero, but motor forward run slowly.

Zero Speed Command Voltage
Pn228

Adjst Range	0~500mV
Default Value	100mV

When Vref minimum voltage can not zero. So the motor can not stop. Set this parameter can stop the motor.

Example : Pn228=100 means Vref voltage below 0.1V defined 0RPM.

Zero Speed Definition
Pn229

Adjst Range	0~300RPM
Default Value	30RPM

In speed mode, when command less than Pn229, motor speed is zero.

Analog Speed Command Reference 2
Pn230

Adjst Range	30~3000RPM
Default Value	3000RPM

At speed mode, set analog 10V corresponding to speed command.
 At position mode or torque mode, analog 10V corresponding to speed limit.

Example : Pn230=1500RPM, means 10V correspond to 1500RPM.

Note : 0.1V corresponding to 0RPM.

Minimum Speed Limited	Adjust Range	0~3000RPM
Pn231	Default Value	0RPM

Set motor run minimum speed when servo “ON”.

Example : Pn231=100rpm, FWD/REV “ON” motor will run 100rpm or above.

C. Torque Mode Parameter

Source of Torque Command	Adjust Range	0~3
Pn300	Default Value	0

0 : Analog torque command by Tref terminal 0~10V.

1 : Analog torque command by panel VR.

2 : Digital torque command (1~4 stage torque)(refer to Pn303, Pn307~Pn309).

3 : Communication torque command address Pn612.

Speed Limit Command Source	Adjust Range	0~1
Pn301	Default Value	0

0 : Analog speed limit by Vref.

1 : Digital speed limit (Pn310 forward speed limit / Pn311 reverse speed limit).

Torque Command 1
Pn303

Adjust Range	0~300%
Default Value	100%

TCM2	TCM1	TORQUE COMMAND
OFF	OFF	Pn303
OFF	ON	Pn307
ON	OFF	Pn308
ON	ON	Pn309

Torque Arrival Detect Range
Pn304

Adjust Range	0~100%
Default Value	10%

When torque arrive torque command within Pn304 range, TARR output low signal.

Analog Torque Command Reference
Pn305

Adjust Range	0~300%
Default Value	300%

At torque mode, set analog 10V corresponding to torque command.
At position mode or speed mode, analog 10V corresponding to torque limit.

Example : Pn305=150%, means 10V correspond to 150% rated torque.

Note : 0.1V corresponding to 0% rated torque.

Analog Torque Command Offset
Pn306

Adjust Range	-100~100mV
Default Value	0mV

At torque mode, use this parameter to stop servomotor if torque command is zero, but servomotor speed is not zero. Adjust the torque command offset to opposite servomotor running direction to stop servomotor.

Example : Set Pn306=-XXmV to stop servomotor, when command is zero, but servomotor forward run slowly.

Torque Command 2
Pn307

Adjust Range	0~300%
Default Value	100%

Torque Command 3
Pn308

Adjust Range	0~300%
Default Value	100%

Torque Command 4
Pn309

Adjust Range	0~300%
Default Value	100%

Forward Speed Limit
Pn310

Adjust Range	30~3000RPM
Default Value	3000RPM

Servomotor forward run speed limit in torque mode.

Reverse Speed Limit
Pn311

Adjust Range	30~3000RPM
Default Value	3000RPM

Servomotor reverse run speed limit in torque mode.

Acceleration Time
Pn312

Adjust Range	0~600
Default Value	2
Unit	A/10ms

Pn312=2, current increase 1A for each 20ms.

Deceleration Time
Pn313

Adjust Range	0~600
Default Value	2
Unit	A/10ms

Pn313=2, current decrease 1A for each 20ms.

Following Position Deviation Range
Pn411

Adjust Range	1~4096pulse
Default Value	2048pulse

Drive will alarm and shows ERR10, when position command and actual position difference is larger than P411.

Position 1 Rotation Number
Pn412

Adjust Range	-3000~+3000rev
Default Value	0rev

Position 1 Pulse Number
Pn413

Adjust Range	-511~+511pulse
Default Value	0pulse

Position pulse command 1 = $512 \times \text{Pn412} + \text{Pn413}$.

AO is 128pulse/rev, but position pulse for 1rev is 512pulse.

STAGE	ACC./DEC. TIME		SPEED	POSITION COMMAND	
1	Pn202	Pn203	Pn212	Pn412	Pn413
2	Pn202	Pn203	Pn213	Pn414	Pn415
3	Pn202	Pn203	Pn214	Pn416	Pn417
4	Pn202	Pn203	Pn215	Pn418	Pn419
5	Pn202	Pn203	Pn216	Pn420	Pn421
6	Pn202	Pn203	Pn217	Pn422	Pn423
7	Pn202	Pn203	Pn218	Pn424	Pn425
Homing	Pn202	Pn203	Pn444 Pn445	HOME need "ON" refer to time chart for position control	

Homing is moving to reference original point, please refer to Pn439.

Position 2 Rotation Number
Pn414

Adjust Range	-3000~+3000rev
Default Value	0rev

Position 2 Pulse Number
Pn415

Adjust Range	-511~+511pulse
Default Value	0pulse

Position pulse command 2 = $512 \times \text{Pn414} + \text{Pn415}$.

Position 3 Rotation Number
Pn416

Adjust Range	-3000~+3000rev
Default Value	0rev

Position 3 Pulse Number
Pn417

Adjust Range	-511~+511pulse
Default Value	0pulse

Position pulse command 3 = $512 \times \text{Pn416} + \text{Pn417}$.

Position 4 Rotation Number
Pn418

Adjust Range	-3000~+3000rev
Default Value	0rev

Position 4 Pulse Number
Pn419

Adjust Range	-511~+511pulse
Default Value	0pulse

Position pulse command 4 = $512 \times \text{Pn418} + \text{Pn419}$.

Position 5 Rotation Number
Pn420

Adjust Range	-3000~+3000rev
Default Value	0rev

Position 5 Pulse Number
Pn421

Adjust Range	-511~+511pulse
Default Value	0pulse

Position pulse command 5 = $512 \times \text{Pn420} + \text{Pn421}$.

Position 6 Rotation Number
Pn422

Adjust Range	-3000~+3000rev
Default Value	0rev

Position 6 Pulse Number
Pn423

Adjust Range	-511~+511pulse
Default Value	0pulse

Position pulse command 6 = $512 \times \text{Pn422} + \text{Pn423}$.

Position 7 Rotation Number
Pn424

Adjust Range	-3000~+3000rev
Default Value	0rev

Position 7 Pulse Number
Pn425

Adjust Range	-511~+511pulse
Default Value	0pulse

Position pulse command 7 = $512 \times \text{Pn424} + \text{Pn425}$.

Homing Offset Pulse Number
Pn426

Adjust Range	0~9999pulse
Default Value	512pulse

Servomotor reduces speed to stop and run opposite direction to set pulse number when servomotor reaches the reference original point during homing offset process. Adjust the setting number to reach the right original position.

Position 1 Stop Time
Pn428

Adjust Range	0~1200 0.1sec
Default Value	0sec

Position 2 Stop Time
Pn429

Adjust Range	0~1200 0.1sec
Default Value	0sec

Position 3 Stop Time
Pn430

Adjust Range	0~1200 0.1sec
Default Value	0sec

Position 4 Stop Time
Pn431

Adjust Range	0~1200 0.1sec
Default Value	0sec

Position 5 Stop Time
Pn432

Adjust Range	0~1200 0.1sec
Default Value	0sec

Position 6 Stop Time
Pn433

Adjust Range	0~1200 0.1sec
Default Value	0sec

Position 7 Stop Time
Pn434

Adjust Range	0~1200 0.1sec
Default Value	0sec

Position Loop Proportional Gain
Pn436

Adjust Range	1~200rad/s
Default Value	30rad/s

Set higher value to have fast response, it may cause vibration if the value is too high.

Position Loop Feed Forward Gain
Pn438

Adjust Range	0~100%
Default Value	20%

Set higher value to have fast response, it may cause vibration if the value is too high.

Homing Mode
Pn439

Adjust Range	0~3
Default Value	2

Make sure the homing direction, otherwise, it may cause the mechanical accident.

0 : Pot being original point and servomotor forward run to search this original point.

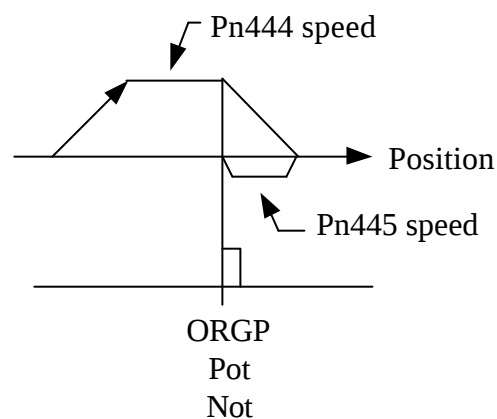
1 : Not being original point and servomotor reverse run to search this original point.

2 : ORGP being original point and servomotor forward run to search this original point.

3 : ORGP being original point and servomotor reverse run to search this original point.

High Speed of Homing
Pn444

Adjust Range	30~3000RPM
Default Value	300RPM



Low Speed of Homing
Pn445

Adjust Range	30~500RPM
Default Value	60RPM

AUTO RUN Operation Mode
Pn446

Adjust Range	0~1
Default Value	0

0 : CTRG on trigger, run 7 stage.

1 : CTRG on trigger, run 1 stage, refer to time chart for position control.

D. Communication Parameter

Communication Address Setting
Pn500

Adjust Range	1~255
Default Value	1

Each drive must have unique identified address if they are controlled by RS-485 communication. Each address cannot be duplicated.

Transmission Speed
Pn501

Adjust Range	0~3
Default Value	3

Setting the transmission speed between computer and drive.

0 : 2400 bits/second.

1 : 4800 bits/second.

2 : 9600 bits/second.

3 : 19200 bits/second.

Communicator Protocol
Pn502

Adjust Range	0~7
Default Value	4

A. Character Format

0 : 8,N,1 RTU (1 start bit+8 data bits+1 stop bit)

8,N,1 RTU (10-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Stop bit
-----------	---	---	---	---	---	---	---	---	----------

1 : 8,N,2 RTU (1 start bit+8 data bits+2 stop bit)

8,N,2 RTU (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Stop bit	Stop bit
-----------	---	---	---	---	---	---	---	---	----------	----------

2 : 8,E,1 RTU (1 start bit+8data bits+1 Even bit+1 stop bit)

8,E,1 RTU (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Even Parity	Stop bit
-----------	---	---	---	---	---	---	---	---	-------------	----------

3 : 8,O,1 RTU (1 start bit+8data bits+1 Odd bit+1 stop bit)

8,O,1 RTU (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Odd Parity	Stop bit
-----------	---	---	---	---	---	---	---	---	------------	----------

4 : 8,N,1 ASCII (1 start bit+8data bits+1 stop bit)

8,N,1 ASCII (10-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Stop bit
-----------	---	---	---	---	---	---	---	---	----------

5 : 8,N,2 ASCII (1 start bit+8data bits+2 stop bit)

8,N,2 ASCII (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Stop bit	Stop bit
-----------	---	---	---	---	---	---	---	---	----------	----------

6 : 8,E,1 ASCII (1 start bit+8data bits+1 Even bit+1 stop bit)
 8,E,1 ASCII (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Even Parity	Stop bit
-----------	---	---	---	---	---	---	---	---	-------------	----------

7 : 8,O,1 ASCII (1 start bit+8data bits+1 Odd bit+1 stop bit)
 8,O,1 ASCII (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Odd Parity	Stop bit
-----------	---	---	---	---	---	---	---	---	------------	----------

B. Communication Protocol(Data contents are in hexadecimal with postive and negative format.)

1. RTU

Start	A silent interval of more than 10ms
Address	8-bit address
Function	8-bit command
Data (n-1)	Contents of data : n*8-bit data, n 16
...	
Data 0	
CRC CHK Low	Check sum (CRCL)
CRC CHK High	Check sum (CRCH)
End	A silent interval of more than 10ms

2. ASCII

STX	Start character=' : ' (3AH)
Address Hi	Communication address : 8-bit address consists of 2 ASCII codes.
Address Lo	
Function Hi	Function code : 8-bit command consists of 2 ASCII codes.
Function Lo	
Data (n-1)	Contents of data : n*8-bit data consist of 2n ASCII codes. n = 16
...	
Data 0	
LRC CHK High	LRC check sum : 8-bit check sum consists of 2 ASCII codes.
LRC CHK Low	
END Hi	End characters : END Hi=CR(0DH) END Lo=LF(0AH)
END Lo	

CRC(Cyclical Redundancy Check) is calculated by the following steps:

Step 1. Load a 16-bit register (called CRC register) with FFFFH.

Step 2. Exclusive OR the first 8-bit byte of the command message with the low order byte of the 16-bit CRC register, putting the result in the CRC register.

Step 3. Shift the CRC registers one bit to the right with MSB zero filling. Extract and examine the LSB.

Step 4. If the LSB of CRC register is 0, repeat step 3, else Exclusive OR the CRC register with the polynomial value A001H.

Step 5. Repeat step 3 and 4 until eight shifts have been performed. When this is done, a complete 8-bit byte will have been processed.

Step 6. Repeat steps 2 to 5 for the next 8-bit byte of the command message . Continue doing this until all bytes have been processed.
The final contents of the CRC register are the CRC value.

LRC (Longitudinal Redundancy Check) is calculated by summing up, module FF, the values of the bytes from Address to last data character then calculating the hexadecimal representation of the 2's-complement negation of the sum.

For example, address 01H, function code 03H, parameter Pn006(D3=00H, D4=06H), read 1 data (D5=00H, 06=01H) :

$01+03+00+06+00+01=B$

the 2's-complement negation of B is F5

LRC HI = " F" (46H), LRC LO = " 5" (35H)

C. ASCII Code Description

Value	0	1	2	3	4	5	6	7
ASCII code	30H	31H	32H	33H	34H	35H	36H	37H
Value	8	9	A	B	C	D	E	F
ASCII code	38H	39H	41H	42H	43H	44H	45H	46H

D. Function Code

1. 03H : Read drive' s setting.
2. 06H : Write parameter setting into drive.

E. Communication Error Respond

Once communication error happened, drive will respond "Function code and 80H" and communication error code to master system.

Communication error code definition

ERROR CODE	DESCRIPTION
01H	Function code error, only 03/06 available
02H	Illegal data address (data address is not available)
03H	Illegal data value (data value is outside limit value)
04H	Illegal command, drive can't do this command
05H	Check sum error

Once communication error happend, drive respond as follow.

1. RTU

D1 Address	D2 Function code & 80H	D3 Error code	D4 CRCL	D5 CRCH
---------------	---------------------------	------------------	------------	------------

2. ASCII

Start code	3A
Address (01)	30 31
Function code & 80H (86)	38 36
Error code (02)	30 32
LRC (77)	37 37
End code H	0D
End code L	0A

E. Communication Write Address

Password
Pn600

Adjust Range	0000~FFFF
Default Value	0000

Parameters are unlock, after input password. Content needs to input password again after repower ON.

Reset to Default
Pn601

Adjust Range	0~1
Default Value	0

0 : No function.

1 : Reset to default.

Clear Error Records
Pn602

Adjust Range	0~1
Default Value	0

After trouble shoot, do Pn602=1 to clear all alarm records.

Operation Command
Pn609

Adjust Range	0~3
Default Value	0

0 : Stop.

1: FWD.

2: REV.

3: No function.

Error Reset
Pn610

Adjust Range	0~1
Default Value	0

0 : No reset.

1: Reset.

Drive Speed Command
Pn611

Adjust Range	0~3000RPM
Default Value	0RPM

0~3000RPM (Hexadecimal 0~0BB8).

Driver Torque Command
Pn612

Adjust Range	0~300%
Default Value	0%

0~300% (Hexadecimal 0~012C).

F. Communication Read Address

Servomotor Speed
Pn700

UNIT	RPM
-------------	------------

This value is worked with Pn008.

Drive Speed Command
Pn701

UNIT	RPM
-------------	------------

Servomotor Torque
Pn702

UNIT	0.01A
-------------	--------------

Percentage of rate torque.

DriveTorque Command
Pn703

UNIT	0.01A
-------------	--------------

Percentage of rate torque.

Stage of Multi- stages
Pn704

Stage of SPD1~SPD3, or TCM1~TCM2.

DI Input Status
Pn705

DI0~DI4 “ON”, show 1.

Example : DI2 “ON” and DI4 “ON”, binary number 10100.

DO Output Status
Pn706

DO0~DO1 output “Low”, show 1.

Example : DO0 output “Low”, binary number 01.

Error Display
Pn707

- 1 : ERR01 : EEPROM error.
- 2 : ERR02 : ADC fail.
- 3 : ERR03 : Over voltage.
- 4 : ERR04 : Low voltage.
- 5 : ERR05 : Over current.
- 6 : ERR06 : Over load.
- 7 : ERR07 : Over target speed 25%.
- 8 : ERR08 : Encoder error.
- 9 : ERR09 : Drive over heat.
- 10 : ERR10 : Excessive following position deviation.
- 11 : ERR11 : Pot or Not action, for position mode only. There is no error 11 in speed and torque mode, but servomotor stop also.

Note : The error codes recoding description as Un007~Un011.

The Last 1 Error Record
Pn708

The Last 2 Error Record
Pn709

The Last 3 Error Record
Pn710

The Last 4 Error Record
Pn711

Software Version
Pn712

Servomotor Position
Pn713

UNIT	pulse
-------------	--------------

Servomotor Position
Pn714

UNIT	rev
-------------	------------

Drive Position Command
Pn715

UNIT	pulse
-------------	--------------

Drive Position Command
Pn716

UNIT	rev
-------------	------------

Following Position Deviation
Pn717

Operation Status
Pn718

Pn713~Pn718 : See function description Un013~Un018.

Machine Code
Pn719

8. REPAIRING AND MAINTENANCE

1. Turn off the power before inspection and maintenance, wait for power light off for 5 minutes to start operate.
2. Only the qualified professional engineers can do repairing and maintenance work.
3. Take off the watches, rings or any other metal accessories before repairing and maintenance, and use insulating measure tools.
4. Please make a static electricity protection to prevent damage the driver inner precision parts.
5. Do NOT use water, solvent or volatilizable liquor to clean driver.
Please use dry clothes to clean stain or use compressed air to clean dirt.
6. Please contact agent or ADLEEPOWER[®] when you cannot obviate problems.
7. Recommend checking list for maintenance.
 - a. Ambient condition around the drive. Checking the ambient temperature, vibration, humidity and any oil, gas, dust or water drops.
 - b. Check if there is any missing or loose screw.
 - c. Check if the magnetic contactor relay work correctly.
 - d. Check cooling system if there is any obstruction in the heat sink, air intake or air outlet. And check the fan is running properly.

Maintenance Period : Daily

	CHECK ITEMS	METHODS AND CRITERIA
Ambient Conditions Around The Drive	Confirm the ambient temperature, vibration, humidity and see if there is any oil, gas, dust or water drops.	Visual inspection and measurement with equipment
	Confirm if there are any dangerous objects around.	Visual inspection
Voltage	Confirm if the voltage of main circuit and control circuit is correct.	Measure with multimeter standard specification
Keypad	Check the display clear for reading or any missing characters.	Visual inspection
Mechanical Parts	Confirm if there is any missing or loose screws.	Tighten or replace screw
Rectifier and IPM	Confirm if there is any abnormal sound ,deformation or peculiar smell.	Visual, aural inspection and smell
DC Capacity	Confirm if there is any leakage of liquid, cracks or deformation.	Visual inspection
Transformer	Confirm if there is any abnormal sound or peculiar smell.	Visual and aural inspection
Magnetic Contactor Relay of Main Circuit (Additional)	Confirm if the Magnetic contactor relay works correctly.	Visual and aural inspection

Maintenance Period : Half Years

	CHECK ITEMS	METHODS AND CRITERIA
Mechanical Parts	Confirm if there is any abnormal sound , vibration, deformation or damage.	Visual and aural inspection
	Confirm if there are any loose screws.	Tighten the screws
	Confirm if there is any color change by overheating, dust or dirt.	Visual inspection
Main Circuit	Confirm if machine or insulator is deformed, cracked, damaged or with changed color due to overheating or aging.	Visual inspection
	Confirm if there is any dust or dirt.	Visual inspection
Terminals and Wiring	Confirm if there is any damaged, deformation or color changed.	Visual inspection
DC Capacity	Measure static capacity when required.	Measure with LC meter (Static capacity initial value*0.8)
Resistor	Confirm if there is any peculiar smell, color change or insulator cracks due to overheating.	Visual and smell inspection
	Confirm if there is any opened or short status.	Visual inspection or measure with multimeter
PCB and Connector	Confirm if there are any loose screws and connector.	Tighten the screws and press the connectors firmly
	Confirm if there is any damaged, deformation, color change or peculiar smell.	Visual and smell inspection
Cooling System	Confirm if there is any obstruction in the heat sink, air intake or air outlet.	Visual inspection

9. TROUBLESHOOTING

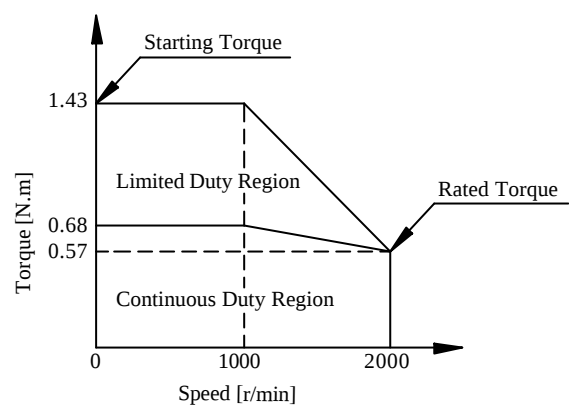
Drive output alarm signal and make servomotor stop when protect function active. Please turn power “ OFF” when alarm occur. Please make sure cause of alarm being corrective before reset alarm, then repower “ ON” . Please repower “ ON” after power “ OFF” more than 5 minutes.

DISPLAY SYMBOL	CAUSE OF FAULT MESSAGE CONTENTS	SUGGESTED REMEDY
ERR01	EEPROM Error	Return to factory.
ERR02	ADC Failure	Return to factory.
ERR03	Over Voltage	Increase deceleration time .
		Decrease regeneration resistor resistance.
		Check input voltage if it is higher than specification.
ERR04	Low Voltage	Check input voltage if it is lower than specification.
		Make sure power relay work normally.
ERR05	Over Current	Check U.V.W. short circuit or not.
		Check U.V.W. screw tightly, there may be one phase loose.
		U.V.W. wrong wiring.
ERR06	Over Load	Continue phase current over 120% rated current.
		If over load occur, than decrease loading or upgrade drive and servomotor.
ERR07	Over Speed	Over target speed 25%.
		Check loading if it is a violent change.

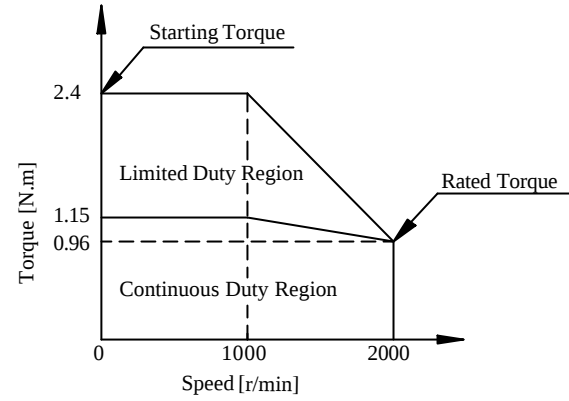
DISPLAY SYMBOL	CAUSE OF FAULT MESSAGE CONTENTS	SUGGESTED REMEDY
ERR08	Encoder Error	Please check encoder wiring. (loose or short circuit or mis-connection).
ERR09	Drive Over Heat	Check phase current over rated current or not.
		Check vantilation of drive.
		Check wiring correct or not.
ERR10	Excessive Following Position Deviation Range	Decrease operation speed and increase deceleration time, if load is too heavy.
		Increase value of Pn436 and Pn438.
		Increase value of Pn411.
		Upgrade drive capacity or upgrade both drive and servomotor capacity.
ERR11	Drive Inhibit	Check Pot and Not is active or not.
		Check Pot and Not sensor is normal or not.
	Commanication Fail	Check host and drive parameter setting (address, baud rate, format).
		Check wiring S+ shall connect S+, S- shall connect S-.

10. MOTOR T-N CURVE

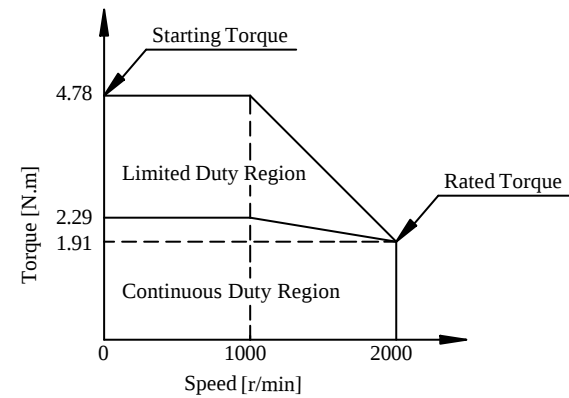
MB2-120L



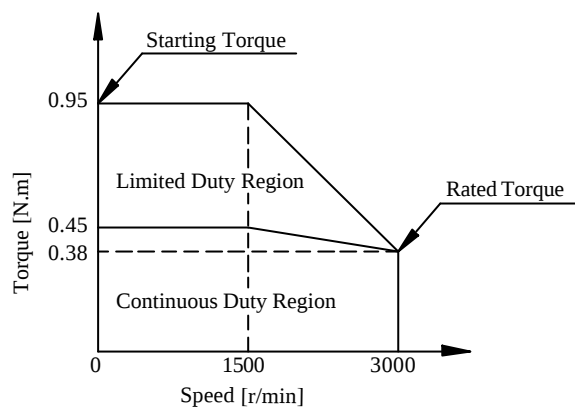
MB2-200L



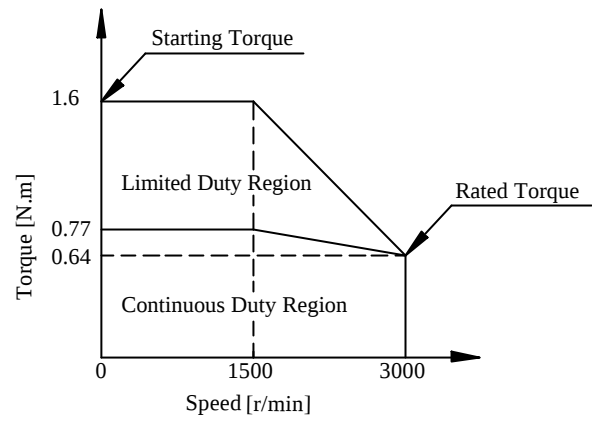
MB2-400L



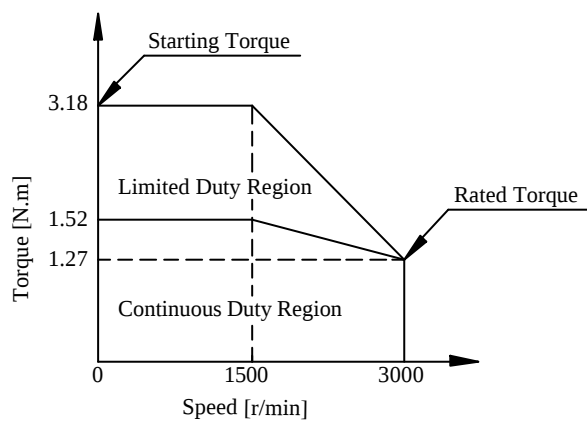
MB2-120M



MB2-200M



MB2-400M



11. APPLICATION EXAMPLES

EXAMPLE 01 : Speed Mode

(1) Permit forward and reverse run.

Control command by panel FWD or REV/STOP key.

Speed command by digital command setting 1st speed 1500RPM,
2nd speed 3000RPM, 3rd speed 500RPM.

Digital torque limit 100%.

Parameter setting

Pn003=0 (speed mode)

Pn004=0 (panel control)

Pn010=0 (FWD)

Pn011=1 (REV)

Pn012=2 (ARST)

Pn013=7 (SPD1)

Pn014=8 (SPD2)

Pn200=2 (digital speed command)

Pn212=1500 (1st speed)

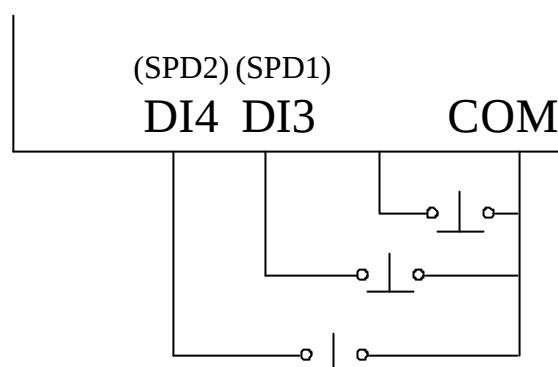
Pn213=3000 (2nd speed)

Pn214=500 (3rd speed)

Pn223=0 (torque limit)

Pn224=100% (forward torque limit)

Pn225=100% (reverse torque limit)



Operation :

Press panel  or  key, motor start to run, speed select by SPD1 and SPD2. Case of SPD1 and SPD2 list at below.

DI3(SPD1)	DI4(SPD2)	
OFF	OFF	1 st speed
ON	OFF	2 nd speed
OFF	ON	3 rd speed

(2) Permit Forward and Reverse Run.

Control command by terminal.

Speed command by digital command setting.

Digital torque limit 100%.

Parameter setting

Pn003=0 (speed mode)

Pn004=1 (terminal control)

Pn010=1 (REV)

Pn011=0 (FWD)

Pn012=2 (ARST)

Pn013=7 (SPD1)

Pn014=8 (SPD2)

Pn200=2 (digital speed command)

Pn212=1500 (1st speed)

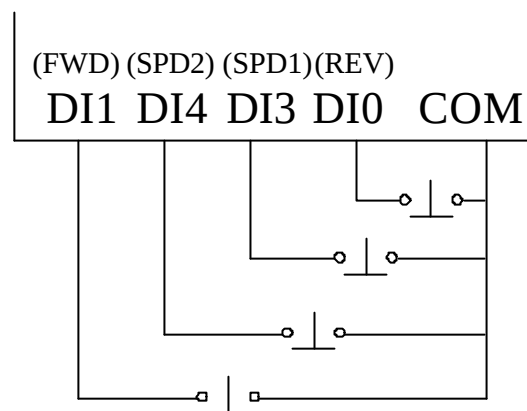
Pn213=3000 (2nd speed)

Pn214=500 (3rd speed)

Pn223=0 (torque limit)

Pn224=100% (forward torque limit)

Pn225=100% (reverse torque limit)



Operation :

DI1 (FWD) terminal “ ON” , enter FWD status, speed command select by SPD1 and SPD2. DI1 “ OFF” , to stop the servomotor, case of SPD1 and SPD2 list as below.

DI3(SPD1)	DI4(SPD2)	
OFF	OFF	1 st speed
ON	OFF	2 nd speed
OFF	ON	3 rd speed

EXAMPLE 02 : Torque Mode

(1) Control command by terminal.

Speed limit by analog terminal Vref.

Torque command by digital (1st torque 100% and 2nd torque 80% rated current).

Parameter setting

Pn003=1 (torque mode)

Pn004=1 (terminal control)

Pn010=1 (REV)

Pn011=0 (FWD)

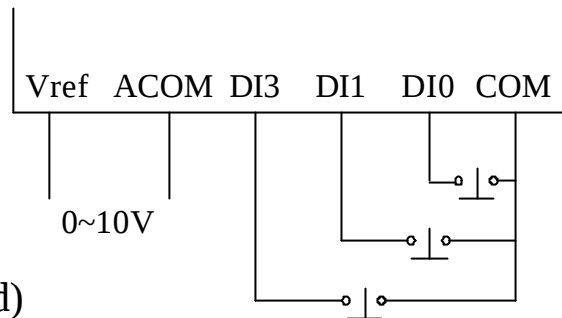
Pn013=10 (TCM1)

Pn300=2 (digital torque command)

Pn301=0 (Analog speed limited by Vref)

Pn303=100%

Pn307=80%



Operation :

DI0 (FWD) “ ON” , servomotor will operate at Pn303 setting torque command. Turn “ ON” DI3(TCM1) terminal to select 2nd torque command. If speed over Vref setting, drive will decrease torque in order to speed at run limit.

DI3(TCM1)	
OFF	1 st torque
ON	2 nd torque

(2) Control command by panel.

Speed limit by digital setting 1500RPM.

Torque command by digital command (1st torque 100% and 2nd torque 80%).

Parameter setting

Pn003=1 (torque mode)

Pn004=0 (panel control)

Pn013=10 (TCM1)

Pn300=2 (digital torque command)

Pn301=1 (digital speed limit)

Pn303=100%

Pn307=80%

Pn310=1500 (forward speed limit)

Pn311=1500 (reverse speed limit)

Operation :

Press panel  or  key, servomotor start to run. Press  key to stop motor. Drive will decrease torque in order to run at speed limit, if speed over Pn310 and Pn311 setting.

DI3(TCM1)	
OFF	1 st torque
ON	2 nd torque

EXAMPLE 03 : Position Control and Homing

(1) Object moving distance 1cm by 1 servomotor turn, speed : 1000RPM.

- (1) 1st position forward run 50.5cm.
- (2) 2nd position reverse run 40cm.
- (3) 3rd position forward run 40cm.
- (4) 4th position reverse run 30cm.
- (5) 5th position forward run 30cm.
- (6) 6th position reverse run 20cm.
- (7) 7th position forward run 20cm.
- (8) Homing offset.

Parameter setting

Stage	POS1	POS2	POS3	Acc./Dec. time		SPEED		POSITION	
1	OFF	OFF	OFF	Pn202	Pn203	1 st speed	Pn212	Pn412	Pn413
2	ON	OFF	OFF	Pn202	Pn203	2 nd speed	Pn213	Pn414	Pn415
3	OFF	ON	OFF	Pn202	Pn203	3 th speed	Pn214	Pn416	Pn417
4	ON	ON	OFF	Pn202	Pn203	4 th speed	Pn215	Pn418	Pn419
5	OFF	OFF	ON	Pn202	Pn203	5 th speed	Pn216	Pn420	Pn421
6	ON	OFF	ON	Pn202	Pn203	6 th speed	Pn217	Pn422	Pn423
7	OFF	ON	ON	Pn202	Pn203	7 th speed	Pn218	Pn424	Pn425
Homing offset	ON	ON	ON	Pn202	Pn203	Pn444 Pn445			

Pn003=2 (position mode)

Pn004=1 (terminal control)

Pn010=1 (REV)

Pn011=13 (set DI1 as CTRG)

Pn012=14 (set DI2 as ORGP)

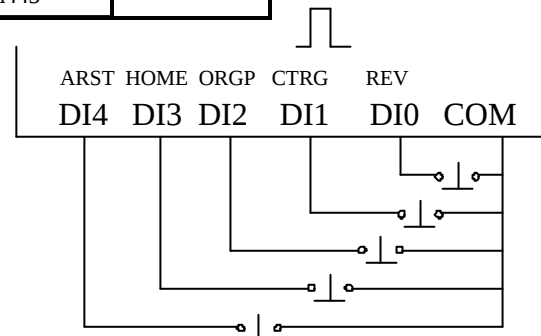
Pn013=12 (set DI3 as HOME)

Pn014=2 (set DI4 as ARST)

Pn412=50; Pn413=256; Pn414=-40; Pn416=40

Pn418=-30; Pn420=30; Pn422=-20; Pn424=20

Pn439=2; Pn212~Pn218=1000



Operation refer to position time chart of control

EXAMPLE 04 : JOG Mode

Pn003=0 (speed mode)

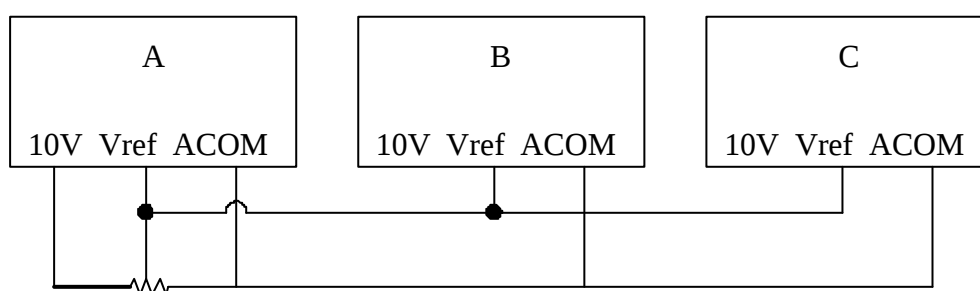
Cn003=1 press  or  key to enter JOG status, speed command set by panel VR.

case1. Press  key, then press  key for reverse run,  key for forward run.

case2. Press  key, then press  key for forward run,  key for reverse run.

EXAMPLE 05 : Speed Control of Master-Slave Drive System

No.	A	B	C
MAX. SPEED	3000	2000	1000
PARAMETER SETTING	Pn003=0 Pn004=1 Pn200=0 Pn202=30.0 Pn203=30.0 Pn226=3000	Pn003=0 Pn004=1 Pn200=0 Pn202=60.0 Pn203=60.0 Pn226=2000	Pn003=0 Pn004=1 Pn200=0 Pn202=90.0 Pn203=90.0 Pn226=1000



EXAMPLE 06 : Using PNP Transistor to Control Forward and Reverse Run

Permit forward and reverse run

Control command by panel.

Speed limit by digital command, 1st speed 1500RPM, 2nd speed 3000RPM, 3rd speed 500RPM.

Parameter setting

Pn003=0

Pn004=0

Pn013=7 (SPD1)

Pn014=8 (SPD2)

Pn200=2

Pn212=1500

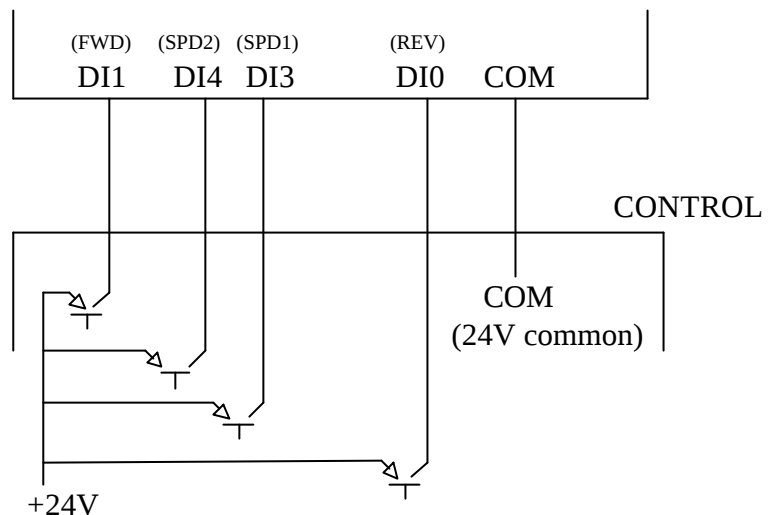
Pn213=3000

Pn214=500

Pn223=0

Pn224=100%

Pn225=100%



Note : S1 shall set at source position.

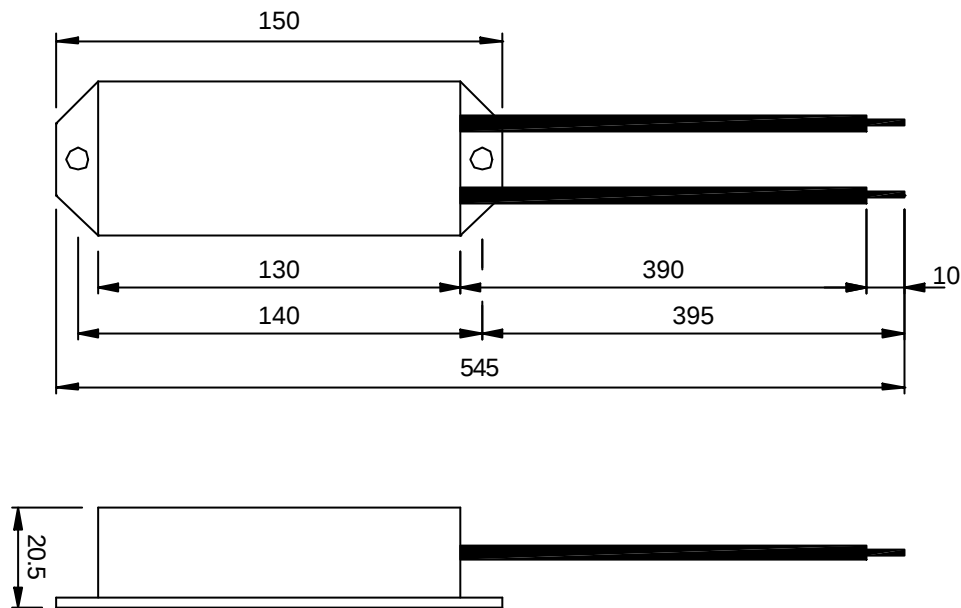
Operation :

Press panel  or  key to run, press  key to stop. Case of SPD1 and SPD2 list to below.

DI3(SPD1)	DI4(SPD2)	
OFF	OFF	1 st speed
ON	OFF	2 nd speed
OFF	ON	3 rd speed

12. APPENDIX

A. Optional Braking Resistor



Part no : E-MSAA-008000
Specification : 60 Ω 80W

Remove build-in dynamic brake resistor.

Connect a larger capacity resistor, the value should be greater than the table below:

Unit : Ohm

MODEL NO	120	200	400
MB2	60	60	60

B. EMC Solution

	AC INPUT (L1/L2)	Power CABLE FOR MOTOR (U, V, W)	MOTOR CABLE (SENSOR)
METHOD	AC source wire winding core 6 turns	Power Cable for motor winding core 2 turns	Motor Cable winding core 2 turns
CORE NUMBER	GL100 T49.1 x 33.8 x 15.9-C	KCF-130-B	KCF-130-B
MANUFACTURER	BIPOLAR	KING CORE	KING CORE

MEMO

INSTRUCTION MANUAL

PART NO : E-PHAA-EMHA02

Model : D310 series

DEC. 2019 2nd Edition

ISO 9001 



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