

Brushless Motor

## BU Series(AC Input) 30W/60W/120W

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### OPERATING MANUAL

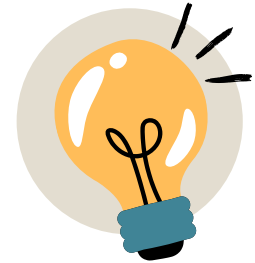
Thank you for your purchasing an LUYANG MOTOR product.

This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.



# INDEX



## **1 PRECAUTIONS 02~05**

- 1.1 Overall
  - 1.2 Usage Environment
  - 1.3 Installation Notes
  - 1.4 Assembling and Disassembling of the Gearbox
  - 1.5 Noise Countermeasures
  - 1.6 Operation
  - 1.7 Transportation and Storage
  - 1.8 Package Content
- 

## **2 MODEL DESCRIPTION 06**

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## **3 SPECIFICATIONS 07~10**

- 3.1 Motor
  - 3.2 Gearbox
- 

## **4 EXTERNAL VIEW 11~13**

- 4.1 Motor
  - 4.2 Motor gear set
  - 4.3 Driver
  - 4.4 Cable
- 

## **5 CONTROLLER AND MOTOR CONNECTION 13**

## **6 OPERATION INSTRUCTIONS 14~18**

- 6.1 Driver Functions
  - 6.2 Power lead wiring
  - 6.3 Output/input signal function descriptions
  - 6.4 Output/input signal wiring
- 

## **7 OPERATION 19~37**

- 7.1 Setting description
  - 7.2 Parameter mode descriptions
  - 7.3 Monitor mode
  - 7.4 Multi-stage mode
  - 7.5 Parameter mode
  - 7.6 Internal speed adjustment description
  - 7.7 Parameter setting description
  - 7.8 Output shaft rotation speed description
  - 7.9 Acceleration/deceleration time setting
  - 7.10 Gentle start and gentle stop settings
  - 7.11 Speed output
- 

## **8 ALARM CODE 38**

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## **9 MONITOR FONT 39**

# 1 Precautions

## 1.1 Overall

### Note before use

- This instruction manual provides operations and safety precautions for the product.
- This product must be used by qualified users with professional knowledge in motors and machineries.
- Make sure to read the instruction manual thoroughly and follow the warnings, notes and important items in the article.
- Please note that our company will not be responsible for any damages caused by failure to follow the warnings.

### Warning

- Please have personnel with appropriate qualifications perform the installation, wiring, operation and fault diagnosis operations.
- Do not use this product near explosive environments, environments with flammable gases, corrosive environments, locations easily exposed to water and flammable objects, otherwise it may cause fires or personal injuries.
- Do not perform moving, installing or wiring operations while power is connected, please disconnect the power and then perform these operations, otherwise it may cause fire or personal injuries.
- Do not use on lifting devices; once the protection function of the driver is activated, the motor will stop and the movable components will lower, and may result in personal injuries or equipment damages.
- When the driver protection function is activated, please eliminate the cause first and then release the protection function. Releasing the protection function before eliminating the cause may cause the motor to malfunction, and may result in personal injuries or equipment damages.
- Do not repair, modify or disassemble the product by yourself, as doing so may cause fire or result in personal injuries.

## 1.2 Usage Environment

### Note

To ensure that the functions of this product are normal, please use this product in locations with an ambient temperature of 0~+40°C (no freezing), ambient humidity of less than 85% (no condensing), altitude under 1000m, little electromagnetic noise, no explosive gases, no hazardous gases and liquids, no direct sunlight exposure and will not be stained by liquids.

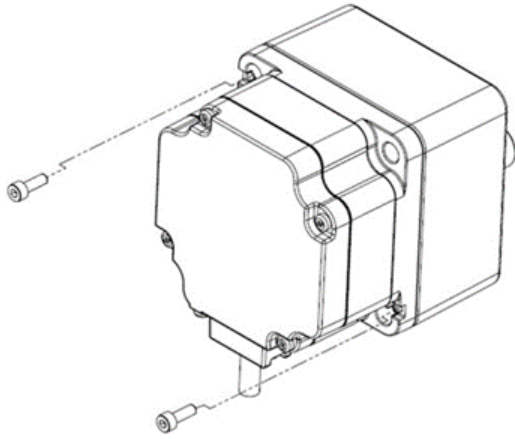
## 1.3 Installation Notes

### Note

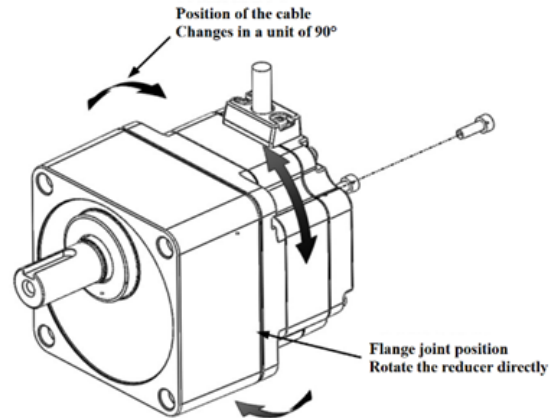
- The driver and the frame and other machines in the frame must be kept apart for 25mm or more horizontally and 50mm or more vertically, and do not place equipment with large amounts of heat dissipation or noise around them.
- The driver must be installed on a smooth metal place with good shock resistance; install the cover on the fixing hole with screws and nuts before dismounting the driver, and do not leave any gaps on the installation board.
- The motor and reducer should be installed at a location that is not easily accessible by personnel or protected with outer covers to avoid personal injuries from touching the rotating axis by accident.
- Please fix the driver, motor and reducer on the installation board properly, otherwise they may cause personal injuries if they fall.
- Please use DC power with reinforced insulation on the primary and secondary sides for the output/input signal power, otherwise it may cause electric shocks.
- Make sure to ground the grounding terminals of the driver and motor with the shortest distance, otherwise it may cause electric shocks.
- Please do not share the grounding terminal with the welding machine or high noise grounding terminal.
- Do not bend, tug or clamp the power cable with force, otherwise it may damage the cable and cause fire.
- Please install the load on the output shaft properly, otherwise it may cause personal injuries.
- The power input voltage of the driver must be controlled within the rated range, otherwise it may cause damage to the equipment or cause a fire.
- When replacing the driver or motor, the power must be disconnected and wait until the power light is completely off before replacing; otherwise it may cause electric shocks.

## 1.4 Assembling and Disassembling of the Gearbox

1. Remove the screws installed on the motor and the gearbox (two places)  
※ Do not separate the motor and the gearbox completely to avoid damaging the gears from improper assembly.



2. Make the motor and gearbox parallel, then slowly rotate the gearbox to the left and right and adjust it to the needed position, then assemble the screws (two places).



## 1.5 Noise Countermeasures

There are two types of noises, including the ones that enter the driver externally and cause the driver to malfunction, and the ones that are emitted externally from the driver that causes peripheral devices to malfunction.

### • Suppressing noises

- Use noise filters when relays and electromagnetic switches are used.
- Cover the driver with a metal plate such as aluminum. It can shield the noise emitted by the driver.

### • Preventing the spreading of noises

- Make sure that the power systems, such as the motor cable and power supply, are at least 10cm away from the signal cable, and do not tie them together.
- Please use 26AWG or above cables as the signal cable of the driver, and control the length within 3m.
- The motor cable must not be rolled or tied up, and should be wired within the shortest possible distance.
- Wind cables with noises around a ferrite core to prevent noises from entering the driver or be emitted from the driver.
- **EMC directive:** If effective measures are not taken for the noise emitted by the motor and driver to the surrounding control systems, it may cause severe interference to other devices.
- To suppress the impact of noise propagation, please use ferrite cores and install them around the driver and motor.
- In order to prevent noise from spreading externally through the power cable, users should prepare an AC wave filter and connect it onto the AC input cable.
- The suitability of EMC must be set according to the descriptions above, and users must confirm EMC compliance.

## 1.6 Operation

### Note

- Please set an emergency stop device or emergency stop circuit on the outside of the device to ensure the device can be in a safe status overall when failures or malfunctions occur; otherwise it may cause personal injuries.
- Please release all driver input signals before connecting the driver's power.
- Do not use the power “ON/OFF” switch directly to start or stop the motor.
- When using the motor, reducer or driver, do not exceed their rated specifications, otherwise it may damage the finished product.
- Do not touch the rotating parts while operating, otherwise it may cause personal injuries.
- The surface temperature may exceed 70°C while the driver and motor are operating normally. Please attach warning signs where people may approach.
- When abnormalities occur, please stop operating immediately and disconnect the driver power; otherwise, it may cause fire or personal injuries.
- Do not touch the motor or driver during operation or within one minute after stopping, as it may cause burns or electric shock.

## 1.7 Transportation and Storage

### Note

- Do not transport the product by holding the output shaft and power cable of the motor (reducer) to prevent it from falling or getting damaged.
- Place this product in the package box provided when storing it.
- Please store this product at a location with an ambient temperature of -20~+70°C (no freezing), ambient humidity of under 85% (no condensing), altitude of under 3000m, no direct sunlight exposure, a little salt and well ventilated.

## 1.8 Package Content

### Note

- Driver..... 1 unit
- Motor or Reducer Motor.....1 unit
- Operating Manual.....1 booklet
- Installation Screw Set.....1 set

※Actual package contents are subject to the order specifications.

# 2 Model Description



## INDICATION OF MOTOR

6	BU	030	GB	-	A	30	<input type="checkbox"/>
DIMENSION	TYPE	OUTPUT	MOTOR SHAFT	VOLTAGE	RATED SPEED	Protection	
6: 60mm 8: 80mm 9: 90mm	BU: BU Brushless motor	030: 30W 060: 60W 120: 120W	A: Round shaft GB: Helical gear shaft	A: AC100~240V	30: 3000RPM	<input type="checkbox"/> : IP40 standard (not shown)	

## INDICATION OF DRIVER

BUD	030	-	C	<input type="checkbox"/>
TYPE	OUTPUT	POWER	INPUT VOLTAGE	FUNCTION
BUD: BU driver	030: 30W 060: 60W 120: 120W	A: Single-phase AC100~120V C: Single-phase/Three-phase AC200~240V		<input type="checkbox"/> : Standard (not shown)

## INDICATION OF GEAR BOX

6	GB	5
DIMENSION	TYPE	RATIO
6: 60mm 8: 80mm 9: 90mm	GB: Helical gearbox	5: 1/5

## INDICATION OF CONNECTION CABLE

CL	010	<input type="checkbox"/>	BU	<input type="checkbox"/>	
CABLE	LENGTH	CONNECTOR	TYPE	SERIES	FUNCTION
CL: Connection cable	010: 1m 020: 2m	<input type="checkbox"/> : Standard (not shown)		BU: BU series	<input type="checkbox"/> : Standard (not shown)

※Gearbox ratio 5, 10, 15, 20, 30, 50, 100

# 3 SPECIFICATION

## 3.1 Motor

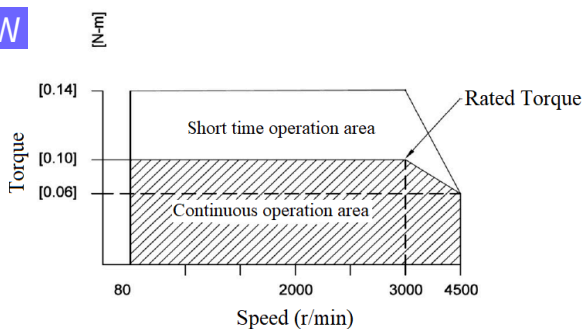
30(W)	Model of motor		6BU030GB(A)-A30			
	Model of driver		BUD030-A	BUD030-C		
	Power input voltage	Rated voltage (V)	Single-phase AC110V	Single-phase AC220V	Three-phase AC 220V	
		Voltage tolerance	±15%			
		Frequency (Hz)	50/60			
		Frequency tolerance	±5%			
		Rated input current (A)	0.86	0.51	0.32	
		Max. input current (A)	2.0	1.2	0.75	
	Rated output (W)		30			
	Motor rated speed (r/min)		3000			
	Speed control range (r/min)		80~4500			
	Speed change rate		±0.2%			
	Motor rated torque (N-m)		0.10			
	Motor peak torque (N-m)		0.14			
	Rotor inertia (J= X 10 kg · m <sup>2</sup> )		0.087			
Allowable load moment of inertia (J= X 10 kg · m <sup>2</sup> )		1.8				
Motor insulation level		B				
Waterproof and dustproof grade		Motor IP40 , Driver IP20				

60(W)	Model of motor		8BU060GB(A)-A30			
	Model of driver		BUD060-A	BUD060-C		
	Power input voltage	Rated voltage (V)	Single-phase AC110V	Single-phase AC220V	Three-phase AC 220V	
		Voltage tolerance	±15%			
		Frequency (Hz)	50/60			
		Frequency tolerance	±5%			
		Rated input current (A)	1.48	0.82	0.50	
		Max. input current (A)	3.3	1.9	1.1	
	Rated output (W)		60			
	Motor rated speed (r/min)		3000			
	Speed control range (r/min)		80~4500			
	Speed change rate		±0.2%			
	Motor rated torque (N-m)		0.19			
	Motor peak torque (N-m)		0.29			
	Rotor inertia (J= X 10 kg · m <sup>2</sup> )		0.23			
	Allowable load moment of inertia (J= X 10 kg · m <sup>2</sup> )		3.3			
Motor insulation level		B				
Waterproof and dustproof grade		Motor IP40 , Driver IP20				

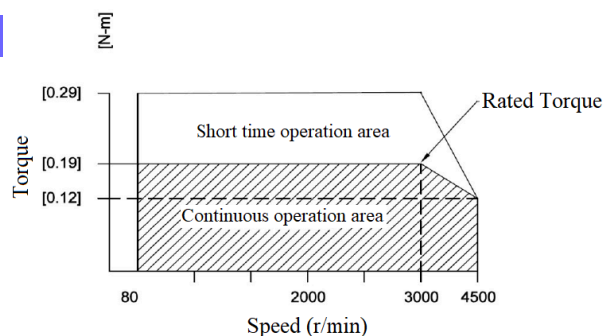
120(W)	Model of motor		9BU120GB(A)-A30		
	Model of driver		BUD120-A	BUD120-C	
	Power input voltage	Rated voltage (V)	Single-phase AC110V	Single-phase AC220V	Three-phase AC 220V
		Voltage tolerance	±15%		
		Frequency (Hz)	50/60		
		Frequency tolerance	±5%		
		Rated input current (A)	2.33	1.41	0.81
		Max. input current (A)	6.8	4.1	2.0
	Rated output (W)		120		
	Motor rated speed (r/min)		3000		
	Speed control range (r/min)		80~4500		
	Speed change rate		±0.2%		
	Motor rated torque (N-m)		0.38		
	Motor peak torque (N-m)		0.57		
	Rotor inertia (J= X 10 kg · m <sup>2</sup> )		0.61		
Allowable load moment of inertia (J= X 10 kg · m <sup>2</sup> )		5.6			
Motor insulation level		B			
Waterproof and dustproof grade		Motor IP40 , Driver IP20			

## Torque Characteristics

30W

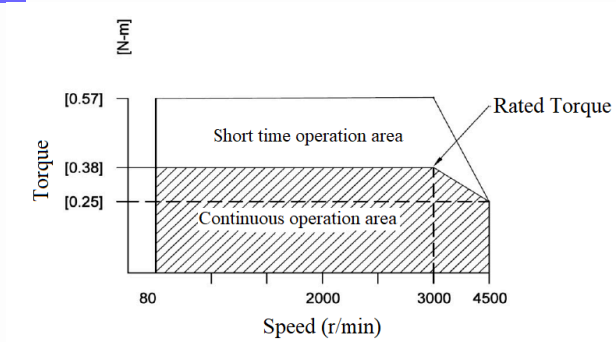


60W



# Torque Characteristics

120W



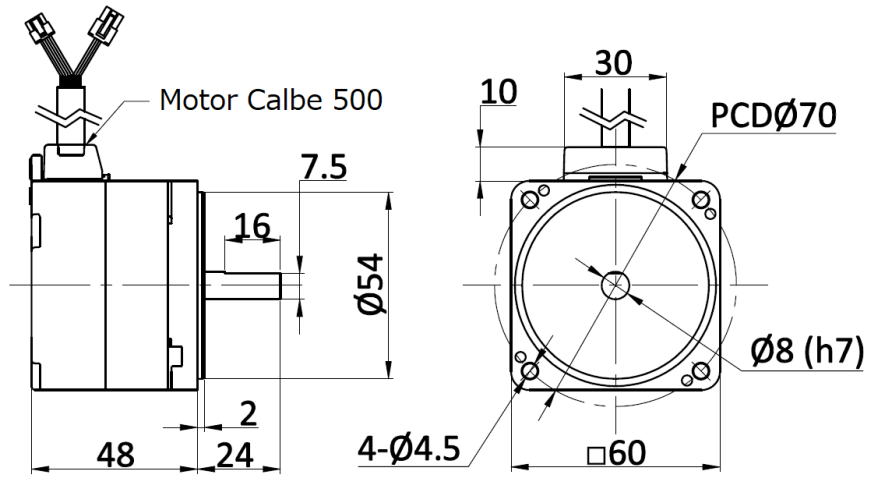
## 3.2 Gearbox

Gearbox			5	10	15	20	30	50	100
Output speed (r/min)	3000r/min		600	300	200	150	100	60	30
Allowable torque (N.m)	30W	80~3000r/min	0.42	0.83	1.26	1.65	2.43	3.98	6.00
		4500r/min	0.29	0.59	0.87	1.17	1.71	2.79	4.86
	60W	80~3000r/min	0.83	1.65	2.52	3.30	4.75	7.95	16.00
		4500r/min	0.59	1.17	1.71	2.34	3.33	5.58	11.16
	120W	80~3000r/min	1.65	3.30	5.04	6.69	9.60	15.91	30.00
		4500r/min	1.17	2.34	3.51	4.68	6.66	11.07	22.23
Allowable hanging load (N)	30W	10mm from the front end of the output shaft	100	150			200		
	60W		200	300			450		
	120W		300	400			500		
	30W	20mm from the front end of the output shaft	150	200			300		
	60W		250	350			550		
	120W		400	500			650		
Allowable thrust load (N)	30W		40						
	60W		100						
	120W		150						
Running direction			Same direction as motor				Opposite direction to the motor		

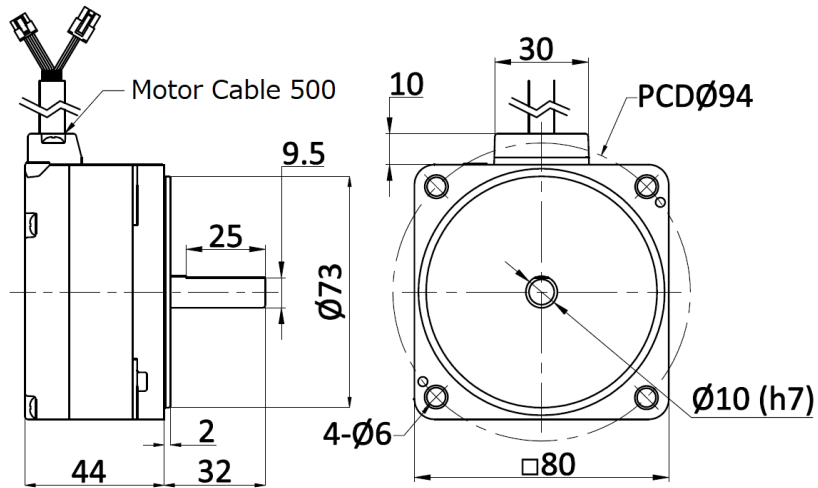
# 4 External View

## 4.1 Motor

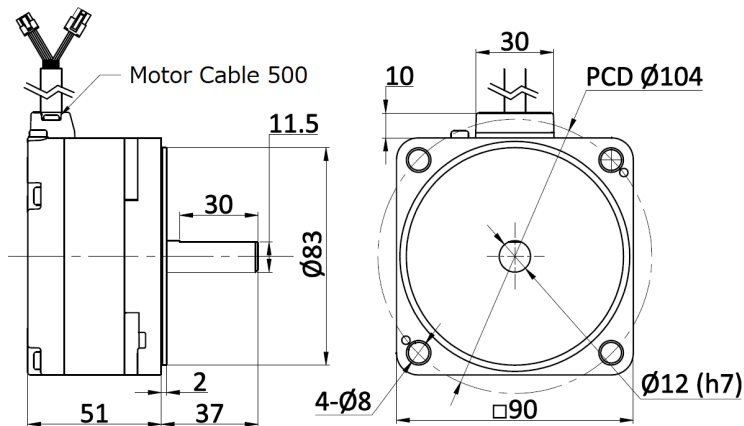
30W



60W



120W

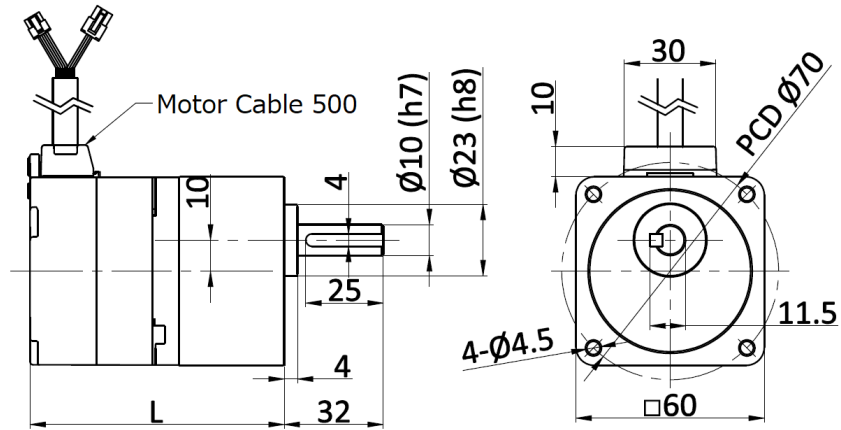


Unit:mm

## 4.2 Motor gear set

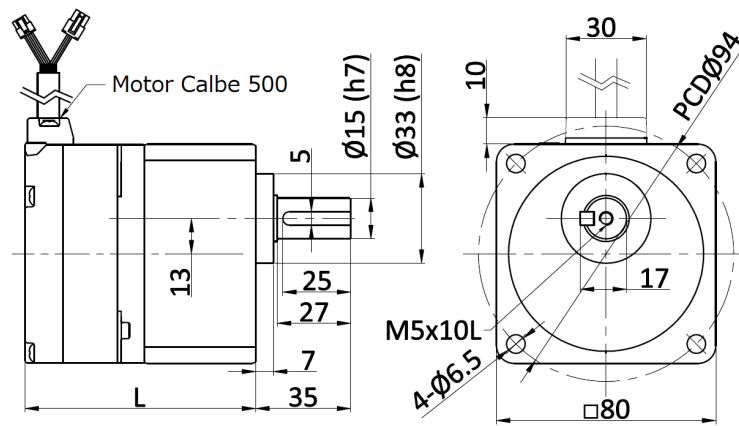
30W

Ratio	L
5~20	82
30~100	86



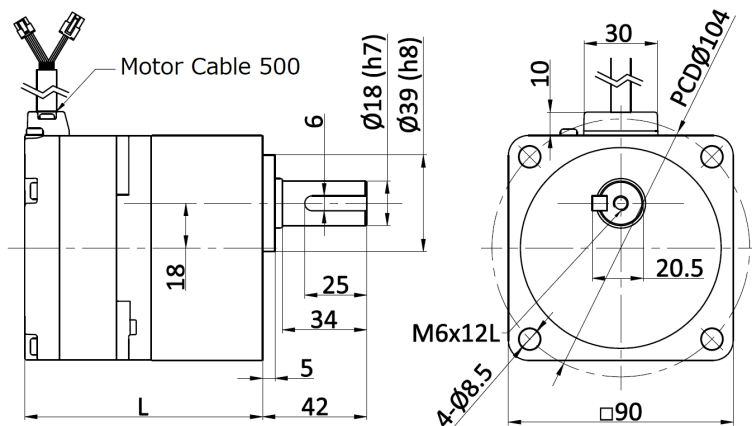
60W

Ratio	L
5~20	85
30~100	90



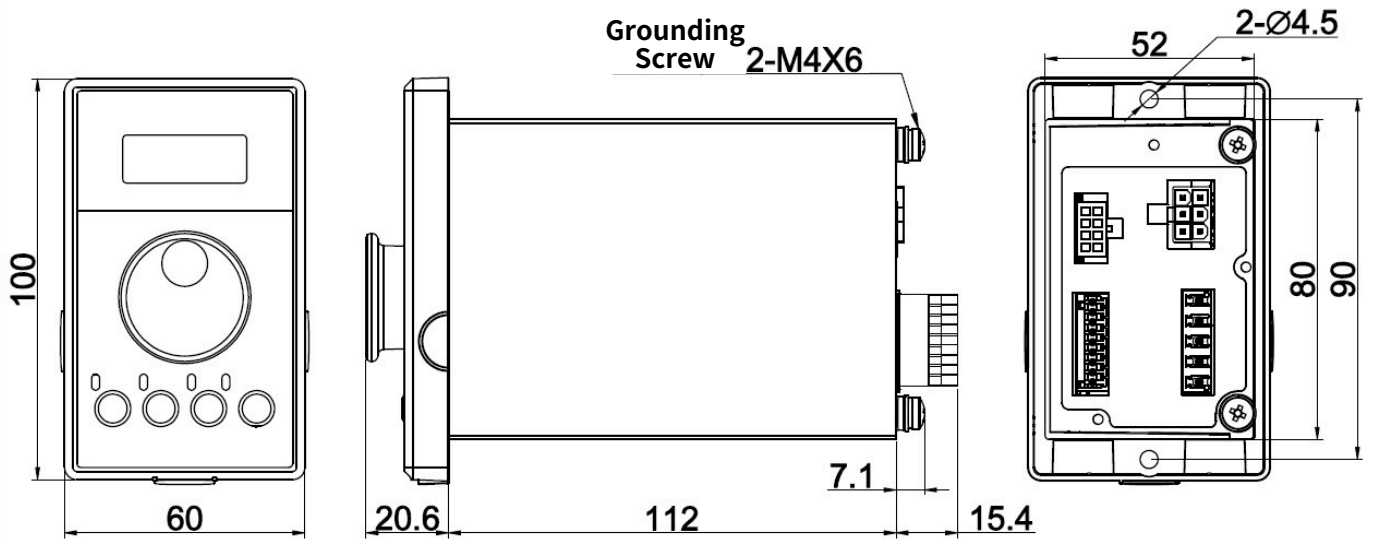
120W

Ratio	L
5~20	96
30~100	109

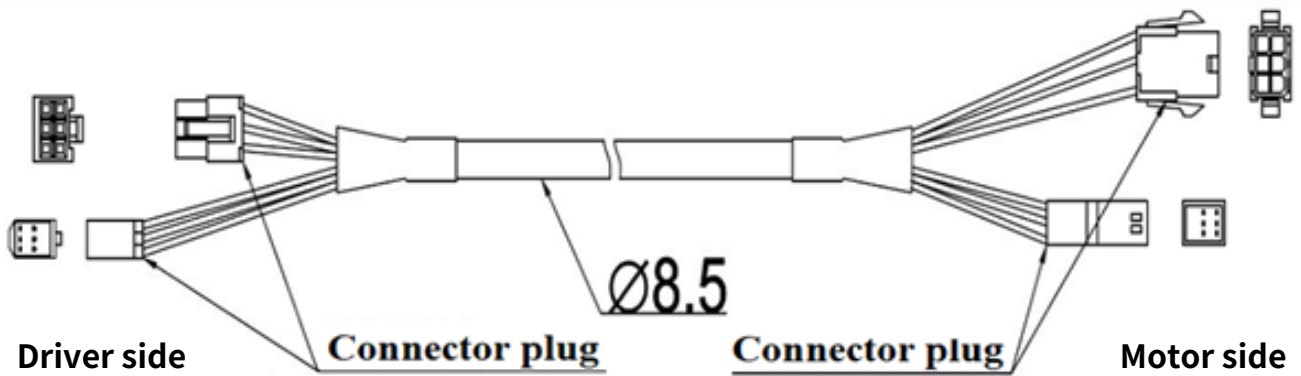


Unit:mm

## 4.3 Driver

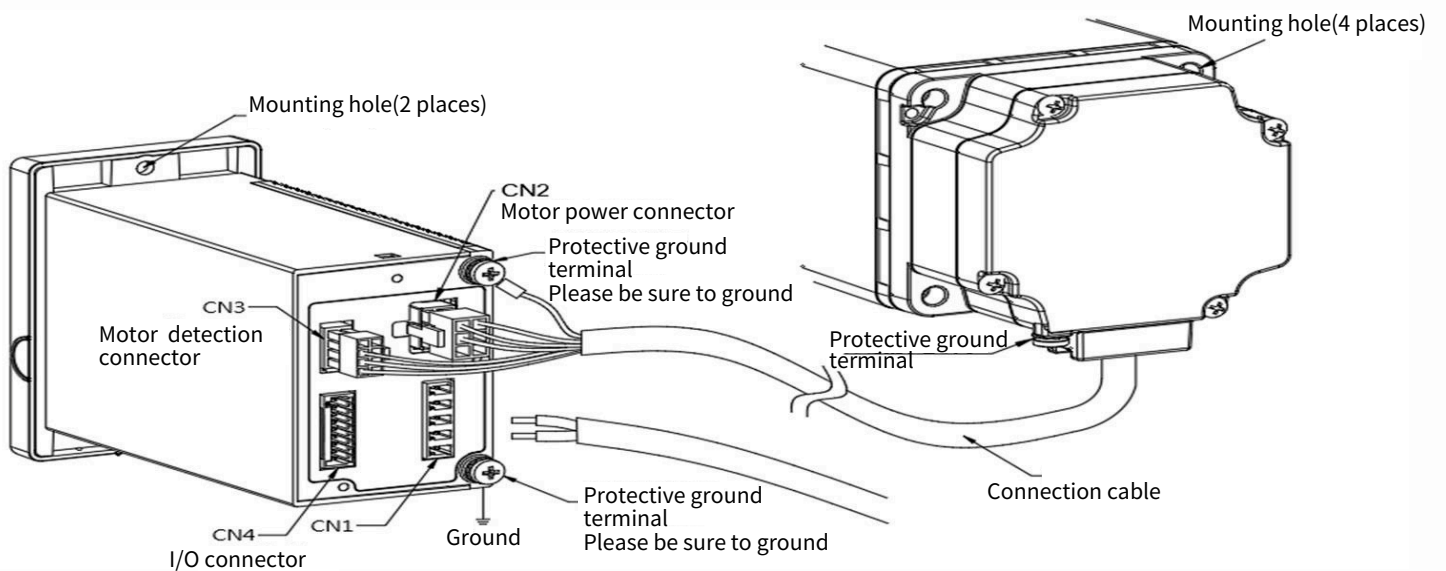


## 4.4 Cable



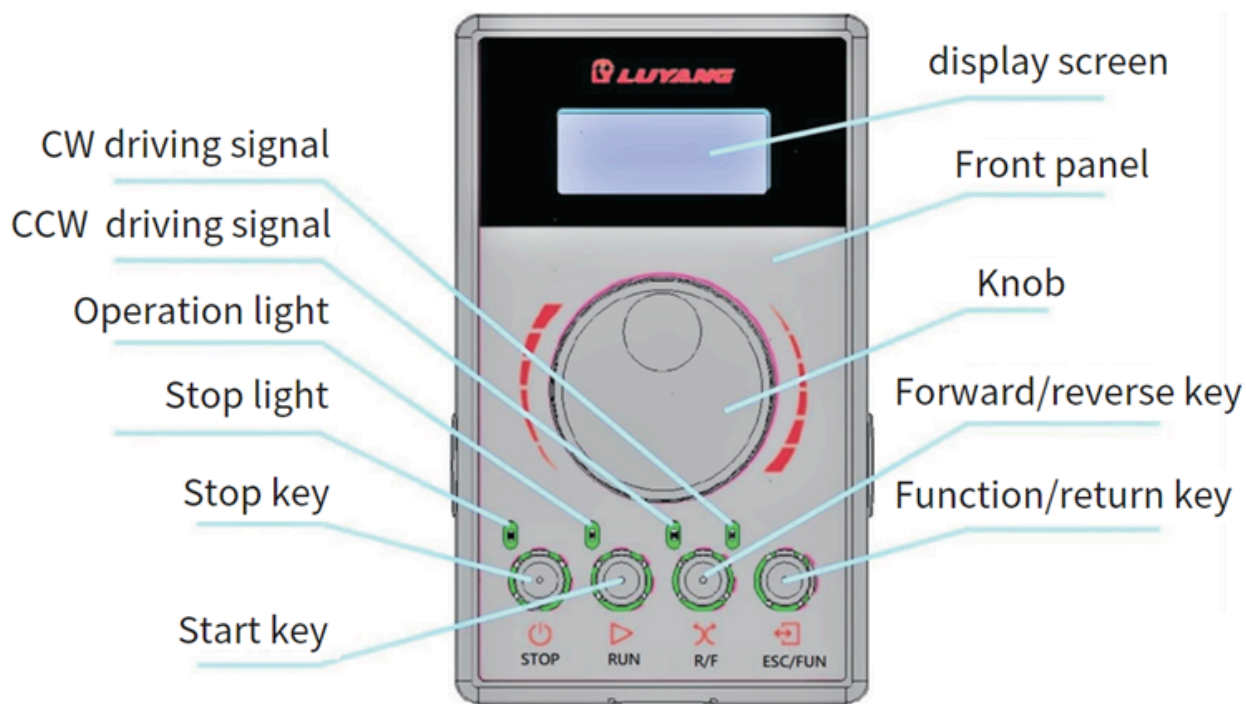
Unit:mm

## 5 Controller and Motor Connection

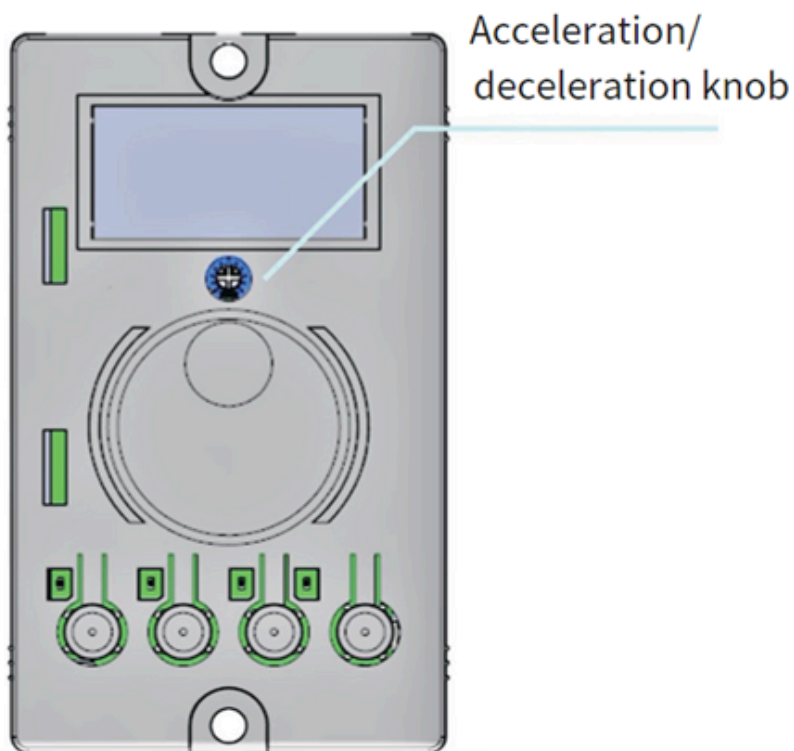


# 6 Operation Instructions

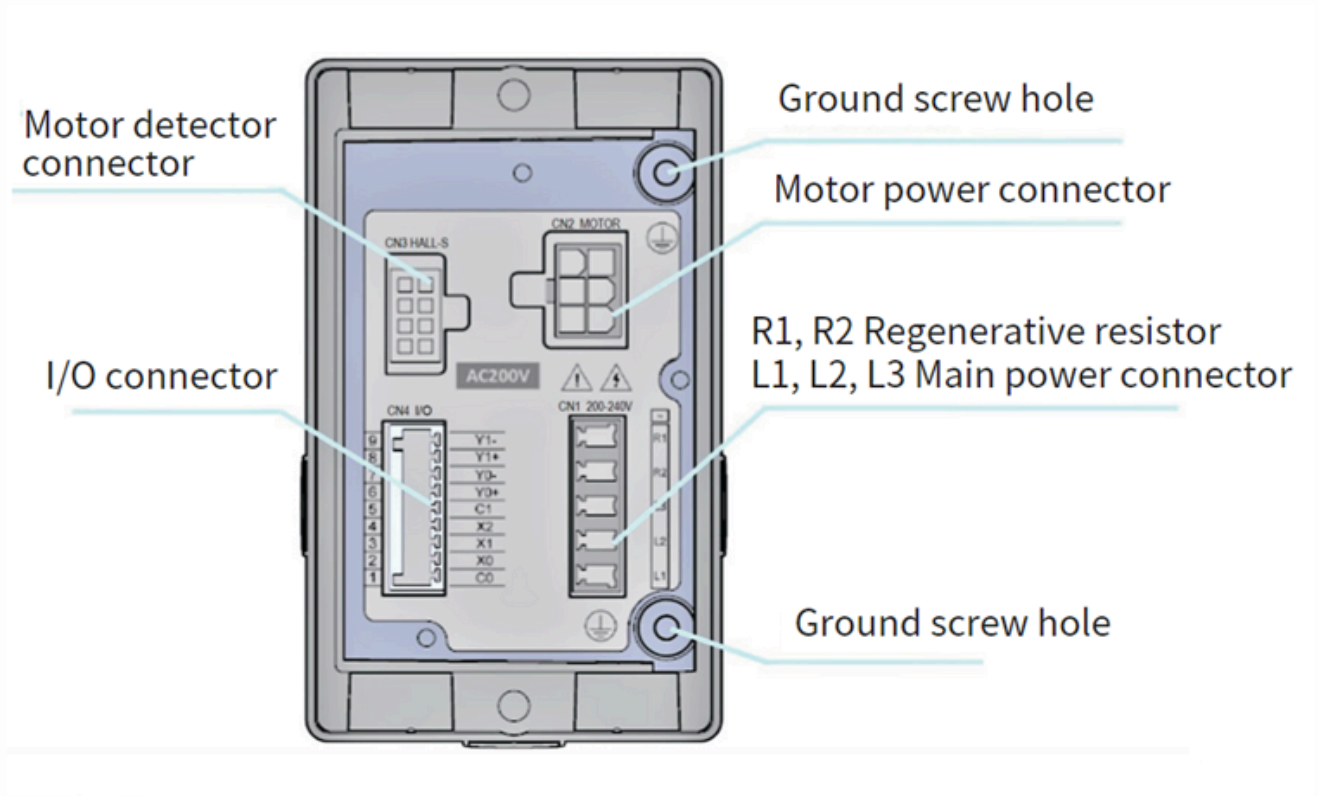
## 6.1 Driver Functions



Driver front panel (with front cover)



Driver front panel (without front cover)



Back Side of Driver

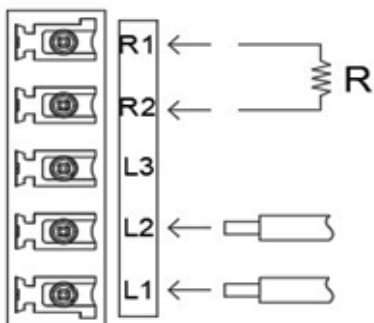
Operation mode	Content
Monitoring mode	Operation status, load rate, number of operation stages, alarm, I/O monitoring, master power voltage, operation amount count value, total operation amount, driver temperature
Multi-stage mode	Operation data 4 stage Rotation speed, torque limit, acceleration/deceleration time
Parameter mode	Speed input mode, operation mode, acceleration/deceleration ratio, number of digits in deceleration ratio, gentle start/stop, stop holding mode, motor speed upper/lower limit, acceleration/deceleration time hardware/software mode, acceleration/deceleration time software setting, torque limit, panel initial display, I/O mode setting, alarm mode, restore factory setting, etc.

※Please refer to parameter mode for details

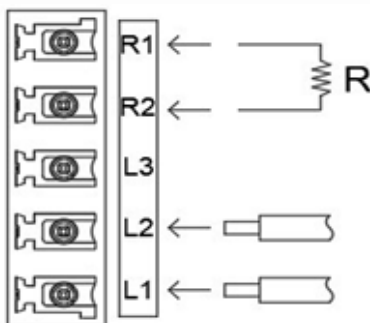
## 6.2 Power lead wiring

	Connection method
Single phase 110V	Connect the power to L1 and L2 respectively
Single phase 220V	Connect the power to L1 and L2 respectively
Three phase 220V	Connect the R phase, S phase and T phase of the power to L1, L2 and L3 respectively
Regenerative resistor	Connect to R1 and R2 respectively

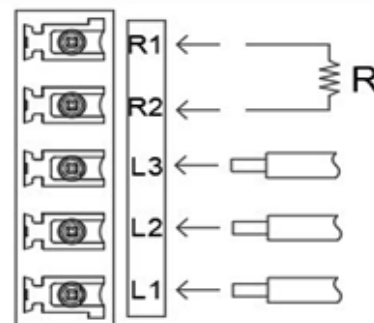
### • Single phase 110V



### • Single phase 220V



### • Three phase 220V



※The wire diameter of the power lead cable must be more than 18AWG.

## 6.3 Output/input signal function descriptions

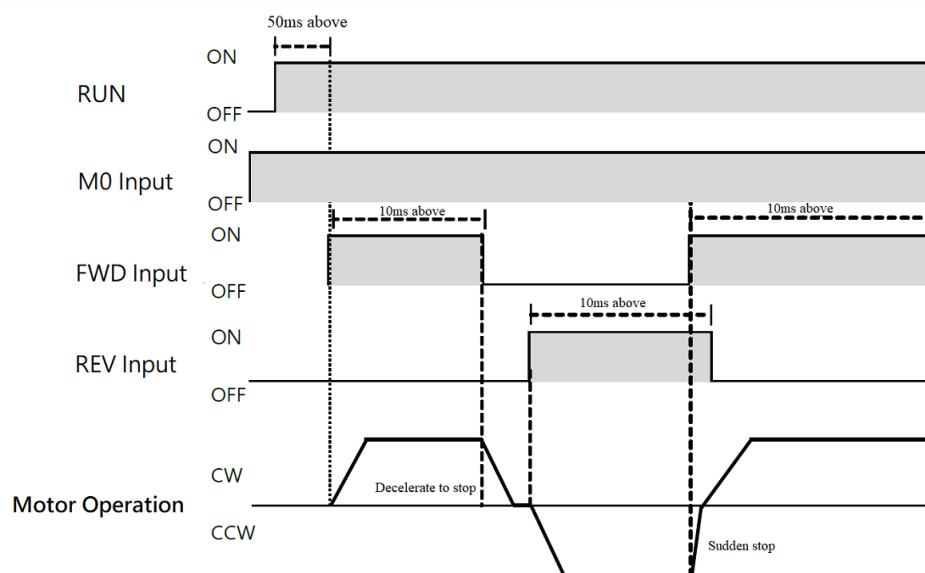
Pin No.	Terminal name	※Default value	Description	Voltage range	Pin No.
9	Y1	[ ALARM OUT ]	OUT-1	Will be OFF when ALARM occurs	DC 5 ~ 30V Current under 10mA
8	Y1+				
7	Y0-	[ SPEED OUT ]	OUT-0	The motor output shaft outputs 30 pulse signals per revolution	
6	Y0+				
5	C1	C1		0V (for internal power use)	DC 0V
4	X2	[ FWD ]	IN-2	When [ON], the motor rotates in the FWD direction	DC 10 ~ 30V Current under 10mA
3	X1	[ REV ]	IN-1	When [ON], the motor rotates in the REV direction	
2	X0	[ M0 ]	IN-0	When [OFF], the motor rotates according to the SP.1 mode	
1	C0	C0		Input signal common contact (for external power use)	
					COM

※[ ] is the factory setting.

※The wire diameter of the output/input signal cable must be more than 26AWG.

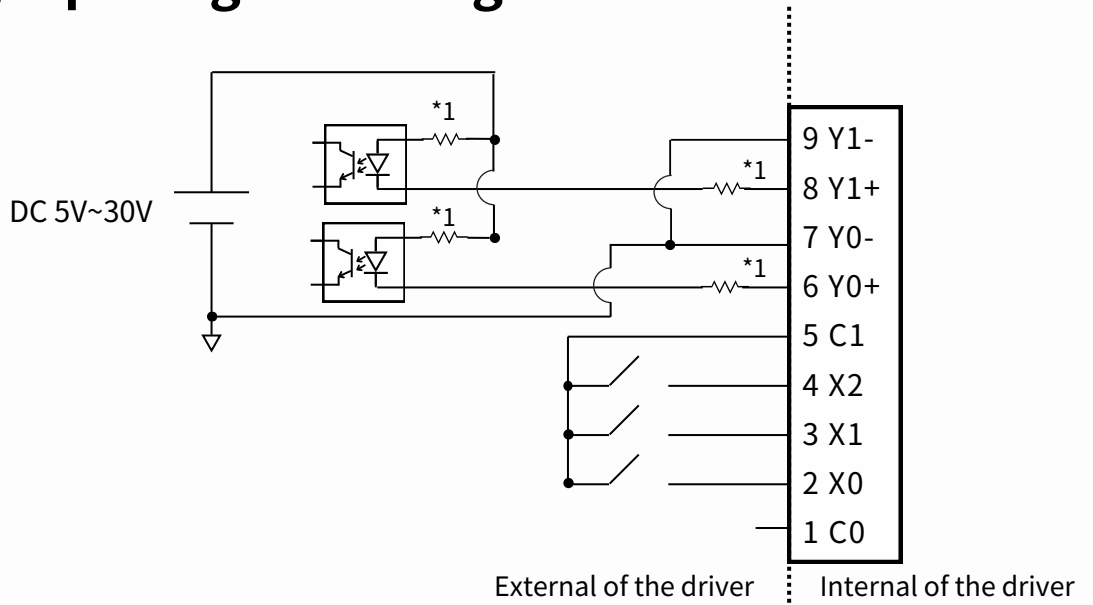
※3 sets of inputs (X0~X2) and 2 sets of outputs (Y0~Y1) can be assigned from the following signals.  
 11 sets of relative input signals : Unused 、 STOP\_MODE 、 FWD 、 REV 、 START/STOP 、 RUN/BRAKE 、 CCW/CW 、 M0 、 M1 、 ALARM\_RESET 、 EMERGENCY\_SWITCH.

6 sets of relative output signals : SPEED\_OUT 、 ALARM\_OUT , MOVE 、 VA 、 DIR 、 TRAV.

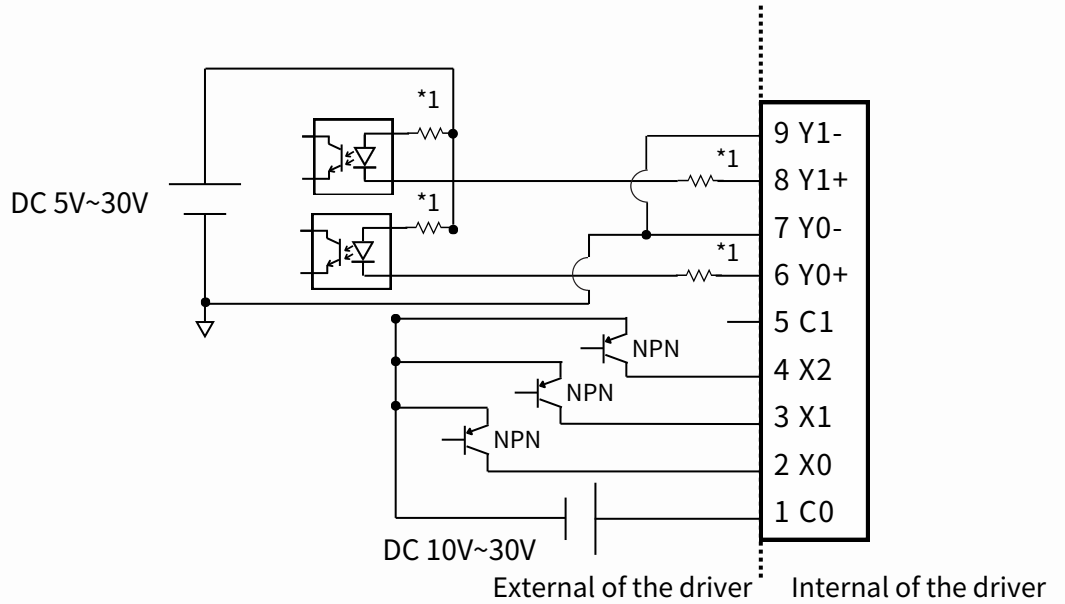


# 6.4 Output/input signal wiring

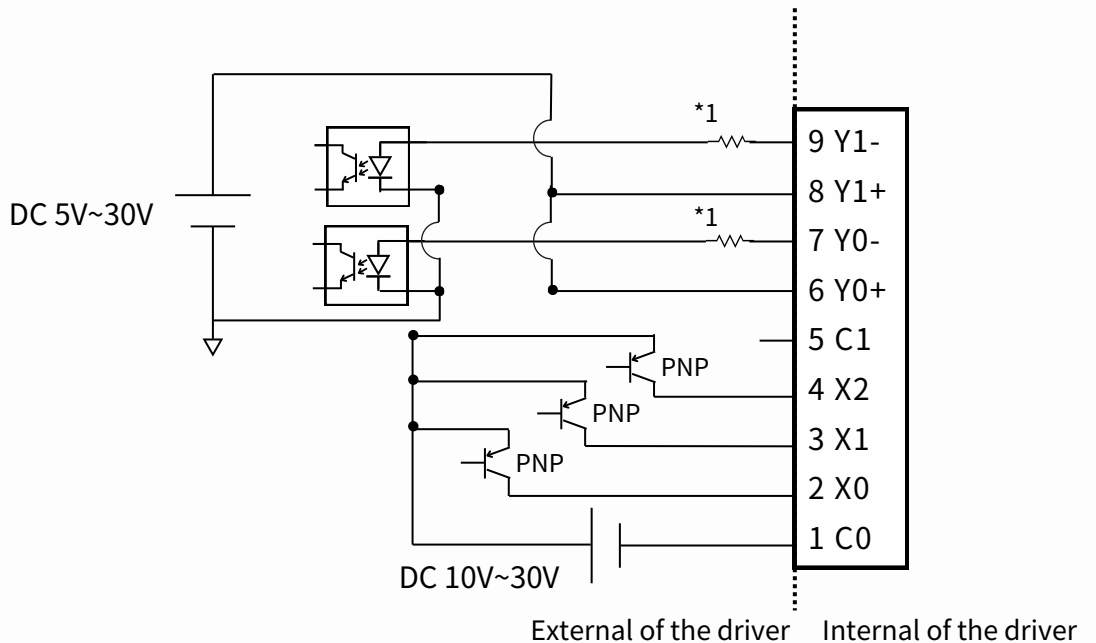
**Sink circuit  
(internal power)**



**Sink circuit  
(external power)**



**Source circuit  
(external power)**



# 7 Operation

## Warning

- Do not use ON/OFF on the power to start and stop the operation of the motor. Make sure to use the RUN/STOP input and input terminals X0, X1, X2 to do so, otherwise it may cause fire or personal injuries.

## Note

- Please place the input signals at least 10ms apart, otherwise it may cause the motor to malfunction.
- The greater the friction load or inertia load, or the more frequent the starting-sudden stopping-reverse operation is, the faster the temperature of the motor rises. Please keep the surface temperature of the motor under 90°C, and the temperature of the driver's radiating plate must also be kept under 90°C.

## 7.1 Setting description

### Icon description



Operate button.  
Press and the motor will start operating.  
Speed mode and monitoring mode are valid.



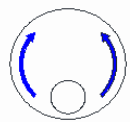
Stop button.  
Press and the motor will stop operating.



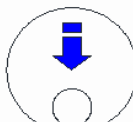
Rotation direction button.  
Press to switch the rotation direction of the motor.



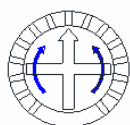
Function/Return button.  
Press to enter the function parameter setting area or return to the previous stage.



Knob.  
Rotate to perform data selection.  
Turn the knob quickly and the amount of change will become larger.



button.  
Press to perform setting for the selected data.



Acceleration/deceleration rate knob.  
Rotate to adjust the acceleration/deceleration time of the motor.



Information, parameter, value display.  
Displayed characters do not flash.



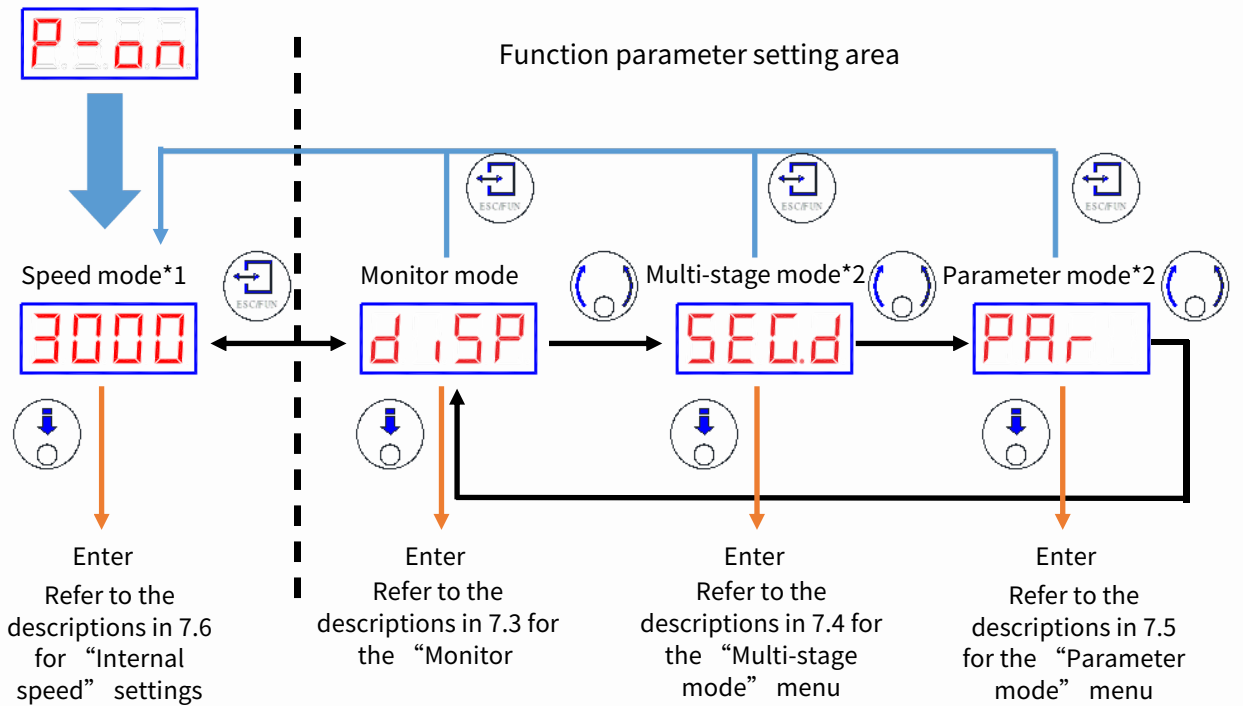
Parameter value selection.  
Displayed characters flash at low frequency.



Save value setting.  
Displayed characters flash rapidly.

# 7.2 Parameter mode descriptions

Mode menu



\*1 : The operation status shows the actual number of revolutions of the motor.

Stop status

Shows the motor revolution number setting

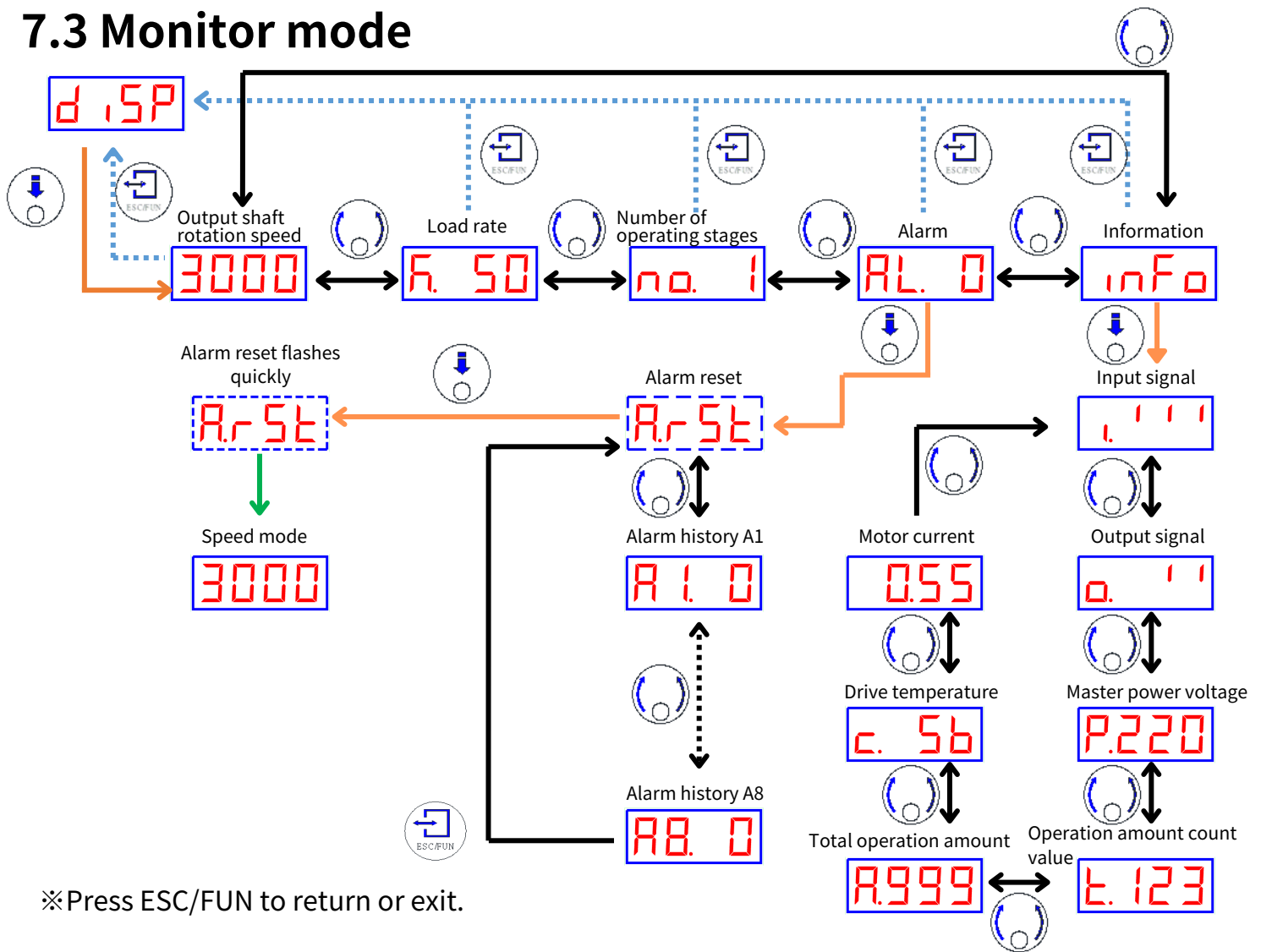
when the HOLD parameter is set as N/A

Shows when the HOLD parameter is set as MCLK

Lock

\*2 : Cannot operate under this mode, and cannot enter this mode while the motor is operating.

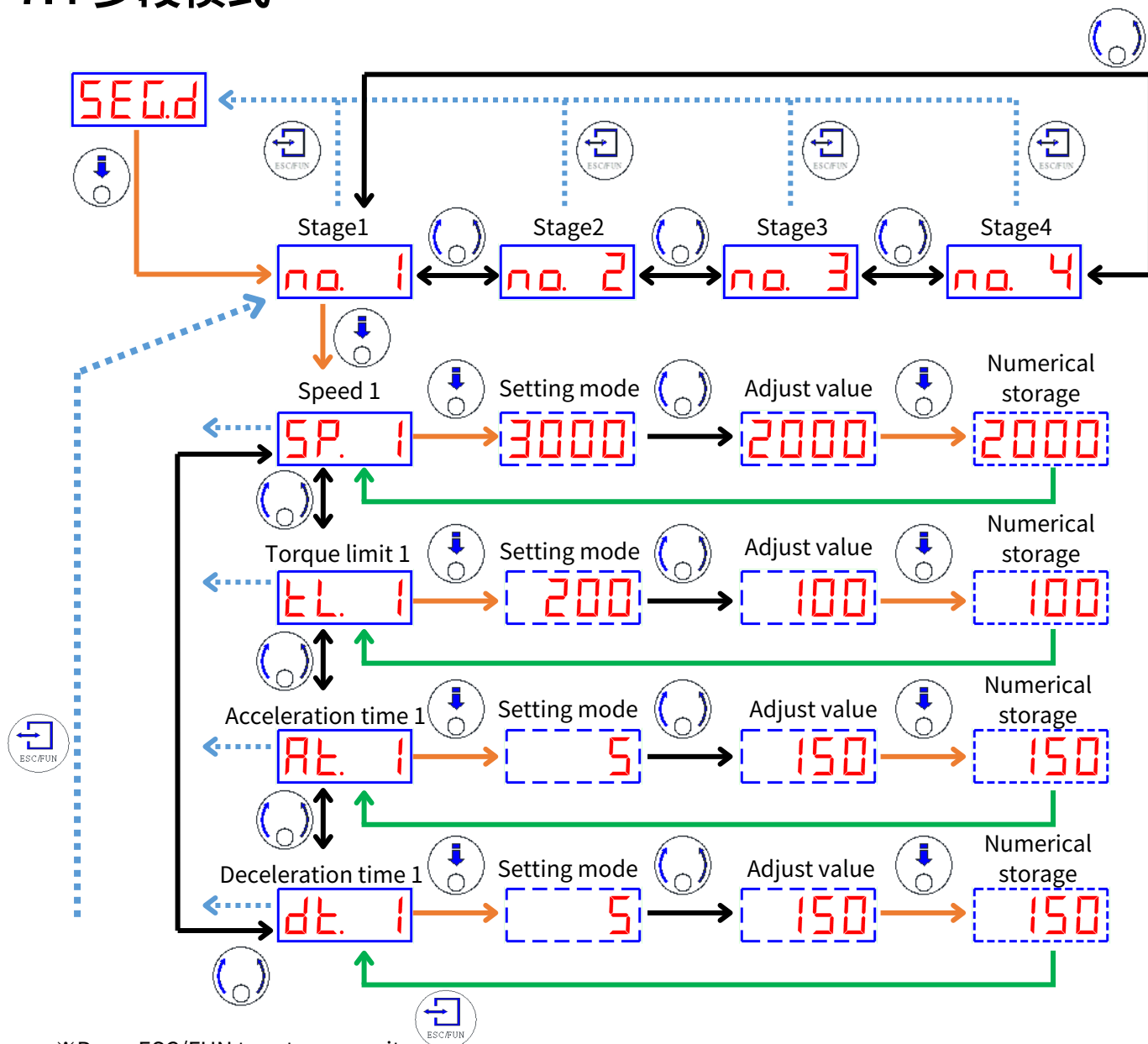
# 7.3 Monitor mode



※ Press ESC/FUN to return or exit.

Item	Display	Monitor content
Output shaft rotation speed	3000	<ul style="list-style-type: none"> <li>Shows the rotation speed of the reducer output shaft or the conveyor belt speed when setting the “Deceleration ratio” parameter.</li> <li>Shows the rotation speed after accelerating through external mechanisms when setting the “Acceleration ratio” parameter.</li> <li>Refer to 7.8 rotation speed display</li> </ul>
Load rate	R. 50	<ul style="list-style-type: none"> <li>Shows the load rate of the motor; the rated torque shows as 100%</li> </ul>
Number of operating stages	no. 0	<ul style="list-style-type: none"> <li>Shows the stage of the selected operation</li> </ul>
Alarm	AL. 0	<ul style="list-style-type: none"> <li>Shows the code of the alarm occurred, and resetting of the alarm and confirmation of the alarm history can be executed. Please refer to “8. Abnormality code” for the alarm code type</li> </ul>
Information	inFo	<ul style="list-style-type: none"> <li>Shows the output/input signal; refer to the figure to the right</li> <li>Shows the power input voltage</li> <li>Shows the operation amount count value</li> <li>Shows to total operation amount</li> <li>Shows the power module temperature</li> <li>Display motor current</li> </ul> <div style="text-align: right;"> </div>

## 7.4 多段模式



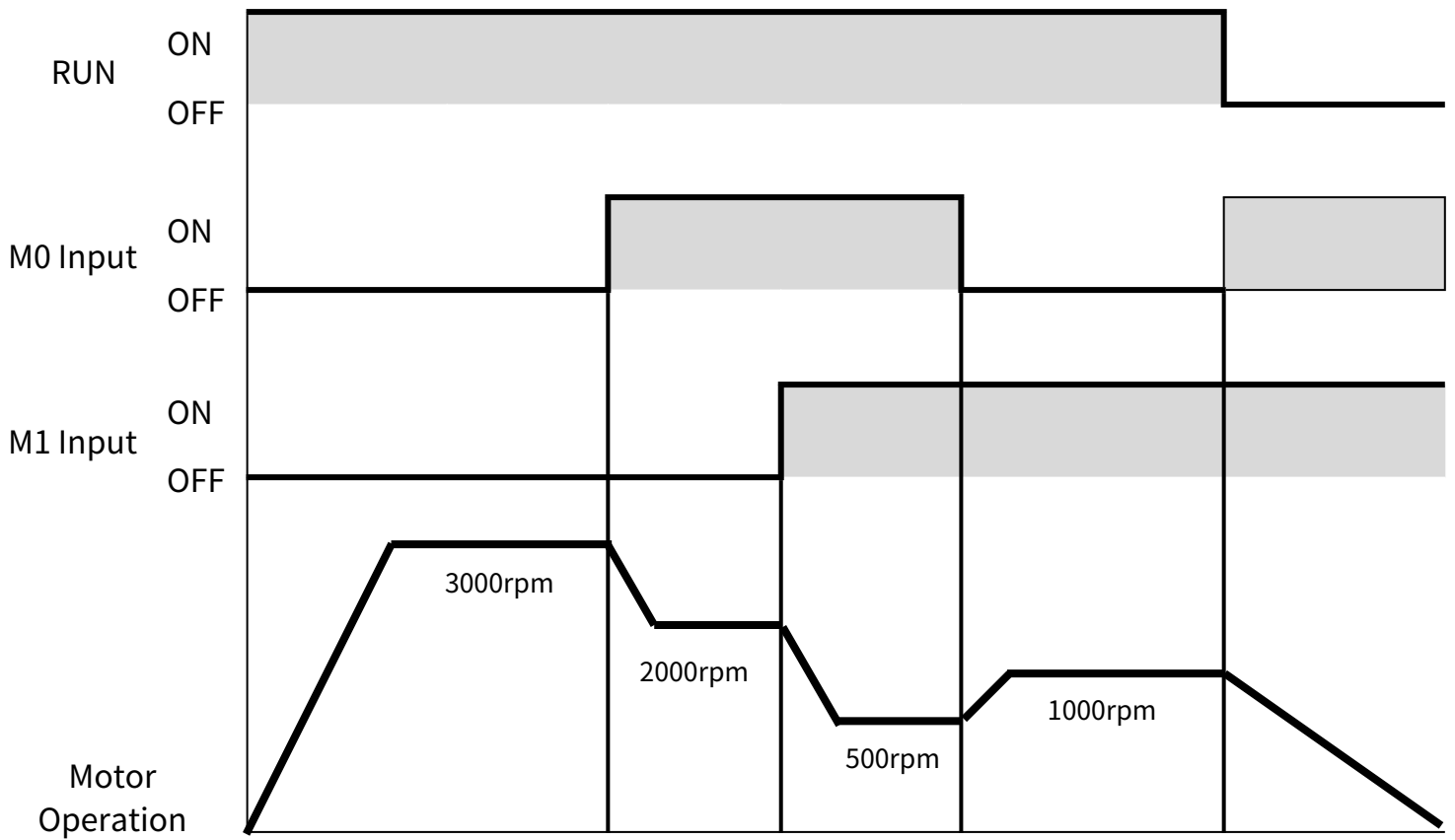
※ Press ESC/FUN to return or exit

※ While using multi-stage speed, switch between M0, M1 and input to perform multi-stage operation.

### Multi-stage mode description

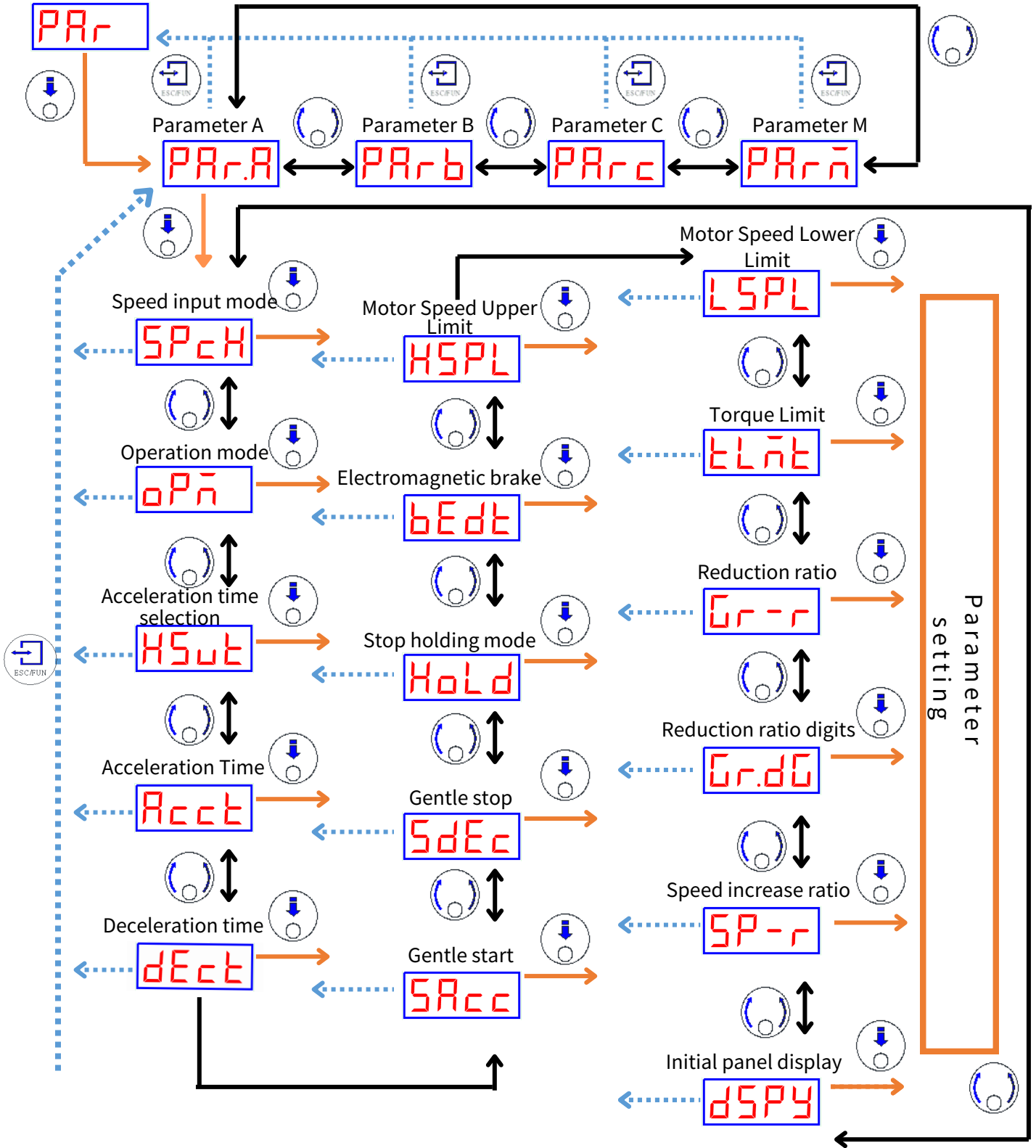
Item	Display	Range	Unit	Default	Multi-stage mode content
Stage number	no. 1	1~4			• Stages 1~4 can be set for the stage number
Speed	SP. 1	80~6000	RPM	3000	• Refer to the HSPL and LSPL parameter settings for the upper limit and lower limit of the speed settings
Torque limit	TL. 1	0~300	%	200	• 0~300% can be set for the torque limit , the rated torque shows as 100%
Acceleration time	AT. 1	2 ~ 150	100ms	5	• 2~150 (0.2~15 sec) can be set for the acceleration time
Deceleration time	dt. 1	2 ~ 150	100ms	5	• 2~150 (0.2~15 sec) can be set for the deceleration time

Operation data	M0	M1	Speed
SP. 1	OFF	OFF	3000
SP. 2	ON	OFF	2000
SP. 3	OFF	ON	1000
SP. 4	ON	ON	500



# 7.5 參數模式

PAR.A 參數



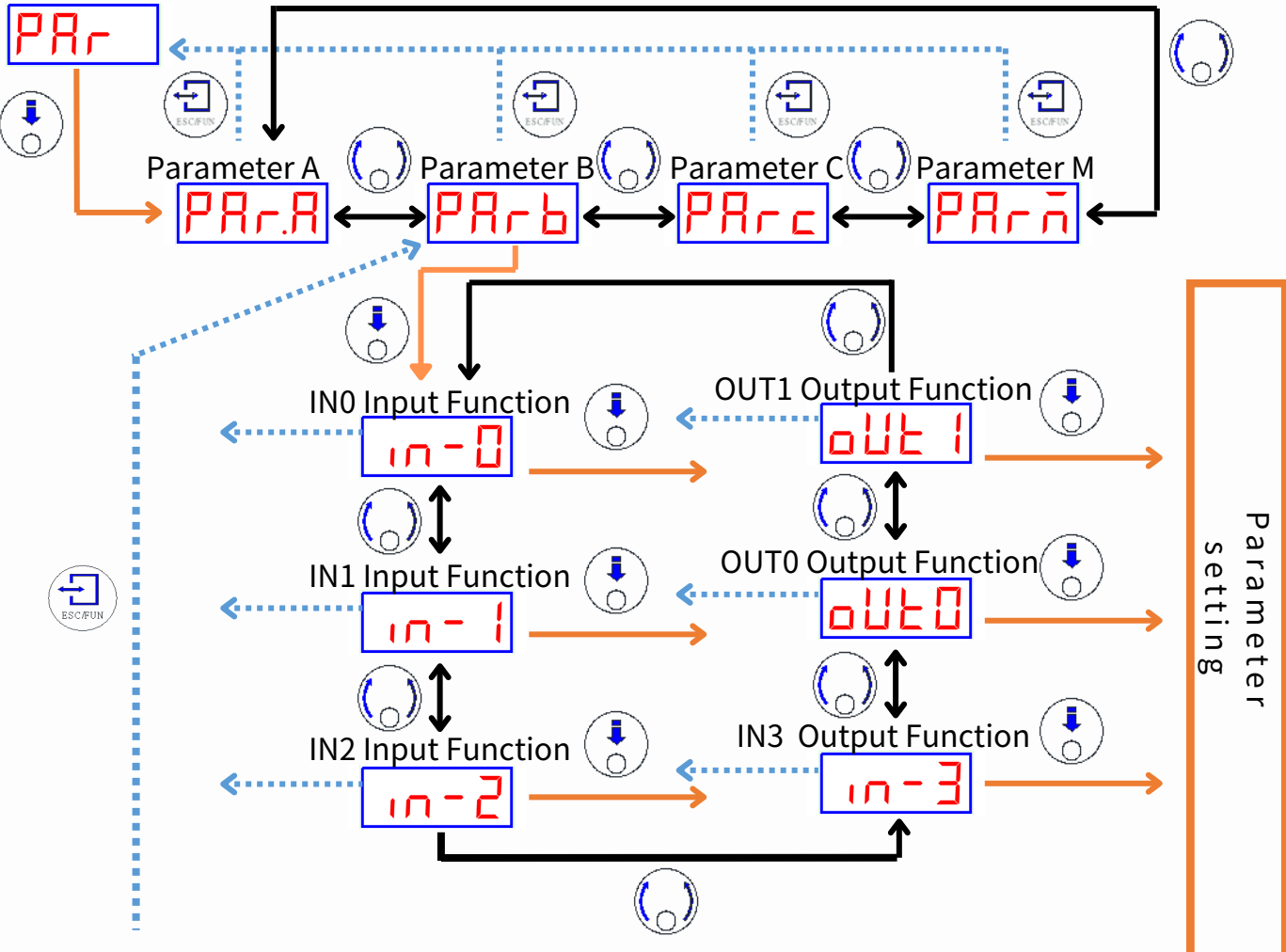
## PAR.A parameter description

Code	Parameter name	Range	Unit	Default	Description
SPCH	Speed input mode	0~1		0	0: Internal speed (panel control) 1: M0~M1 multi-stage speed (I/O control, parameter setting)
OPM	Operation mode	0~2		0	0: Panel operation (RUN, STOP, F/R) 1: I/O operation (FWD, REV) 2: I/O operation (START/STOP, RUN/BRAKE, CCW/CW)
HSVT	Acceleration/deceleration time setting selection	OPVR PRMT		OPVR	OPVR : Hardware setting (acceleration/deceleration rate knob) PRMT : Software setting (ACCT, DECT, AT, DT)

## PAR.A parameter description

Code	Parameter name	Range	Unit	Default	Description
ACCT	Acceleration time	1 ~ 150	100ms	5	Internal speed, refer to 7.8.
DECT	Deceleration time	1 ~ 150	100ms	5	Internal speed, refer to 7.8.
SACC	Gentle start	0 ~ 5		0	0~500rpm acceleration rate Refer to 7.9 0 : Disable 1 : Mode 1 (ACCT*2) 2 : Mode 2 (ACCT*4) 3 : Mode 3 (ACCT*8) 4 : Mode 4 (ACCT*16) 5 : Mode 5 (ACCT*32)
SDEC	Gentle stop	0 ~ 5		0	500~0rpm deceleration rate Refer to 7.9 0 : Disable 1 : Mode 1 (DECT*2) 2 : Mode 2 (DECT*4) 3 : Mode 3 (DECT*8) 4 : Mode 4 (DECT*16) 5 : Mode 5 (DECT*32)
HOLD	Stop holding	NA MLCK NCBK NOBK		N/A	NA : Disable MLCK : Motor simple holding reference parameter 【WBK】 NCBK : Normal close electromagnetic brake (power off brake type) reference parameter 【BKDT】 NOBK : Normal open electromagnetic brake (power on brake type) reference parameter 【BKDT】
BKDT	Electromagnetic brake	0~9999	ms	0	Use electromagnetic brake and HOLD=NCBK、NOBK valid
HSPL	Motor speed upper limit	80~5000	RPM	4500	Sets the upper limit for the rotation speed of the motor
LSPL	Motor speed lower limit	80~5000	RPM	4500	Sets the lower limit for the rotation speed of the motor
TLMT	Operation torque limit	0 ~ 300	%	200	Sets the torque limit percentage.
GR-R	Deceleration ratio	1~9999		1	Sets the deceleration ratio relative to the rotation speed of the motor output shaft. Shows the speed calculated from the deceleration ratio, number of digits for the deceleration ratio and the acceleration ratio in monitor mode. After the deceleration ratio of the transmission shaft is calculated, it can also be displayed as the conveyor belt speed.
GR.DG	Number of digits for deceleration ratio	1~0.01		1	1 : ( [Parameter GR-R *1 ] ) 0.1 : ( [Parameter GR-R *0.1 ] ) 0.01 : ( [Parameter GR-R *0.01 ] )
SP-R	Acceleration ratio	1.0~2.0		1.0	After accelerating the rotation speed of the motor through external mechanisms, the conversion speed can be displayed.
DSPY	Initial display of the panel	MSPD GRSP SGNO LOAD		MSPD	MSPD : Speed mode - Motor revolution count GRSP : Monitor mode - Output shaft revolution count SGNO : Monitor mode - Operation stage number LOAD : Monitor mode - Motor load rate

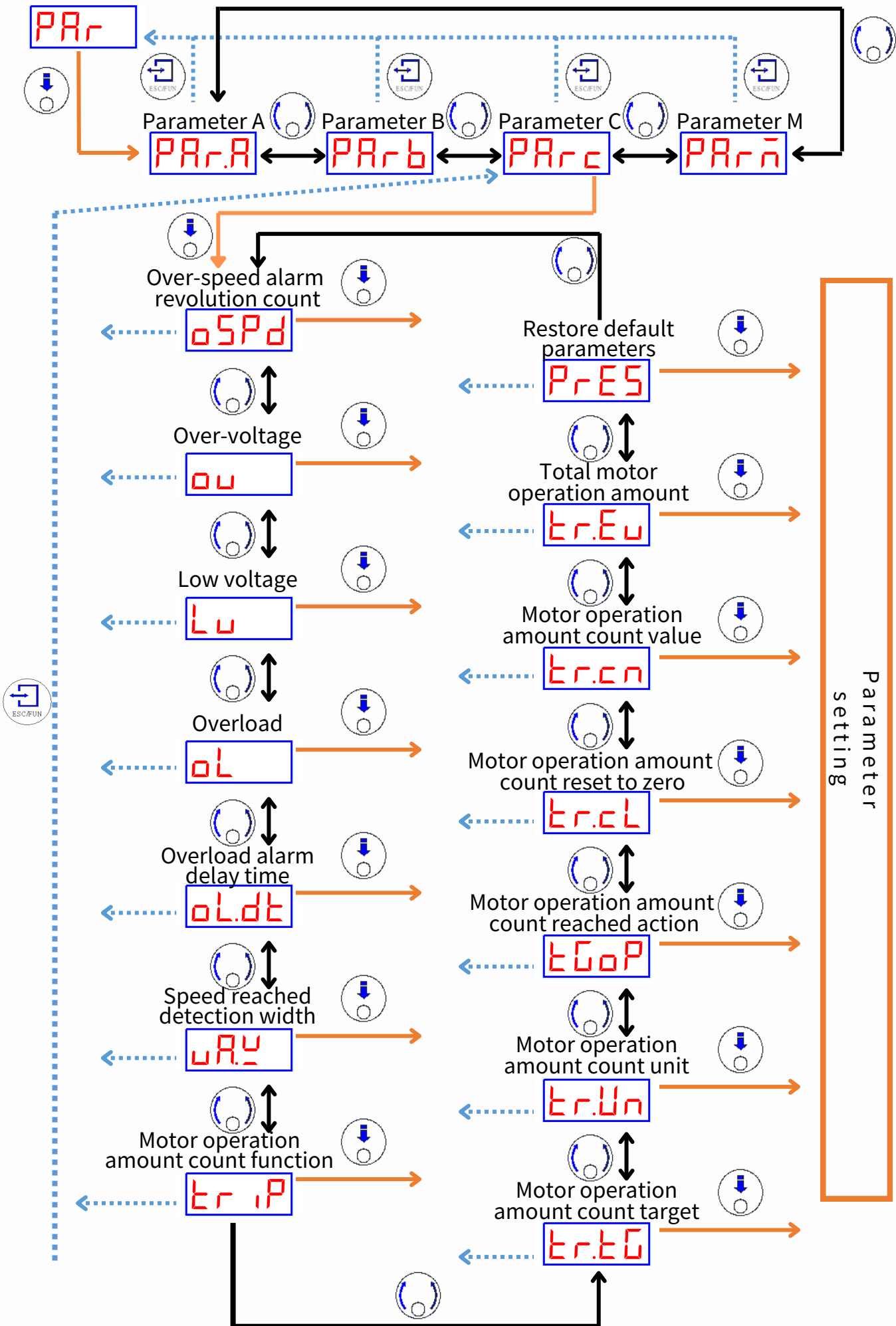
# PAR.B parameter



# PAR.B parameter

Code	Parameter name	Range	Unit	Default	Description
IN-0	IN0 input function	0~10		2	2 : FWD clockwise rotation 3 : REV 10counter-clockwise rotation 6 : CCW/CW clockwise/counter-clockwise 7 : M0 (multi-stage speed BIT-0)
IN-1	IN1 input function	0~10		3	0 : No used 1 : STOP_MODE deceleration stop mode 4 : START/STOP 5 : RUN/BRAKE
IN-2	IN2 input function	0~10		7	8 : M1 (multi-stage speed BIT-1) 9 : ALARM RESET 10 : EMERGENCY SWITCH
OUT-0	OUT0 input function	101~106		101	101 : SPEED OUT motor revolution count 102 : ALARM OUT alarm 103 : MOVE operating 104: VA revolution count reached
OUT-1	OUT1 input function	101~106		102	105: DIR motor rotation direction 106 : TRAV operation amount count reached

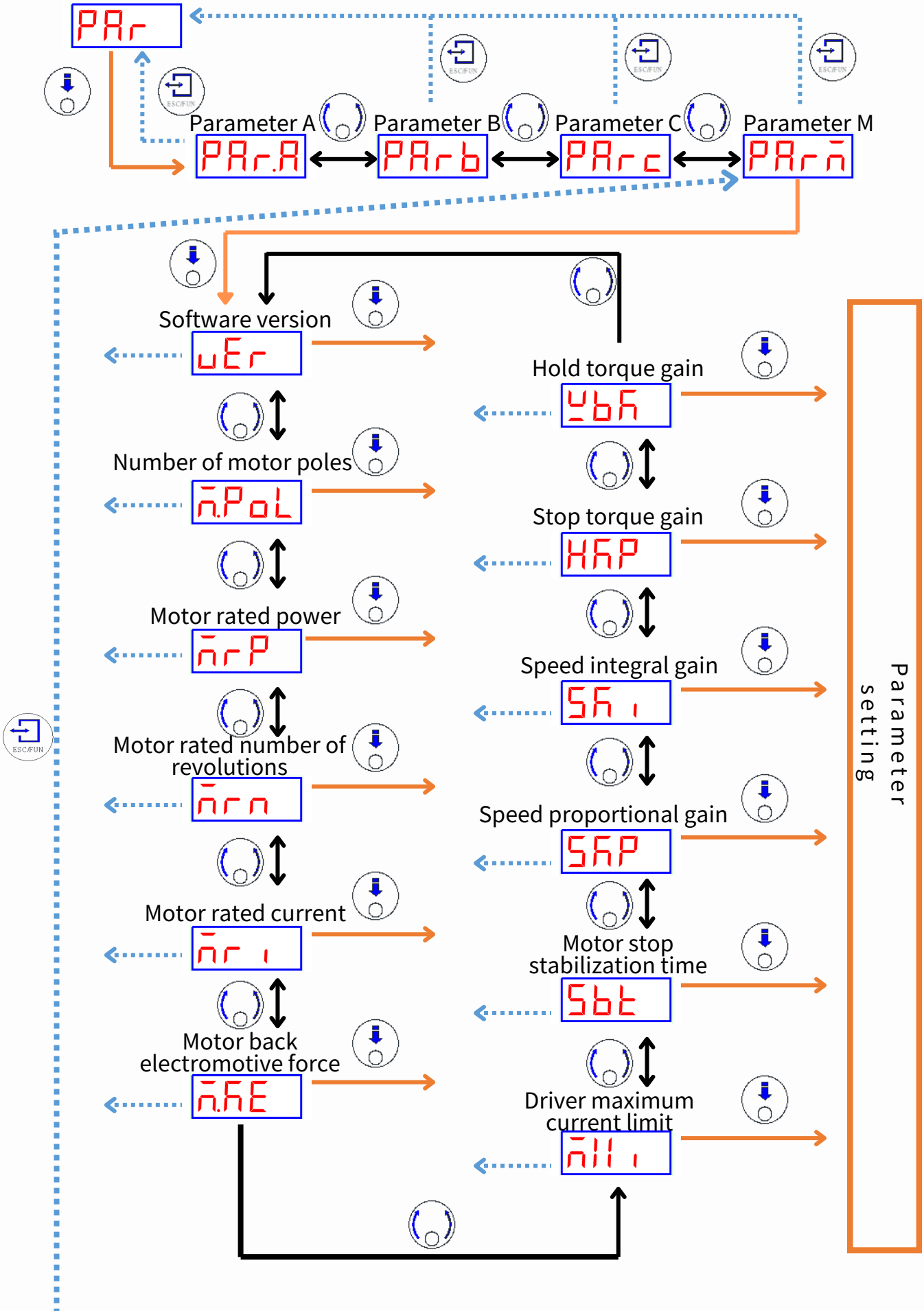
# PAR.C parameter



## PAR.C parameter description

Code	Parameter name	Range	Unit	Default	Description
OSPD	Over-speed alarm revolution count	80 ~ 6000	rpm	5000	Sets the over-speed alarm revolution count
OV	Over-voltage detection value	120 ~ 158 240 ~ 315	Vac	135 268	Sets the over-voltage detection value Controller voltage 110V settable range, 120 ~ 158V Controller voltage 220V settable range, 240 ~ 315V
LV	Low voltage detection value	60 ~ 90 120 ~ 180	Vac	80 176	Sets the low voltage detection value Controller voltage 110V settable range, 60 ~ 90V Controller voltage 220V settable range, 120 ~ 180V
OL	Overload detection value	100 ~ 300	%	200	Sets the overload percentage
OL.DT	Overload alarm delay time	1 ~ 30	Second	20	Sets the overload alarm delay time
VA.W	Speed reached detection width	0 ~ 400	rpm	200	Sets the speed reached detection width
TRIP	Operation amount count function	ON / OFF	ms	OFF	ON: Count function function on OFF: Count function function off
TR.TG	Operation amount count target	1 ~ 999		1	<b>【TR.TG】 x 【TR.UN】</b>
TR.UN	Operation amount count unit	1K 10K 100K 1M	Rev	1K	
TGOP	Operation amount count reached action	NA ALRM STOP		NA	NA: No action ALRM: Output Alarm, motor does not stop STOP: Output Alarm, motor stops
TR.CL	Operation amount counter reset to zero	ON / OFF		OFF	ON: Operation amount counter reset to zero
TR.CN	Operation amount count value	Display		OFF	Motor operation amount count function valid when [TRIP]=ON
TREV	Total operation amount	Display	10MRev		Continuous accumulation cannot reset
P.RES	Restore default parameters	ORG / OFF		OFF	ORG: All parameters restored to original setting contents

# PAR.M parameter

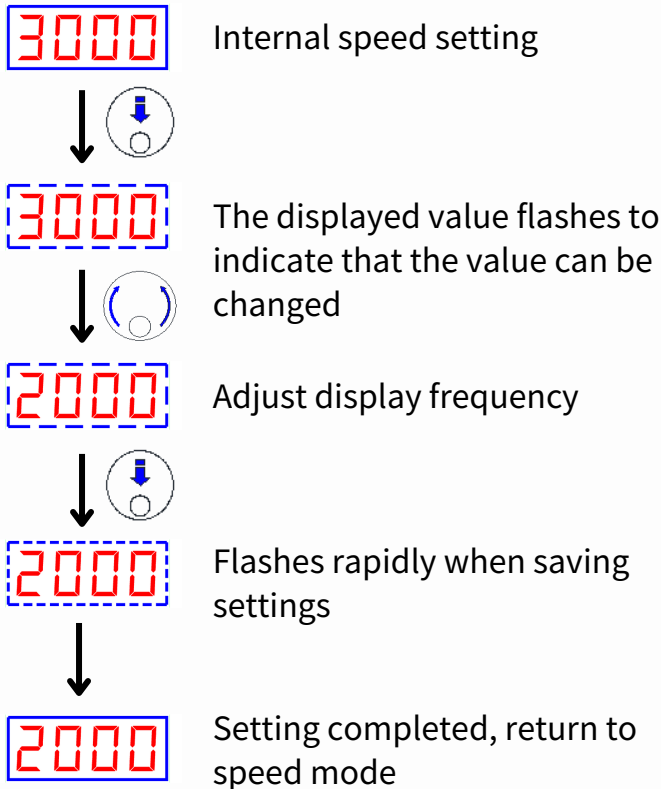


## PAR.M parameter description

Code	Parameter name	Range	Unit	Default	Description
VER	Software version	Display			Only displays, cannot set
M.POL	Number of motor poles	Display	Pole		Only displays, cannot set
MRP	Motor rated output power	Display	W		Only displays, cannot set
MRN	Motor rated number of revolutions	Display	rpm		Only displays, cannot set
MRI	Motor rated current	Display	A		Only displays, cannot set
M.KE	Motor back electromotive force voltage	Display	V/Krpm		Only displays, cannot set
MXI	Driver maximum current limit	Display	A		Only displays, cannot set
SBT	Motor stop stabilization time	0 ~ 9999	ms	100	
SKP	Speed proportional gain	0 ~ 9999		50	
SKI	Speed integral gain	0 ~ 9999		1000	
HKP	Stop torque gain	0 ~ 9999		25	
WBK	Hold torque gain	0 ~ 9999		50	Motor simple hold valid when [HOLD]=MLCK

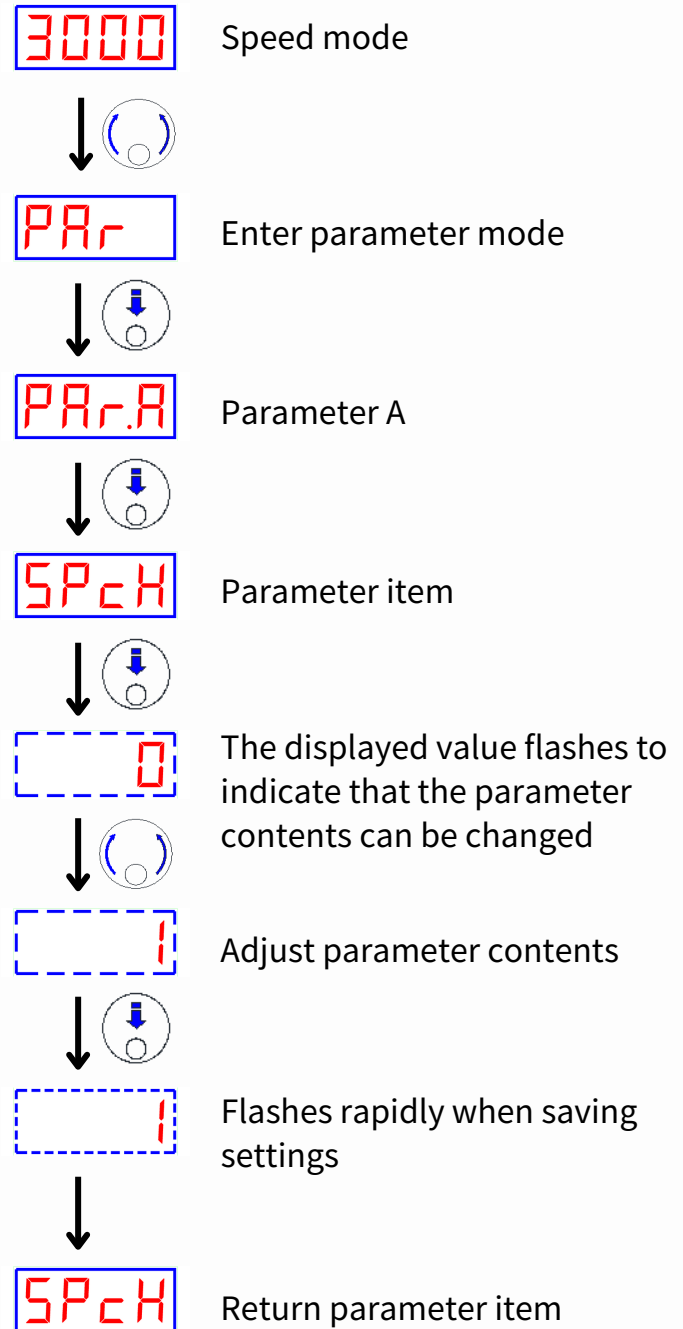
## 7.6 Internal speed adjustment description

Front panel operation  
Parameter SPCH=0 (for internal speed use)



## 7.7 Parameter setting description

Front panel operation



## ▼ Motor operation and stop (parameter SPCH and OPM selection)

### When SPCH=0

SPCH	OPM	Description
0	0	<p><b>Panel control:</b> Operate(RUN) Stop(STOP) Rotation direction(R/F)</p> <p><b>I/O control :</b> 1:STOP_MODE deceleration stop mode</p>
	1	<p><b>Panel control:</b> N/A</p> <p><b>I/O control:</b> 2:FWD clockwise rotation 3:REV counter-clockwise rotation</p>
	2	<p><b>Panel control:</b> Rotation direction(R/F)</p> <p><b>I/O control:</b> 4:START/STOP Start/Stop 5:RUN/BRAKE Operate/Brake 6:CCW/CW Clockwise/Counter-clockwise ※When 6 is not selected for I/O, the rotation direction can be controlled with the panel</p>

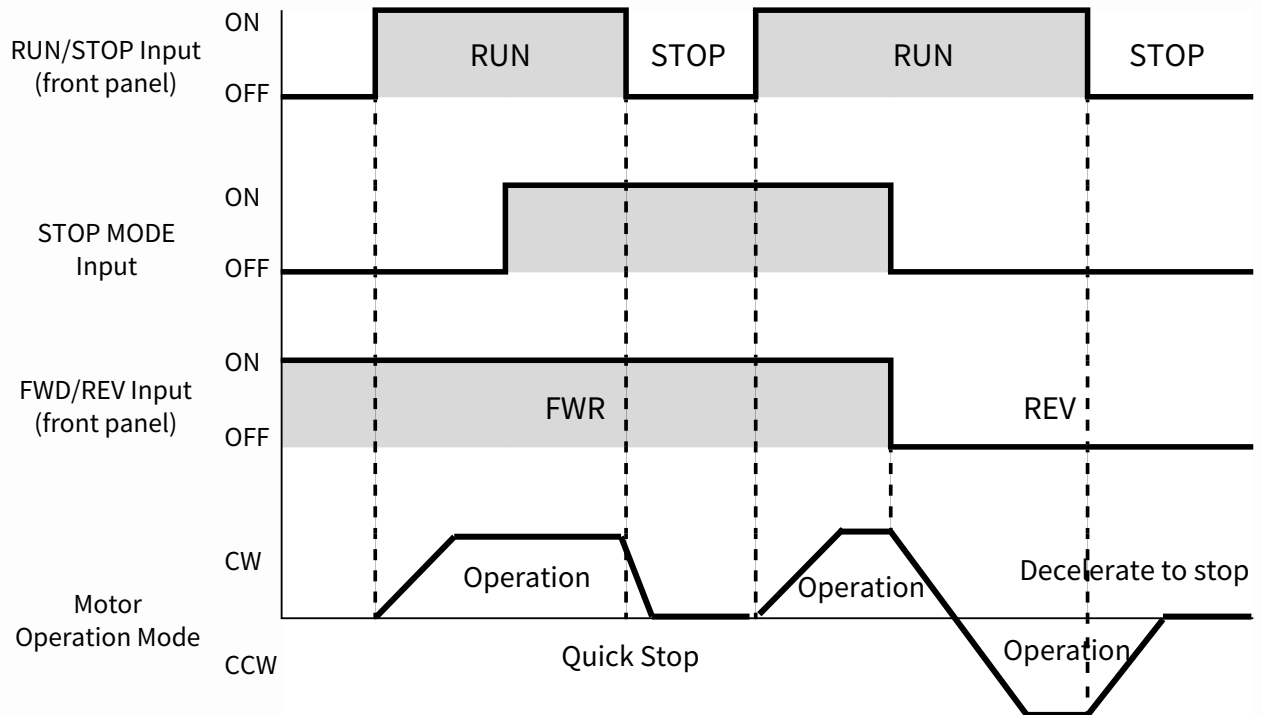
### When SPCH=1

SPCH	OPM	Description
1	0	<p><b>Panel control:</b> Operate(RUN) Stop(STOP) Rotation direction(R/F)</p> <p><b>I/O control:</b> 1:STOP_MODE deceleration stop mode 7:M0 -stage speed BIT-0 8:M1 -stage speed BIT-1</p>
	1	<p><b>Panel control:</b> N/A</p> <p><b>I/O control:</b> 2:FWD clockwise rotation 3:REV counter-clockwise rotation 7:M0 -stage speed BIT-0 8:M1 -stage speed BIT-1</p>
	2	<p><b>Panel control:</b> Rotation direction (R/F)</p> <p><b>I/O control:</b> 4:START/STOP Start/Stop 5:RUN/BRAKE Operate/Brake 6:CCW/CW Clockwise/Counter-clockwise ※When 6 is not selected for I/O, the rotation direction can be controlled with the panel 7:M0 -stage speed BIT-0 8:M1 -stage speed BIT-1</p>

## Motor operation and stop (parameter OPM)

### ● OPM=0

	※Stop mode STOP MODE	Motor movement status	Description
Signal level	ON	Quick stop	Quick stop
	OFF	Decelerate and stop	Decelerate and stop according to deceleration time

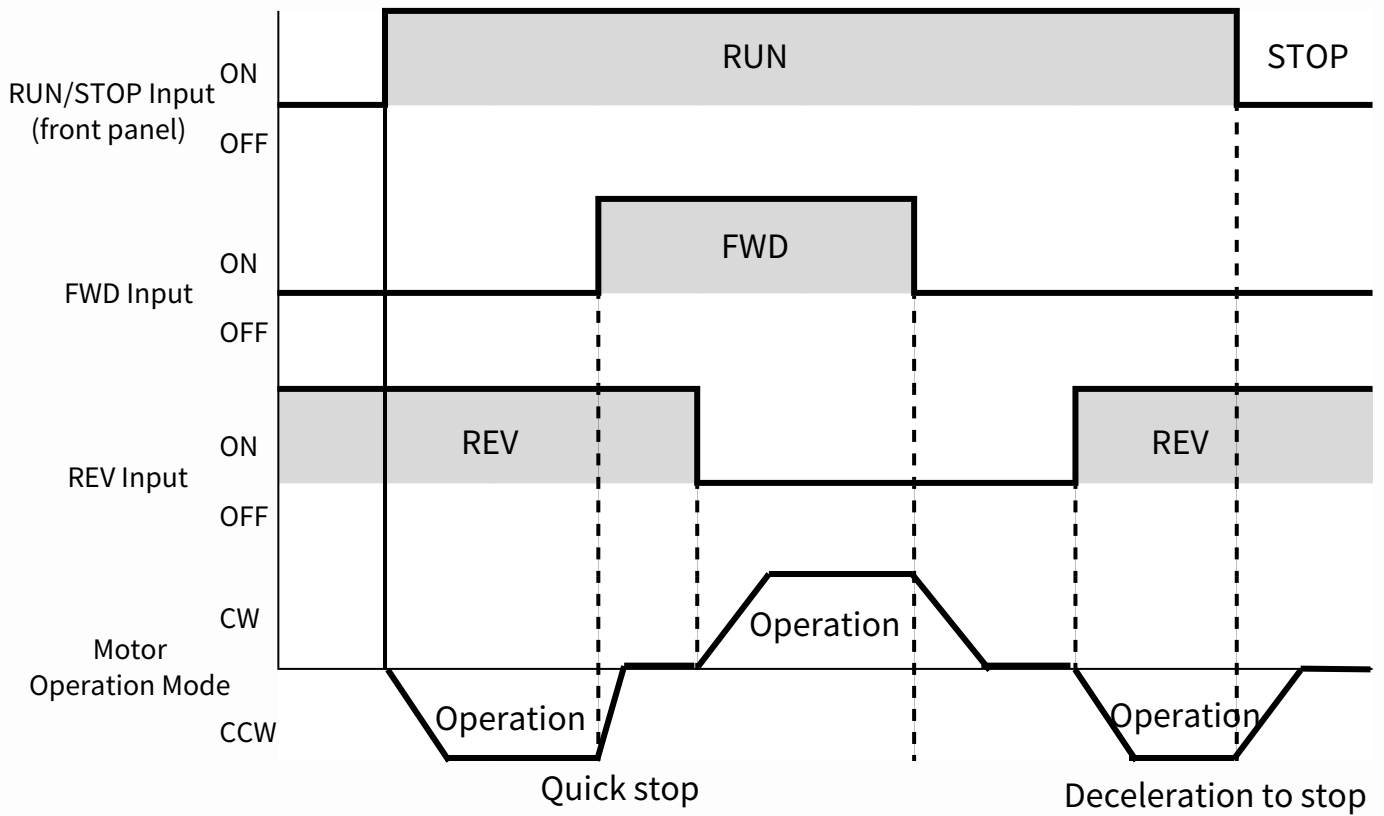


※OPM=0, STOP MODE setting is valid

### ● OPM=1

	※FWD input	※REV input	Motor movement status
Signal level	ON	ON	Quick stop
	ON	OFF	CW direction operation
	OFF	OFF	Decelerate and stop according to deceleration time
	OFF	ON	CCW direction operation

※OPM=1, FWD and REV can be set as a single selection, and the other signal is OFF by default

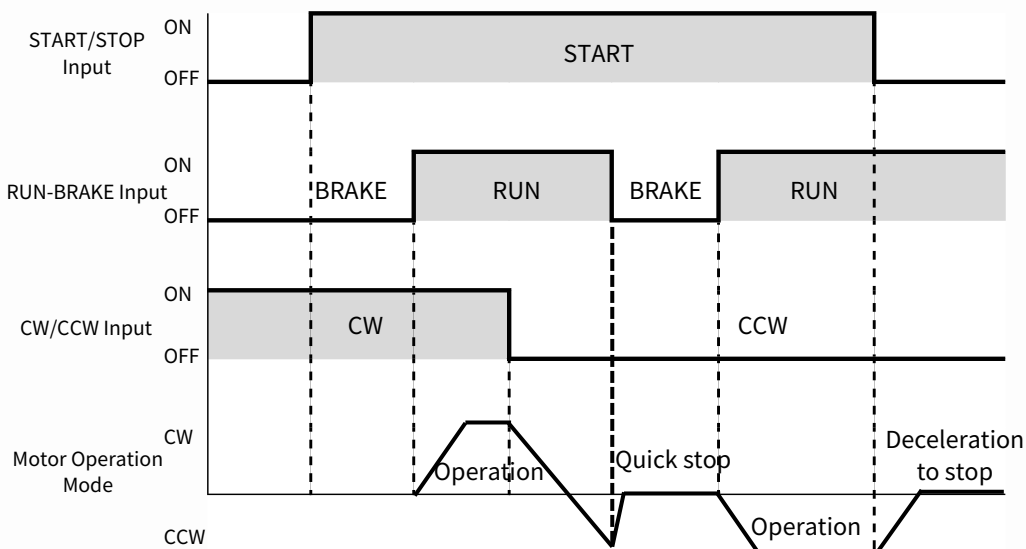


● OPM=2

	※START/STOP input	※RUN/BRAKE input	Motor movement status
Signal level	ON	ON	Operation
	ON	OFF	Quick stop
	OFF	OFF	Decelerate and stop according to deceleration time
	OFF	ON	Decelerate and stop according to deceleration time

※OPM=0, STOP MODE setting is valid

※OPM=0, RUN/BRAKE can be selected not to be set, the default is ON



## 7.8 Output shaft rotation speed description

※Output shaft rotation speed display

When the motor is operating, display the calculated values of ①~③.

When the motor stops. Display 

① Calculation of the revolution count of the reducer output shaft

Reducer output revolution count [rpm] = motor revolution ÷ reducer deceleration ratio  
reducer deceleration ratio = deceleration ratio (GR-R) x number of digits of the deceleration ratio (GR.DG)

Example:

The motor revolution count [rpm] = 3000, the gearbox deceleration ratio is 125, the number of digits of the deceleration ratio is 0.1, then the reducer output shaft revolution count =  
 $3000 \div 125 \div 0.1 = 240\text{rpm}$

② Conveyor belt conveying speed display calculation

The conveyor conveying speed [m/min] = output shaft revolution count [rpm] ÷ conveyor deceleration ratio  
conveyor belt deceleration ratio = gearbox deceleration ratio ÷ pulley diameter [m] ÷  $\pi$

Example:

The motor revolution count is 3000rpm, the gearbox reduction ratio is 125, and the pulley diameter is 0.2 meters, then the conveyor belt conveying speed (m/min) =  
=  $3000 \div \text{conveyor belt deceleration ratio}$   
=  $3000 \div (125 \div 0.2 \div \pi)$   
=  $3000 \div (\text{approximately } 198)$   
= 15.15m/min

③ External mechanism acceleration calculation

External mechanism accelerated revolution speed [rpm] = motor revolution count \* acceleration ratio

Example:

The motor revolution count is = 3000rpm, the acceleration ratio (SP-R) 2, then the external mechanism accelerated revolution speed =  
 $3000 \times 2 = 6000\text{rpm}$

※When the acceleration parameter is set as 1.0, the deceleration ratio is more effective than the setting of the number of digits of the deceleration ratio.

※When the acceleration ratio parameter is set to a value other than 1.0, the acceleration ratio setting is valid.

## 7.9 Acceleration/deceleration time setting

Acceleration time: The time required for the motor to accelerate from a stopped state to 3000rpm.

Deceleration time: The time required for the motor to decelerate from 3000rpm to stop state.

Example:

The acceleration time is set as 150ms

The deceleration time is set as 100ms

The acceleration time of the motor accelerating to 2,000rpm from stopped =  $2000 \div (3000 \div 150) = 100\text{ms}$

The deceleration time of the motor decelerating to stopped from 3,000 rpm =  $3000 \div (3000 \div 100) = 100\text{ms}$

※ The actual acceleration and deceleration time of the motor may vary with the corresponding action time set due to factors such as the load borne and the inertia.

## 7.10 Gentle start and gentle stop settings

Gentle start: The time required for the motor from stopped to 500rpm

Gentle stop: The time required for the motor from 500rpm to stopped

Example:

The acceleration time is set as 150ms

The deceleration time is set as 100ms

The gentle start is set to 3, therefore, the gentle start time = acceleration time x 8

The gentle stop time is set to 5, therefore, the gentle stop time = deceleration time x 32

Acceleration time of the motor accelerated to 2,000rpm from stopped =  $500 \div (3000 \div (150 \times 8)) + (2000 - 500) \div (3000 \div 150) = 200 + 75 = 275\text{ms}$

Deceleration time of the motor decelerated to stopped from 3,000rpm =  $(3000 - 500) \div (3000 \div 100) + 500 \div (3000 \div (100 \times 32)) = 83.33 + 533.33 = 616.7\text{ms}$

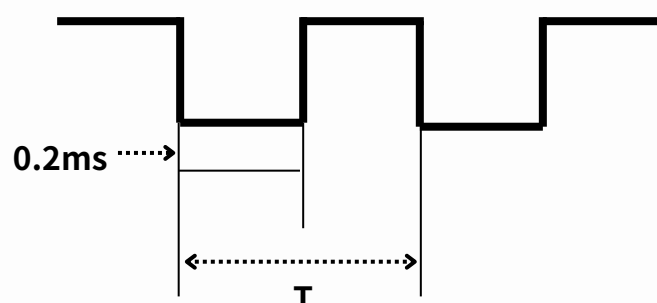
## 7.11 Speed output

Simultaneous with the motor operation, 30 pulse signals will be outputted for every revolution of the motor output shaft (pulse amplitude: 0.2ms).

The operation speed of the motor can be calculated by measuring the frequency of the SPEED output.

Motor operation speed\*[r/min] = (SPEED output frequency/30) × 60

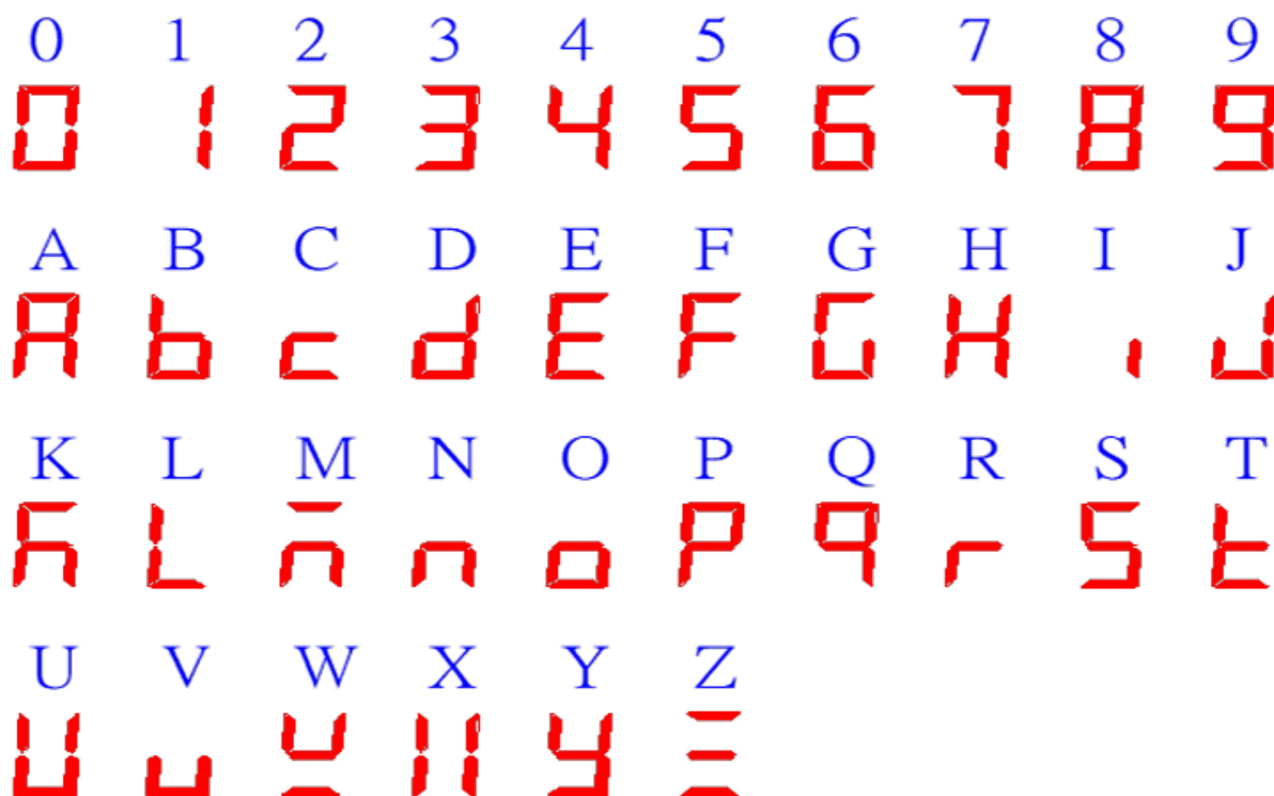
SPEED output frequency =  $1/T$



# 8 Alarm code

Alarm code	Warning name	Cause of failure	Troubleshooting
AL. 2	Over-current	Motor operation current exceeded rated current by 300%	<ul style="list-style-type: none"> <li>• Confirm whether the wiring between the driver and motor is damaged.</li> </ul>
AL. 3	Overload	Motor operation load exceeded the parameter [OL] [OL.DT] settings	<ul style="list-style-type: none"> <li>• Confirm the parameter setting values.</li> <li>• Increase the motor capacity or reduce the load.</li> </ul>
AL. 4	Master power over-voltage	Input power voltage exceeded the parameter [OV] setting value	<ul style="list-style-type: none"> <li>• If abnormalities still occur when the input voltage is within the rated allowable range, send the product back to the dealer or original manufacturer for repairs.</li> </ul>
AL. 5	Master power low voltage	Input power voltage exceeded the parameter [LV] setting value	<ul style="list-style-type: none"> <li>• If abnormalities still occur when the input voltage is within the rated allowable range, send the product back to the dealer or original manufacturer for repairs.</li> </ul>
AL. 6	Regenerative over-voltage	The regenerative electric power exceeded 445VDC when the motor brakes.	<ul style="list-style-type: none"> <li>• Reduce load inertia.</li> <li>• Confirm whether the brake resistor is connected.</li> </ul>
AL. 7	Motor stalled	Motor did not operation within 2 seconds after started	<ul style="list-style-type: none"> <li>• Confirm whether the load end is stuck.</li> </ul>
AL. 8	Motor over-speed	The motor operation speed exceeded the parameter [OSPD] setting value	<ul style="list-style-type: none"> <li>• Reduce the load.</li> <li>• Adjust acceleration and deceleration inertia conditions.</li> </ul>
AL. 9	Driver over-temperature	The temperature of the driver power module is too high	<ul style="list-style-type: none"> <li>• Reduce the ambient temperature.</li> <li>• Improve the ventilation conditions in the machine frame.</li> </ul>
AL. 11	Safe start	The motor start signal is at the ON position when the master power is connected; released after the motor start signal returns to OFF	<ul style="list-style-type: none"> <li>• Reconfirm the wiring.</li> </ul>
AL. 12	Detector abnormal	Motor detector signal abnormal	<ul style="list-style-type: none"> <li>• Confirm the connection of the motor driver.</li> <li>• If it is still abnormal after resetting, send the product back to the dealer or original manufacturer for repairs.</li> </ul>
AL. 13	Driver power module abnormal	Over-current, over-voltage, over-temperature abnormalities occurred to the driver power module.	<ul style="list-style-type: none"> <li>• If it is still abnormal after resetting, send the product back to the dealer or original manufacturer for repairs.</li> </ul>
AL. 14	Abnormal current detection	Abnormal driver current detected	<ul style="list-style-type: none"> <li>• If it is still abnormal after resetting, send the product back to the dealer or original manufacturer for repairs.</li> </ul>
AL. 30	Operation amount count target reached	Motor operation amount count value reached the setting values of [TR.TG] [TR.UN]	<ul style="list-style-type: none"> <li>• Readjust operation amount [TR.TG] [TR.UN].</li> </ul>
AL. 99	External stop	External stop signal input	<ul style="list-style-type: none"> <li>• Confirm input signal setting.</li> </ul>

## 9 Monitor font



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