GGM
GLOBAL GEARED MOTOR

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OPERATION MANUAL

GUF SERIES

BLDC SPEED CONTROL UNIT

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GGM Co., Ltd.

Thank you for purchasing a GGM product.
To ensure that you areusing this product correctly, make sure to first read this operation manual thoroughly and familiarize yourself with allknowledge, safety information and precautions related tothe product. After you have read this operation manual, keep it at hand for reference whenneeded.

1. Safety precautions

In usingand operating the product, be sure to observe the following precautions. Failure to observe the precautions may result in electric shock, injury or fire. The following precautions are very important and should be observed at all times.

⚠ Warning	Ignoring thesewarnings may cause death or serious injury.

- Do not use the product near explosive materials, combustible materials, flammable gas, corrosive materials, or anyplace where it may be splashed by water.
  Doing so may cause fire, electric shock or injury.

- Do not forcibly bend, pull or insert the motor lead wire.
  Doing so may cause fire or electric shock.

- Do not move, install, connect or inspectthe product while an electric current is being applied. Be sure to only perform repair or installationwork after cutting off the power supply.
  Failure to do so may cause an electric shock.

- Have a qualified person with relevant knowledge install, connect, operate, control and check the product for failure.
  Doing so may cause fire, electric shock or injury.

- After cutting off the power supply, allow a full minute to elapse before touchingthe output terminal. Failure to do so may cause an electric shock.

- Be sure to cut off the power supply when the power failure protection device or overheating protection device (thermal protector) is triggered.
  Failure to do so may cause injury when the product re-starts without warning.

- Install the bldc speed controller in the housing.
  Ground the protective ground terminal when it is installed.
  Failure to do so may cause an electric shock or injury.

- Make sure thatthe AC power supply to the bldc speed controlleris at the rated voltage. Failure to do so may cause a fire or product damage.

- Do not disassemble or modify the motor orthe speed controller. Failure to do so may cause an electric shock or injury.

2. Confirmation when the product is handed over

- Confirm that the delivered product is the product you ordered.
- If a different product is installed, it will create the risk of injury or fire.
- Contact a nearby retail store if you were delivered an insufficient number of products or if a damaged product wasdelivered.

1) CONTROLLER ---------- One
2) user's manual (this manual)---------- One
3) optional (extension cable)

MODEL		length of extension cable
30, 60, 150W	200, 400W	
KFEW-1	K10FEW-1	1m
KFEW-2	K10FEW-2	2m
KFEW-3	K10FEW-3	3m
KFEW-5	K10FEW-5	5m
KFEW-7	K10FEW-7	7m
KFEW-10	K10FEW-10	10m

If the controller is far away from the motor, refer to the optional specification specified in the table above.

3. Specifications

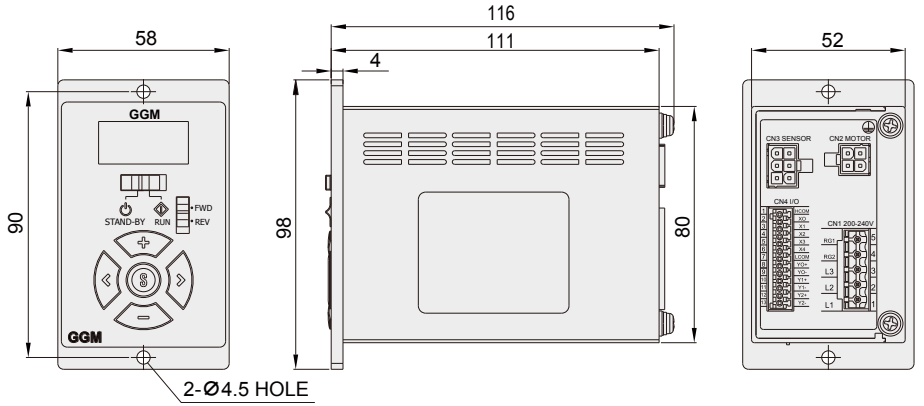
Part Number		GUF-C-30	GUF-C-60	GUF-C-150	GUF-C-200	GUF-C-400
Rated Output Power (Continuous)		30W	60W	150W	200W	400W
Power input	Rated voltage	Single-phase : 200~240V / three-phase : 200~240V (Permissible range ±10 %)				
	Rated frequency	50 / 60 Hz (Permissible range ±5 %)				
	Rated input current	Single-Phase 0.8A Three-Phase 0.5A	Single-Phase 1.0A Three-Phase 0.7A	Single-Phase 2.0A Three-Phase 1.2A	Single-Phase 2.5A Three-Phase 1.8A	Single-Phase 4.0A Three-Phase 3.0A
	Maximum input current	Single-Phase 1.9A Three-Phase 1.1A	Single-Phase 2.8A Three-Phase 1.7A	Single-Phase 4.5A Three-Phase 2.6A	Single-Phase 5.5A Three-Phase 3.2A	Single-Phase 7.8A Three-Phase 5.0A
Rated Output Current		0.17 A	0.43 A	0.95 A	1.60 A	2.30 A
Rated Torque		0.1 N.m	0.2 N.m	0.49 N.m	0.65 N.m	1.30 N.m
Maximum Instantaneous Torque		0.15 N.m	0.3 N.m	0.60 N.m	1.15 N.m	1.80 N.m
Rated Speed		3000 r/min				
Speed Control Range		100~4000 r/min				
Speed Regulation		0.5% or less/ Conditions : 0~RatedTorque, Rated Speed, Rated Voltage, Normal Temperature				
Operating Environment	Temperature	Use : 0 ~ 40℃(Non-freezing), Storage : -20 ~ 70℃(Non-freezing)				
	Humidity	Use : 85%below(Non-condensing), Storage : 85%below(Non-condensing)				
	Environment	No corrosive gas and dust, No splashing water and oil				
Input output	Input signal	5 user inputs (Photocoupler)				
	Output signal	3 user outputs (Photocoupler)				

4. CONTROLLER CODING SYSTEM

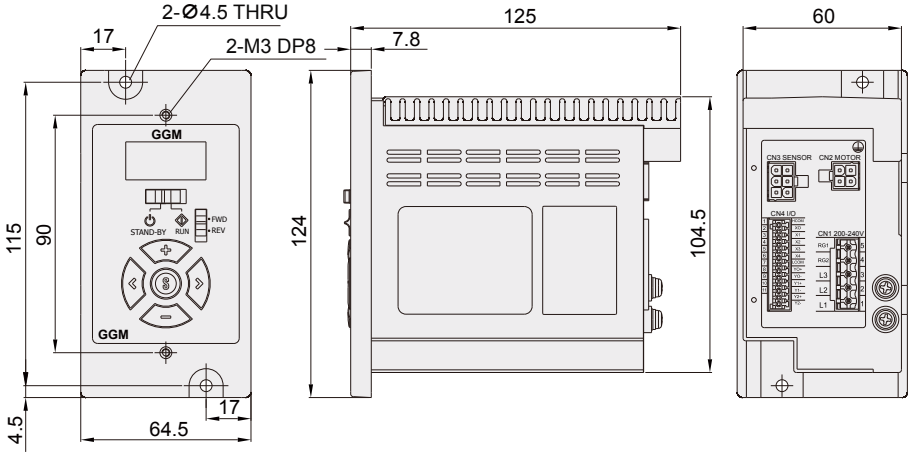
G	U	F	—	C	—	30
GGM Co.,LTD.	Unit Type	F-Series		C : POWER Single Phase 200~240V Three phase 200~240V		30 : 30W 60 : 60W 150 : 150W 200 : 200W 400 : 400W

5. Dimensions of the product

■ 30,60,150W drives



■ 200,400W drives



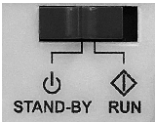
6. Product characteristics

1. Stable speed control (Speed ripple: 0.5%)
The product adjusts the current applied to the motor through vector control by constantly comparing the set speed with the speed feedback signal from the motor, enabling stable rotation speed from low speed to high speed even if the load changes.

2. Wide speed control range
Speed : 100 ~ 4000 r/min

3. Simple connection
• The motor connector can be wired simply.
• Connect the lead wire to the power connector using the screw driver.
• Connect the lead wire to the I/O connector by pressin

4. Simple use (front panel)



• Run and stand-by control
Operate the product simply by using the operation switch.

• Rotational direction control
Change the rotational direction of the motor using the rotational direction switch.

• Speed control
The speed can be easily controlled and various functions executed using the speed control buttons.

5. Operation by external I/O (PLC, etc.)
Start/Stop, change of rotational direction, multi-level speed operation by external I/O, etc.

6. Display indication
(load ratio, actual speed, etc.)

Display of load ratio (100%)

Display of actual speed (1500rpm)

7. Multi-level speed operation (8 speeds)
8-speed operation is available by setting data to operation data No.0 ~ No.7.

8. Setting/operation lock
(Prevents speed or data changes)
- Set the Lock function: Press and hold down the (S) button for 5 seconds or longer.
- Cancel the Lock function: Press and hold down the (S) button for 5 seconds or longer.

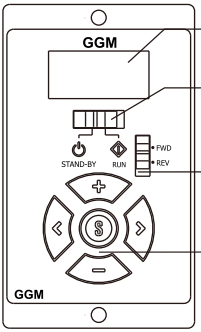
9. Protection function
The product is equipped with a function that enables it to detect abnormal status such as overload and overvoltage.
If an abnormality is detected, operation will stop and an alarm will occur.

7. Applicable Motor

Item name	K6F□30NC	K8F□60NC	K9F□150NC	K10F□200NC	K10F□400NC
Rated output	30W	60W	150W	200W	400W
Rated torque	0.1 N.m	0.2 N.m	0.49 N.m	0.65 N.m	1.3 N.m
Rated output current	0.17 A	0.43 A	0.95 A	1.60 A	2.30 A
Rated rotation speed	3,000 r/min				

* □ : SHAFT SHAPE (S : STRAIGHT, H : PINION)

8. Name and function of each part

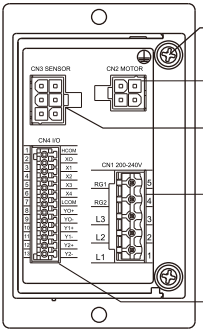


Display unit
[Displays the rotation speed and parameters]

Operation switch
[When you toggle the operation switch to RUN, the motor rotates when you toggle the operation switch to STAND-BY, the motor stops.]

Rotational direction switch
[Changes the rotational direction of the motor]

Setting button
[Changes the rotation speed and parameters]



Protection ground terminal
[Connects the protection ground wire.]

Motor power connector CN2
[Connects the motor power connector.]

Motor sensor connector CN3
[Connects the motor sensor connector.]

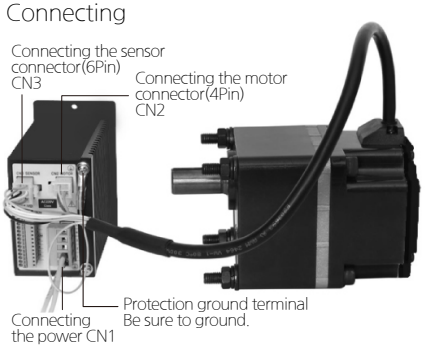
Power connector CN1
[Connects the AC power supply (single-phase/three-phase).]

I/O connector CN4
[Connects I/O signals.]

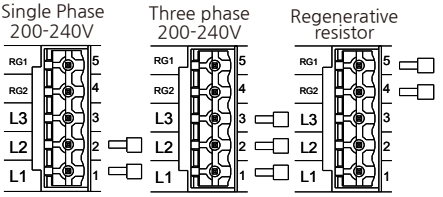
9. Setting and operation

9-1 Connect

▶ Connecting



▶ Connecting the power supply



• Connect AC power supply to CN1 according to the input power supply.
Applied lead wire - AWG 18~14 (0.75~2.0mm²)
• when reduction time is short or big inertias operated, use restoration resistance.(100W/400Ω)

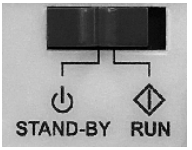
9-2 Inputting the power

Turn on the power after connect with above.

Indicator light
Display item : Setting speed

Attention

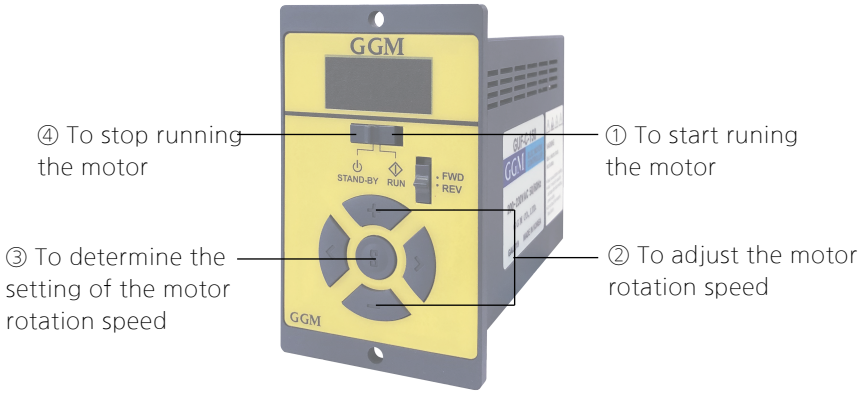
If the operation switch “RUN” when power turning on, the alrarm code “ AL.oP ” (Pervention of operation at power-on alarm) is displayed and the do not operated motor.
Set the operation switch from “RUN” to “STAND-BY” for release an alarm before use motor.



• How to disable the alarm when the power is turned on in the RUN state
[Change to oP.AL oFF in parameter mode (p. 14)]

9-3 Operating

After turning on the power, operate the product as follows.



① Running the motor

Set the operation switch to the “RUN”, the motor to start rotating .

② Adjust the speed

When pressing the “+” button, the rotation speed accelerates by 1r/min increment and when pressing the “-“ button, the rotation speed decelerates by 1r/min decresment.

When press and hold the“+”,”-“ button, RPM will acceleration and deceleration by 1rpm->10rpm->100rpm.

③ Rotation Speed Confirmation and Lock

- When pressing the “S” button, the rotation speed is determined.

When the display is blinking, the rotation speed has not set.

- Can lock the operation by pressing the “S” button for more than 5 seconds in the “STAND-BY” mode for can not change the definite rotation speed.

④ Stopping the motor

Setting the operation switch to the “STAND-BY” side causes the motor to decelerate to a stop. Setting the operation switch again to the “RUN” side causes the motor to start rotating at the set rotation speed.

⑤ Changing the rotation direction

Change the rotation direction of the motor (gearhead) using the rotation direction switch. The rotation direction can be changed while operating. With the combination type, the rotation direction of the gearhead output shaft varies depending on the rear ratio of the gearhead.

9-4 Operating by I/O signals

The motor can be operated and stopped from the external signals.

① Setting the “External operation signal input” parameter
Set the parameter (PAr-> io.En-> on / oFF) to "on" (page 14)
"on"-External I / O enabled, "oFF"-External I / O disabled / The factory setting is "oFF".

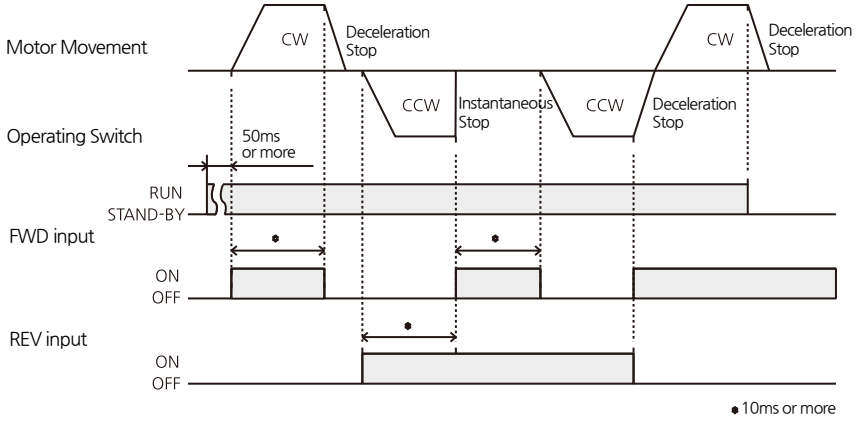
② Run command [Run when FWD or REV input is ON]
Forward rotation when FWD (No. 2) + LCOM (No. 7)
connected / Reverse rotation when REV (No. 3) + LCOM (No. 7) connected
(Operation should be made with front control Run position, no operation at stand-by)

③ Pin allotment of CN4

Pin No.	Terminal Name	Input Output	Signal Name	Description
1	HCOM	Common	—	Input signal common : Sink Logic : +24V, Source Logic : 0V (GND)
2	X0	Input	[FWD]	The motor rotates is FWD direction during signal “ON
3	X1	Input	[REV]	The motor rotates is REV direction during signal “ON”
4	X2	Input	[P0]	Select the operating data
5	X3	Input	[P1]	Select the operating data
6	X4	Input	[A.rst]	Reset the alarm
7	LCOM	Common	-	Input signal common
8	Y0+	Output	[SPD]	For every rotation of the motor, 30 pulses are output
9	Y0-	Output		
10	Y1+	Output	[AL.on]	It turns off when an alarm is generated (Normally closed)
11	Y1-	Output		
12	Y2+	Output	[MovE]	It turns on when the motor is operated (Normally opened)
13	Y2-	Output		

Applicable lead wire AWG 26~20 (0.14~0.5mm²)
※ Function in [ ] is assigned at shipment
※ Can be assigned required functions to 5 input signals(X0~X4) and 3 output signals(Y0~Y2)
• Input signals : Can be used 5 functions out of FWd(CW rotation), rEv(CCW rotation), P0 (operation data 1), P1(operation data 2), P2(operation data 2), A.rst(Alarm reset), E.Err(External alarm)
• Output signals : Can be used 3 functions out of SPd(Speed output), AL.on(Alarm output), AL.ov(Overvoltage alarm output), OvLd(Overload alarm output), MovE(Motor operation output)

④ Timing chart example



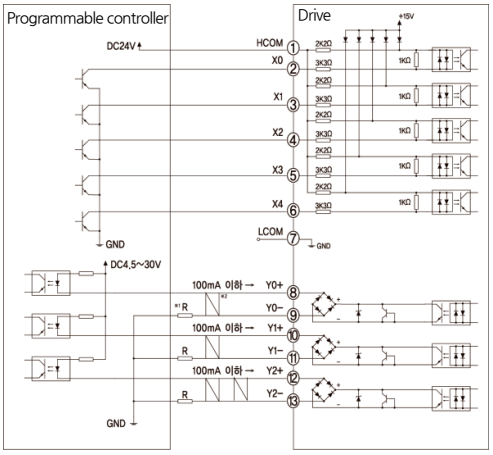
※ Operation input

- The motor rotates when either FWD input or REV input is set to “ON”.
- The motor instantaneous stop when FWD input and REV input is set to “ON” at the same time.

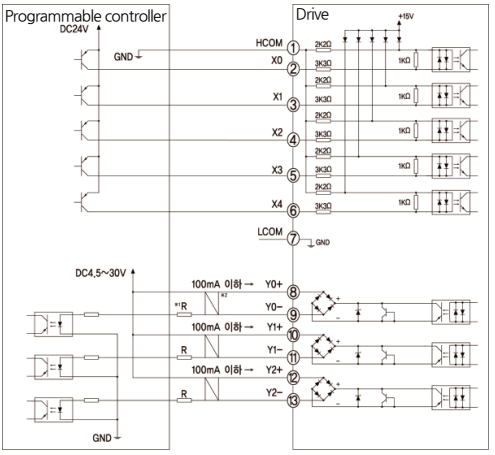
⑤ Connection example for I/O signals and programmable controller

This is connection example for operating a motor using a transistor output type programmable controller.

SINK LOGIC



SOURCE LOGLC



※ 1) Limited resistance
In the case of 24V DC : 680Ω~2.7Ω (2W)
In the case of 5V DC : 150Ω~560Ω (0.5W)

2) Twisted Pair Shield Cable

Attention) For the Y0, Y1 and Y2, be sure to keep the current value at 100mA or less. If the current exceeds this value, connect the limiting resistor R.

⑥ Driving at two or more speeds

You can operate at two or more speeds by switching to external input.
Up to 8 speeds are possible.

• Operating method

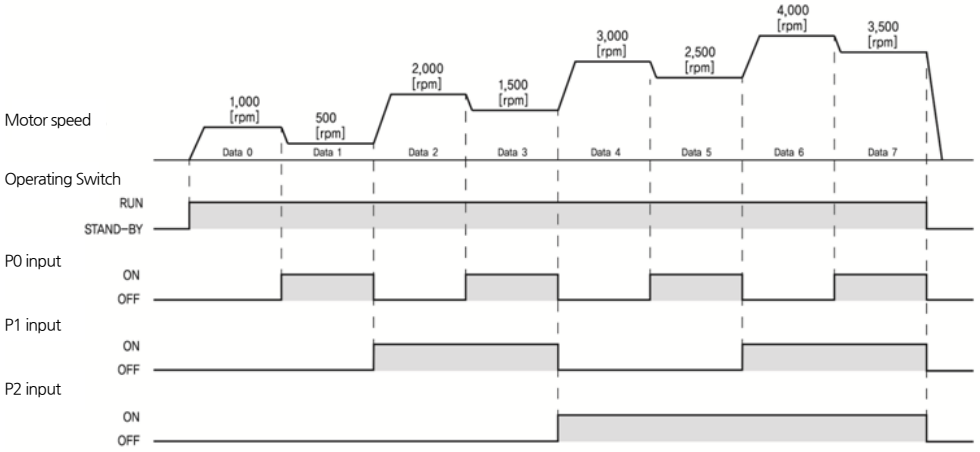
Operate the motor by selecting any of the operation data No.0 to No.7 based in a combination of ON/OFF status of the P0, P1 and P2 inputs. The motor is operated using the rotation speed, acceleration time, deceleration time and torque limit in the selected operation data number.

• Operation procedure (When the “external operation signal input” parameter is set to “ON”)

1. Set the operation switch to “RUN” side
2. Select the operation data number suing the P0, P1 and P2 inputs
3. When the FWD or REV input is turned ON, the motor will rotate.
4. Switch the operation data number using the P0, P1, and P2 inputs
5. When the FWD or REV input switch has been turned ON or is turned OFF, the motor will stop.

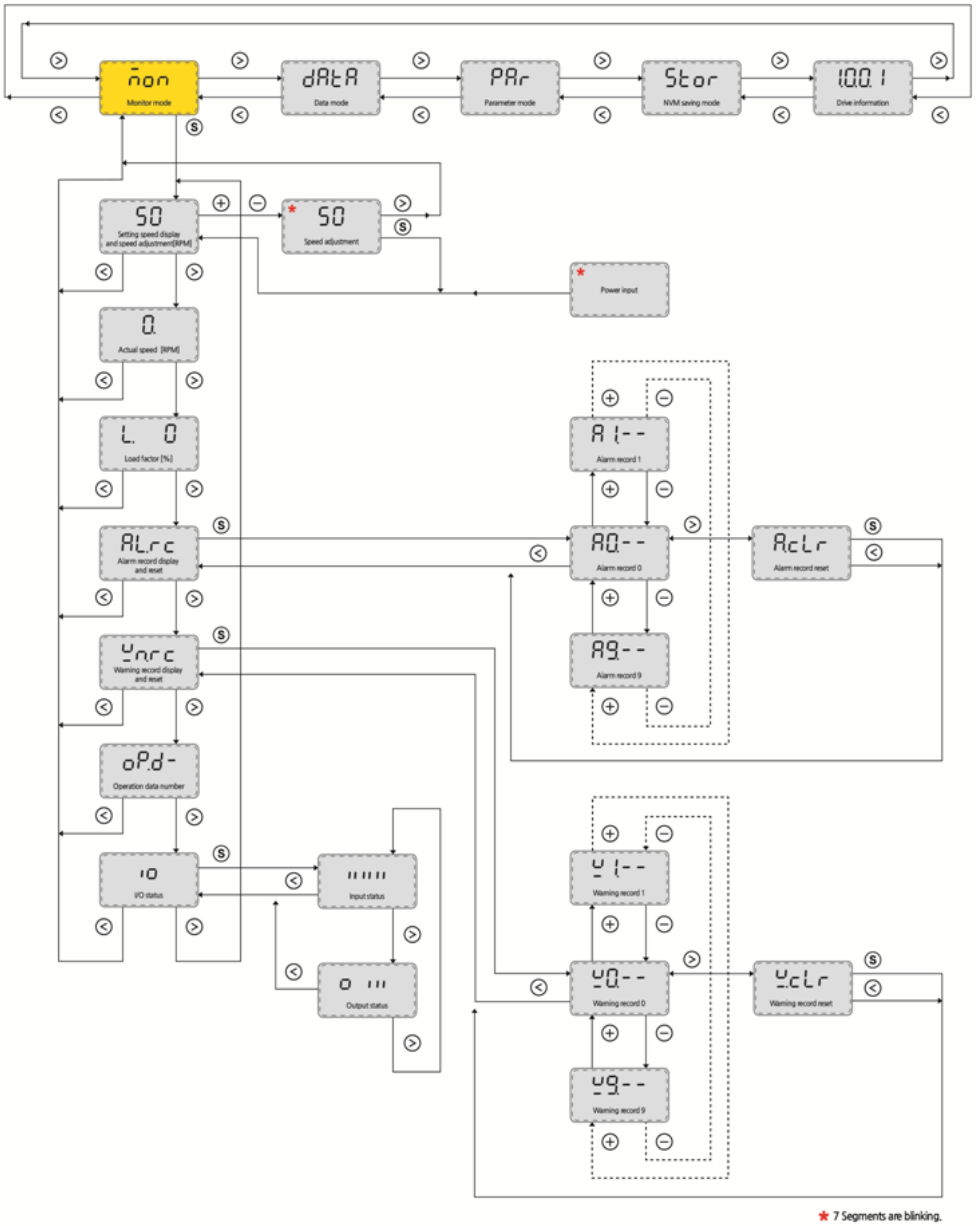
Operation data number	P0	P1	P2	Rotation speed [rpm]
0	OFF	OFF	OFF	1000
1	ON	OFF	OFF	500
2	OFF	ON	OFF	2000
3	ON	ON	OFF	1500
4	OFF	OFF	ON	3000
5	ON	OFF	ON	2500
6	OFF	ON	ON	4000
7	ON	ON	ON	3500

* Setting speed value is example, can be changed to needed speed.
When changing from the present speed to the new speed, the acceleration time and deceleration time set in the next operation data number are used.

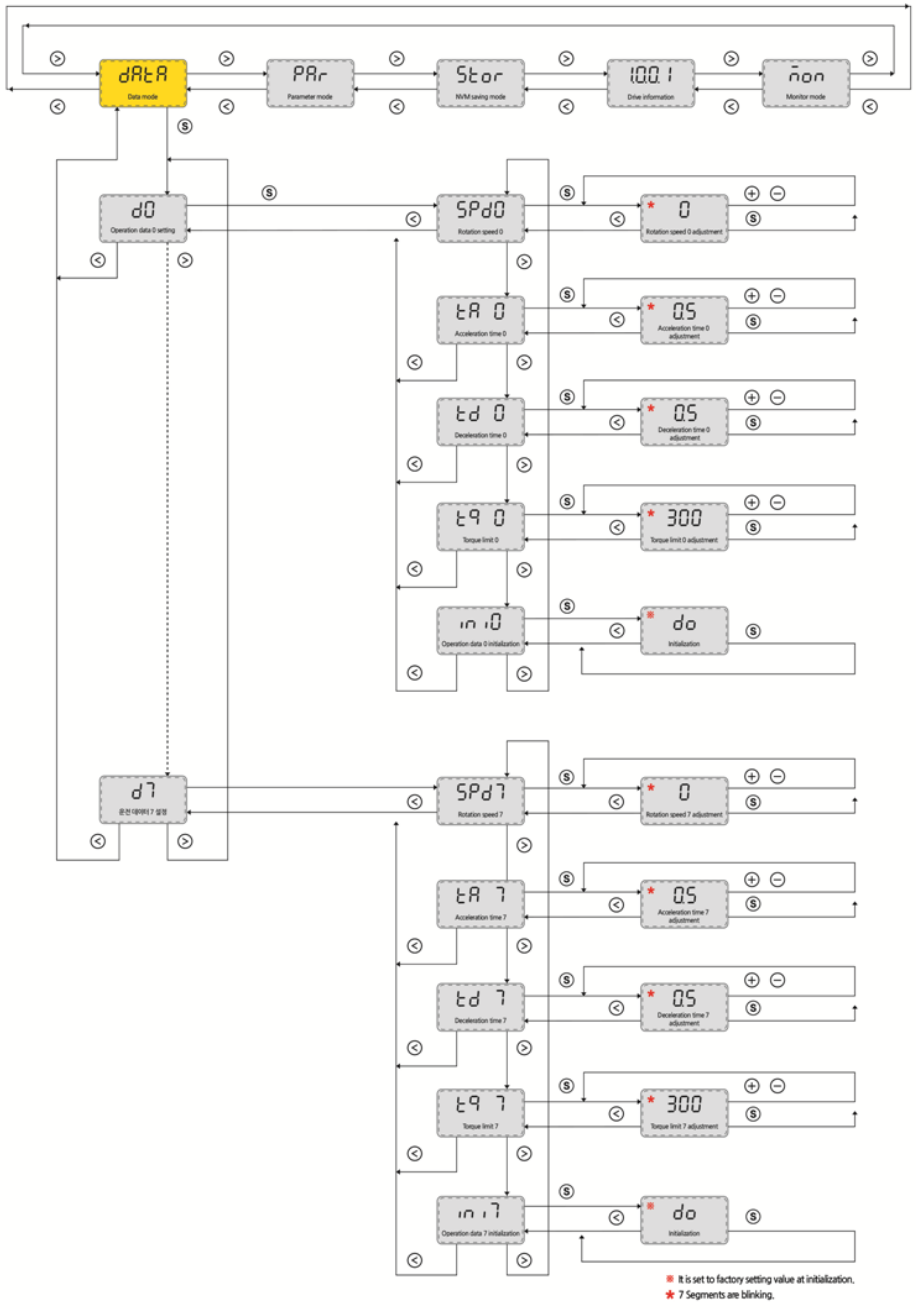


10. Setting and 7-segments display

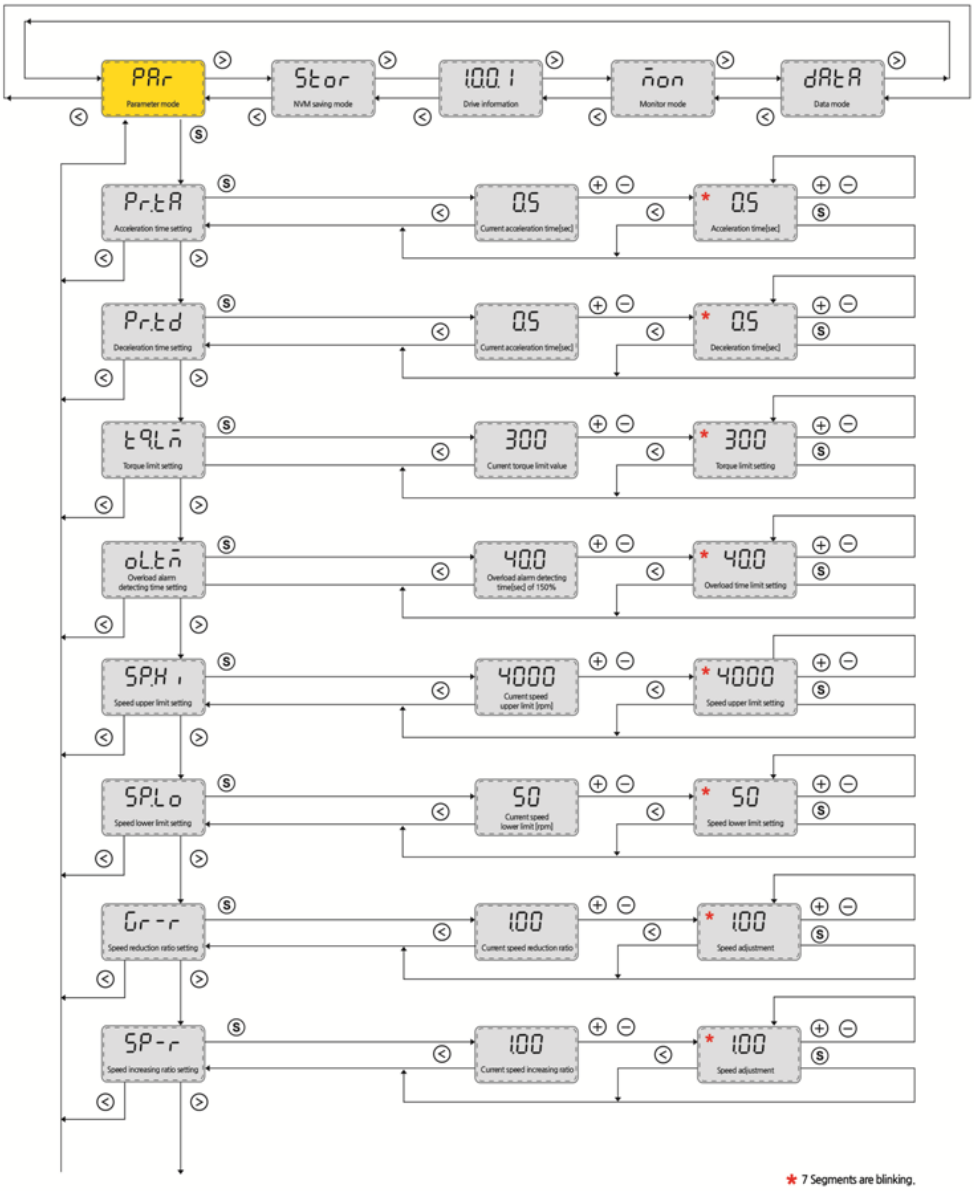
10-1 Monitor mode



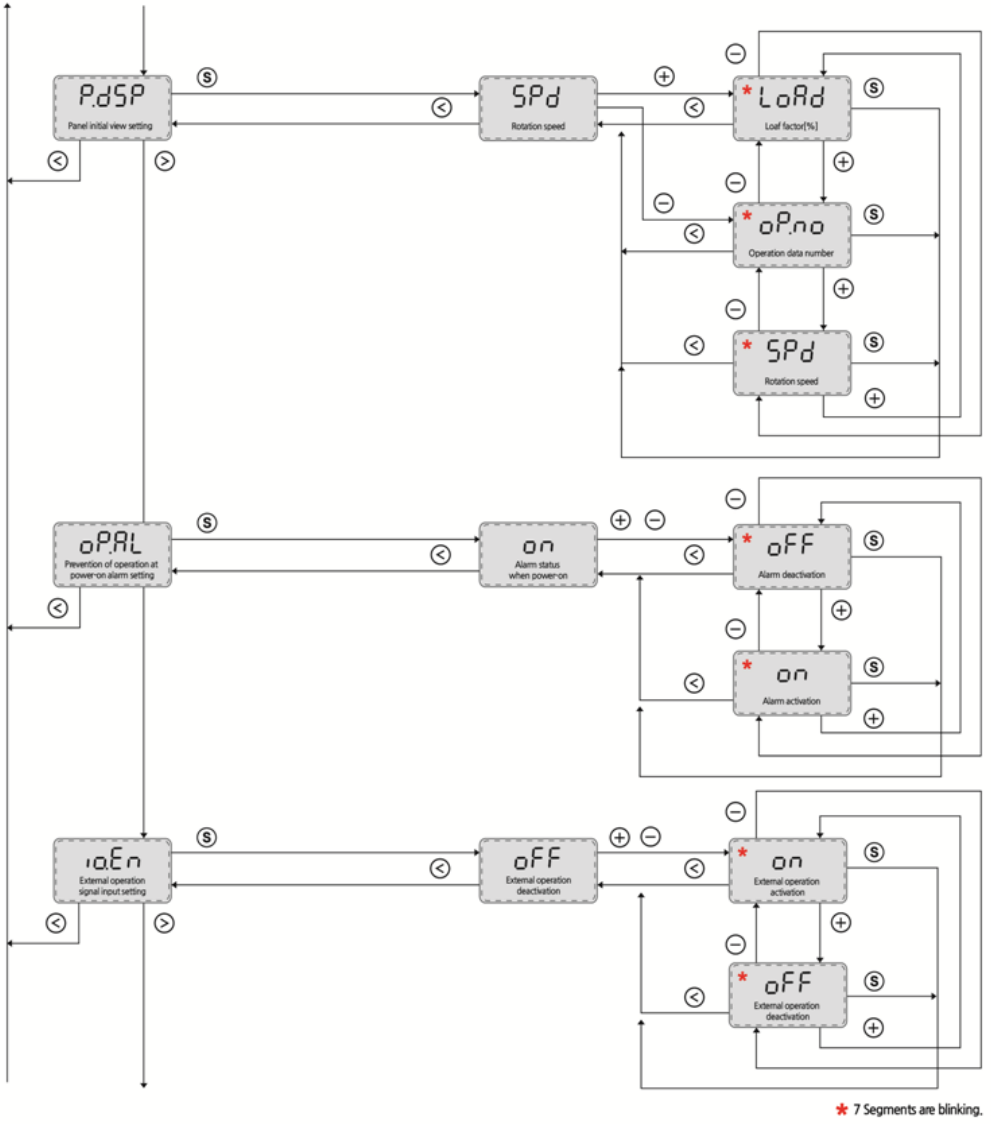
10-2 Input/Output setting mode



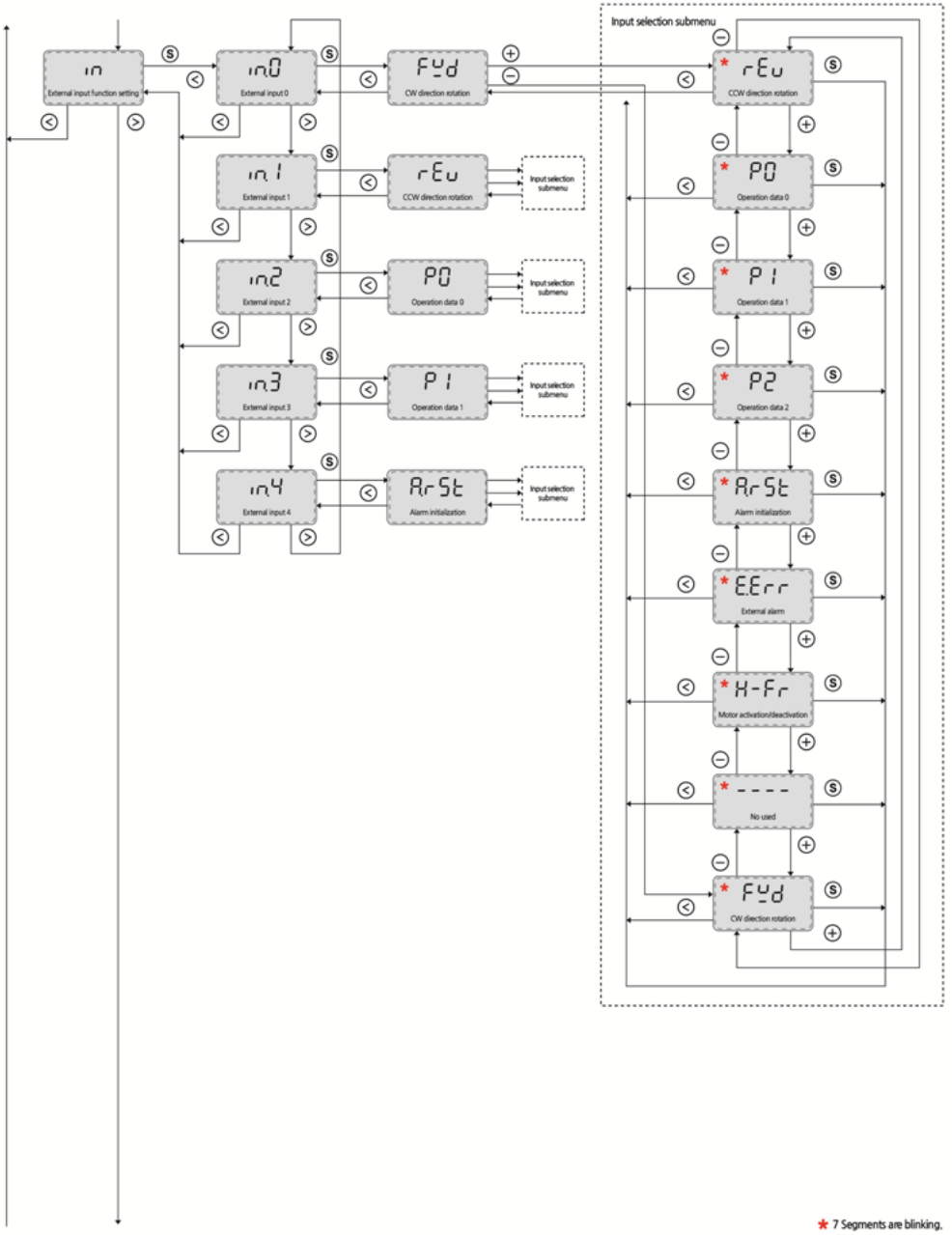
10-3 Parameter setting mode(1page)



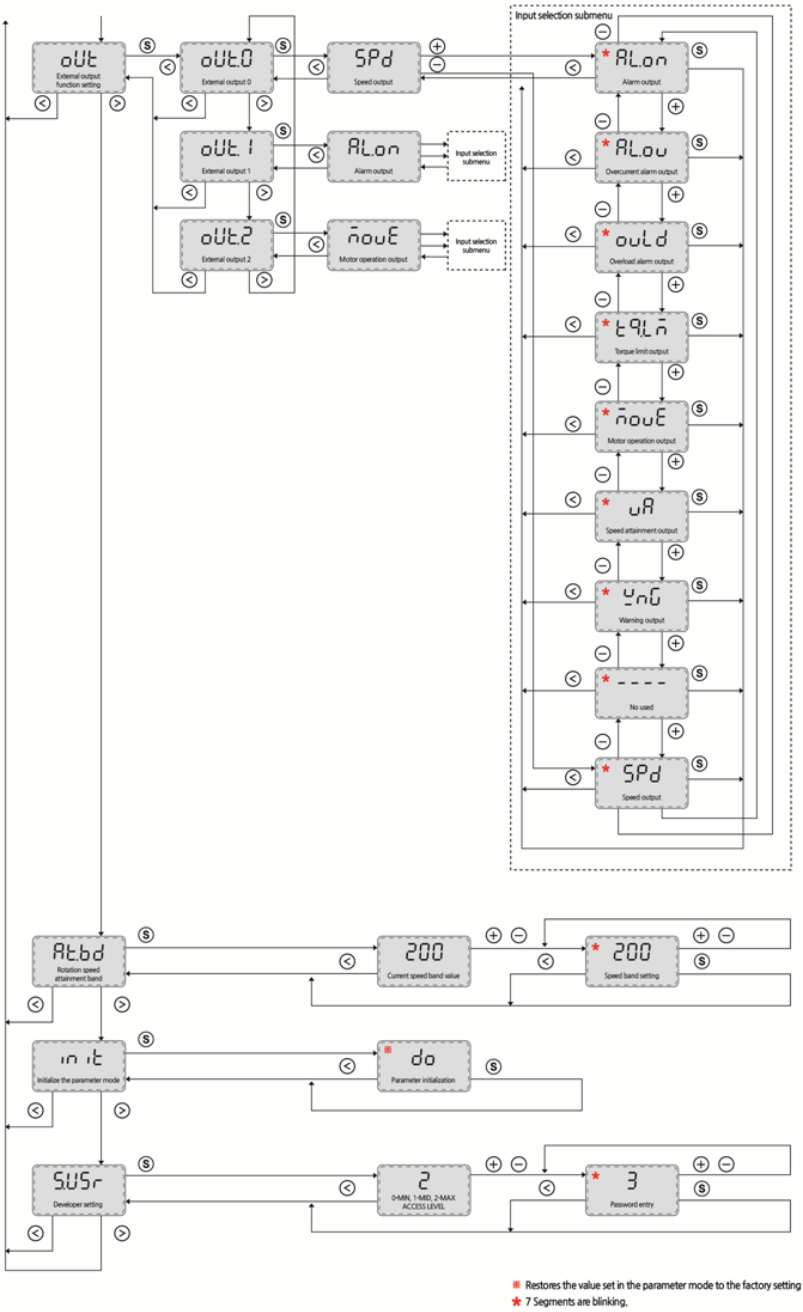
10-3 Parameter setting mode(2page)



10-3 Parameter setting mode(3page)

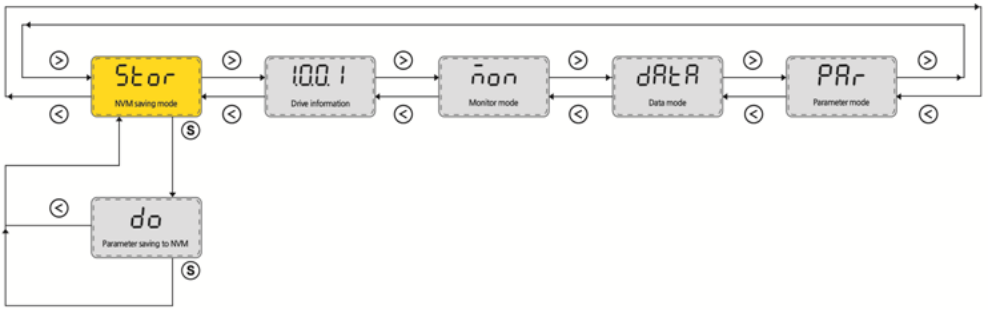


10-3 Parameter setting mode(4page)



※ Restores the value set in the parameter mode to the factory setting
★ 7 Segments are blinking.

10-4 saving mode



11. Parameter list

Item	Display	Description	Setting range	Factory setting
Acceleration time	Pr.tA	Sets the acceleration time.	0.0 ~ 15 s	0.5 S
Deceleration time	Pr.td	Sets the deceleration time	0.0 ~ 15 s	0.5 S
Torque limit	Tq.LM	Sets the torque limit	10~300	300
Overload alarm detection time except when holding a shaft	oL.tM	Sets the time to output the alarm after detecting the overload condition when a load up to the limited duty region exceeding the continuous duty region was applied.	0.1 ~ 60 s	40 S
Speed upper limit	SP.Hi	Sets the upper limit of the rotation speed.	50 ~ 4000 rpm	4000 rpm
Speed lower limit	SP.Lo	Sets the lower limit of the rotation speed.	50 ~ 4000 rpm	50 rpm
Speed reduction ratio	Gr-r	Sets the speed reduction ratio relative to the rotation speed of the motor output shaft. Displays the speed calculated based on the speed reduction ratio on the monitor mode. If the speed reduction ratio for the conveyor is calculated and input, the conveyor speed can also be displayed.	1.00 ~ 9999	1.00
Speed increasing ratio	SP-r	When increasing the motor rotation speed using the external input, the converted speed can be displayed.	1.00 ~ 2.00	1.00
Panel initial display	P.dSP	After the power is turning on, the item displayed on the monitor mode can be changed.	SPd - Rotation speed(r/min) Load - Load factor (%) oP.no - Operation data number	SPd

Item	Display	Description	Setting range	Factory setting
Prevention of operation at power-on alarm	oP.AL	Sets whether to enable or disable the “prevention of the operation at power on alarm”	on - Enable oFF - Disable	on
External I/O function	io.En	The operation method can be selected between the front panel and external input signals. When operating or stopping the motor using the external input signals, the functions of the operation switch, rotation direction switch, and setting button can be set to disable.	oFF - Disable on - Enable	oFF
External input function	in	External input setting.		
X0 input function selection	in.0	Assigns the input signals to the external input terminals.	FWd - FWD rEv - REV P0 - Operation data 0 P1 - Operation data 1 P2 - Operation data 2 A.rSt - Alarm reset E.Err - External error ---- - Not used	FWd
X1 input function selection	in.1			rEv
X2 input function selection	in.2			P0
X3 input function selection	in.3			P1
X4 input function selection	in.4			A.rSt
External output function	oUt	External output setting.		
Y0 output function selection	oUt.0	Assigns the output signals to the external output terminals.	SPd - Rotation speed AL.on - Alarm on AL.ov - Overvoltage OvLd - Overload Tq.LM - Torque limit MovE - Motor operation vA - Rotation speed WnG - Warning ---- - Not used	SPd
Y1 output function selection	oUt.1			AL.on
Y2output function selection	oUt.2			MovE
Rotation speed attainment band	At.bd	Sets the band within which the rotation speed of the motor is deemedto have reached the set value.	1 ~ 400 rpm	200 rpm
Initialize the parameter mode	init	Restores the value set in the parameter mode to the factory setting.		Initial value
Developer setting	S.USr	Developer setting	0 - User setting	0

Attention

- When setting the speed increasing ratio to 1.00, the speed reduction ratio will be effective.
- When setting a longer time in the “overload alarm detection time except when holding a shaft” parameter, an overload status may continue. Repeating this condition may result in shorter service life of the motor and gearhead.
- If a load exceeding the limited duty region was applied or output shaft was holded, the “overload alarm detection time except when holding a shaft” is maximum 5 seconds.

12. Description of I/O signals

Assignable alternative input functions

Display	Function	Description
[FWd]	FWD	The motor rotates when either FWD input or REV input is set to “ON”. The motor instantaneous stop when FWD input and REV input is set to “ON” at the same time.
[rEv]	REV	
[P0]	Operation data 0	These signals are used to select the operation data number. 8 speeds can be specified by using three opertation datas.
[P1]	Operation data 1	
[P2]	Operation data2	
[A.rSt]	Alarm reset	This signal is used to reset the alarm when be operated protection function.
[E.Err]	External error	When turning this signal OFF, an alarm generates and the motor stops instantaneously.
[----]	Not used	This input is not assigned to any signal.

Assignable alternative input functions

Display	Function	Description
[SPd]	Rotation speed	For every rotation of the motor, 30 pulses are output SPEED [RPM] = (SPEED-OUT [Hz] * 60 [Sec]) / 30 [pulses]
[AL.on]	Alarm output	It is output when an alarm is generated (Normally closed)
[AL.ov]	Over voltage alarm	It is output when an alarm is finished (Nomally open)
[OvLd]	Overload alarm	It is output when overload alarm is generated or exceeded (Normally closed)
[tq.LM]	Torque limit	It is output when the torque limit is reached.
[MovE]	Motor operation	It is output when motor is operated.
[vA]	Rotation speed attainment output	It is output when the motor rotation speed becomes equal the value set by the rotation speed attainment band parameter.
[WnG]	Warning output	It is output when a warning generates. (The motor will continue to operate.) when the warning is released, it will automatically turn OFF
[----]	Not used	This input is not assigned to any signal.

13. Alarm list

Alarm code	Alarm type	Cause	Remedial action
[AL.UV.]	Under voltage	• The power supply voltage be-camelower than approximately 60% of the rated voltage	• Check the power supply voltage • Check the wiring of the power supply cable
[AL.oV.]	Over voltage	• The power supply voltage exceeded approximately 120% of the rated voltage. • Vertical drive(gravitational operation) was performed or a load exceeding the permissible load inertia was driven.	• Check the power supply voltage • If this alarm occurs during operation, reduce the load or make the acceleration/deceleration time longer.
[AL.oT.]	Overheat	• The temperature inside drive exceeded the alarm detection temperature.	• Review the ambient temperature.
[AL.oC]	Overcurrent	• Excessive current has flown through the drive due to ground fault. Etc.	• Check the wiring between the drive and motor for damage.
[AL.SF]	Speed feedback	• Actual speed and set speed are different.	• Check the power supply voltage. • Check the load.
[AL.SS]	Sensor error (Hall sensor)	• The motor sensor signal line experienced an open circuit during operation or the motor signal connector came off.	• Check the wiring between the drive and motor.
[AL.oS]	Overspeed	• The rotation speed of the motor output shaft exceeded approximately 4800rpm	• Reduce the load • Review the operation pattern such as acceleration/deceleration time.
[AL.oL]	Overload	• A load exceeding the continuous duty region was applied to the motor for the time exceeded the value set in the “The overload alarm detection time” parameter.	
[AL.oP]	Operation at power-on	• When the power is turned on with the operation switch set to the "RUN" side.	• Set the operation switch to the “STAND-BY”
		• When the power is turned on while the FWD input or REV input is set to “ON”.	• Turn the FWD input or REV input from ON to OFF.
[AL.Et]	External Error (From external input signal)	• The motor instantaneous stop when EXT-ERROR(Stop) input.	• .Check the EXT-ERROR input.. Change status from activated to deactivated

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