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Description

The AS(D01) is a 3-phase BLDC motor drive with 110/220VAC(different models) power input. It can drive up to 400W. The drive can operate slow acceleration and slow deceleration. It is protected against over-voltage, under-voltage, over-current, over-heating and feedback signal fault.

Features

- Stable speed and torque output
- Programmable IO and operation function
- Programmable protect functions
- Parameter setting (additional BT module required)

MODES OF OPERATION

- Speed Control Mode (closed loop)

COMMAND SOURCE

- External Analog Voltage (0~5 or 0~10 VDC)
- External potentiometer
- Digital Indexing

I/O (Function Programmable)

- 3 Digital Inputs (X1 ~ X3)
- 2 Digital Outputs (Y1 ~ Y2)
- 1 Analog Inputs (A1)

Application

- General Industry and Automation

Part Number

ASDS - B 200 R 01-B

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①	Series	ASDS : AS series(D01) three phase BLDC motor drive		
②	Supply Voltage	A : 110VAC 1 phase	B : 220VAC 1 phase	
③	Rated Power	100 : 100W	200 : 200W	400 : 400W
④	Rating	Standard		
⑤	Function	Standard		

Product Line

Model	Voltage	Output Power	Max. Peak Output Current	Continuous Output Current
ASDS-A200R01-B	110 VAC	200 W	5.8	4
ASDS-B200R01-B	220 VAC	200 W		2.6
ASDS-B400R01-B		400 W		4

Specifications

Power Specifications

Model		ASDS-A200R01-B	ASDS-B200R01-B	ASDS-B400R01-B
Item		Value		
Rated Output Power		W	200	400
Power Source	Supply Rated Voltage	VAC(VDC)	110 (155) 1 phase	220 (311) 1 phase
	Permissible Voltage Range	-	± 15%	
	Supply Frequency	Hz	60	
	Permissible Frequency Range	-	± 3%	
	DC BUS Over Voltage Limit*1	VDC	188	367
	DC BUS Under Voltage Limit*1	VDC	120	264
Max. Peak Output Current		A	5.8	
Rated Continuous Output Current (rms) *2		A	4	4
Low Voltage Supply Output (Control Power)		VDC	15 VDC 30mA for I/O only	

*1. Voltage protect can be set between the DC BUS limit range.

*2. If the load is over rated current over 3 sec, the over load protect will activate to stop the motor.

*3. This specification is for drive only.

Control Specifications

Item		Value []: default
Feedback Supported		Halls
Modes of Operation		Speed, Duty
Digital Inputs (X1 ~ X3)		Photocoupler input. Input resistance 9.1kΩ Internal power supply: 15VDC External power supply: 24VDC ± 15% , 50mA min SINK / SOURCE input: applied through external wiring Programmable digital input functions for X1 ~ X3 NC 、 [START/STOP](FWD) 、 [CCW/CW](REV) 、 FREE 、 STOP-MODE 、 [ALM-RST] 、 M0 、 M1 、 M2
Digital Outputs (Y1 ~ Y2)		Open-Collector External power supply: 5 ~ 27VDC 50mA max. INK / SOURCE input: applied through external wiring Programmable digital input functions for Y1 ~ Y2 [SPD-OUT] 、 [ALM-OUT] 、 BUSY-OUT 、 VA-OUT 、 EN-OUT 、 ALM-PULSE 、 BUSY-ALM-PULSE
Analog Inputs (A1)		The input voltage range ([0 ~ 5VDC] or 0 ~ 10VDC), gain and off set can be set by parameter.
Protect Function		Over-voltage, Under-voltage, Over-current, Overload, Main circuit overheat, Feedback sensor error, Over-Speed, EEPROM error
Speed	Setting Method	Select one of the following methods: • [External potentiometer (5kΩ or 20kΩ, 1/4W B Type) or DC voltage (0~5 or 0~10 VDC) through A1] • Digital Setting selected by Input M0, M1, M2 (max 8 data to select, value can be set by parameter)
	Control Range*1	250 ~ 4000 r/min (Hall, No load)
	Regulation *2	± 1%
Acceleration / Deceleration	Setting Method	Digital Setting selected by Input M0, M1, M2 (max 8 data to select, value can be set by parameter)
	Control Range	0.1 ~ 20.0 sec (3000 r/min , No load). Default: ACC = 2.0 sec / DEC = 2.0 sec
Brake		Dynamic emergency stop (with limited motor and inertia)

*1. Other speed range can be customized.

*2. Operation condition : 0 ~ rated torque 、 rated voltage 、 25℃

Communication Specifications

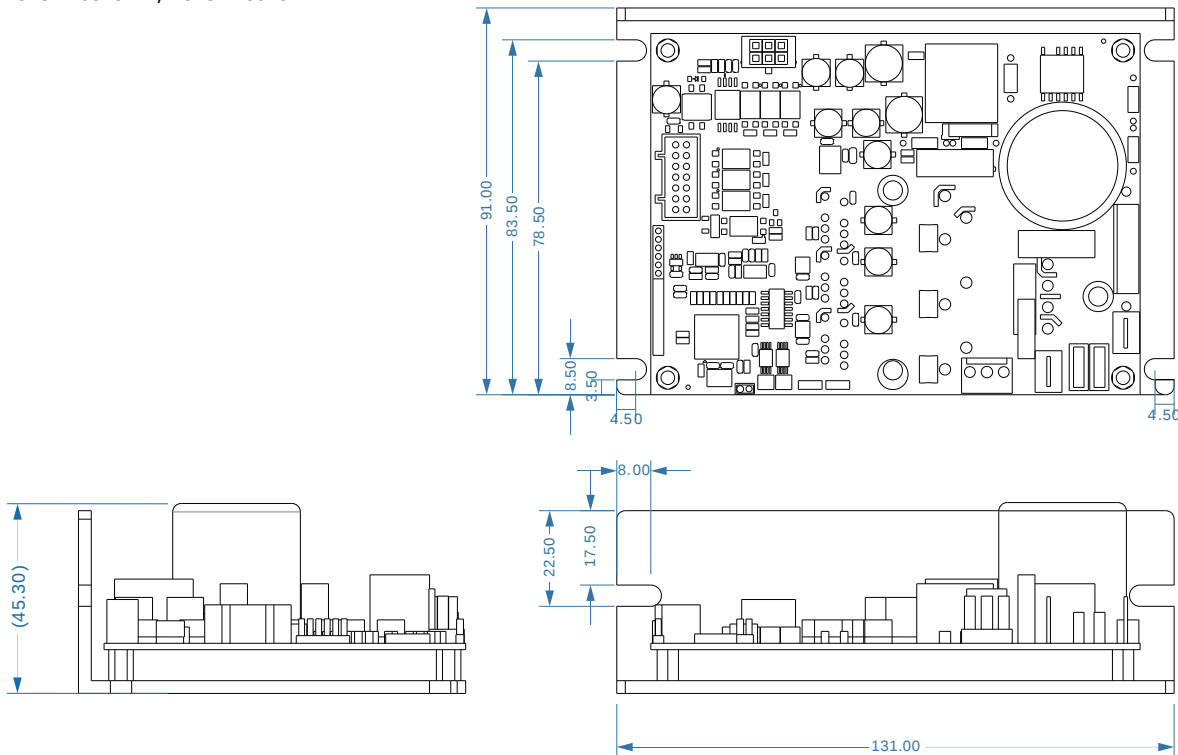
Item	Value
Communication Protocol	Modbus ASCII
Electrical Characteristics	UART (can connect to HC-06 BT module)
Transmit/Receive Method	Hardware full-duplex / Software half-duplex
Baud Rate	115200 bps
Physical Layer (default)	Data: 8-bit, Stop-Bit: 1-bit, Parity: None
Number of Connection Units	1 to 1

General Specifications

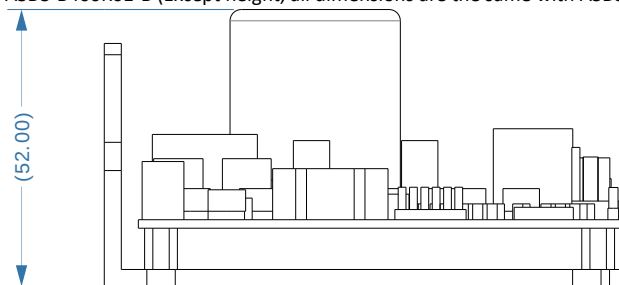
Item		Value
Operating Environment	Ambient Temperature	0℃ ~ +45℃ (External cooling is required when the environment temperature is higher than 45℃)
	Ambient Humidity	< 85 % RH (non-condensing)
Dimension	mm	ASDS-A200R / ASDS-B200R 131 * 191 * 43
		ASDS-B400R 131 * 91 * 49

Mounting Dimension (Unit: mm)

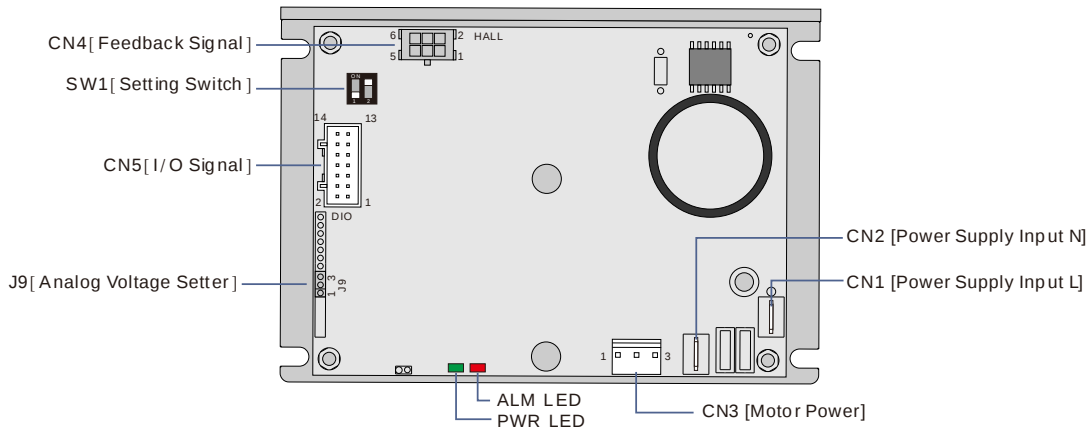
ASDS-A200R01-B / ASDS-B200R01-B



ASDS-B400R01-B (Except height, all dimensions are the same with ASDS-B200R01-B)



Interface / Panel



LED and Switch

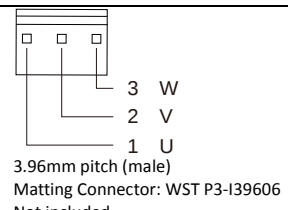
Name	Display	Description
PWR-LED	PWR	ON: AC main power supply is on OFF: AC main power supply is off
ALM-LED	ALM	ON: Normal Blink: Alarm occurs. The type of alarm can be confirmed by the blink count.
IO PWR	SW1-1 And J9	Analog input power setting switch 0 to 10V: SW1-1 = ON, J9-2,3 short. 0 to 5V (or ext VR): SW1-2 = OFF, J9-1,2 short.
	SW1-2	Digital input power setting switch ON: Internal 15V (input active when short with GND-SS). OFF: External 24V

CN1/CN2 AC Power Supply Input

Name	Description
L	AC main power input
N	Matting Connector: WST D70604BS(BL)-2 Not included.

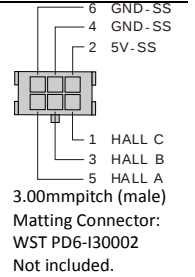
CN3 Motor Power

Name	Description
R-	Regen unit terminal
R+	Regen unit terminal
U	Motor phase U
V	Motor phase V
W	Motor phase W



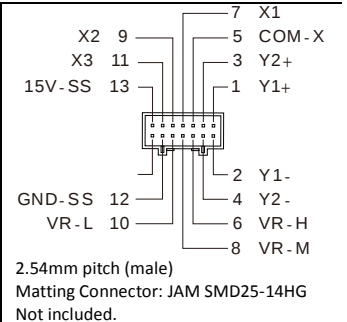
CN4 Feedback Signal

Name	Display	Description
1	NC	Reserved
2	SGND	Signal ground
3	SGND	Signal ground
4	5V-OUT	+5V hall supply
5	NC	Reserved
6	NC	Reserved
7	HALL-U	Motor hall U(S1)
8	HALL-V	Motor hall V(S2)
9	HALL-W	Motor hall W(S3)
10	NC	Reserved



CN5 I/O

Type	No.	Name	Function <Setting No.>	Description (Default)
Digital Input	5	COM-X	Input COM	Use when input using external 24V. Connect to 24V when SINK. Connect to SGND when SOURCE.
	7	X1	START/STOP <1>	SC mode: The motor rotates in the direction set by CCW/CW input when the START/STOP input is ON. The motor stops when the START/STOP input is OFF. Select how the motor should stop by the STOP-MODE input.
	9	X2	CCW/CW <2>	
	11	X3	ALM-RST <8>	Toggle ALM-RST ON/OFF to reset alarm.
Digital Output	1	Y1+	ALM-OUT <2>	Output "ON" when alarm occurs. "OFF" when normal.
	2	Y1-		
	3	Y2+	BUSY-OUT <3>	Output "ON" when motor in operation. "OFF" when motor not in operation (stop).
	4	Y2-		
Analog Input	6	VR-H	+5V-OUT	+5V supply for external potentiometer.
	8	VR-M	A1 analog input	Speed adjustment when using analog input. External potentiometer (5 kΩ or 20 kΩ, 1/4W B Type) or DC voltage (0~5 or 0~10VDC) input.
	10	VR-L	SGND	Signal ground (For analog input)
Control Power	12	GND-SS	SGND	Signal ground
	13	15V-SS	+15V-OUT	Control +15V output for IO only (Reference to SGND).
	14	GND-SS	SGND	Signal ground



1. Is default setting.

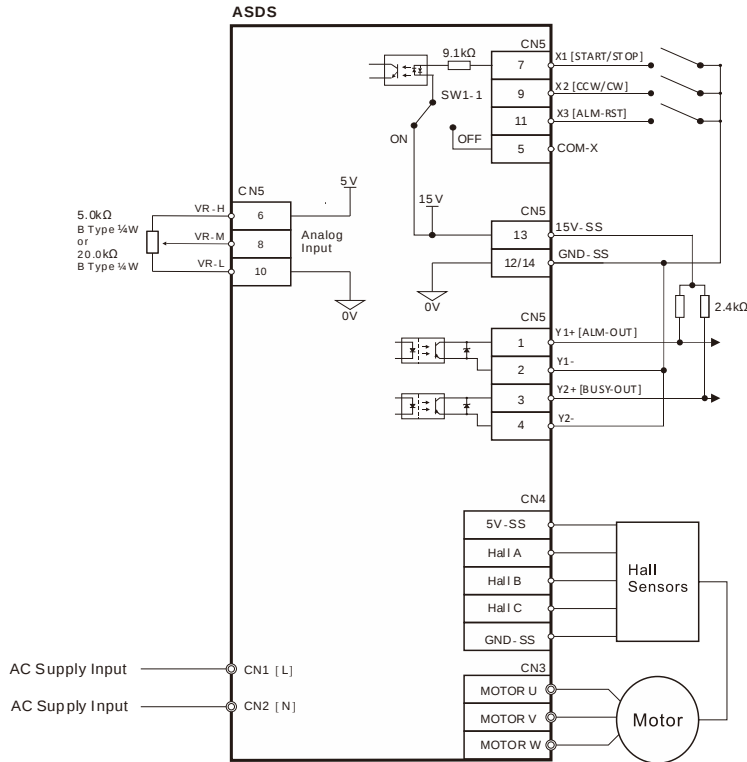
NOTE IO and communication signal should be away from the inductance load, power and motor power at least 100mm. Cables not in use should be insulated well.

NOTE Use SW1/J9 to set to different voltage for digital/analog input. Please turn off the power of the drive before setting SW1/J9.

Connection

■ IO use internal 15V , SINK , Analog input with External potentiometer

Set SW1-2 to ON



Digital Input Default Logic

ON when closed circuit.

OFF when open circuit.

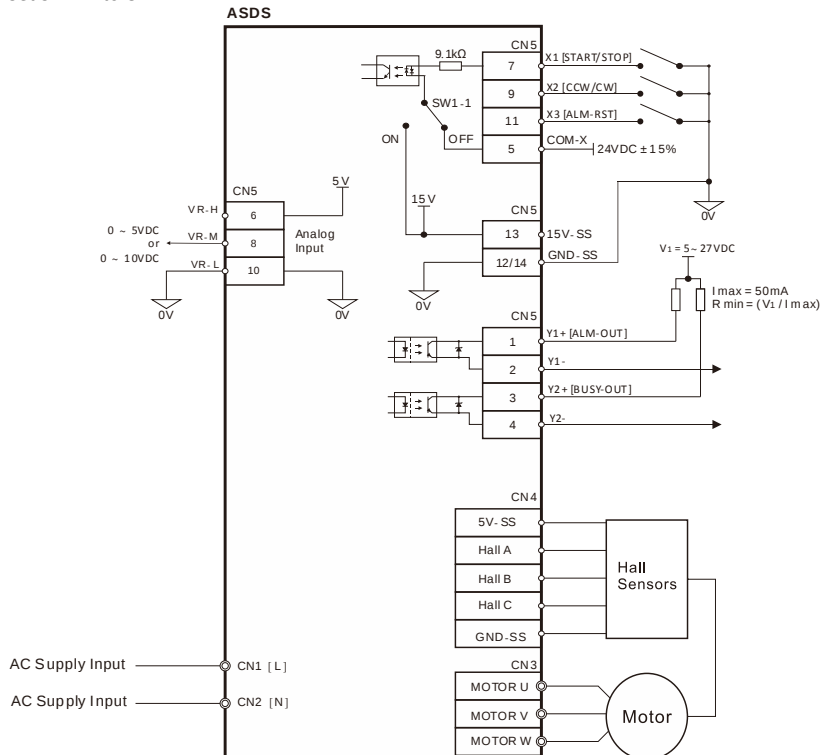
Digital Output Default Logic

ON when closed circuit.

OFF when open circuit.

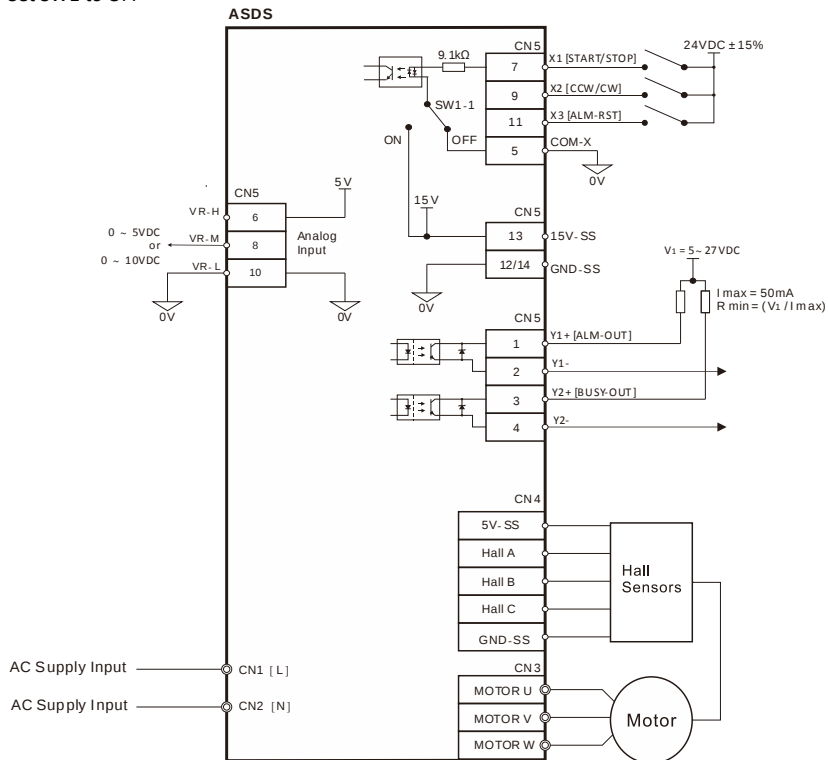
■ IO use external 24V , SINK , Analog input with External DC voltage

Set SW1-2 to OFF



■ IO use external 24V , SOURCE , Analog input with External DC voltage

Set SW1 to OFF



Basic Function

Programmable Input/output

IO signal logic can be programmed through parameter (RS232 model).

I/O	No	Function	Description	Setting	
				ON	OFF
Input	0	NC	No function. Set when the terminal is not connected.	-	-
	1	START/STOP (SC mode)	SC mode: When START/STOP is "ON", motor start operation. When REV is "ON", motor start CW operation. When START/STOP is "OFF", motor stops.	Run	Stop
		FWD (CC mode)	Operation direction set by CCW/CW, stop method set by STOP-MODE.	CW operation	Stop
	2	CCW/CW (SC mode)	CC mode: When FWD is "ON", motor start CW operation. When REV is "ON", motor start CW operation.	CCW	CW
		REV (CC mode)	When FWD and REV are both "ON" and parameter 08-07 is 1, motor stops. When FWD and REV are both "OFF", motor stops Stop method set by STOP-MODE.	CCW operation	Stop
	5	FREE	When FREE is "ON" motor output is cut off.	FREE	FREE deactivate
	6	STOP-MODE	Set the motor stop method: "ON": motor instant stop (brake). "OFF" or not in use: motor decelerate to stop.	Instant stop	Deceleration stop
	8	ALM-RST	Alarm reset: Set ALM-RST "OFF" more than 0.5 sec then set it to "ON" more than 0.5 sec then set it back to "OFF" again to reset an alarm. For safety concern, alarm can only be reset when all the operation signals (START/STOP, FWD, REV...) are "OFF"	-	-
	10	M0	Operation data No. select: M0, M1, M2 as 3 bits binary to select operation data No. M0 as bit0, M1 as bit1, M2 as bit2. E.g.: 000b=No.0, 001b=No.1, 010b=No.2...	M0 is 1	M0 is 0
	11	M1		M1 is 1	M1 is 0
	12	M2		M2 is 1	M2 is 0
Output	0	NC	No function. Set when the terminal is not connected.	-	-
	1	SPD-OUT	Speed pulse output. Output 12 pulse per motor revolution for a 8 poles motor. $\text{RPM} = \frac{\text{SPD-OUT freq.} \cdot 2}{\text{motor poles} \cdot 3} \cdot 60 = \frac{\text{SPD-OUT freq.}}{\text{motor poles}} \cdot 40$	-	-
	2	ALM-OUT	"ON": alarm occurs; "OFF": normal.	有 Alarm	無 Alarm
	3	BUSY-OUT	"ON": motor in operation (running); "OFF": motor not in operation (not running).	-	-
	4	VA-OUT	VA-OUT is "ON" when the motor speed is in the setting range.	Speed in range	Speed out of range
	5	EN-OUT	The EN-OUT output is "ON" when the motor speed is over the setting value (parameter 02-16).	Speed over	Speed under
	6	ALM-PULSE	When the protect function has activated, the ALM-PULSE generates pulses same as the ALM-LED flashes.	-	-
	7	BUSY-ALM-PULSE	When normal, the BUSY-ALM-PULSE function is same as the BUSY-OUT. When the protect function has activated, the BUSY-ALM-PULSE function is same as ALM-PULSE.	-	-

Operation Data (Speed, ACC/DEC)

■ Operation Data Command Source

The speed/Duty setting method can be set by 「Operation Data Command Source」 parameter(ID:02-03).

ID: 02-03 Setting	Speed/Duty	ACC	DEC	Tq Limit	Description
0 (default)	A1	Digital	Digital	Digital	Analog A1 to control speed/Duty.
1	Digital				All operation data set by digital.

■ Operation Data Table

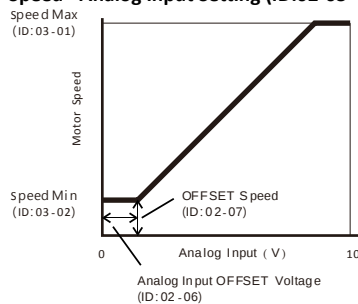
Data No.	M2	M1	M0	Parameter ID				
				Speed	ACC	DEC	Torque Limit	Duty
0	OFF	OFF	OFF	03-09	04-01	04-09	07-01	07-09
1	OFF	OFF	ON	03-10	04-02	04-10	07-02	07-10
2	OFF	ON	OFF	03-11	04-03	04-11	07-03	07-11
3	OFF	ON	ON	03-12	04-04	04-12	07-04	07-12
4	ON	OFF	OFF	03-13	04-05	04-13	07-05	07-13
5	ON	OFF	ON	03-14	04-06	04-14	07-06	07-14
6	ON	ON	OFF	03-15	04-07	04-15	07-07	07-15
7	ON	ON	ON	03-16	04-08	04-16	07-08	07-16

Data No.	M2	M1	M0	Register Address (Hex)									
				Speed		ACC		DEC		Torque Limit		Duty	
				EEP	RAM	EEP	RAM	EEP	RAM	EEP	RAM	EEP	RAM
0	OFF	OFF	OFF	0308h	3F08h	0400h	4000h	0408h	4008h	0700h	4300h	0708h	4308h
1	OFF	OFF	ON	0309h	3F09h	0401h	4001h	0409h	4009h	0701h	4301h	0709h	4309h
2	OFF	ON	OFF	030Ah	3F0Ah	0402h	4002h	040Ah	400Ah	0702h	4302h	070Ah	430Ah
3	OFF	ON	ON	030Bh	3F0Bh	0403h	4003h	040Bh	400Bh	0703h	4303h	070Bh	430Bh
4	ON	OFF	OFF	030Ch	3F0Ch	0404h	4004h	040Ch	400Ch	0704h	4304h	070Ch	430Ch
5	ON	OFF	ON	030Dh	3F0Dh	0405h	4005h	040Dh	400Dh	0705h	4305h	070Dh	430Dh
6	ON	ON	OFF	030Eh	3F0Eh	0406h	4006h	040Eh	400Eh	0706h	4306h	070Eh	430Eh
7	ON	ON	ON	030Fh	3F0Fh	0407h	4007h	040Fh	400Fh	0707h	4307h	070Fh	430Fh

■ Speed Setting

The speed setting method can be set by 「Operation Data Command Source」 parameter(ID:02-03). The default setting is using analog input.

Speed - Analog Input Setting (ID:02-03 = 0)



$$\text{Command_Speed} = (\text{Input_V} - \text{OFFSET_V}) \times \text{Gain} + \text{OFFSET_Speed}$$

ID	Parameter	Description	Range	Default
02-04	Analog Input Range	Set the input voltage range	0: 0 ~ 5 VDC 1: 0 ~ 10 VDC 2: Set by SW/Jumper	2
02-05	Analog Input Gain	Command speed(r/min) per delta 1V of input	0 ~ 10000 r/min perV	850
02-06	Analog Input OFFSET V	Origin v of analog input	0 ~ 200 (1=0.01 VDC)	0
02-07	Analog Input OFFSET Speed	Speed when input is OFFSET V	0 ~ 10000 r/min	250
03-01	Analog Input Speed Max	Max and min speed can be set by analog input	200 ~ 10000 r/min	4000
03-02	Analog Input Speed Min		200 ~ 10000 r/min	250

Speed - Operation data No. indexing (RS232) (ID:02-03 = 1)

Speed can be selected using parameter ID:03-09 to 03-16 depends on the status of input M0, M1, M2 (see Operation Data for reference).

■ ACC/DEC Setting

ID	Parameter	Description	Range	Default
04-01 ~ 04-08	ACC No.0 ~ ACC No.7	Acceleration time digital setting	1 ~ 100 (1=0.1sec)	20
04-09 ~ 04-16	DEC No.0 ~ DEC No.7	Deceleration time digital setting	1 ~ 100 (1=0.1sec)	20

■ Torque Limit Setting

ID	Parameter	Description	Range	Default
07-01 ~ 07-08	Torque Limit No.0 ~ Torque Limit No.7	Torque limit digital setting	0 ~ 2000 (1=0.1%)	2000

Operation and Stop

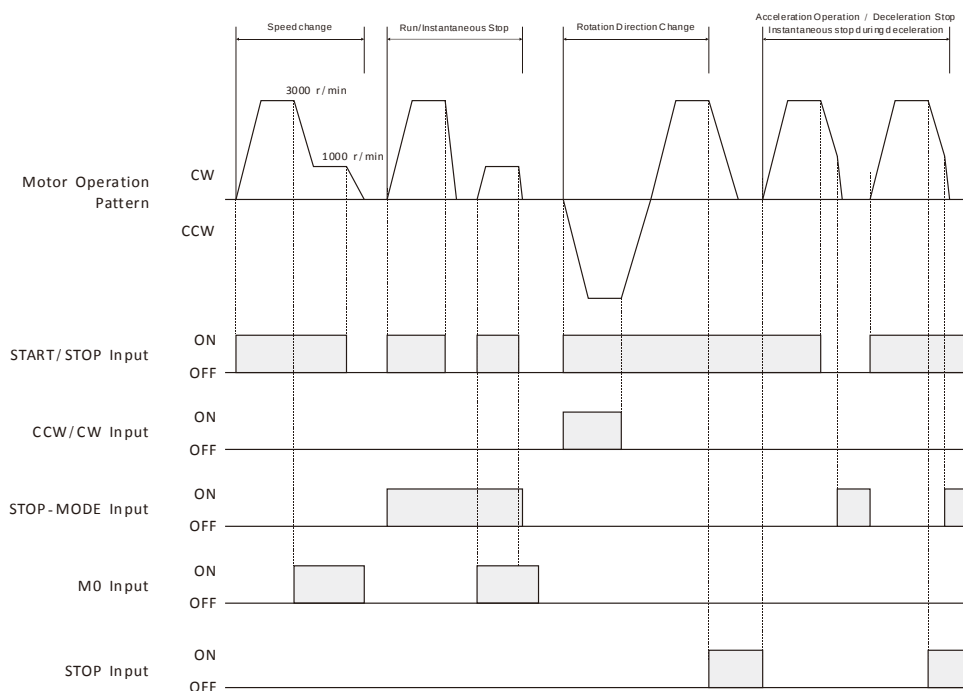
The motor start, stop operation and operating direction can be set by digital input. There are 2 different digital input mode (SC or CC mode) can be selected by parameter (02-01) for the motor operation.

ID	Parameter	Description	Range	Default
02-01	SC/CC Mode	SC: Use input START/STOP to control run and stop. Use CCW/CW input to control operation direction. CC: Use input FWD and REV to control both run/stop and operation direction.	0: SC Mode 1: CC Mode	0

■ SC Mode Operation

The motor start and stop operation is set by START/STOP input. The motor operating direction is set by CCW/CW input.

START/STOP Input	STOP-MODE Input	Motor Operation
ON	OFF	The motor rotates in the direction set by CCW/CW input.
OFF	OFF	The motor stops by the rated of deceleration time setting.
OFF	ON	The motor stops instantaneously.



■ CC Mode Operation

The motor start, stop operation and operating direction is set by FWD and REV inputs.

FWD Input	REV Input	STOP-MODE Input	Motor Operation
ON	OFF	OFF	The motor rotates in the CW direction.
OFF	ON	OFF	The motor rotates in the CCW direction.
OFF	OFF	OFF	The motor stops by the rated of deceleration time setting.
OFF	OFF	ON	The motor stops instantaneously.
ON	ON	OFF	The motor stops by the rated of deceleration time setting.
ON	ON	ON	The motor stops instantaneously.

Protect Function (Alarm)

When an alarm occurs, the motor coasts to stop, the ALM-OUT outputs ON and the ALM-LED blinks.

Before resetting an alarm, always remove the cause of the alarm and ensure safety then perform one of the reset operations specified below.

- Set the ALM-RST input "OFF" for more than 0.5 sec then set it to "ON" for more than 0.5 sec then set it to "OFF".
- Cycle the power. When cycling the power please turn the power off for at least 1 min or till the PWR LED off then turn the power on again.

NOTE Some alarm can only be reset by cycling the power.

NOTE The alarm cannot be reset if the drive operation command is "ON" (e.g. START/STOP input is ON). Please set all the operation command/signal to "OFF" before reset the alarm.

■ ALM LED

ALM LED blinks in a cycle when an alarm occurs. The blink time in each cycle is corresponding to the alarm error code.

Example of ALM-LED blinks 2 times in a cycle (error code 2: overload).



Error Code	Protect Function	Description
1	Over current	Excessive current has flown through the drive. Could be motor power short or drive power is not enough.
2	Over load	The load exceeds the rated value has applied to the motor more than the allowed time (default 5 sec).
3	Motor feedback fault	Motor hall signal bad or not connected.
4	Over voltage	The input power supply voltage has exceeded the maximum limit. Or the inertia of the load is too large.
5	Under voltage	The input power supply voltage is under the low limit. Or bad power connection.
6	Drive overheat	The drive's heat sink temperature is over maximum limit.
7	Startup failed	Motor UVW bad connection or motor stuck.
8	EEP data error	Error in EEPROM data (Can NOT be reset by ALM-RST).
10	Motor overheat	The motor temperature is too high. Or parameter 05-01 setting incorrect.
12	Over speed	Motor operation speed is over the parameter 05-04 setting.
20	Hall sequence fault	The hall sequences no matching the drive's setting.
22	Parameter error	Parameter setup value was incorrect.

Troubleshooting

Problem	Possible Explanation	Remedial Action
Motor fails to run (But none of the alarm occurred.)	Control power supply incorrect.	Re-examined the IO signal and power supply.
	IO signal bad connection.	
	IO logic incorrect.	
Motor stops after operating for a short duration (few seconds). ALM LED blinks 3 times or 7 times.	Speed command is zero.	Set the speed command $\geq$ the minimum value.
	FREE input is "ON".	Set the FREE input to "OFF".
	Hall signal noise.	Replace the signal cable by a shielded cable. Keep signal cable a distance from the power cable.
	Hall sensor fault	Please contact our support.
	Motor UVW bad connection or motor stuck.	Re-examined the motor power cable and the motor load.
	Drive damaged.	Please contact our support.

Revision History

REV	Date	Remark
1.0	20190426	1 st Release.