




VER 1.0

# Technical Manual

## DS-OLS7-FRS4



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# 1. Features

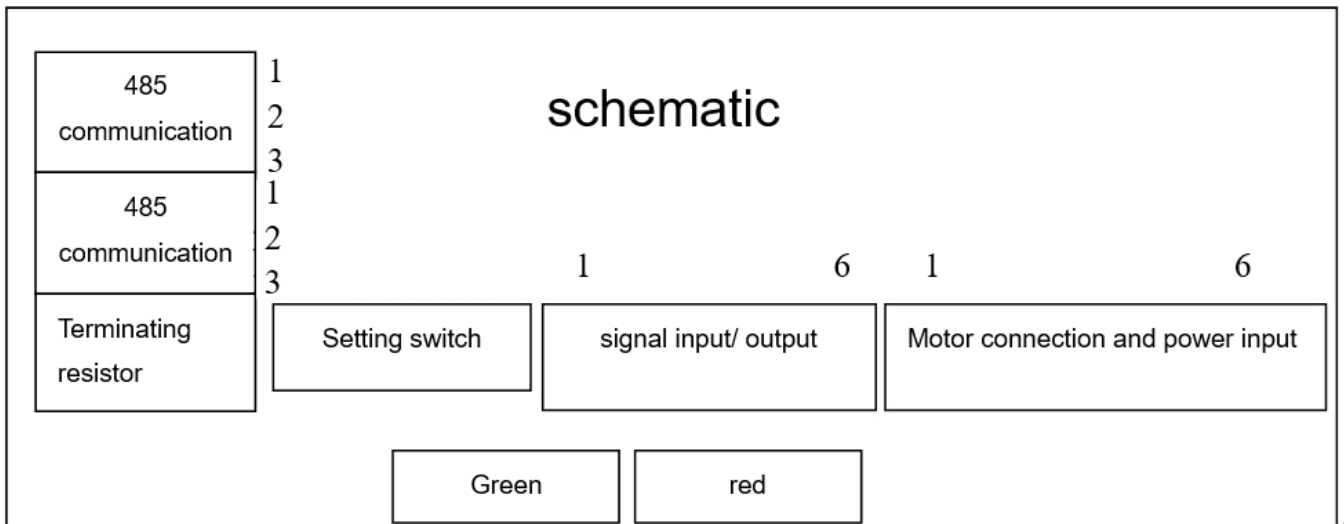


- Input power: DC 24V-48V
- PWM constant current bipolar subdivision drive
- Single / double pulse selection
- Optically isolated input function
- Motor short circuit protection
- Compact design, low noise and low vibration
- Adjustable driving current peak below 3.2 A
- Support RS 485 communication

# 2. Technical Parameters

STEP Drive model		DS-OLS7-FRS4
Adapter motor	Adapted to two-phase hybrid stepping motor, DS-OLS7 FRS4 Maximum fit 3.2A	
Power supply	24 - 48V DC	
Output current	DS-OLS7-FRS4 : 0.1A-3.2A/ phase	
Drive mode	Full-bridge bipolar PWM driver	
Input signal	IN1 ( DIR ) signal IN2 ( STEP ) signal	Optocoupler input voltage H = 3.5 - 26.0V , L = 0 - 0.8V On current 6-15mA
Output signal	OUT Output	Optically isolated output, highest withstand voltage30VDC , Maximum saturation current 50mA
Size	94 × 77 × 27mm ( Including terminal block )	
Weight	About 175 g	
Use surroundings	Use occasion	Avoid dust, oil mist and corrosive gases
	Humidity	< 85 % RH, No condensation
	Temperature	0°C - +40°C
	Heat dissipation	Installed in a ventilated environment

### 3. Schematic and Interface Definition



#### 1) Signal input (as shown from left to right)

##### Operation mode selection 0: external pulse

1 pin --- pulse STEP +, 2 pin --- pulse STEP-, 3 pin --- direction DIR +, 4 pin --- direction DIR-  
 5 feet --- output OUT +, 6 feet --- output OUT-

##### Operation mode selection 1: internal pulse

Pin 1 --- Input port IN1 +, Pin 2 --- Input port IN1-, Pin 3 --- Input port IN2 +, Pin 4 --- Input port IN2-  
 Pin 5 --- Output OUT +, Pin 6 --- Output OUT-

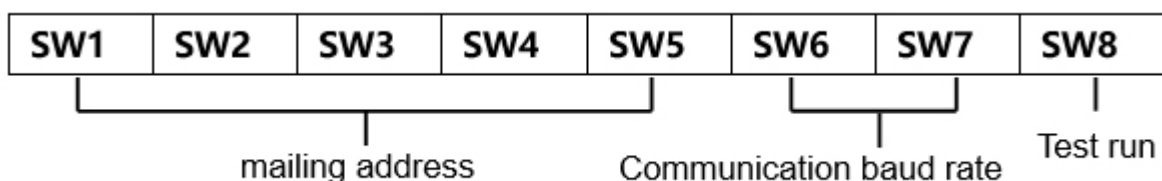
#### 2) Motor connection and power input (as shown from left to right)

1 pin --- A +, 2 pin --- A- 3 pin --- B +, 4 pin --- B-, 5 pin --- V-, 6 pin --- V +

#### 3) RS485 IN / RS485 OUT ( side )

1 pin --- A, 2 pin --- B 3 pin --- GND

#### ● Setting Switch



#### 4) mailing address

Users can control up to 30 DS-OLS7-FRS4 drives simultaneously using the RS-485 bus.

The drive communication address setting uses a 5-digit DIP switch.

The address setting range is 1-32, where address 32 is reserved for the system. When the drive address setting is greater than 31, it needs to be set and saved using the upper debugging software.

And the switch must be set to all OFF (default is 1).



#### Notes

- 1) One controller can control up to 30 DS-OLS7-FRS4 drives simultaneously via the RS-485 bus.
- 2) The communication address setting of each drive must be unique, otherwise it will cause communication error.

DIP switch					address
SW1	SW2	SW3	SW4	SW5	
ON	ON	ON	ON	ON	1
ON	ON	ON	ON	OFF	2
ON	ON	ON	OFF	ON	3
ON	ON	ON	OFF	OFF	4
ON	ON	OFF	ON	ON	5
ON	ON	OFF	ON	OFF	6
ON	ON	OFF	OFF	ON	7
ON	ON	OFF	OFF	OFF	8
ON	OFF	ON	ON	ON	9
ON	OFF	ON	ON	OFF	10
ON	OFF	ON	OFF	ON	11
ON	OFF	ON	OFF	OFF	12
ON	OFF	OFF	ON	ON	13
ON	OFF	OFF	ON	OFF	14
ON	OFF	OFF	OFF	ON	15
ON	OFF	OFF	OFF	OFF	16
OFF	ON	ON	ON	ON	17
OFF	ON	ON	ON	OFF	18
OFF	ON	ON	OFF	ON	19
OFF	ON	ON	OFF	OFF	20
OFF	ON	OFF	ON	ON	21
OFF	ON	OFF	ON	OFF	22
OFF	ON	OFF	OFF	ON	23

OFF	ON	OFF	OFF	OFF	24
OFF	OFF	ON	ON	ON	25
OFF	OFF	ON	ON	OFF	26
OFF	OFF	ON	OFF	ON	27
OFF	OFF	ON	OFF	OFF	28
OFF	OFF	OFF	ON	ON	29
OFF	OFF	OFF	ON	OFF	30
OFF	OFF	OFF	OFF	ON	31
OFF	OFF	OFF	OFF	OFF	N/A

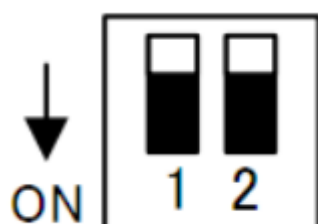
### 5) Communication baud rate

DIP switch		Baud rate (bps)
SW6	SW7	
ON	ON	4800
ON	OFF	9600
OFF	ON	19200
OFF	OFF	38400

### 6) Test run

The commissioning function is used to verify the performance of the drive. Turn the SW8 switch to ON when the power is off. Then, after power-on, without pulse input, the SW8 gear dial switch is turned from the ON position to the OFF position. After 1 second, the OFF position is set to the ON position, that is, the test run function is started (the motor is at 1 rev/sec. The speed of the cycle is positive and negative movements in a circle).

### 7) DIP switch (SW9-10) setting



Set the terminal resistance to ON/OFF

Please set both switches of the final node to ON only.

Never set more than two device switches to ON.

## 8) Idle current

After 500 milliseconds of no pulse input, the current will automatically enter the idle current to reduce motor heating. The current is restored to the set value during pulse input.

## 9) Indicator function

This product has 2 LEDs indicating that the light shows the working status:

### 1. Green light: (work instructions)

When the motor has no current, the lamp flashes 2 times (0.5 second low level, 0.5 second high level) to complete the 2 second high level, and then recirculate.

It is always on when the motor is running.

The lamp flashes when the motor is running (0.5 second low level, 0.5 second high level).

### 2. Red light: (fault indication)

Mode: Blinking (0.5 sec low level, 0.5 sec high level) times to complete 2 seconds high level, then recirculate.

Alarm function	Flashing light	Description
<b>Motor overcurrent</b>	Constantly bright	Motor phase current overcurrent or driver failure
<b>Motor phase loss</b>	Flashing once	The motor is not connected
<b>Power overcurrent</b>	2 flashes	Power overcurrent or drive failure
<b>Undervoltage</b>	3 flashes	Power input is less than 18V
<b>Overpressure</b>	4 flashes	Power input is greater than 52V
<b>overheat</b>	5 flashes	Drive heatsink temperature above 80 °C
<b>overload</b>	8 flashes	Brake resistor failure
<b>other</b>	other	Other failure

## 4. Power Supply

### 4.1 Voltage



The chopper driver continuously changes the size and direction of the motor winding voltage and detects the current to obtain accurate phase current. If both high efficiency and low noise are to be ensured, the driver supply voltage shall be at least 5 times the motor rated phase voltage (that is, the motor rated phase current  $\times$  phase resistance).

If you need the motor to get better high speed performance, you need to increase the driver supply voltage.

If power is supplied from a regulated power supply, the supply voltage shall not exceed 48V.

If non-stabilized power supply is used, the voltage shall not exceed 34V.

Because the rated current of non-stabilized power supply is full load current ; When the load is light, such as when the motor is not running, the actual voltage is up to 1.4 times the rated voltage of the power supply. For smooth and quiet operation of the motor, choose low voltage.

### 4.2 Current

The maximum supply current shall be the sum of the two phase currents. Usually, the amount of current you need depends on the type of motor, voltage, speed, and load conditions. The actual supply current value is much lower than this maximum value, because the driver USES a switching amplifier that converts high voltage and low voltage current into low voltage and high current. The more the supply voltage exceeds the motor voltage, the less supply current is required. When the motor is connected to a 48V power supply, the output current of the power supply is half of that of the 24V power supply.

### 4.3 Regeneration of Discharge

When the motor slows down, it ACTS like a generator, converting the kinetic energy of the load into electricity. Some energy is consumed by the driver and motor. If your application has a large load running at high speed, a considerable amount of kinetic energy can be converted into electricity. Easy to cause the drive alarm (overvoltage) may even cause damage to the drive.

***Since this driver has the function of anti-power connection, it can prevent the driver damage caused by power connection, so the use of external regenerative discharge device does not work.***

***When your application has a large load running at high speed, please contact the company in advance, shield anti - reverse connection function, and external***



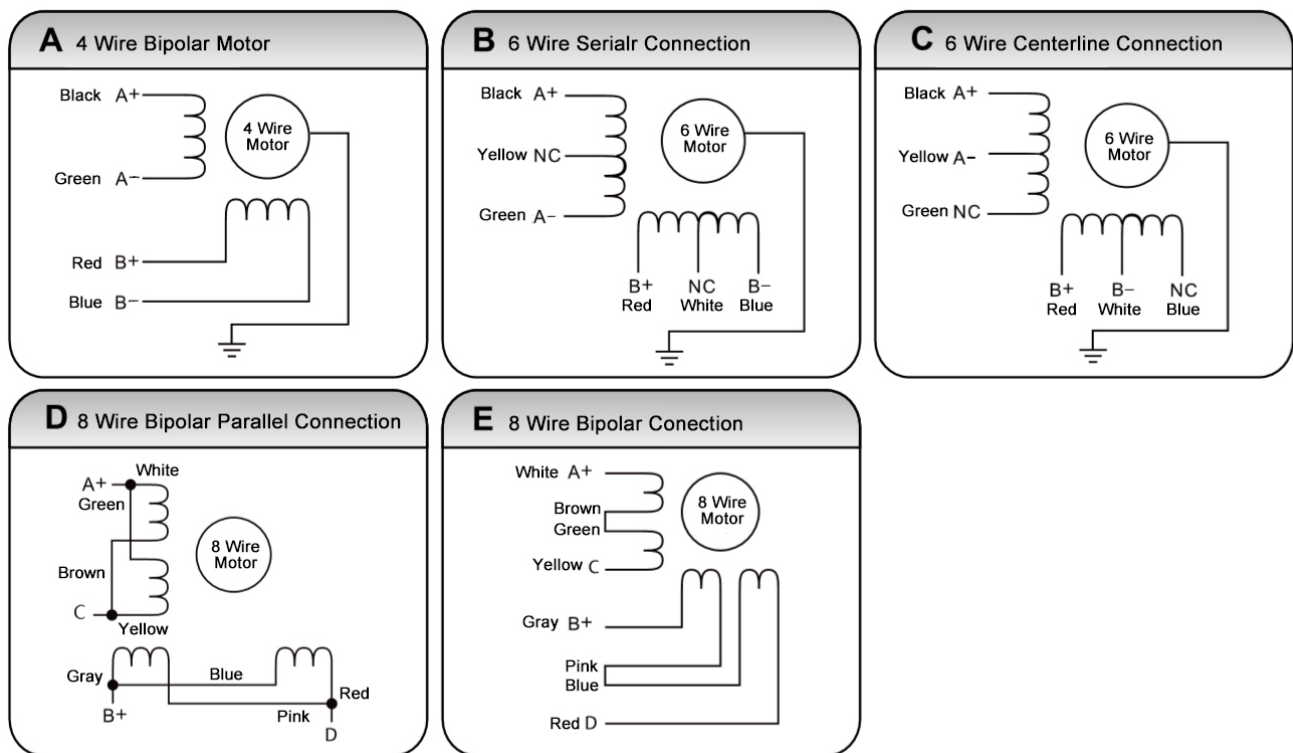
*regenerative discharge device. Please note that the positive and negative terminals of the power supply should not be inversely connected when there is no anti-inversely connected function.*

*The driver damage caused by inversely connected power supply cannot be guaranteed.*

## 5. Motor Connection



Warning: When connecting the motor to the drive, first make sure that the power of the drive is turned off. Make sure that the unused motor leads are not short-circuited with other objects. The motor cannot be disconnected while the drive is energized. Do not connect motor leads to ground or power.



- 1) Four-wire motors can only be connected in one way.
- 2) Six-wire motors can be connected in two ways: full group and half group. In the full group mode, the motor has greater torque at low speeds, but it cannot run as fast as in the half group. When the whole group is running, the motor needs to run at less than 30% of the half-group current to avoid overheating.
- 3) Eight-wire motors can be connected in two ways: series and parallel. The series mode has greater torque at low speeds and less torque at high speeds. When running in series, the motor needs to run at 50% of the current in parallel to avoid overheating.



## Notes

- 1) The corresponding colors of different motors are different. When using the motors, the specifications of the motors shall prevail. For example, the colors of 57 and 86 motor wires are different.
- 2) The phases are relative, but the windings of different phases cannot be connected to the terminals of the same phase of the driver (A +, A- is one phase, B +, B- is the other phase). If the motor direction is different from the expected direction, only A + , A-.
- 3) This driver can only drive two-phase hybrid stepping motors, not three-phase and five-phase stepping motors.
- 4) The method of judging whether the stepper motor is connected in series or in parallel: Rotate the shaft of the motor directly by hand without connecting the driver. If it can rotate easily and evenly, it means that the wiring is correct. If it encounters large resistance and unevenness Accompanied by a certain sound indicating that the wiring is incorrect.

## 6. Signal Input

### 6.1 Pulse Signal : STEP

The driver port has a built-in optocoupler, which can accept 5-24VDC single-ended or differential signals, and the highest voltage can reach 26V. Its change from off to on is understood as accepting a valid pulse edge command. For the common anode, the low level is valid (the common negative is valid for the high level). At this time, the driver will drive the motor to run one step according to the corresponding timing. For the normal operation of the driver, the duty cycle of the effective level signal should be below 50%. In order to ensure the reliable response of the pulse signal, the duration of the pulse effective level of the subdivided driver should not be less than 1us. The signal response frequency of the subdivision driver is 500KHz, and an excessively high input frequency may get an incorrect response.

### 6.2 Direction Signal : DIR

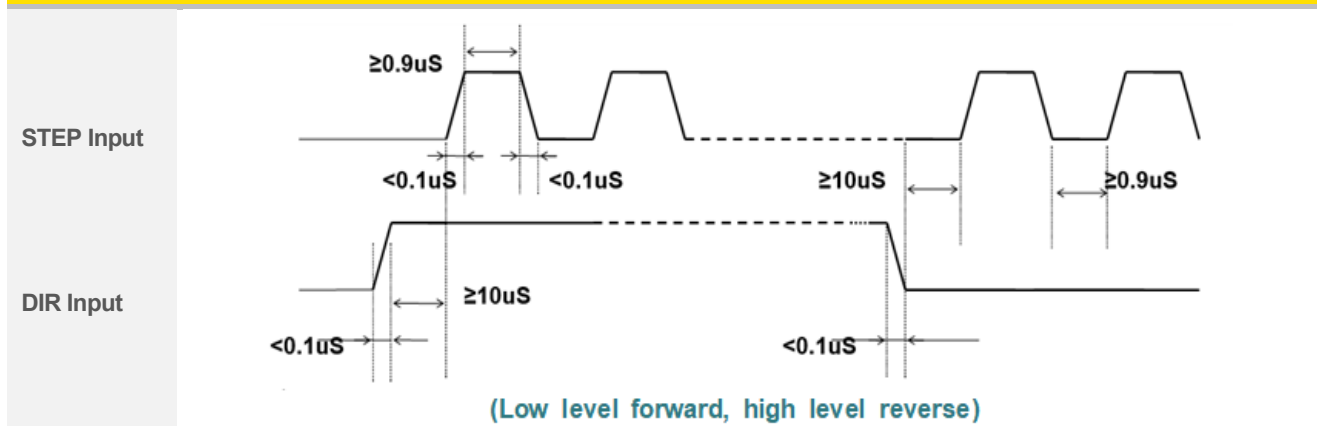
Can accept 5-24VDC single-ended or differential signals, the highest voltage can reach 26V. The on / off of the internal photocoupler at this end is interpreted as two directions of motor operation. The change of the direction signal will change the direction of motor operation. The floating of this end is equivalent to the input high level. It should be noted that the subdivision driver should ensure that the direction signal is established at least 10us ahead of the pulse signal input to avoid the driver's incorrect response to the pulse signal. When the motor is commutated, it must be switched after the motor decelerates and stops to the starting

frequency. The commutation signal must be changed after the last STEP pulse of the previous direction signal and before the first STEP pulse of the next direction. When no commutation is required, the direction signal terminal can be left floating.

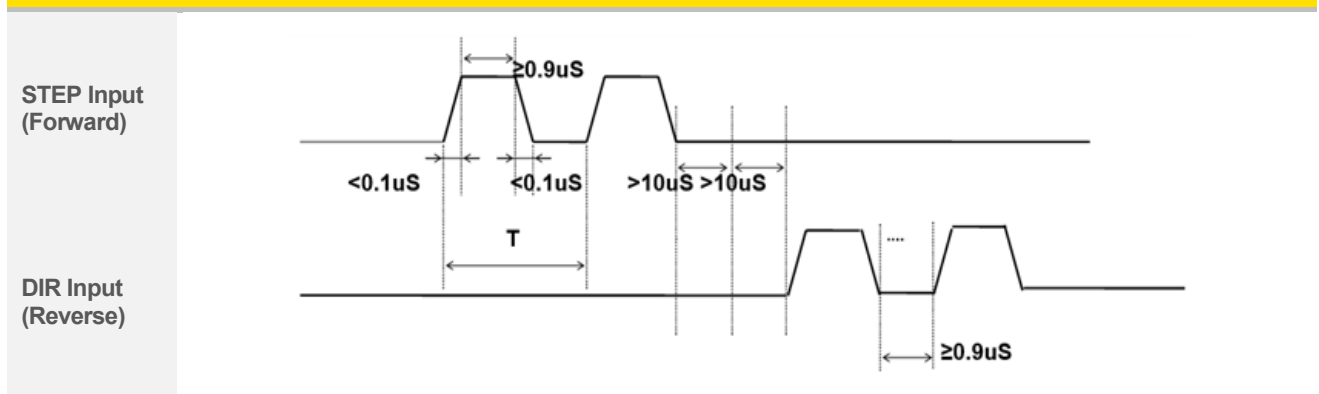
### 6.3 Pulse / Direction Input Timing Diagram



Input signal waveform and timing (single pulse method)



Input signal waveform and timing (double pulse method)

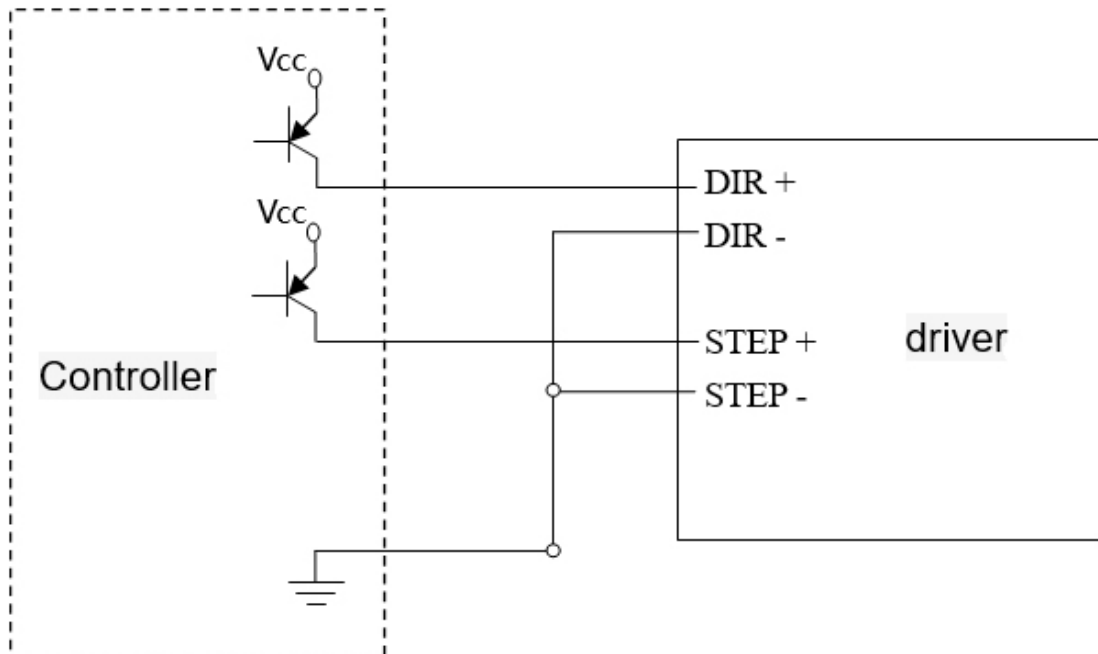
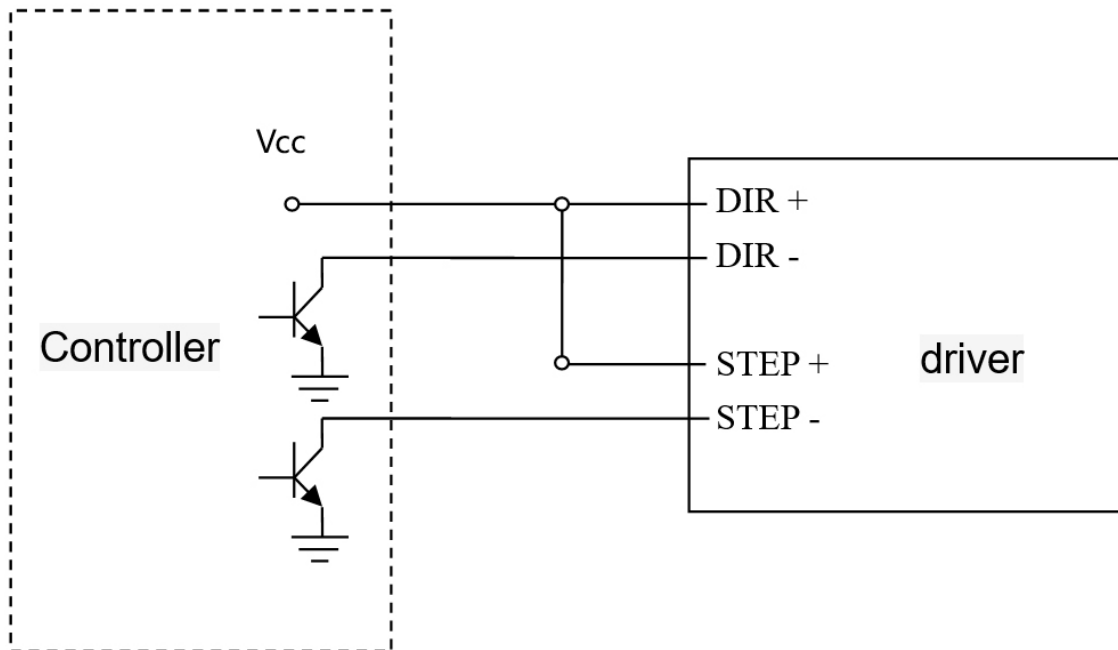


#### Notes

When the driver is set to external pulse control, IN1 is the STEP pulse input port and IN2 is the DIR direction input port.

## 7. Typical Signal Connection

### 7.1 Common Positive Connection



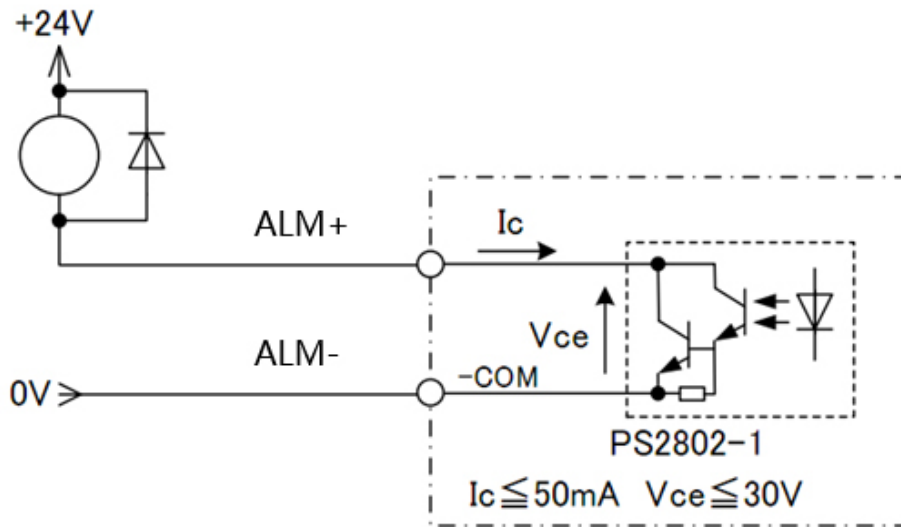
**i** **Notes**

The pulse and direction terminals have a constant current input function, which can be directly connected to the input signal without external series resistor step-down current limiting protection. The VCC value is 3.5-26V.

## 8. Typical Connection of Signal Output



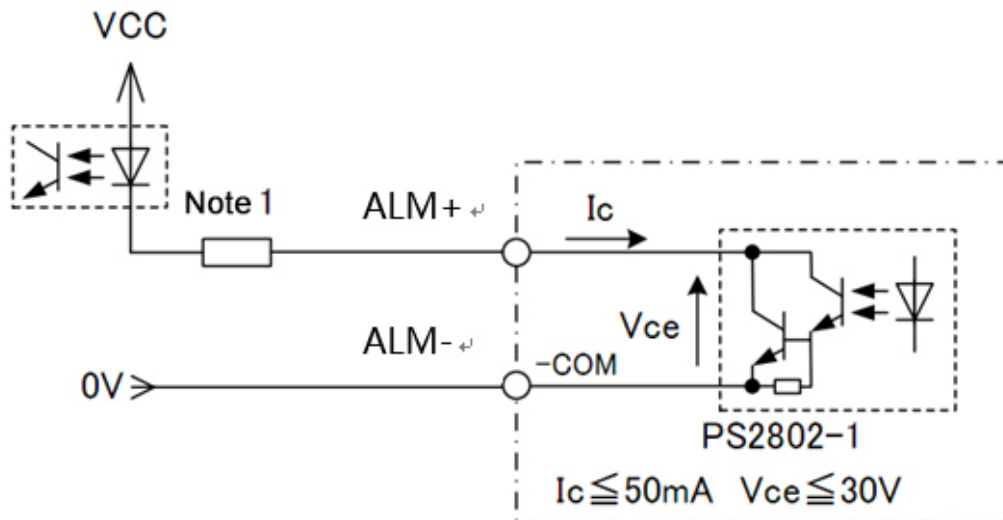
### 8.1 Relay Connection



#### Notes

When the relay is connected, it is required to connect diodes at both ends of the relay (such as IN4000 series)

### 8.2 Optocoupler Connection

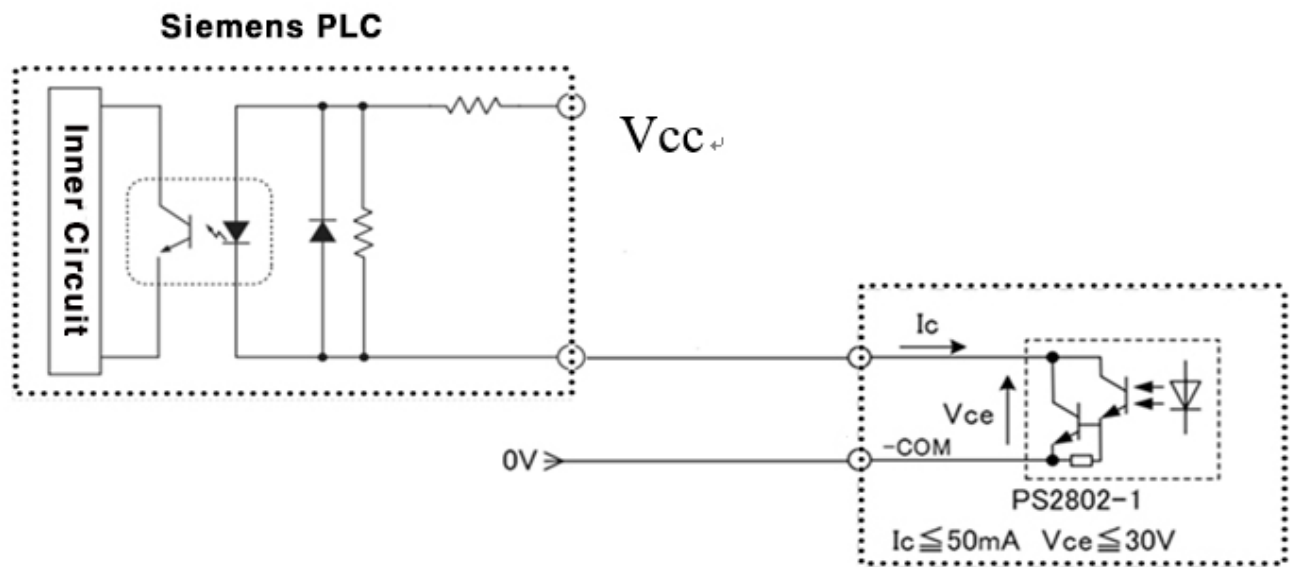


The alarm output is optically isolated, with a maximum voltage of 30VDC and a maximum saturation current of 50mA.

When the driver is working normally, the output is closed.

When the drive fails, the output is left floating.

**Ex** example Connecting with Keyence products

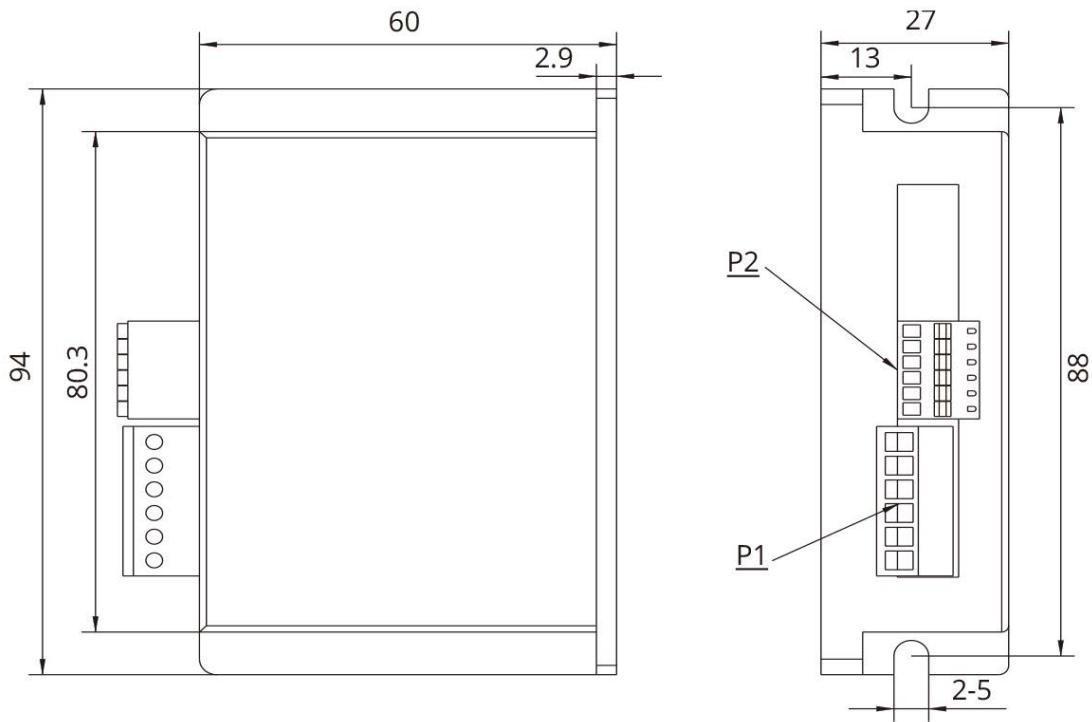


## 9. Wiring Requirements



- 1) In order to prevent the driver from being disturbed, it is recommended to use shielded cable for the control signal, and the shield layer should be shorted to the ground. Except for special requirements, the shielded wire of the control signal cable is grounded at one end: the upper end of the shielded cable is grounded. The driver end of the wire is left floating. Grounding can only be performed at the same point in the same machine. If it is not a real ground wire, the interference may be serious, and the shielding layer is not connected at this time.
- 2) Pulse and direction signal lines and motor lines are not allowed to be bundled side by side, preferably at least 10cm apart, otherwise motor noise may easily interfere with pulse direction signals, causing inaccurate positioning of the motor, system instability and other faults.
- 3) If one power supply is used for multiple drives, a parallel connection should be adopted at the power supply. It is not allowed to connect one to the other in a chain.
- 4) It is strictly forbidden to plug and unplug the drivers strong current (motor and power) terminals. When the charged motor is stopped, a large current still flows through the coil. Plugging and unplugging the strong current (motor and power) terminals will cause a huge momentary induced electromotive force to burn out. driver
- 5) It is strictly forbidden to add lead to the terminal after adding tin, otherwise the terminal may be damaged due to overheating due to the increased contact resistance.
- 6) The wiring head must not be exposed outside the terminal to prevent the driver from being accidentally shorted.

## 10. Installation Dimensions (unit : mm)



### [ Drive installation ]

Install with narrow sides, and install with M3 / M4 screws through the holes on both sides. The power device of the driver will generate heat. If it works continuously under high input voltage and high power conditions, it should expand the effective heat dissipation area or force cooling.

Do not use in places where air circulation is not allowed or where the ambient temperature exceeds 40 ° C; do not install the drive in humid or metal shavings.

## 11. Control Parameter



### Notes

Informal version of communication parameters, some parameters are fixed and not open.

### 11.1 Controller Basic Status (Class 01)



adr	word	content	Elaborate	Range / unit
0100	1	Motor current	Motor real-time current value	0.1%A
0101	1	Input voltage	Current input voltage	1%V
0104	2	Set up segmentation	Set segmentation value	ppr
0106	1	Pulse mode	1 is pulse + direction mode, 2 is double pulse mode	1-2
0108	1	error code	Code at the time of alarm, see 1-2 for content, and display "0" for no fault	-
0109	1	Operating status	Drive running status, see 1-1	-
0110	1	hardware version	Drive hardware version	-
0111	1	Software version	Drive software version	-
0117	2	current position	target location	pulse
0119	1	Actual speed display	-	0.01rps
0126	2	Actual location	Run real-time location	pulse
0174	1	IO select multiple run paragraphs	-	-
0176	1	Multi-segment writing error No	-	-
0178	1	Multi-stage operation	-	-

### 11.2 Basic Parameter Setting (Class 02)

adr	word	content	Elaborate	Range / unit
0201	1	Motor direction switching	Select the motor running direction	0 ~ 1
0206	1	User instructions	Set when the motor is stopped 1: user parameter reset 2: Clear the alarm (except for some hardware failure alarms) 3: drive restart	0~5
0213	1	Half-flow ratio	Stop current ratio (effective in open loop mode)	10%~120%
0224	1	Angular filtering	The smaller the value, the smoother the motor runs, but the higher the delay	1~700
0234	1	Digital filtering	Filter coefficient of input pulse. The larger the value, the lower the input	1~15



			frequency response.	
<b>0241</b>	1	Input Current	Set current	100~3200 0.1A~-3.2A
<b>0242</b>	2	Set up segmentation	Pulses per revolution	200~102400 ppr
<b>0244</b>	1	Pulse mode	1: Pulse + direction mode 2: double pulse mode	1~2
<b>0245</b>	1	Half-flow time	Delay time when the motor stops running and enters half flow state (open loop mode is valid)	1~32767 ms
<b>0296</b>	1	Selection of operating mode	0: external pulse 1: internal pulse Default: 0 Note: After the function is modified, you need to power off and restart	0~1
<b>0298</b>	1	mailing address	Default: 1	1~255
<b>0299</b>	2	Communication baud rate	Default: 19200	1600~115200

### 11.3 Control Parameters (Class 05)



adr	word	content	Elaborate	Range / unit
<b>0301</b>	1	Starting frequency	Default:100	1~2000 0.01~20rps
<b>0302</b>	1	Stop frequency	Default:100	1~2000 0.01~20rps
<b>0303</b>	1	Acceleration	Default:100	5~10000 rps <sup>2</sup>
<b>0304</b>	1	deceleration	Default:100	5~10000 rps <sup>2</sup>
<b>0305</b>	1	Return to origin mode	Return to origin mode, 0: Return to origin clockwise 1: Return to the origin counterclockwise	0~1
<b>0306</b>	1	Fixed-length running speed	Default: 1000	1~5000 0.01~50rps
<b>0307</b>	1	Speed mode running speed	In speed mode, the running direction is consistent with the speed direction Default: 1000	-5000~5000 -50~50rps
<b>0308</b>	1	Jog running speed	Default: 1000	1~5000 0.01~50rps

<b>0309</b>	1	Home speed	Default: 1000	1~5000 0.01~50rps
<b>0310</b>	1	Creeping speed	Running speed after hitting the origin Default: 1000	1~5000 0.01~50rps
<b>0311</b>	2	Home offset	Default: 0	-2000000000~ 2000000000 pulse
<b>0313</b>	2	Output pulse	Running stroke Absolute position mode: run to the specified position Relative position mode: travel setting offset stroke Default: 0	-2000000000~ 2000000000 pulse
<b>0317</b>	2	Positive soft limit	Default: 2000000000 Note: It is invalid during return to origin	-2000000000~ 2000000000 pulse
<b>0319</b>	2	Negative soft limit	Default: -2000000000 Note: It is invalid during return to origin	-2000000000~ 2000000000 pulse
<b>0321</b>	2	Set current position	Default: 0	-2000000000~ 2000000000 pulse
<b>0323</b>	1	control commands	0. empty 1. Absolute running, running to the set distance, running direction is determined by distance plus or minus, speed plus or minus value is invalid, it is effective to modify target position during running 2. Relative running, running at a set distance and running speed. The running direction is determined by the distance plus or minus. The speed plus or minus value is invalid. Modifying the movement distance during running is invalid 3. Speed mode 4. Jog forward 5. Reverse jog 6. deceleration and stop 7. Emergency stop 8. Set the current position, which can only	0~29

be set when the motor is stopped  
 12. Back to origin  
 13. Alarm clear  
 14. Multi-segment data verification  
 15. Multi-segment data storage  
 16. Multi-segment data starts  
 17. Multiple data pauses  
 18. End of multiple segments of data  
 Default: 0

<b>0324</b>	1	Internal control switch		0-65535						
<table border="1"> <thead> <tr> <th>Data bit</th> <th>Bit1</th> <th>Bit0</th> </tr> </thead> <tbody> <tr> <td>Features</td> <td>Negative soft limit</td> <td>Positive soft limit</td> </tr> </tbody> </table>					Data bit	Bit1	Bit0	Features	Negative soft limit	Positive soft limit
Data bit	Bit1	Bit0								
Features	Negative soft limit	Positive soft limit								
1: open function, 0: close function Default: 0										
<b>0327</b>	1	Number of paragraphs	Default: 1	1~32						
<b>0328</b>	1	Multiple selection	Default: 0	0~31						
Note: If IO port is configured with multi-segment selection function, IO configuration multi-segment selection is preferred										

## 11.4 Input Block Designation (Class 06)



adr	word	content	Elaborate	Range / unit
<b>0400</b>	1	IN1 function selection	0. empty 1. Absolute running, running to the set distance, running direction is determined by distance plus or minus, speed plus or minus value is invalid, it is effective to modify target position during running 2. Relative running, running at a set distance and running speed. The running direction is determined by the distance plus or minus. The speed plus or minus value is invalid. Modifying the movement distance during running is invalid 3. Speed mode	0~30

- 4. Jog forward
  - 5. Reverse jog
  - 6. deceleration and stop
  - 7. Emergency stop
  - 8. Set the current position, which can only be set when the motor is stopped
  - 9. positive limit
  - 10. Negative limit
  - 11. Origin signal
  - 12. Back to origin
  - 13. Alarm clear
  - 14. Multi-segment data verification
  - 15. Multi-segment data storage
  - 16. Multi-segment data starts
  - 17. Multiple data pauses
  - 18. End of multiple segments of data
  - 20. Enable
  - 25. IO port configuration multi-stage selection Bit0
  - 26. IO port configuration multi-stage selection Bit1
  - 27. IO port configuration multi-stage selection Bit2
  - 28. IO port configuration multi-stage selection Bit3
  - 29. IO port configuration multi-stage selection Bit4
- Default: 0

<b>0401</b>	1	IN2 function selection	The setting content is the same as IN1 (default value: 0)	0~30
<b>0402</b>	1	IN3 function selection	The setting content is the same as IN1 (default value: 0)	0~30
<b>0429</b>	1	Universal digital input logic		
<b>0410</b>	1	Pseudo communication settingIN1	0: OFF (initial value 0) 1: ON (trigger the action of IN1 configuration)	0~1
<b>0411</b>	1	Pseudo communication settingIN2	0: OFF (initial value 0) 1: ON (trigger the action of IN2 configuration)	0~1
<b>0412</b>	1	Pseudo communication settingIN3	0: OFF (initial value 0) 1: ON (trigger the action of IN3 configuration)	0~1



## 11.5 Output Block Specification (Class 07)

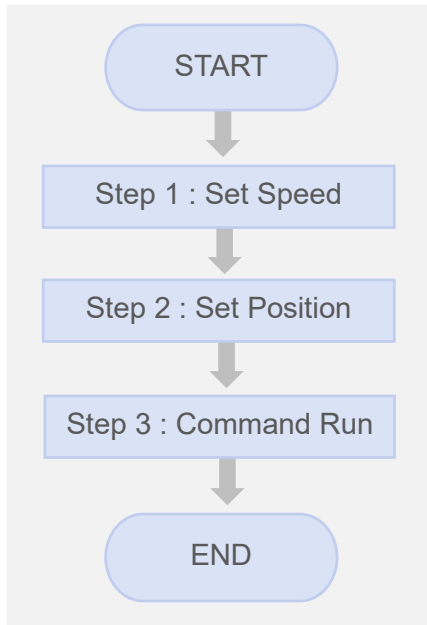
adr	word	content	Elaborate	Range / unit										
0420	1	OUT1 function selection	100: universal port 101: Alarm output function: There is an output signal when there is no alarm, and there is no output signal when there is an alarm. 102: In place signal 103: Enable control output: There is an output signal when offline, and no output signal when enabled.  (Default: 101)	100~104										
0428	1	Universal digital output control	Output port function selection <table border="1"> <tr> <td>Data bit</td> <td>Bit3</td> <td>Bit2</td> <td>Bit1</td> <td>Bit0</td> </tr> <tr> <td>Output port</td> <td>OUT4</td> <td>OUT3</td> <td>OUT2</td> <td>OUT1</td> </tr> </table>	Data bit	Bit3	Bit2	Bit1	Bit0	Output port	OUT4	OUT3	OUT2	OUT1	
Data bit	Bit3	Bit2	Bit1	Bit0										
Output port	OUT4	OUT3	OUT2	OUT1										
0430	1	Digital output logic	Corresponding output port logic <table border="1"> <tr> <td>Data bit</td> <td>Bit3</td> <td>Bit2</td> <td>Bit1</td> <td>Bit0</td> </tr> <tr> <td>Output port</td> <td>OUT4</td> <td>OUT3</td> <td>OUT2</td> <td>OUT1</td> </tr> </table>	Data bit	Bit3	Bit2	Bit1	Bit0	Output port	OUT4	OUT3	OUT2	OUT1	
Data bit	Bit3	Bit2	Bit1	Bit0										
Output port	OUT4	OUT3	OUT2	OUT1										

# 12. Modbus-RTU Example



## 12.1 Running Motor

### 12.1.1 Absolute Position Mode



Step	Add.	Word	Content	Range	Unit
1	0306	1	Running Speed	1 ~ 5000	0.01 rps
2	0313	2	Target Position	-2,000,000,000 ~ 2,000,000,000	pulse
3	0323	1	Control Command	0 ~ 18	-

● Example. 1

Step 1 : Set Speed

Slave ID	1 (0x01)	Driver ID
Function	6 (0x06)	Write Single Register
Address	306 (0x0132)	Running Speed
Data	1200 (0x04B0)	1200 = 12 RPS = 720 RPM
CRC	0x8D2A	CRC-16

Request							
Slave ID	Function	Starting Address		Data		CRC 16	
		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x06	0x01	0x32	0x04	0xB0	0x2A	0x8D
CRC 16							

Response							
Slave ID	Function	Starting Address		Data		CRC 16	
		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x06	0x01	0x32	0x04	0xB0	0x2A	0x8D
CRC 16							

● Example. 2

Step 2 : Set Position

Slave ID	1 (0x01)	Driver ID
Function	16 (0x10)	Write Multi Register
Address	313 (0x0139)	Target Position
Quantity	2 (0x02)	Quantity of Registers
Data	5000 (0x00001388) -5000 (0xFFFFEC78)	5000 pulse -5000 pulse

Request												
Slave ID	Function	Starting Address		Quantity of Registers		Byte Count	Data 1		Data 2		CRC 16	
		Hi	Lo	Hi	Lo		Hi	Lo	Hi	Lo		
0x01	0x10	0x01	0x39	0x00	0x02	0x04	0xEC	0x78	0xFF	0xFF	0x88	0x78
CRC 16												

Response								
Slave ID	Function	Starting Address		Quantity of Registers		CRC 16		
		Hi	Lo	Hi	Lo	Lo	Hi	
0x01	0x10	0x01	0x39	0x00	0x02	0x90	0x39	
CRC 16								

● Example. 3

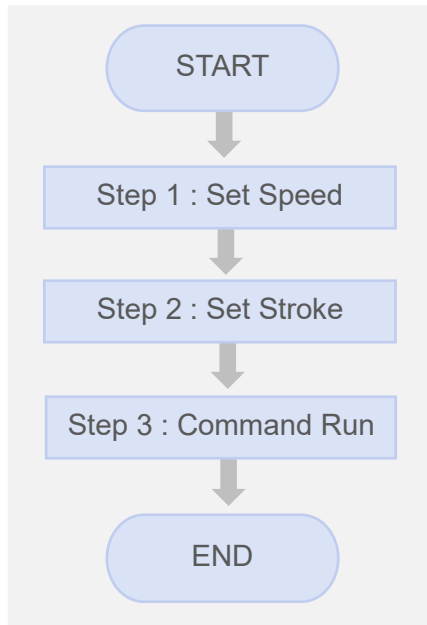
Step 3 : Command Run

Slave ID	1 (0x01)	Driver ID
Function	6 (0x06)	Write Single Register
Address	323 (0x0143)	Command Run
Data	01 (0x0001)	1 : Absolute running
CRC	0x23F8	CRC-16

Request								
Slave ID	Function	Starting Address		Data		CRC 16		
		Hi	Lo	Hi	Lo	Lo	Hi	
0x01	0x06	0x01	0x43	0x00	0x01	0xB8	0x22	
CRC 16								

Response								
Slave ID	Function	Starting Address		Data		CRC 16		
		Hi	Lo	Hi	Lo	Lo	Hi	
0x01	0x06	0x01	0x43	0x00	0x01	0xB8	0x22	
CRC 16								

### 12.1.2 Relative Position Mode



Step	Add.	Word	Content	Range	Unit
1	0306	1	Running Speed	1 ~ 5000	0.01 rps
2	0313	2	Running Stroke	-2,000,000,000 ~ 2,000,000,000	pulse
3	0323	1	Control Command	0 ~ 18	-

● Example. 1

Step 1 : Set Speed

Slave ID	1 (0x01)	Driver ID
Function	6 (0x06)	Write Single Register
Address	306 (0x0132)	Running Speed
Data	1200 (0x04B0)	1200 = 12 RPS = 720 RPM
CRC	0x8D2A	CRC-16

Request							
Slave ID	Function	Starting Address		Data		CRC 16	
		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x06	0x01	0x32	0x04	0xB0	0x2A	0x8D
CRC 16							

Response							
Slave ID	Function	Starting Address		Data		CRC 16	
		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x06	0x01	0x32	0x04	0xB0	0x2A	0x8D
CRC 16							



● Example. 2

Step 2 : Set Stroke

Slave ID	1 (0x01)	Driver ID
Function	16 (0x10)	Write Multi Register
Address	313 (0x0139)	Running Stroke
Quantity	2 (0x02)	Quantity of Registers
Data	5000 (0x00001388) -5000 (0xFFFFEC78)	5000 pulse -5000 pulse

Request												
Slave ID	Function	Starting Address		Quantity of Registers		Byte Count	Data 1		Data 2		CRC 16	
		Hi	Lo	Hi	Lo		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x10	0x01	0x39	0x00	0x02	0x04	0x13	0x88	0x00	0x00	0xB9	0xEF
CRC 16												

Response								
Slave ID	Function	Starting Address		Quantity of Registers		CRC 16		
		Hi	Lo	Hi	Lo	Lo	Hi	
0x01	0x10	0x01	0x39	0x00	0x02	0x90	0x39	
CRC 16								

● Example. 3

Step 3 : Command Run

Slave ID	1 (0x01)	Driver ID
Function	6 (0x06)	Write Single Register
Address	323 (0x0143)	Command Run
Data	02 (0x0002)	2 : Relative running
CRC	0x23F8	CRC-16

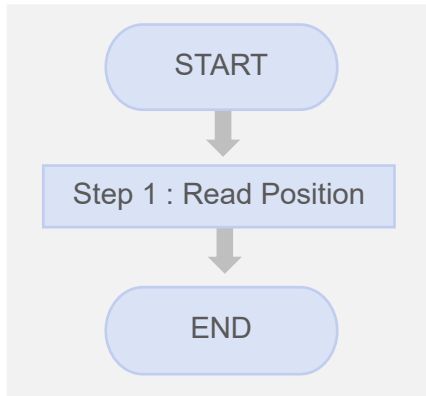
Request								
Slave ID	Function	Starting Address		Data		CRC 16		
		Hi	Lo	Hi	Lo	Lo	Hi	
0x01	0x06	0x01	0x43	0x00	0x02	0xF8	0x23	
CRC 16								

Response								
Slave ID	Function	Starting Address		Data		CRC 16		
		Hi	Lo	Hi	Lo	Lo	Hi	
0x01	0x06	0x01	0x43	0x00	0x02	0xF8	0x23	
CRC 16								



## 12.2 Read Motor Status

### 12.2.1 Read Current Position



Step	Add.	Word	Content	Range	Unit
1	0117	2	Current Position	-2,000,000,000 ~ 2,000,000,000	pulse

● **Example**

Step 1 : Read Current Position

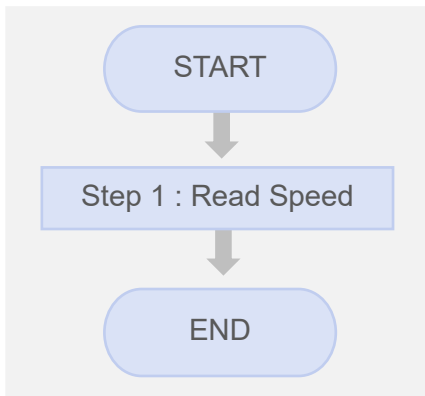
Slave ID	1 (0x01)	Driver ID
Function	3 (0x03)	Read Register
Address	117 (0x0075)	Current Position
Quantity	2 (0x02)	Quantity of Registers

Request							
Slave ID	Function	Starting Address		Quantity of Registers		CRC 16	
		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x03	0x00	0x75	0x00	0x02	0xD5	0xD1
CRC 16							

Response IF : current position = 5000 ( 0 x 00001388 )								
Slave ID	Function	Byte Count	Read Registers 126		Read Registers 127		CRC 16	
			Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x03	0x04	0x13	0x88	0x00	0x00	0x7E	0x9D
CRC 16								



## 12.2.2 Read Current Speed



Step	Add.	Word	Content	Range	Unit
1	0119	1	Current Speed	1 ~ 5000	0.01 RPS

● **Example**

Step 1 : Read Current Speed

Slave ID	1 (0x01)	Driver ID
Function	3 (0x03)	Read Register
Address	119 (0x0077)	Current Speed
Quantity	1 (0x01)	Quantity of Registers

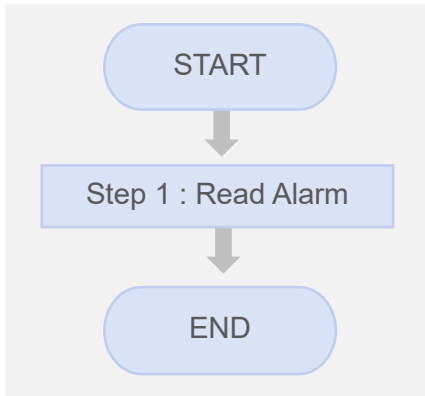
Request							
Slave ID	Function	Starting Address		Quantity of Registers		CRC 16	
		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x03	0x00	0x77	0x00	0x01	0x34	0x10
CRC 16							

Response IF : current speed = 1200 ( 0x04B0 )							
Slave ID	Function	Byte Count	Read Registers 119		CRC 16		
			Hi	Lo	Lo	Hi	
0x01	0x03	0x02	0x04	0xB0	0xBB	0x30	
CRC 16							



## 12.3 Read Alarm Status

### 12.3.1 Alarm Status



Step	Add.	Word	Content	Range	Unit
1	0108	1	Alarm Status	-	-

- **Example**

Step 1 : Read Alarm Status

Slave ID	1 (0x01)	Driver ID
Function	3 (0x03)	Read Register
Address	108 (0x006C)	Alarm Status
Quantity	1 (0x01)	Quantity of Registers

Request							
Slave ID	Function	Starting Address		Quantity of Registers		CRC 16	
		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x03	0x00	0x6C	0x00	0x01	0x44	0x17
CRC 16							

Response IF : alarm status = 11 ( 0 x 000E ) = Motor phase loss							
Slave ID	Function	Byte Count	Read Registers 176		CRC 16		
			Hi	Lo	Lo	Hi	
0x01	0x03	0x02	0x00	0x0E	0xF9	0x83	
CRC 16							

# 13. Parts



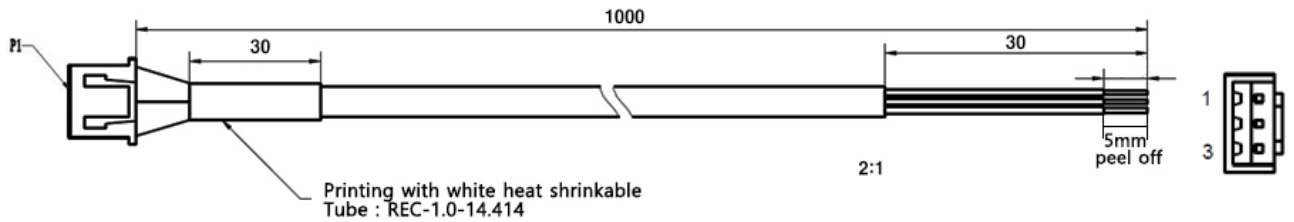
## 1. RS485 Communication line ① (Driver to RS485)

Order Model	L (mm)	Material No.
REC-1.0-14.414	1000	09-516

Connector model : XHP-3

Terminal model : SXH-001T-P0.6 Supplier : JST

Wiring Harness : UL 2464 28AWG\*3C



### Interface Definition

PIN	Describe	Color
1	RS485 A	Red
2	RS485 B	Yellow
3	RS485 GND	Black

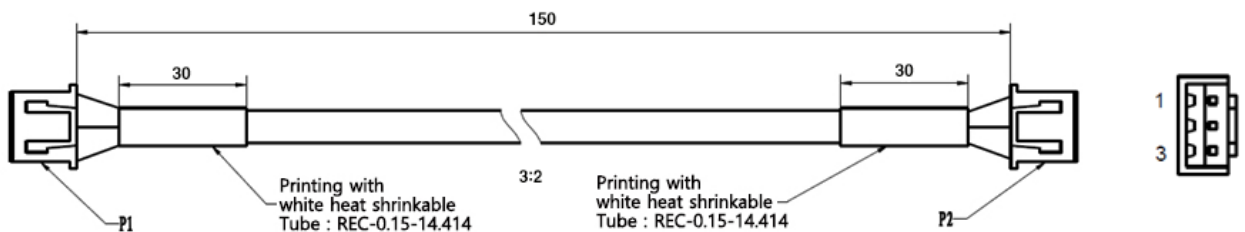
## 2. RS485 Communication line ② (Driver to Driver)

Order Model	L(mm)	Material No.
REC-0.15-14.414	150	09-517

Connector model : XHP-3


Terminal model : SXH-001T-P0.6 Supplier : JST


Wiring Harness : UL 2464 28AWG\*3C




### Interface Definition

P1 P2	Describe	Color
1	RS485 A	Red
2	RS485 B	Yellow
3	RS485 GND	Black

 +86-0519-8517 7825

 +86-0519-8517 7807

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