DINGS
Precision Motion Specialist

VER 1.5

Technical Manual

DS-OLS8-FRS4

DINGS
Precision Motion Specialist

Table of Contents

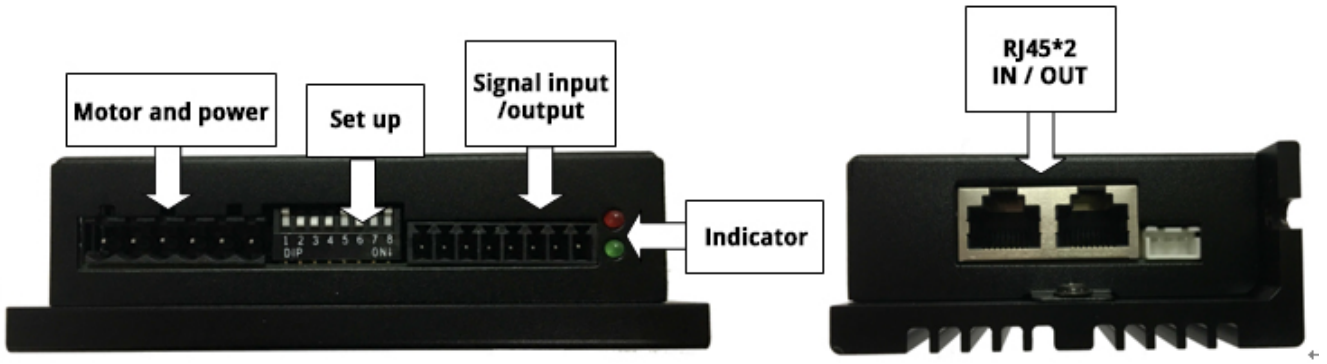
1. Features

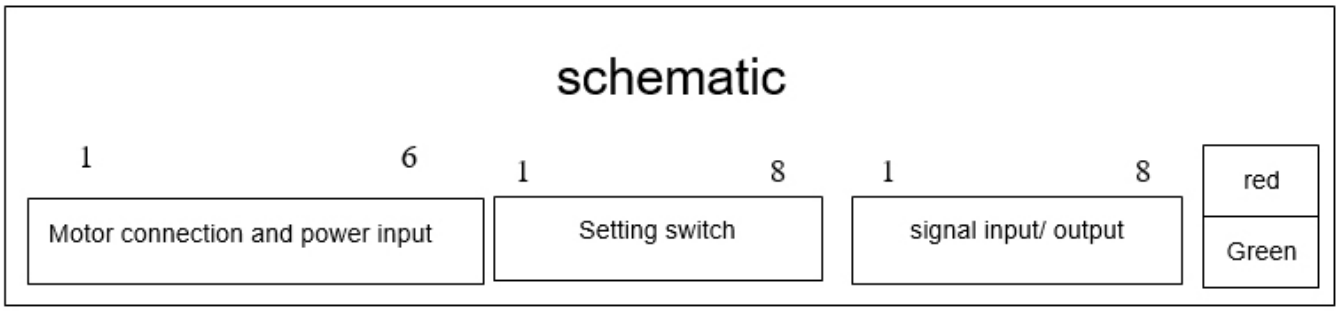
- Input power: DC 24V-72V
- It has offline function, adopts RS-485 isolated bus, supports standard MODBUS-RTU protocol, and can mount up to 30 devices
- Bus-type driver can realize long-distance reliable control, effectively solve the problem of pulse loss in interference environment
- The user can set the current, subdivision and lock current, running mode (pulse input mode, point control mode) through the bus;
- Run real-time status queries
- Built-in single-axis controller function: users can set parameters such as start speed, acceleration time, deceleration time, maximum speed, and total pulse number through the bus
- Deceleration position control function, support position control, speed control and return to origin mode
- 3 channels of optically isolated input (5-24VDC compatible); pulse, direction, and offline input ports are programmed as general-purpose input ports in point control mode to receive external signals
- Control signal to realize the functions of driver enable, start stop, emergency stop, limit, etc.
- 1 optical isolation programmable output interface, output driver status and control signal
- Motor short circuit protection
- Trial run function
- 16 constant-speed constant-angle subdivisions
- Smooth and accurate current control, low heat generation of the motor
- When the step pulse stops for more than 500ms, the motor current enters the idle current
- Excellent smoothness at low subdivisions
- Adjustable driving current peak below 6.5A
- With over-voltage, under-voltage, over-current protection functions

2. Technical Parameters

Drive model		DS-OLS8-FRS4
Applied motor		Adapted to two-phase hybrid stepping motor, DS-OLS8-FRS4 maximum fit 6.5A
Power supply		24 - 72V DC
Output current		DS-OLS8-FRS4：0.1A-6.5A/ phase
Drive method		Full-bridge bi-polar PWM drive
Input signal	Pulse signal	Optocoupler input voltage H = 3.5-26V, L = 0-0.8V On-current 6-15mA
	Offline signal	
	Direction signal	
Output signal	Alarm Output	Optically isolated output, highest withstand voltage 30VDC, maximum saturation current 50mA
Dimension		118 × 78 × 34mm（Including terminal block）
Weight		About 300g
Operation Environment	Precaution	Avoid dust, oil mist and corrosive gases
	Humidity	< 85 % RH, Non-condensing
	Temperature	0°C - +40°C
	Cooling	Installation in a ventilated environment

3. Schematic and Interface Definition





3.1 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 --- offline FREE +, 6 feet --- offline FREE-, 7 feet --- output OUT +, 8 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 --- Input port IN3 +, Pin 6 --- Input port IN3-, Pin 7 --- Output OUT +, Pin 8 --- Output OUT-

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

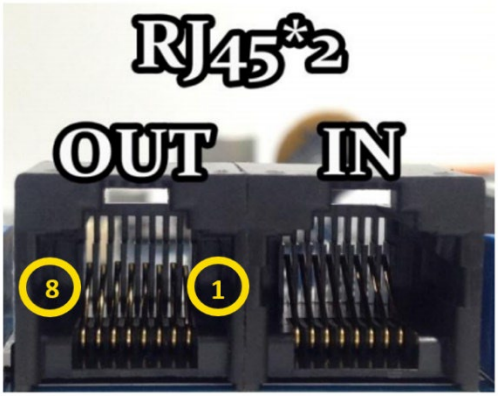
1 pin --- V +, 2 pin --- V-, 3 pin --- A +, 4 pin --- A-, 5 pin --- B +, 6 pin --- B-

3.3 RS485 IN / RS485 OUT (side)

Pin.	Signal name	Pin.	Signal name
1	NC	2	GND
3	A Input (RS485)	4	NC
5	NC	6	B Input (RS485)
7	Terminating resistor (OUT)	8	Terminating resistor (OUT)

Standard product:

RJ45 type × 2 Pin position from the insertion angle

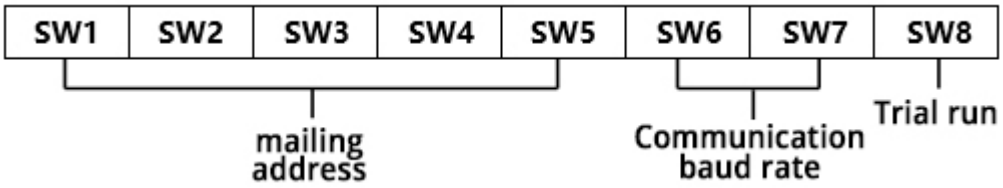


Notes

When multiple units are connected in series, when pins 3 and 8 of the last OUT port are short-circuited, and pins 6 and 7 are short-circuited, it is the access terminal resistance.

The IN port does not include a terminating resistor.

Setting switch



3.4 Mailing address

Users can control up to 30 HSD286pro drives at the same time using RS-485 bus. The driver's communication address is set by 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-level debugging software.

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

Notes

1) One controller can control up to 30 HSD286pro drives at the same time through the RS-485 bus.
2) The communication address setting of each driver 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		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

3.5 Communication baud rate

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

3.6 Trial run

The test run function is used to verify the performance of the drive. Turn OFF the 8th gear switch in the power-off state. Then when the power is turned on without pulse input, turn the

SW8 gear dial switch from ON to OFF, and then set OFF to ON from 1 second, then start the trial operation function (the motor rotates at 1 revolution / second Speed cycle forward and backward).

3.7 Idle current

The driver will automatically enter idle current after 500 milliseconds without pulse input to reduce motor heating. The current is restored to the set value during pulse input.

3.8 Indicator function

■ Status display

This product has 1 red and 1 green LED patch indicator to show status. (The actual LED indicator model and status display is based on the driver)

Mode: complete the number of blinks (0.5 sec low, 0.5 sec high) corresponding to different states, complete 2 sec high, then cycle again.

Status Functions	Indicator Status	Status Code	Clarification
Motor Free	Green light flashing	1	Disable, drive goes offline, motor rotor can run freely
Holding	Green light flashing	2	Enable, no pulse input, motor phase lock but motor not running
Running	Green light always on	3	Pulse input available, motor in operation

■ Alarm display

This product has 1 red and 1 green LED patch indicator to show status. (Actual indicator type and status are based on driver LED settings)

Mode: complete the number of blinks (0.5 sec low, 0.5 sec high) corresponding to different states, complete 2 sec high, then cycle again.

Alarm type	Alarm function	Indicator Status	Status Code	Clarification
Alarm	Motor overcurrent	1 green + 1 red	10	H/W motor phase overcurrent
	Motor out of phase	1 green + 2 red	11	Motor is not connected.
	Over current	1 green + 1 red	12	S/W overcurrent
	Under voltage	1 green + 4 red	13	Power input less than 18V (actual is based on driver specifications)
	Over voltage	1 green + 3 red	14	Power input greater than 60V (actual is based on drive specifications)

	Over Temperature	1 green + 5 red	15	Drive overheating
	Drive failure	1 green + 5 red	16	1. MOS tube driver voltage failure 2. External power supply instability
	EEPROM error	1 green + 5 red	20	EEPROM data write abnormality
	Speed error	1 green + 5 red	24	Motor running speed exceeds system maximum
	Following Error	1 green + 5 red	25	Position deviation greater than set value
	Over load	1 green + 5 red	26	Motor overload
	Communication error	1 green + 5 red	50b	Communication bus abnormality. The communication line is disconnected or the communication quality is unstable in the state of device enable.
	Communication bus error	1 green + 5 red	100	Motor in enable state, bus cut out of OP mode
Warning	EEPROM data reading	Red light always on	256	EEPROM data reading abnormality
	Unstable bus voltage	Red light always on	512	Unstable bus voltage
	Emergency stop	Red light always on	1024	emergency stop
	Positive limit	Red light always on	2048	On positive limits or over positive soft limits
	Negative limit	Red light always on	4096	On negative limits or over negative soft limits
	Origin failed	Red light always on	8192	Failed to return to origin

Notes **The lower 8 bits are alarm codes, only one at the same moment, the higher 8 bits are warnings, warnings can be more than one at the same time**

Example **Positive and negative limits (2048) and negative limits (4096) are triggered at the same time, warning code is displayed: 2048+4096=6144**

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 × 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 72V.

If non-stabilized power supply is used, the voltage shall not exceed 53V.

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.

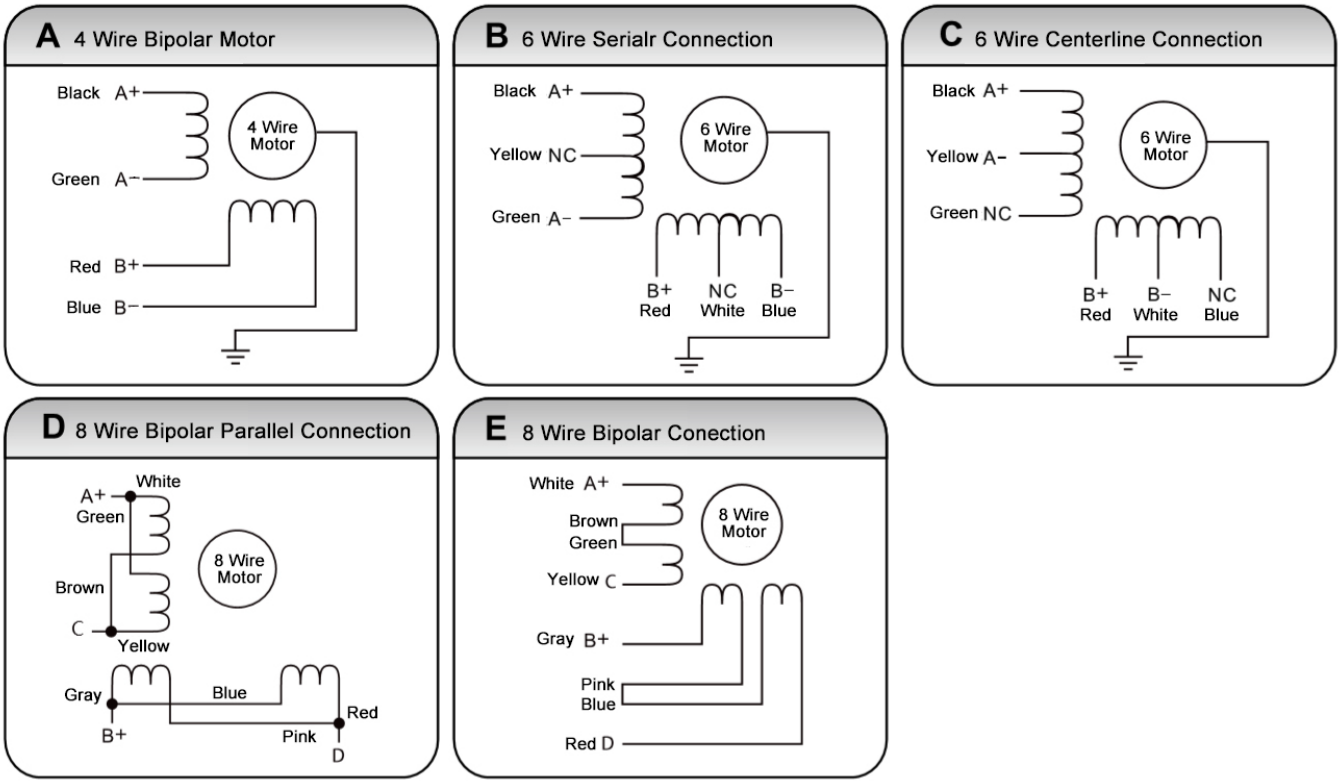
Since this driver has the function of anti-power connection, it can prevent the driver damage caused by power connection, so the use of external regenerative discharge device does not work.

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

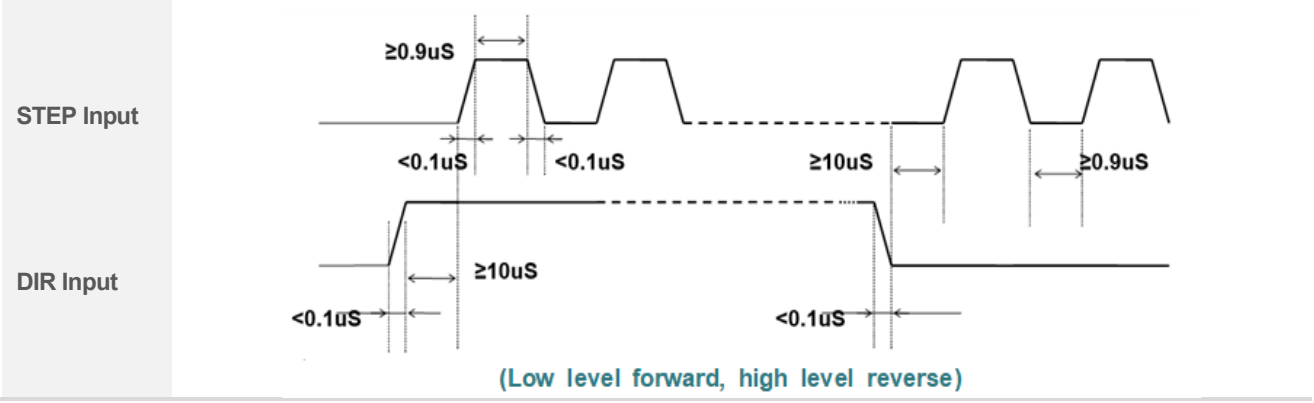
Can accept 5-24VDC single-ended or differential signals, the highest voltage can reach 26V. The on / off of the internal photocoupler at this end is interpreted as two directions of motor operation. The change of the direction signal will change the direction of motor operation. The floating of this 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 Offline Signal : FREE

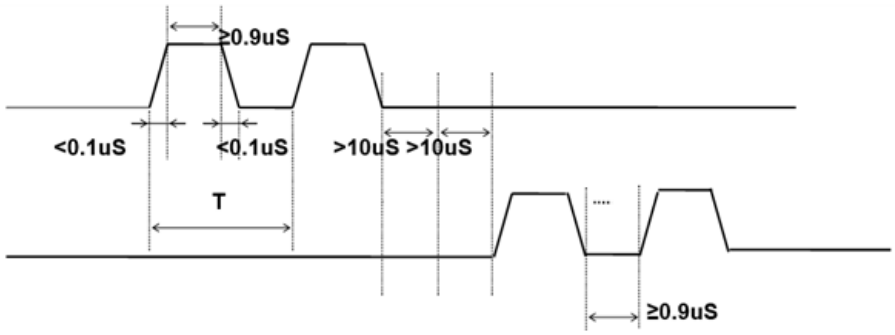
Can accept 5-24VDC single-ended or differential signals, the highest voltage can reach 26V. When the built-in photocoupler is turned on, the motor phase current is cut off, and the rotor is in a free state (off-line state). When this function is not needed, the offline signal terminal can be left floating.

6.4 Pulse / Direction Input Timing Diagram

Input signal waveform and timing (single pulse method)

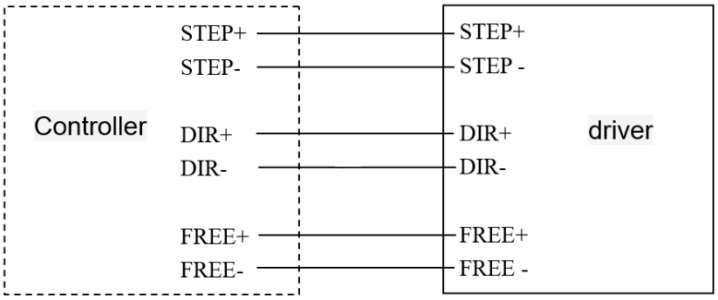


(Low level forward, high level reverse)

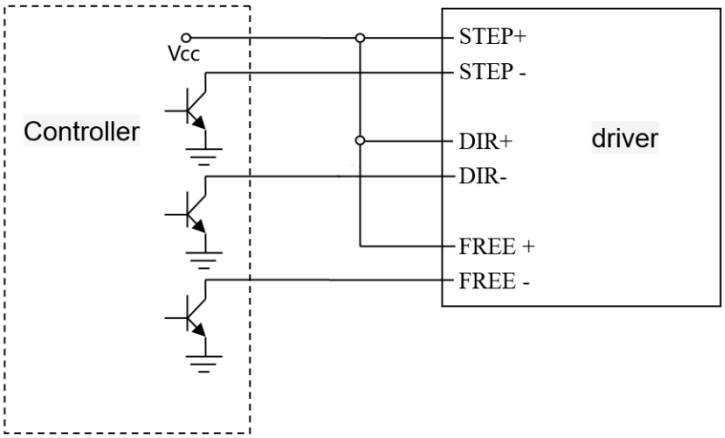
Input signal waveform and timing (double pulse method)	
STEP Input (Forward) DIR Input (Reverse)	

7. Typical Signal Connection

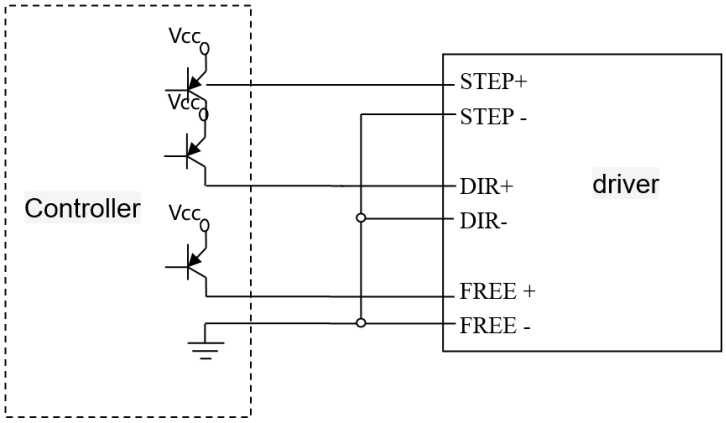
7.1 Differential Connection Method



7.2 Common Positive Connection



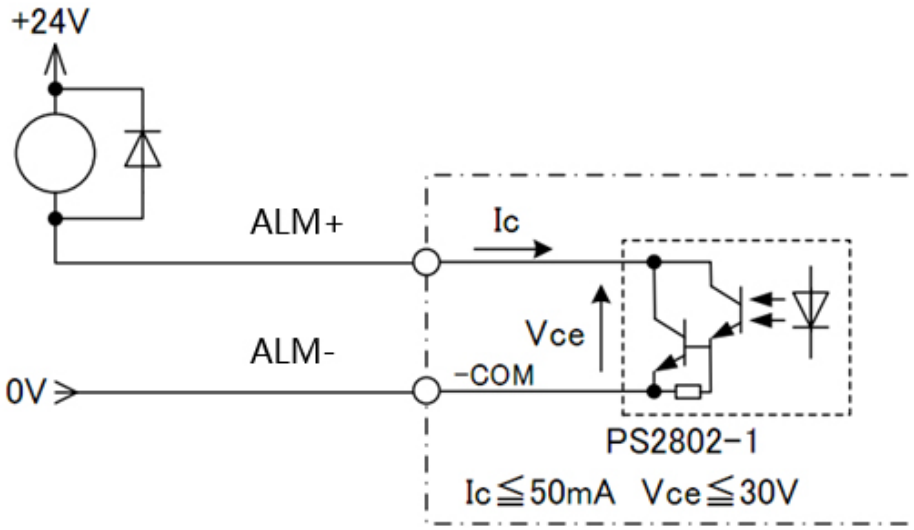
7.3 Common female Connection Method



8. Typical Connection of Signal Output

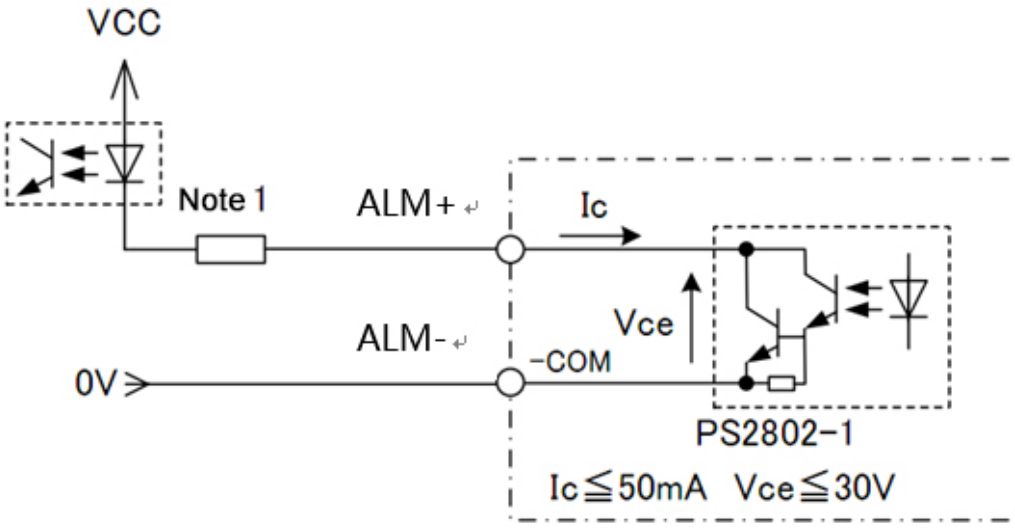
8.1 Relay Connection

Notes The pulse, direction and offline terminals all have constant current input function. You can directly connect the input signal without external series resistor step-down current limiting protection. The VCC value is 3.5-26V.



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

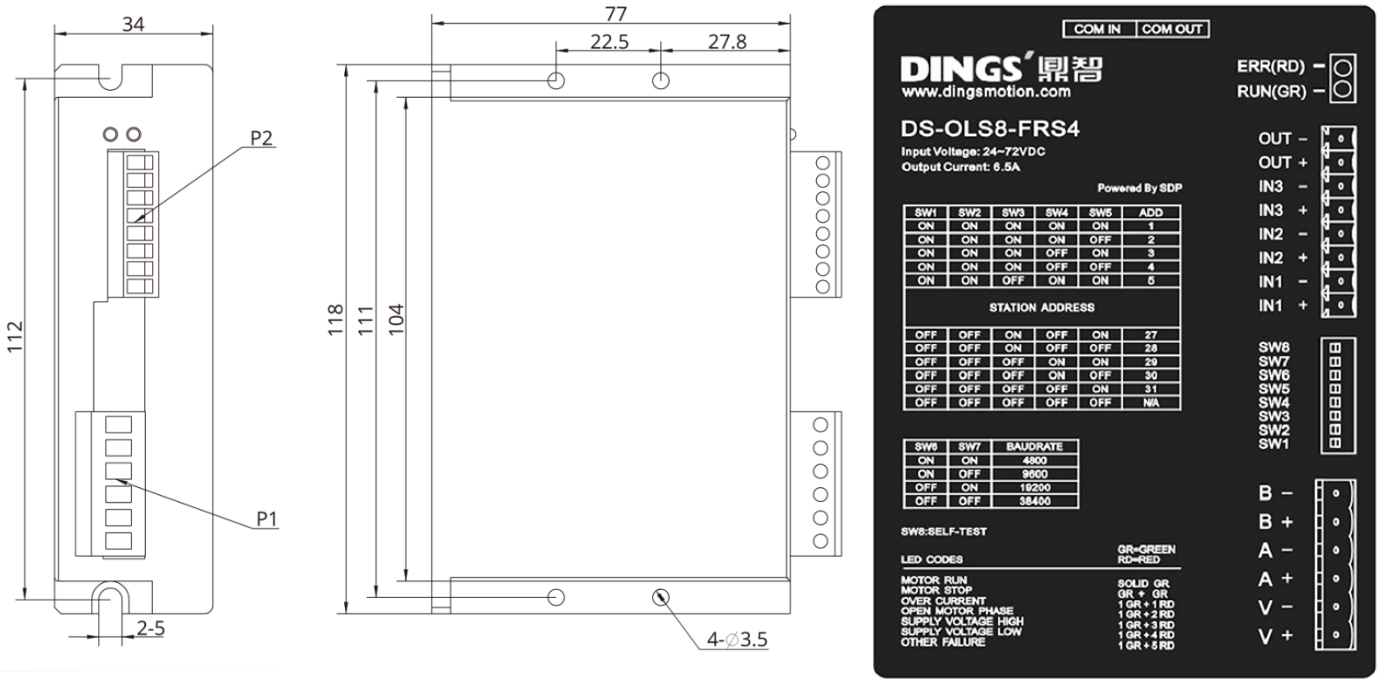
8.2 Optocoupler Connection



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 driver's 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 3-8 for content, and display "0" for no fault	-
0109	1	Operating status	Drive running status, see 3-8	-
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.	
0241	1	Input Current	Set current	100~6500 0.1A~-6.5A
0242	2	Set up segmentation	Pulses per revolution	200~102400 ppr
0244	1	Pulse mode	1: Pulse + direction mode 2: double pulse mode	1~2
0245	1	Half-flow time	Delay time when the motor stops running and enters half flow state (open loop mode is valid)	1~32767 ms
0296	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
0298	1	mailing address	Default: 1	1~255
0299	2	Communication baud rate	Default: 19200	1600~115200

11.3 Control Parameters (Class 05)

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

0309	1	Home speed	Default: 1000	1~5000 0.01~50rps
0310	1	Creeping speed	Running speed after hitting the origin Default: 1000	1~5000 0.01~50rps
0311	2	Home offset	Default: 0	-2000000000~ 2000000000 pulse
0313	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
0317	2	Positive soft limit	Default: 2000000000 Note: It is invalid during return to origin	-2000000000~ 2000000000 pulse
0319	2	Negative soft limit	Default: -2000000000 Note: It is invalid during return to origin	-2000000000~ 2000000000 pulse
0321	2	Set current position	Default: 0	-2000000000~ 2000000000 pulse
0323	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

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

11.4 Input Block Designation (Class 06)

adr	word	content	Elaborate	Range / unit
0400	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	
0401	1	IN2 function selection	The setting content is the same as IN1 (default value: 0)	0~30
0402	1	IN3 function selection	The setting content is the same as IN1 (default value: 0)	0~30
0429	1	Universal digital input logic		
0410	1	Pseudo communication settingIN1	0: OFF (initial value 0) 1: ON (trigger the action of IN1 configuration)	0~1
0411	1	Pseudo communication settingIN2	0: OFF (initial value 0) 1: ON (trigger the action of IN2 configuration)	0~1
0412	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)

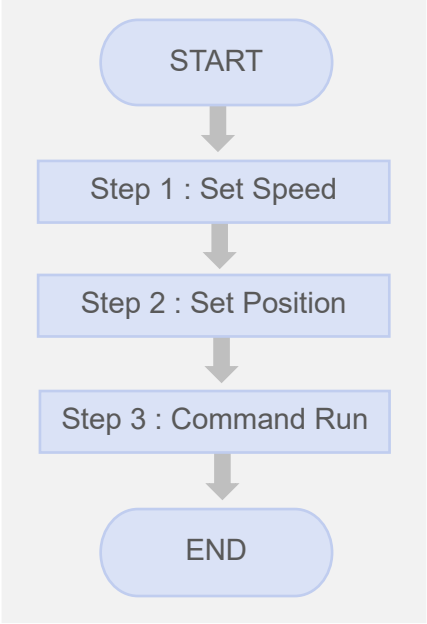
<table>
<tr><th>adr</th><th>word</th><th>content</th><th>Elaborate</th><th>Range / unit</th></tr>
<tr><td>0420</td><td>1</td><td>OUT1 function selection</td><td>100: universal port
101: Alarm output function:
There is an output signal when there is no alarm, and there is no output signal when there is 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)</td><td>100~104</td></tr>
<tr><td>0428</td><td>1</td><td>Universal digital output control</td><td>Output port function selection<table><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></td><td></td></tr>
<tr><td>0430</td><td>1</td><td>Digital output logic</td><td>Corresponding output port logic<table><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></td><td></td></tr>
</table>

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	Lo	Hi
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

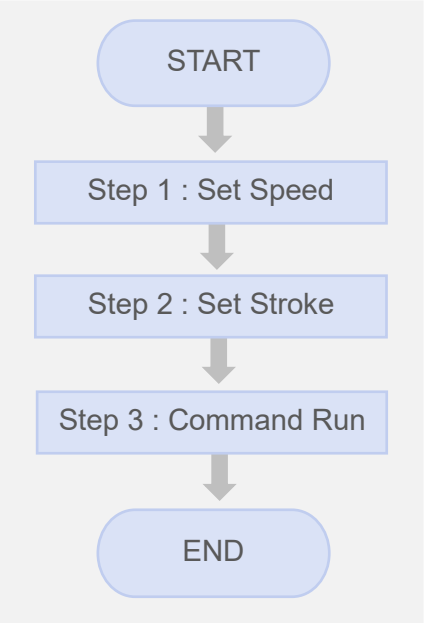
Request

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

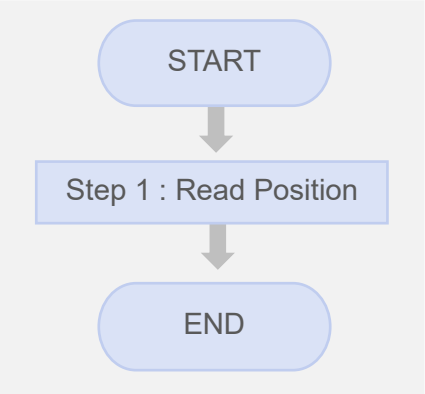
Slave ID	Function	Starting Address		Data		CRC 16	
		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x06	0x01	0x43	0x00	0x02	0xF8	0x23
CRC 16							

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

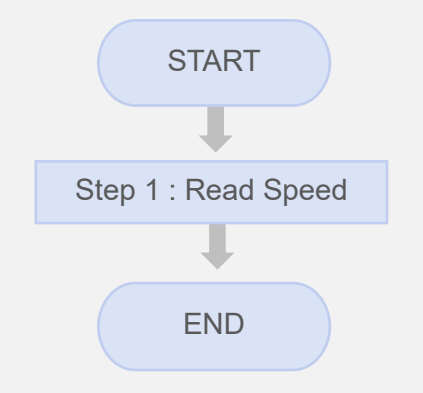
Request

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

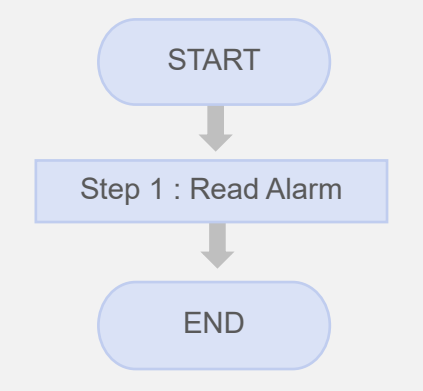
Slave ID	Function	Starting Address		Quantity of Registers		CRC 16	
		Hi	Lo	Hi	Lo	Lo	Hi
0x01	0x03	0x00	0x77	0x00	0x01	0x34	0x10
CRC 16							

Response **IF : current speed = 1200 (0 x 04B0)**

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							

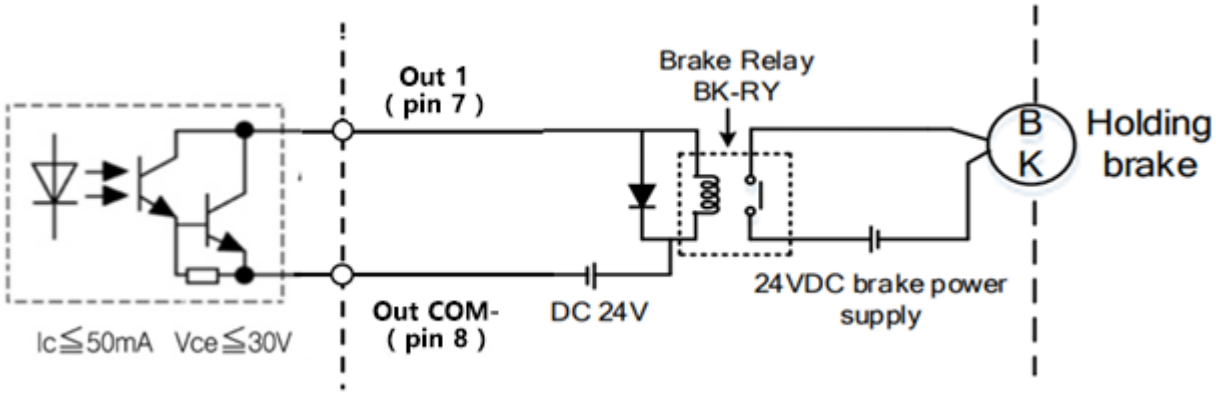
Response **IF : alarm status = 11 (0 x 000B) = Motor phase loss**

Slave ID	Function	Byte Count	Read Registers 176		CRC 16	
			Hi	Lo	Lo	Hi
0x01	0x03	0x02	0x00	0x0B	0xF9	0x83
CRC 16						

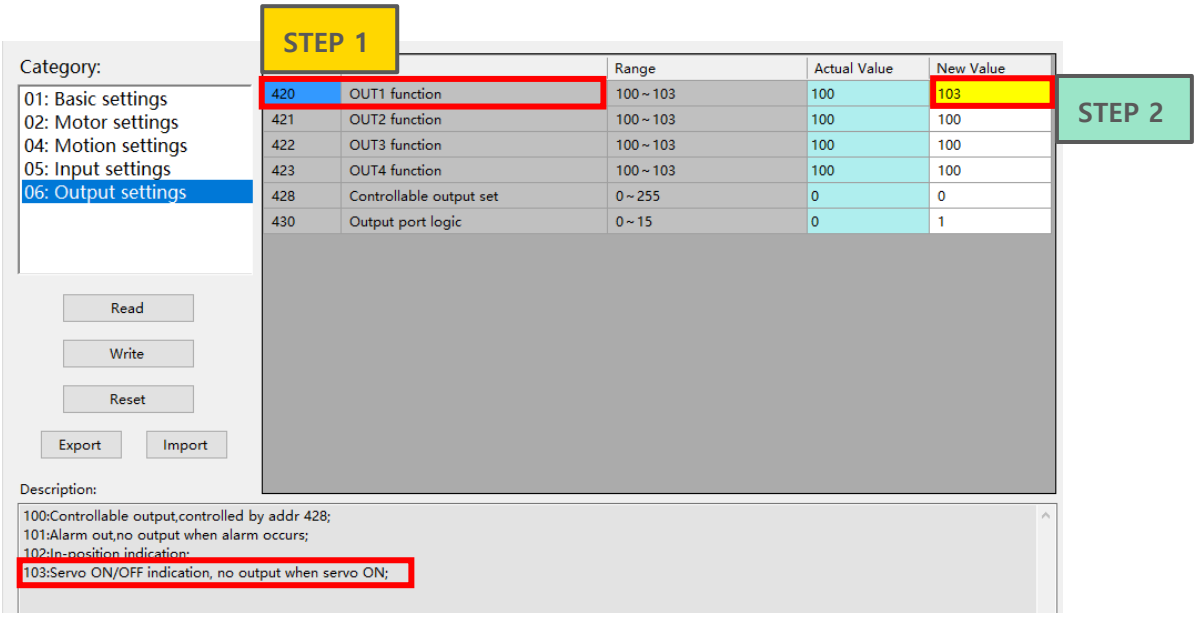
13. Brake Using Method

13.1 Brake Output Circuit Diagram

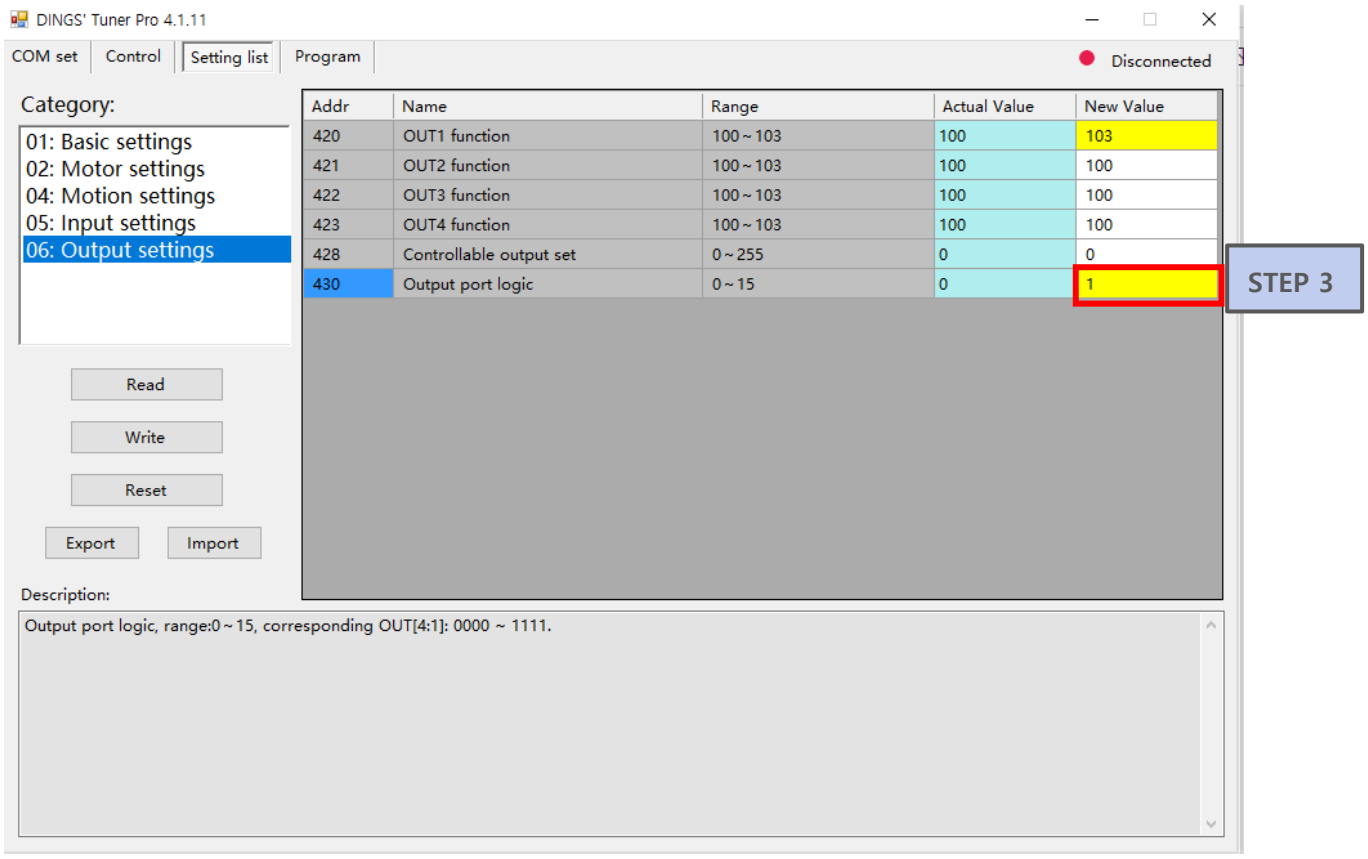
Driver Status	Driver OUT Sig.	Motor Status
Servo ON	ON	Motor Run
Servo Off of Alarm	OFF	Motor Braking



13.2 Output Port Parameter Setting



STEP 1	**Select brake output port** OUT1 → pin 7 Please choose one of OUT and assign pin accordingly
STEP 2	Set output function 103 : Servo-ON



STEP 3

Set output port logic Bit

Output port > Value
Out1(Bit0) > 1

DINGS
Precision Motion Specialist

International Customer
Person in Charge : *Daniel Jang*
daniel@dingsmotion.com
No. 2850 Luheng Road, Changzhou Economic Development Zone, Jiangsu Province, China
+86-519-85177825, 85177826

North America Customer
Person in Charge : *Nicolas Ha*
sales@dingsmotionusa.com
335 Cochrane Circle Morgan Hill, CA 95037
+1-408-612-4970

China Customer
Person in Charge : *Sweet Shi*
info@dingsmotion.com
No. 2850 Luheng Road, Changzhou Economic Development Zone, Jiangsu Province, China
+86-519-85177825, 85177826

DINGS
Precision Motion Specialist

+86-0519-8517 7825

+86-0519-8517 7807

No. 2850 Luheng Road, Changzhou Economic Development Zone, Jiangsu Province, China

www.dingsmotion.com