EDIO-S003
EDIO-S005
EDIO-S003H
Hardware User Manual

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http://www.epcio.com.tw

Table of Contents

Chapter 1 Overview

1.1 Functions

- EDIO-S003 / EDIO-S005
    - Serial communication interface
    - 64 digital inputs
    - 64 PhotoMos Relay outputs
    - Galvanic isolation from EPCIO series motion control card.
    - PCB carrier (optional), TS32(A)/TS35(A) DIN Rail
- EDIO-S003H
    - Serial communication interface
    - 32 digital inputs
    - 32 PhotoMos Relay outputs
    - Galvanic isolation from EPCIO series motion control card.
    - PCB carrier (optional), TS32(A)/TS35(A) DIN Rail

1.2 Specifications

- EDIO-S003 / EDIO-S005
    - Dimensions(W x L) : 292mm x 108mm
    - EDIO-S003 terminal blocks type
        - (9x2)18-pin terminal block (screw-in), 5.00mm
    - EDIO-S005 terminal blocks type
        - (9x2)18-pin terminal block (plug-in), 5.00mm
    - Operating temperature : 0°C ~ 55°C
    - EDIO-S003 / EDIO-S005 input and output
        - 64 Source-Type or Sink-Type inputs
            - First 4 inputs can be programmed with an interrupt function
            - The close or open connections of the input and COM, it will determine to input 1or 0.
            - Source Type : COM requires +5V ~ +24V
            - Sink Type: COM requires 0V
        - 64 PhotoMos Relay output
            - Source Type : COM requires 5V ~ 24V

- ➢ Sink Type: COM requires 0V
- ➢ The maximum single output current is 100 mA
- ■ Power requirements:
  - ● E5V : DC 5V (+4.5V~+5.5V，min. 500 mA)
  - ● Voltage command to COM of each input and output
- ■ EDIO-S003H
  - ■ Dimensions(W x L) : 178mm x 108mm
  - ■ (9x2)18-pin terminal block (screw-in), 5.00mm
  - ■ Operating temperature: 0°C ~ 55°C
  - ■ Input and Output
    - ● 32 Source-Type or Sink-Type inputs
      - ➢ First 4 inputs can be programmed with an interrupt function
      - ➢ The close or open connections of the input and COM, it will determine to input 1or 0.
      - ➢ Source Type: COM requires 5V ~ 24V
      - ➢ Sink Type: COM requires 0V
    - ● 32 PhotoMos Relay output
      - ➢ Source Type: COM requires 5V~ 24V
      - ➢ Sink Type: COM requires 0V
      - ➢ The maximum single output current is 100 mA
  - ■ Power requirement:
    - ● E5V : DC 5V(+4.5V~+5.5V，min. 500 mA)
    - ● Voltage command to COM of each input and output

**If E5V voltage is insufficient (less than +4.5V), the module of EDIO-S003 / EDIO-S005 / EDIO-S003H will be unable to function properly

1.3 System Connection Diagram

Fig. 1 shows the connection diagram of EDIO series remote I/O control card. The Host PC is connected to EPCIO series motion control card by PCI bus and accesses the information of EDIO series remote I/O control card through the EPCIO series motion control card, including input reading, output control and interrupt signal processing (EPCIO-4000/6000 can connect up to 2 cards and support up to 128 output and input connections).
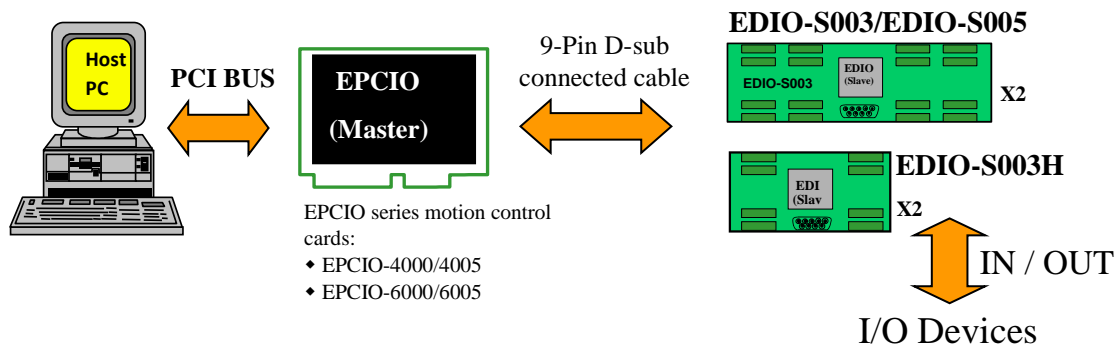

Fig. 1 Connection diagram of EDIO series remote I/O control card

Fig. 2 shows the function block diagram of EPCIO series motion control card. The EPCIO ASIC (MASTER) is updating the remote I/O status in a programmable interval time. For transmit section, the output signal first passes through the driver circuit to be transformed into a differential signal, and then is output from the 9-pin D-sub connecter to the EDIO series remote I/O control card. For receive section, the differential signal input from the connector and sends it to the EPCIO ASIC (MASTER) input through the photo coupler.
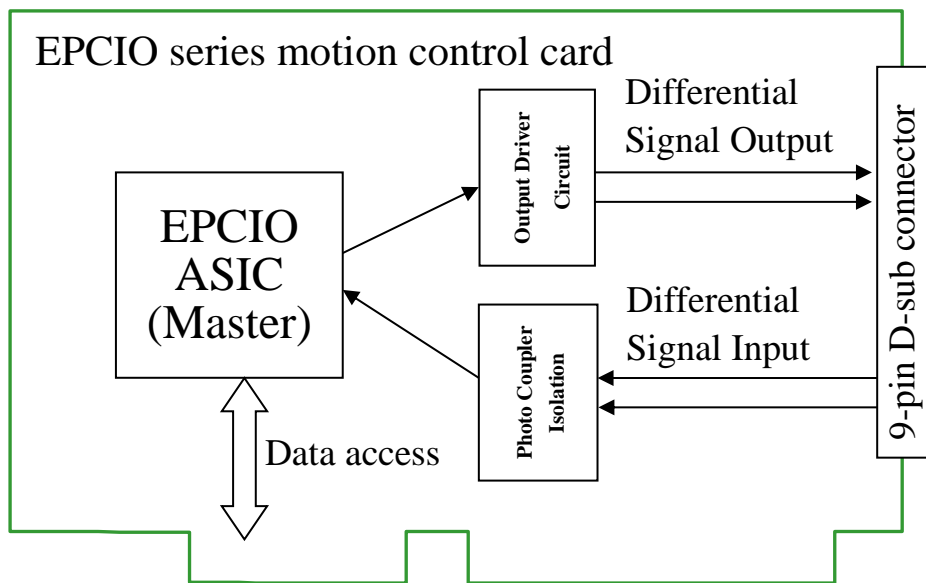
Fig. 2 The function block diagram of EPCIO series motion control card.

Fig. 3 shows the function block diagram of EDIO series remote I/O control card. The EDIO ASIC (SLAVE) is responsible for accepting information from the EPCIO series motion control card, and the EPCIO series motion control card gets the actual I/O status by outputting and reading. The entire configuration utilizes a wire-saving remote control system, where all controlled circuits are integrated in the EDIO ASIC (SLAVE) to increase dependability and stability.
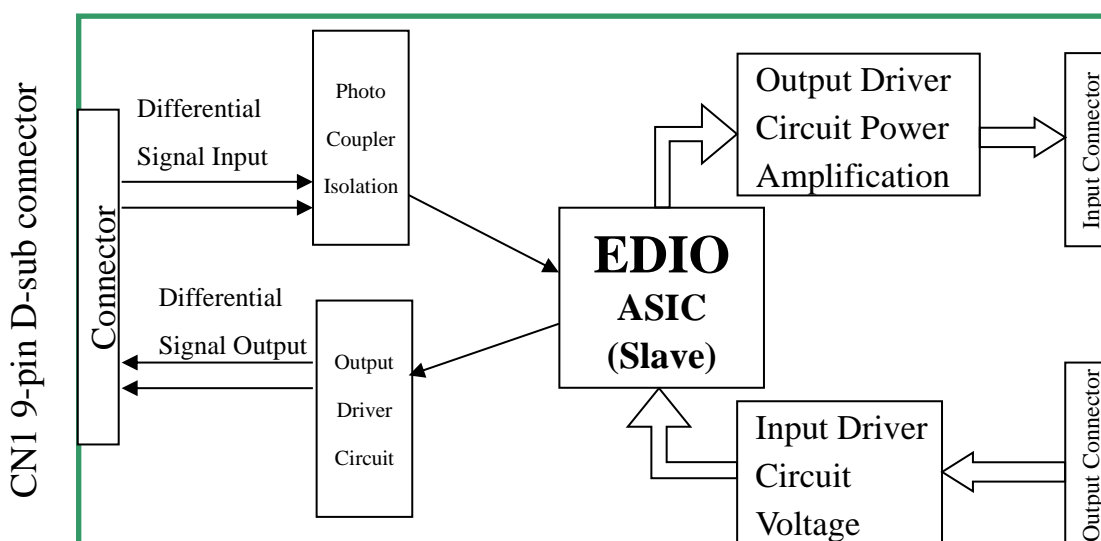

Fig. 3 The function block diagram of EDIO series remote I/O control card.

Chapter 2   Hardware Installation Guideline

2.1 Pin Definition

The output and input pins of the EDIO-S003/EDIO-S005 are defined as Fig. 4. O0 to O63 represent the output connections. I0 to I63 represent the input connections. COM is a +24V or 0 voltage input provided for the input and output use. E5V / EGND (CN3) is operation power input provided for EDIO series remote I/O control card use. The communication using CN1 is a D-sub connector connecting the EPCIO series motion control card and the EDIO-S003 / EDIO-S005.
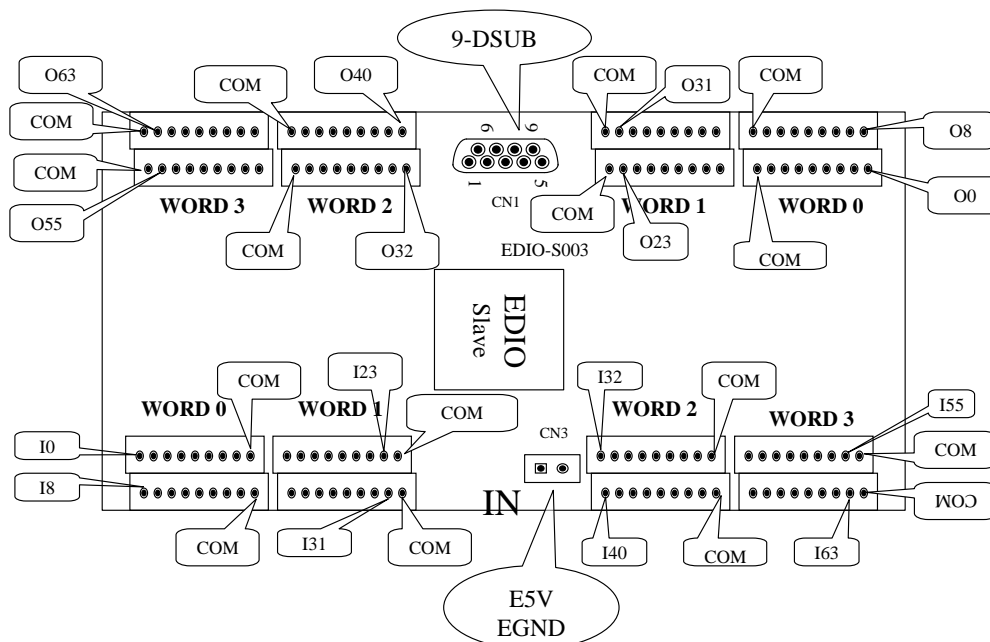

Fig. 4 Pin definition of EDIO-S003 / EDIO-S005

The pins of the EDIO-S003H are defined as Fig. 5. O0 to O31 represent the output connections. I0 to I31 represent the input connections. COM is a +24V or 0 voltage input provided for the input and output use. E5V / EGND (CN3) is operation power input provided for EDIO series remote I/O control card use. The communication using CN1 is a D-sub connector connecting the EPCIO series motion control card and the EDIO-S003H.
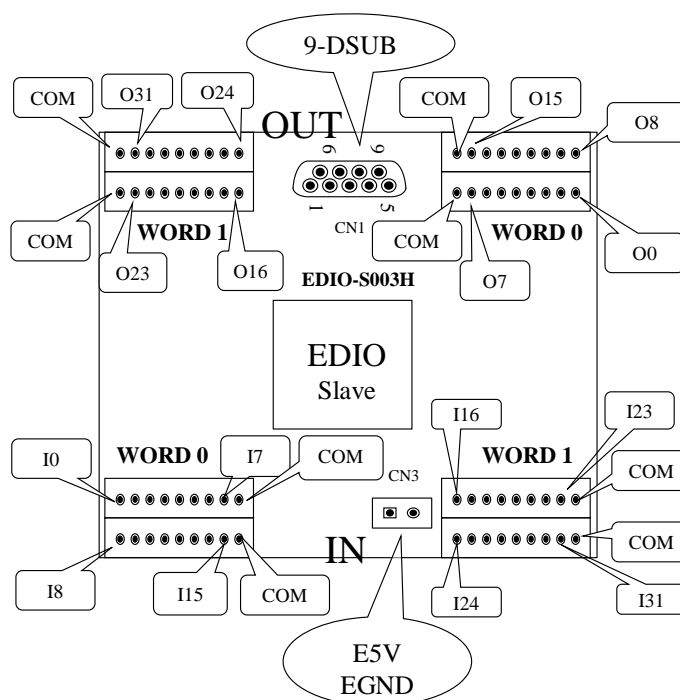

Fig. 5 Pins definition of EDIO-S003H

2.2 Pin Assignment of Connectors

CN1 : Communication connector pins are assigned below:

Fig. 6 CN1 connector pin assignment

CN1: 9-pin D-sub
- ➢ Pins 1, 6 (CLK\, CLK) are the clock transmission differential inputs
- ➢ Pins 2, 7(SCS\, SCS) are the module selection enabling differential inputs
- ➢ Pins 3, 8 (SDO\, SDO) are are the serial data differential output signals
- ➢ Pins 4, 9 (SDI\, SDI) are the serial data differential input signals
- ➢ Pin 5 (GND) is the E5V ground

CN3: power pins are assigned below:

Fig. 7 CN3 connector pin assignment

CN3: 2-pin terminal block (plug-in), 5.00mm
- ➢ Pin1: +5V input

➢ Pin2: ground

2.3 Definition of LED Indicators

The module of EDIO-S003 / EDIO-S005 / EDIO-S003H has one green PWR (D4), one orange LNK (D6) and one red WDG (D7) LED indicator, which are defined below:

D4	PWR	Green	Light on→ Power on
D6	LNK	Orange	Light constantly on → Communication with EPCIO series motion control card is normal Flashing light → Communication with EPCIO series motion control card is abnormal
D7	WDG	Red	Light on→ Enable watchdog function Light off→ Disable watchdog function

2.4 Other Pins

JP1—EN_WDG

－ Short the JP1 can disable watchdog function (a RESET signal is not sent when communication fail, so RESET will never occur); if watchdog function is required for use, the JP1 must be opened.

－ JP1 is default set to short.

Chapter 3   Hardware Wiring

3.1 Output Wiring
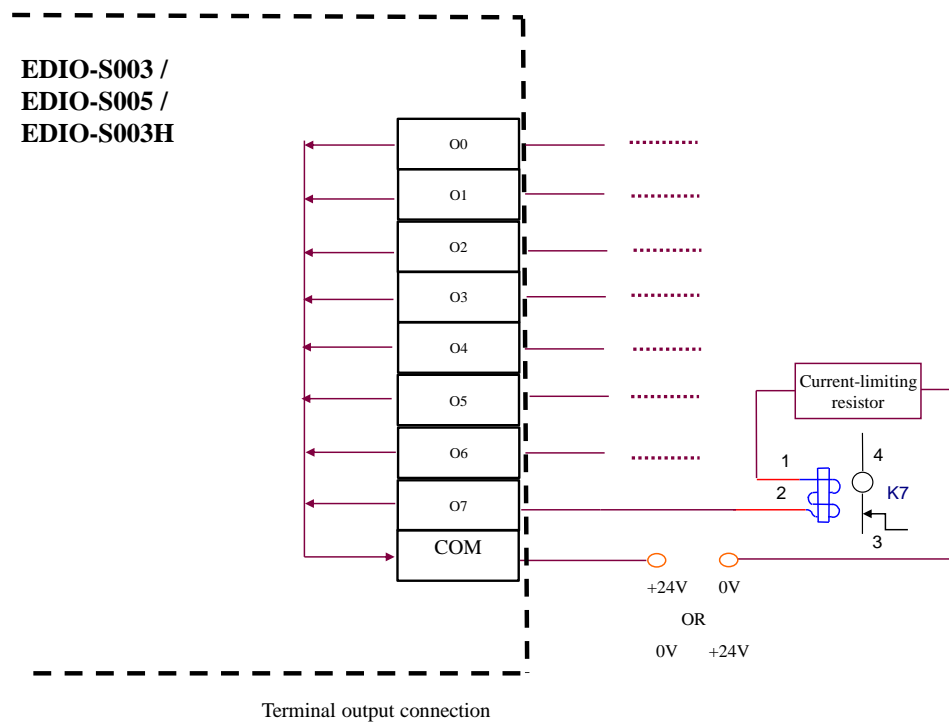

Terminal output connection

Fig. 8 Output wiring

Fig. 8 shows the EDIO-S003 / EDIO-S005 / EDIO-S003H output pins connect solenoid valve or relay application (sink or source-types output are available).

When COM connects to the 24V input, it operates as source-output type. When one terminal of the load relay solenoid connects to output connections O0 to O7, the other terminal connects the current limiting resistor to 24V_GND (0V). When the output is HIGH (1), the relay is ON and the current flows from the output connections.

When COM connects to the 0V input, it operates as sink-output type. When one terminal of the load relay solenoid connects to output connection O0 to O7, the other terminal connects the current limiting resistor of 24V. When the output is HIGH (1), the relay is ON and the current flows into the output connections.

3.2 Input Wiring

The input wiring of EDIO-S003 / EDIO-S005 / EDIO-S003H can receive either Source or Sink types input.

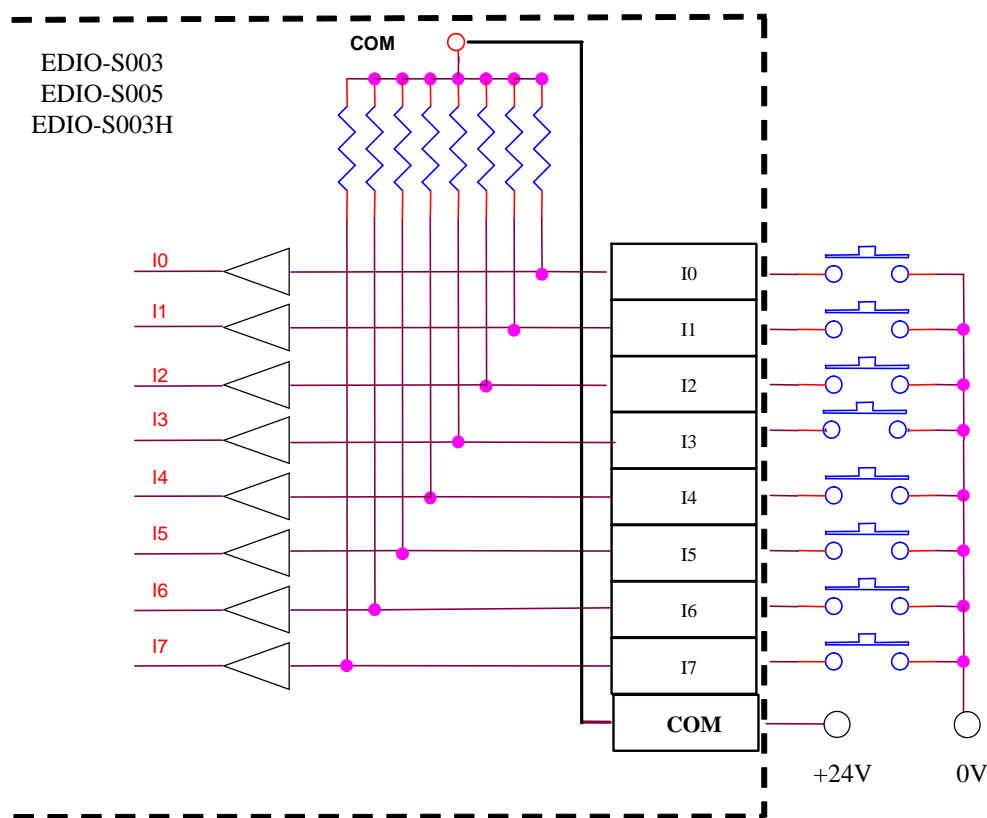### 3.2.1 Source-Input Type

Fig. 9-1 Source-input type wiring

Fig. 9-1 shows the source-input type application of EDIO-S003/EDIO-S005/EDIO-S003H input connection wiring. When COM is connected to 24V, it operates as source-input type and the current flows from the input connections. When one terminal of the SW Button is connected to I0 to I7 and the other terminal is connected to 0V, the EPCIO series motion control card will read the status as LOW (0); otherwise, it will read the status as HIGH (1).
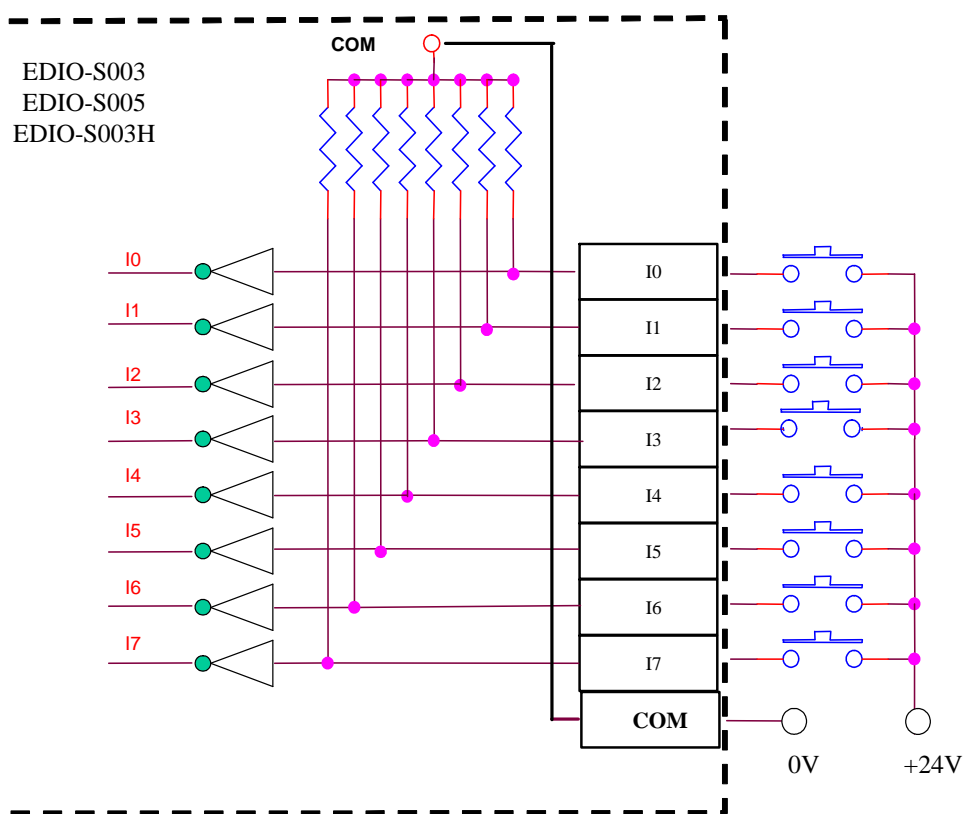
3.2.2   Sink-Input Type

Fig. 9-2 Sink-input type wiring

Fig. 9-2 shows the sink-input type application of EDIO-S003/EDIO-S005/EDIO-S003H input connection wiring. When COM is connected to 0V, it

operates as sink-input type and the current flows into the input connections. When one terminal of the SW Button is connected to I0 to I7 and the other terminal is connected to 24V, the EPCIO series motion control card will read the status as LOW (0); otherwise it will read the status as HIGH (1).

3.3 Transmission Distance

Hardware required: EDIO-S003 / EDIO-S005 / EDIO-S003H

Device Under Test:

E146924 AWM 2464 VW-1 80℃ 300V 24AWG

LL101096 CSA AWM A/B I/II 80℃ 300V FT1 24AWG GEI TAI

9-pin RS232 shielded transmission line.

A. The maximum transfer rate for a 100 m cable is 650 kHz clock rate; converted to data update rate, the cable can update 64 inputs and 64 outputs data once approximately every 150 us

B. The maximum transfer rate for a 15 m cable is 3.4 MHz clock rate; converted to data update rate, the cable can update 64 inputs and 64 outputs data once approximately every 30 us

C. The maximum transfer rate for a 1.5 m cable is 4 MHz clock rate; converted to data update rate, the cable can update 64 inputs and 64 outputs data once approximately every 25 us

3.4 Field Ground Wiring

Caution - To improve external noise resistance when field ground the wiring, use a field ground terminal with a surface area greater than 3.5mm² to connect the field ground wire with the control box (the metal plate).

The grounding terminal position of EDIO-S003 / EDIO-S005 is displayed as J10 in Fig. 10 and EDIO-S003H is displayed as J10 in Fig. 11.
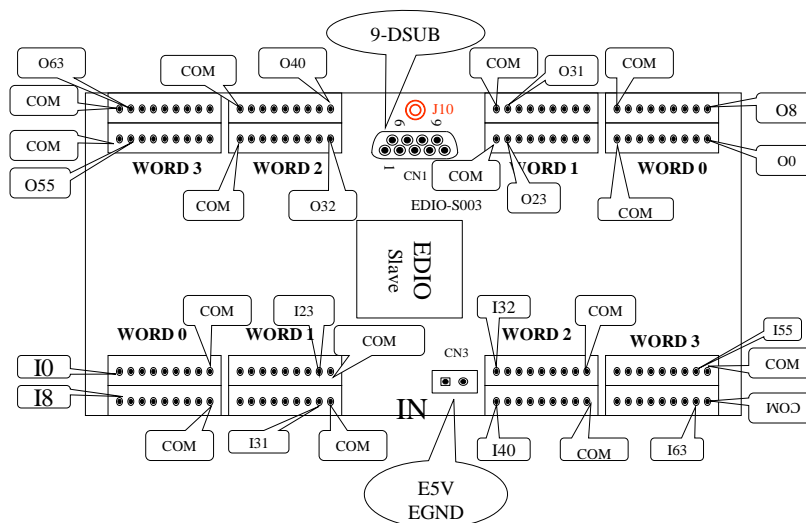
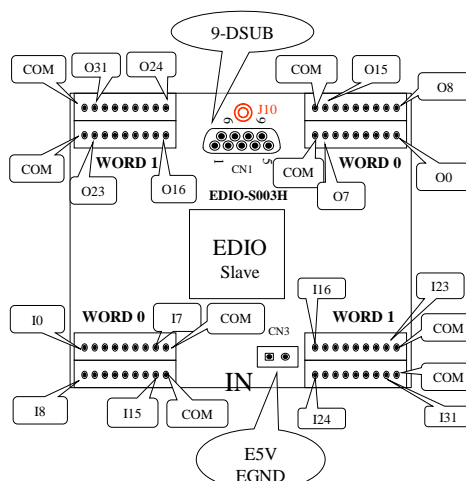**Fig. 10 The position of field ground terminal (J10) of EDIO-S003/S005**

Fig. 11 The position of field ground terminal (J10) of EDIO-S003H

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Revision History

Date	Version	Summary of Changes
2007/04/23	1.2	Item No. 3 was revised to 3 terminal types (P. 2-Specification); Fig. 4-2 was added in EDIO-003 remote module (P.6).
2008/03/04	1.3	+5V~24V was revised to +24V (Fig. 8); the input wiring diagram on P. 9 was revised to Fig. 9.1 (Source-type) and Fig. 9-2 (Sink-type).
2010/05/07	1.4.0	COM working voltage description was revised and power requirement was revised from +4.8V to +4.5V (P. 2); definition of LNK & WDG indicators and JP1－ EN_WDG use description were added (P. 7).
2010/08/04	1.4.1	EDIO-S003 ground wiring description was added in P. 11.
2016/03/30	1.5.0	EDIO-S005 / EDIO-S003H description was added