LNC-T800

Hardware Application Manual

Leading Numerical Controller

LNC Technology Co., Ltd.

Table Of Contents

1   SYSTEM STRUCTURE

This chapter describes the system configuration of LNC-T800, including the axis system, software, hardware, and hardware layout, etc.

1.1   Control Axes of the 2 Systems

System	Axis	Remark
System 1	X1 Y1 Z1 C1+S1-1 S1-2 S1-3	1. C1+S1-1 refers C1 & 1st spindle of System 1 are applied concurrently. 2. S1-2 refers to the 2nd spindle of System 1. 3. S1-3 refers to the 3rd spindle of System 1.
System 2	X2 Y2 Z2 C2+S2-1 S2-2 S2-3	1. C2+S2-1 refers C2 & 1st spindle of System 2 are applied concurrently. 2. S2-2 refers to the 2nd spindle of System 2. 3. S2-3 refers to the 3rd spindle of System 2.

1.2   System Software

Applied to LNC-T800 V4.00.000 or later versions.

1.3   Hardware Components

	Model X Q'ty	Remark
Input/ Output Interface		
TFT LCD Monitor	X 1	
MDI Panel	X 1	
Operation Panel	OP-2520 X 1	
Hand Wheel	X 1	
Floppy	X 1	
Controller & Peripherals		
Control Unit	ELC-2200 X 1	
Motion Card	PCC-1840 X 2	1. PCC-1840 has 4 sets of pulse commands (P1~4), 2 sets of DA (DA4~DA5), & 6 sets of ENCODER (E1~6). 2. S1 base address of the 1st motion card is set to 0x200; S2 base address of the 2nd motion card is set to 0 x 240.
Transit Card	TRF-2760 X 2	
I/O Card	EIO-2000 X 1 or SIO-1540 X 1	
Relay Card	REL-2840 X 1	1. REL-2840 20IN/16OUT are applied to general IO points.
Battery Holder	X 1	

1.4 Hardware Layout

TFT LCD Monitor   MDI Panel

Floppy

Control Unit

I/O Card   Operation Panel

MPG

Relay Board

Battery

S1 Transit Card

X1

Y1

Z1

C1
+
S1-1

S2 Transit Card

X2

Y2

Z2

C2
+
S2-1
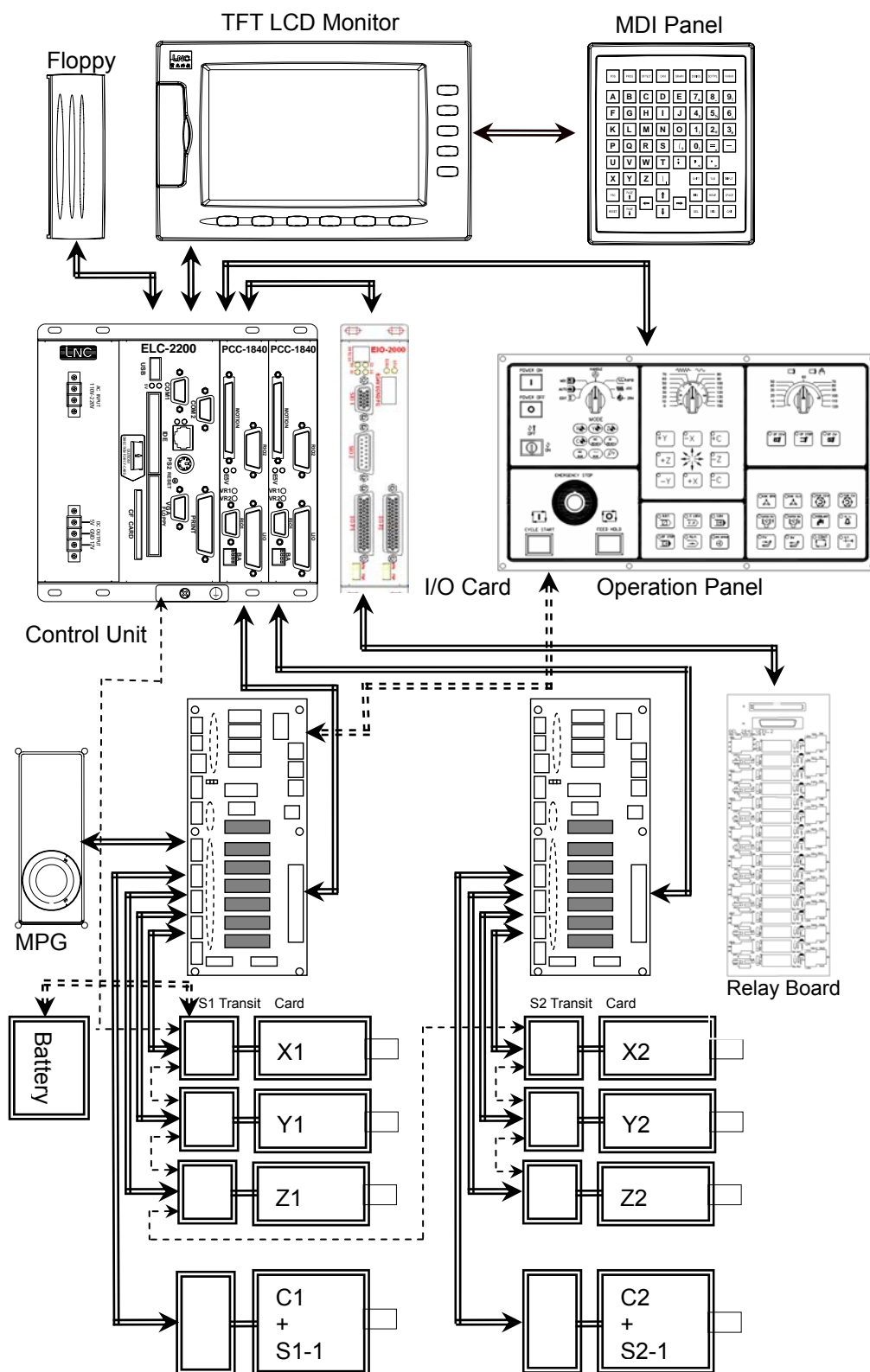
2   HARDWARE COMPONENTS

This chapter describes each component of LNC-T800 controller in details.
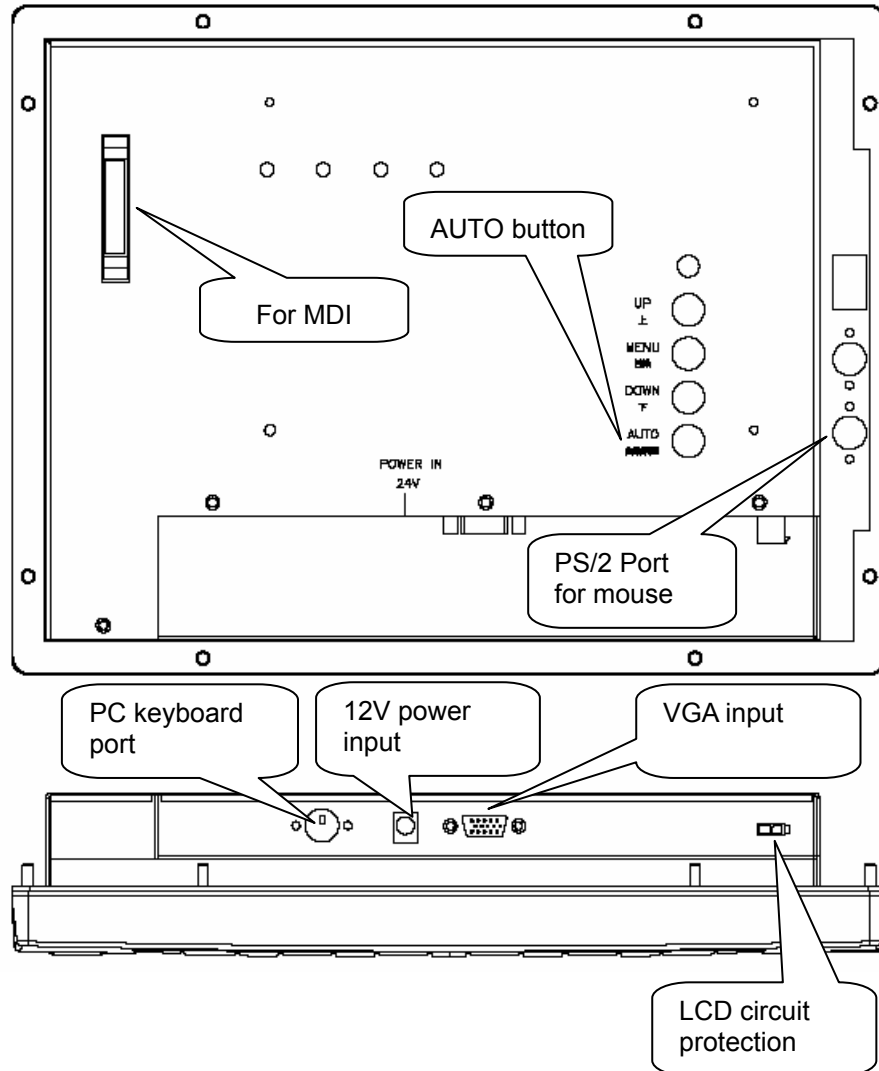
2.1   TFT LCD Monitor

● **Specifications**

1. Screen size: 10.4"

2. Power requirement: 12V, 2.8A

3. Provides an extra standard PS/2 port for keyboard or mouse.

4. Standard VGA signal input

5. Standard PS2 keyboard & mouse input interface.

6. Resolution: 800 x 600

7. Storage temperature: -20~60℃

8. Operation temperature: 0~50℃

● **Hardware Diagram:**
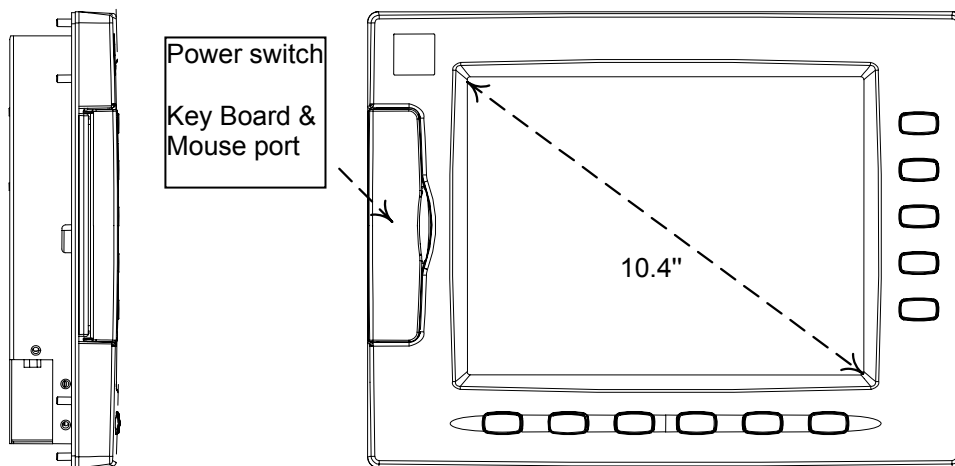
● **Operating Instruction, Settings, & Lights**

1. Please connect each peripheral according to each connector definition. Please verify if +12V & GND are correctly connected. Failure to connect +12V & GND will result in damage of LCD.

2. MDI IDC port provides connection for MDI module of our company. If MDI is not applied, there is no need for connection.

3. PC keyboard port: Connect the keyboard port of LED module of our company to PS/2 keyboard port of the control unit.

4. 12V power input: Input voltage should be DC12V.

5. VGA input: Please find below the definitions for each pin.
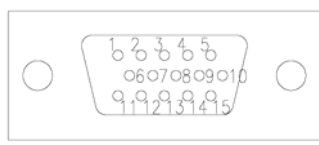
Pin	Definition	Pin	Definition	Pin	Definition
1	VGA-R	6	GND	11	GND
2	VGA-G	7	GND	12	VGA-SDA
3	VGA-B	8	GND	13	VGA-HS
4	GND	9	NC	14	VGA-VS
5	GND	10	VGA-CONN	15	VGA-SCL

6. LCD circuit protection: To protect the anodic tube, when there is a short circuit, backlight will be turned off automatically.

7. AUTO button: Press this button, and the screen is auto-tuned to the best position, phase, and frequency, etc. Please wait for a few seconds for auto-tuning to be finished. After it is done, the current optimal settings will be saved by the system.

2.2   MDI Panel

● **Hardware Diagram:**
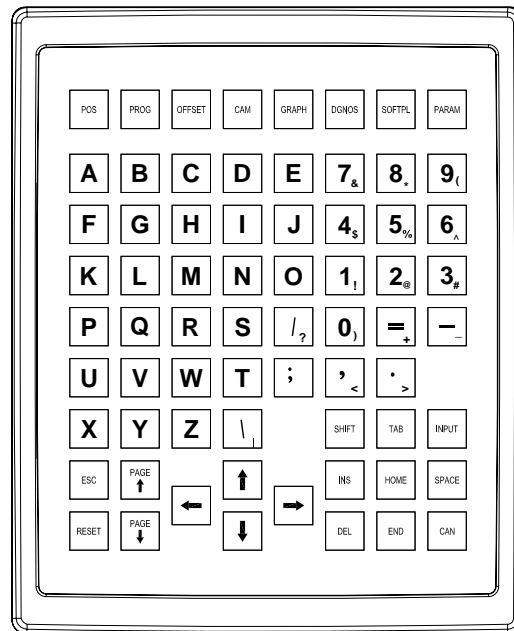
● **Connector, Components, & Lights:**

1.   The back IDC port of MDI provides connection for the LCD module.

2.3   Operation Panel

2.3.1   OP-2520

● **Specifications:**

1. ON/OFF switch

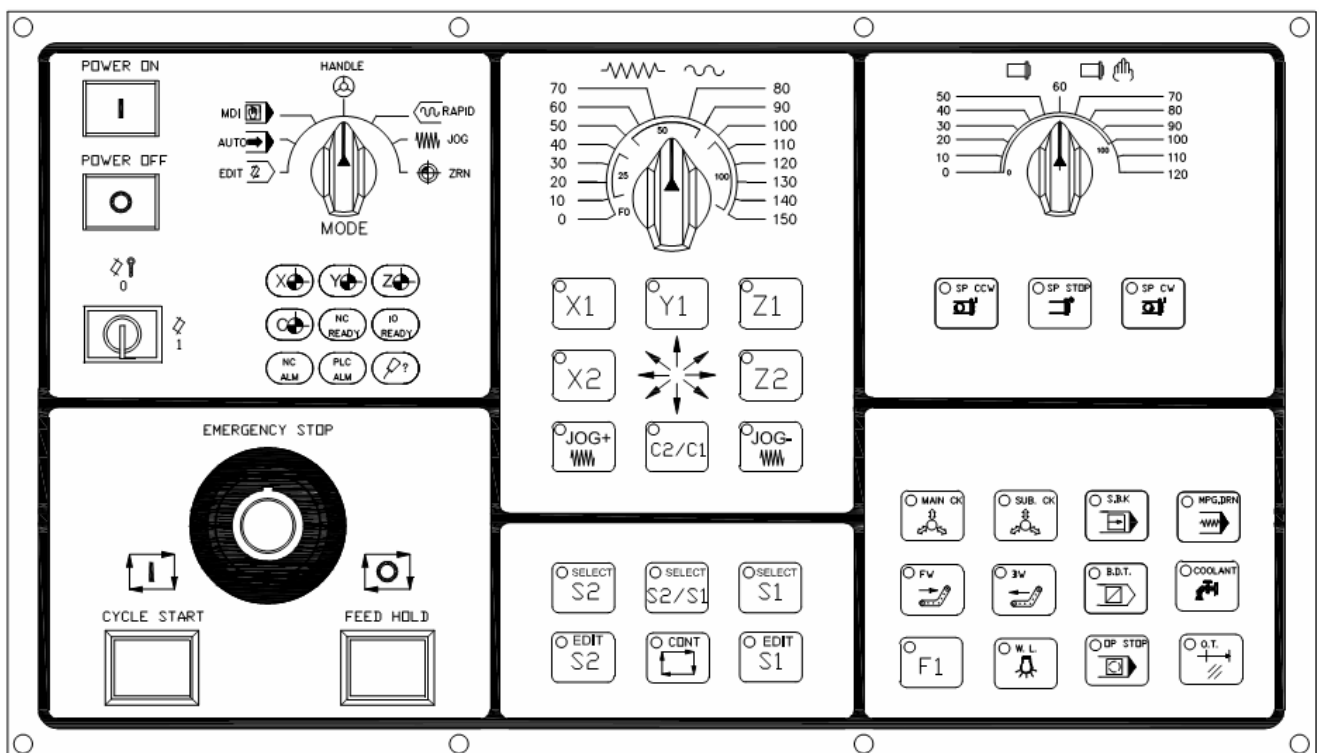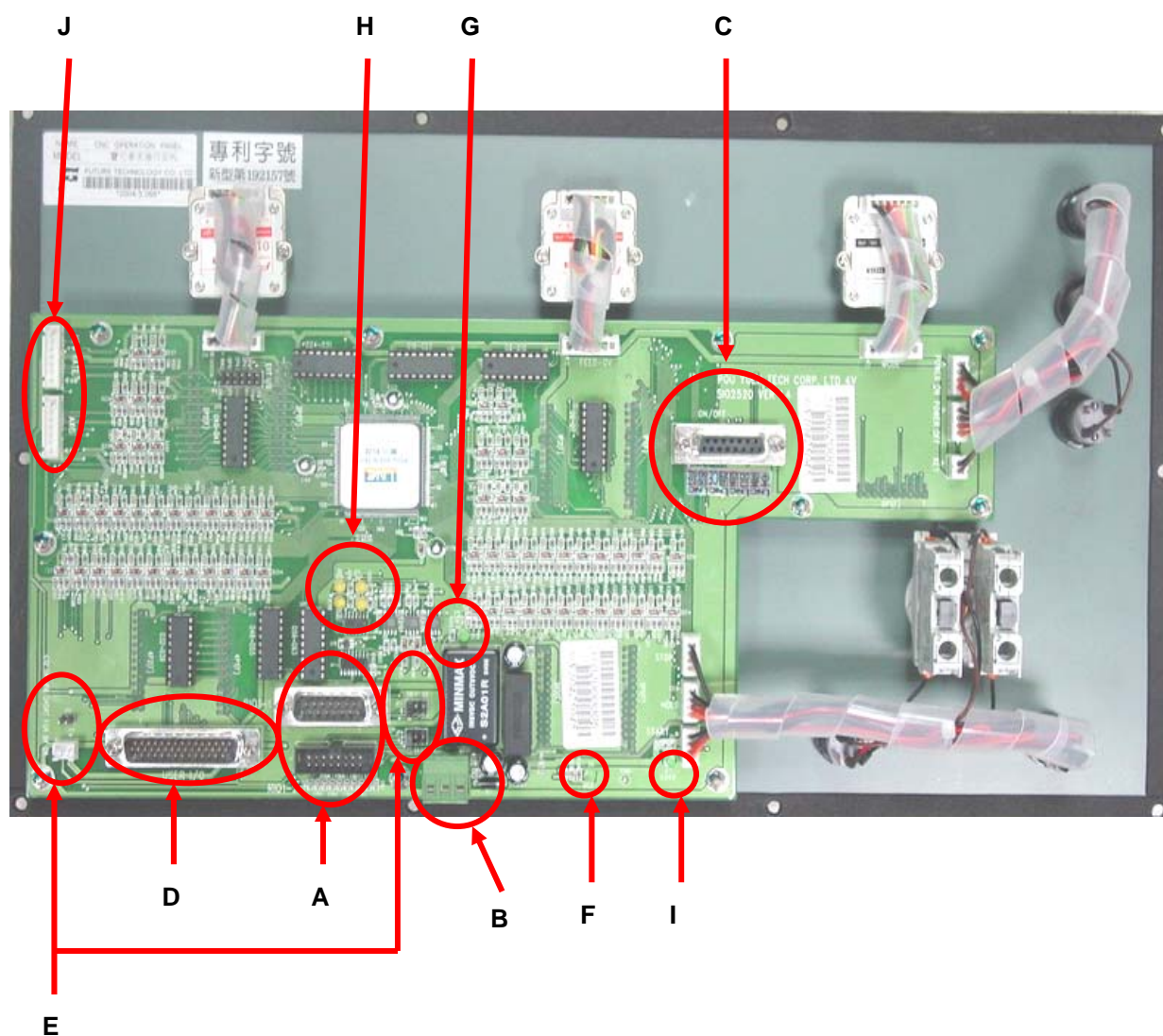2. Emergency stop button

3. Rotary switch $\times 3$

4. Key switch

5. Input buttons

6. Input: 64IN (24V level input)

7. Output: 64OUT (24V level output)

● **Hardware Diagram:**

1. Standard operation panel for the dual-system lathe controller

2. Standard operation panel for the dual-system lathe controller: Rear View

● **Connector, Component, & Light:**

Power Supply --- **(B)**			
Connector/Pin	Type	Function	Operating Instruction
T1	3PIN 5.08mm	DC 24V Input for IO/FG	Connect to Power/Field

ON/OFF Control, Safety Loop --- **(C)**			
Connector/Pin	Type	Function	Operating Instruction
P3	D_SUB 15PIN Female	Power ON/OFF, Safety loop connector	Connect to ON/OFF connector of TRF card

USER IO --- **(D)**			
Connector/Pin	Type	Function	Operating Instruction
P1	HD_SUB 44PIN (Male)	Offers 20IN/16OUT IO interface	24V input/output level
Note：Please pay attention with application as some USER IO may be the same as the fixed IO on the panel. Please refer to 『IO List』 for related information.			

Panel Fixed IO of Panel			
Connector/Pin	Type	Function	Operating Instruction
1P~4P	IDC connector	For buttons & lights of panel	
C1~C5	4PIN 2.5 mm white connector	For IO of buttons	
C7~C9	7PIN 2.5 mm white connector	For IN points of rotary switched	

IO of Panel **---(J)**			
Connector/Pin	Type	Function	Operating Instruction
C10,C11	7PIN 2.5 mm white connector	User-definable	

JUMPER Setting ---**(E)**			
Connector/Pin	Type	Function	Operating Instruction
JP3,JP4	3PIN 2.54mm	SLAVE setting	Set to 1~3
JP2,C12	2PIN 2.54mm	Backlight setting	Backlight is enabled when short circuit.

Light ---**(F,G,H,I)**			
Light	Type	Function	Operating Instruction
D5	3.0mm (Green)	5V Power Light of IO Cable	
D6	3.0mm (Green)	Internal Power Light of OP-2520 E5V	
D7~D10	3.0mm (Yellow)	Communication Status Light	
D12	3.0mm (Green)	E24V Power Light	

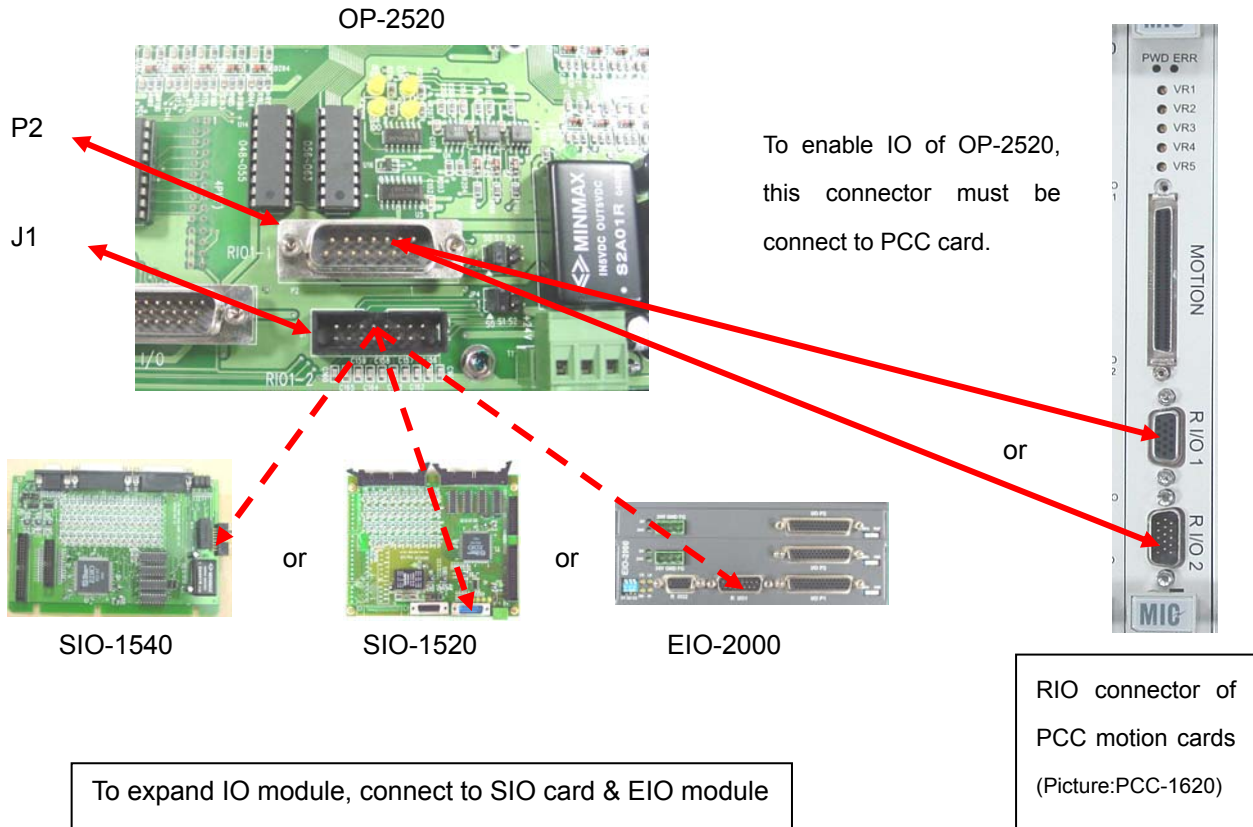● **Operating Instruction, Settings, & Lights：**

A: P2 & J1 Application

Both P2 & J1 are serial IO interface output of OP-2520. Both connectors have the same signals, but their types are different. The corresponding PIN defintions are listed as below:

PIN Definition Chart (P2: D_SUB15 PIN Connector; J1: 2.54mm Box Header Connector)															
P2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
J1	1	3	5	7	9	11	13	15	2	4	6	8	10	12	14

◎ P2 application: Connect to RIO port of a motion card to send serial IO signals.

◎ J1 application: Connect to SIO cards & EIO modules for serial IO expansion.

Example:

OP-2520

P2

J1

To enable IO of OP-2520, this connector must be connect to PCC card.

or

SIO-1540   or   SIO-1520   or   EIO-2000

To expand IO module, connect to SIO card & EIO module

RIO connector of PCC motion cards (Picture:PCC-1620)

Caution: To make wiring & cables, please refer to the last paragraph of this chapter.

B: T1-- E24V Power Connector

T1 connector provides E24V power for output points of OP-2520. In other words, to enable O points to output signals, OP-2520 must input power from this connector.

◎ Connector Description：

On the back layout of OP-2520, connector definition is as below:
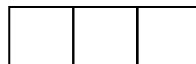
E24V   EGND0   FG

Please connect E24V & EGND to DC current output of power supply. FG is field ground, please connect it to earth ground.

◎Power requirement：E24V (Above 3A)

Caution:

- As E24V input power supplies O points of OP-2520, when wiring, please take into consideration of possible voltage lost during transmission and make sure there is sufficient power to enable a component receiver. (For example, if some relay component requires 24V, while there is only 16V input at T1 port due to voltage lost, relay might not be enabled successfully when O point outputs a signal.
- For wire between T1 connector and power supply cable, please use wire of at least 0.75mm or above, and the length should be as short as possible.
- Please DO NOT connect 24V ground wire of power supply to FG port of T1 otherwise OP might not operate normally and components could get damaged.

C: P3 ON/OFF for Safety Loop Connector

P3 connector provides the ports for ON/OFF and also other related EMG keys connection. When applied, please attach ON/OFF connectors of TRF transit cards to this port (such as TRF-1720, TRF-2760, etc.). Please use 15PIN pin-to-pin wires for connection. After connected, this port controls power of relay & SERVO-ON relay of transit cards.
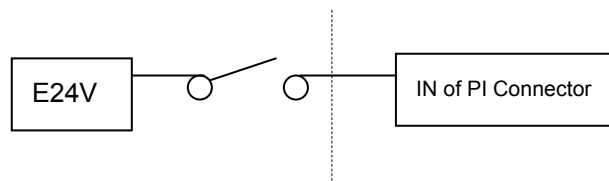
D: P1 USER IO Connector

P1 connector offers 20IN/ 16OUT IO interface at most to connect REL Series realy cards.

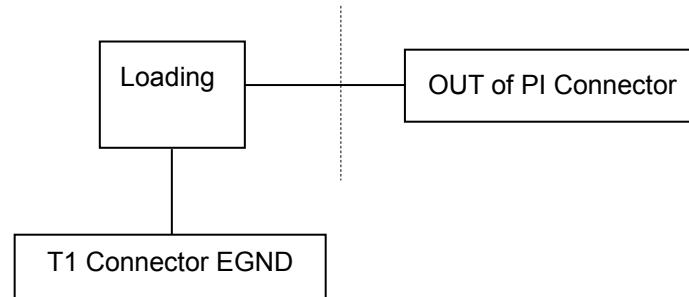◎IN points specification: 24V input (PNP input).

◎OUT points specification: 24V output (PNP output); max. output: 60mA.

1. Example: Input Points Application at P1:

When the switch is turn on, E24V is input to IN point, and IN point is active.

2. Example: Output Points Application at P1:

When OUT point is active, it outputs E24V to enable loading.

Caution：

- If the power systems of IN/OUT & T1 are different, please note gounding of power system must connect to EGND of T1 connector. In other words, the grounds of both systems must connect to each other so IO can function nomally (both power levels are the same).

- If P1 is connected to REL Series relay cards, the application of IO points depends on the type of relay card that is selected (for instance, if REL-2840 is used, its O point is "a point" of RELAY without any power). Please refer to the description of each relay cards for application.

E：C12, JP2, JP3, & JP4 JUMPER Settings
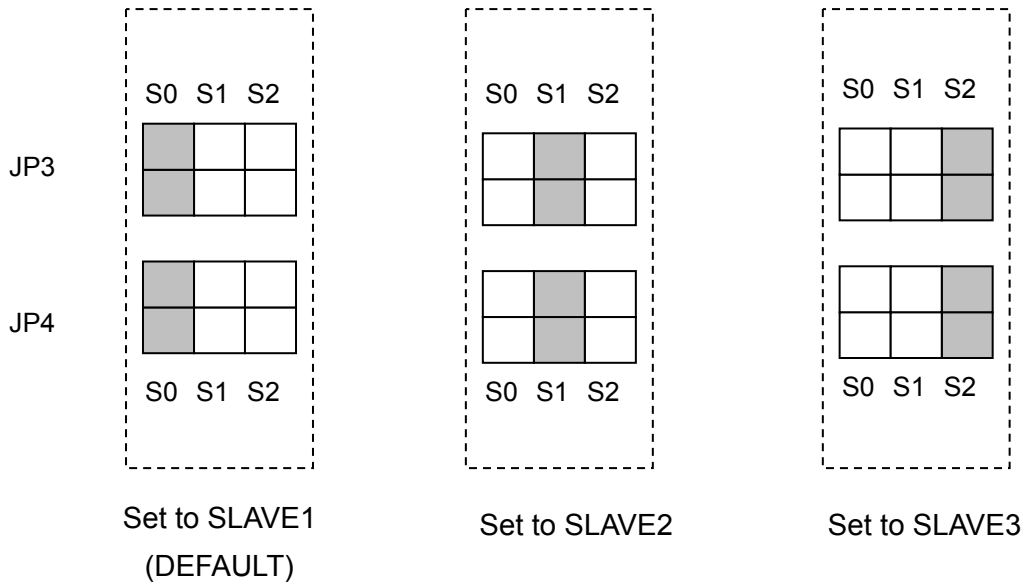
The functions of JUMPERs are as below:

1.C12 & JP2: For setting of backlight function of OP panel.

2.JP3 & JP4: For setting of SLAVE control of serial communication.

- **C12 & JP2 setting:**
  1. When any end of some point of C12 & JP2 is short circuit, backlight function is enabled (by default, C12 is short circuit).
  2. When both ends of C12 & JP2 are open circuit, backlight function is disabled

- **JP3 & JP4 setting:**

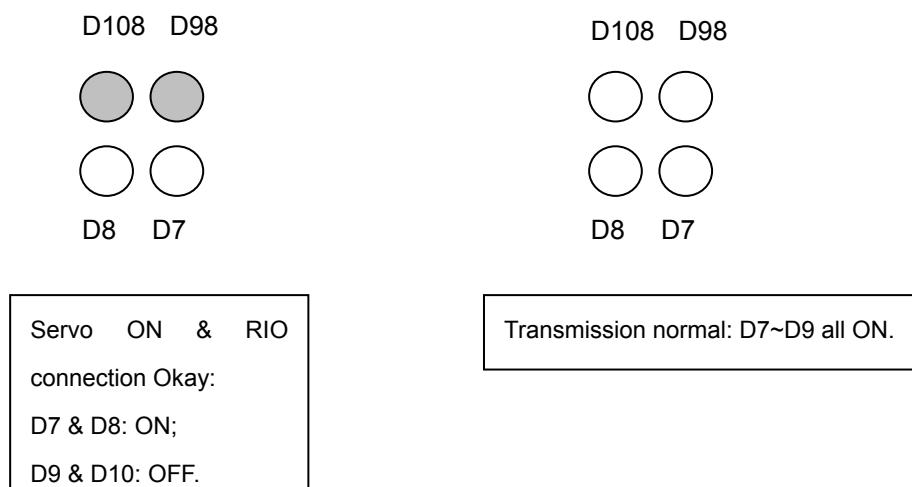Set to SLAVE1 (DEFAULT)　　　Set to SLAVE2　　　Set to SLAVE3

Setting instruction:

1. The above marked areas are short circuit locations of JUMPER.
2. IO functions normally only when hardware setting is in conformity to software settings (PLCIO.CGF file).

F, G, H, & I: Lights

Light	ON	OFF (NG)	Troubleshooting
F	5V input of OP is normal.	RIO transmission NG	Check RIO wire & wiring
G	DC/DC power conversion OK	RIO transmission NG	Damaged component of SIO card
I	E24V of O points is normal.	O point fails to output.	T1 connector, E24V power supply

There are 4 lights on OP-2520 for easy troubleshooting as described below：

- **H Light:**

D108 D98

D8 D7

| Servo ON & RIO connection Okay:
D7 & D8: ON;
D9 & D10: OFF. |

D108 D98

D8 D7

| Transmission normal: D7~D9 all ON. |

Besides warning signals of software, users can also check RIO IO transmission by H light.

Note：Requirement for normal transmission (D7 ~ D10 lights are all ON).

1. RIO wires are normal (not broken or have any incomplete solder injoints, etc.). Connectors of both ends are securely attached.

2. F & G lights are both ON.

3. Settings of JP3 & JP4 JUMPERs and software (PLCIO.CFG) match each other.

4. System program is executing.

J: C10 & C11 Connectors

C10 connector provides 3 input points & E24V. C11 provides 4 IN points & E24V; it can be utilized as connection of LNC MPG module signals.

Wiring Example:

LNC MPG (Front)   OP moduel (Back)
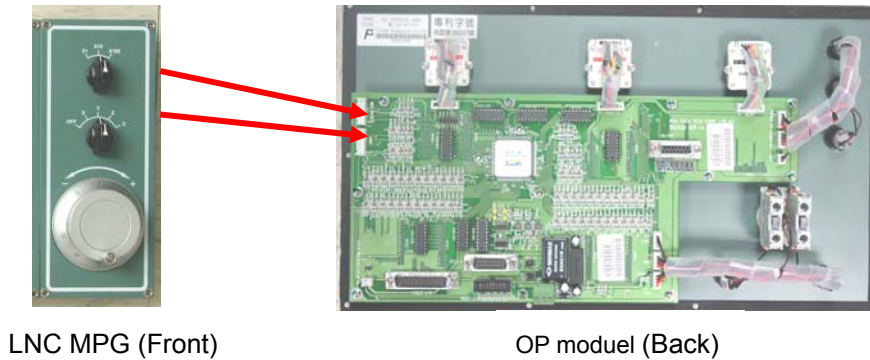
 Caution：

- Because IN points of C10 & C11 connectors and user IN points of P1 connector overlap, please choose only one from them in case there is conflict of IN points application.
- Please refer to IO list for definitions of IN points.

- **Interface & Pin Definition：**

  (1). P1 Pin Definition---- Signals of USER IO Interface (Number is given starting from IN00)

PIN	Definition	PIN	Definition	PIN	Definition	PIN	Definition
1	IN44(Note*)	12	OUT60	23	OUT49	34	IN55
2	IN47(Note*)	13	OUT63	24	OUT52	35	IN58
3	IN50(Note*)	14	-	25	OUT55	36	IN61
4	IN53	15	EGND	26	OUT58	37	OUT50
5	IN56	16	IN45(Note*)	27	OUT61	38	OUT53
6	IN59	17	IN48(Note*)	28	-	39	OUT56
7	IN62	18	IN51	29	-	40	OUT59
8	OUT48	19	IN54	30	EGND	41	OUT62
9	OUT51	20	IN57	31	IN46(Note*)	42	-
10	OUT54	21	IN60	32	IN49(Note*)	43	E24V
11	OUT57	22	IN63	33	IN52	44	E24V

Note*：When LNC MPG module or C10 & C11 connectors are applied, IN44 ~ IN50 are required. Please use IN points after IN51 for user IN points.

PIN locations of a 44PIN connector are defined as below:
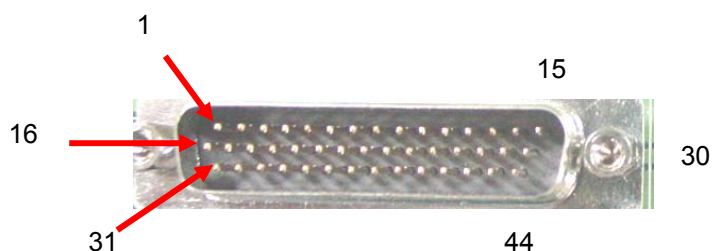
Caution:

● Because IN44 ~ IN50 and C10 & C11 overlap, please choose only one from them in case there is conflict of IN points application.

(2). ON/OFF PIN Definition ----Signals of ON/OFF & EMG Interface

PIN	Name	Description
1	OTR1	Over travel release button PIN 1
2	×	×
3	×	×
4	SERONL	Servo ON light control (Light is on OP controlled by TRF Series transit cards, for example: TRF-2760)
5	EGND	E24V Power GND
6	OFF1	OFF button port PIN1
7	ESP1	Emergency Stop button port PIN1
8	ON1	ON button port PIN1
9	OTR2	Over travel release button PIN2
10	×	×
11	×	×
12	OFFL	OFF button light control
13	OFF2	OFF button port PIN2
14	ESP2	Emergency Stop button port PIN2
15	ON2	ON button port PIN2

(3). C10 & C11 Connector definition----Input interface signals

| C10		C11	
PIN	Definition	PIN	Definition
1	IN44	1	IN47
2	IN46	2	IN49
3	×	3	×
4	E24V	4	E24V
5	×	5	IN50
6	IN45	6	IN48
7	×	7	×
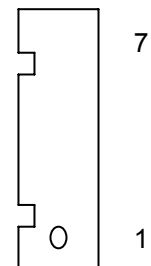
C10 & C11 connectors

PIN definitions

● **Corresponding IO Location of Standard Operation Panel for Lathe Dual System Controller**
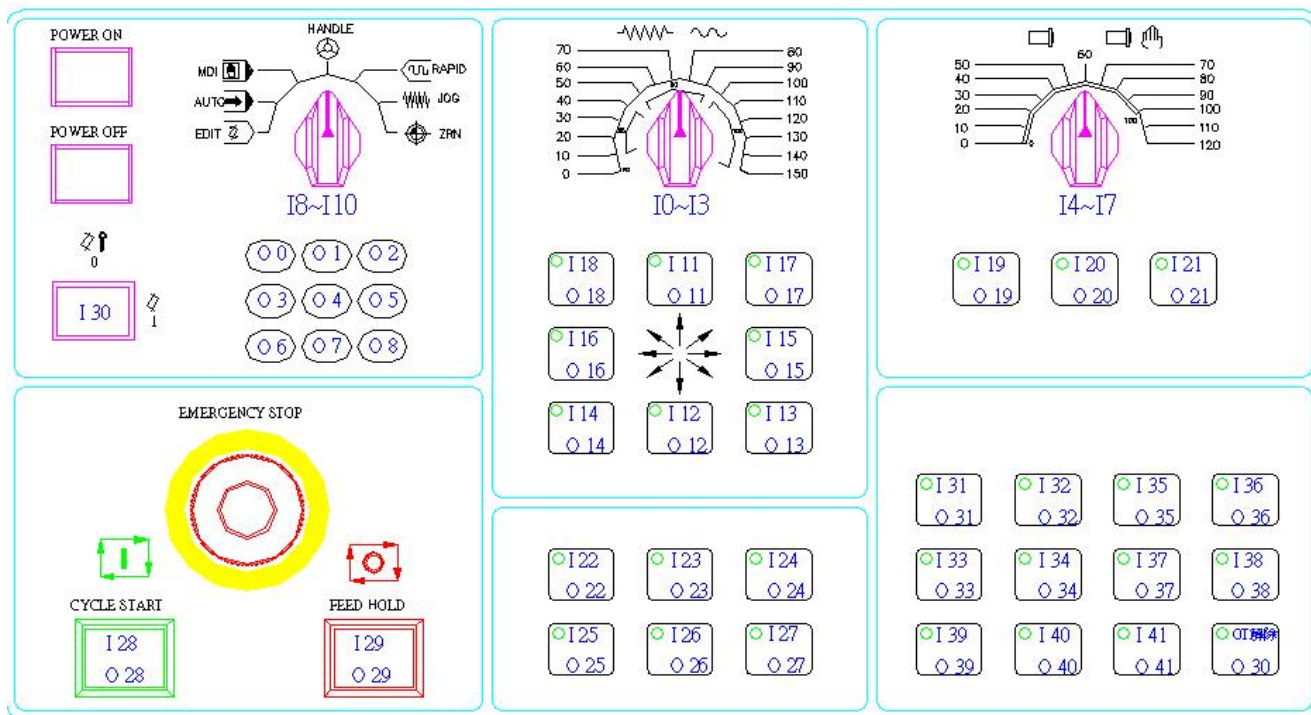
● **Cable-Making Information**

1. Pin-to-pin cable.
2. Please use twisted pair.
3. Please make sure to connect to metal shielding.

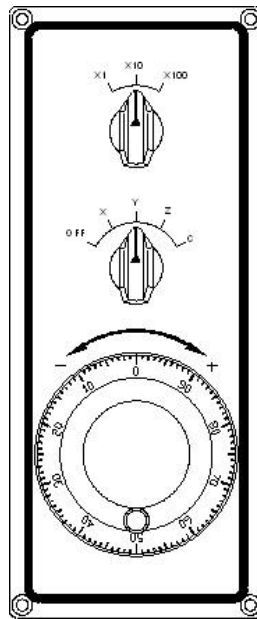RIO control
connector

OP-2520P2
connector
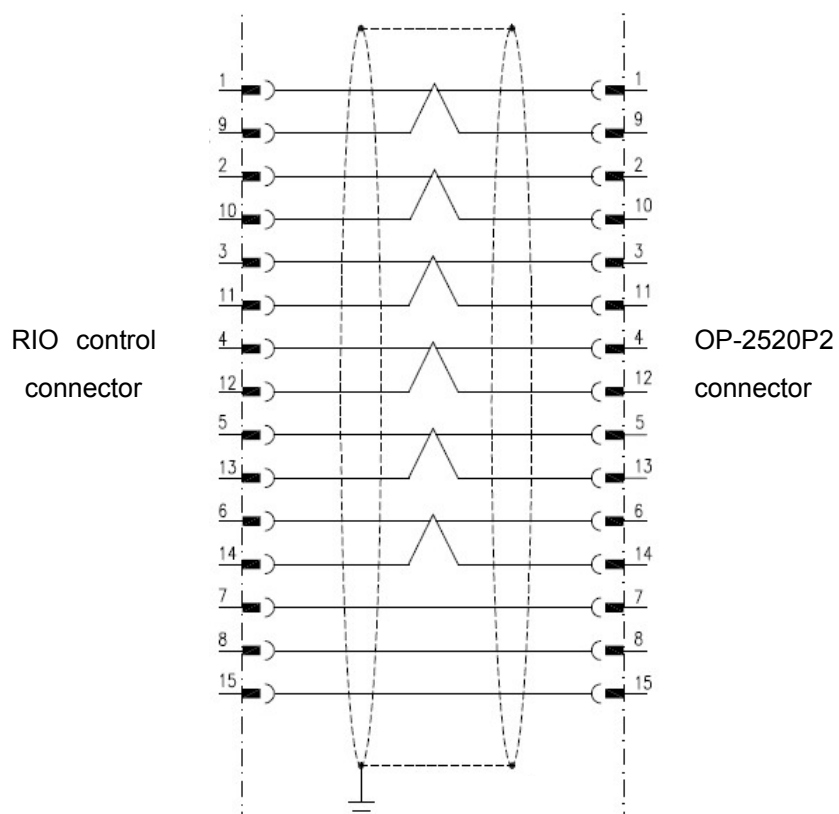
2.4   MANUAL PULSE GENERATOR

● **Specifications:**

1.   MPG outputs A, B, /A, & /B signals, 100 pulse/rev.

2.   Feedrate multiplier rotary switch: 3 positions

3.   Axis selection rotary switch: 5 positions

● **MPG Diagram:**

● **Connector, Components, Lights:**

1.   MPG contacts are A,B,/A,/B,5V & GND.

2.   3- rate selection switch connects to OP panel.

3.   .5- axis selection switch connects to OP panel.

2.5 CONTROL UNIT

2.5.1 ELC-22OO

● **Specifications:**

ELC-2200	Specification
Display Interface	VGA output
SDRAM	Over 64M bytes (Max. 512M)
CF card	Over 64M bytes (Max. 1G)
COM PORT	1×RS-232,1×RS-232/485/422
Ethernet (RJ45)	10/100 Mpbs
PS2	mini-DIN KEYBOARD/MOUSE
USB	USB 1.1
FDD	3.5"1.44MB
IDE	1×EIDE
Power	100W 5V(10A)/12V(3A) AC 110V/230V 50Hz/60Hz
Operation temperature	0~60°C
Operation humidity	Below 90% RH (no condensation)
Storage temperature	-10~80°C (no icing)
Storage humidity	Below 90% RH (no condensation)
Vibration	Below 1G; 10HZ~150HZ

● **Connectors & Pins:**

PC Interface Signals			
Mark	Component	Function	Connecting Method
VGA	HD_SUB 15PIN Male		Connect to monitor
PS2	mini-DIN	KEY BOARD/MOUSE Port	Connect to keyboard/mouse
IDE	40PIN 2.54mm	IDE Interface	Connect to IDE component
COM1	D_SUB 9PIN Male	COM PORT 1	Connect to peripherals
COM2	D_SUB 9PIN Male	COM PORT 2	Connect to peripherals
PRINT	D_SUB 25PIN Female	PRINT PORT	Connect to peripherals
FLOPPY	34PIN 2.54mm	FDD Interface	Connect to floppy
IDE	34PIN 2.54mm	IDE Interface	Connect to IDE component
USB	-	USB 1.1	Connect to peripherals
CF Card	-	CF Card Interface	Connect to CF card
Power			
Connector/PIN	Type	Function	Operating Instruction
AC INPUT	2PIN 7.62 mm Terminal Block	Input main power (AC 110V~230V)	Connect to AC power
DC OUTPUT	3PIN 7.62 mm Terminal Block	DC Power 5V & 12V output	Supplies power for IDE & FDD components

● **Hardware Diagram:**
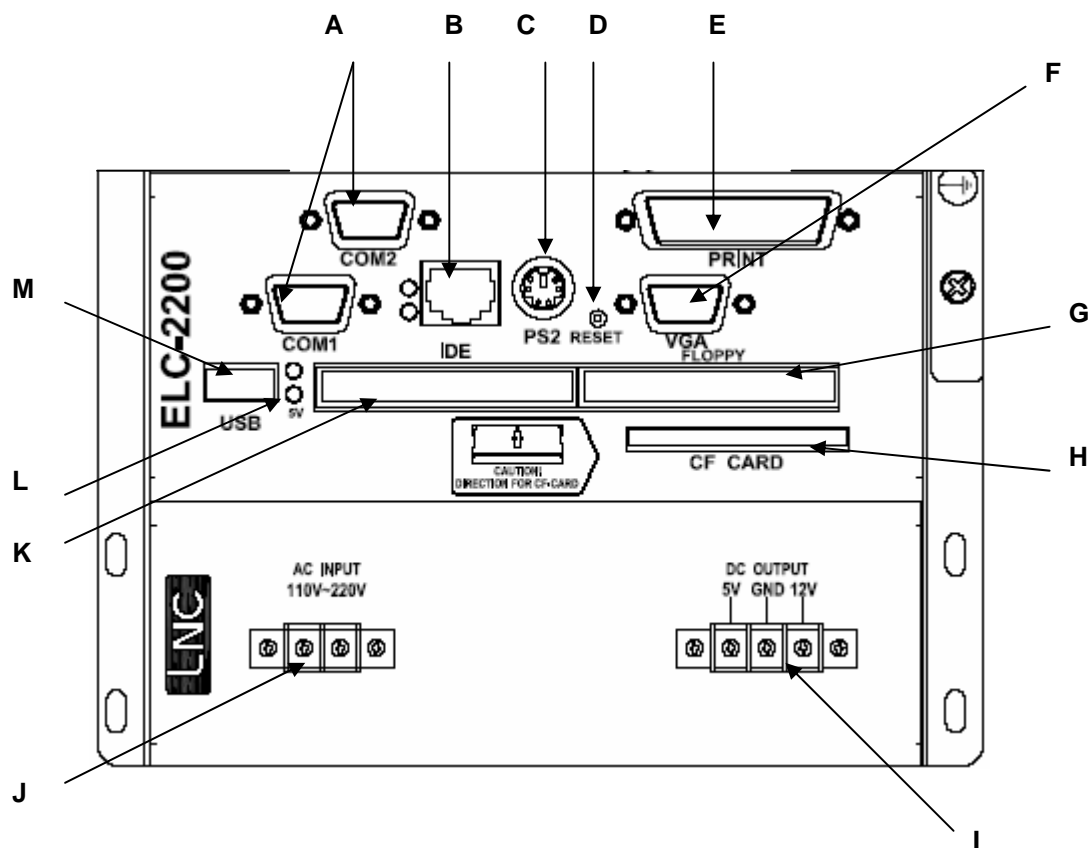
● **Operation/Setting & Lights:**

A：COM PORT

ELC-2200 provides 2 sets of COM PORT.

COM1 is for RS-232.

COM2(default) is for RS-232; if necessary, it can be applied to RS-485/422.

B: Network Connector

Network connector is RJ45, and the speed is 10/100Mbps.

C: PS2 Port

PS2 port can be connected for keyboard or mouse.

D: RESET Button

After RESET is pressed, the controller reboots. Please do not press button unless necessary.

E: PRINT Port

Multi-mode (ECP/EPP/SPP) serial ports are provided.

F: VGA Connector

Display interface: CRT Mode: 1280x1024@16bpp(60Hz), 1024x768@16bpp(85Hz)

G: Floppy Interface

3.5" 1.44MB

H: CF Card Connector

Please use TYPE I connector for CF card.

Caution:

When inserting an CF card into the controller, please follow the instruction on the sticker and insert it in the correct direction. Please do not press CF card otherwise CF slot might get damaged.

I: DC Voltage Output Connector

1. DC voltage output connector provides 5V,GND, &12V.
2. Capacity: 5V(3A);12V(2A)
3. This connector supplies the power for FDD & IDE components.

Caution:

- 5V/12V/GND supply power for controller system. If connected to other peripherals, they serve as power supply for FDD or IDE component only. Please DO NOT apply 5V/12V/GND for any other purpose in order to ensure stability of system functions.

J: AC Power Input Connector

1. This connector inputs main power, including a 100W power supply.
2. Rated input capacity: 2A/115VAC;1A/230VAC.
3. When rated current is input from this connector, controller is started. This connector can be controllered by TRF Series cards or other external circuits.

Example：
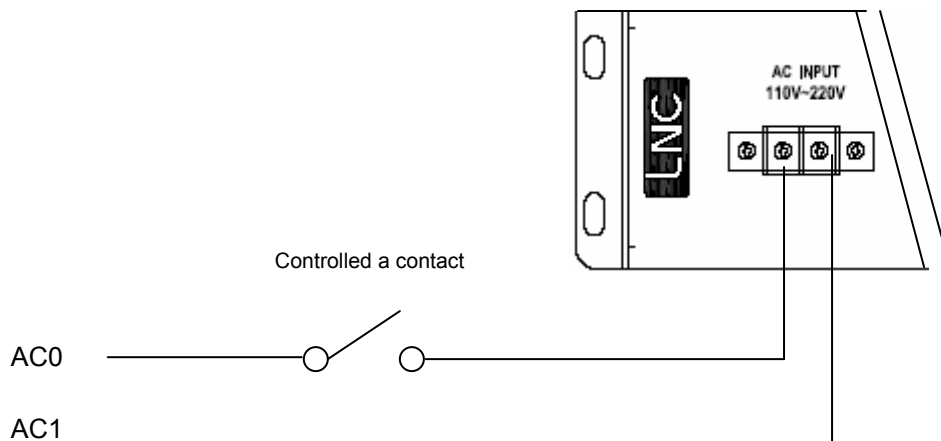
Caution：

- Please ensure power quality. Input specification is AC 110V/230V 50Hz/60Hz.
- Please attach cables securely.

K: IDE Connector

IDE connector supports IDE devices. 5V/12V power of IDE devices must be input from 『 I 』 point (same level).
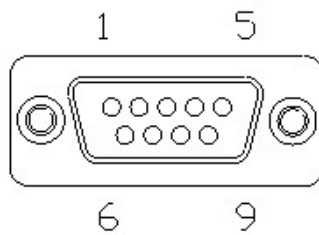

L: Light of DC 5V Power

After powered on, and 5V power of controller system is ready, 5V power indication light turns on.

M: USB Interface

When the software supports USB interface, connect the USB component via this interface.

- **Interface & Pin Definition:**
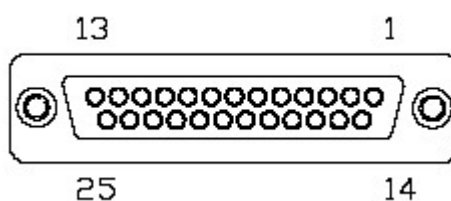 1. COM PORT Pin Definition

PIN	RS-232C	RS-422	RS-485
1	DCD	TxD-	DATA-
2	RXD	TxD+	DATA+
3	TXD	RxD+	N/C
4	DTR	RxD-	N/C
5	GND	GND	GND
6	DSR	N/C	N/C
7	RTS	N/C	N/C
8	CTS	N/C	N/C
9	RI	N/C	N/C

  2. RJ45 Net Connector Definition

PIN	Name
1	XMT+
2	XMT-
3	RCV+
4	NC
5	NC
6	RCV-
7	NC
8	NC

  3. PRINT Port Pin Definition

PIN	Name	PIN	Name
1	STROBE	2	AUTOFD
3	D0	4	ERR
5	D1	6	INIT
7	D2	8	SLCTINI
9	D3	10	GND
11	D4	12	GND
13	D5	14	GND
15	D6	16	GND
17	D7	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

4. USB Pin Definition
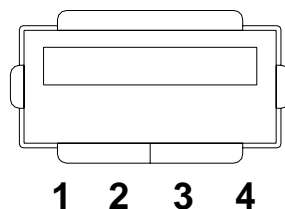
PIN	Name
1	5V
2	UV-
3	UV+
4	GND

2.6   MOTION CARD

2.6.1   PCC-1840

- **Specifications:**

PCC-1840	Specification
PULSE Output Axis	4 axes (A/B,P/D,CW/CCW)
ENCODER Input Axis	6 axes (A/B,P/D,CW/CCW)
DA Output Axis	2 axes ±10V output (Optional)
RIO (Serial I/O）	2 × RIO ports
LOCAL I/O	8 IN/8 OUT

- **Hardware Diagram:**
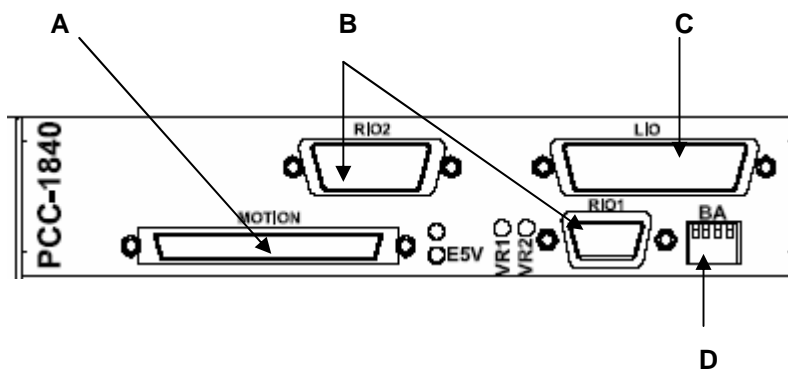
- **Connectors & Components Description:**

Motion Control			
Mark	Component Type	Function	Operating Instruction
MOTION	SCSI-2 68PIN	Motion Control Signals Connector	Connect to TRF cards
IO Control			
Mark	Component Type	Function	Operating Instruction
RIO1	HD_SUB 15PIN Female	Serial IO control port 1	Connect to SIO cards
RIO2	D_SUB 15PIN Female	Serial IO control port 2	Connect to SIO cards
LIO	D_SUB 25PIN Female	LOCAL IO interface(8IN/ 8OUT)	Connect to peripherals
Setting			
Mark	Component Type	Function	Operating Instruction
BA		Set hardware base address	Set according to software
Power			
Mark	Component Type	Function	Operating Instruction
E5V	Green LED	E5V Light	

● **Operation & Setting Description:**

A: MOTION Connector

◎Description：1.This connector includes motion control signals of PULSE,ENCODER, & DAC, etc.

2.DAC output is optional.

◎Operating Instruction: This connector is connected to transit cards such as TRF-2760 & TRF-1720.

B: Serial Communication Connector

◎Description：1.PCC-1840 provides 2 serial communicatioin control ports. Each port connects 3 SIO,

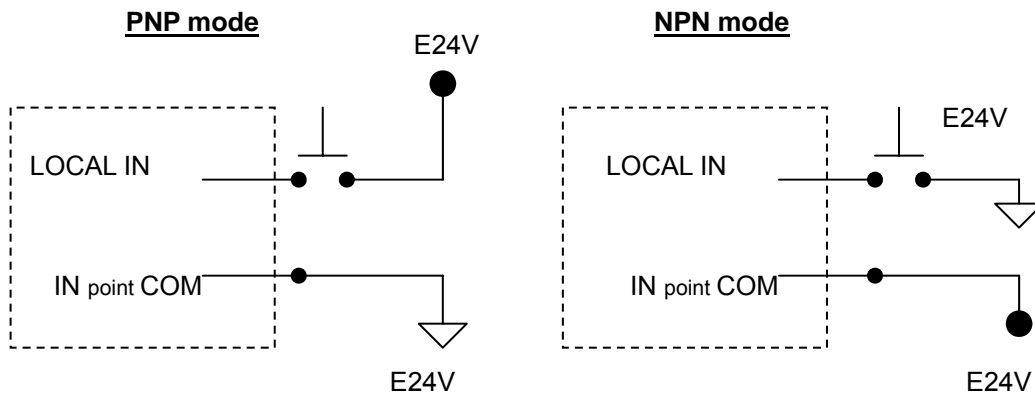EIO modules for serial IO expansion.

C：LOCAL IO Connector

◎Description：1.LIO connecto provides ON_BOARD 8IN/8OUT LOCAL IO.

2.IN points are 24V level and can be input from NPN/PNP of COM ports.

3.O points are open colletor output, and the rated current is 60mA

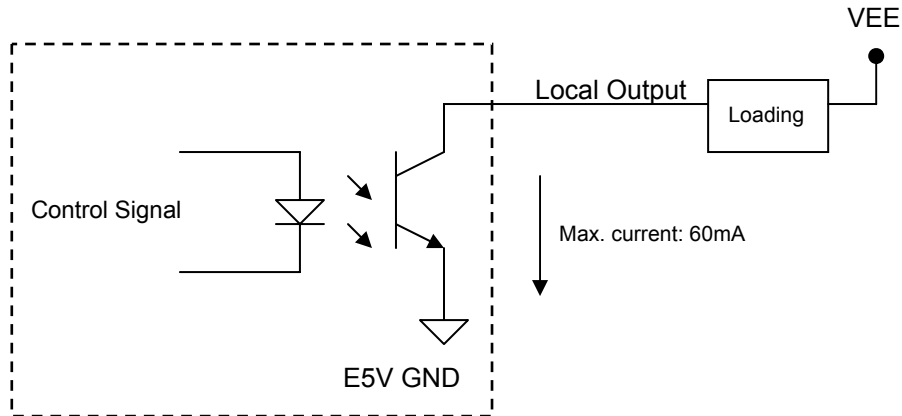◎Operating Instruction：

1.IN points application example:

Caution：

● After the input mode is set, 8 IN points will be the same mode.

● IN points is 24V±0.5V level. All the other levels are NOT applicable.

2.LOCAL OUT points application example:

Caution：

● Please do not select current loading that is over 60MA otherwise components might be damaged.
VEE/60 mA=R ← Current loading cannot be lower than this value.

D: Base Address Setting Switch

◎Description：1.PCC-1840 is the interface card of PC104 which should be set in accordance to correspondent base address of software.
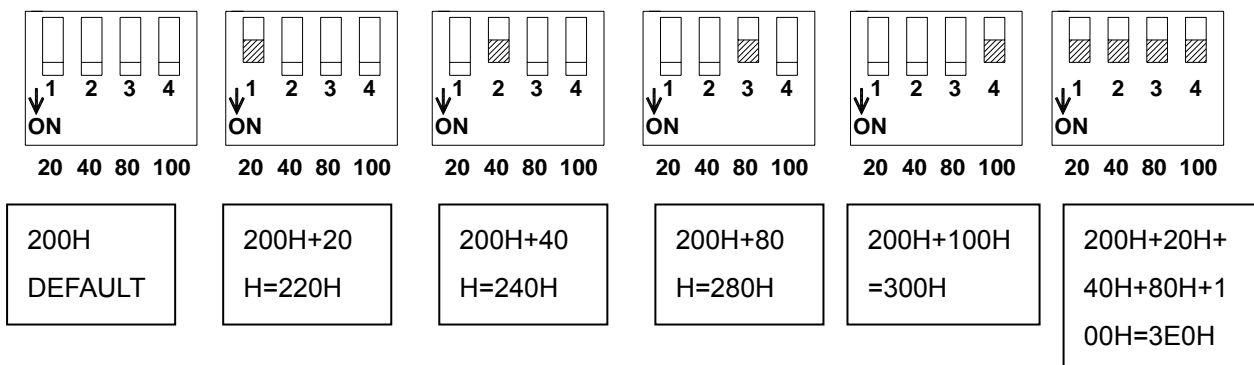
2.By default: 200H(all switch to ON).

◎Operating Instruction:

Base Address Range: 200H~3E0H

1.By default, 200H, & SW is set as below.

2.Other examples:

200H DEFAULT	200H+20 H=220H	200H+40 H=240H	200H+80 H=280H	200H+100H =300H	200H+20H+ 40H+80H+1 00H=3E0H

And apply the same rule for the rest of other settings.

Caution：

● Because base address affects software operation directly, if some special application requires modification of base address, please ask a technician to modify the setting. Please DO NOT change the base address at will.

● **Connector PIN Definictions:**

A：SCSI 68 PIN MOTION Connector

PIN	Name	Definition	I/O	PIN	Name	Definition	I/O
1	ENC_IN6A	Phase A of Encoder 6	IN	35	E5V	External 5V Power	IN
2	/ENC_IN6A	Phase –A of Encoder 6	IN	36	-	-	-
3	ENC_IN6B	Phase B of Encoder 6	IN	37	ENC_IN6C	Phase C of Encoder 6	IN
4	/ENC_IN6B	Phase –B of Encoder 6	IN	38	/ENC_IN6C	Phase –C of Encoder 6	IN
5	HS1	IN Point 0	IN	39	P4A	Phase A of Axis 4	Out
6	HS2	IN Point 1	IN	40	/P4A	Phase –A of Axis 4	Out
7	HS3	IN Point 2	IN	41	P4B	Phase B of Axis 4	Out
8	HS4	IN Point 3	IN	42	/P4B	Phase –B of Axis 4	Out
9	ENC_IN1A	Phase A of Encoder 1	IN	43	ENC_IN3A	Phase A of Encoder 3	IN
10	/ENC_IN1A	Phase –A of Encoder 1	IN	44	/ENC_IN3A	Phase –A of Encoder 3	IN
11	ENC_IN1B	Phase B of Encoder 1	IN	45	ENC_IN3B	Phase B of Encoder 3	IN
12	/ENC_IN1B	Phase –B of Encoder 1	IN	46	/ENC_IN3B	Phase –B of Encoder 3	IN
13	ENC_IN1C	Phase C of Encoder 1	IN	47	ENC_IN3C	Phase C of Encoder 3	IN
14	/ENC_IN1C	Phase –C of Encoder 1	IN	48	/ENC_IN3C	Phase –C of Encoder 3	IN
15	ENC_IN2A	Phase A of Encoder 2	IN	49	ENC_IN4A	Phase A of Encoder 4	IN
16	/ENC_IN2A	Phase –A of Encoder 2	IN	50	/ENC_IN4A	Phase –A of Encoder 4	IN
17	ENC_IN2B	Phase B of Encoder 2	IN	51	ENC_IN4B	Phase B of Encoder 4	IN
18	/ENC_IN2B	Phase –B of Encoder 2	IN	52	/ENC_IN4B	Phase –B of Encoder 4	IN
19	ENC_IN2C	Phase C of Encoder 2	IN	53	ENC_IN4C	Phase C of Encoder 4	IN
20	/ENC_IN2C	Phase –C of Encoder 2	IN	54	/ENC_IN4C	Phase –C of Encoder 4	IN

PIN	Name	Definition	I/O	PIN	Name	Definition	I/O
21	EGND	E5V GND	-	55	ENC_IN5A	Phase A of Encoder 5	IN
22	EGND	E5V GND	-	56	/ENC_IN5A	Phase –A of Encoder 5	IN
23	P1A	Phase A of Axis 1	Out	57	ENC_IN5B	Phase B of Encoder 5	IN
24	/P1A	Phase –A of Axis 1	Out	58	/ENC_IN5B	Phase –B of Encoder 5	IN
25	P1B	Phase B of Axis 1	Out	59	ENC_IN5C	Phase C of Encoder 5	IN
26	/P1B	Phase –B of Axis 1	Out	60	/ENC_IN5C	Phase –C of Encoder 5	IN
27	P2A	Phase A of Axis 2	Out	61	P3A	Phase A of Axis 3	Out
28	/P2A	Phase –A of Axis 2	Out	62	/P3A	Phase –A of Axis 3	Out
29	P2B	Phase B of Axis 2	Out	63	P3B	Phase B of Axis 3	Out
30	/P2B	Phase –B of Axis 2	Out	64	/P3B	Phase –B of Axis 3	Out
31	AGND	Analog Output GND		65	AGND	Analog Output GND	
32	-	-	-	66	-	-	-
33	-	-	-	67	DACO4	D/A Output 4(*)	Out
34	DACO5	D/A Output 5(*)	Out	68	-	-	Out

(*) Optional

1. C：LOCAL IO Connector

| PIN	Name	PIN	Name
1	IN1	14	OUT1
2	IN2	15	OUT2
3	IN3	16	OUT3
4	IN4	17	OUT4
5	IN5	18	OUT5
6	IN6	19	OUT6
7	IN7	20	OUT7
8	IN8	21	OUT8
9	IN point COM	22	GND(E5V GND)
10	IN point COM	23	GND(E5V GND)
11	X	24	X
12	X	25	X
13	X		

2.7 TRANSIT CARD

2.7.1 TRF-2760

● **Specifications:**

1. For PCC-1620V2.2 Motion card; P/V CMD transition for 6 axes.

2. MPG transition.

3. 24V HOME sersors for 4 axes.

4. 2 OT points.

5. 2 EMG points.

6. ON/OFF power control & EMG protection.

7. Provides system E5V & 24V power transition.

8. Servo COM point settings.

9. SERVO_ON connector for each axis (6 axes).

10. SERVO_RDY signal for 6 axes.
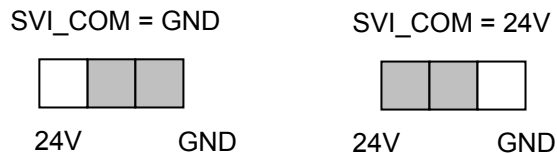
11. SERVO_ALM signal for 6 axes.

● **Hardware Diagram:**
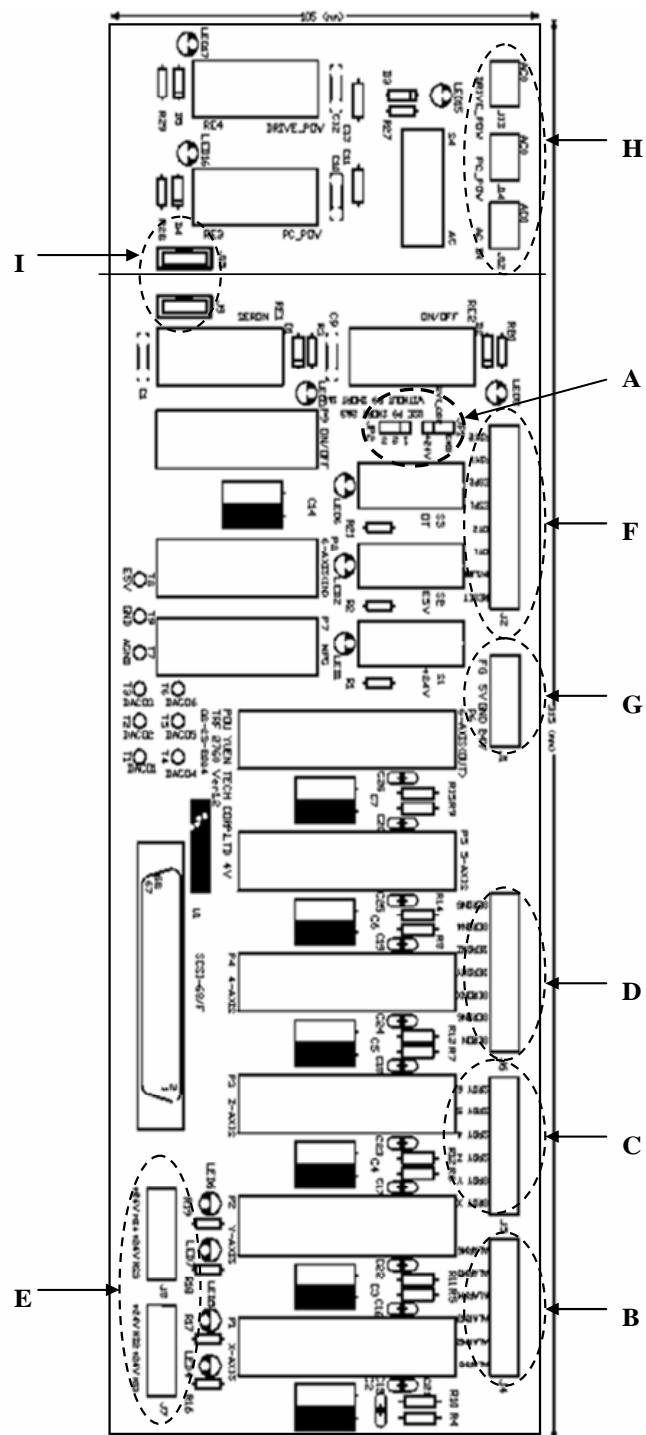
- **Operation, Settings, & Lights:**

  A: JP1 & JP2 Settings

  ◎Set servo COM input point mode by JP1

  Setting example：As shown in the diagrams below, set servo INPUT COM points to GND or 24 V according the type of servo that is applied.

  SVI_COM = GND   SVI_COM = 24V

  24V   GND   24V   GND

  (Default)

  Note: The colored parts are the locations for JUMPER.

  ◎Set ON/OFF connector (P9) relation by JP2

  When P9 applies a LNC standard OP, please set PIN2 & PIN3 of JP2 to short circuit.

  3   2   1
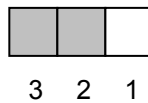
  (DEFAULT)

  When P9 is not applied, please make PIN1 & PIN2 of JP2 short circuit.

  3   2   1
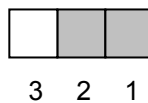
  Note：The colored parts are the locations for JUMPER. If settings are incorrect, servo drivers might not be enabled successfully (cannot SERVO ON).

  B：J4 connector for servo alarm signal points

  J4 connector provides servo alarm points for 6 axes. In most situations, when there is a servo alarm, this point outputs 24V current. To enable servo alarm detection, please connect this signal to IN points.

**C：J5 connector for servo alarm signal points**

J5 connector provides servo ready signal points for 6 axes. In most situation, when servo control power and main power are okay, and there is no alarm, this point outputs "LOW" current (servo status is okay). Otherwise, it outputs 24V current. To enable servo status detection, please connect this signal to IN points.

D：J6 connector for servo start signal points

J6 connector provides independent servo start signal points for 6 axes and also one servo on signal point.

Example 1:

When 6 servo axes are motivated concurrently, please connect each point with a SERON point.

5　4　Z　Y　X　6　SERON
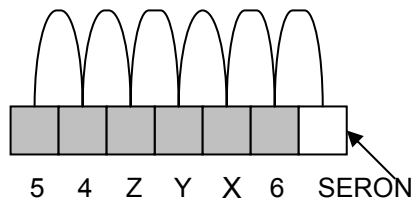
Example 2:

The example is the wiring diagram when Z axis is motivated separately, and the other axes are enabled simultaneously together.

a contact of other components

5　4　Z　Y　X　6　SERON
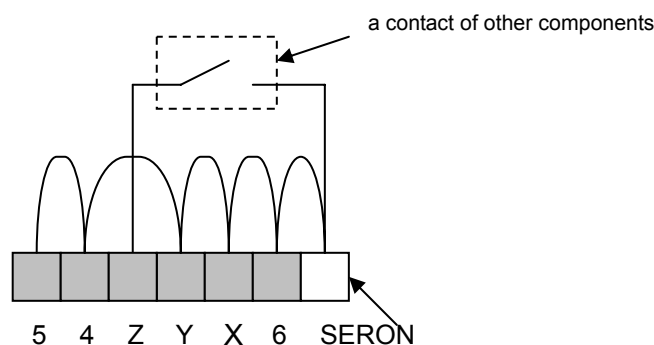
E：J7 & J8 LOCAL IN points

The input level of this LOCAL INPUT is 24V; each IN point provides one 24V contact.

Example 1:

INPUT point wiring diagram
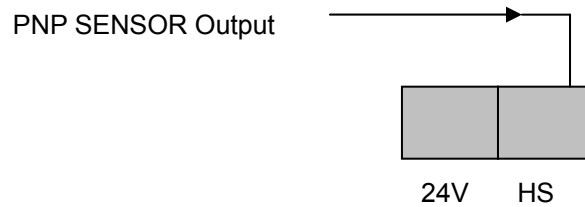
contact
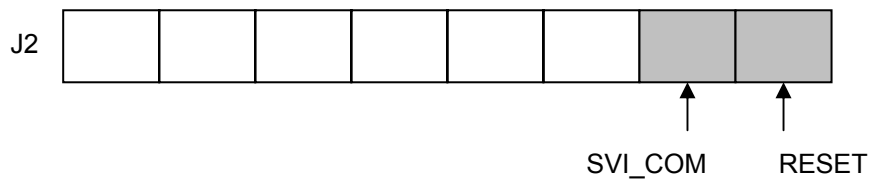
24V   HS
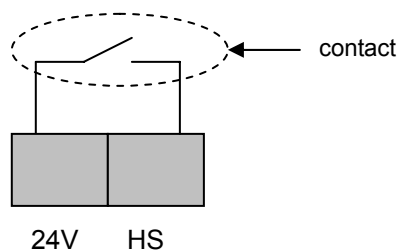
Example 2:

PNP SENSOR wiring diagram

PNP SENSOR Output

24V   HS

F：J2 points

J2 points have 3 main functions --- 1. Servo reset/cancel, 2. Servo safety loop, & 3, Servo Start. Please find detail description & the operating method as below. (Loop diagram is as depicted in the appendix.)

1.Servo reset/cancel ----

J2

SVI_COM   RESET

Description：J2 RESET point is connected to PIN9 of P1~P6 connectors; its function is to reset/cancel an alarm or other statuses for the servo of 6 axes.

Operating method：Make both SVI_COM & RESET points short circuit, and servo can be reset or a servo status can be cancelled. For its related wiring or operating information, please refer to Operating Instruction of servo drivers.

2.Servo Safety Loop ----

J2

ESP2   ESP1   OT2   OT1
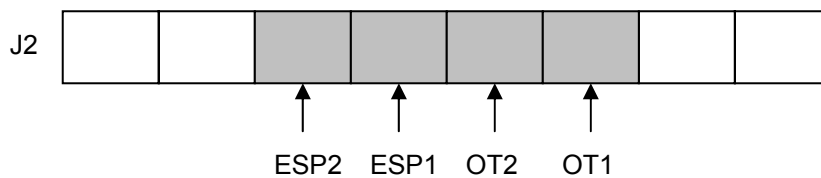
Description：OT1 & OT2 points are over travel points. The mandatory condition to enable servo on is to make these 2 points short circuit. They are safety contacts of hardware. Because there are only 2 points available, please connect "serial b point" externally when multi-axis OT protection is necessary.

ESP1 & ESP2 are the connecting points for emergency button. The two points must be short circuit to enable servo on. They are safety contacts of hardware. Please use b contact.
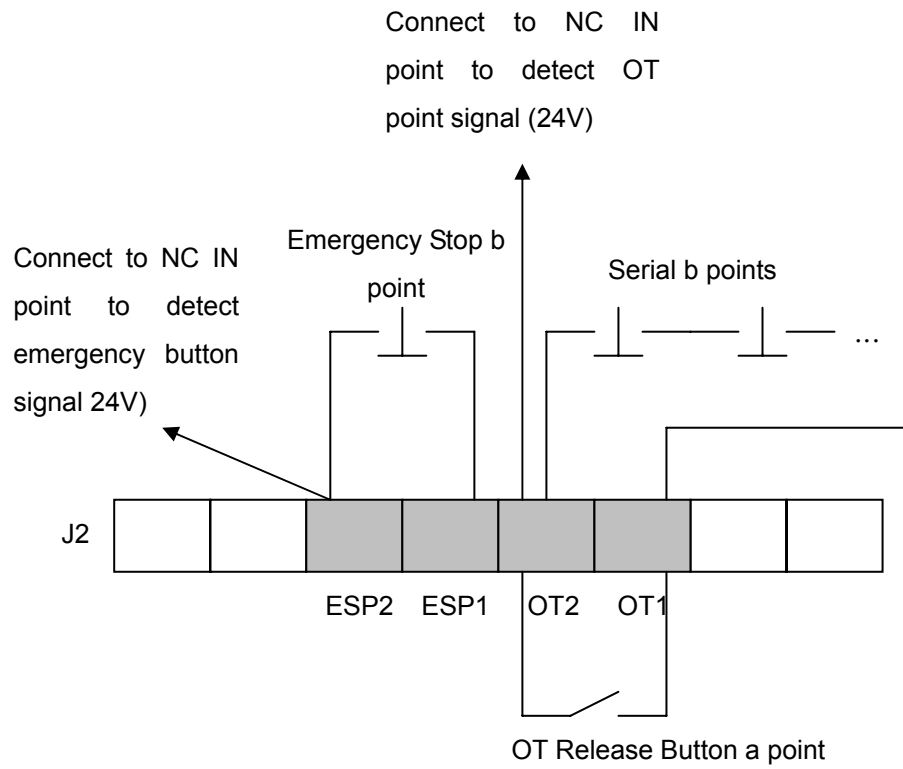
Operating method:

Case 1：Wiring diagram of OT protection for LNC standard OP panel.
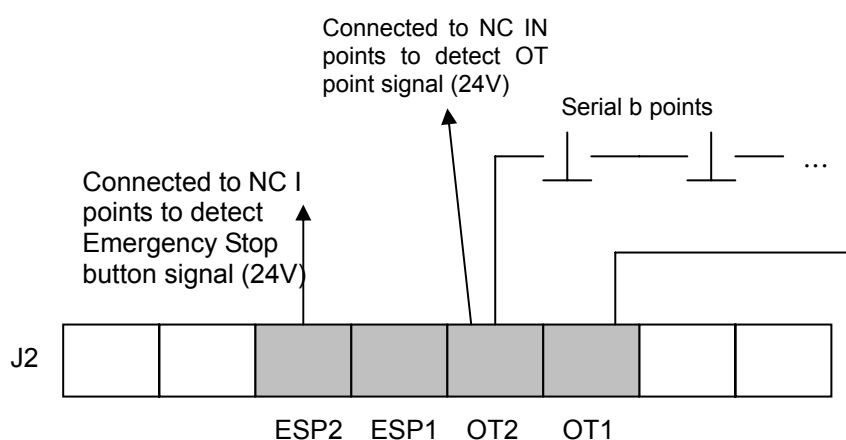
Note: LNC OP panel has provided the Emergency Stop button & OT release button.

Case 2：Wiring diagram of OT protection for non-LNC OP panels.

Connect to NC IN point to detect OT point signal (24V)

Connect to NC IN point to detect emergency button signal 24V)

Emergency Stop b point

Serial b points

...

J2

ESP2   ESP1   OT2   OT1

OT Release Button a point

1.Servo ON point ----

Description：RDY1 & RDY2 points are servo on control points. Only when OT1 & OT2 points and also ESP1 & ESP2 points are all short circuit, making RDY1 & RDY2 points short circuit will enable relay RE1 to start servo driver.

Operating method:

Controlled a contact

J2

RDY2   RDY1
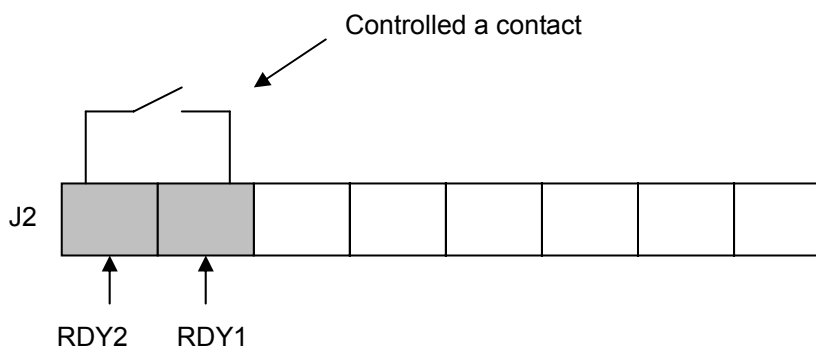
G: J1 External IO DC Power Input Point

J1 point inputs 24 power for SERVO ON/safety loop, & also 5V power for encoder/linear scale. In addition, it supports field ground.

Caution：

- 5V power of this input supplies external encoders and linear scales. Please select the power supply that is required according to the actual need (If no linear scale is used, minimum power should be 2A. If a linear scale is applied, please refer to the specifications of the linear scale.) DO NOT share this power supply with 5V power for system kernel.

- FG is field ground connecting point. Please connect field (ground) to this point. DO NOT connect it to power GND point.

- Before powered on, please verify if polarity and specification of current are correct. False wiring or specification might cause damage to transit cards or peripherals (ex. MPG, servo, etc.).

- Power input specification: 5V/(2A~5A),24V/(Above 4A). Because the input power is DC power, please pay extra attention that cable length & width should meet the requirement of 5V & 24V power for TRF-2760 card. Voltage lost or noise could all cause abnormality of operation (please refer to 5V power requirement for the linear scale).

H: AC Power Input Point

J12 point inputs AC power. J14 can be power resource of system kernel, controlled by RE3 via ON/OFF connector. J13 can be applied as a control point for AC component, controlled by RE4 through serial connection of TO & ESP points.
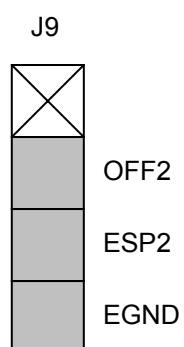
Input Capacity：Max. 5A,240V AC

Below is the control circuit diagram:

TRF-2760 Card
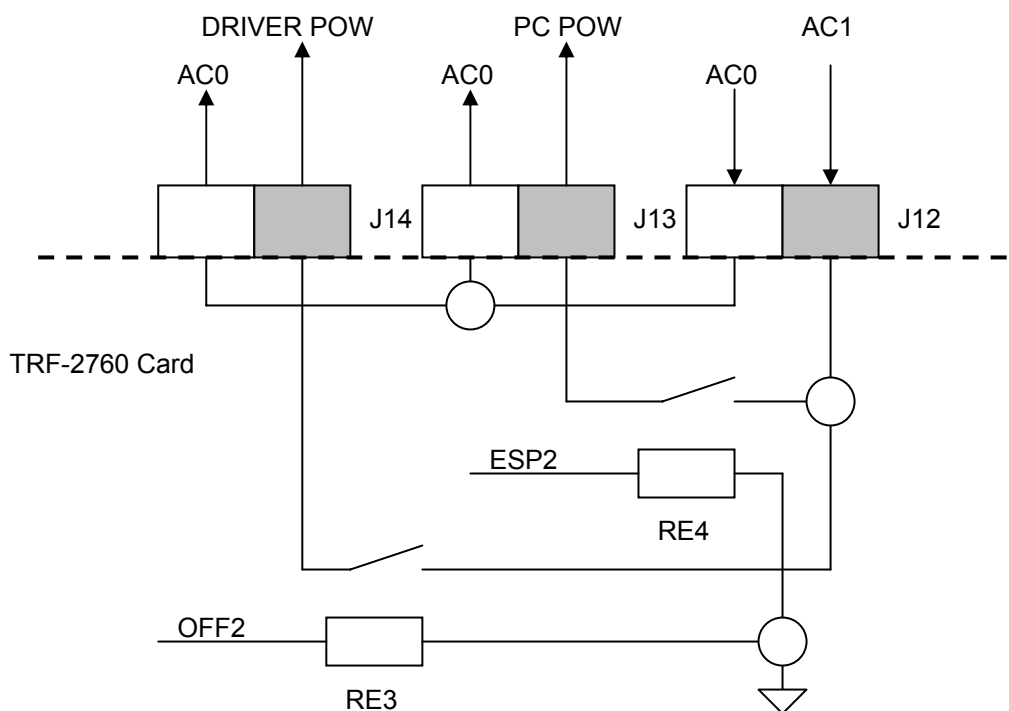
I: AC Power Control Point

J19 & J15 are pin-to-pin 4PIN 2.5mm connectors for control of AC RELAY RE3 & RE4. If users are goint to design AC circuit by themselves, J9 provides 2 safety & power switch control points – ESP2 & OFF2 – for users to apply.

J9

OFF2

ESP2

EGND

Please find connector definitions as below:

● **Interface & PIN Definitions**

(1). P1~P6 in Definition---- Servo Axis Signals

PIN	Name	Description
1	/PB	Pulse Output Command /B
2	PB	Pulase Output Command B
3	E5V	E5V Power
4	EGND	E24V/E5V Ground
5	AGND	Analog Output Ground
6	SERON	Output Control Signal of SERVO-ON
7	EGND	E24V/E5V Ground
8	SVI_COM	Servo INPUT COM Point
9	SER_RESET	Servo Reset/Clear
10	C	(INDEX)Encoder Phase Z Differential Feedback Signal C
11	A	Encoder Phase A Differential Feedback Signal A
12	B	Encoder Phase B Differential Feedback Signal B
13	FG	Field Ground
14	/PA	Pulse Output Command /A
15	PA	Pulse Output Command A
16	SRDY	Servo Ready
17	DAC_OUT	Analog Output of Each Axis
18	E24V	E24V power
19	ALRAM	Alarm Signal Output of Each Servo Axis
20	SVI_COM	Servo IN COM Points
21	EGND	E24V/E5V Ground
22	×	×
23	/C	(INDEX)Encoder Phase Z Differential Feedback Signal /C
24	/A	Encoder Phase A Differential Feedback Signal /A
25	/B	Encoder Phase B Differential Feedback Signal /B

Description:

1.Please use shielded wire to make cables. Also, make sure to securely attach shielding net to connector metal cover or to the 13th pin of connector in order to prevent false response caused by interference of noise.

(2). P7 PIN Definition ---- MPG Signals

PIN	Name	Description
1	E24V	E24V Output
2	×	×
3	/B	MPG Pulse/B Input
4	/A	MPG pulse/A input
5	×	×
6	×	×
7	×	×
8	E5V	E5V Power
9	EGND	(E24V,E5V) GND
10	FG	Field Ground
11	B	MPG Pulse B Input
12	A	MPG Pulse A Input
13	×	×
14	×	×
15	E5V	E5V Power

Description:

1. E5V supports MPG PULSE output.

2. E24V supports MPG (direction/override) output.

(3). P8 PIN Definition---- 6th Axis Signals of Motion Card

PIN	Name	Description
1	E5V	E5V power
2	EGND	(E24V,E5V)GND
3	DAC_OUT	Analog output
4	/A	Encoder Phase A Differential Feedback Signal /A
5	/B	Encoder Phase B Differential Feedback Signal /B
6	/C	(Index) Encoder Phase Z Differential Feedback Signal /C
7	PA	Pulse Output Command Phase A
8	/PB	Pulse Output Command Phase /B
9	E5V	E5V Power
10	AGND	Analog Output Ground
11	A	A Phase Encoder Differential Feedback Signal A
12	B	B Phase Encoder Differential Feedback Signal B
13	C	Z Phase (INDEX)Encoder Differential Feedback Signal C
14	PA	Pulse Output Command Phase A
15	PB	Pulse Output Command Phase B

Description:

1. Signals of this connector is input from PCC1620 V2.2 motion card. When this connector is not attached, there will be no signal output from P6 connector.

2. Please reserve sufficient installation & distribution space for wires & connectors as this connector comes out from the upper part of motion cards.
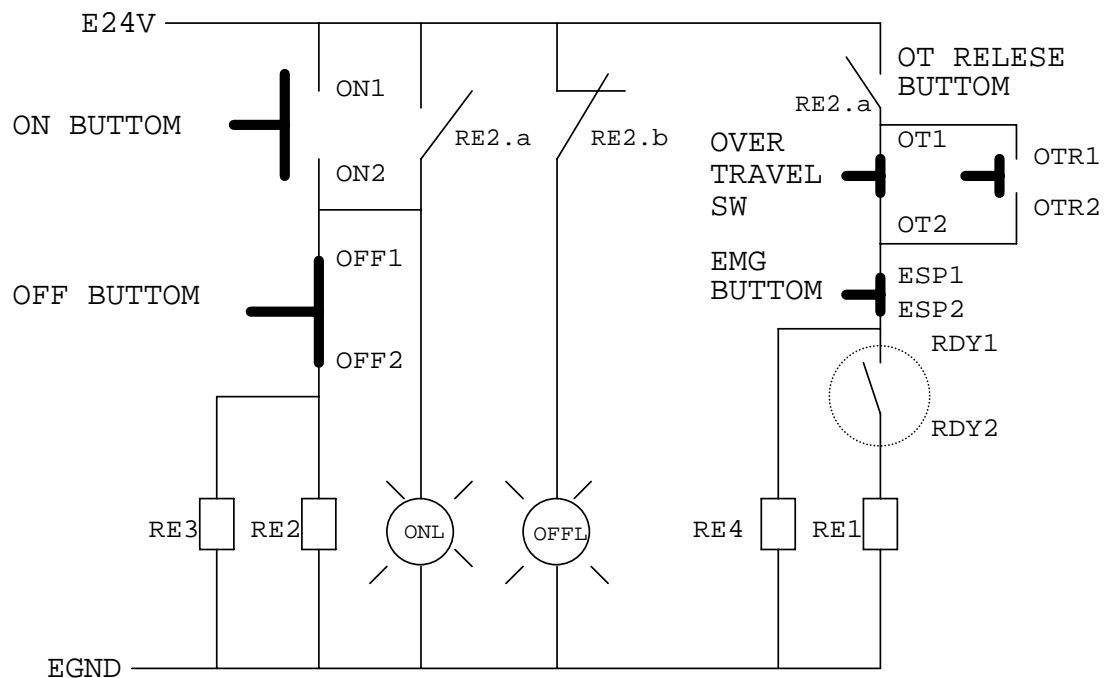
(4). P9 Pin Definition----ON/OFF connector

PIN	Name	PIN	Name
1	OT1	9	ESP1/OT2
2	×	10	×
3	×	11	×
4	SERONL	12	OFFL
5	EGND	13	OFF2
6	ON2/OFF1	14	ESP2
7	ESP1/OT2	15	ON2/OFF1
8	ON1		

Definition:

1. Related circuit & components diagram of ON/OFF connector, OP, & TRF cards:

● **Circuit Enabling Description：**

1. ON button & OFF button: The two buttons are on the OP panel. When ON is pressed, RE2 & RE3 are enabled, & RE2 is in locked status. When OFF is pressed, RE1, RE2, RE3, & RE4 will be all released at the same time.

2. After RE2 is enabled, if OVER TRAVEL & EMG buttons are both ON, RE4 can be enabled.

3. RDY is a controlled contact. When it is connected, RE1 is enabled, and servo driver is enabled (SERVO_ON).

4. When EMG button is pressed or OT is released, RE1 & RE4 will be released, and servo driver stops to operate for hardware protection.

- **Component Description :**

    1. ON & OFF buttons are on OP panel and control system power.

    2. RE3 controls system power of control unit.

    3. RE2 offers the contact for power control.

    4. OVER TRAVEL SW is installed on the machine.

    5. OT RELEASE is on OP panel.

    6. EMG button is on OP panel.

    7. RE4 controls power of peripherals.

    8. RE1 controls servo status.

2.8   I/O CARD

There are two kinds of I/O cards for selection: EIO-2000 or SIO-1540, which are described respectively as below.

2.8.1   EIO-2000

● **Specifications:**
1. Spec (1): 40 IN / 32 OUT; Spec (2): 60 IN / 48 OUT.
2. Each serial port can connect up to 3 sets of EIO-2000 module, which equal to control 180 IN / 144 OUT.
3. Settings of NPN & PNP modules input points.
4. SLAVE Number Setting (1~3).

● **Hardware Diagram**

Spec (1): 40 IN / 32 OUT
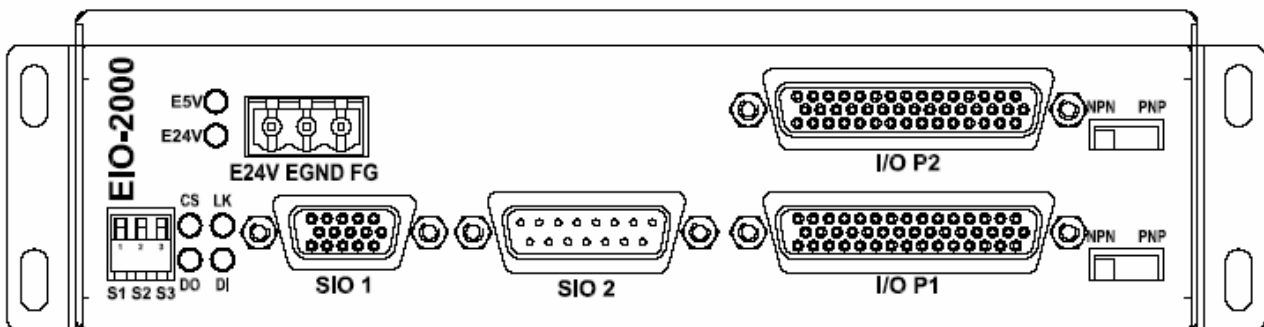
Spec (2): 60 IN / 48 OUT
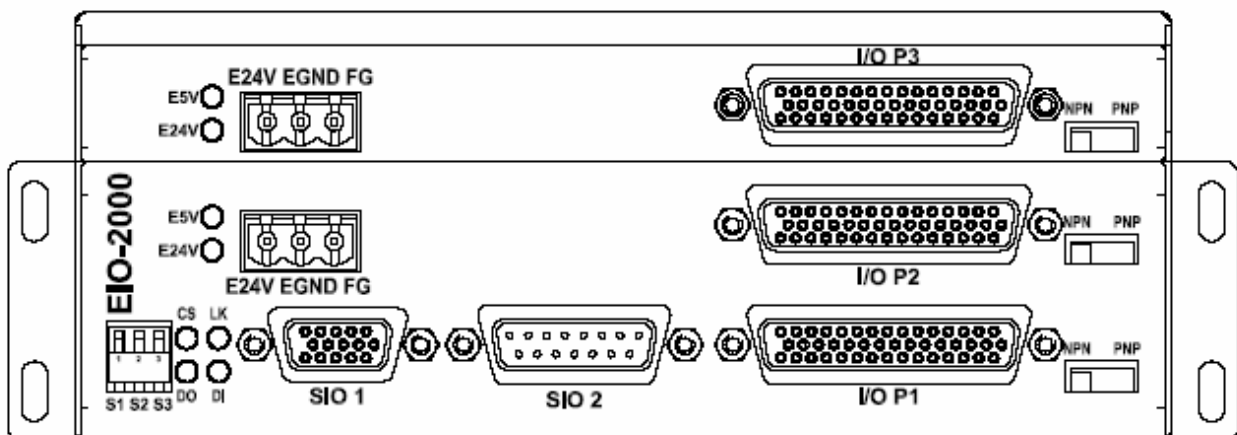
● **Connector, Component, & Light Description:**

Power			
Mark	Component Type	Function	Operating Instruction
E24V EGND FG	3PIN 5.08mm	DC(24V) Power Input/FG	Connect to POWER/Field
Light			
Mark	Component Type	Function	Operating Instruction
E5V	Green LED	E5V Light	
E24V	Green LED	E24V Light	
CS	Yellow LED	Transmission Status Light	Light ON: NC Connected & Power ON
DO	Yellow LED	Transmission Status Light	Light ON: NC Connected & Power ON
DI	Yellow LED	Transmission Status Light	Light ON:Transmission Normal
LK	Yellow LED	Transmission Status Light	Light ON:Transmission Normal
IO Connector			
Mark	Component Type	Function	Operating Instruction
SIO1	HD_SUB 15PIN Female	Serial Port	Connect to NC RIO port
SIO2	D_SUB 15PIN Female	Serial Port	Connect to NC RIO port*1
I/O P1	HD_SUB 44PIN Female	20IN/16OUT IO Port	Connect to REL Series card
I/O P2	HD_SUB 44PIN Female	20IN/16OUT IO Port	Connect to REL Series card
I/O P3	HD_SUB 44PIN Female	20IN/16OUT IO Port	Connect to REL Series card
Setting			
Mark	Component Type	Function	Operating Instruction
S1 S2 S3		SLAVE Number Setting	Switch ON of Designated NO.
NPN PNP		IN points mode setting	Same Mode of 20 IN Points after Setting is Finished.

*1 SIO1 & SIO2 are pin-to-pin circuit for serial connection.

● **Settings, Lights, & Operating Description:**

1. PNP & NPN Switch:

   IN points mode of EIO-2000 can be changed by this switch. Same mode will be applied to 20 IN p[oints of each connector (P1~P3); and each connector can be set independently.
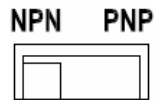
   (1) PNP mode (Default):

   When SW is switched to PNP mark, IN points of IO connector is set to PNP mode. In other words, when external signal is E24V, this IN point is active.
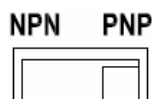
   (2) NPN mode:

   When SW is switched to NPN mark, IN points of IO connector is set to NPN mode. In other words, when external signal is EGND, this IN point is active.

NPN   PNP

Caution：

- Power supply of components must be the same system as E24V ^ EGND or IN points will be inactive.
- Please switch modes after turning off power supply of E24V. DO NOT switch modes when power is still ON.
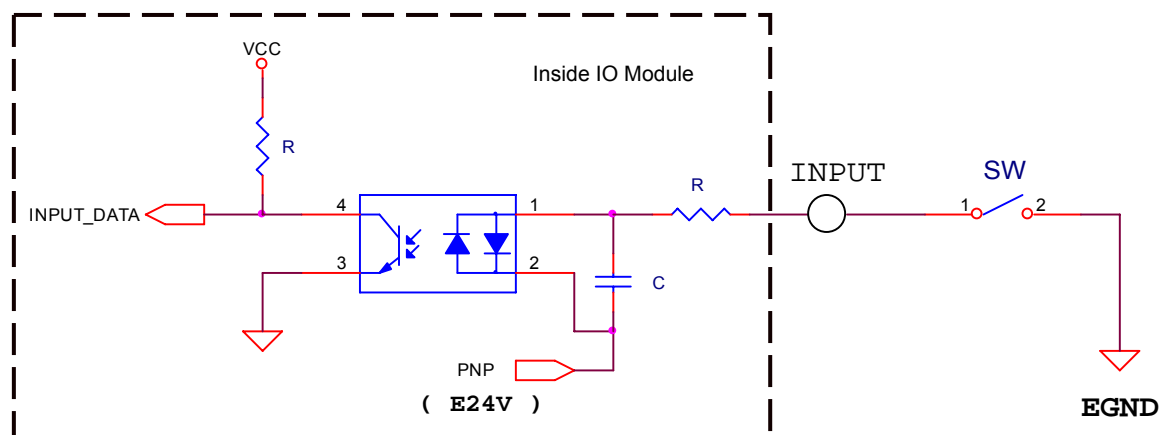
2. IO Ports (P1, P2, & P3):

   This connector is connected to REL Series card for IO control. Each port can control 20IN/ 16 OUT when applied with REL Series cards.

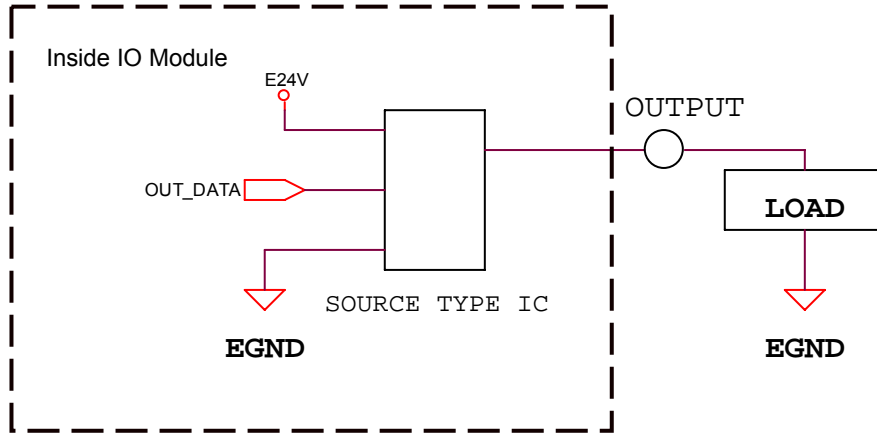   (1) IN Points Operating Instruction(Take examples of "a" contacts)

   PNP mode:
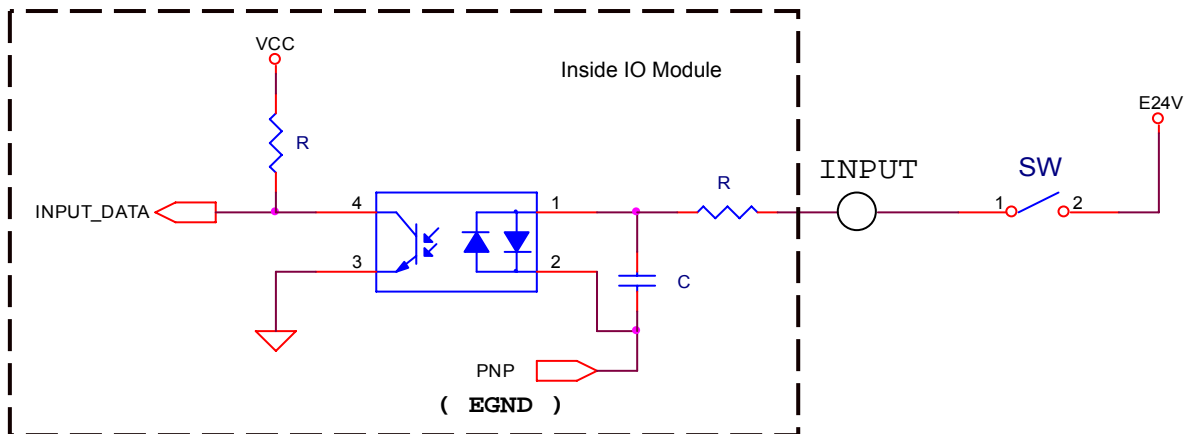
NPN mode:

(2) Operating Instruction of O Points

O points are SOURCE TYPE and outputs E24V when active. The maximum current is 60mA.

Caution：

- Please DO NOT select a current loading over 60 mA otherwise components will get damaged.

  E24V/60 mA=400Ω ←Loading resistance cannot be lower than this value.

- Please pay extra attention. IC will immediately burn when O points and ground are short circuit.

3. Serial Ports SIO1 & SIO2:
   (1) SIO1 & SIO2 are serial communication control connectors which must be attached to RIO ports of controller.
   (2) SIO1 & SIO2 are two connectors of parallel signals for serial expansion purpose.

Operating method is as below:

(Take example of serial connection of 3 40IN/32OUT modules)
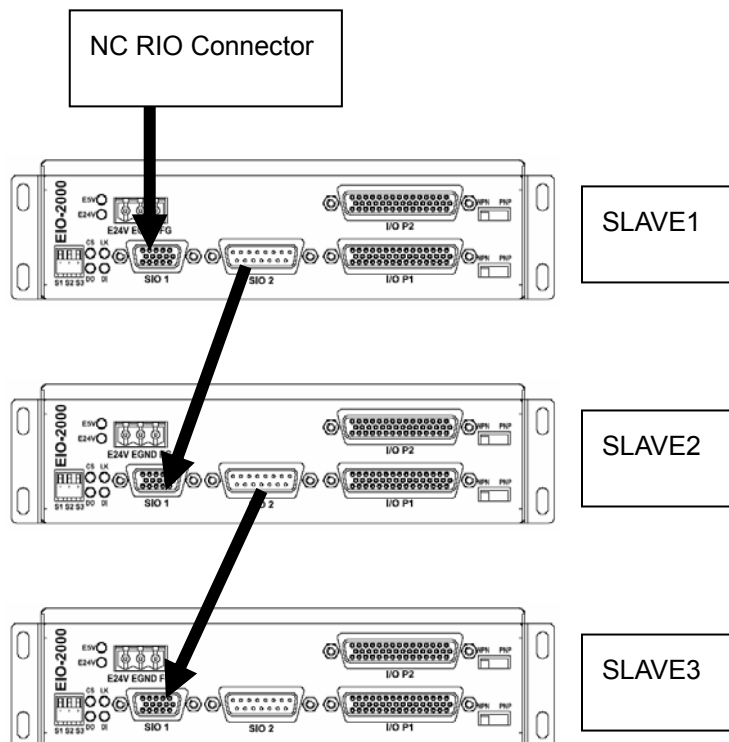
Caution:

● Serial cables should be connected to each other pin-pin. If cables are DIY, please pay attention to the shielding materials. Please refere to Appendix 1.
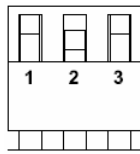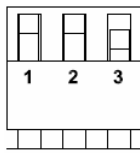
4. SLAVE Selection Switch:

This switch sets the number of SLAVE. To function properly, the set SLAVE number must be applied with software & PLC programming. After SLAVE number is set, please do not change it at will unless necessary.
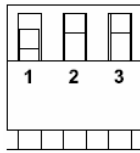
 Set IO module to SLAVE 1: Switch 1(S1) to the bottom, and 2 & 3 to the top.

 Set IO module to SLAVE 2: Switch 2(S2) to the bottom, and 1 & 3 to the top.

 Set IO module to SLAVE 3: Switch 3(S3) to the bottom, and 1 & 2 to the top.

5. E24V/EGND Power Input Pins:
   (1) There is one power connector for 40IN/32 OUT module, and 2 power connectors for 60IN/ 48 OUT module. This power supply serves as IO input/output. Please input E24V to the two connectors to ensure power stability.
   (2) If power is input correctly, E24V indication light will turn on.

 Caution:

- Input current range must be 22V~26V.
- Please input FG contact to the earth of POWER instead of EGND. If earth and EGND are connected, unexpected damage could occur. Hence please be extra careful when wiring.

6. Light Description:
   (1) E5V Light:
   When EIO-2000 module is connected to control unit, and control unit is powered ON, this indication light will turn on to show that module power has prepared ready.

(2) CS & DO Light:

If EIO-2000 module is correctly connected to controller, and controller is powered ON, CS & DO lights will turn on. If two lights do not turn on at the same time, there is some abnormality and the following communication will not be normal.

(3) LK & DI Light:

After CS & DO lights turn on, if SLAVE number of EIO-2000 matches the controller's setting of software/PLC, communication is normal, then LK & DI lights will turn on.

(4) E24V Light:

E24V lights turns on to indicate power of IO interface is normal. If this light is off, IO points will have no response.

7. PIN Definitions for IO connector:

P1 HD_SUB 44PIN Female Pin Definition					
PIN	Definition	PIN	Definition	PIN	Definition
1	IN 00	16	IN 01	31	IN 02
2	IN 03	17	IN 04	32	IN 05
3	IN 06	18	IN 07	33	IN 08
4	IN 09	19	IN 10	34	IN 11
5	IN 12	20	IN 13	35	IN 14
6	IN 15	21	IN 16	36	IN 17
7	IN 18	22	IN 19	37	OUT 02
8	OUT 00	23	OUT 01	38	OUT 05
9	OUT 03	24	OUT 04	39	OUT 08
10	OUT 06	25	OUT 07	40	OUT 11
11	OUT 09	26	OUT 10	41	OUT 14
12	OUT 12	27	OUT 13	42	-
13	OUT 15	28	-	43	E24V
14	-	29	-	44	E24V
15	EGND	30	EGND	-	-

PIN	Definition	PIN	Definition	PIN	Definition
P2 HD_SUB 44PIN Female Pin Definition					
1	IN 20	16	IN 21	31	IN 22
2	IN 23	17	IN 24	32	IN 25
3	IN 26	18	IN 27	33	IN 28
4	IN 29	19	IN 30	34	IN 31
5	IN 32	20	IN 33	35	IN 34
6	IN 35	21	IN 36	36	IN 37
7	IN 38	22	IN 39	37	OUT 18
8	OUT 16	23	OUT 17	38	OUT 21
9	OUT 19	24	OUT 20	39	OUT 24
10	OUT 22	25	OUT 23	40	OUT 27
11	OUT 25	26	OUT 26	41	OUT 30
12	OUT 28	27	OUT 29	42	-
13	OUT 31	28	-	43	E24V
14	-	29	-	44	E24V
15	EGND	30	EGND	-	-

PIN	Definition	PIN	Definition	PIN	Definition
P3 HD_SUB 44PIN Female Pin Definition for EIO-2000(60IN / 48OUT) only					
1	IN 40	16	IN 41	31	IN 42
2	IN 43	17	IN 44	32	IN 45
3	IN 46	18	IN 47	33	IN 48
4	IN 49	19	IN 50	34	IN 51
5	IN 52	20	IN 53	35	IN 54
6	IN 55	21	IN 56	36	IN 57
7	IN 58	22	IN 59	37	OUT 34
8	OUT 32	23	OUT 33	38	OUT 37
9	OUT 35	24	OUT 36	39	OUT 40
10	OUT 38	25	OUT 39	40	OUT 43
11	OUT 41	26	OUT 42	41	OUT 46
12	OUT 44	27	OUT 45	42	-
13	OUT 47	28	-	43	E24V
14	-	29	-	44	E24V
15	EGND	30	EGND	-	-

Cable Information for SIO Serial Communication:

Pin-to-pin twisted pair cable. Please make sure to connect metal shielding.
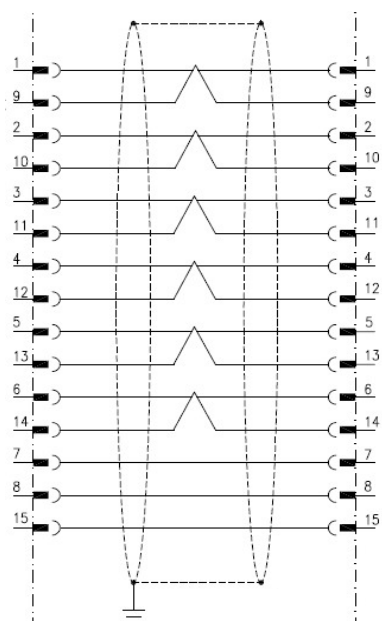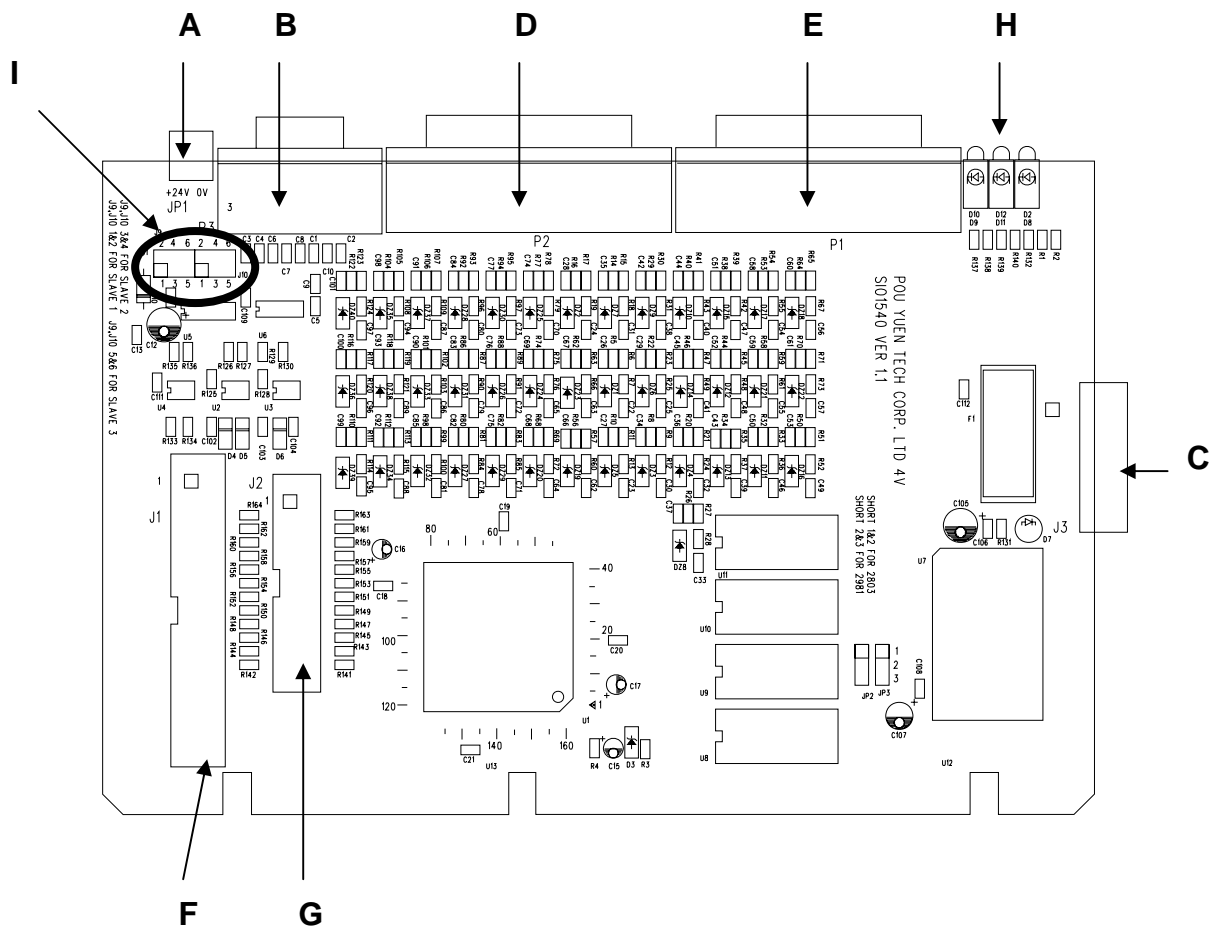
2.8.2   SIO-1540

● **Specifications:**

1.   SIO-1540 provides a 40IN /32 OUT interface (24IN / 32 OUT is optional).

● **Hardware Diagram:**

- **Connectors, Components, Light Description:**

Power			
Mark	Component Type	Function	Operating Instruction
A	3PIN 3.81mm Adapter	DC(24V) Power Input	Connect to POWER
Light			
Mark	Component Type	Function	Operating Instruction
H	E5V Green LED	E5V Light	Light ON: E5V is okay
	E24V Green LED	E24V Light	Light ON: E24V is okay
	CS Yellow LED	Transmission Status Light	Light ON: Connected to controller & powered ON
	DO Yellow LED	Transmission Status Light	Light ON: Connected to controller & powered ON
	DI Yellow LED	Transmission Status Light	Light ON: Communication is normal.
	LK Yellow LED	Transmission Status Light	Light ON: Communication is normal.
IO Connector			
Mark	Component Type	Function	Operating Instruction
B	D_SUB HD 15PIN Female	Serial Port	Connect to NC RIO port
C	16PIN 2.54mm Box Header	Serial Port	Connect to NC RIO port
D	D_SUB H.D. 44PIN Male	Back 20 IN/16 OUT	Connect to REL cards
E	D_SUB HD 44PIN Female	Front 20 IN/16 OUT	Connect to REL cards
F	40PIN 2.54 mm Box Header	Preserve 32 O points	Optional
G	26PIN 2.54 mm Box Header	Preserve 24 IN points	Optional
Setting			
Mark	Component Type	Function	Operating Instruction
I	2.54mm JUMPER	SLAVE Number Setting	As described below

- **Settings, Lights, & Operating Description:**

A: E24V Power Connector

◎Description：This connector supports O point output power. If malfunction, O points output will be abnormal (no effect to IN points though).

◎Rated Capacity: E24V±2V (Above 3A)

B & C: Serial Communication Connectors

◎Description：1.B & C connectors are applied for serial communication and must be attached to RIO ports of the controller.

2 B & C connectors are parallel signals for serial expansion.

◎Application example of serial expansion:

Serial connection of 3 SIO-1540 cards

NC RIO Connector

SLAVE1

(H.D. 15PIN pin-to-pint
Male/Male cable)

(16PIN 2.54mm IDC)

SLAVE2

SLAVE3
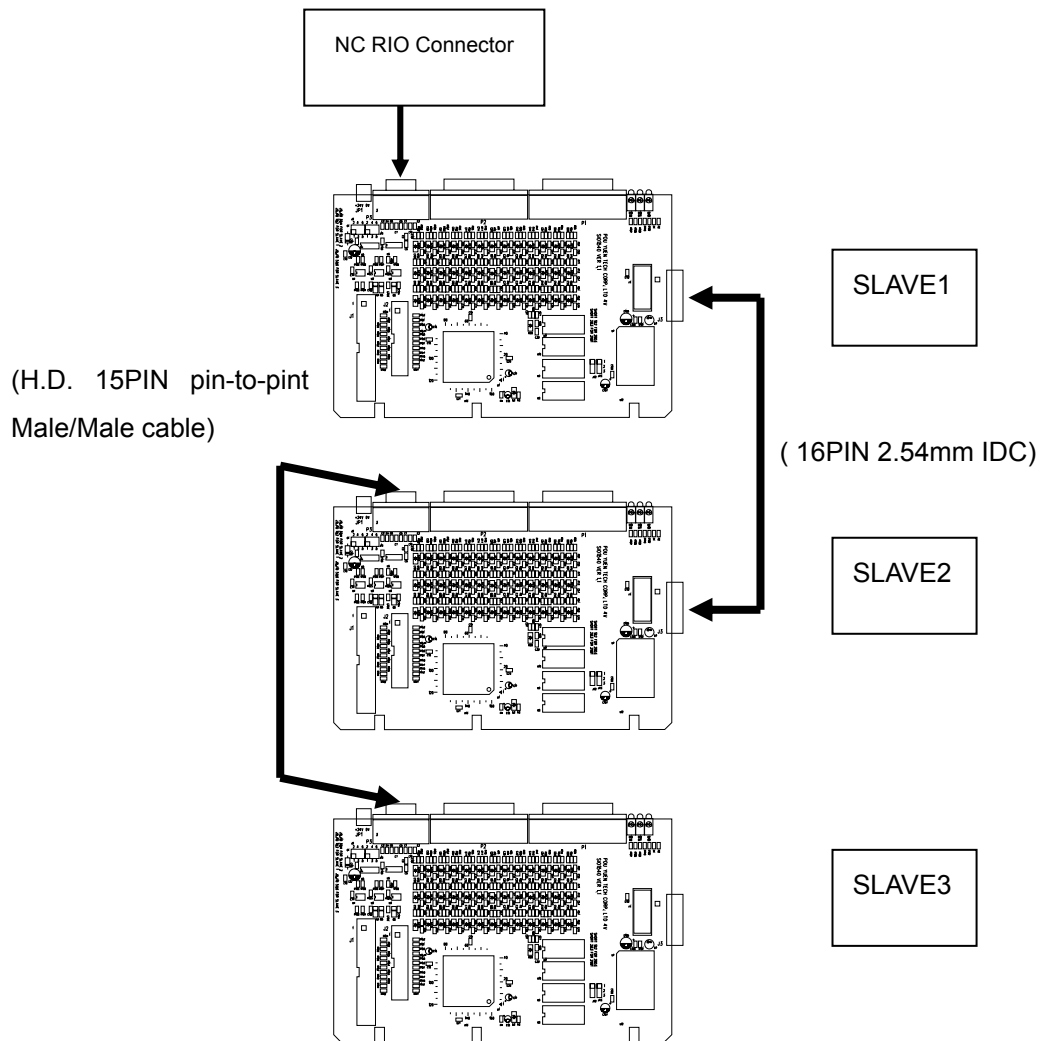
D & E: IO Ports

◎Description：1.D & E connectors are attached to REL Series card for IO control. Each port can control
20IN/16OUT points with application of REL Series cards.

◎IN Points Operating Instruction (without REL Series cards):

E24V

SIO-card IN
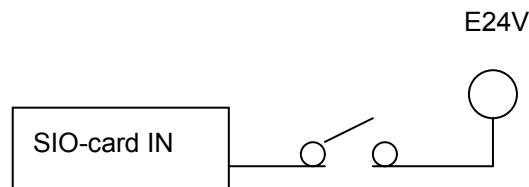
◎O Points Operating Instruction (without REL Series cards):

O points is SOURCE TYPE & outputs E24V when active. The maximum current is 60mA.
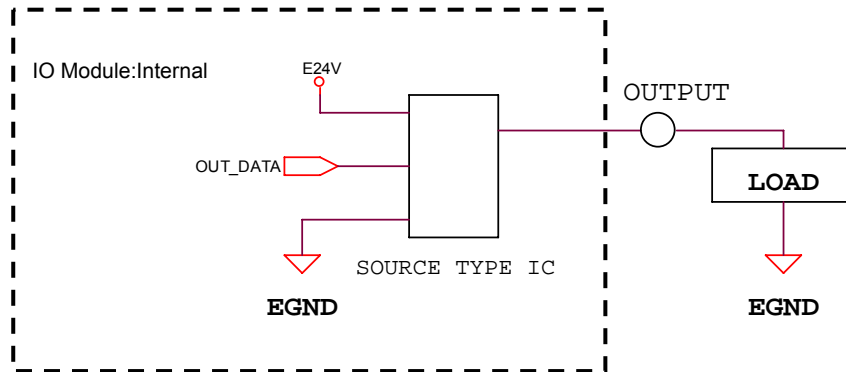
Caution：

- Please DO NOT select a current loading over 60 mA otherwise components will get damaged. E24V/60 mA=400Ω ←Loading resistance cannot be lower than this value.
- Please pay extra attention. IC will immeditately burn when O points and ground are short circuit.

F & G: Reserved IO Connectors

◎Description：1.F & E connectors preserve a 32OUT/24IN IO control interface which must be applied with SIO-1530 card at the same time.

H: Communication/Power Light

◎Description：

    (1) E5V Light: When SIO-1540 moduel is connected to control unit, and control unit is powered ON, this light turns on to indicate module power is prepared ready.

    (2) CS & DO Light: When SIO-1540 moduel is connected to control unit, and control unit is powered ON, both lights turn on. If both lights do not turn on at the same time, there is some abnoramality, and the following communication will not operate normally.

    (3) LK & DI Light: When CS & DO lights turn on, SLAVE settings of SIO-1540 moduleand NC software/PLC match each other, and communication is normal, LK & DI lights turn on.

    (4) E24V Light: E24V turns on to indicate power supply of O interface is normal. If it does not turn on, O points will be inactive.

I: SLAVE & JUMPER Settings

◎Description：Set SLAVE number. After setting is finished, please apply with correspondent software & PLC programming in order to communicate normally. Please do not change setting at will.
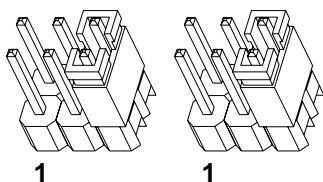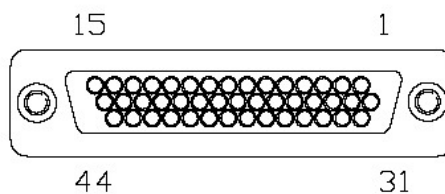
◎Setting Example：
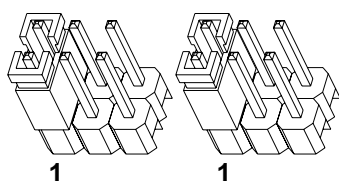
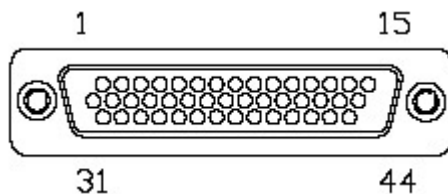JUMPER set to SLAVE1
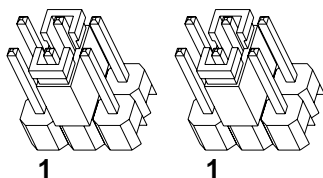
JUMPER set to SLAVE2

JUMPER set to SLAVE3

● **Connector PIN Definition**

1. E：44 PIN H.D. Connector (Female) Pin Definition

PIN	Definition	PIN	Definition	PIN	Definition
1	IN 00	16	IN 01	31	IN 02
2	IN 03	17	IN 04	32	IN 05
3	IN 06	18	IN 07	33	IN 08
4	IN 09	19	IN 10	34	IN 11
5	IN 12	20	IN 13	35	IN 14
6	IN 15	21	IN 16	36	IN 17
7	IN 18	22	IN 19	37	OUT 02
8	OUT 00	23	OUT 01	38	OUT 05
9	OUT 03	24	OUT 04	39	OUT 08
10	OUT 06	25	OUT 07	40	OUT 11
11	OUT 09	26	OUT 10	41	OUT 14
12	OUT 12	27	OUT 13	42	-
13	OUT 15	28	-	43	E24V
14	-	29	-	44	E24V
15	EGND	30	EGND	X	-

2. D：44 PIN H.D. Connector (Male) Pin Definition

PIN	Definition	PIN	Definition	PIN	Definition
1	IN 20	16	IN 21	31	IN 22
2	IN 23	17	IN 24	32	IN 25
3	IN 26	18	IN 27	33	IN 28
4	IN 29	19	IN 30	34	IN 31
5	IN 32	20	IN 33	35	IN 34
6	IN 35	21	IN 36	36	IN 37
7	IN 38	22	IN 39	37	OUT 18
8	OUT 16	23	OUT 17	38	OUT 21
9	OUT 19	24	OUT 20	39	OUT 24
10	OUT 22	25	OUT 23	40	OUT 27
11	OUT 25	26	OUT 26	41	OUT 30
12	OUT 28	27	OUT 29	42	-
13	OUT 31	28	-	43	E24V
14	-	29	-	44	E24V
15	EGND	30	EGND	-	-

2.9 RELAY CARD

2.9.1 REL-2840

● **Specifications:**

1. Provides 20 terminal blocks of 24V input points.

2. Output points support 2 sets of A, B, & C contacts, and 14 sets of A & C contacts, totally 16 sets of output points.

3. Contact capacity of output points is AC 250V/6A.

● **Hardware Diagram:**
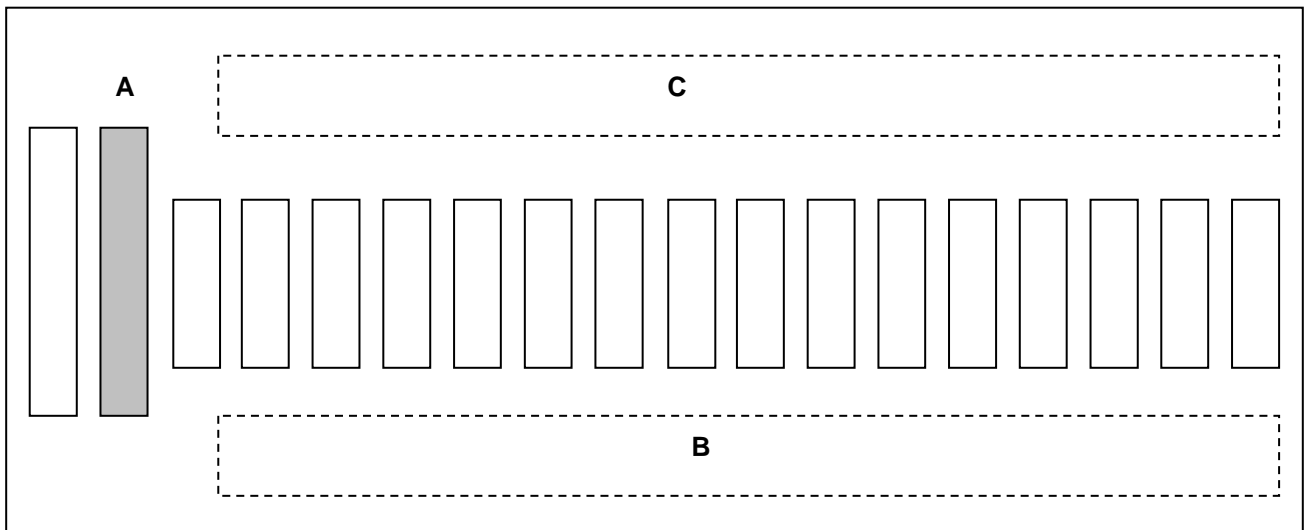
REL-2840 Diagram

● **Connectors, Components, & Lights Description:**

A：44 PIN D-SUB H.D. Connector（Female）, 20 IN / 16 OUT, connected to I/O cards such as SIO-1540.

B：5.08mm terminal blocks group 1, output terminals.

C：5.08mm terminal blocks group 2, input terminals.

Note 1：C terminal blocks provide 0V × 20 & 24V × 20 connectors for input points.

Note 2：Each relay has its corresponding LED. When some replay is active, its corresponding LED will be turn on, which can be utilized for troubleshooting of relay & input points.

Settings, Lights, & Operating Description:

1. B: 44 PIN H.D. Connector (Female) Pin Definition
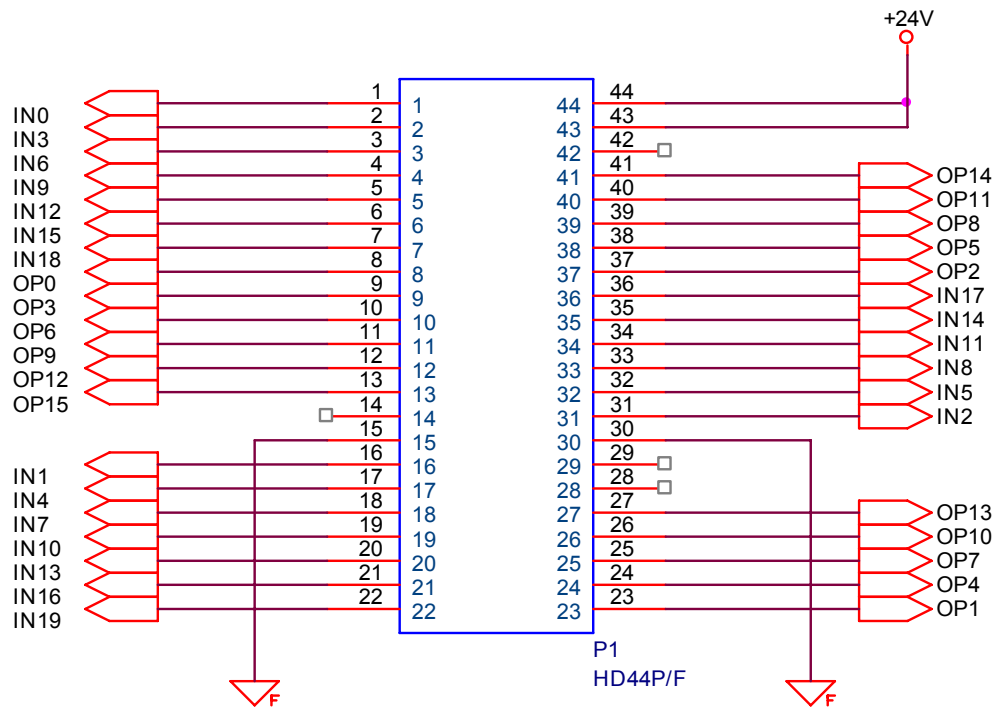
PIN	Definition	PIN	Definition	PIN	Definition
1	IN 0	16	IN 1	31	IN 2
2	IN 3	17	IN 4	32	IN 5
3	IN 6	18	IN 7	33	IN 8
4	IN 9	19	IN 10	34	IN 11
5	IN 12	20	IN 13	35	IN 14
6	IN 15	21	IN 16	36	IN 17
7	IN 18	22	IN 19	37	OUT 2
8	OUT 0	23	OUT 1	38	OUT 5
9	OUT 3	24	OUT 4	39	OUT 8
10	OUT 6	25	OUT 7	40	OUT 11
11	OUT 9	26	OUT 10	41	OUT 14
12	OUT 12	27	OUT 13	42	X
13	OUT 15	28	X	43	+24V
14	X	29	X	44	+24V
15	EGND	30	EGND	X	X

2.10   BATTERY HOLDER

● **External Dimensions**：
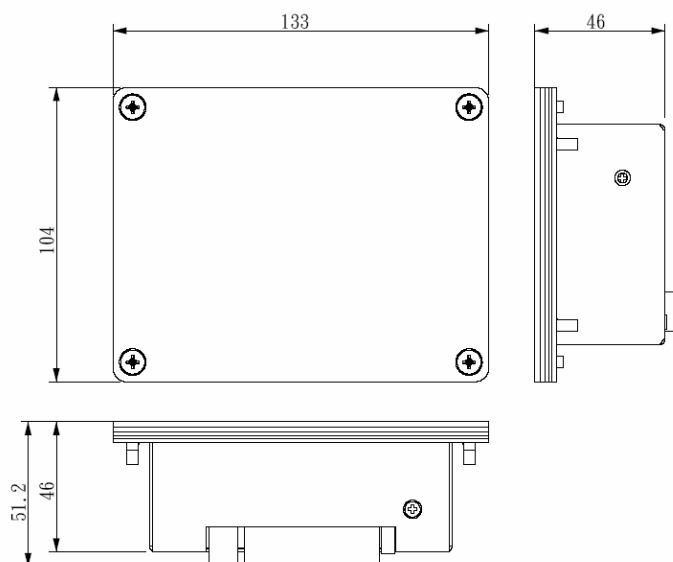
● **Installation Dimensions**：
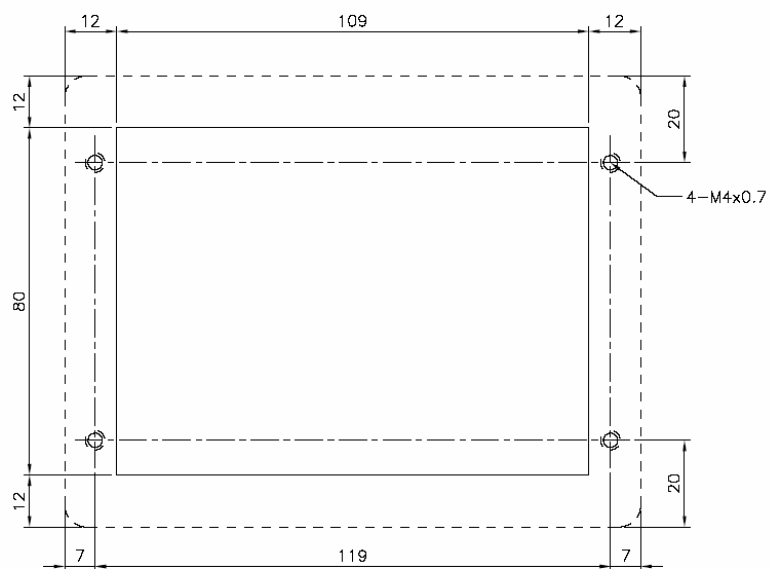
- **Installation Instruction：**
   1. Please drill 4 holes on the encoder chassis for the battery holder according to the above installation dimensions. When drilling, please verify if the wiring length suits the distance between holder & encoder so wiring can be connected easily from holder to encoder.
   2. Take 4 flat head M4x10 screws from the accessory kit. Secure the battery holder by mounting the 4 screws onto the 4 holes of the holder body.
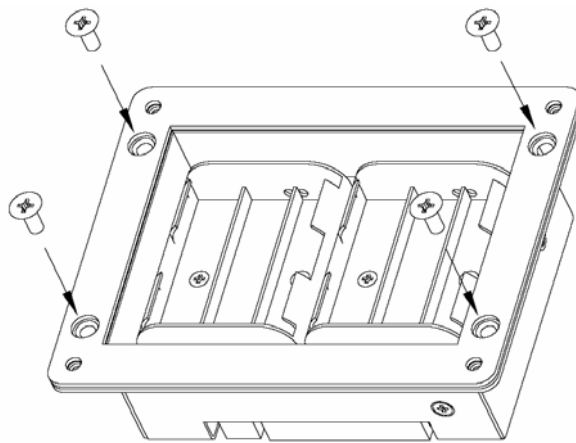
   3. Please prepare 6 AA batteries of the same brand, model, and specifications. Insert the batteries into the battery holder as shown in the diagram below.
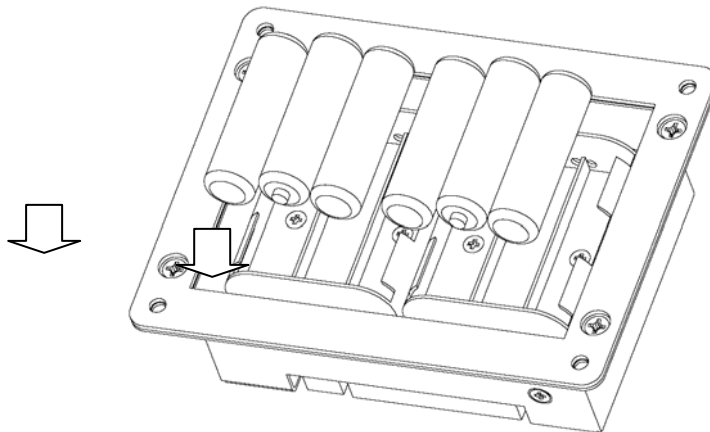
   NOTE：A.Do NOT use batteries of different brans, models, or specifications at the same time.

   B.Please replace thw whole set of batteries (6pcs) at the same time> Do NOT use new and old batteries at the same time, which will reduce battery lifetime.

4. Mount the upper chassis with 4 M3x6 flat head screws, and tighten them securely for oil-proof and sealing purposes.
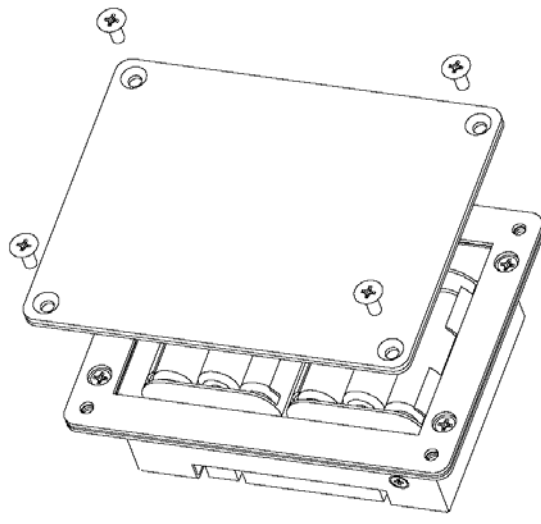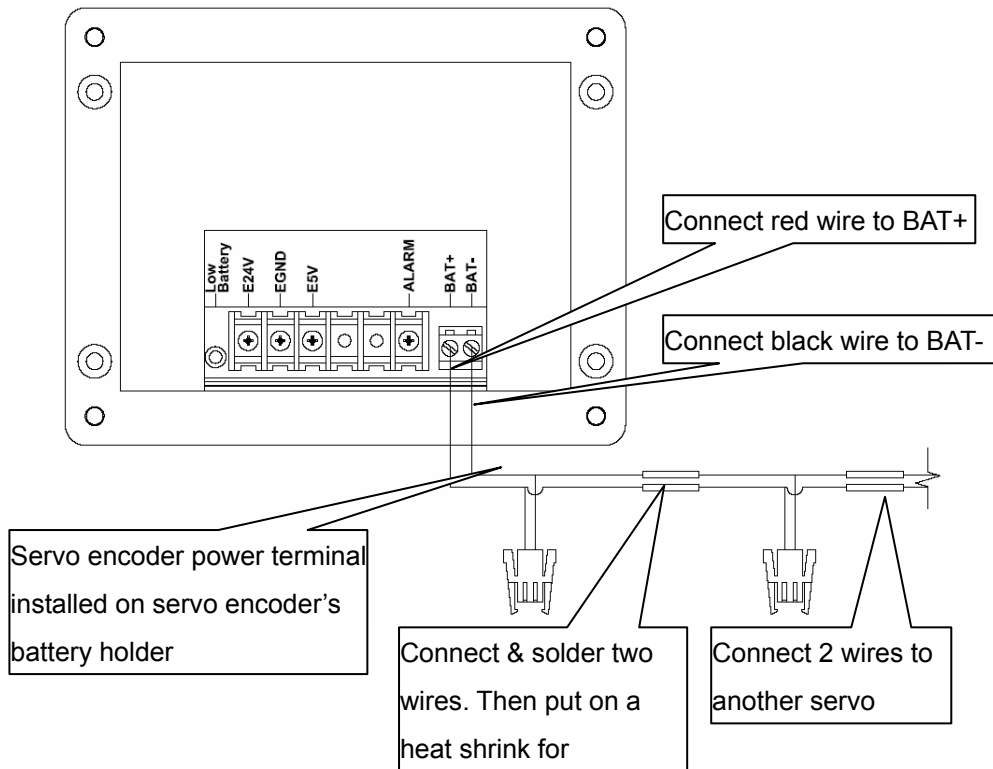

- **Wiring Instruction：**
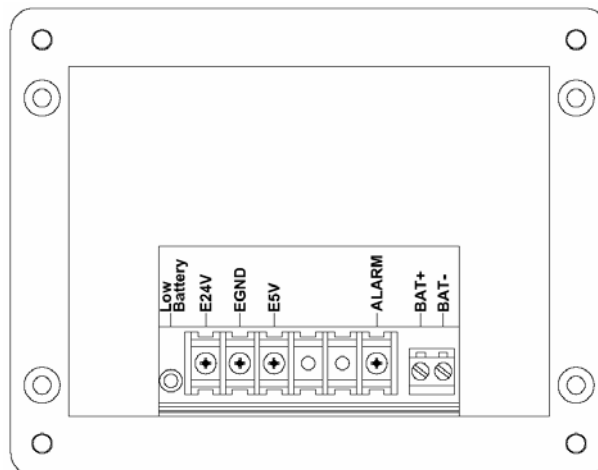
1. Low Battery: Indication light of low voltage. When battery voltage is below 3.3V, external power must be attached in order to function normally.

2. E24V/EGND/E5V: Input point of external DC power. It can be applied as indication light for   E24V; or for O point (ALARM); or for E5V power to detect circuit.

3. ALARM: Output point of low voltage sensor signals (24V level). When battery capacity is below 3.3V, this point outputs high voltage.

4. BAT+/BAT-: Power output terminal, which is connected to power terminal of servo encoder. There can be more than two servo encoders to be connected at the same time.

● **Servo Encoder Power Wiring Description:**

1. Wiring method is as the diagram below:

Connect red wire to BAT+

Connect black wire to BAT-

Servo encoder power terminal installed on servo encoder's battery holder

Connect & solder two wires. Then put on a heat shrink for

Connect 2 wires to another servo

● **Battery Replacement Instruction：**

1. Battery lifetime can be varied depending on the capacity and number of servo encoders that are connected.

	Battery Capacity	Battery No.	Axis No.	Lifetime
Case 1	2200mAh	6	5	About 12 mos.
Case 2	1800 mAh	6	5	About 10 mos.
Case 3	1800 mAh	6	3	About 12 mos.

2. It is recommended to replace the batteries annually.

3. It is recommended to use this product along with LNC controller components for the best performance of battery capacity.

3   MECHANICAL DIMENSIONS

3.1   TFT LCD Monitor

Chassis Dimensions

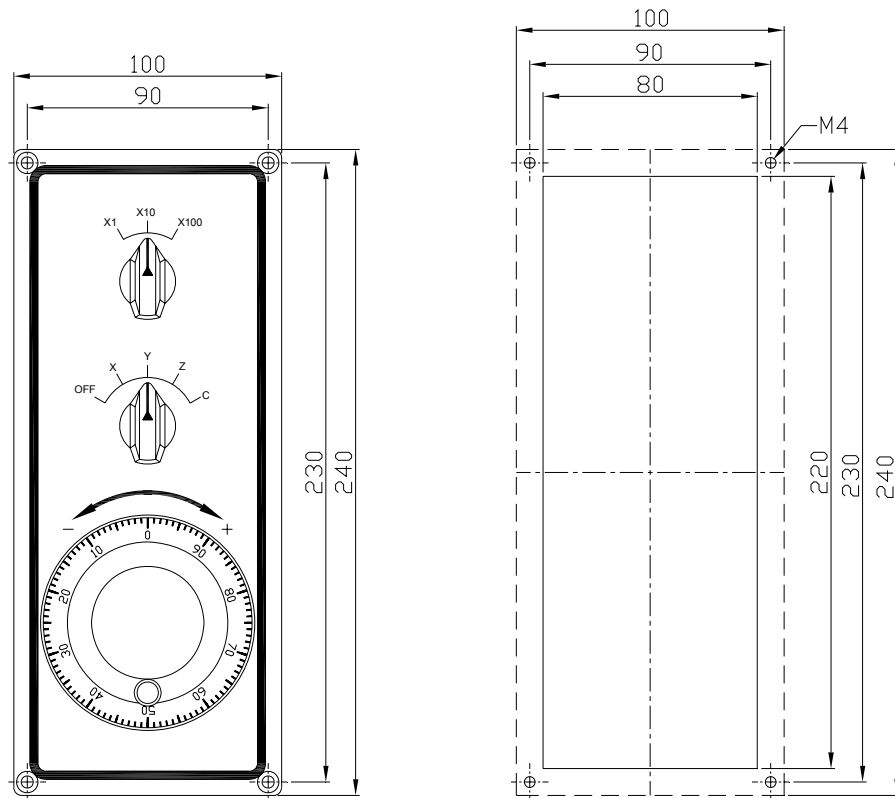## 3.2   MDI Panel
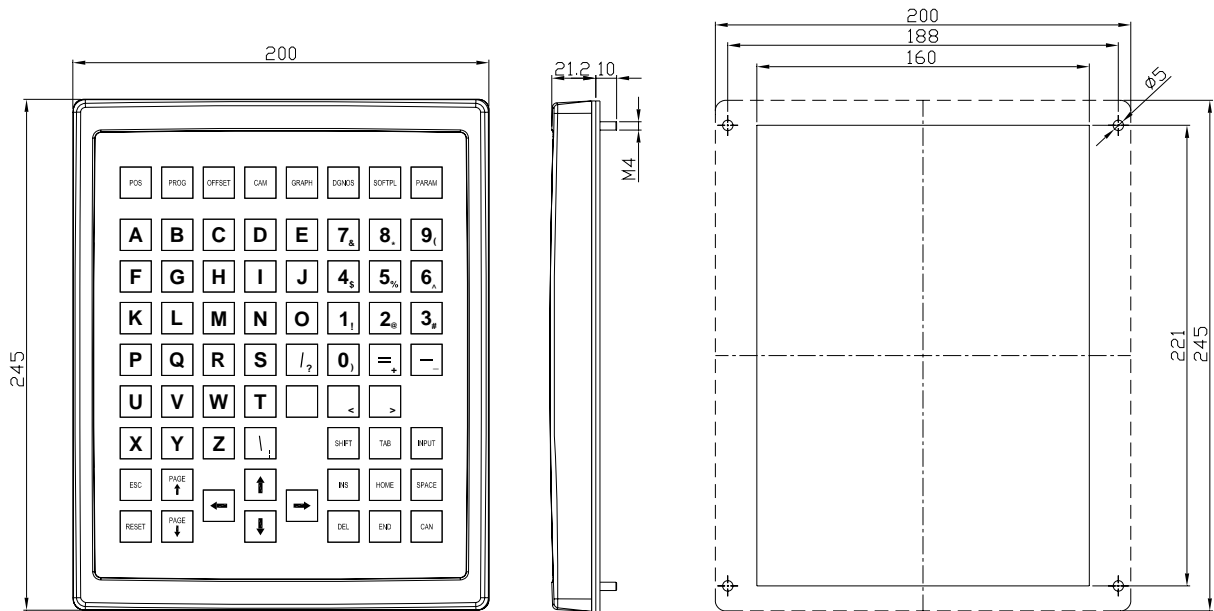
Chassis Dimensions
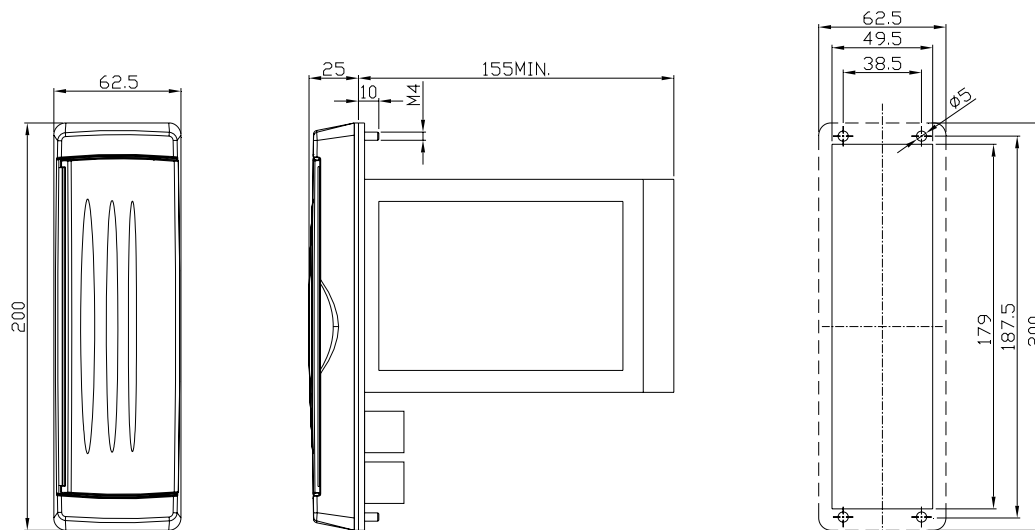
3.3   Operation Panel

3.3.1   OP-2520
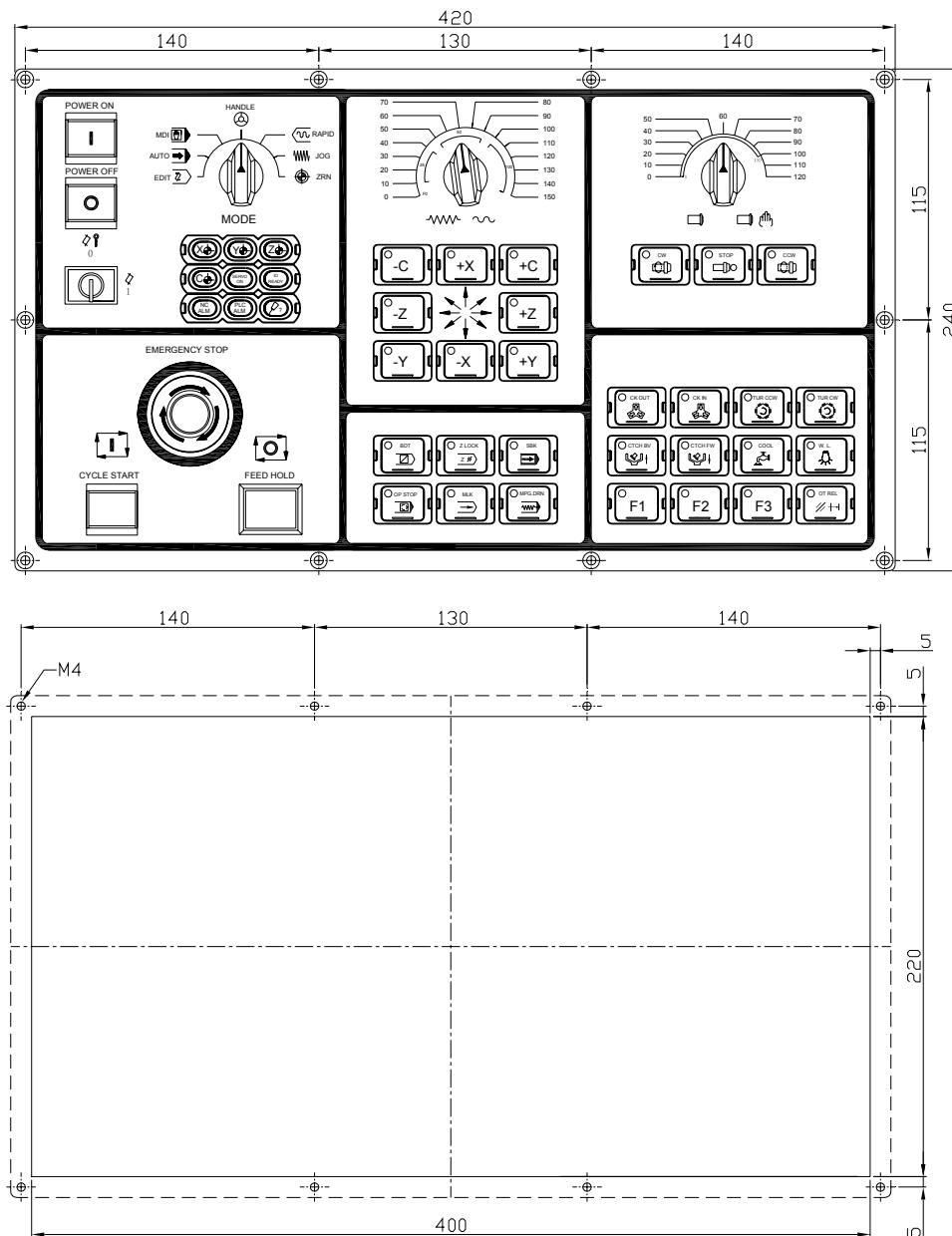
Chassis Dimensions
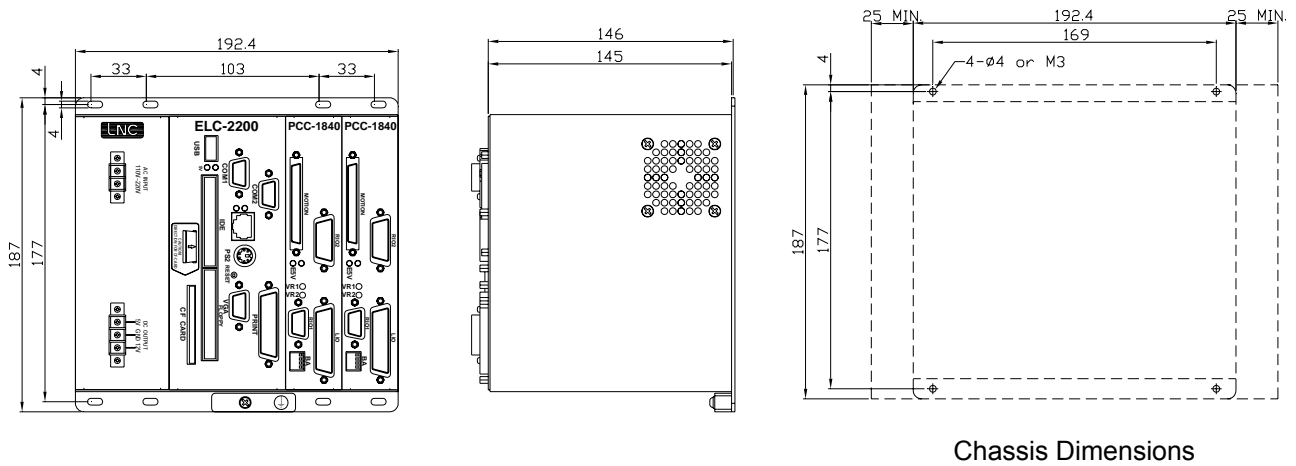
3.4   Manual Pulse Generator

Chassis Dimensions

3.5 Floppy

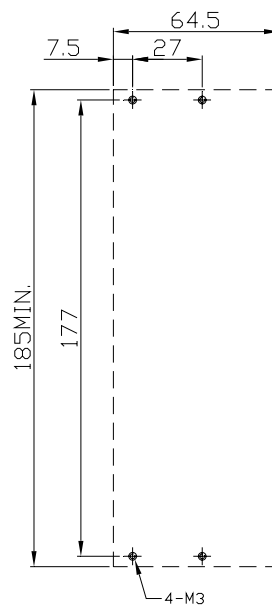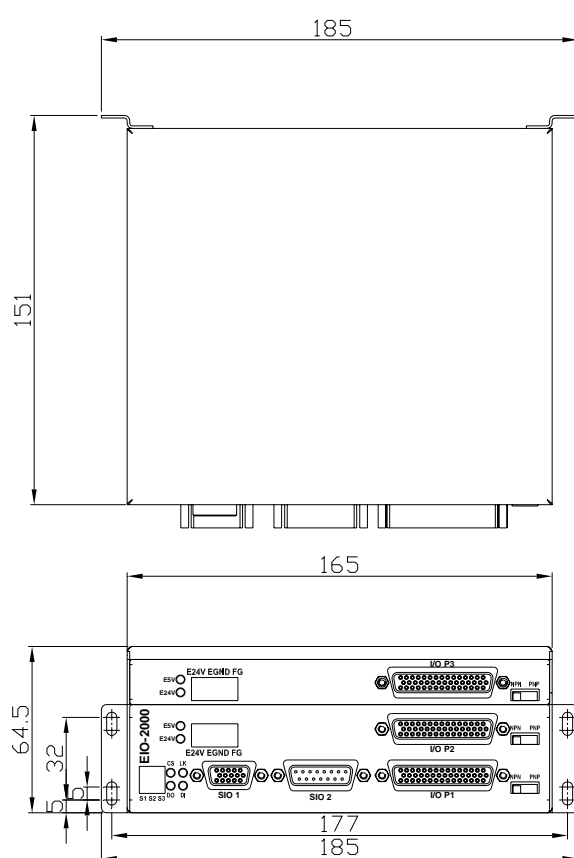Chassis Dimensions

3.6   CONTROL UNIT & MOTION CARD

3.6.1   EIC-2200+PCC-1840x2

Chassis Dimensions

3.7   I/O CARD

3.7.1   EIO-2000
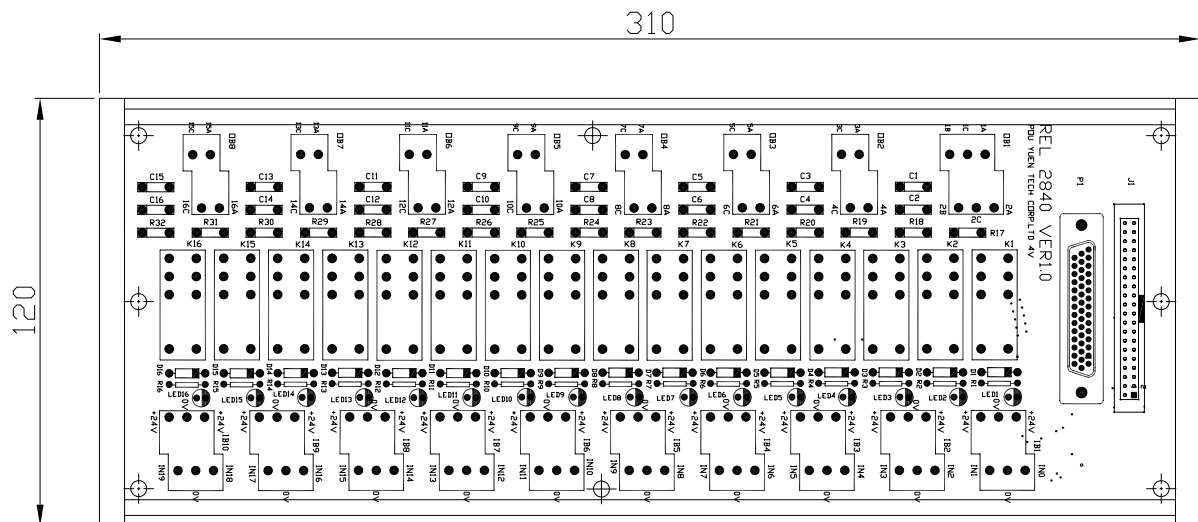

Chassis Dimensions

3.8   RELAY CARD

3.8.1   REL-2840

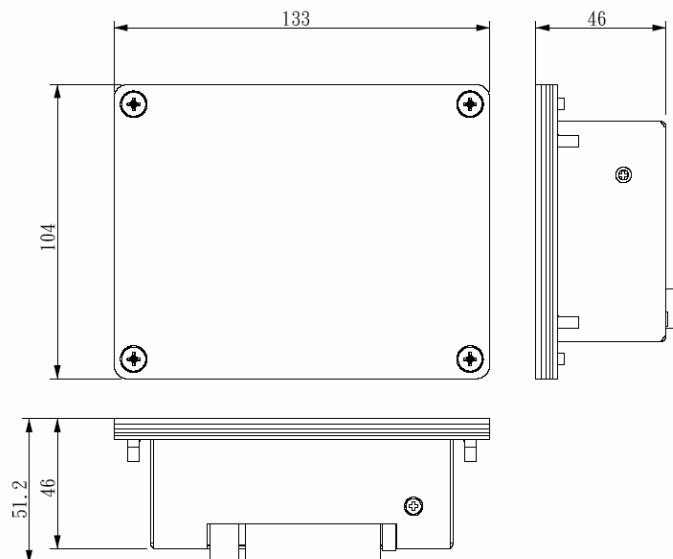**Aluminium DIN Rails for Wiring 320mm**

3.9 BATTERY HOLDER

● **External dimensions：**

● **Installation dimensions：**