

ROBOSTAR ROBOT
N1 Series
INSTRUCTION MANUAL



- INSTRUCTION MANUAL
- OPERATION MANUAL
- PROGRAMMING MANUAL
- UNI-HOST MANUAL
- GAIN SETUP MANUAL
- ALARM CODE MANUAL

Robostar

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 - (5) failures caused in manure, flooding, or other environment
 - (6) failure caused by the consumption of consumable parts
 - (7) failures arising when not being operated under the instructions listed in the user or instruction manual and the maintenance manual
 - (8) damages in cost other than the cost of robot repairing

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For Safe Use

1. Safety for Robot (Generals)

Be sure to fully understand the manuals for safe use of this product. Each manual includes the following notations for subjects requiring carefulness necessary for the safe use of this product, and therefore carefully read the manual before using this product.

■ Safety Signs

Sign	Meaning
 DANGER	This sign indicates that, if handled incorrectly, the serious life or property damage may be caused.
 WARNING	This sign indicates that, if handled incorrectly, the product failure, malfunction or accident may arise.
 CAUTION	This sign indicates that the product may malfunction or may not work due to incorrect use, and shows a matter requiring attention.
 PROHIBITION	This sign shows the matter that is to be prohibited for normal use of the product. E.g.) Never use a fire. 
 Required	This sign shows the matter that must be performed for normal use of the product. E.g.) Compulsory ground is required. 

Since this robot and robot controller are industrial equipments manufactured with advanced technology, please be sure to observe the following matters in order to prepare for accidents that may occur.



CAUTION

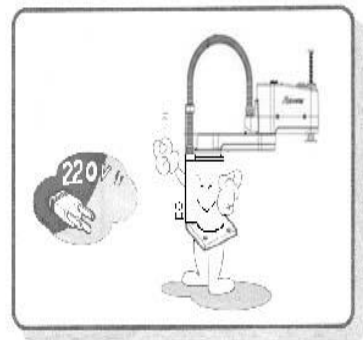
For safer and more efficient use, please operate the robot after reading all the documentations.



WARNING

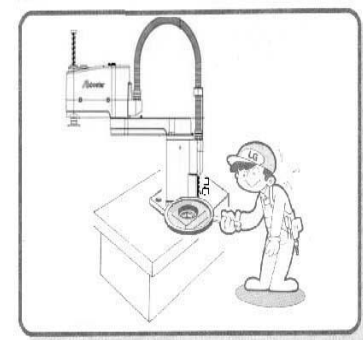
All of the load and power must be used within the range of rated load and power spec.

In particular, make sure before use that the input power is AC 220V.



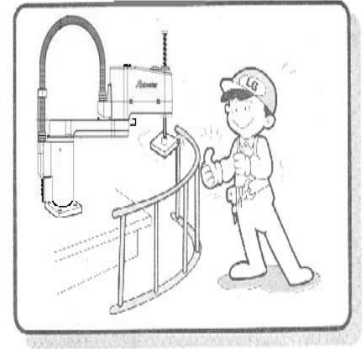
CAUTION

When installed, the robot must be securely fixed so as not to be shaken.

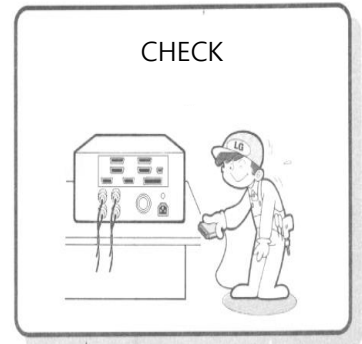




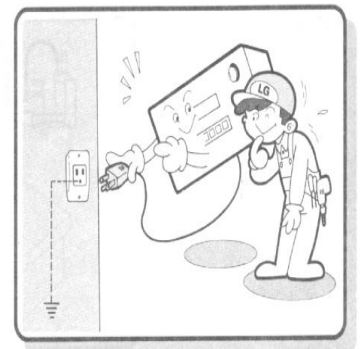
For safe operation, a safety net must be installed around the robot.



Make sure to check the wirings of a controller before powering on it. Due to the incorrect wirings, the machine may not work properly.



To prevent electrical shock, be sure to install FG (Frame Ground).





Be careful not to enter into the range of motion of a robot while the robot is operating or in the operable state.

Please note such subject even if the robot is in stationary state.



If many people work at the same time, especially in powering ON/OFF and driving a motor manually, be sure to check the mutual safety before starting the work.



When in maintenance of the robot, be sure to unplug a power cord of the controller

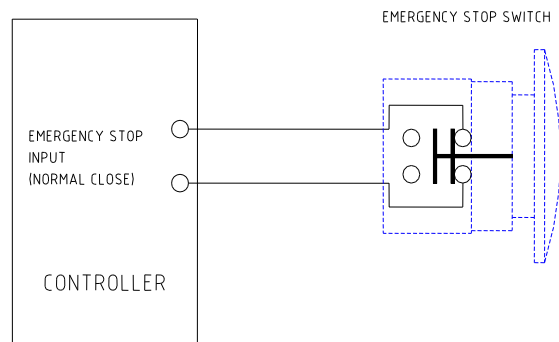


2. Safety for Robot (Details)

- 1) For the safety of workers, be sure to wear a helmet, safety shoes, etc.
- 2) Before powering ON, check that there is no people within the area of robot motion and then operate the robot.
- 3) When entering into the area of the robot motion for maintenance or inspection, be sure to power OFF the robot.
- 4) If a cable of the robot is installed in a pathway, prevent the cable from damage by using a cover or a duct.
- 5) As soon as the cable damage is found, replace it immediately.
- 6) Do not operate the robot under the load exceeding nominal weight.
- 7) Be sure to fully understand the instruction manual before operating the robot.
- 8) In the case of installing a safety net:
 - ① Give it sufficient strength to withstand reactions that occur during work, or environmental conditions, and do not have it be easily moved, destroyed, or climbed.
 - ② Remove the dangerous parts, such as sharp edges or burr.
 - ③ Firmly fix it.
 - ④ If you are installing a safety net having a door, install a detector or other sensors so that the robot is stopped immediately after the door is opened.
 - ⑤ The safety net must be distanced by 40 cm or farther from robot motion area and the robot body.

9) Emergency Stop Switch

- ① Mount an emergency stop switch at the place where an operator can easily operate the robot.
- ② The color of the emergency stop switch is to be red with yellow circumferential band for easy discrimination of its position.
- ③ Use the emergency stop switch which does not automatically return.



10) Ground Spec.

- Class 3 Ground (Ground resistance is not more than 100Ω.)

11) Lamp indicating the robot power supplying status

- Install a lamp which indicates whether the power source is being supplied to the robot.

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Chapter 1 Controller Overview

1.1 Features

N1 Series Controller is a high-performance robot controller for a wide variety of applications, and has the following features.

- Controls 2 to 6 axes Cartesian coordinate robot and SCARA robot
- Full-digital servo system
- Supports the multi-robot (2 channels)
- Modularized servo amplifiers per 2 axes
- Easy to change various parameters and the gain (changeable by the software)
- Monitoring available while in operation
- Provides rich input-output interfaces
 - System I/O (24 points/12 points), User I/O (16 points/16 points), Option I/O (32 points/32 points)
- Plenty of robot commands
- Offers the versatile online program (Unihost)

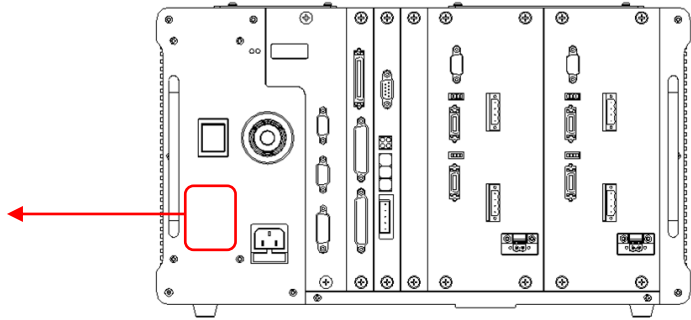
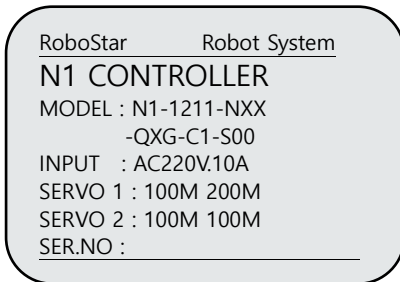
In addition, the performance of the robot controller has been improved and the following functions are available.

- Palletizing, sealing, etc.
- 2D and 3D interpolation control of the arc, circle, high-speed, and high precision
- Parallel processing of the robot commands while processing the input and output and the movement command depending on the conditions
- Variety of pass motions, such as setting the travel distance (PFOS), travel distance ratio (FOS), etc.

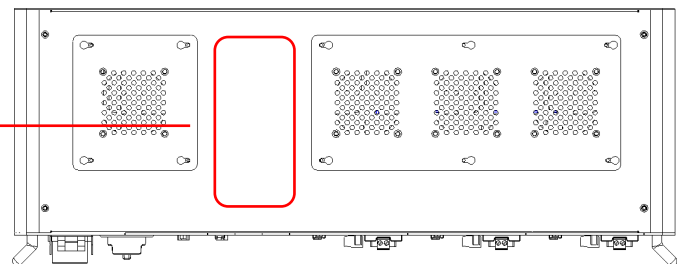
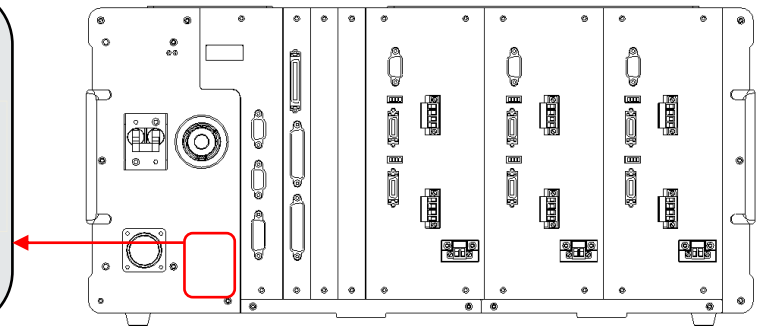
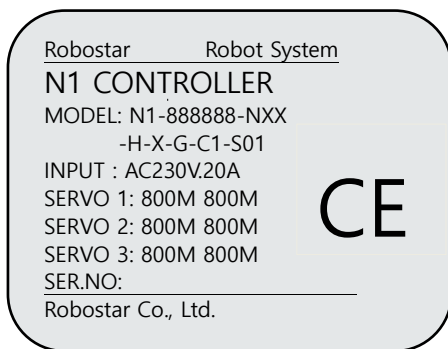
1.2 Name Plate

The model name of the controller is written on a name plate or paper which is attached to a front side of the controller as shown below. For identification of the model name, refer to a code table below.

1.2.1 4-axis Controller Nameplate



1.2.2 6-axis Controller Nameplate



■ Code Table for Model Name

1	2	3	4	5	6	7	8	9	10
Model Name	Capacity	IO	Option1	Option2	Case	Main	Power Separation	Safety Level	Version
N1	888888	N	X	X	H	X	G	C1	S01
No	Item	Name	Description						
1	N1	Controller Model Name	N1						
2	888888	Servo Capacity	S: 50W 1:100W 2:200W 4:400W 8:750W						
3	N	IO	N:NCOM P:PCOM						
4	X	Option 1	I: Extended IO NCOM C: CCLINK D: DEVICENET P: PROFIBUS A: AIO X: None						
5	X	Option 2	I: Extended IO NCOM C: CCLINK D: DEVICENET P: PROFIBUS A: AIO X: None						
6	H	Case	D: 2-axis CASE Q: 4-axis CASE H: 6-axis CASE						
7	X	Main Board	X: None						
8	G	Power Separation	G: Single power U: Power separation						
9	C1	Safety Level	C1: Safety Level 1						
10	S01	Version	S00: Standard S01: CE						

1.3 Product Code of N1 Controller

N1 제품코드

N 1 - 8 8 8 8 8 8 - N - X - X - H - X - G - C 1 - S 0 1

N1 시리즈

서보 용량

- S 50W
- 1 100W
- 2 200W
- 4 400W
- 8 800W
- A 1KW
- X 없음

표준 I/O

- N : 표준 I/O NCOM
- P : 표준 I/O PCOM

옵션1

- C CCLINK
- P PROFIBUS
- D DEVICENET
- A ANALOG I/O
- I 확장 I/O NCOM
- O 확장 I/O PCOM
- X 없음

옵션2

- C CCLINK
- P PROFIBUS
- D DEVICENET
- A ANALOG I/O
- I 확장 I/O NCOM
- O 확장 I/O PCOM
- X 없음

CASE

- D 2축 케이스
- Q 4축 케이스
- H 6축 케이스
- M MOTION 케이스
- C 카테고리4 케이스

MAIN BD 옵션

- E ETHERNET
- U USB
- F ETHERNET+USB
- X 없음

전원분리

- G 단일전원
- U 전원분리

안전등급

- C1 안전등급1
- C4 안전등급4

VERSION

- S00 : 로봇 초도품
- T00 : TR 일반 RS-50-24 SMPS 포함
- T01 : TR CE
- D01 : 부전전자 데스크탑
- S01 : 로봇 CE
- S02 : CATEGORY4

1.4 Software Version

The version of software in the controller can be checked by a teaching pendant, as shown below.

Step 1.

SYSTEM		MODE	
CH	MODE	J_NUM	STATE
1	AUTO	NONE	IDL
2	AUTO	NONE	IDL
1R	2R		<u>EXIT</u>

F4

Exit from SYSTEM MODE.

Robostar
NewRo N1-Series
Ver: 03.02.03-SB
(RO 120727)

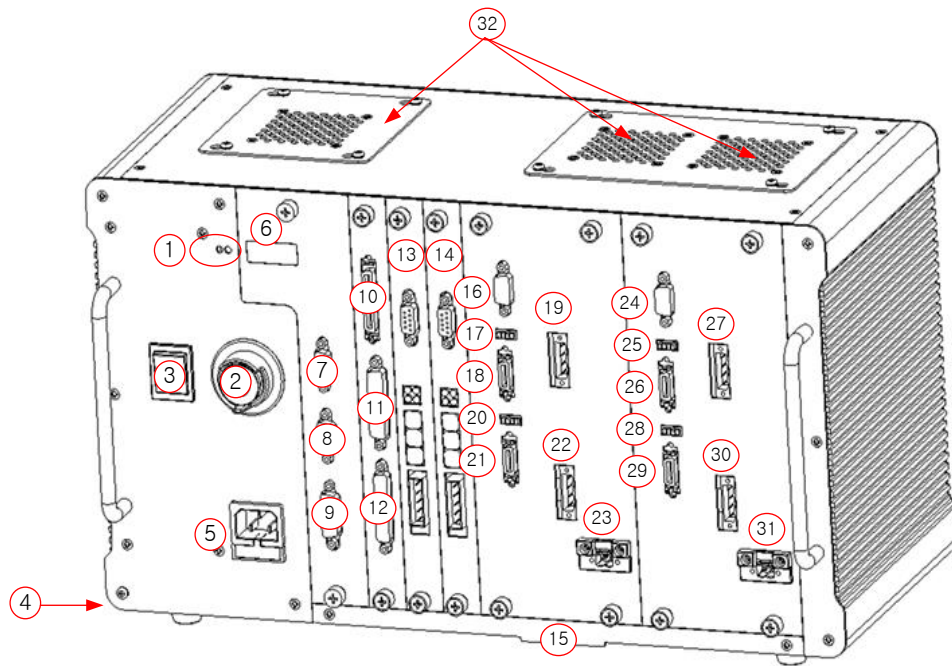
Press ENTER Key

Check Software Version

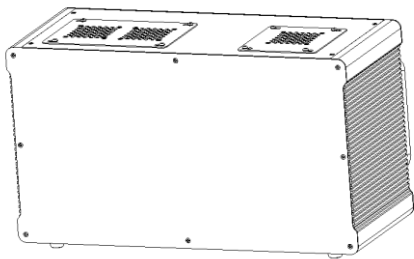
1.5 Name of Parts

The following shows the names of each part of the appearance of the controller. For more information, see the table below.

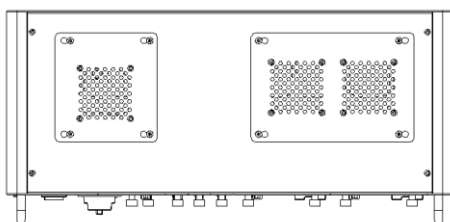
1.5.1 4-axis Controller Name



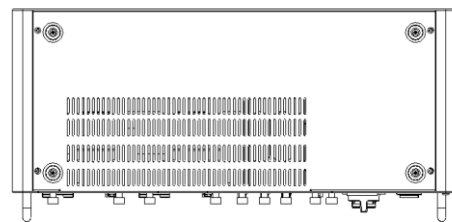
<FRONT>



<REAR>



<TOP>

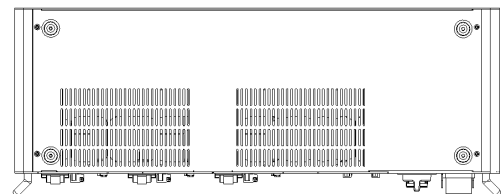
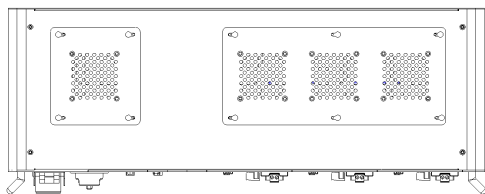
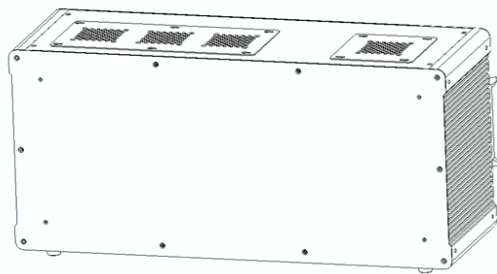
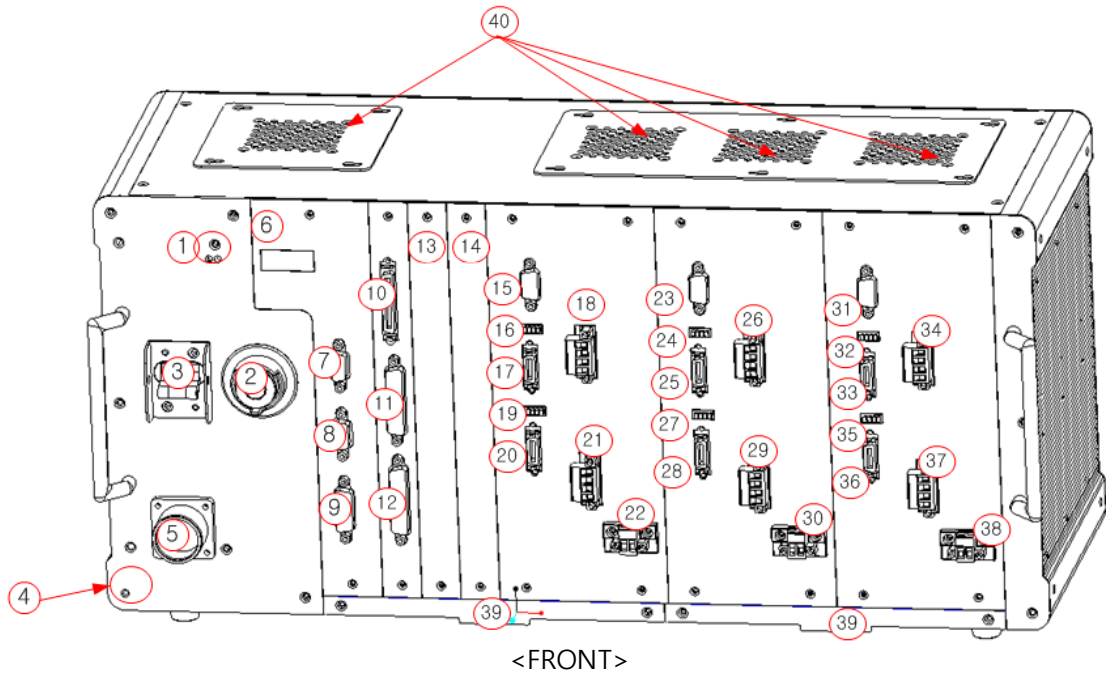


<BOTTOM>

■ 커넥터 설명

Connector No.	Exterior Marking	Description
1	5V / 24V	SMPS Status Indication
2	EMERGENCY	Robot Emergency Stop Button
3	POWER(ON/OFF)	AC Power Input Switch
4		FG (Frame Ground) Connection Terminal
5	AC 220V	AC Power Input Connector(FUSE 10A)
6	7-Segment	Status Indicating 7-Segment
7	MPG/485	MPG Connection Connector
8	HOST	Unihost Connection Connector
9	T/P	Teaching Pendant Connection Connector
10	SYSTEM IN/OUT	SYSTEM I/O Connector
11	USER OUTPUT	USER OUT Connector
12	USER INPUT	USER IN Connector
13	OPTION B/D 1	Connection Slot for Option I/O, Field Bus, Analog Board, etc.
14	OPTION B/D 2	Connection Slot for Option I/O, Field Bus, Analog Board, etc.
15	FILTER	Air Intake Filter
16	EXT IO	Servo Module Update & Monitoring (No.1 & 2 axis)
17	AL/RD/SV/POW	Servo Module Status Indication (No. 1 axis)
18	ENC #1	Encoder Input Connector (No. 1 axis)
18	U V W FG	Motor Power Output Connector (No. 1 axis)
20	AL/RD/SV/POW	Servo Module Status Indication
21	ENC #2	Encoder Input Connector (No.2 axis)
22	U V W FG	Motor Power Output Connector (No.2 axis)
23	PB	Regenerative Resistor Connector (1, 2 axis)
24	EXT IO	Servo Module Update & Monitoring (No.3 & 4 axis)
25	AL/RD/SV/POW	Servo Module Status Indication (No. 3 axis)
26	ENC #3	Encoder Input Connector (No. 3 axis)
27	U V W FG	Motor Power Output Connector (No. 3 axis)
28	AL/RD/SV/POW	Servo Module Status Indication(No. 4 axis)
29	ENC #4	Encoder Input Connector (No.4 axis)
30	U V W FG	Motor Power Output Connector (No.4 axis)
31	PB	Regenerative Resistor Connector (3, 4 axis)
32	Fan	Air Exhaust Fan

1.5.2 6-axis Controller Name



■ Description of Connectors

Connector No.	Exterior Marking	Description
1	5V/24V	SMPS Status Indication
2	EMERGENCY	Robot Emergency Stop Button
3	POWER(ON/OFF)	AC Power Input Switch
4		FG (Frame Ground) Connection Terminal
5	AC 220V	AC Power Input Connector(FUSE 10A)
6	7-Segment	Status Indicating 7-Segment
7	MPG/485	MPG Connection Connector
8	HOST	Unihost Connection Connector
9	T/P	Teaching Pendant Connection Connector
10	SYSTEM I/O	SYSTEM I/O Connector
11	USER OUTPUT	USER OUT Connector
12	USER INPUT	USER IN Connector
13	OPTION BOARD 1	Connection Slot for Option I/O, Field Bus, Analog Board, etc.
14	OPTION BOARD 2	Connection Slot for Option I/O, Field Bus, Analog Board, etc.
15	EXT IO	Servo Module Update & Monitoring (No.1 & 2 axis)
16	AL/RD/SV/POW	Servo Module Status Indication (No. 1 axis)
17	ENC #1	Encoder Input Connector (No. 1 axis)
18	U V W FG	Motor Power Output Connector (No. 1 axis)
18	AL/RD/SV/POW	Servo Module Status Indication
20	ENC #2	Encoder Input Connector (No.2 axis)
21	U V W FG	Motor Power Output Connector (No.2 axis)
22	PB	Regenerative Resistor Connector (1, 2 axis)
23	EXT IO	Servo Module Update & Monitoring (No.3 & 4 axis)
24	AL/RD/SV/POW	Servo Module Status Indication (No. 3 axis)
25	ENC #3	Encoder Input Connector (No. 3 axis)
26	U V W FG	Motor Power Output Connector (No. 3 axis)
27	AL/RD/SV/POW	Servo Module Status Indication(No. 4 axis)
28	ENC #4	Encoder Input Connector (No.4 axis)
29	U V W FG	Motor Power Output Connector (No.4 axis)
30	PB	Regenerative Resistor Connector (3, 4 axis)
31	EXT IO	Servo Module Update & Monitoring (No.5 & 6 axis)
32	AL/RD/SV/POW	Servo Module Status Indication (No. 5 axis)
33	ENC #5	Encoder Input Connector (No. 5 axis)
34	U V W FG	Motor Power Output Connector (No. 5 axis)
35	AL/RD/SV/POW	Servo Module Status Indication (No. 6 axis)
36	ENC #6	Encoder Input Connector (No.6 axis)
37	U V W FG	Motor Power Output Connector (No.6 axis)
38	PB	Regenerative Resistor Connector (5, 6 axis)
39	FILTER	Air Intake Filter
40	Fan	Air Exhaust Fan

1.6 Specifications

1.6.1 General Specifications

■ Installation Environment

Item	Description
Supply Power	AC 230V (+10%) , 50 to 60Hz
Power Capacity	4.5kVA
Encoder Spec.	17bit Absolute Encoder (Serial Type)
Ambient temperature for use	0 to 40°C
Ambient humidity for use	20 to 80% RH (No dew formed)
Ambient temperature for storage	0~40°C
Ambient humidity for storage	10 to 90% RH (No dew formed)

■ Performance

Item	Description	
Withstanding Voltage	AC-FG 1.5kV for 1 min., Primary-Secondary 3kV for 1 min.	
Immunity to Source Noise	$\pm 1,500\text{Vp-p}$, 1usec , for COMMON and Normal each, for 1 min.	
Noise Immunity	Motor/Encoder $\pm 1,500\text{Vp-p}$, 1usec , under induced noise for 1 min.	
	I/O $\pm 1,500\text{Vp-p}$, 1usec , under induced noise for 1 min.	
Insulation Resistance	Input power-to-FG: 20M Ω or more	
Immunity to Instantaneous Power Failure	1/2 cycle per 10 periods of the Input power frequency	
Positional Preciseness	Within ± 1 pulse of the encoder	
Servo Capacity	1.5kW Max for 2-axis module, 3kW Max for overall 4-axis	
I/O	Minimum Input Current	5mA/1 point
	Maximum Output Current	50mA/1 point
Brake Control	24V Motor bake driving	
Motor Driving Type	AC Servo motor driving (Sine wave PWM current control)	

■ Specifications

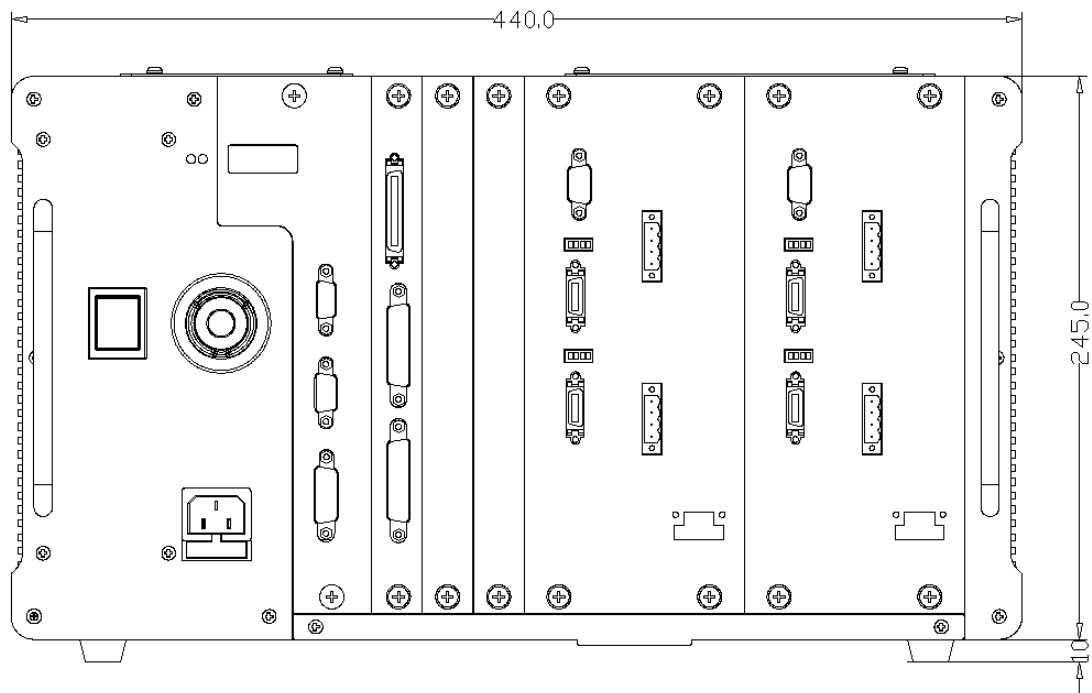
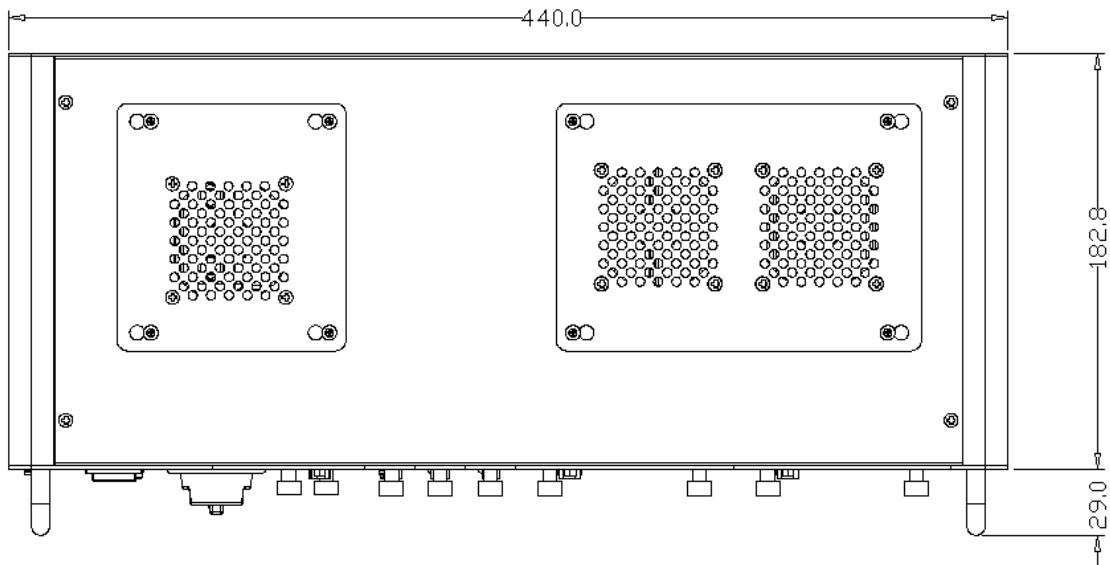
Item		Function
Robot Control		SCARA , Cartesian , Transfer Robot
Behavior Control Type		PTP , CP
Control Axis Construction		6 axes
Servo Drive System		All-axis, Full-digital AC Servo
Input-Output (I/O)	SYSTEM	System I/O (24 points/12 points)
	USER	User I/O (16 points/16 points)
	Option	Option I/O (32 points/32 points)
Teaching Type		Direct Teaching (Teach Pendant) On-Line Teaching (Uni-Host)
Multi Robot Support		2 channels (See Reference 1)
Robot Language		RRL (ROBOSTAR Robot Language)
Robot Program Support Standard	Job	Maximum 200 pieces
	Point	Maximum 2000 pcs per job (Local) , Maximum 1000 pcs per job (Global)
	Step	Maximum 2000 Lines
	Global Parameters	Integer type, Maximum 500 pcs , Real number type Maximum 500 pcs
External Communication (option)		CC Link , DeviceNet , Profibus , Analog BOARD
Error Indications		Front 7-Segment , Teach Pendant
On-Line Functions		Job , Point , Parameter UP/Down, and Editing and Storage
Protection Functions		IPM Error , Over Current , Over Load , Over Speed, Positional Error, etc.
Special Functions		3D Palletizing, In-Out Parallel Processing, Real-time Velocity Control
Cooling Type		Forceful Blowing
Dimension		535.8 (W) x 182.8 (D) x 245.0 (H)
Weight		15kg

Ref. 1) The multi-robot support is applied only for a robot model having 3 axes or less.

1.6.2 4-axis Controller Product Dimension

■ General Configuration

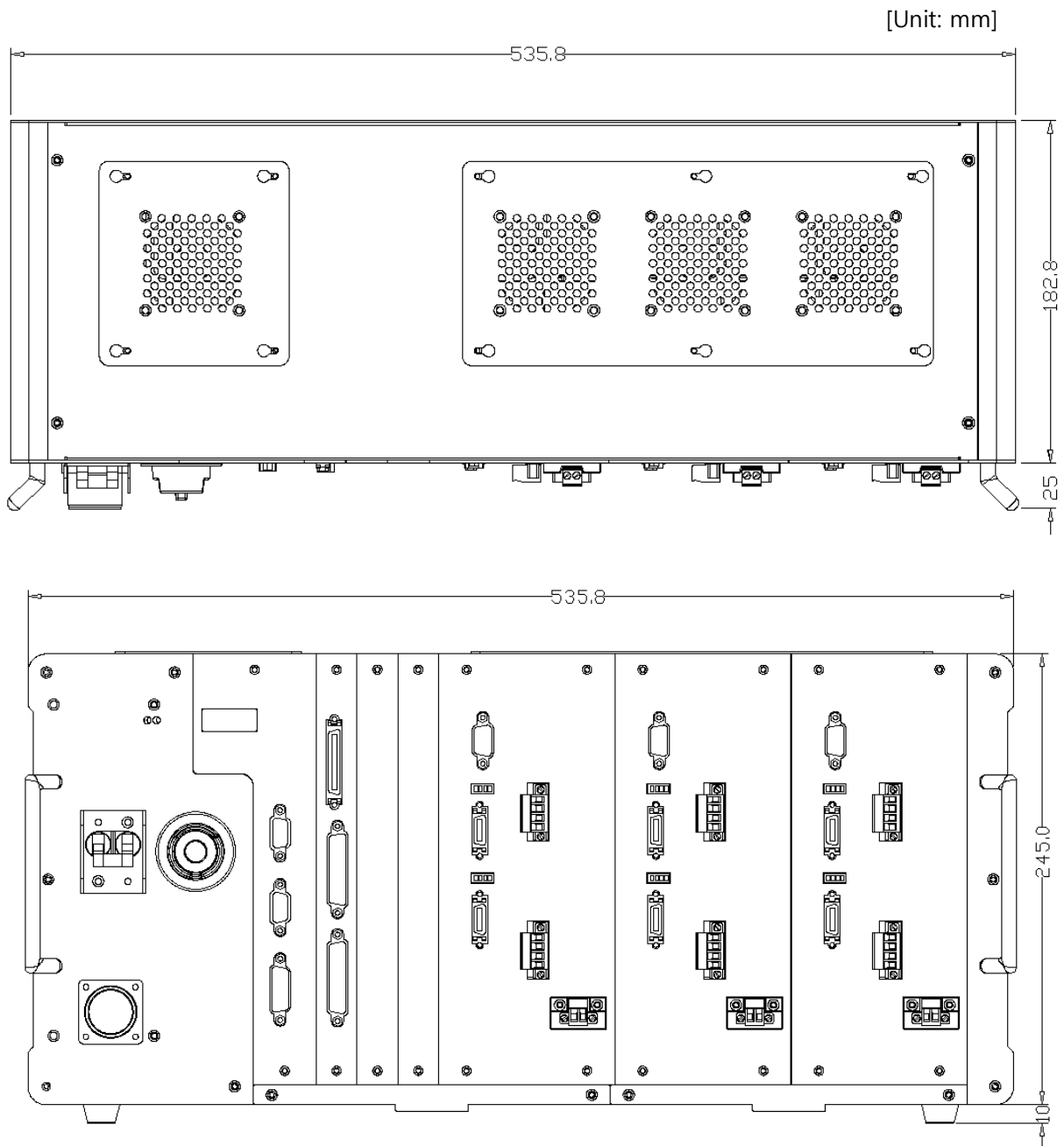
[Unit: mm]



440 (W) x 182.8 (D) x 245.0 (H)

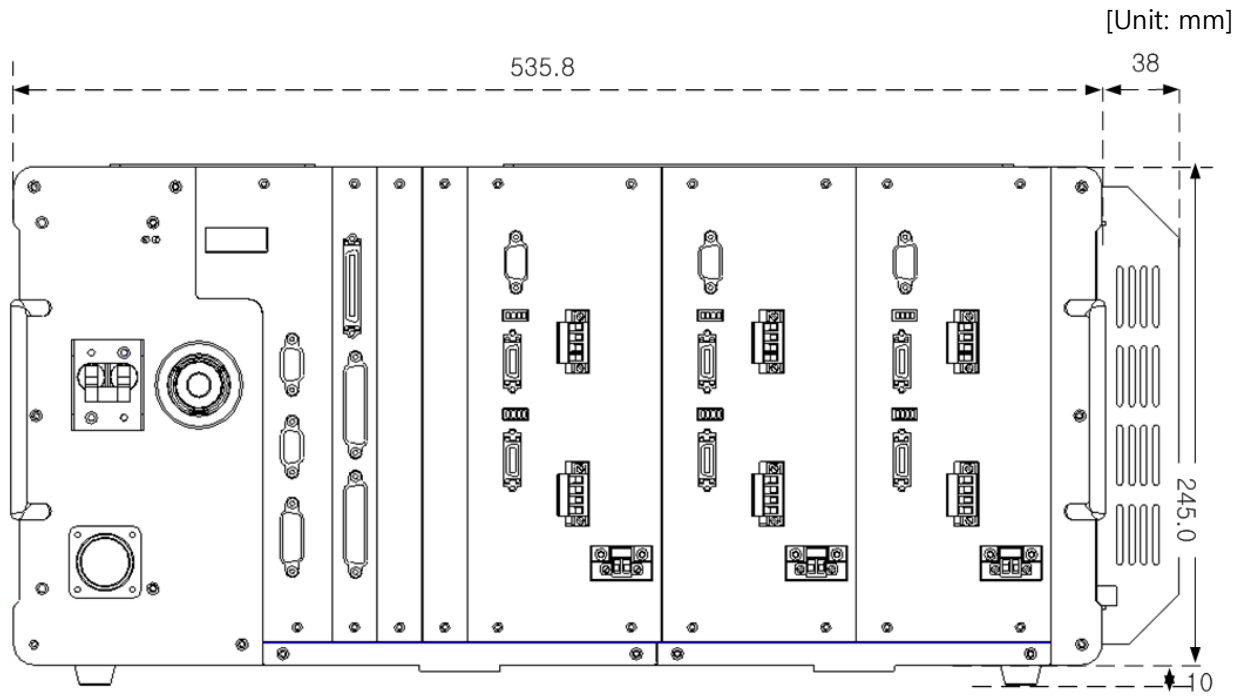
1.6.3 6-axis Controller Product Dimension

■ General Configuration



535.8 (W) x 182.8 (D) x 245.0 (H)

■ External Mounting of Regenerative Resistor (Optional)



573.8 (W) x 182.8 (D) x 245.0 (H)

Chapter 2 Installing Method of Controller

2.1 Getting Proper Installation Environment

2.1.1 Conditions for Installation Environment

- Since the robot and the controller are not intended to be of anti-explosion, dust-proof, or drop-proof standard, they cannot be installed at the following places.
 - (1) Environment where flammable gases, flammable liquids, etc. is used
 - (2) Environment where conductive materials such as metal processed chip is scattering
 - (3) Environments with acid or alkali corrosive gas
 - (4) Environments with the mist such as cutting liquid or grinding liquid
 - (5) Environments with the mist such as cutting liquid or grinding liquid containing the oil component
 - (6) Environment close to the electrical noise sources, such as a large inverter, high-power frequency oscillator, a large conductor, welding machine, etc.

2.1.2 Ambient Temperature and Humidity

- Ambient temperature range in operation is to be 0 to 40 °C.
- Be the humidity 80% RH (MAX) or less.
- Make well-ventilated and be less dust, dirt and moisture.

2.1.3 Vibration

- Install the robot at the place where is away from the environment subjected to excessive vibration and shock

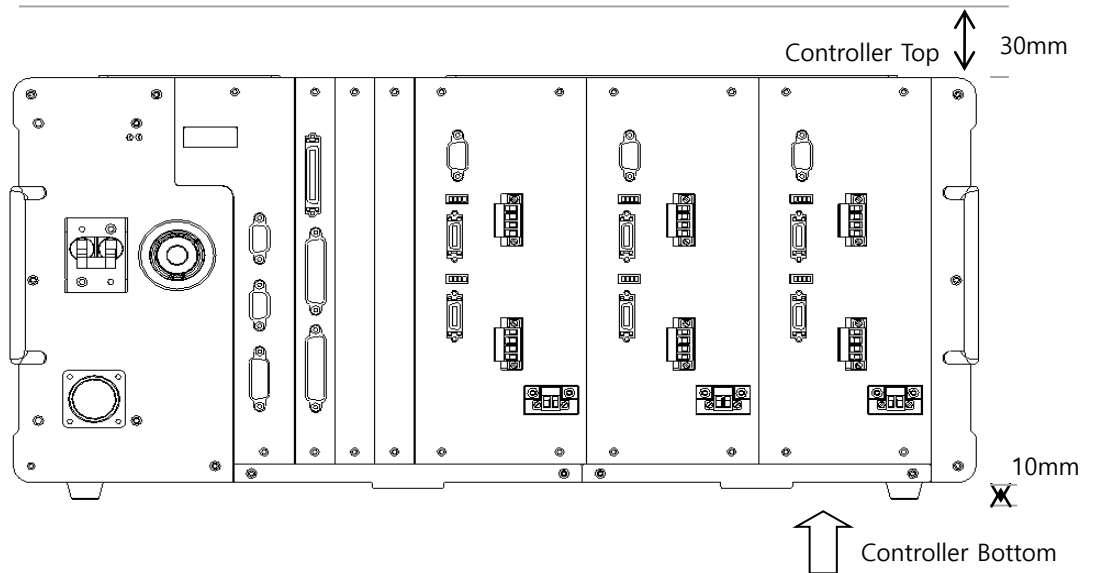


CAUTION

The installation environment for a robot body and a controller unit is very important. Be sure to observe the following installation environment. If the installation environment is not proper, the function and performance may not be fully accomplished, as well as the life of the device may be shortened and unexpected failures may be caused.

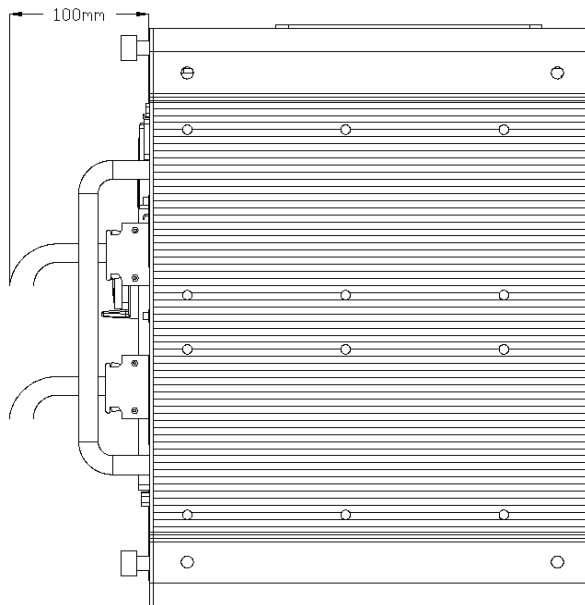
2.2 Preparation of Installation Space

Prepare the enough space taking into consideration the robot cable bending, cooling fan interference or the like, as shown below.



CAUTION

The cooling system of the controller is a fan forced ventilation type. Be sure to prepare the space so that the cooling fan is not subjected to the occurrence of interference.

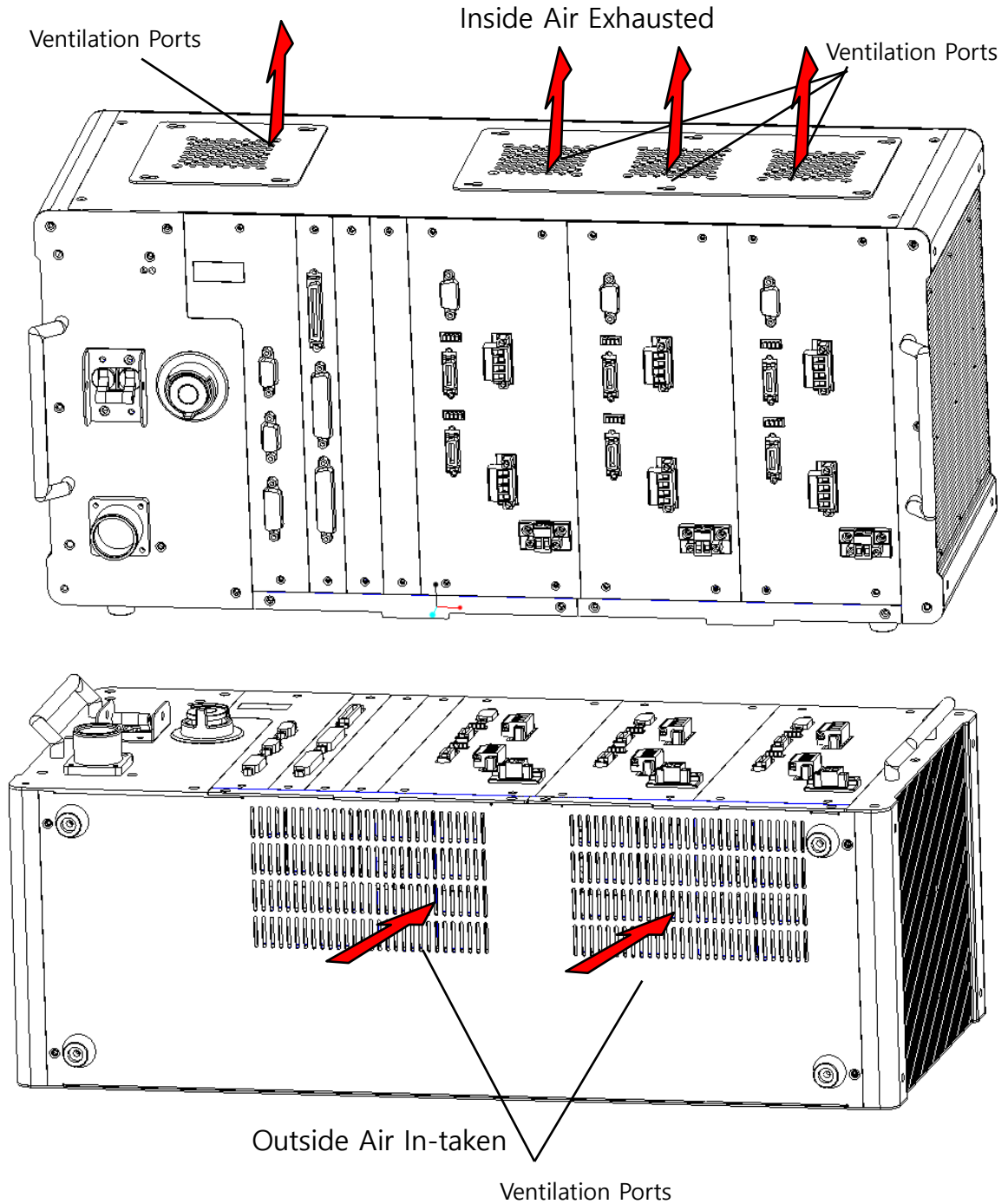


CAUTION

Make room and tidy up wires so that robot cables connected to the controller may not be compressed and entangled.

2.3 Ventilation Direction

Ventilation direction of the controller is as follows. Consider it when in controller installation.



CAUTION

An air filter for the front ventilation ports must be replaced from time to time by checking the contaminated state.

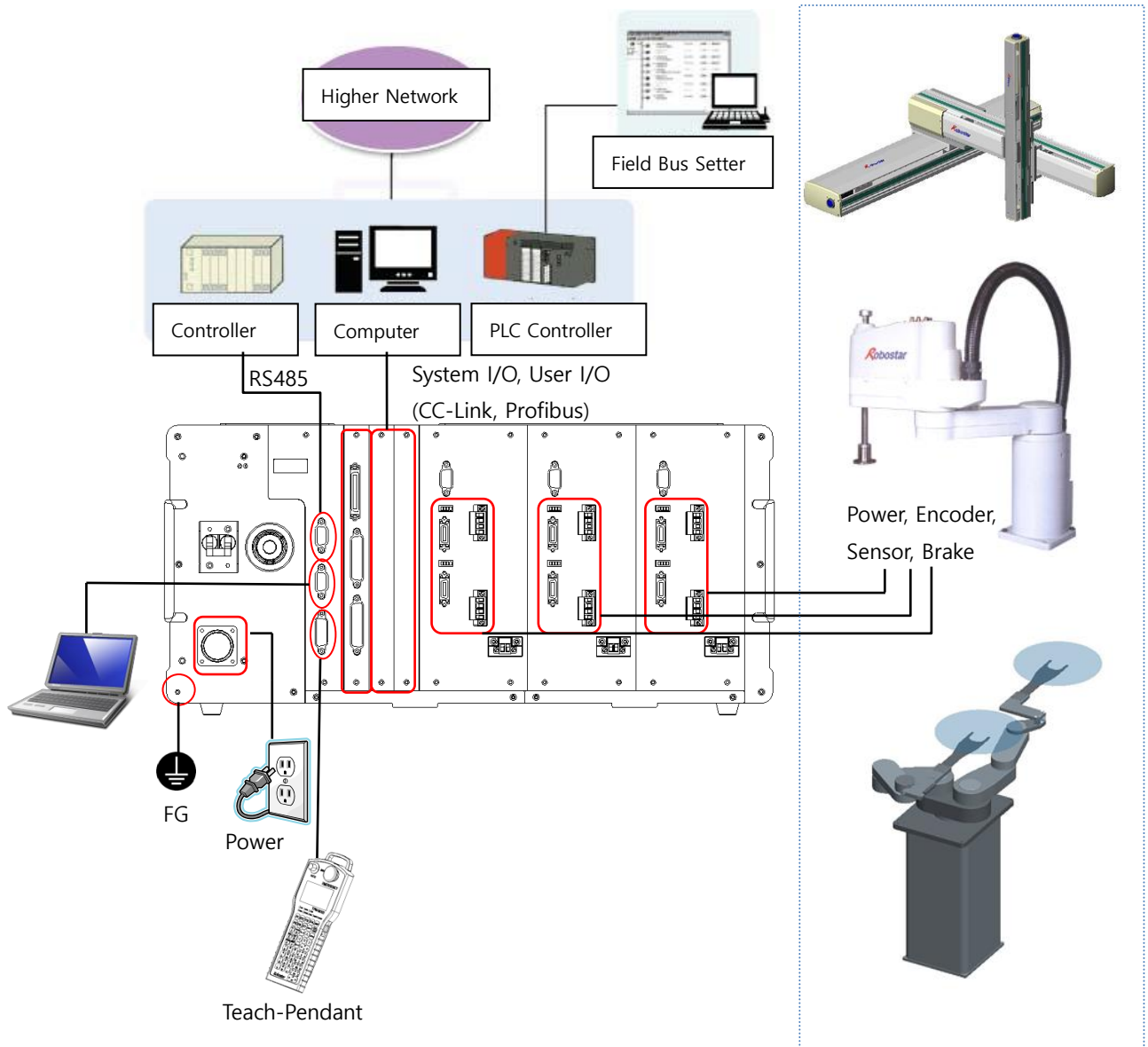
Chapter 3 Robot Connection Method and External Interface

3.1 Construction of Robot System

N1-Series Robot System is constructed as follows. For the interface of each part, see the next chapter.

■ Construction of SCARA and Cartesian Coordinate Robot System

When constructing SCARA and Cartesian Coordinate Robot System, a plurality of robots can be operated through separate independent channels (2 channels). (E.g., Cartesian Coordinate Robot 2-axis + Cartesian Coordinate Robot 2-axis)



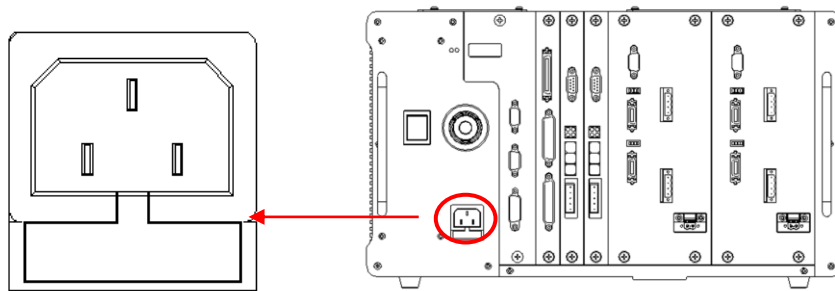
3.2 How to Connect Power to Robot

3.2.1 AC Power Cable

Interface for feeding AC power supply to the controller.

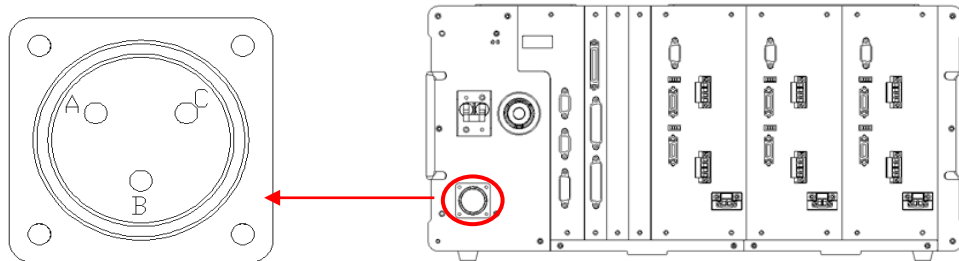
■ Controller Interface (4 Axis)

Connector on Controller Side	Power inlet Socket
Connector on Cable Side	AC POWER CABLE(3Pin)



■ Controller Interface (6 Axis)

Connector on Controller Side	MS3102A-18-21P(United)
Connector on Cable Side	MS3106B-18-21S(United)



AC Power Connector	
PIN No	Signal
A	AC220V ±10%, 50-60Hz, Input
B	FG
C	AC220V ±10%, 50-60Hz, Input



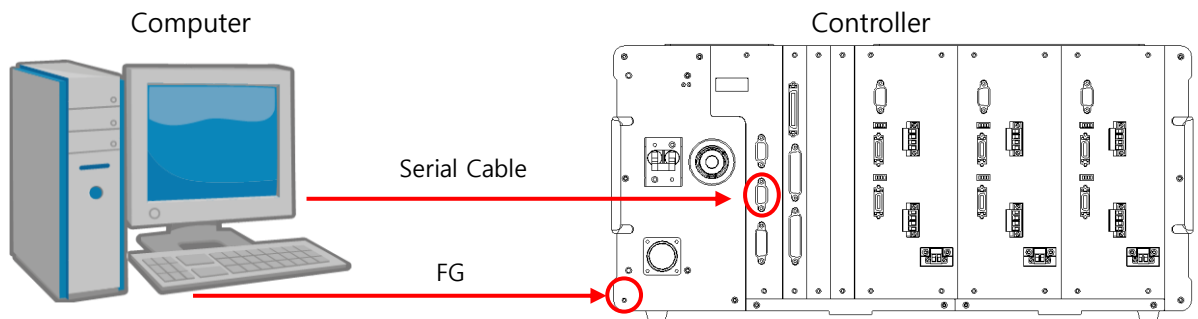
CAUTION

In case the connector of the power cable to robot is wrongly connected, a circuit breaker shuts off or the inside of the controller may be damaged.

3.3 Online Connection Method

- Using the serial (RS-232C) communication with Host Computer, the robot can automatically operate.
- After the power is supplied, 'Host Mode' is automatically performed by 'H-OPEN' signal of a serial communication cable. (Provided that the communication cable is connected to the controller)
- For more information about the operation, see 'Instruction Manual for Unihost'.
- Before using Host Mode, set up the parameters of the controller by using a teaching pendant and then set up the parameters of the computer identically.

3.3.1 Cable Connection Diagram



Signal Name	Pin No.	Pin No.		Signal
		9-pin	25-pin	
RXD	2	2	2	RXD
TXD	3	3	3	TXD
GND	5	5	7	GND
H-OPEN	6	4	20	DTR
		6	6	DSR
		7	4	RTS
		8	5	CTS



If a regular serial cable is used for the above connection, a controller-side pin 6 (H-OPEN) and pin 5 (GND) should be connected.

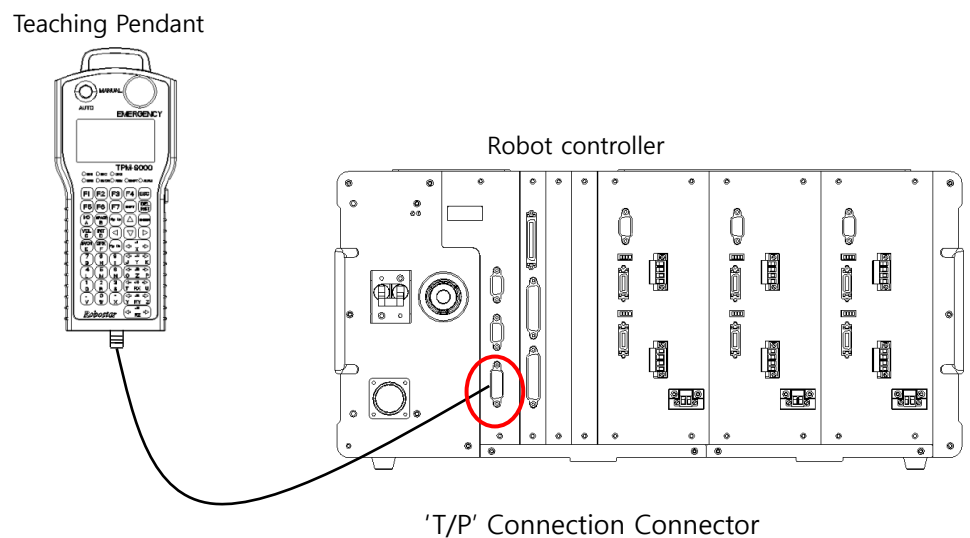
H-OPEN: If Pin 6 is a GND Input when the power is turned on (Reset), a mode is automatically changed to PC communication mode. If the H-OPEN signal is HIGH, a mode is changed to the PC communication mode when '3. HOST' mode is selected in the Teaching Pendant.

3.3.2 Specifications for Cable

- Use a cable with a shield whose minimum core wire diameter is 0.3mm² or more.
- Connect both lateral shields (Controller and Computer) of a case with each other.
- Have FG(Frame Ground) Level of the Controller be the same as that of the Host Computer. (Using a wire 2 mm² or more, connect the FG terminal of the controller with the FG terminal of the host computer.
- Use a serial cable not longer than 10m.
- Connector Spec.: D-Sub 9s (Socket Type)

3.4 Teaching Pendant Connection Method

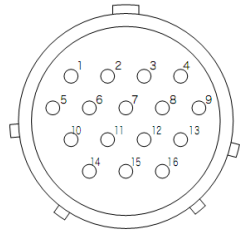
Teaching Pendant is to be connected to 'T/P' Connector of a controller, as shown below. For the more detailed connection method and the information on the teaching pendant, refer to 'Chapter 4. About Teaching Pendant'.



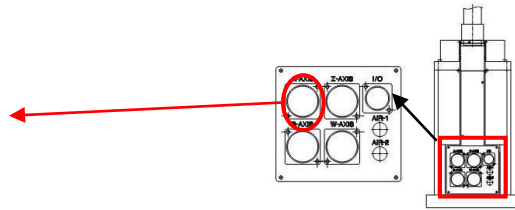
■ Robot Interface

No.1 Axis

Robot-Side Connector	JMR 2528F
Robot Cable-Side Connector	STRAIGHT DDK JMSP2528M ELBOW DDK JMLP2528M



(Ref. 1)



(Ref.2)

Ref. 1) Connected 1:1 to pins of a robot cable-side connector.

Ref. 2) Location of the connector may vary as the machine models.

Pin No	Signal Name (INC)	Signal Name (ABS)
1	P5V	P5V
2	G5V	G5V
3	SD	SD
4	/SD	/SD
5	CW	
6	CCW	
7	P24V	
8	G24V	
9	ORG	
10	BRK+	BRK+
11	BRK-	BRK-
12	FG(ENC)	FG(ENC)
13	FG(MOTOR)	FG(MOTOR)
14	U	U
15	V	V
16	W	W

Ref. 3) '-' sign means the unused pin.

Ref. 4) An encoder FG is different from a motor FG. Be careful when in wiring them.

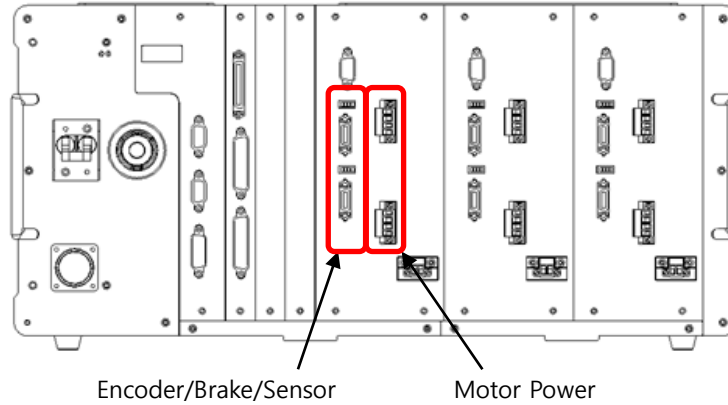


CAUTION

Connector and pin maps of all axes from 'No.1 Axis' to 'No.4 Axis' are the same.

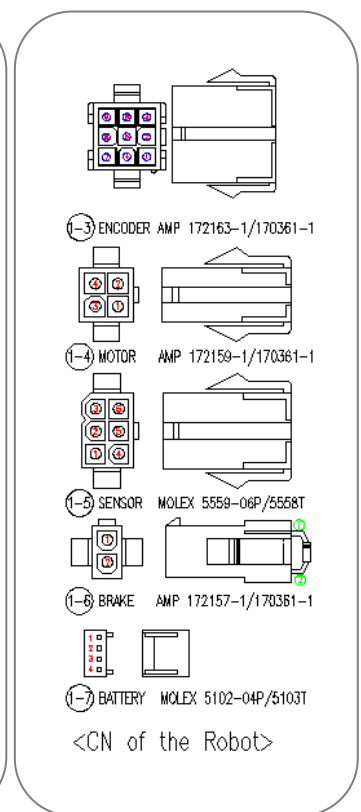
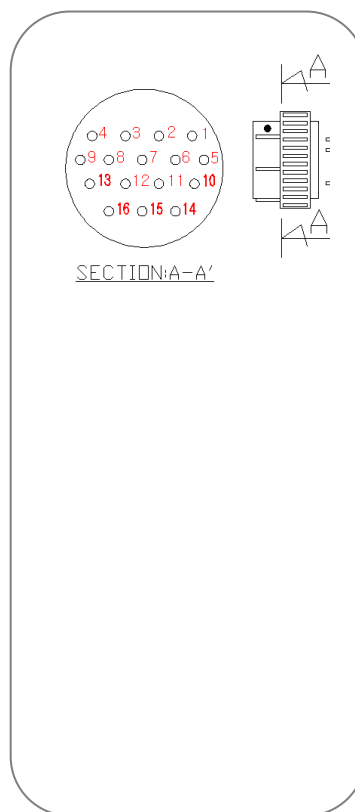
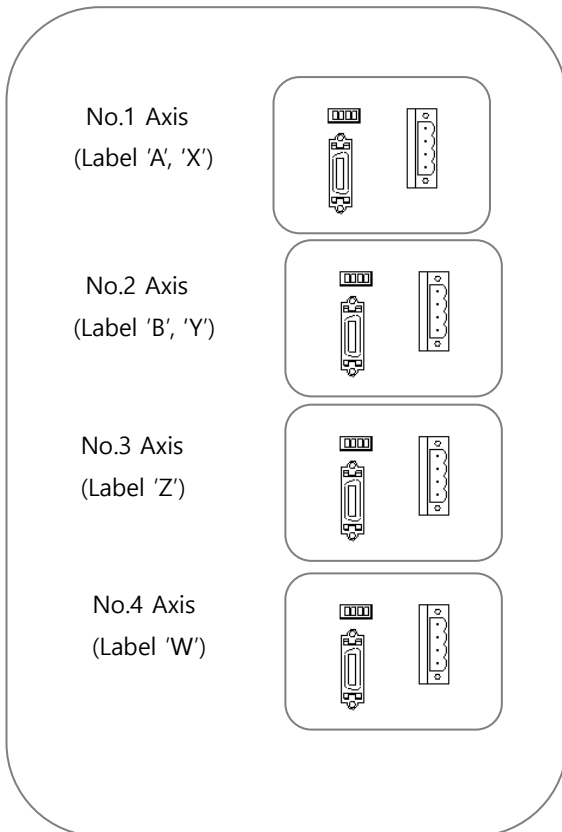
3.5 Robot Connection Method


The robot and the controller are connected with each other by using a robot cable. The robot cable is composed of a motor power cable, and an encoder cable, a brake cable, and a sensor cable, all of which are separate to one another.



Robot cable (controller side)

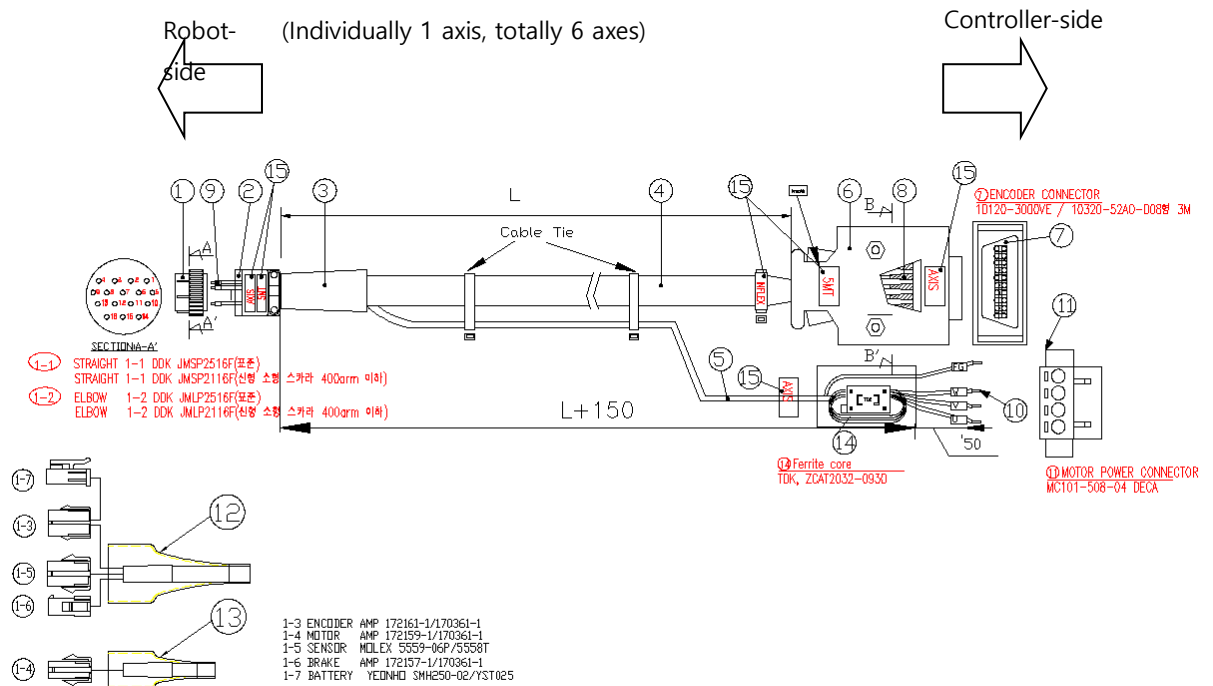
Robot cable (machine side)



 After connecting the robot cable, make sure that housing locks (a connector locking device) of the controller-side connector are completely engaged with each other.

CAUTION

■ Robot Cable



CAUTION

For a motor cable and an encoder cable, use a cable dedicated to the robot.

- Always check the wiring before powering on, to prevent device destruction due to the mis-wiring.
- Always use a moving cable for moving parts.



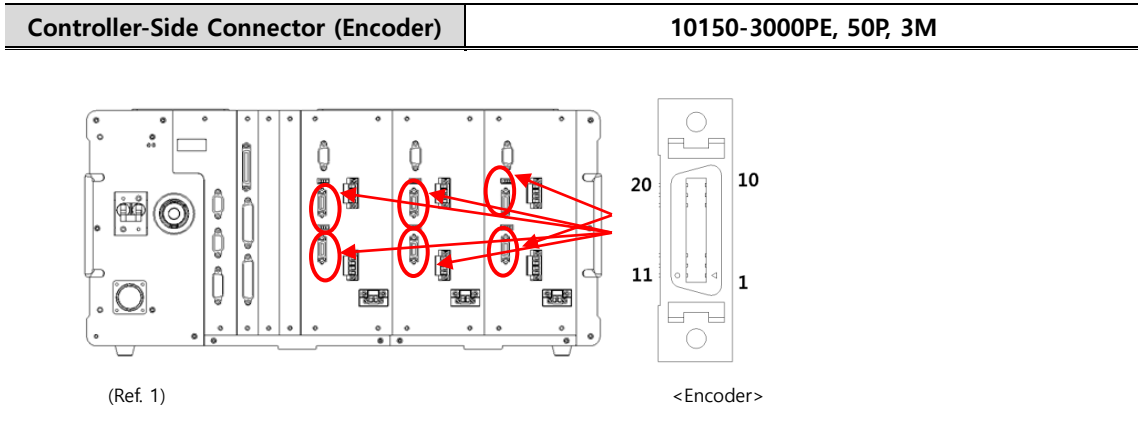
WARNING

Be sure to install a ground FG (Frame Ground).

3.5.1 Encoder, Sensor and Brake Interface

An interface for wiring the encoder, sensor, and brake.

■ Controller Interface



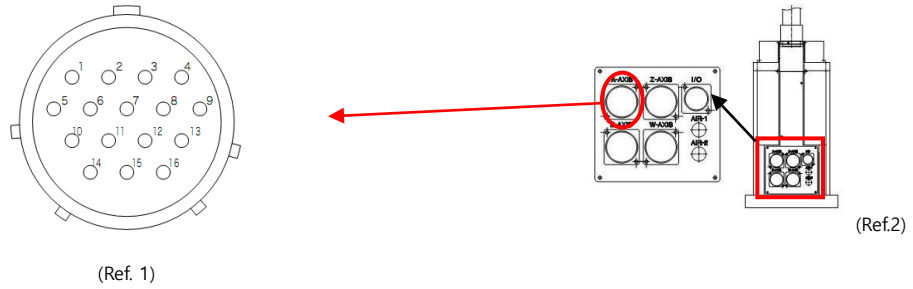
Ref. 1) Connected 1:1 to pins of a robot cable-side connector.

ENCODER			
Pin No.	Signal	Pin No.	Signal
1	P5V	11	G5V
2		12	
3		13	
4		14	
5		15	
6		16	
7	SD	17	/SD
8	ORG	18	BRK+
9	CW	19	CCW
10	P24V	20	G24V
		CASE	FG

■ Robot Interface

No. 1 Axis

Robot-Side Connector	JMR 2528F
Robot Cable-Side Connector	STRAIGHT DDK JMSP2528M ELBOW DDK JMLP2528M




Ref. 1) Connected 1:1 to pins of a robot cable-side connector.

Ref. 2) Location of the connector may vary as the machine models.

Pin No	Signal Name (INC)	Signal Name (ABS)
1	P5V	P5V
2	G5V	G5V
3	SD	SD
4	/SD	/SD
5	CW	
6	CCW	
7	P24V	
8	G24V	
9	ORG	
10	BRK+	BRK+
11	BRK-	BRK-
12	FG(ENC)	FG(ENC)
13	FG(MOTOR)	FG(MOTOR)
14	U	U
15	V	V
16	W	W

Ref. 3) '-' sign means the unused pin.

Ref. 4) An encoder FG is different from a motor FG. Be careful when in wiring them.



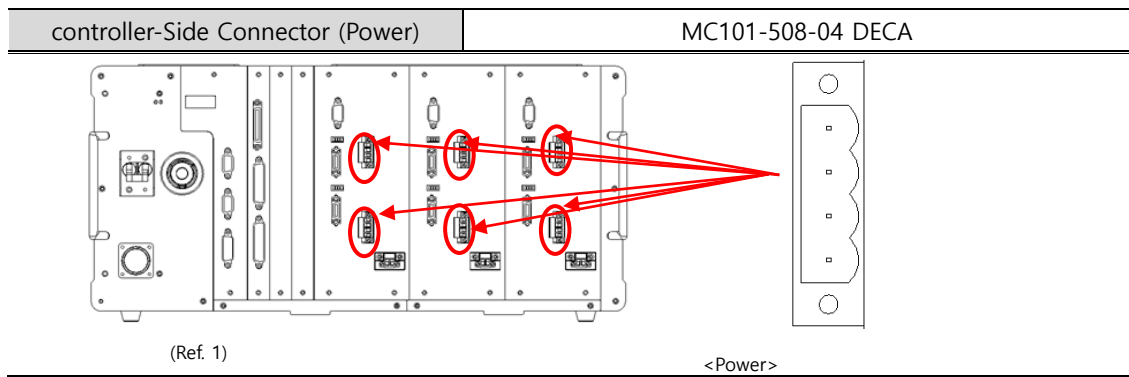
Connector and pin maps of all axes from 'No.1 Axis' to 'No.4 Axis' are the same.

CAUTION

3.5.2 Motor Power Interface

Interface for Motor Power Connection.

■ controller Interface




Ref. 1) Connected 1:1 to pins of a robot cable-side connector.

MOTOR POWER	
Pin No.	Signal
1	U
2	V
3	W
4	FG

3.6 In/Out Connection Method

In/Out (I/O) Connection Method for a higher level controller to an external device will be explained. After accurately checking the pin numbers of each I/O, connect them correctly.

 CAUTION	Pay particular attention that incorrect connection could damage the controller, as well as the peripherals .
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3.6.1 I/O Assignment

I/O for N1-Series is composed of System I/O (24 points/12 points), User I/O (16 points/16 points), and Option I/O (32 points/32 points).

System I/O Assignment is used in a teaching pendant as follows.

The detailed information can be obtained from "Operation Manual".

Teaching Pendant Menu	4.PARA → F3.PUB → 1.HW CONF → 3. I/O	
System I/O Assignment	0	Basic I/O (System I/O(24/12)+ User I/O (16/16))
	1	Basic I/O+ Option I/O (32/32)
	2	Basic I/O+ Option I/O (64/64)

3.6.2 I/O Spec.

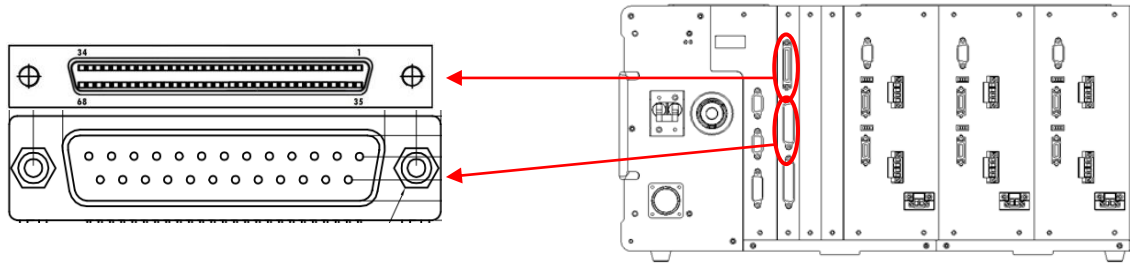
Item	User Input	User Output
Rated I/O Voltage	DC 24V (External source used) (Ref.2)	
Rated I/O Current	Min. 5mA/ 1 contact	Max. 30mA/ 1 contact
Insulation Type	Photo-coupler used	
Signal Delay	Within 1ms	
Input Resistance	4.7kΩ	-
Number of I/O Contacts	40 points (8 points/1 common)	28 points (8 points/1 Common)
Controller-Side Connector	MCR50FL31/ DSUB-25P	MDR50FL31/ DSUB-25S
Cable-Side Connector	MC50MA/DSUB-25S	MC50MA/DSUB-25P

Ref. 2) N1-Series does not provide internal power source for I/O. Be sure to use the external power source.

3.6.3 I/O Interface (Standard I/O)

■ Input Connector

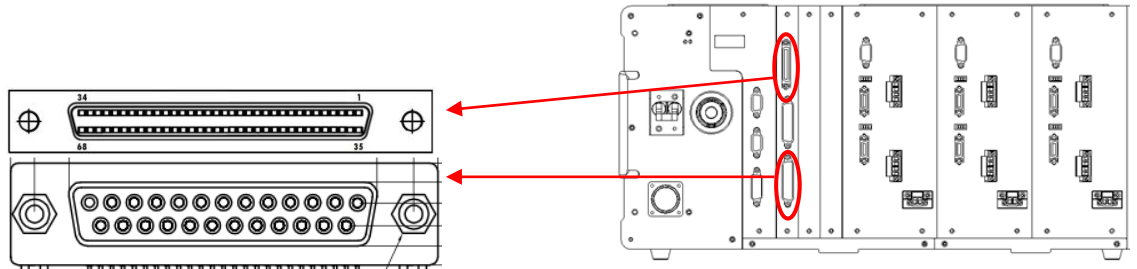
Controller-Side Connector (System)	MDR50FL31 (3M)
I/O Cable-Side Connector (System)	MC50MA (3M)
Controller-Side Connector (USER)	DSUB RA 25P
I/O Cable-Side Connector (USER)	DSUB SOLD 25S FB(HOOD)



Ref. 2) Connected 1:1 to the pins of I/O cable-side connector.

■ Output Connector

Controller-Side Connector (System)	MDR50FL31 (3M)
I/O Cable-Side Connector (System)	MD50MA (3M)
Controller-Side Connector (USER)	DSUB RA 25S
I/O Cable-Side Connector (USER)	DSUB SOLD 25P FB(HOOD)



Ref. 1) Connected 1:1 to the pins of I/O cable-side connector.



CAUTION

If I/O marking on a controller model name is 'N' (N-TYPE), Input → Positive Common (24V+) and Output → Negative Common (24V-);
 If I/O marking on a controller model name is 'P' (P-TYPE), Input → Negative Common (24V-) and Output → Positive Common (24V+)

3.6.4 Functions of System I/O

- System I/O signal can be connected to Higher Level Controller (PLC) or System Operation Panel for automatic operation.
- I/O of N1-Series uses System I/O (24 points/12 points), User I/O (16 points/16 points), and further additional 32 points/32 points if Option I/O Board is used.

Functions of System Input

Pin No.	Signal Name	Description
1, 26	-	-
2, 27	-	-
10, 35	INCOM0	N type: VCC Common for USER INPUT P type: GND Common for USER INPUT <Ref.> Refer to System I/O Circuit Diagram.
11	CH SEL	Robot channel selecting signal -If this bit is OFF, first robot is selected. -If this bit is ON, second robot is selected. -According to the bit selection, the function of the program number and the mode change velocity of the robot can be used.
36	PROG0	- If all bits are OFF, No. 0 program is executed. - If all bits are ON, No. 31 program is executed. - All bits are set to Binary. - Using the bit combination, No. 0 to 31 programs are executed. - For more information, refer to <Ref. 1>.
12	PROG1	
37	PROG2	
13	PROG3	
38	PROG4	
14	PROG_SEL	- Using the above 5 bits (PROG0, PROG1, PROG2, PROG3, PROG4), the desired job can be selected.
39	MODE 0/AXIS 0	- Mode setting: Changes MODEs. - Axis setting: Sets the axis when in Jog Mod.
16	MODE 1/AXIS1	- For more information, refer to <Ref. 2>.
15, 40	INCOM1	N type: VCC Common for USER INPUT P type: GND Common for USER INPUT <Ref.> Refer to System I/O Circuit Diagram.
41	MODE SEL	- Using the above 2 bits (MODE0/AXIS0, MODE1/AXIS1), the desired mode can be selected.
17	VEL	- The jog velocity can be set when in Jog Mode. If VEL is ON, the robot moves at Jog Velocity Set Value among the parameter values, If it is OFF, the robot moves at 1/2 velocity of such value.
42	VEL +/-MOV +	- Velocity up during running: While in operation(Running), the operation velocity can be increased, using this contact. - The velocity is displayed on a teaching pendant, and is adapted after one point has been moved. - One time of the signal can increase 5% each, and the range is 20 to 100%. - Set axis is moved in Jog Mode in the direction of (+).

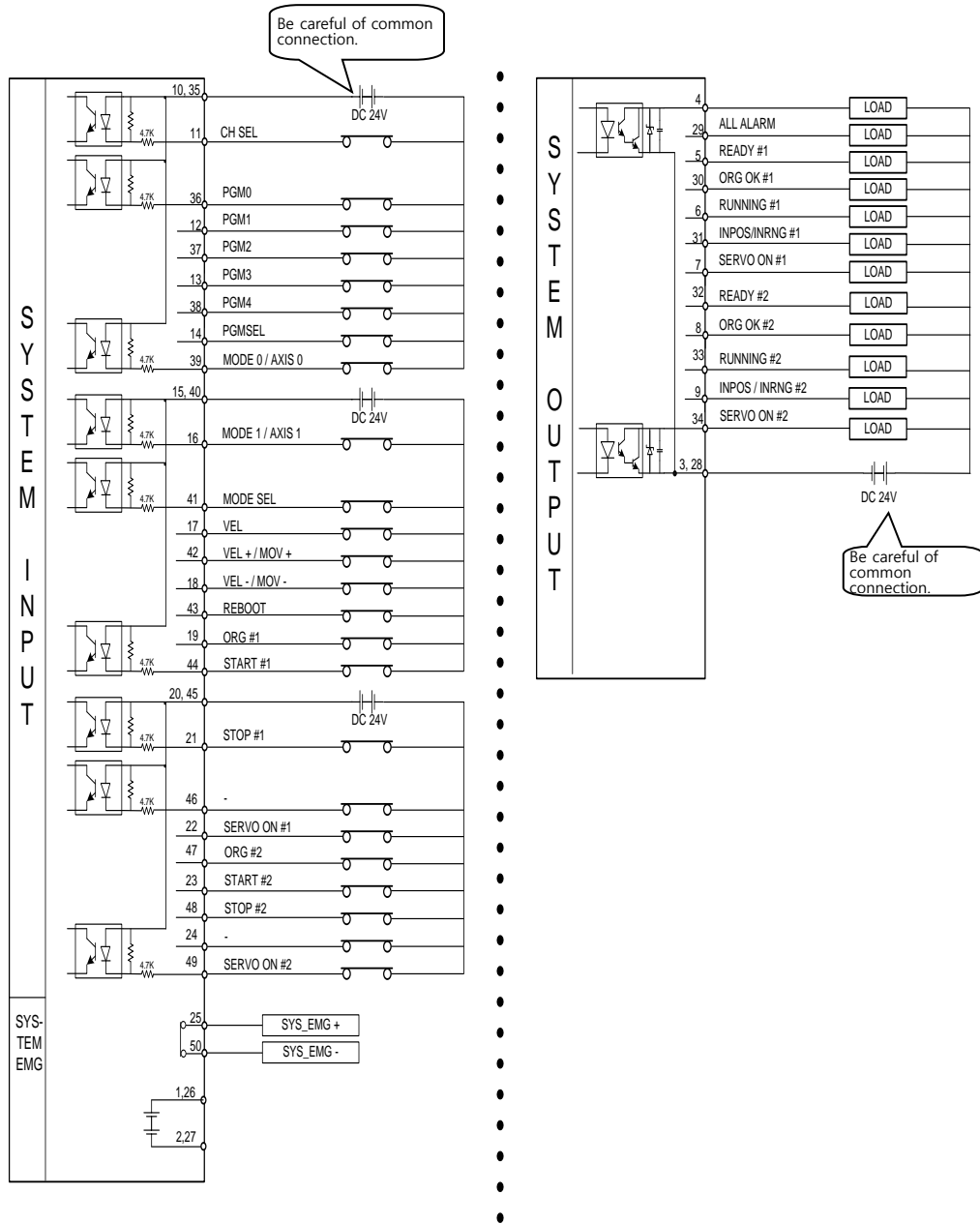
18	VEL -/MOV -	<ul style="list-style-type: none"> - Velocity down during running: While in operation(Running), the operation velocity can be decreased, using this contact. - The velocity is displayed on a teaching pendant, and is adapted after one point has been moved. - One time of the signal can decrease 5% each, and the range is 20 to 100%. - Set axis is moved in Jog Mode in the direction of (-).
43	REBOOT	<ul style="list-style-type: none"> - Controller Initialization Signal. <Caution> Carefully use this signal while in operation.
19	ORIGIN #1	<ul style="list-style-type: none"> - Homing signal for 1st channel robot. When receiving this signal, the controller performs the homing function depending on the parameter settings.
44	START #1	<ul style="list-style-type: none"> - Work starting signal for 1st channel robot. When this signal is input, the controller operates the robot according to the predetermined program and point. The desired work shall be selected in advance. - There are Start and Restart.
20, 45	INCOM1	<p>N type: VCC Common for USER INPUT P type: GND Common for USER INPUT <Ref.> Refer to System I/O Circuit Diagram.</p>
21	STOP #1	<ul style="list-style-type: none"> - Work stop signal: This signal stops temporarily the moving robot. - Servo Offsignal: When receiving this signal after stopped, the servo is turned off. - Alarm Reset: When the alarm is generated, this signal clears the alarm.
46	Reserved	
22	Servo ON #1	<ul style="list-style-type: none"> - Signal for performing SERVO ON/OFF operation of the robot in the first channel.
47	ORIGIN #2	<ul style="list-style-type: none"> - Homing signal for 2nd channel robot. <Ref.> This function is the same as ORG #1.
23	START #2	<ul style="list-style-type: none"> - Work starting signal for 2nd channel robot. <Ref.> The function is the same as START #1.
48	STOP #2	<ul style="list-style-type: none"> - Work stop signal: This signal stops temporarily the moving robot. <Ref.> This function is the same as STOP #1.
24	Reserved	
49	Servo On #2	<ul style="list-style-type: none"> - Signal for performing SERVO ON/OFF operation of the robot in the second channel.
25	SYS_EMG+	<ul style="list-style-type: none"> - Emergency stop signal. If this signal is cut off, the controller stops all operations in progress and turns into an emergency stop (Alarm State).
50	SYS_EMG-	<ul style="list-style-type: none"> - Refer to 3.7 Emergency Stop Circuit Wiring <Caution> Carefully use this signal while in operation.

Function of System Output

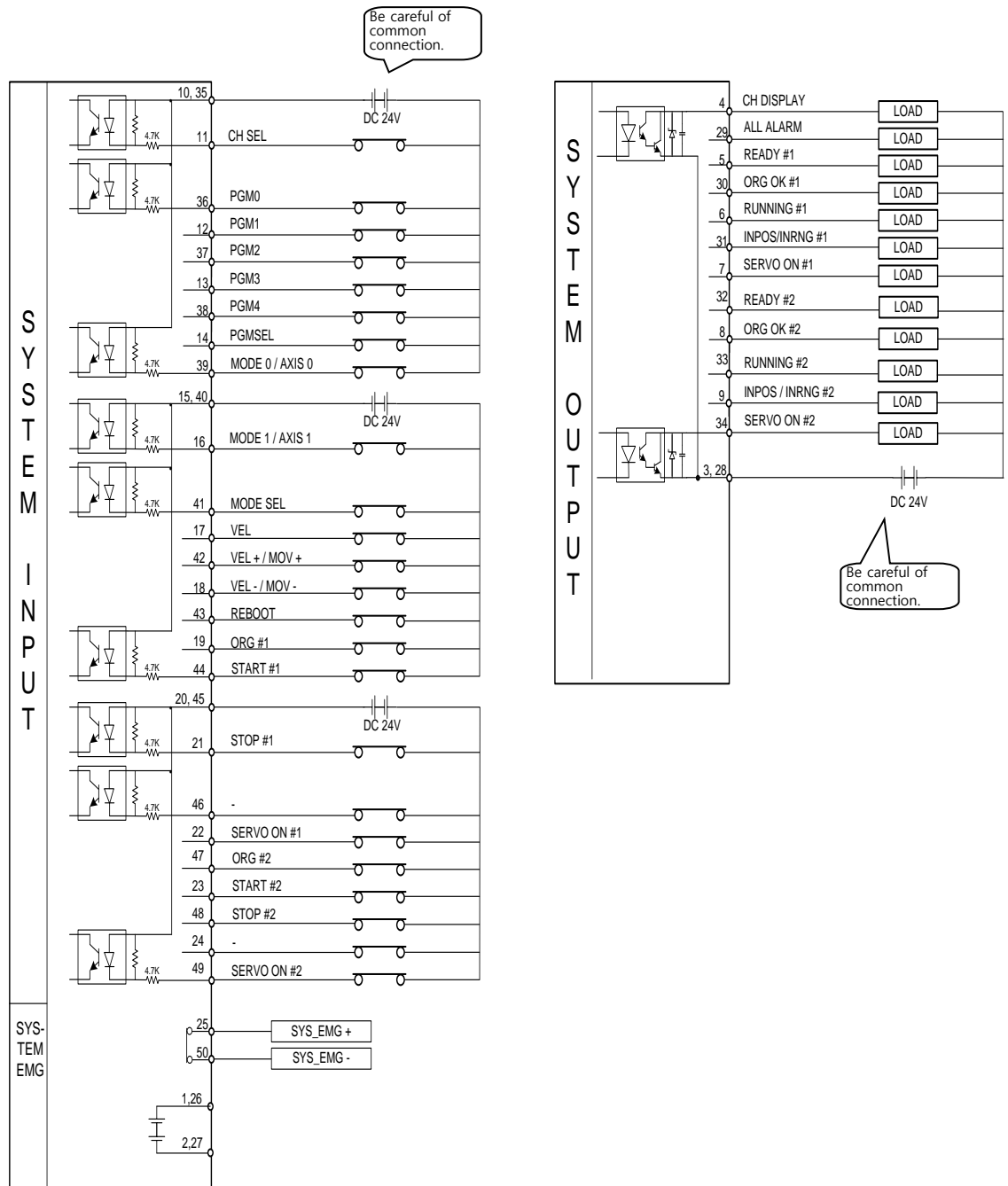
Pin No.	Signal Name	Description
1, 26	-	-
2, 27	-	-
3, 28	OUT_COM0	N type: VCC Common for USER INPUT P type: GND Common for USER INPUT <Ref.> Refer to System I/O Circuit Diagram.
4	CH DISPLAY	- This signal indicates whether the channel has been selected by CH SEL signal.
29	ALL ALARM	- If the alarm is generated while one of the robot channels is in an initial state or is operating, the controller outputs this signal. - On Teach Pendant, the Alarm message is displayed.
5	READY #1	- When the controller is powered ON, the whole system of a 1st channel is tested. If the result is normal, this signal is output. - If the result is abnormal, the alarm signal is output.
30	ORIGIN OK #1	- If ORIGIN #1 signal is input, homing the 1st channel is performed. When such homing has been completed, this signal is output.
6	RUNNING #1	- When a job to be performed in the 1st channel is selected, and the job is executed by inputting START signal, this signal is output.
31	INPOS/INRNG #1	- When the robot goes to the target point during 1st channel work, this signal is output. - When the robot reaches within Inposition Pulse set in System Parameter, this signal is output. - Regardless of the state of the controller, the current position of the mechanical part of the robot is judged whether it is positioned within the range set in System Parameter. If it is within the range, this signal is output.
7	SERVO ON #1	- If the 1st channel robot in in SERVO ON state, this signal is output.
32	READY #2	- This function is the same as READY #1.
8	ORIGIN OK #2	- This function is the same as ORIGIN OK #1.
33	RUNNING #2	- This function is the same as RUNNING #1.
9	INPOS/INRNG #2	- This function is the same as INPOS/INRNG #1.
34	SERVO ON #2	- This function is the same as SERVO ON #1.

3.6.5 System I/O Circuit Diagram

3.6.5.1 N-TYPE System I/O Circuit Diagram (Input: PCOM, Output: NCOM)



3.6.5.2 P-TYPE System I/O Circuit Diagram (Input: NCOM, Output: PCOM)



- When wiring the power source, confirm that the connection polarity of DC 24V is correct.
- Mis-wiring may cause the internal parts to be destroyed. Pay special attention to the polarity of the common contacts.
- The external supply voltage has to be DC 24V±10%.
- When soldering connector pins, provide pins with tubes to prevent short-circuit of pins.

Ref. 1) How to Select Program

1. If Program No. is not selected, No. 0 job is automatically selected.
(This is the same as when "PROG0 to 4" and "PSEL" Input signal are not wired.)
2. Selection of Program Nos.: Using PROG0 to PROG4, the total 32 jobs can be selected.

PROG4	PROG3	PROG2	PROG1	PROG0	Number of JOB DIR
OFF	OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	ON	ON	3
to	to	to	to	to	To
ON	ON	ON	OFF	OFF	28
ON	ON	ON	OFF	ON	29
ON	ON	ON	ON	OFF	30
ON	ON	ON	ON	ON	31

Ref. 2) Mode Change & Mode Functions

MODE1	MODE0	Symbol	MODE	Remarks
OFF	OFF	M00	Auto Run Mode	System MODE
OFF	ON	M01	Step Run Mode	
ON	OFF	M10	Jog Mode	

1. System Mode

- If powered ON, the machine automatically branches to this mode.

■ Auto Run Mode

: When System I/O is connected to peripherals as a standard function, if the power is turned on, a mode automatically branches to this mode.

: In an advanced function, if the power is turned on, the execution mode is set to branch to Auto Run Mode.

■ Step Run Mode

: In an advanced function, the execution mode is set to branch to Step Run Mode.

■ Jog Mode

: In an advanced function, the execution mode is set to branch to Jog Mode.

Functions of Input Signals for Operation Mode in Advanced Function

Mode	Mode Description	Functions of Input Signals	Output
Auto Run Mode	Job Auto Run Mode	<ul style="list-style-type: none"> ▶ PROG_SEL: After inputting the job number to P0 to P4 on a basis of BCD and if pressing the key, the relevant job is selected. ▶ VEL-/MOV-: The digit number of a job number displayed on the 7-segment is moved. (Plural functions) <ul style="list-style-type: none"> - If this is input while a job is executed, the robot moving velocity is decreased. ▶ VEL+/MOV+: The digit number of a job number displayed on the 7-segment is increased. (Plural functions) <ul style="list-style-type: none"> - If this is input while a job is executed, the robot moving velocity is increased. ▶ MODE_SEL: After M1/A1 and M0/A0 signals are input and if the key is pressed, the relevant mode is selected. ▶ START: The selected job is executed. After the robot is temporarily stopped by inputting STOP signal while the job is executed: <ul style="list-style-type: none"> - If START signal is input: Execution starts from the step currently stopped - If START signal is input simultaneously with STOP signal input: Execution starts from the first step of the currently stopped job. ▶ STOP: Job being executed is temporarily stopped. (Plural functions) <ul style="list-style-type: none"> - If Alarm is generated, this clears the alarm. - After the temporary stop and if this signal is additionally input one time, Servo is turned OFF. - If homing is being executed, the homing is stopped. ▶ Execution of IP Interrupt Function If IP Input is turned ON(1) while the selected job is being executed, the executed Job is stopped (if the robot is moving, it stops) and INTERJOB is executed. At this time, a job file whose name is "INTER" must exist in Job Directory. Interrupt execution can be changed only when the selected job is being executed in Auto Run Mode. - <u>How to execute the first execution job while INTERJob is being executed.</u> (Execution starts for the first step of the job) Reset Signal Input, Execution Job No Input, PROG_SEL Input, START Signal Input STOP Signal Input, Execution Job No Input, PROG_SEL Input, START Signal Input 	<ul style="list-style-type: none"> ▶ ALARM: Output when in alarming. ▶ READY: Output when in normal standby state. ▶ ORIGIN: Output when homing is completed. ▶ INPOS: Turned off when Robot moves. Turned off when the target point is reached. ▶ RUN: Output while job is being executed. ▶ 7-Segment: <ul style="list-style-type: none"> - Alarm E alarm code is displayed - Job execution is temporarily stopped. : "P job number" is displayed. - During Job execution: "A step number" is displayed. - During homing: "Org" is displayed.

Mode	Mode Description	Functions of Input Signals	Output
Step Run Mode	Job Step Run Mode	<ul style="list-style-type: none"> ▶ VEL-/MOV-: The digit number of an execution step, displayed on the 7-segment which displays the execution step of the selected job program, is moved. (Plural functions) - If this is input while a job is executed, the execution step is decreased by one step. 	<ul style="list-style-type: none"> ▶ ALARM: Output when in alarming. ▶ READY: Output when in normal standby state. ▶ ORIGIN: Output when homing is completed. ▶ INPOS: Turned off when Robot moves. Turned off when the target point is reached. ▶ RUN: Output while job is being executed. ▶ 7-Segment: <ul style="list-style-type: none"> - Alarm E alarm code is displayed - Job execution is temporarily stopped. : "P job number" is displayed. - During Job execution: "A step number" is displayed. - During homing: "Org" is displayed.
		<ul style="list-style-type: none"> ▶ VEL+/MOV+: The digit number of an execution step, displayed on the 7-segment which displays the execution step of the selected job program, is moved. (Plural functions) - If this is input while a job is executed, the execution step is increased by one step. 	
		<ul style="list-style-type: none"> ▶ MODE_SEL: After M1/A1 and M0/A0 signals are input and if the key is pressed, the relevant mode is selected. 	
		<ul style="list-style-type: none"> ▶ START: The selected job is executed. By one time inputting this, one step of the job program displayed on the 7-segment is executed. - if START signal is input: Execution starts from the step currently stopped - if START signal is input simultaneously with STOP signal input: Execution starts from the first step of the currently stopped job. 	
		<ul style="list-style-type: none"> ▶ STOP: Job being executed is temporarily stopped. (Plural functions) - If Alarm is generated, this clears the alarm. - After the temporary stop and if this signal is additionally input one time, Servo is turned OFF. - If homing is being executed, the homing is stopped. 	

Mode	Mode Description	Functions of Input Signal	Output																					
Jog Mode	Jog Execution Mode	<p>1. Axis Setting Sets the job moving axis according to M1/A1 and M0/A0 signal input</p> <table border="1" data-bbox="596 461 991 716"> <thead> <tr> <th>M1/A1</th> <th>M0/A0</th> <th>Axis Setting</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>OFF</td> <td>1 axis</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>2 axes</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>3 axes</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>4 axes</td> </tr> </tbody> </table> <p>2. Velocity Setting Sets the job moving velocity according to VEL signal input</p> <table border="1" data-bbox="596 842 906 1010"> <thead> <tr> <th>VEL</th> <th>Velocity or velocity</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>LOW</td> </tr> <tr> <td>ON</td> <td>HIGH</td> </tr> </tbody> </table> <p>HIGH: Moves at the velocity of Jv among the Parameter Joint set values. LOW: Moves at the velocity of 1/2 of Jv.</p> <p>▶ VEL-/MOV-: By inputting M1/A1 and M0/A0 signal, the axis which has set by the above axis setting moves in (-) direction while the signal is being input.</p> <p>▶ VEL+/MOV+: By inputting M1/A1 and M0/A0 signal, the axis which has set by the above axis setting moves in (+) direction while the signal is being input.</p> <p>▶ MODE_SEL: After M1/A1 and M0/A0 signals are input and if the key is pressed, the relevant mode is selected.</p> <p>▶ STOP: If Alarm is generated, this clears the alarm.</p>	M1/A1	M0/A0	Axis Setting	OFF	OFF	1 axis	OFF	ON	2 axes	ON	OFF	3 axes	ON	ON	4 axes	VEL	Velocity or velocity	OFF	LOW	ON	HIGH	<p>▶ ALARM: Output when in alarming.</p> <p>▶ READY: Output when in normal standby state.</p> <p>▶ ORIGIN: Output when homing is completed.</p> <p>▶ INPOS: Turned off when Robot moves. Turned off when the target point is reached.</p> <p>▶ RUN: Output while job is being executed.</p> <p>▶ 7-Segment: - Alarm E alarm code is displayed - Job execution is temporarily stopped. : "P job number" is displayed. - During Job execution: "A step number" is displayed. - During homing: "Org" is displayed.</p>
M1/A1	M0/A0	Axis Setting																						
OFF	OFF	1 axis																						
OFF	ON	2 axes																						
ON	OFF	3 axes																						
ON	ON	4 axes																						
VEL	Velocity or velocity																							
OFF	LOW																							
ON	HIGH																							

3.6.6 Connector Configuration & Circuit Diagram of User I/O

■ USER Input Function and Pin Map

Pin No.	Name	Description
1, 14	-	-
2, 15	-	-
4, 16	IN_COM0	N type: VCC Common for USER INPUT P type: GND Common for USER INPUT <Ref.> Refer to System I/O Circuit Diagram.
17	USER IN 0	System/User Input Contact 0
5	USER IN 1	System/User Input Contact 1
18	USER IN 2	System/User Input Contact 2
6	USER IN 3	System/User Input Contact 3
19	USER IN 4	System/User Input Contact 4
7	USER IN 5	System/User Input Contact 5
20	USER IN 6	System/User Input Contact 6
8	USER IN 7	System/User Input Contact 7
9, 21	IN_COM1	N type: VCC Common for USER INPUT P type: GND Common for USER INPUT <Ref.> Refer to System I/O Circuit Diagram.
22	USER IN 8	System/User Input Contact 8
10	USER IN 9	System/User Input Contact 9
23	USER IN 10	System/User Input Contact 10
11	USER IN 11	System/User Input Contact 11
24	USER IN 12	System/User Input Contact 12
12	USER IN 13	System/User Input Contact 13
25	USER IN 14	System/User Input Contact 14
13	USER IN 15	System/User Input Contact 15

Ref. 1) '-' sign means the unused pin.

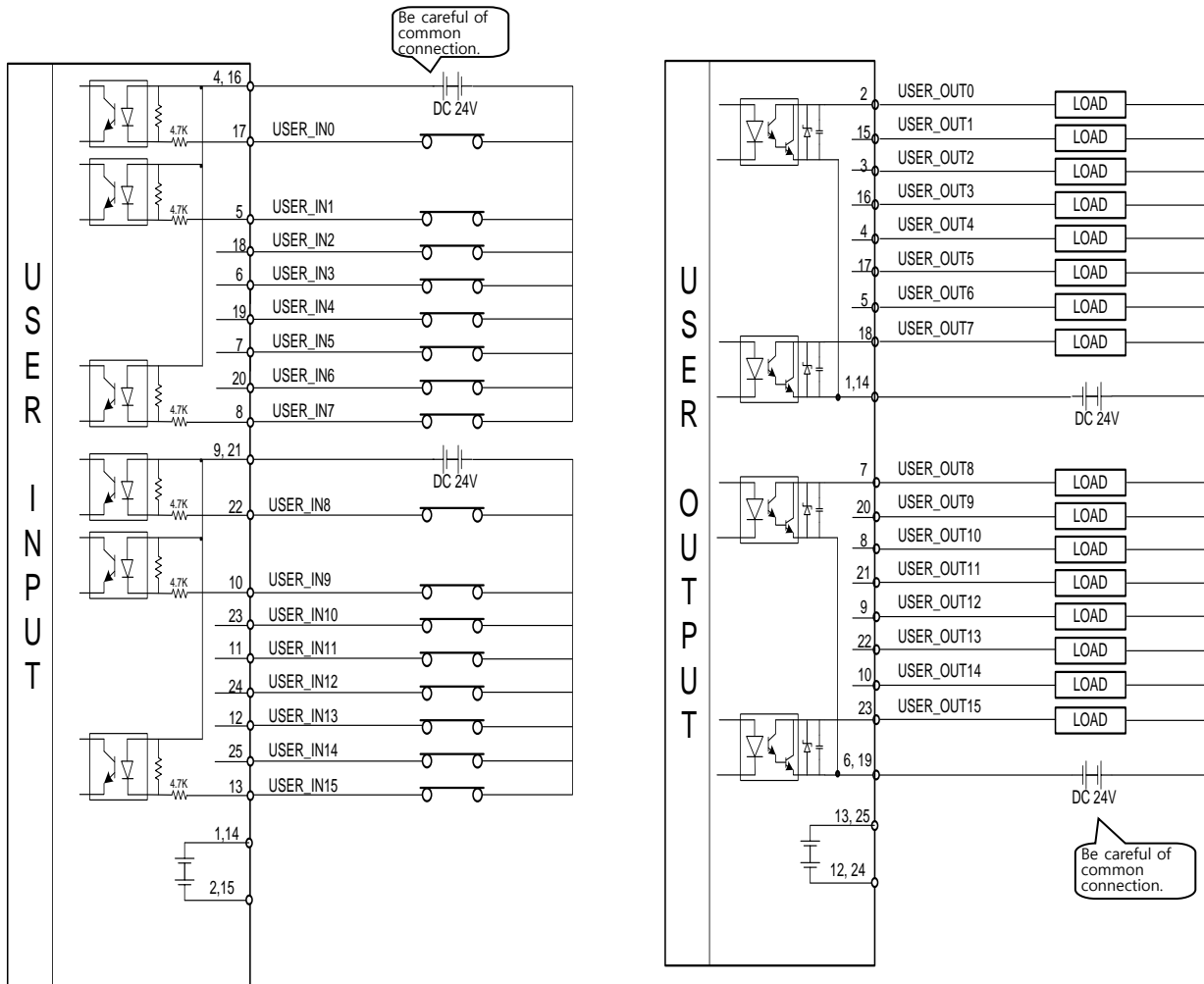
■ **USER Output Functions and Pin Map**

Pin No.	Name	Description
1, 14	OUT_COM0	N type: GND Common for USER Output P type: VCC Common for USER Output <Ref.> Refer to System I/O Circuit Diagram.
2	USER OUT 0	System/User Output Contact 0
15	USER OUT 1	System/User Output Contact 1
3	USER OUT 2	System/User Output Contact 2
16	USER OUT 3	System/User Output Contact 3
4	USER OUT 4	System/User Output Contact 4
17	USER OUT 5	System/User Output Contact 5
5	USER OUT 6	System/User Output Contact 6
18	USER OUT 7	System/User Output Contact 7
6, 19	OUT_COM1	N type: GND Common for USER Output P type: VCC Common for USER Output <Ref.> Refer to System I/O Circuit Diagram.
7	USER OUT 8	System/User Output Contact 8
20	USER OUT 9	System/User Output Contact 9
8	USER OUT 10	System/User Output Contact 10
21	USER OUT 11	System/User Output Contact 11
9	USER OUT 12	System/User Output Contact 12
22	USER OUT 13	System/User Output Contact 13
10	USER OUT 14	System/User Output Contact 14
23	USER OUT 15	System/User Output Contact 15
12, 24	-	-
13, 25	-	-

Ref. 1) '-' sign means the unused pin.

3.6.7 Input/Output Circuit Diagram for USER I/O

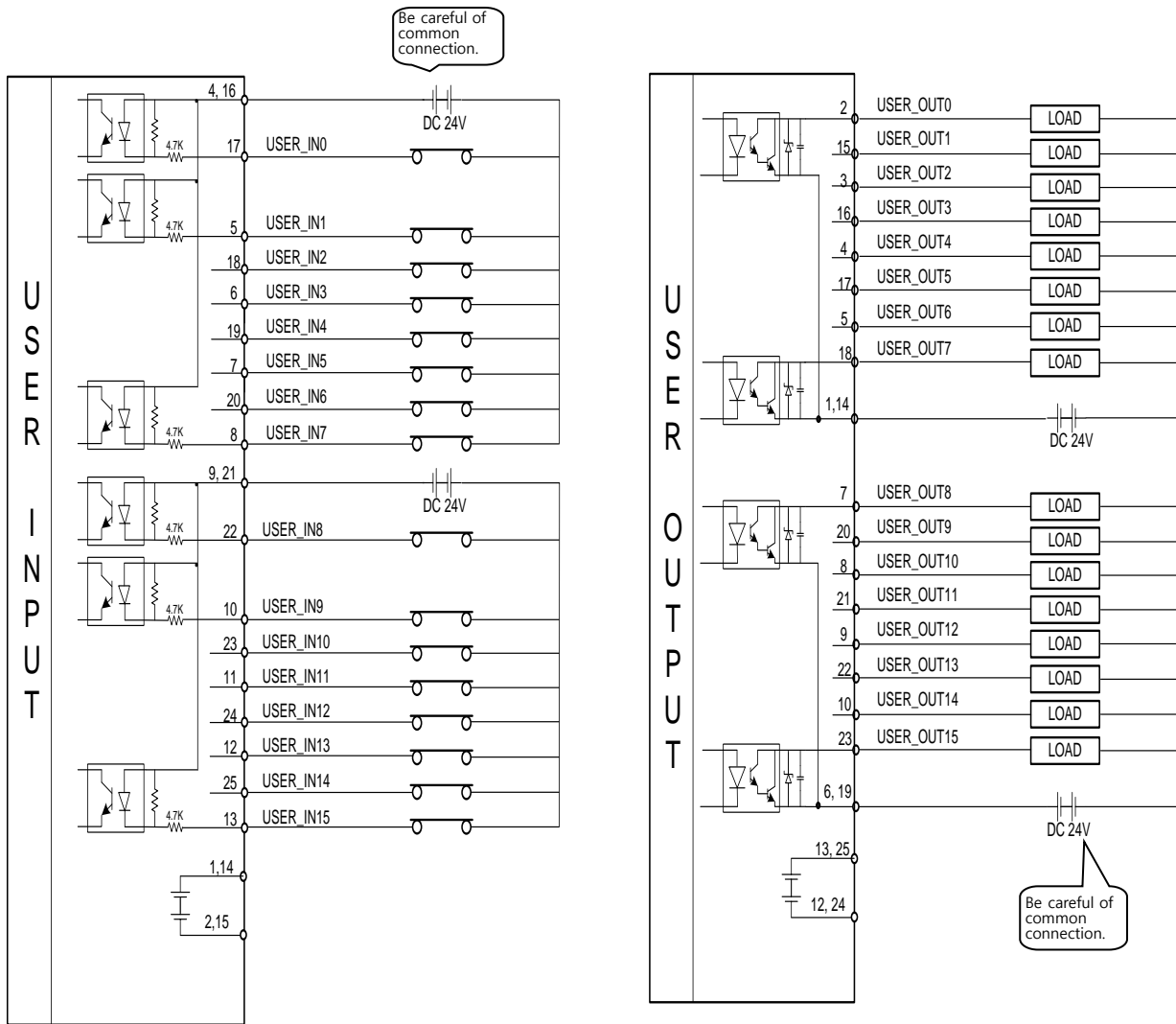
3.6.7.1 N-TYPE USER I/O Circuit Diagram (Input: PCOM, Output: NCOM)




CAUTION

- When wiring the power source, confirm that the connection polarity of DC 24V is correct.
- Mis-wiring may cause the internal parts to be destroyed. Pay special attention to the polarity of the common contacts.
- The external supply voltage has to be DC 24V±10%.
- When soldering connector pins, provide pins with tubes to prevent short-circuit of pins.

3.6.7.2 P-TYPE USER I/O Circuit Diagram (Input: NCOM, Output: PCOM)





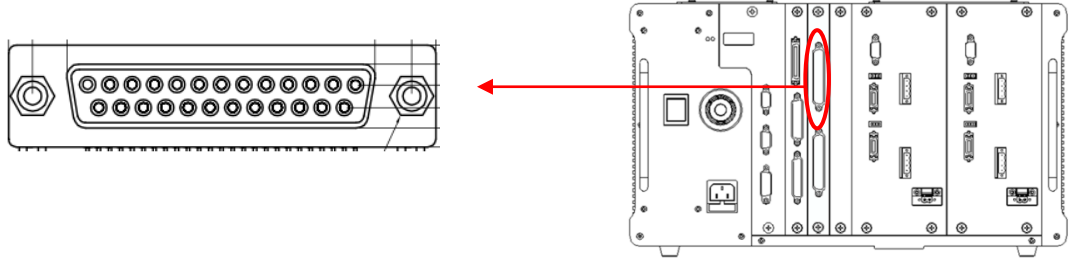
CAUTION

- When wiring the power source, confirm that the connection polarity of DC 24V is correct.
- Mis-wiring may cause the internal parts to be destroyed. Pay special attention to the polarity of the common contacts.
- The external supply voltage has to be DC 24V±10%.
- When soldering connector pins, provide pins with tubes to prevent short-circuit of pins.

3.6.8 Extended USER I/O Interface

■ Input Connector

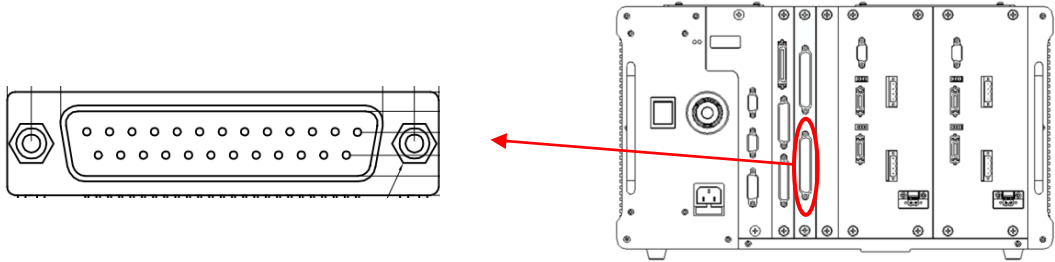
Controller-Side Connector (USER)	DSUB RA 37S
I/O Cable-Side Connector (USER)	DSUB SOLD 37P FB(HOOD)



Ref. 2) Connected 1:1 to the pins of I/O cable-side connector.

■ Output Connector

Controller-Side Connector (USER)	DSUB RA 37P
I/O Cable-Side Connector (USER)	DSUB SOLD 37S FB(HOOD)



Ref. 1) Connected 1:1 to the pins of I/O cable-side connector.



CAUTION

If I/O marking on a controller model name is 'N' (N-TYPE), Input → Positive Common (24V+) and Output → Negative Common (24V-);

If I/O marking on a controller model name is 'P' (P-TYPE), Input → Negative Common (24V-) and Output → Positive Common (24V+)

(Ref.2)

3.6.9 Extended USER I/O Connector Configuration & Circuit Diagram

■ Extended USER Input Functions and Pin Map

PIN NUMBER	Classifications	Description	PIN NUMBER	Classifications	Description
1	FG	FG	20	IN_COM1	N type : VCC Common P type : GND Common <Ref.>I/O Circuit Diagram Ref.
2	USER IN 16	Extended User Input Contact 16	21	USER IN 17	Extended User Input Contact 17
3	USER IN 18	Extended User Input Contact 18	22	USER IN 19	Extended User Input Contact 19
4	USER IN 20	Extended User Input Contact 20	23	USER IN 21	Extended User Input Contact 21
5	USER IN 22	Extended User Input Contact 22	24	USER IN 23	Extended User Input Contact 23
6	IN_COM2	N type : VCC Common P type : GND Common <Ref.>I/O Circuit Diagram Ref.	25	USER IN 24	Extended User Input Contact 24
7	USER IN 25	Extended User Input Contact 25	26	USER IN 26	Extended User Input Contact 26
8	USER IN 27	Extended User Input Contact 27	27	USER IN 28	Extended User Input Contact 28
9	USER IN 29	Extended User Input Contact 29	28	USER IN 30	Extended User Input Contact 30
10	USER IN 31	Extended User Input Contact 31	29	IN_COM3	N type : VCC Common P type : GND Common <Ref.>I/O Circuit Diagram Ref.
11	USER IN 32	Extended User Input Contact 32	30	USER IN 33	Extended User Input Contact 33
12	USER IN 34	Extended User Input Contact 34	31	USER IN 35	Extended User Input Contact 35
13	USER IN 36	Extended User Input Contact 36	32	USER IN 37	Extended User Input Contact 37
14	USER IN 38	Extended User Input Contact 38	33	USER IN 39	Extended User Input Contact 39
15	IN_COM4	N type : VCC Common P type : GND Common <Ref.>I/O Circuit Diagram Ref.	34	USER IN 40	Extended User Input Contact 40
16	USER IN 41	Extended User Input Contact 41	35	USER IN 42	Extended User Input Contact 42
17	USER IN 43	Extended User Input Contact 43	36	USER IN 44	Extended User Input Contact 44
18	USER IN 45	Extended User Input Contact 45	37	USER IN 46	Extended User Input Contact 46
19	USER IN 47	Extended User Input Contact 47			

Ref. 1) '-' sign means the unused pin.

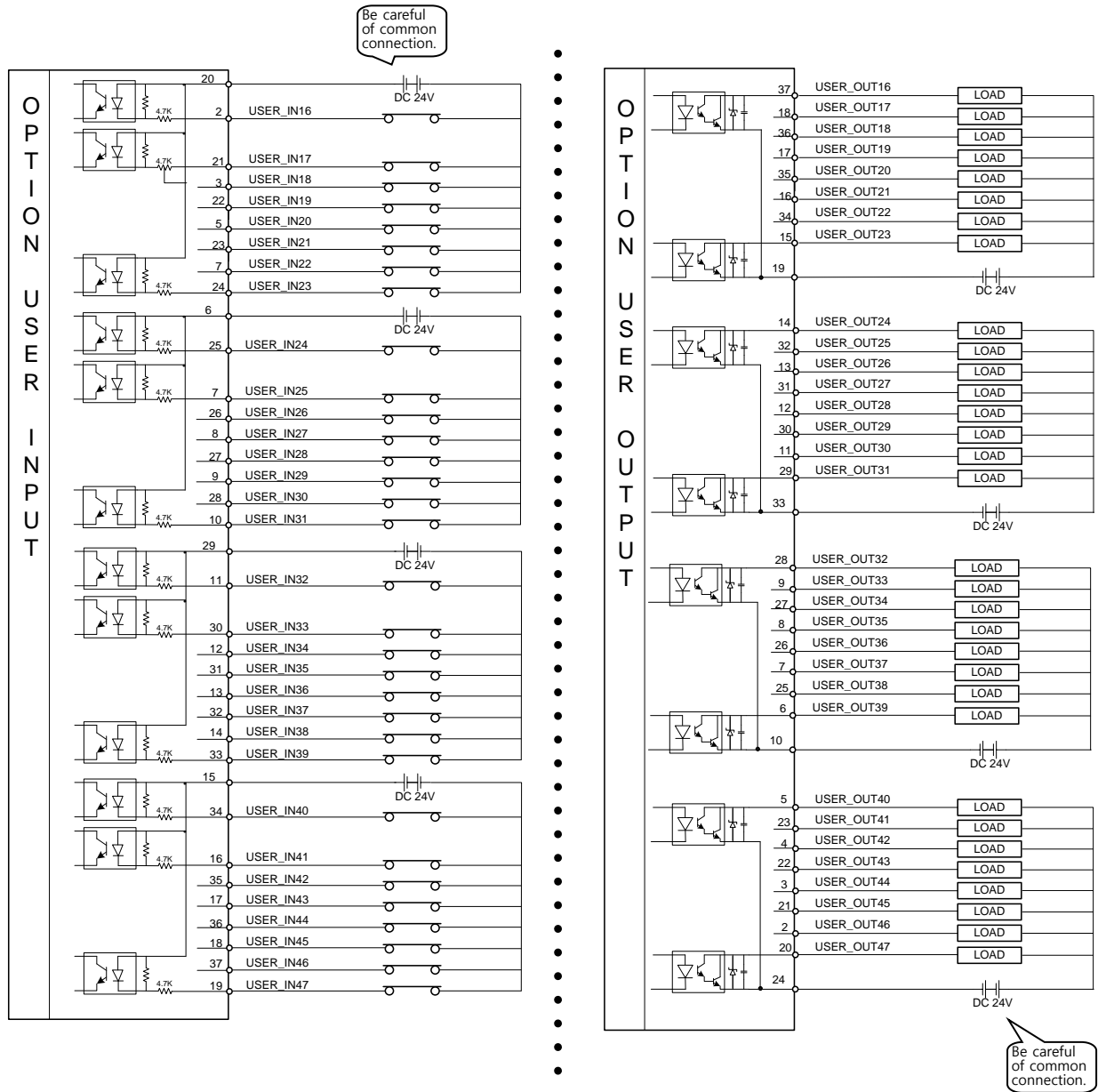
■ Extended USER Output Functions and Pin Map

PIN NUMBER	구분	설명	PIN NUMBER	구분	설명
1	FG	FG	20	USER OUT 47	Extended User Output Contact 47
2	USER OUT 46	Extended User Output Contact 46	21	USER OUT 45	Extended User Output Contact 45
3	USER OUT 44	Extended User Output Contact 44	22	USER OUT 43	Extended User Output Contact 43
4	USER OUT 42	Extended User Output Contact 42	23	USER OUT 41	Extended User Output Contact 41
5	USER OUT 40	Extended User Output Contact 40	24	IN_COM3	N type : GND Common P type : VCC Common <Ref.> Refer to I/O Circuit Diagram.
6	USER OUT 39	Extended User Output Contact 39	25	USER OUT 38	Extended User Output Contact 38
7	USER OUT 37	Extended User Output Contact 37	26	USER OUT 36	Extended User Output Contact 36
8	USER OUT 35	Extended User Output Contact 35	27	USER OUT 34	Extended User Output Contact 34
9	USER OUT 33	Extended User Output Contact 33	28	USER OUT 32	Extended User Output Contact 32
10	OUT_COM2	N type : GND Common P type : VCC Common <Ref.> Refer to I/O Circuit Diagram.	29	USER OUT 31	Extended User Output Contact 31
11	USER OUT 30	Extended User Output Contact 30	30	USER OUT 29	Extended User Output Contact 29
12	USER OUT 28	Extended User Output Contact 28	31	USER OUT 27	Extended User Output Contact 27
13	USER OUT 26	Extended User Output Contact 26	32	USER OUT 25	Extended User Output Contact 25
14	USER OUT 24	Extended User Output Contact 24	33	OUT_COM1	N type : GND Common P type : VCC Common <Ref.> Refer to I/O Circuit Diagram.
15	USER OUT 23	Extended User Output Contact 23	34	USER OUT 22	Extended User Output Contact 22
16	USER OUT 21	Extended User Output Contact 21	35	USER OUT 20	Extended User Output Contact 20
17	USER OUT 19	Extended User Output Contact 19	36	USER OUT 18	Extended User Output Contact 18
18	USER OUT 17	Extended User Output Contact 17	37	USER OUT 16	Extended User Output Contact 16
19	OUT_COM0	N type : GND Common P type : VCC Common <Ref.> Refer to I/O Circuit Diagram.			

■ Ref. 1) '-' sign means the unused pin.

3.6.10 Extended USER I/O Circuit Diagram

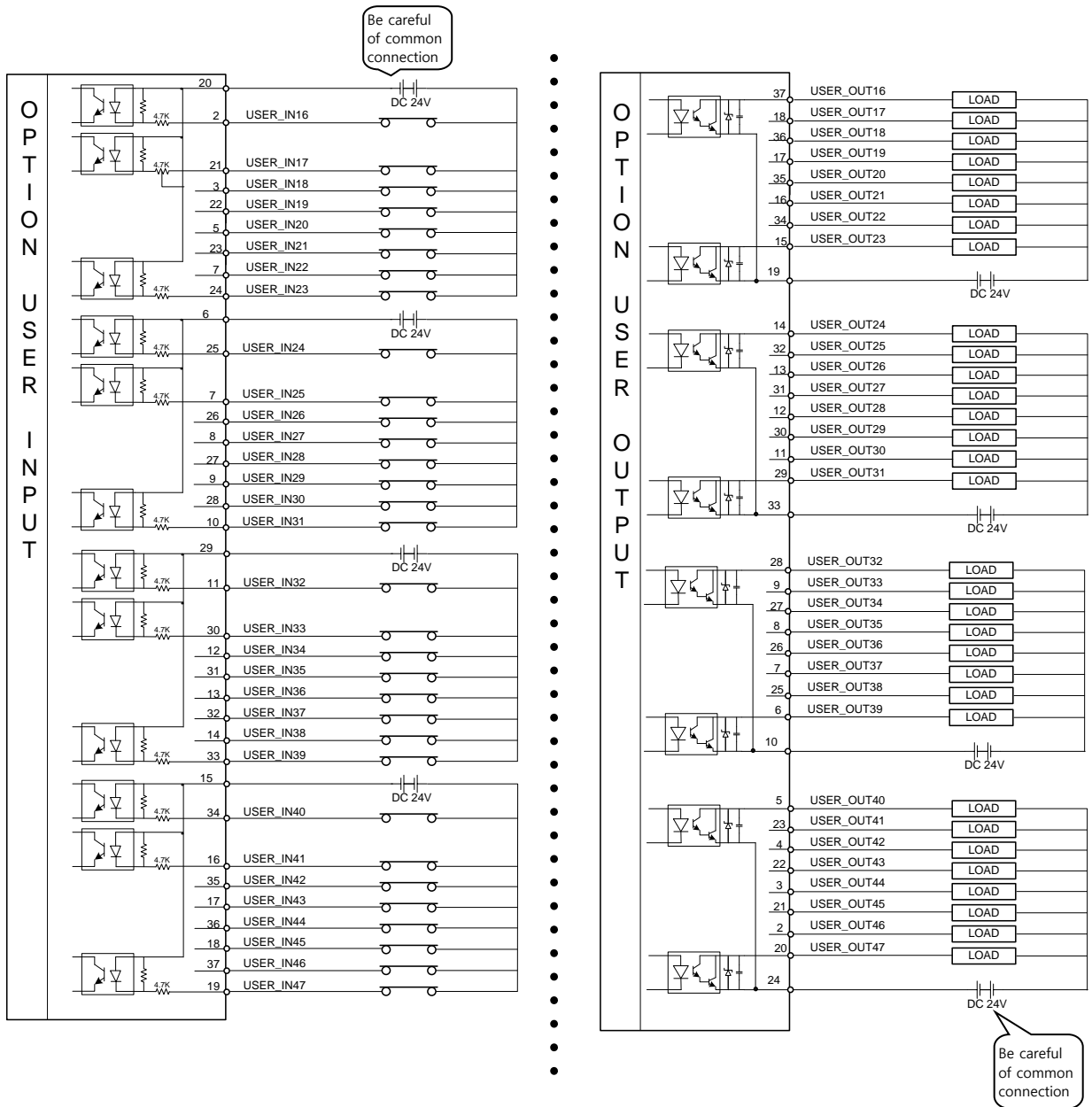
3.6.10.1 N-TYPE Extended USER I/O Circuit Diagram (Input: PCOM, Output: NCOM)




CAUTION

- When wiring the power source, confirm that the connection polarity of DC 24V is correct.
- Mis-wiring may cause the internal parts to be destroyed. Pay special attention to the polarity of the common contacts.
- The external supply voltage has to be DC 24V±10%.
- When soldering connector pins, provide pins with tubes to prevent short-circuit of pins.

3.6.10.2 P-TYPE Extended USER I/O Circuit Diagram (Input: NCOM, Output: PCOM)





CAUTION

- When wiring the power source, confirm that the connection polarity of DC 24V is correct.
- Mis-wiring may cause the internal parts to be destroyed. Pay special attention to the polarity of the common contacts.
- The external supply voltage has to be DC 24V±10%.
- When soldering connector pins, provide pins with tubes to prevent short-circuit of pins.

3.6.11 I/O Connection Checking

■ I/O Screen Menu Checking

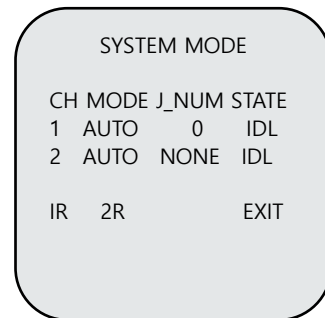
Step 1.



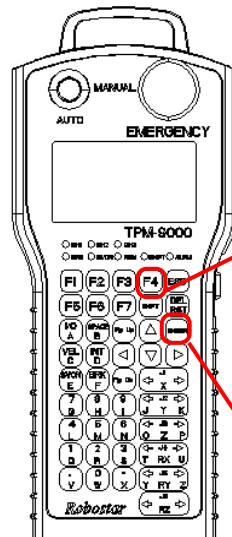
Power source is provided.

(If the error occurs, settle it according to the error codes.)

Screen

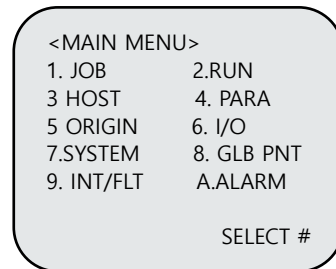
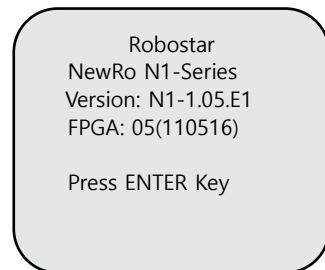


Step 2.



Press 「F4」 (to escape from System Mode) and then 「Enter」.

Screen

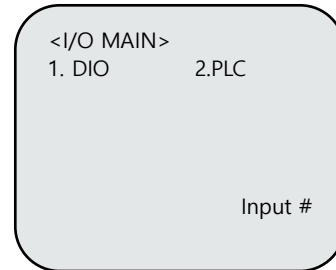


Step 3.



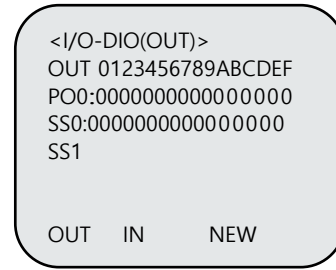
Press 「6」. Then, User Output Contact Monitor Screen appears.

①
6
N

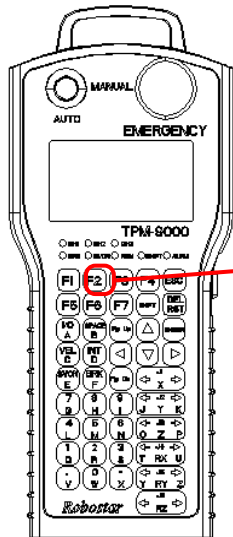


②
1
Q

System Output Contact Monitor



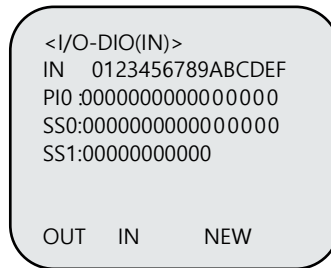
Step 4.



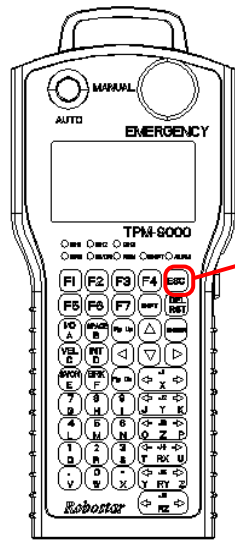
Press 「F2」. Then, User Input Contact Monitor Screen appears.

①
F2

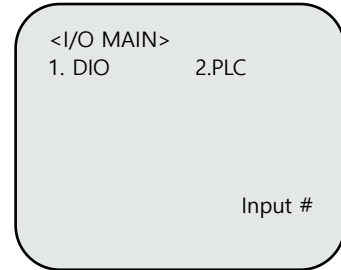
User Input Contact Monitor



Step 5.



If 「ESC」 is pressed, a higher level menu screen appears.



■ User Output Contact Monitoring & Checking

User Output Monitor Screen

```
</I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000000000000000
SS0:0000000000000000
SS1

OUT IN NEW
```

OUT: Status of Output Screen

0: Signal OFF

1: Signal ON

0 to F: Output Contact No. is displayed

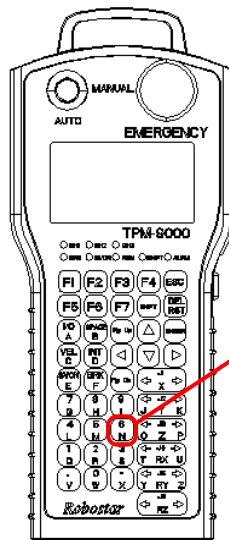
PO0: User Output 0 to 15 is displayed.

SS0: System Output 0 to 15 is displayed.

SS1: System Output 16 to 31 is displayed.

Example 1 of
Checking
User Output Contact

In the case OUT6 is
ON(=1)/OFF(=0),



6
N

User Output Contact Monitor

```
</I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000000000000000
SS0:0000000000000000
SS1

OUT IN NEW
```

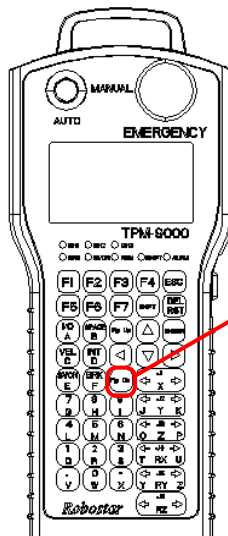


```
</I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000001000000000
SS0:0000000000000000
SS1

OUT IN NEW
```

Example 2 of
Checking
User Output Contact

If SS0 is intended to
be ON(=1)/OFF(=0),
first move a cursor (:)
PO0:→SS0: by
using 「PgDn」 key.



PgDn

User Output Contact Monitor

```
</I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000000000000000
SS0:0000000000000000
SS1

OUT IN NEW
```



```
</I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000000000000000
SS0:0000000000000000
SS1

OUT IN NEW
```

■ System Output Contact Monitoring & Checking

System Output Monitor Screen

```
<I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000000000000000
SS0:0000000000000000
SS1

OUT IN NEW
```

Screen Display No.	System Output Name	Screen Display No.	System Output Name
0	CH DISPLAY	6	SERVO ON #1
1	ALL ALARM	7	READY #2
2	READY #1	8	ORG OK #2
3	ORG OK #1	A	RUNNING #2
4	RUNNING #1	B	INPOS/INRNG #2
5	INPOS/INRNG #1	C	SERVO ON #2

Ref. 1) For the omitted system output, refer to '3.3.5.2 System Output Functions'. (Ref. 1)

Example of Checking System Output Contact

On a user output contact monitor screen, press 「PgDn」 key to change the screen to the system output contact monitor screen.



Check 'READY' Output of No.1 Robot.

```
<I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000000000000000
SS0:0010000000000000
SS1

OUT IN NEW
```

Check 'ORG_OK1' Output of No.1

```
<I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000000000000000
SS0:0001000000000000
SS1

OUT IN NEW
```

Check 'RUN1' Output of No.1 Robot.

```
<I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000000000000000
SS0:0001000000000000
SS1

OUT IN NEW
```

Check 'ALR1' Output of No.1 Robot.

```
<I/O-DIO(OUT)>
OUT 0123456789ABCDEF
PO0:0000000000000000
SS0:0100000000000000
SS1

OUT IN NEW
```


■ User Input Contact Monitoring & Checking

User Input Monitor Screen

```
<I/O-DIO(IN)>
IN 0123456789ABCDEF
PI0 :0000000000000000
SS0:0000000000000000
SS1:000000000000

OUT IN NEW
```

IN: Status of Input Screen
0: Signal OFF
1: Signal ON
0 to F: Output Contact No. is displayed.
PO0: User Input 0 to 15 is displayed.
SS0: System Input 0 to 15 is displayed.
SS1: System Input 16 to 31 is displayed.

Example of
 Checking
 User Input
 Contact

On a user output
 contact monitor
 screen, press
 「F2」 key
 to change the
 screen to
 the user input
 contact monitor
 screen.



F2

When Signal is Input to 'IN0':
 User Input Contact Monitor

```
<I/O-DIO(IN)>
IN 0123456789ABCDEF
PI0 :0000000000000000
SS0:0000000000000000
SS1:000000000000

OUT IN NEW
```



```
<I/O-DIO(IN)>
IN 0123456789ABCDEF
PI0 :0000000000000000
SS0:1000000000000000
SS1:000000000000

OUT IN NEW
```

■ System Input Contact Monitoring & Checking

System Input Monitor Screen

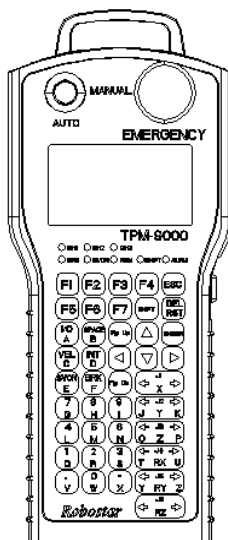
```

<I/O-DIO(IN)>
IN 0123456789ABCDEF
PIO : 0000000000000000
SSO: 0000000000000000
SS1: 000000000000
OUT IN NEW
  
```

Screen Display No.	System Output Name	Screen Display No.	System Output Name
0	CH SEL	E	ORG #1
1	PROG0	F	START #1
2	PROG1	0	STOP1
3	PROG2	1	INT_REQ #0
4	PROG3	2	SERVO ON #1
5	PROG4	3	ORG #2
6	PSEL	4	START2
7	MODE 0/AXIS 0	5	STOP2
8	MODE 1/AXIS 1	6	INT_REQ #1
9	MODE SEL	7	SERVO ON #2
A	VEL	8	
B	VEL +/MOV +	9	
C	VEL1 -/MOV -	9	
D	REBOOT	A	

Example of Checking System Input Contact

On a user input contact monitor screen, press 「PgDn」 key to change the screen to the system input contact monitor screen.



```

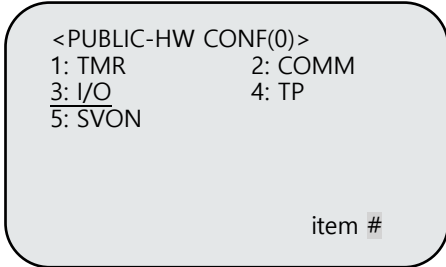
<I/O-DIO(IN)>
IN 0123456789ABCDEF
PIO : 0000000000000000
SSO: 0100000000000000
SS1: 000000000000
OUT IN NEW
  
```

■ I/O --- Setting the Number of Extended I/O Board

1. Setting Sequence

Step 1.

I/O Screen is Moved

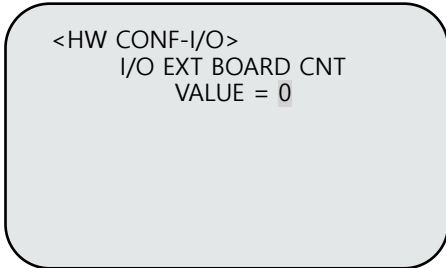


OPEN HW CONF(0) screen.
Select 3: I/O.



Step 2.

DIO Setting Screen



Set I/O Extended Board.

▶ How to change and store the set values (using numeral keys) Ref.)

■ Comment

▷ For N1 controller, each I/O card can be used for 3 slots, respectively.

Basically N1-SYS I/O is used for the first slot, and optionally User Extended I/O is used for the remaining 2 slots.

	Set Value	Description
VALUE	0	Basic I/O (System I/O (24/12) + User I/O (16/16))
	1	Basic I/O + Option I/O (32/32)
	2	Basic I/O + Option I/O (64/64)

Important

▶ N1-SYS I/O is supported by only the first slot.

■ **Extended Output Monitoring**

The number of DIO Port may vary as the digital board settings.

▶ **User(USER) Output Screen**

```
<DIO(OUT)>
OUT 0123456789ABCDEF
PO1:1111111111111111
PO2:0000000000000000
PO3:0000000000000000
PO4:0000000000000000
OUT IN NEW
```

OUT: Status of Output Screen

0 : Signal OFF

1 : Signal ON

0 to F: Output Contact No. is displayed.

PO#: User Output Port Number (0 to 19).

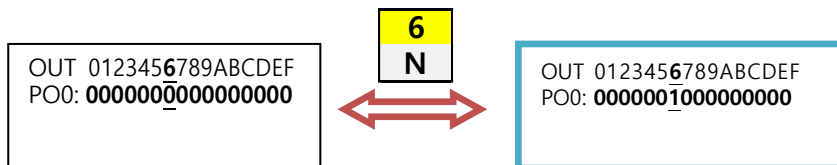
SS#: System Output Port Number (0 to 1). For the information on the assigned pins, refer to SYSIO Input Parameter Menu.

▶ **System(SYSTEM) Output Contact Screen**

```
<DIO(OUT)>
OUT 0123456789ABCDEF
PO2:0000000000000000
PO3:0000000000000000
PO4:0000000000000000
SS0:11000011110001110
SS1:0000
OUT IN NEW
```

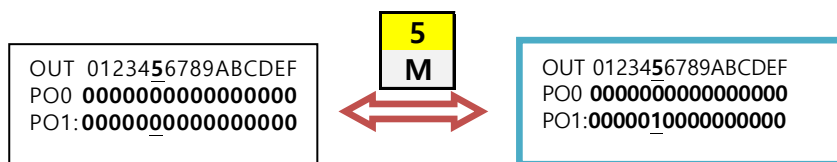
▶ **How to turn on User(USER) Output Contact Signal**

E.g.) When OUT6 is intended to be ON(=1)/OFF(=0),



E.g.) If OUT20 is intended to be ON(=1)/OFF(=0),

first move a cursor (:): USR: → OP0: by using PgDn key.



■ Extended Input Monitoring

▶ **User(USER) Input Screen**

```
<DIO(IN)>
IN   0 1 2 3 4 5 6 7 8 9 A B C D E F
PI0 : 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
PI1 : 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
PI2 : 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
PI3 : 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
PI4 : 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
OUT  IN  NEW
```

IN: Status of DIO Input Screen

0 : Signal OFF

1 : Signal ON

0 to F: Input Contact No. is displayed.

PI#: User Input Port Numbers (0 to 19)

SS#: System Input Port Numbers (0 to 1). For the information on the assigned pins, refer to SYSIO Input Parameter Menu.

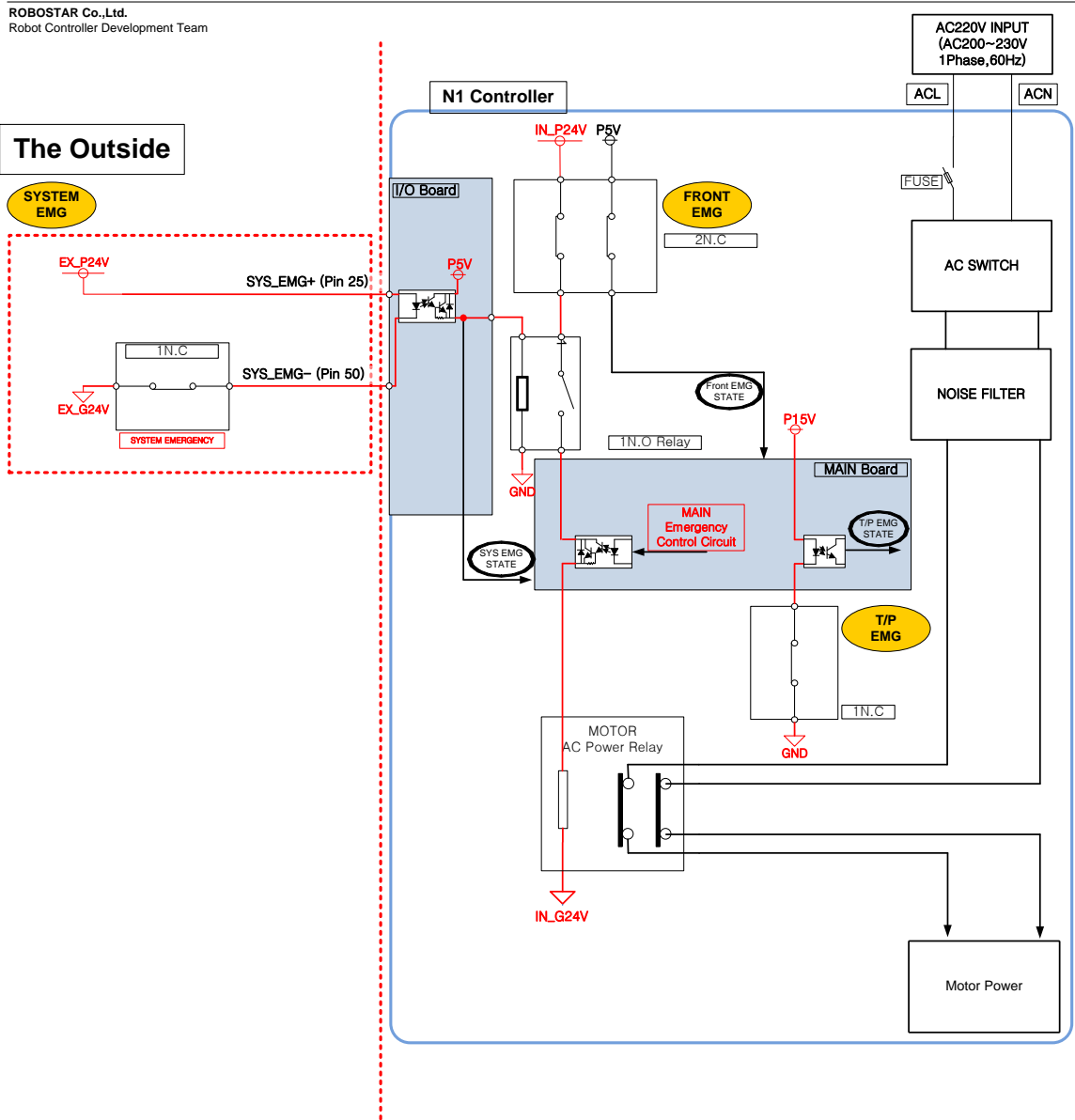
▶ **System(SYSTEM) Input Contact Screen**

```
<DIO(IN)>
IN   0 1 2 3 4 5 6 7 8 9 A B C D E F
PI2 : 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
PI3 : 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
PI4 : 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
SS0 : 1 1 0 0 0 0 1 1 1 0 0 0 1 1 1 0
SS1 : 0 0 0 0
OUT  IN  NEW
```

3.7 Emergency Stop Circuit Wiring

N1 Emergency Block Diagram

Unauthorized duplication prohibited.



CAUTION

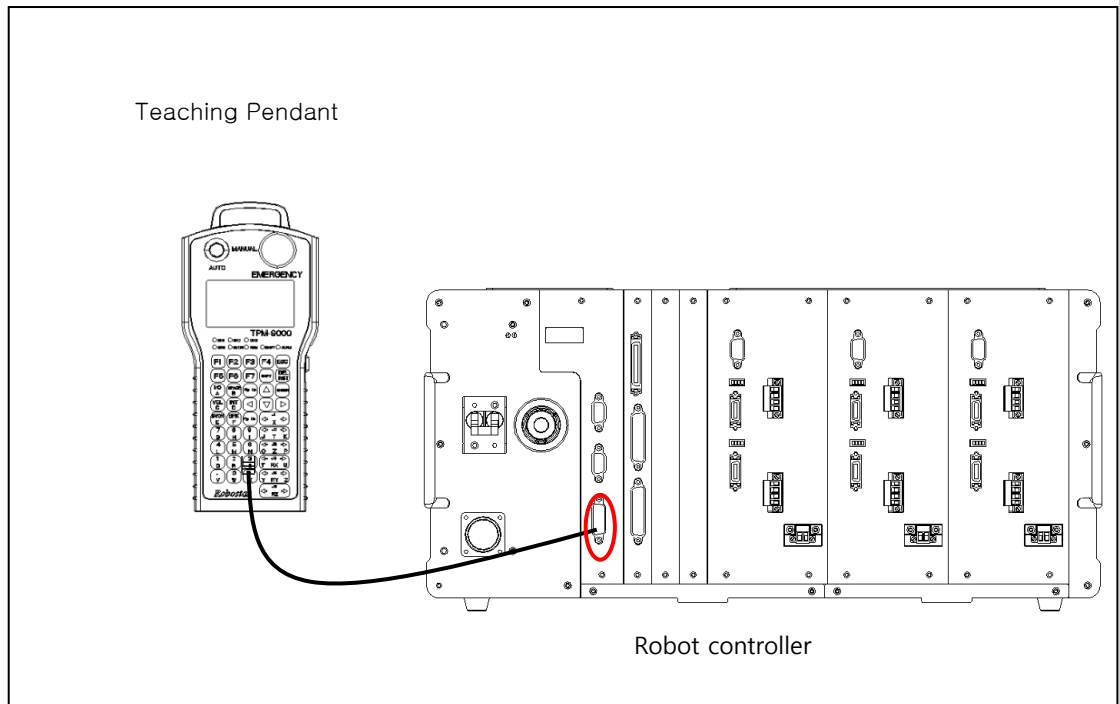
- Emergency circuit is composed of 'T/P Emergency', 'Front Emergency', and 'System Emergency'. To the pins of 'System Emergency' (SYS_EMG+, SYS_EMG-), 24V power supply is to be connected. If not, 'System Emergency Alarm' is generated.
- Since, if Teaching Pendant is not connected to the circuit, 'T/P Emergency Alarm' is generated, be sure to have the teaching pendant be connected to the circuit or to connect to it Teaching Pendant Dummy Connector supplied by Robostar.

Chapter 4 About Teaching Pendant

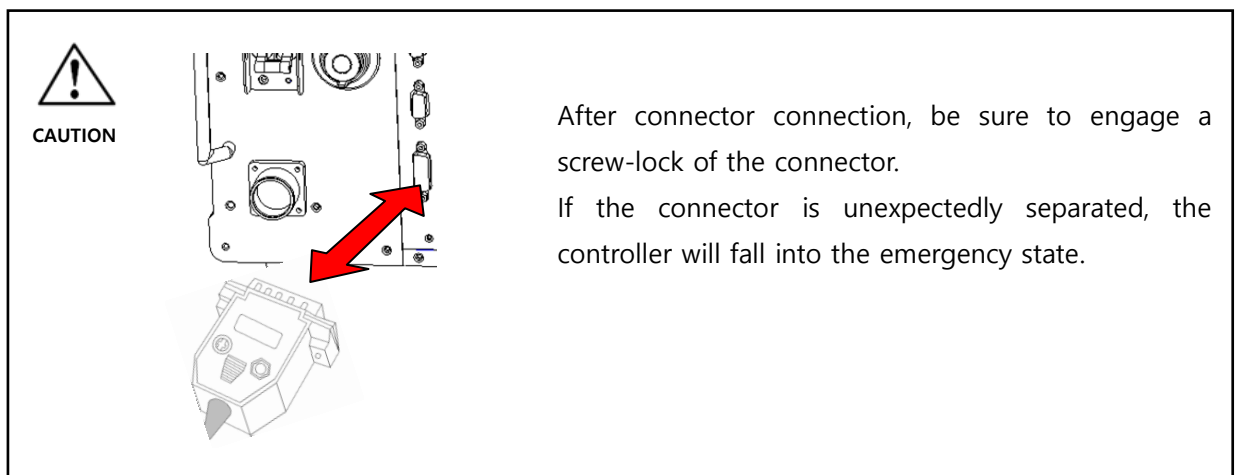
4.1 Connection of Teaching Pendant

4.1.1 Connection to controller

As shown below, connect T/P connector of the robot controller to the teaching pendant.

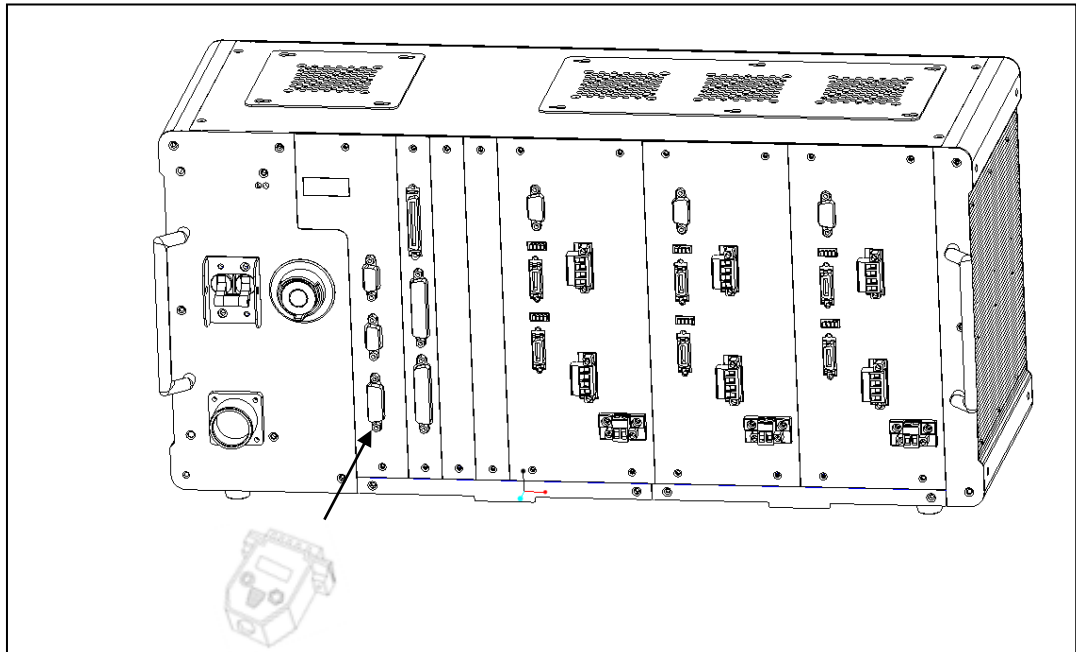


<Figure 4.1.2> Connection of Teaching Pendant

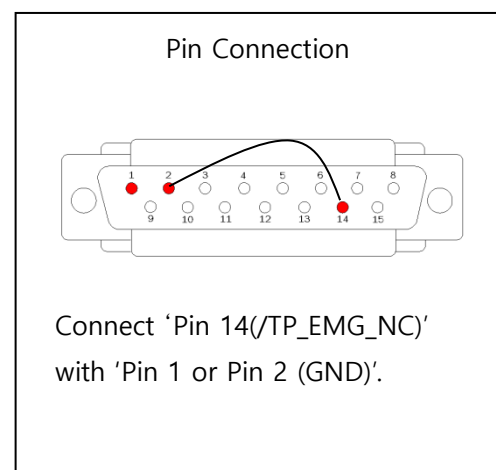
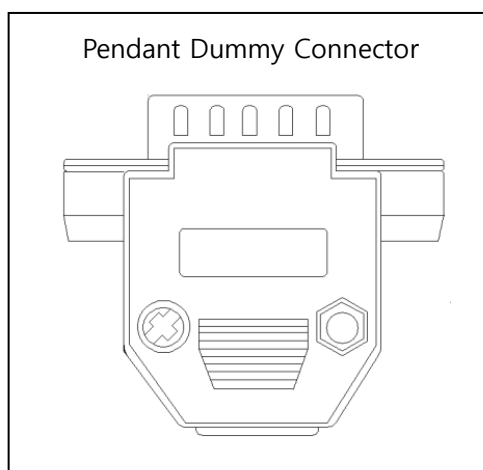


4.1.2 Using Controller without Teaching Pendant

If, after teaching has been done, you want to disconnect the teaching pendant or an operating panel from the robot controller, instead connect a connector which does not have 'Pendant Dummy Connector' to it. In order to operate the robot without using the teaching pendant, an I/O control signal must be received from the external device.



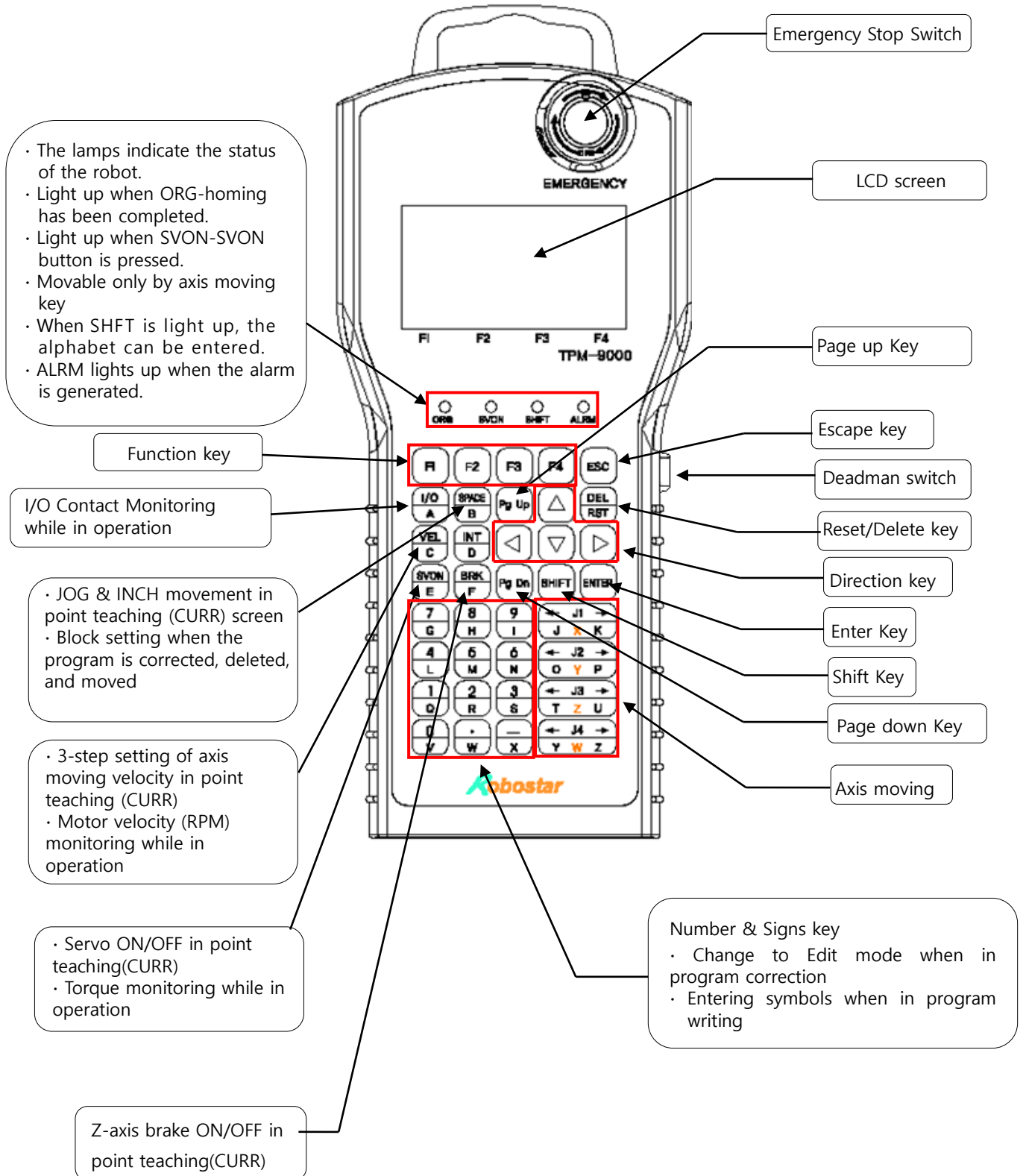
<<Using Connector without Pendant>>



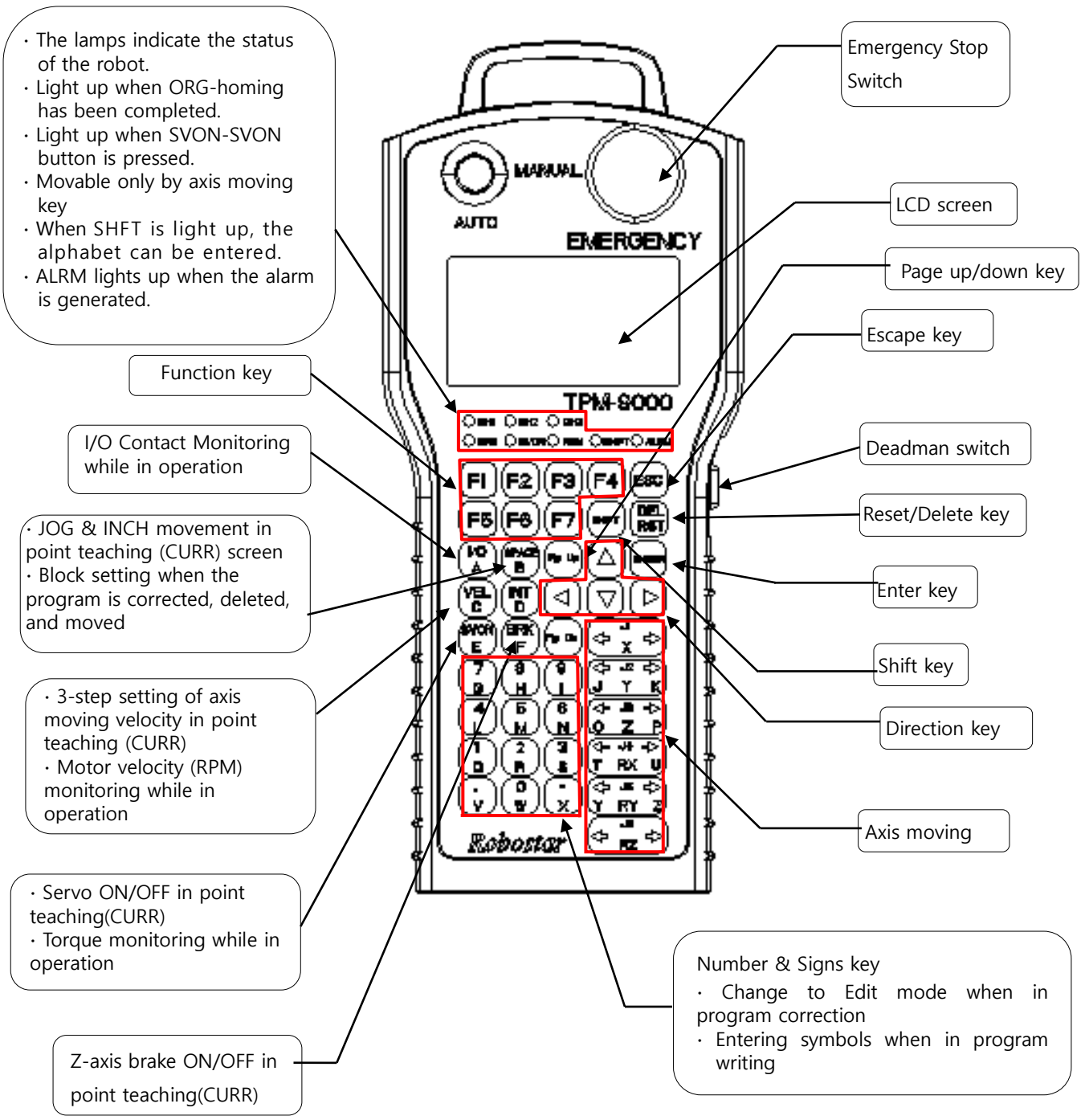
4.2 Exterior Appearance & Manipulation Method

4.2.1 Exterior Appearance & manipulation keys

■ Teach Pendant for 4-Axis Controller

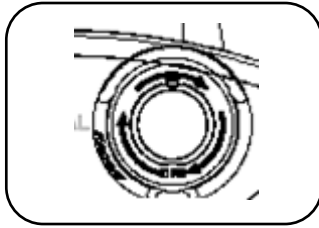


■ Teach Pendant for 6-Axis Controller



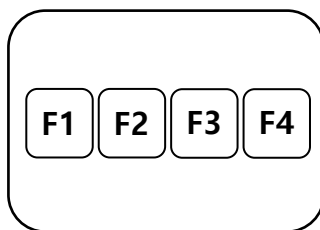
4.2.2 Function of Manipulation Keys

1) Emergency Stop Switch



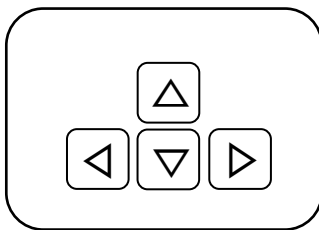
- ▶ In emergency situation, the robot operation is stopped.
- ▶ Power source for a motor is shut down.

2) Function Key



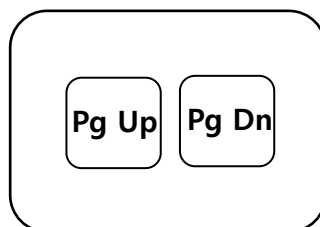
- ▶ Menus on a screen(LCD) are selected.
- ▶ A menu is changed according to a mode. For menu selection and its function, refer to 'Program Manual'.

3) Direction Key



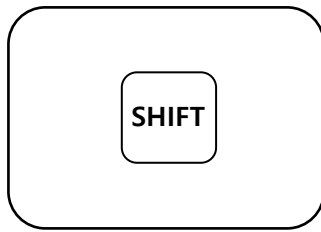
- ▶ A cursor on a screen is moved in the direction of arrow. .
- ▶ How to use the direction key depends on a mode. E.g.) When to write a robot program in JOB mode,
- ▶ Only four commands can be displayed on 1 screen and so, if the direction key is used when more than 4 commands are necessary, other commands can be shown.

4) Page Up/Down Key



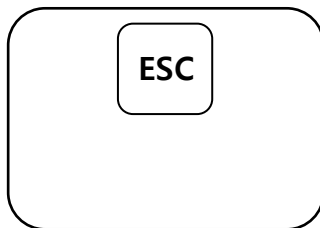
- ▶ A cursor can be moved on a basis of screen.
- ▶ 'Pg Up' key moves up a screen, and 'Pg Dn' key moves down a screen. If these keys are used in point teaching, the point number can be increased or decreased.

5) Shift Key



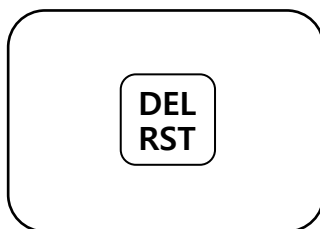
- ▶ This key enables 1 key to perform 2 functions.
- ▶ If this key is pressed, LED at the upper right of the teaching pendant lights up.
 - When in lit state → The bottom function of the key is executed. (E.g., entering Alphabet)
 - When in turned off state → The upper function of the key is executed.

7) Escape Key



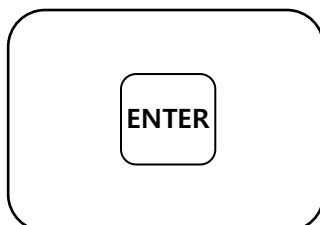
- ▶ Used to escape from the state displayed on LCD screen to the previous state or mode.

8) Reset/Delete Key



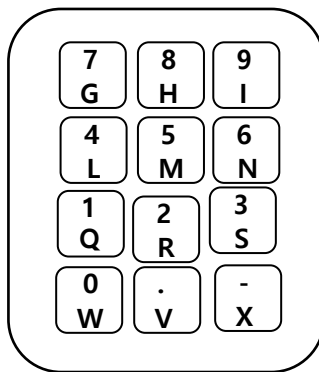
- ▶ RST – Reset the alarmed state.
- ▶ DEL – Delete the wrong used letter, number, and commands.

9) Enter Key



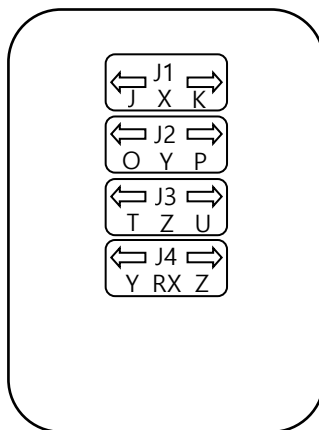
- ▶ Used to input the desired data.
- ▶ Usage is dependent on a mode.
 - E.g.) Parameter mode → The sign changes whenever this key is pressed.
 - JOB mode → This key is used to input the command when writing a program.

10) Number & Sign Key



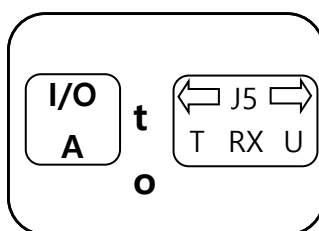
- ▶ Used to enter the numerals.
- ▶ Used to select a mode or for MDI teaching, in which this key is used to enter the numerals among the command.
- ▶ When 16-ary number is used in commands or when the output contact is checked, numerals 0 to F are used.

11) Axis Moving Key



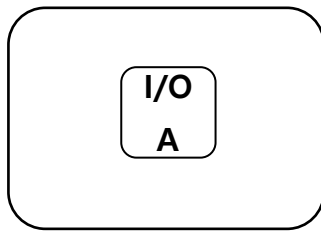
- ▶ Used to move each axis of the robot.
- ▶ When these keys are pressed in an initial menu screen or on a point teaching (CURR) screen, the axis moves in the direction of the arrow.
- ▶ JOG movement and INCH movement can be performed.

12) Character Key

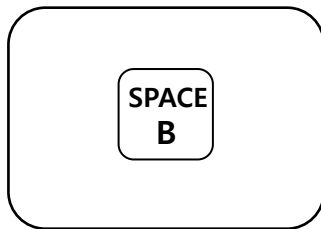


- ▶ Used to enter the characters.
- ▶ Used to type JOB name, or to enter variable name, label name, sub-execution sentence name in commands.

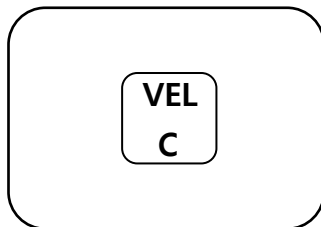
13) Special Function Key



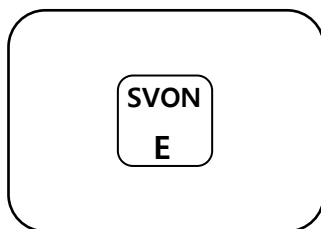
- ▶ On a point teaching (CURR) screen, I/O (In/Out) state can be seen.
- ▶ While in operation, I/O and internal contact is monitored.



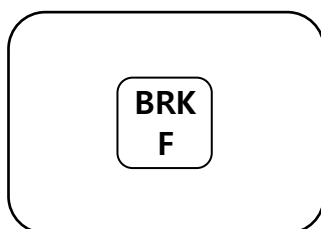
- ▶ Block setting function when the program is corrected, deleted, and moved.
- ▶ On a point teaching (CURR) screen, JOG movement and INCH movement are selected.



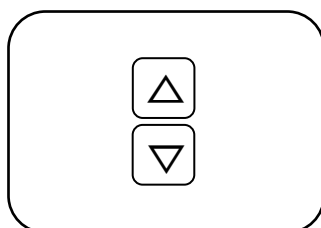
- ▶ On a point teaching (CURR) screen, the velocity of the axis moving key is set up in 3 steps.
- ▶ In INCH movement, the moving distance is set up, and in point checking (Forward), the moving velocity is set up.



- ▶ While in operation, the velocity (RPM) of a motor of each axis is checked.
- ▶ On a point teaching (CURR) screen, Servo ON/OFF can be done. .



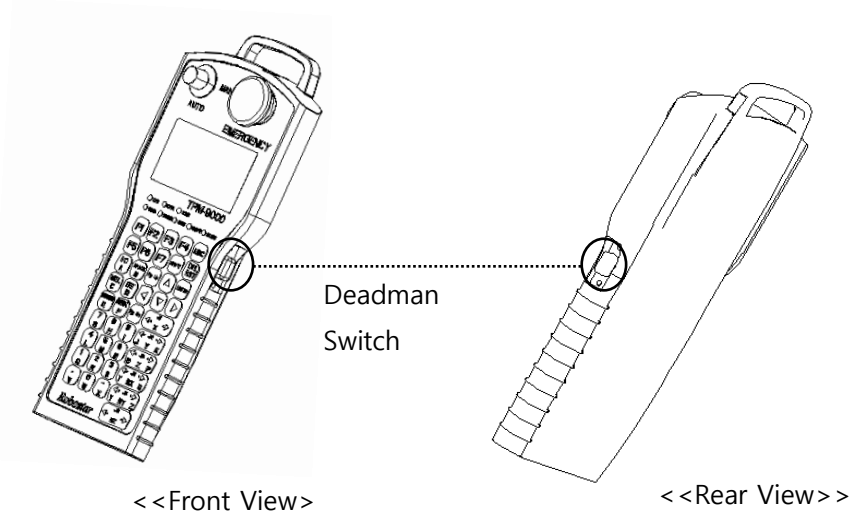
- ▶ On a point teaching (CURR) screen, the brake of each axis can be turned on/off.



- ▶ While in operation (RUN mode), robot moving velocity is increased.
- ▶ While in operation (RUN mode), robot moving velocity is decreased.

4.2.3 Deadman Switch

When performing teaching using a teaching pendant, press the following shown part and then operate the robot.




Deadman Switch is used to automatically, safely stop the robot, when the robot cannot normally operate due to the unexpected situations, such as power failure, full discharge, or other emergency situation, during a manual mode (Jog mode) of robot operation based on the teaching pendant. If such situation occurs, a user can stop the robot operation by changing the pressure pressing the deadman switch.

Deadman Switch has the following three behavior conditions.

Pressing Strength	Switch State	Robot Operation
When the switch is not pressed, or weakly pressed	OFF	X
When the moderate pressure is loaded on the switch	ON	O
When too strong pressure is loaded on the switch	OFF	X

If the Deadman Switch is turned OFF, the robot does not operate or stops while in operation.

 CAUTION	To use such deadman function, T/P of System Parameter is to be set to DEADMAN S/W to enable the function.
---	---

Chapter 5 Controller Alarm Code Table

5.1 File System Alarms

File System Alarms			
Code Num	T/P DISPLAY	Description	Alarm clearing
E1001	File System Error	Damaged file system	RESET
E1002	Directory Full	File directory is full	RESET
E1003	Out of Memory	Insufficient memory for execution of Job	RESET
E1004	Same File Name Ext	There are different Jobs having the same name	RESET
E1005	Bad File	Damaged file system	RESET
E1006	Disk Full	Insufficient space for storage of Job	RESET
E1007	PROG Delete Error	Job file does not exist	RESET
E1008	POINT Delete Error	PNT file does not exist	RESET
E1009	PROG Copy Error	Job file cannot be copied	RESET
E1010	POINT Copy Error	PNT file cannot be copied	RESET
E1013	There Is No Job	Job file does not exist or damaged	RESET
E1018	Para Load Fail	Parameter structure damaged	RESET
E1019	Bad Parameter Data	Parameter value damaged	RESET
E1020	STR buff overflow	300 or more character variables and character constants are used for each channel	RESET
E1021	Line buff overflow	The length of text string of character variable and character constant exceeds 100 letters	RESET

5.2 Protective Alarms

Protective Alarms			
Code Num	T/P DISPLAY	Description	Alarm clearing
E1101	S/W Limit	Deviation from the operation range of the robot parameter (Range)	RESET
E1102	Inpos. Error	A motor does not stop within the regular time	RESET
E1103	H/W Limit	H/W limit sensor signal is detected	RESET
E1104	Servo Not Ready	Servo ON is actuated when a servo module has not been yet initialized.	RESET
E1105	Torque Limit	While TRQ command is used, the setup value is higher than the actual torque value	RESET
E1151	System Emergency	Emergently stop because of manipulation of system I/O	RESET
E1152	Front Emergency	Emergently stopped by a front panel emergency stop switch	RESET
E1153	T/P Emergency	Emergently stopped by an emergency stop switch of the teaching pendant	RESET
E1154	Host Emergency	Emergently stopped by an emergency stop protocol in Host mode	RESET
E1163	Enc count Alarm	Encoder value of a motor abruptly changes over the permissible value.	RESET
E1165	Ref count Alarm	Positional error due to operation error of a controller	RESET
E1168	Servo ON POS Error	Amount of rotation of a motor exceeds the permissible value when in Servo ON	RESET
E1169	TASK EXIT FAIL	Abnormal system task in the controller	POWER ON/OFF

5.3 Run Time Alarms

Run Time Alarms			
Code Num	T/P DISPLAY	Description	Alarm clearing
E1201	File Not Found	JCALL'ed, but Job does not exist	RESET
E1202	Range Over	Values of command and variable index are out of permissible range	RESET
E1203	Invers Error	Error arising in inversion of XY mode (X,Y,Z,W) into Joint (A,B,Z,W) in a horizontal articulated robot	RESET
E1204	Not Teaching Point	Error arising when in use of a point which has not been taught	RESET
E1205	Job Depth Over	JCALL is continuously used, exceeding the regular times (3 times)	RESET
E1206	CALL Depth Over	CALL is continuously used, exceeding the regular times (8 times)	RESET
E1207	Invalid FOS Error	Improper use of FOS command	RESET
E1208	Format Error	Factors of a command are not the specified value	RESET
E1209	Pallet Data Error	Improper pallet data	RESET
E1210	Unreachable Point	A point that the robot cannot move to has been taught	RESET
E1211	EXIT Instruction	When EXIT command is executed	RESET
E1212	POS Variable Error	Wrong use of POS variable	RESET
E1213	JCALL Error	Insufficient memory during the robot Job operation	RESET
E1214	Not Support function	When motion-related commands are executed, use of the robot is not set up	RESET
E1216	Source Line Error	There are no commands in the executed Job	RESET
E1217	Passing PLT Over	The number of uses of PASS command is exceeded.	RESET
E1219	Range Over Axis1 AXIS	Deviate from Axis 1 setup range	RESET
E1220	Range Over Axis2 AXIS	Deviate from Axis 2 setup range	RESET
E1221	Range Over Axis3 AXIS	Deviate from Axis 3 setup range	RESET
E1222	Range Over Axis4 AXIS	Deviate from Axis 4 setup range	RESET
E1223	Range Over Axis5 AXIS	Deviate from Axis 5 setup range	RESET
E1224	Range Over Axis6 AXIS	Deviate from Axis 6 setup range	RESET
E1225	Not ready start	Job loading is not completed.	RESET
E1226	Please Origin	Error requiring the origin searching	RESET
E1227	Invalid Parameter	Insufficient number of variables of the string command	RESET
E1228	Invalid string leng	Text string and the number of extracted letters does not correspond to each other in String Command	RESET
E1230	Comm buf overflow	The received number of the text string is more than the specified text string	RESET
E1231	LPOS Read Timeout	Time to read the latched position data is longer than the specified time	RESET
E1232	Latch Sequence Err	Latch commands are not executed in the determined order.	RESET
E1233	Data Miss match SLV1	Point data of Master and Slave of synchronizing axes do not match	RESET
E1234	Data Miss match SLV2	Point data of Master and Slave of synchronizing axes do not match	RESET
E1235	Data Miss match SLV3	Point data of Master and Slave of synchronizing axes do not match	RESET
E1237	Not find Fieldbus	Setups of Fieldbus card and system parameters (FDBUS-CARD) are not identical	RESET

5.4 Job Compile Alarms

Job Compile Alarms			
Code Num	T/P DISPLAY	Description	Alarm clearing
E1301	Syntax Error	Job program syntax error	RESET
E1302	Not Init Sys Var	System variable (TMR, CNT, and SYS) or the like is used without initialization	RESET
E1303	Undefined Symbol	Undefined command or non-declared variable name is used	RESET
E1304	Duplicated Symbol	The same variable name is declared in duplicate	RESET
E1305	Impossible Branch	Branch executional error	RESET
E1306	Too Many Param	Exceed the parameter value	RESET
E1307	Not Enough Param	Parameter value not reached	RESET
E1308	Illegal Exp	Error in operation format	RESET
E1309	Illegal Var. Type	Command does not match the variable type	RESET
E1310	Impossible Assign	Error in variable assignment formation	RESET
E1311	EOF In Comment	Error in Comment statement	RESET
E1312	No Exist Label	LABL branch error.	RESET
E1313	Declaration Error	Array declaration error	RESET
E1314	Compile Error	Error in robot Job compiling	RESET
E1315	Not Same Spec RBT	Information on the robot Job is not identical to the current system parameter	RESET
E1316	Not Find JOB	Job file does not exist	RESET
E1317	Robot Disabled	Error when the system parameter (RDIS) has been set to "not used"	RESET
E1318	Robot Idle	Robot tries to check the robot information while it is in idle state.	RESET
E1319	Loading Error	Job file number exceeds the maximum value	RESET

5.5 Trajectory Alarms

Trajectory Alarms			
Code Num	T/P DISPLAY	Description	Alarm clearing
E1400	Trajectory Error	Motion trajectory creation is not exact	RESET
E1401	CP Sched. Error	Fail in creation of interpolation motion profile	RESET
E1402	Restart Sched. Error	Creation of motion profile is failed in restarting after motion stops	RESET
E1404	Time Sync. Err	Axis-to-axis synchronous motion profile creation is failed	RESET
E1405	Arc Plan Error	Creation of circular or arc motion trajectory is failed	RESET
E1406	Too Much FOS	Error in FOS setup value	RESET
E1413	Inverse Kine. Err	Error in coordinate conversion form X,Y mode to Joint mode	RESET
E1414	IK Isnan Error	JOINT data error in coordinate conversion form X,Y mode to Joint mode	RESET
E1415	IK Position Error	XY coordinate entered in X,Y mode deviates from the length of the robot arm	RESET
E1416	IK Range Over 1 Axis	The coordinate of Axis 1 entered in X,Y mode deviates from the setup range of the system parameter (RANG)	RESET
E1417	IK Range Over 2 Axis	The coordinate of Axis 2 entered in X,Y mode deviates from the setup range	RESET

		of the system parameter (RANG)	
E1418	IK Range Over 3 Axis	The coordinate of Axis 3 entered in X,Y mode deviates from the setup range of the system parameter (RANG)	RESET
E1419	IK Range Over 4 Axis	The coordinate of Axis 4 entered in X,Y mode deviates from the setup range of the system parameter (RANG)	RESET
E1420	IK Range Over 5 Axis	The coordinate of Axis 5 entered in X,Y mode deviates from the setup range of the system parameter (RANG)	RESET
E1421	IK Range Over 6 Axis	The coordinate of Axis 6 entered in X,Y mode deviates from the setup range of the system parameter (RANG)	RESET
E1422	PTP Sched. Err	Failure in PTP motion profile creation	RESET
E1423	Over Range Err	Permissible range of axis moving is deviated during the robot operation	RESET
E1424	Over Speed(Ref) Error	Velocity instruction exceeds the specified value	RESET
E1425	Over Accel(Ref) Err	Acceleration and deceleration instructions exceeds the specified value	RESET

5.6 COMMUNICATON

COMMUNICATON			
Code Num	T/P DISPLAY	Description	Alarm clearing
E2101	Main Com Time Out 1 SM	No reply from the servo module 1	RESET
E2102	Main Com Time Out 2 SM	No reply from the servo module 2	RESET
E2103	Main Com Time Out 3 SM	No reply from the servo module 3	RESET
E2104	RX Time out 1 SM	Data not received as much as the specified number of packet from the servo module 1	RESET
E2105	RX Time out 2 SM	Data not received as much as the specified number of packet from the servo module 2	RESET
E2106	RX Time out 3 SM	Data not received as much as the specified number of packet from the servo module 3	RESET
E2110	Com ID Err 1 SM	ID setup value and the slot position in a servo module 1 do not match.	RESET
E2111	Com ID Err 2 SM	ID setup value and the slot position in a servo module 2 do not match	RESET
E2112	Com ID Err 3 SM	ID setup value and the slot position in a servo module 3 do not match	RESET
E2113	Packet Data Err 1 SM	Loss in communication data between a main module and a servo module 1	RESET
E2114	Packet Data Err 2 SM	Loss in communication data between a main module and a servo module 2	RESET
E2115	Packet Data Err 3 SM	Loss in communication data between a main module and a servo module 3	RESET
E2122	PARA Read Err 1 SM	Failure in the parameter data read from the servo module 1	RESET
E2123	PARA Read Err 2 SM	Failure in the parameter data read from the servo module 2	RESET
E2124	PARA Read Err 3 SM	Failure in the parameter data read from the servo module 3	RESET
E2125	PARA Write Err 1 SM	Parameter is not normally written in the servo module 1	RESET
E2126	PARA Write Err 2 SM	Parameter is not normally written in the servo module 2	RESET
E2127	PARA Write Err 3 SM	Parameter is not normally written in the servo module 3	RESET
E2128	PARA Save Err 1 SM	The parameter is not normally saved in the servo module 1	RESET
E2129	PARA Save Err 2 SM	The parameter is not normally saved in the servo module 2	RESET
E2130	PARA Save Err 3 SM	The parameter is not normally saved in the servo module 3	RESET
E2131	SYNC SIGNAL Err 1 SM	Failure in Sync signal for synchronization of the servo module 1	RESET
E2132	SYNC SIGNAL Err 2 SM	Failure in Sync signal for synchronization of the servo module 2	RESET

E2133	SYNC SIGNAL Err 3 SM	Failure in Sync signal for synchronization of the servo module 3	RESET
E2134	SV Ext EMG Err 1 SM	External emergency signal is entered the servo module 1	RESET
E2135	SV Ext EMG Err 2 SM	External emergency signal is entered the servo module 2	RESET
E2136	SV Ext EMG Err 3 SM	External emergency signal is entered the servo module 3	RESET
E2137	SV Com Time Out 1 SM	Servo module 1 does not receive the communication data within the specified time	RESET
E2138	SV Com Time Out 2 SM	Servo module 2 does not receive the communication data within the specified time	RESET
E2139	SV Com Time Out 3 SM	Servo module 3 does not receive the communication data within the specified time	RESET
E2140	M-Turn Clear Fail 1 Axis	Multi-turn data of an encoder of Axis 1 is not cleared within the specified time	RESET
E2141	M-Turn Clear Fail 2 Axis	Multi-turn data of an encoder of Axis 2 is not cleared within the specified time	RESET
E2142	M-Turn Clear Fail 3 Axis	Multi-turn data of an encoder of Axis 3 is not cleared within the specified time	RESET
E2143	M-Turn Clear Fail 4 Axis	Multi-turn data of an encoder of Axis 4 is not cleared within the specified time	RESET
E2144	M-Turn Clear Fail 5 Axis	Multi-turn data of an encoder of Axis 5 is not cleared within the specified time	RESET
E2145	M-Turn Clear Fail 6 Axis	Multi-turn data of an encoder of Axis 6 is not cleared within the specified time	RESET

5.7 SERVO AMP

SERVO AMP			
Code Num	T/P DISPLAY	Description	Alarm clearing
E2160	Over Voltage 1 SM	DC link voltage of the servo module 1 exceeds 400V	RESET
E2161	Over Voltage 2 SM	DC link voltage of the servo module 2 exceeds 400V	RESET
E2162	Over Voltage 3 SM	DC link voltage of the servo module 3 exceeds 400V	RESET
E2163	Under Voltage 1 SM	DC link voltage of the servo module 1 is under 180V	RESET
E2164	Under Voltage 2 SM	DC link voltage of the servo module 2 is under 180V	RESET
E2165	Under Voltage 3 SM	DC link voltage of the servo module 3 is under 180V	RESET
E2166	Motor Power Fail 1 SM	When instantaneous power failure lasts longer than motor power detection time system parameter (MPDT) set value of No. 1 Servo Module	RESET
E2167	Motor Power Fail 2 SM	When instantaneous power failure lasts longer than motor power detection time system parameter (MPDT) set value of No. 2 Servo Module	RESET
E2168	Motor Power Fail 3 SM	When instantaneous power failure lasts longer than motor power detection time system parameter (MPDT) set value of No. 3 Servo Module	RESET
E2178	E-STOP OVS1 AXIS	When the motor rate of rotation goes beyond the set value of the system parameter (E-STOP->OVS) in urgently stopping the no.1 axis	RESET
E2179	E-STOP OVS2 AXIS	When the motor rate of rotation goes beyond the set value of the system parameter (E-STOP->OVS) in urgently stopping the no.2 axis	RESET
E2180	E-STOP OVS3 AXIS	When the motor rate of rotation goes beyond the set value of the system parameter (E-STOP->OVS) in urgently stopping the no.3 axis	RESET
E2181	E-STOP OVS4 AXIS	When the motor rate of rotation goes beyond the set value of the system parameter (E-STOP->OVS) in urgently stopping the no.4 axis	RESET
E2182	E-STOP OVS5 AXIS	When the motor rate of rotation goes beyond the set value of the system parameter (E-STOP->OVS) in urgently stopping the no.5 axis	RESET
E2183	E-STOP OVS6 AXIS	When the motor rate of rotation goes beyond the set value of the system parameter (E-STOP->OVS) in urgently stopping the no.6 axis	RESET

E2184	IPM Fault 1 AXIS	Failure in IPM of servo module of Axis 1	POWER ON/OFF
E2185	IPM Fault 2 AXIS	Failure in IPM of servo module of Axis 2	POWER ON/OFF
E2186	IPM Fault 3 AXIS	Failure in IPM of servo module of Axis 3	POWER ON/OFF
E2187	IPM Fault 4 AXIS	Failure in IPM of servo module of Axis 4	POWER ON/OFF
E2188	IPM Fault 5 AXIS	Failure in IPM of servo module of Axis 5	POWER ON/OFF
E2189	IPM Fault 6 AXIS	Failure in IPM of servo module of Axis 6	RESET
E2190	Current Sen Err 1 AXIS	Failure in the current sensing circuit in the servo module of Axis 1	RESET
E2191	Current Sen Err 2 AXIS	Failure in the current sensing circuit in the servo module of Axis 2	RESET
E2192	Current Sen Err 3 AXIS	Failure in the current sensing circuit in the servo module of Axis 3	RESET
E2193	Current Sen Err 4 AXIS	Failure in the current sensing circuit in the servo module of Axis 4	RESET
E2194	Current Sen Err 5 AXIS	Failure in the current sensing circuit in the servo module of Axis 5	RESET
E2195	Current Sen Err 6 AXIS	Failure in the current sensing circuit in the servo module of Axis 6	RESET
E2196	Over Current 1 AXIS	The current of Axis 1 motor exceeds the permissible maximum value.	RESET
E2197	Over Current 2 AXIS	The current of Axis 2 motor exceeds the permissible maximum value.	RESET
E2198	Over Current 3 AXIS	The current of Axis 3 motor exceeds the permissible maximum value.	RESET
E2199	Over Current 4 AXIS	The current of Axis 4 motor exceeds the permissible maximum value.	RESET
E2200	Over Current 5 AXIS	The current of Axis 5 motor exceeds the permissible maximum value.	RESET
E2201	Over Current 6 AXIS	The current of Axis 6 motor exceeds the permissible maximum value.	RESET
E2202	Over Load 1 AXIS	Torque load rate of Axis 1 exceeds the system parameter (OVL)	RESET
E2203	Over Load 2 AXIS	Torque load rate of Axis 2 exceeds the system parameter (OVL)	RESET
E2204	Over Load 3 AXIS	Torque load rate of Axis 3 exceeds the system parameter (OVL)	RESET
E2205	Over Load 4 AXIS	Torque load rate of Axis 4 exceeds the system parameter (OVL)	RESET
E2206	Over Load 5 AXIS	Torque load rate of Axis 5 exceeds the system parameter (OVL)	RESET
E2207	Over Load 6 AXIS	Torque load rate of Axis 6 exceeds the system parameter (OVL)	RESET
E2208	Over Speed 1 AXIS	Rotational velocity of Axis 1 motor exceeds the system parameter (OVS).	RESET
E2209	Over Speed 2 AXIS	Rotational velocity of Axis 2 motor exceeds the system parameter (OVS).	RESET
E2210	Over Speed 3 AXIS	Rotational velocity of Axis 3 motor exceeds the system parameter (OVS).	RESET
E2211	Over Speed 4 AXIS	Rotational velocity of Axis 4 motor exceeds the system parameter (OVS).	RESET
E2212	Over Speed 5 AXIS	Rotational velocity of Axis 5 motor exceeds the system parameter (OVS).	RESET
E2213	Over Speed 6 AXIS	Rotational velocity of Axis 6 motor exceeds the system parameter (OVS).	RESET
E2214	Following Err 1 AXIS	Positional error value of Axis 1 motor exceeds the setup value range of the system parameter (FOW)	RESET
E2215	Following Err 2 AXIS	Positional error value of Axis 2 motor exceeds the setup value range of the system parameter (FOW)	RESET
E2216	Following Err 3 AXIS	Positional error value of Axis 3 motor exceeds the setup value range of the system parameter (FOW)	RESET
E2217	Following Err 4 AXIS	Positional error value of Axis 4 motor exceeds the setup value range of the system parameter (FOW)	RESET
E2218	Following Err 5 AXIS	Positional error value of Axis 5 motor exceeds the setup value range of the system parameter (FOW)	RESET
E2219	Following Err 6 AXIS	Positional error value of Axis 6 motor exceeds the setup value range of the system parameter (FOW)	RESET

5.8 ENCODER

ENCODER			
Code Num	T/P DISPLAY	Description	Alarm clearing
E2220	Enc Open 1 AXIS	Disconnection of an encoder line when in use of a pulse encoder of Axis 1 motor	RESET
E2221	Enc Open 2 AXIS	Disconnection of an encoder line when in use of a pulse encoder of Axis 2 motor	RESET
E2222	Enc Open 3 AXIS	Disconnection of an encoder line when in use of a pulse encoder of Axis 3 motor	RESET
E2223	Enc Open 4 AXIS	Disconnection of an encoder line when in use of a pulse encoder of Axis 4 motor	RESET
E2224	Enc Open 5 AXIS	Disconnection of an encoder line when in use of a pulse encoder of Axis 5 motor	RESET
E2225	Enc Open 6 AXIS	Disconnection of an encoder line when in use of a pulse encoder of Axis 6 motor	RESET
E2226	Enc INIT Err 1 AXIS	Failure in an encoder signal of Axis 1 motor during initialization of a servo module	RESET
E2227	Enc INIT Err 2 AXIS	Failure in an encoder signal of Axis 2 motor during initialization of a servo module	RESET
E2228	Enc INIT Err 3 AXIS	Failure in an encoder signal of Axis 3 motor during initialization of a servo module	RESET
E2229	Enc INIT Err 4 AXIS	Failure in an encoder signal of Axis 4 motor during initialization of a servo module	RESET
E2230	Enc INIT Err 5 AXIS	Failure in an encoder signal of Axis 5 motor during initialization of a servo module	RESET
E2231	Enc INIT Err 6 AXIS	Failure in an encoder signal of Axis 6 motor during initialization of a servo module	RESET
E2232	Enc Hall Open 1 AXIS	Failure in a Hall sensor signal of the encoder of Axis 1 motor	RESET
E2233	Enc Hall Open 2 AXIS	Failure in a Hall sensor signal of the encoder of Axis 2 motor	RESET
E2234	Enc Hall Open 3 AXIS	Failure in a Hall sensor signal of the encoder of Axis 3 motor	RESET
E2235	Enc Hall Open 4 AXIS	Failure in a Hall sensor signal of the encoder of Axis 4 motor	RESET
E2236	Enc Hall Open 5 AXIS	Failure in a Hall sensor signal of the encoder of Axis 5 motor	RESET
E2237	Enc Hall Open 6 AXIS	Failure in a Hall sensor signal of the encoder of Axis 6 motor	RESET
E2238	Enc Hall Init Err 1AXIS	Failure in a Hall sensor signal of Axis 1 encoder during initialization of a servo module	RESET
E2239	Enc Hall Init Err 2AXIS	Failure in a Hall sensor signal of Axis 2 encoder during initialization of a servo module	RESET
E2240	Enc Hall Init Err 3AXIS	Failure in a Hall sensor signal of Axis 3 encoder during initialization of a servo module	RESET
E2241	Enc Hall Init Err 4AXIS	Failure in a Hall sensor signal of Axis 4 encoder during initialization of a servo module	RESET
E2242	Enc Hall Init Err 5AXIS	Failure in a Hall sensor signal of Axis 5 encoder during initialization of a servo module	RESET
E2243	Enc Hall Init Err 6AXIS	Failure in a Hall sensor signal of Axis 6 encoder during initialization of a servo module	RESET
E2244	Enc Timeout 1 AXIS	There is no reply from a communicational encoder of Axis 1 motor in a servo module	RESET
E2245	Enc Timeout 2 AXIS	There is no reply from a communicational encoder of Axis 2 motor in a servo module	RESET
E2246	Enc Timeout 3 AXIS	There is no reply from a communicational encoder of Axis 3 motor in a servo module	RESET

		module	
E2247	Enc Timeout 4 AXIS	There is no reply from a communicational encoder of Axis 4 motor in a servo module	RESET
E2248	Enc Timeout 5 AXIS	There is no reply from a communicational encoder of Axis 5 motor in a servo module	RESET
E2249	Enc Timeout 6 AXIS	There is no reply from a communicational encoder of Axis 6 motor in a servo module	RESET
E2250	Enc ID Miss 1 AXIS	The setup value of the system parameter is different from the type of the actual motor of Axis 1	RESET
E2251	Enc ID Miss 2 AXIS	The setup value of the system parameter is different from the type of the actual motor of Axis 2	RESET
E2252	Enc ID Miss 3 AXIS	The setup value of the system parameter is different from the type of the actual motor of Axis 3	RESET
E2253	Enc ID Miss 4 AXIS	The setup value of the system parameter is different from the type of the actual motor of Axis 4	RESET
E2254	Enc ID Miss 5 AXIS	The setup value of the system parameter is different from the type of the actual motor of Axis 5	RESET
E2255	Enc ID Miss 6 AXIS	The setup value of the system parameter is different from the type of the actual motor of Axis 6	RESET
E2256	Enc Over Speed 1 AXIS	Failure in multi-turn data detection in an absolute encoder of Axis 1	RESET
E2257	Enc Over Speed 2 AXIS	Failure in multi-turn data detection in an absolute encoder of Axis 2	RESET
E2258	Enc Over Speed 3 AXIS	Failure in multi-turn data detection in an absolute encoder of Axis 3	RESET
E2259	Enc Over Speed 4 AXIS	Failure in multi-turn data detection in an absolute encoder of Axis 4	RESET
E2260	Enc Over Speed 5 AXIS	Failure in multi-turn data detection in an absolute encoder of Axis 5	RESET
E2261	Enc Over Speed 6 AXIS	Failure in multi-turn data detection in an absolute encoder of Axis 6	RESET
E2262	Enc Status 1AXIS	Power source is applied when an absolute encoder of Axis 1 rotates over 100 rpm.	RESET
E2263	Enc Status 2AXIS	Power source is applied when an absolute encoder of Axis 2 rotates over 101 rpm.	RESET
E2264	Enc Status 3AXIS	Power source is applied when an absolute encoder of Axis 3 rotates over 102 rpm.	RESET
E2265	Enc Status 4AXIS	Power source is applied when an absolute encoder of Axis 4 rotates over 103 rpm.	RESET
E2266	Enc Status 5AXIS	Power source is applied when an absolute encoder of Axis 5 rotates over 104 rpm.	RESET
E2267	Enc Status 6AXIS	Power source is applied when an absolute encoder of Axis 6 rotates over 105 rpm.	RESET
E2268	Enc S-Turn Err 1 AXIS	Failure in 1-turn data of an absolute encoder of Axis 1	RESET
E2269	Enc S-Turn Err 2 AXIS	Failure in 2-turn data of an absolute encoder of Axis 2	RESET
E2270	Enc S-Turn Err 3 AXIS	Failure in 3-turn data of an absolute encoder of Axis 3	RESET
E2271	Enc S-Turn Err 4 AXIS	Failure in 4-turn data of an absolute encoder of Axis 4	RESET
E2272	Enc S-Turn Err 5 AXIS	Failure in 5-turn data of an absolute encoder of Axis 5	RESET
E2273	Enc S-Turn Err 6 AXIS	Failure in 6-turn data of an absolute encoder of Axis 6	RESET
E2274	Enc Over Flow 1 AXIS	Multi-turn data overflow of an absolute encoder of Axis 1	RESET
E2275	Enc Over Flow 2 AXIS	Multi-turn data overflow of an absolute encoder of Axis 2	RESET
E2276	Enc Over Flow 3 AXIS	Multi-turn data overflow of an absolute encoder of Axis 3	RESET
E2277	Enc Over Flow 4 AXIS	Multi-turn data overflow of an absolute encoder of Axis 4	RESET
E2278	Enc Over Flow 5 AXIS	Multi-turn data overflow of an absolute encoder of Axis 5	RESET

E2279	Enc Over Flow 6 AXIS	Multi-turn data overflow of an absolute encoder of Axis 6	RESET
E2280	Enc M-Turn Err 1 AXIS	Failure in multi-turn counter of an absolute encoder of Axis 1	RESET
E2281	Enc M-Turn Err 2 AXIS	Failure in multi-turn counter of an absolute encoder of Axis 2	RESET
E2282	Enc M-Turn Err 3 AXIS	Failure in multi-turn counter of an absolute encoder of Axis 3	RESET
E2283	Enc M-Turn Err 4 AXIS	Failure in multi-turn counter of an absolute encoder of Axis 4	RESET
E2284	Enc M-Turn Err 5 AXIS	Failure in multi-turn counter of an absolute encoder of Axis 5	RESET
E2285	Enc M-Turn Err 6 AXIS	Failure in multi-turn counter of an absolute encoder of Axis 6	RESET
E2286	Enc Sys Down 1 AXIS	The battery voltage of an absolute encoder of Axis 1 is under 2.5V	RESET
E2287	Enc Sys Down 2 AXIS	The battery voltage of an absolute encoder of Axis 2 is under 2.5V	RESET
E2288	Enc Sys Down 3 AXIS	The battery voltage of an absolute encoder of Axis 3 is under 2.5V	RESET
E2289	Enc Sys Down 4 AXIS	The battery voltage of an absolute encoder of Axis 4 is under 2.5V	RESET
E2290	Enc Sys Down 5 AXIS	The battery voltage of an absolute encoder of Axis 5 is under 2.5V	RESET
E2291	Enc Sys Down 6 AXIS	The battery voltage of an absolute encoder of Axis 6 is under 2.5V	RESET
E2316	Enc Type Miss 1 AXIS	The setup value of the system parameter is different from the encoder type of an actual motor of Axis 1	RESET
E2317	Enc Type Miss 2 AXIS	The setup value of the system parameter is different from the encoder type of an actual motor of Axis 2	RESET
E2318	Enc Type Miss 3 AXIS	The setup value of the system parameter is different from the encoder type of an actual motor of Axis 3	RESET
E2319	Enc Type Miss 4 AXIS	The setup value of the system parameter is different from the encoder type of an actual motor of Axis 4	RESET
E2320	Enc Type Miss 5 AXIS	The setup value of the system parameter is different from the encoder type of an actual motor of Axis 5	RESET
E2321	Enc Type Miss 6 AXIS	The setup value of the system parameter is different from the encoder type of an actual motor of Axis 6	RESET
E2322	Enc Data Err 1 AXIS	When the data received by motor encoder on axis no.1 is nor correct	RESET
E2323	Enc Data Err 2 AXIS	When the data received by motor encoder on axis no.2 is nor correct	RESET
E2324	Enc Data Err 3 AXIS	When the data received by motor encoder on axis no.3 is nor correct	RESET
E2325	Enc Data Err 4 AXIS	When the data received by motor encoder on axis no.4 is nor correct	RESET
E2326	Enc Data Err 5 AXIS	When the data received by motor encoder on axis no.5 is nor correct	RESET
E2327	Enc Data Err 6 AXIS	When the data received by motor encoder on axis no.6 is nor correct	RESET

5.9 SV_MEMORY

SV_MEMORY			
Code Num	T/P DISPLAY	Description	Alarm clearing
E2292	SV ParaRom Err 1 AXIS	Failure in an internal EEPROM of a servo module of Axis 1	RESET
E2293	SV ParaRom Err 2 AXIS	Failure in an internal EEPROM of a servo module of Axis 2	RESET
E2294	SV ParaRom Err 3 AXIS	Failure in an internal EEPROM of a servo module of Axis 3	RESET
E2295	SV ParaRom Err 4 AXIS	Failure in an internal EEPROM of a servo module of Axis 4	RESET
E2296	SV ParaRom Err 5 AXIS	Failure in an internal EEPROM of a servo module of Axis 5	RESET
E2297	SV ParaRom Err 6 AXIS	Failure in an internal EEPROM of a servo module of Axis 6	RESET
E2298	Fac. Para Err 1 AXIS	Failure in the parameter of Axis 1	RESET

E2299	Fac. Para Err 2 AXIS	Failure in the parameter of Axis 2	RESET
E2300	Fac. Para Err 3 AXIS	Failure in the parameter of Axis 3	RESET
E2301	Fac. Para Err 4 AXIS	Failure in the parameter of Axis 4	RESET
E2302	Fac. Para Err 5 AXIS	Failure in the parameter of Axis 5	RESET
E2303	Fac. Para Err 6 AXIS	Failure in the parameter of Axis 6	RESET

Rev.	Revised Date	Description	Revisor	S/W Version
V.1	2012.07.30	First Edition Printed	Hong	
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N1 ROBOT CONTROLLER

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ROBOT R&D CENTER
