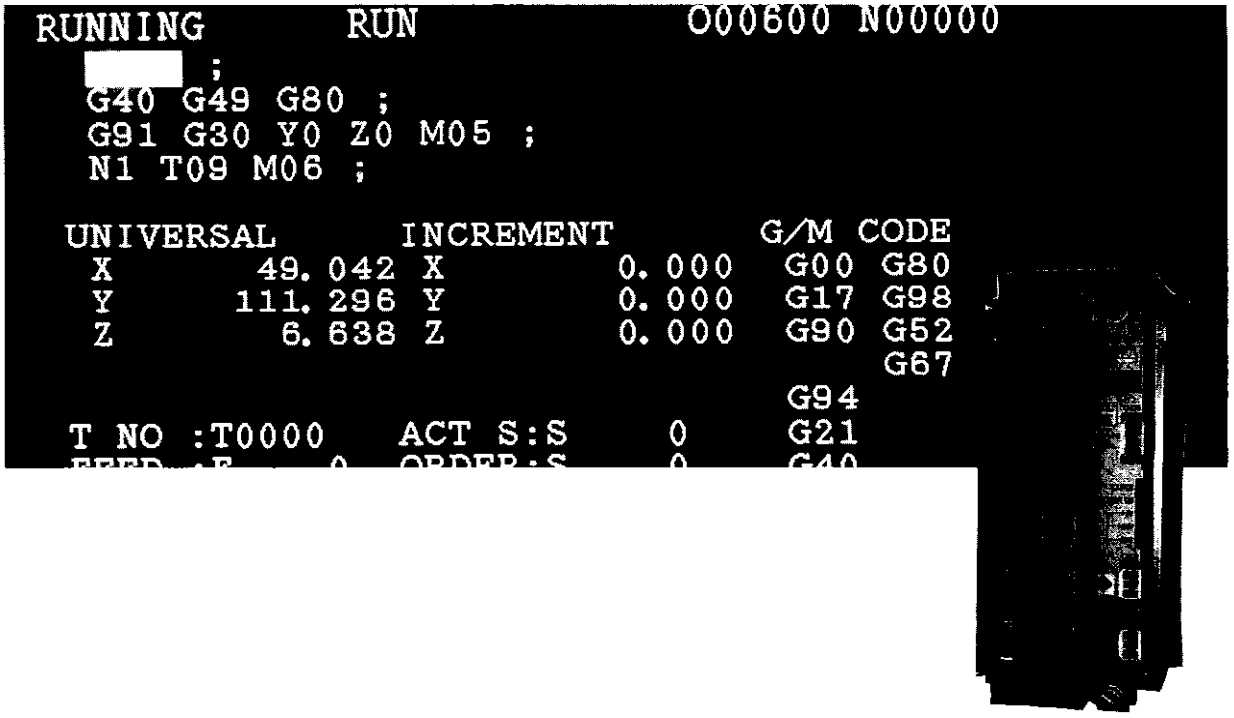
YASNAC J300
CONNECTING MANUAL (TYPE B)



Connection between Devices

This manual describes the specifications for connecting YASNAC J300 with machines, machine interfaces and external equipment.

Necessary connections to be provided by the machine tool builder differ depending on the type of the CNC cabinet supplied by Yaskawa. Make additions or deletions of connections in accordance with the combination for standard cabinets and integrated units.

The programmable controller system (hereafter called PLC) is installed in the YASNAC J300 CNC cabinet. For details of the PLC, refer to YASNAC J300 PLC Programming Manual (SIE-C843-13.1).

YASKAWA ELECTRIC CORPORATION

General Precautions

- Some drawings in this manual are shown with the protective cover or shields removed, in order to describe the detail with more clarity. Make sure all covers and shields are replaced before operating this product.
- This manual may be modified when necessary because of improvement of the product, modification, or changes in specifications.
  Such modification is made as a revision by renewing the manual No. on the front cover.
- To order a copy of this manual, if your copy has been damaged or lost, contact your Yaskawa representative.
- Yaskawa is not responsible for any modification of the product made by the user since that will void our guarantee.

NOTES FOR SAFE OPERATION

Read this manual thoroughly before installation, operation, maintenance or inspection of the YASNAC J300.

The functions and performance as an CNC machine tool are not determined only by an CNC unit itself. Before the operation, read thoroughly the machine tool builder's documents relating to the machine tool concerned.

In this manual, the Notes for Safe Operation are classified as "WARNING" or "CAUTION".

⚠ WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

Symbol  is used in labels attached to the product.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to personnel and damage to equipment.

It may also be used to alert against unsafe practices.

Even items described in ⚠ CAUTION may result in a vital accident in some situations. In either case, follow these important notes.

Please note that symbol mark used to indicate caution differs between ISO and JIS.

ISO	JIS
	

In this manual, symbol mark stipulated by ISO is used.

On products, caution symbol marks of ISO and JIS are used in labels. Please follow the same safety instructions concerning caution.

1. Transport Precautions

⚠ CAUTION

- Do not lift the cable when moving the product.
  Failure to observe this caution may lead to personal injury or product failure.
- Do not move the product in a place subject to rain, water drops, harmful gases or liquids.
  Failure to observe this caution may result in personnel accident or product failure.

2. Storage Precautions

⚠ CAUTION

- Do not store the product in a place subject to rain, water drops, harmful gases or liquids.
  Failure to observe this caution may result in product failure.
- Select a storage area indoors that is clean and meets the following temperature and humidity conditions.
  Failure to observe this caution may result in product failure.
  - Ambient temperature : –20 °C to 60 °C (–4 °F to 140 °F)
  - Relative humidity : 10% to 90%

3. Installation Precautions

⚠ CAUTION

- When installing the product, avoid shutting the intake port or the exhaust port. Also avoid foreign matter from entering the device.
  Failure to observe this caution may lead to fire or product failure.
- Avoid strong impact during installation.
  Failure to observe this caution may result in product failure.
- Set the power line capacity higher than the power consumption of the device.
  Failure to observe this caution may result in product malfunction.

⚠ CAUTION

- The current capacity of 24 VDC external power unit for input / output contacts is determined by the number of contact points to be used. When the current capacity is low, install an additional external power unit.
- Rust preventive has been applied to the shaft end and the flange surface of the motor, so remove it by wiping with a clean cloth before installing the device.
- When connecting the motor shaft to a driven machine, make sure that they are centered accurately to prevent vibration.
  Failure to observe this caution may lead to vibration causing product failure or personal injury.
- Design and install the box in accordance with the following.
  Failure in box such as electric control panel may result in product failure or malfunction.

  1. Use an airtight enclosure.
  2. Limit the average temperature increase of internal air within the enclosure to under 10 °C (50 °F) compared to the ambient temperature.
  3. Use a fan to circulate air in order to improve the cooling efficiency of a closed enclosure and to prevent abnormal temperature rise.
  4. Seal the cable inlet, door, etc. completely.
  5. CRT display attracts airborne particles because of its high voltage and may result in malfunction, therefore, provide a structure to prevent the entry of such particles.
  6. In the CPU unit, various units and printed circuit boards, dust in the air may result in malfunction, therefore, make structures to prevent the entry of dust.
  7. Install packing on the cable inlet, doors, back covers, etc. to eliminate gaps or openings.
  8. Ambient magnetic field may cause screen fluctuations of the CRT display, therefore, prevent this by layout and magnetism shield.

⚠ CAUTION

- Install various units in accordance with the following.
  Failure to observe this caution may result in product failure or malfunction.

1. Mount the servo unit vertically with screws or bolts.
2. The servo unit will generate heat, therefore, install it with adequate clearance around it.
3. In order to reduce the internal loss causing heat generation, arrange the cooling fin of the servo unit outside the enclosure so that the fin is exposed to the external atmosphere.
4. When circulating air inside the enclosure, do not blow air directly onto the servo unit (in order to prevent dust contamination).
5. Regenerating resistor will generate heat, therefore, install it away from devices that may be affected by heat.
6. Arrange units so that maintenance, inspection or change of parts may be made easily.

4. Wiring Precautions

⚠ CAUTION

- Correct and precise wiring should be performed by qualified, authorized personnel only.
  Failure to observe this caution may result in electric shock, fire, or malfunction.
- Never connect a 3-phase power supply to motor output terminals "U, V, and W" of the drive unit.
  Otherwise, the device may be damaged.
- Select the type of wire and its size according to your requirement and current capacity.
  When the ambient temperature exceeds 30 °C (86 °F), the allowable current goes down.
  Select the cable size in conformance with local electrical codes or the cable manufacturer's technical data.
  Failure to observe this caution may result in fire.
- Use twisted wire or multi-core twisted pair shielded wire for general signal wires and feedback signal wires for the encoder.
  This helps the prevention of malfunction.

⚠ CAUTION

- Connect wires in the shortest possible length.
  This helps the prevention of malfunction.

- Connect the power supply 200/220 VAC to the power terminal.
  Use it under the following conditions:

  1. The input power supply to CPU unit works normally until a momentary power loss of 1/2 cycle or the voltage drop by 50% within 1 cycle.
  2. The allowable range of voltage fluctuation is -15 to +10%; however, use the average voltage at the rated 200 VAC, 220 VAC, or 230 VAC.

  Connecting it to power supply with different voltage may cause fire.

- Do not run the I/O signal wires with power wires or in the same duct with power wires.
  Sufficient separation of signal wires from power wires will reduce the noise influence slight.

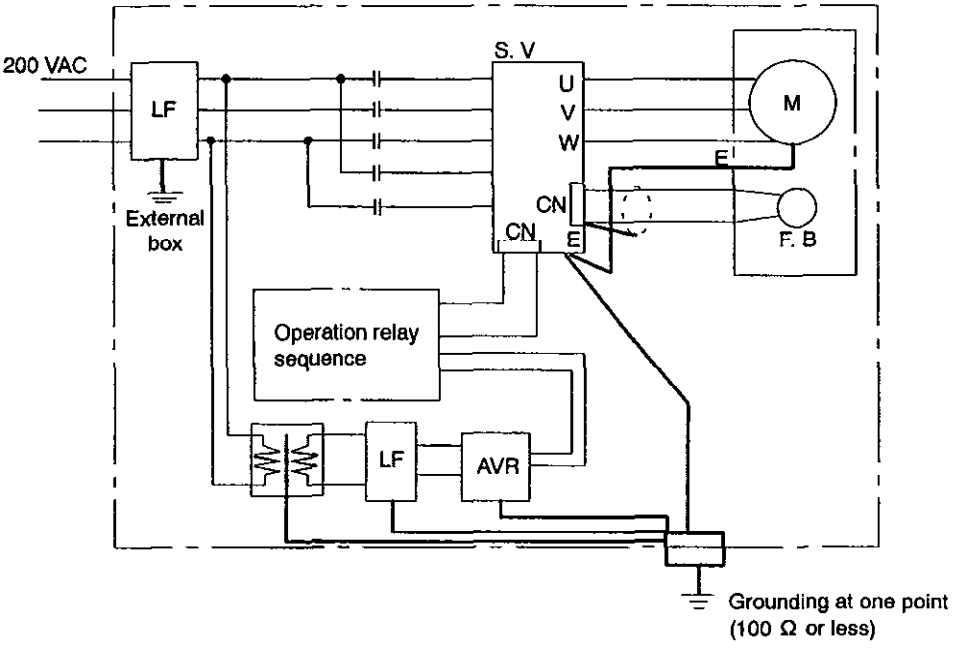
- In the event of noise from a power wire, use a noise suppressor to prevent it. As for the specifications and capacity of noise filter, refer to this connection manual.
  Correct use of noise filter will reduce the noise influence.

- Be sure to complete the end terminal processing to the last module of the remote I/O module.
  Set the "TERMINATION" shorting pin to "ON."
  Failure to observe this caution may lead to malfunction.

⚠ CAUTION

- Connect the grounding line of each unit to the housing or grounding plate independently.

Example of grounding



- Select the wire for grounding in conformance with local electrical codes.
- Be sure to connect the grounding terminal of the motor to the grounding terminal of the drive unit.
- Ground at one point. (Ground resistance 100 Ω or less)
  Failure to observe this caution may lead to electric shock, fire, or malfunction.
- Be sure to separate the grounding line of the unit from a power unit.
  Failure to observe this caution may lead to malfunction.

5. Application Safety Precautions

⚠ WARNING

- During operation, be sure to observe the following.
  Failure to observe this warning may lead to electric shock or device malfunction.

  1. Do not touch the unit or terminal while the unit is turned ON.
  2. Just after the unit is turned OFF, it is still in charging status. Do not touch the running parts for 5 minutes after the unit is turned OFF.

- Do not damage, pinch, or give excessive stress to cables.
  Excessive load on cable may cause electric shock.

- While the unit is turned ON, never touch its rotating parts.
  Failure to observe this warning may lead to personal injury.

- Never modify the product.
  Failure to observe this warning may result in electric shock, fire, or product failure.

⚠ CAUTION

- Use the product under the following conditions.
  Use in an environment with high temperature, high humidity, dust, corrosive gases, vibration, or impact may cause fire, electric shock, or malfunction.

  1. Free from explosive gases or steam
  2. Free from oil, organic solvent, corrosive liquids, etc.
  3. Relative humidity 10 to 90% RH and non-condensation
  4. Ambient temperature 0 °C to 45 °C (32 °F to 113 °F) and without freezing (Free from direct sunlight, heat generating devices, and outside atmosphere)
  5. Vibration under 4.9m/s^2 (0.5G)

- Do not let foreign matter such as electric wire scrap enter the unit.
  Failure to observe this caution may result in fire, product failure or malfunction.

- For the programming functions, follow the procedures in the user's manual.
  Failure to observe this caution may lead to personnel accident or malfunction.

- Use the unit with "System Number Switch" of CPU unit set to "0."
  Failure to observe this caution may lead to malfunction.

⚠ CAUTION

- Before turning the unit ON again, wait for 2 seconds or more after turning it OFF.
  Failure to observe this caution may lead to malfunction.
- Never disassemble or modify the components of the unit.
  Failure to observe this caution may result in fire, product failure or malfunction.
- Never change the set values of the components and variable resistors used in the control panel.
  Failure to observe this caution may result in fire, product failure or malfunction.

CONTENTS

3. POWER SUPPLY CONNECTION

4. CONNECTION OF CNC OPERATION PANEL

5. CONNECTION OF MANUAL PULSE GENERATOR

6. CONNECTION OF POWER ON/OFF EXCLUSIVE SIGNAL

10. CONNECTION OF I/O MODULE

11. CONNECTION OF GENERAL-PURPOSE I/O

APPENDIX 1 DIMENSIONS

1

DESIGN OF CONTROL PANEL

Chapter 1 describes the requirements for designing the control panel.

1

1.1 Configuration

This section describes the configuration of the control panel.

1.1.1 System Configuration of YASNAC

The system configuration of YASNAC is as shown in Fig. 1.1.

As the generic expression for the feed servo unit and spindle drive unit, the term "Servopack" is used.

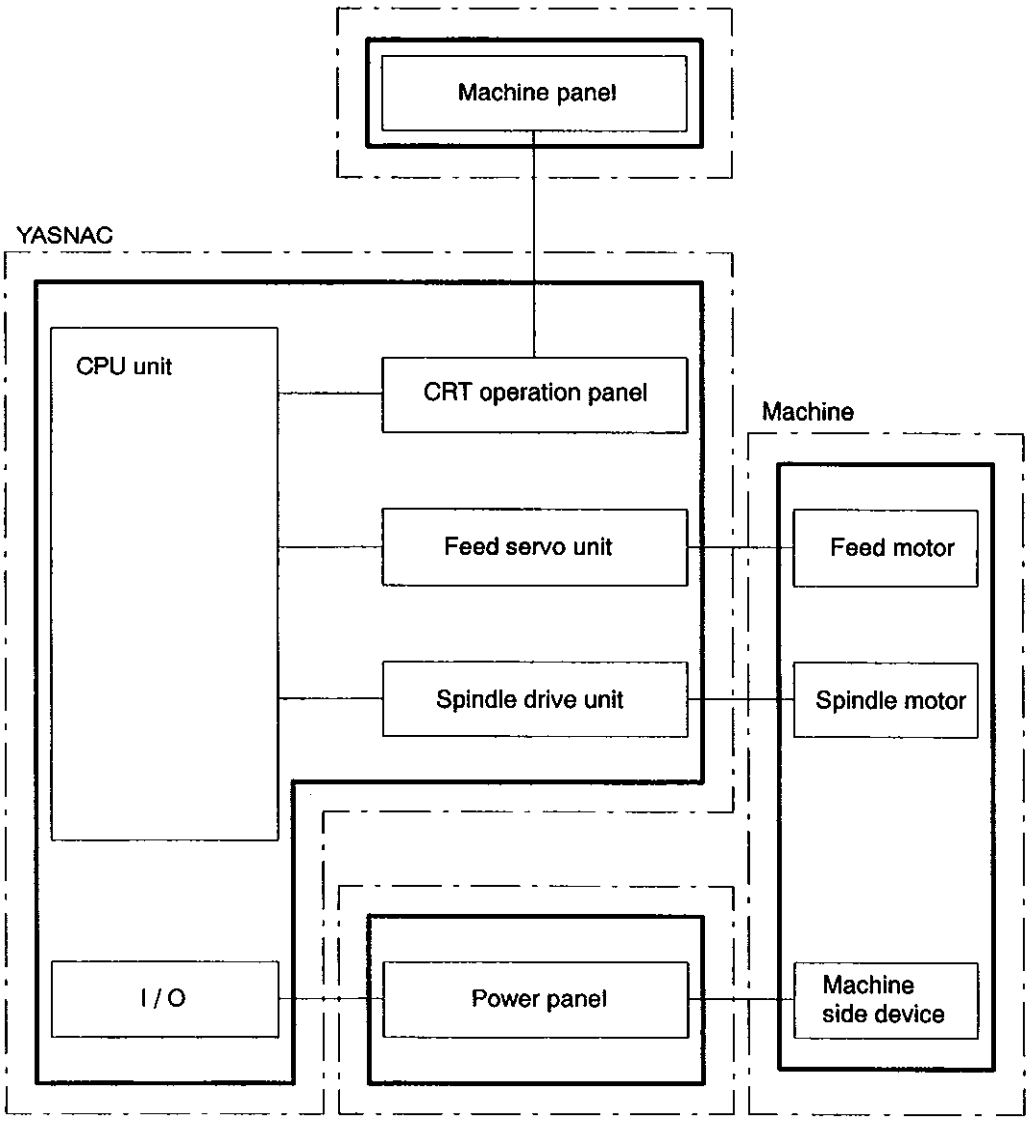


Fig. 1.1 System Configuration of YASNAC

1.2 Connection between Devices

This section describes the connection between devices.

(1) Example - Connection between J300 and Machine

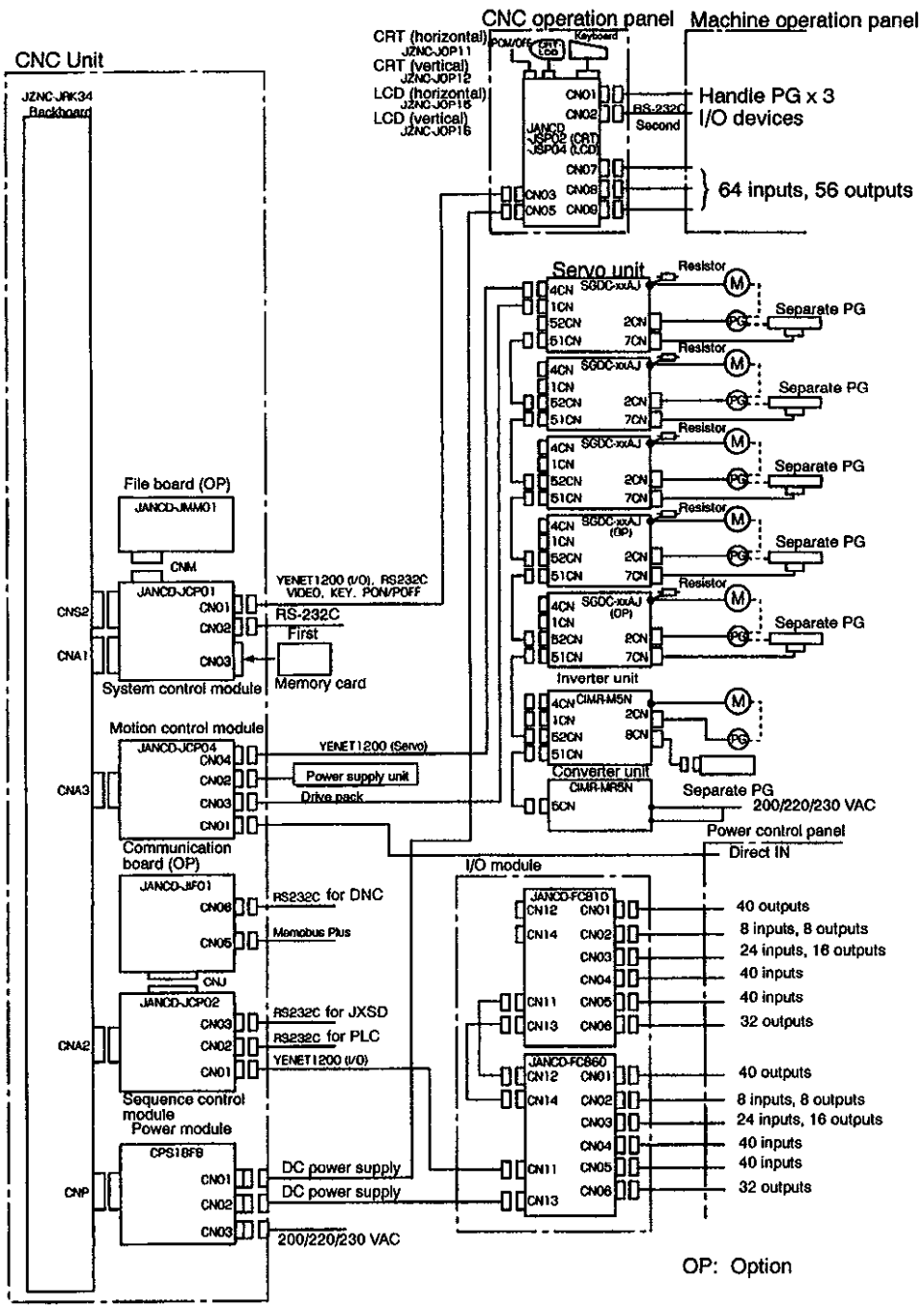


Fig. 1.2

(2) Example - Connection between J300 with ACGC and Machine

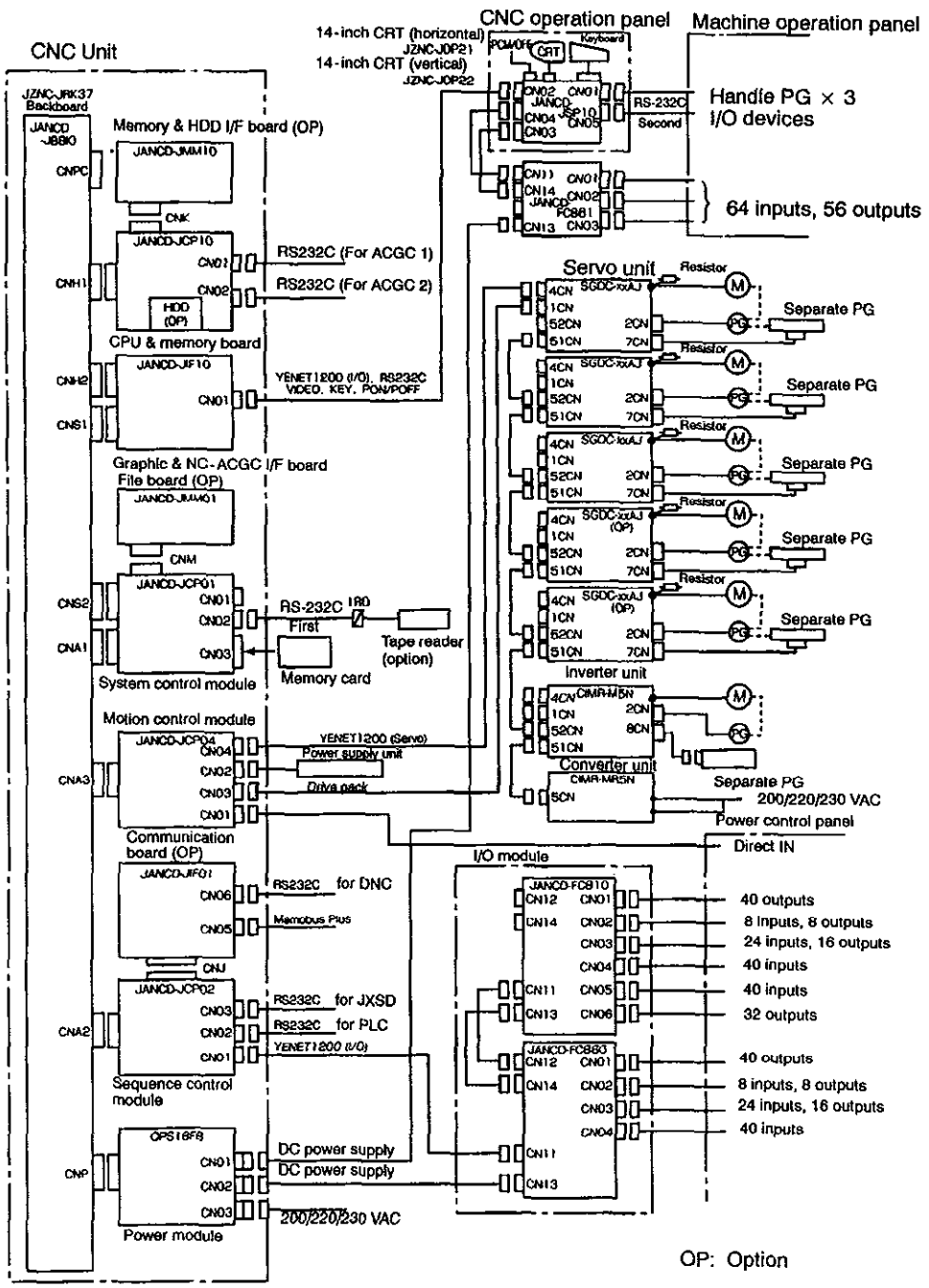


Fig. 1.3

1.3 Environmental Conditions

This section describes the environmental conditions of the control panel for machine tool builder.

1.3.1 Specifications

1

Design the panel to meet the following conditions completely.

Table 1.1 Specifications

Item		Specification
Ambient Conditions	Temperature	0°C to 45°C at operation. (Note) –20°C to +60°C at storage and transportation.
	Humidity	10% to 90% RH (with no condensation)
	Vibration	Less than 4.9 m/s^2
	Others	Free from dust, coolant or organic solvent.
	Input Power Source Input Voltage	CPU unit 200/220/230 VAC–15% to +10%
	Frequency	50/60 Hz ± 2 Hz
	Momentary Power Loss	Power loss is detected at power storage over 1 cycle.

Note: Avoid installation of the control panel in a location subject to direct sunlight, near heat generating devices, or outdoors even if the ambient temperature is lower than 45°C.

1.4 Packaging

This section describes the notes on packaging of the control panel.

When designing the box to contain CNC unit and other units, take the following into consideration.

1.4.1 General Notes

- Use an air-tight enclosure.
- Arrange packaging of units so that maintenance, inspection, removal, mounting should be performed easily.
- Secure clearance of 100 mm between parts and enclosure wall in order not to restrict air flow.
- When the operation panel is built-in the machine door or the like, it is subject to vibration of the machine, therefore, be sure to reinforce it against vibration.
- Limit the average temperature increase of internal air of enclosure to below 10°C of the external air.
- Use a fan to circulate air in order to improve the cooling efficiency of a closed enclosure and to prevent local temperature increase. (As a standard, arrange so that air over 1 m/s flows over the surface of printed circuit boards within various units.)
- Do not blow the fan air directly onto printed circuit boards.
- In order to prevent malfunctions owing to noise, keep various units 10 mm away from cables or parts over 90 VDC, cables such as AC power supply or parts.
- When wiring, observe the following points:
  Separate AC lines from DC lines.
  Separate the primary side and the secondary side of transformer, line filter, etc.

1.4.2 Installation of CNC Unit

1

When installing the CNC unit, observe the following notes:

- Mount the CNC unit in the direction as shown in Fig. 1.4.

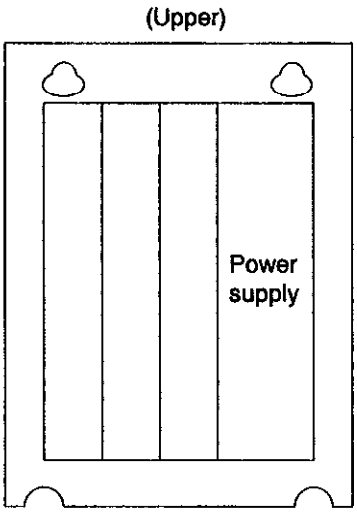


Fig. 1.4 Mounting of CNC Unit

- This CNC unit has a built-in fan so that air flows at 1 m/s over the upper side of the unit.
- Arrange clearance over 50 mm above the CNC unit and over 100 mm below it for ventilation and ease of maintenance.

1.4.3 Installation of Feed and Spindle Servopacks

In this manual the term "Servopack" is used to represent both the inverter unit and the servo unit.

- Since the Servopack is a wall-mounted type, mount it vertically with screws or bolts.
- Arrange it so that maintenance, inspection and parts replacement can be made easily.
- Since the Servopack will generate heat to some extent, arrange other units or devices with sufficient space above and below it.
- In order to reduce the internal loss from the viewpoint of heat generation, arrange the cooling fin of the Servopack outside of the enclosure, and blow external air on the cooling fin. (2.5 m/s)
- When circulating the internal air in the enclosure, do not blow air directly to the Servopack (in order to prevent dust contamination).
- For the installation of the feed Servopack, refer to the respective operation manuals.
- In order to reduce the internal loss from the viewpoint of heat generation, it is recommended to arrange the cooling fin of the servo unit outside of the enclosure. This helps make the enclosure closed structure and make the capacity of the heat exchange unit small.

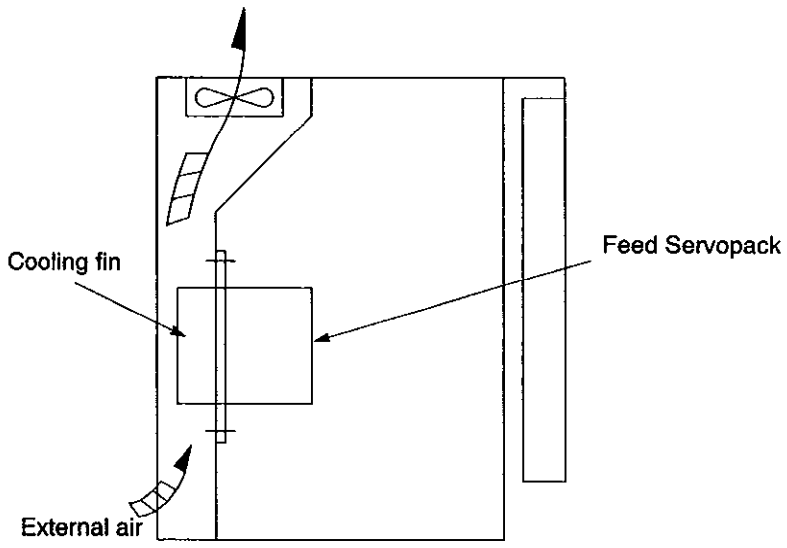


Fig. 1.5

1.5 Thermal Design of Box

This section describes the thermal design of box.

Design should be made on the condition that the average temperature increase of internal air of the box to contain the CNC unit and other units should be below 10°C of the external air.

1.5.1 Enclosure Internal Temperature Increase (Average Temperature Increase)

The internal temperature increase of enclosure made of sheet metal is generally as shown below:

$$\Delta T = \frac{P}{qe} = \frac{P}{k \cdot A}$$

where, ΔT : Internal temperature increase (°C)
P : Heat generation in enclosure (W)
qe : Enclosure heat percolation ratio (W/°C)
k : Heat transit ratio of sheet metal ($W/m^2°C$)
$6W/m^2°C$: With internal circulating fan
$4W/m^2°C$: Without internal circulating fan
A : Efficient heat diffusion area of enclosure (m^2)
Area capable of diffusing heat in surface area of the enclosure
(Excluding area contacting other devices)

(Example) Allowable heat generation in the enclosure with internal circulating fan

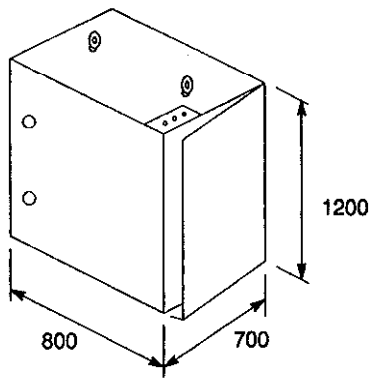


Fig. 1.6

Efficient heat diffusion area is independently located, so bottom area is excluded.
$A = 4.16\ m^2$

If the heat generation in the enclosure is supposed to be 246 W (113 W in CNC portion, 104 W in servo portion, and 29 W in I/O portion),

$$\Delta T = \frac{P}{qe} = \frac{P}{k \cdot A}$$

$$= \frac{246}{6 \times 4.16} = 9.9\ (°C)$$

Therefore, the above value is within the temperature increase value.
When it exceeds 10°C, it is necessary to arrange separate cooling countermeasures.

1.5.2 Cooling Capacity of Heat Exchanger

Where cooling capacity is insufficient by mounting the circulating fan in the enclosure, the following heat exchangers are supplied by Yaskawa:

Table 1.2 Heat Exchangers

Heat Exchanger	Cooling Capacity	External Dimensions (mm)
REX1550	100 W/10°C	295 (W) × 890 (H) × 50 (D)
HEATEX02	250 W/10°C	440 (W) × 924 (H) × 50 (D)

The heat generation in the cooling capacity column is the allowable heat generation amount where the internal temperature increase within the enclosure is limited to below 10°C.

(Example) Allowable heat generation amount in the enclosure with heat exchanger

The internal heat generation amount to make the internal temperature increase below 10°C when the enclosure equipped with HEATEX02 is expressed by the following equation:

$$P = k \cdot A \cdot \Delta T + 250 \text{ W/10°C}$$
$$= 6 \times 4.16 \times 10 + 250$$
$$= 499 \text{ W/10°C}$$

therefore, it is necessary to be below 499 W.

1.5.3 Mounting of Heat Exchanger

1

Heat exchanger should be mounted on the enclosure manufactured by the machine tool builder.

Fig. 1.7 shows an example. Mount it so that internal air is taken in from the upper portion and discharged from the lower portion, while external air is taken in from the lower portion and discharged from the upper portion.

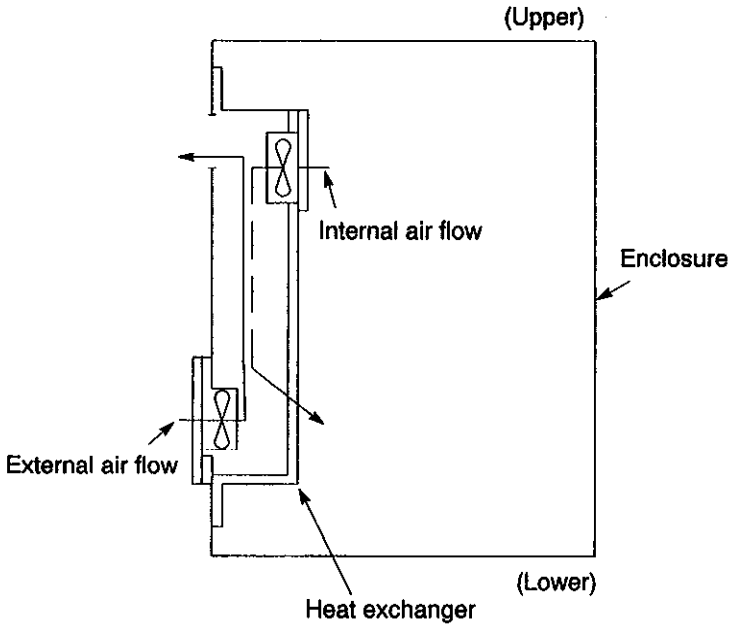


Fig. 1.7 Mounting of Heat Exchanger

1.5.4 Heat Generating of Respective Units

Table 1.3

Unit Name	Type	Total Heat Generation (W)	Internal Heat Generation (W)	Min. Wind Velocity for Cooling	Remarks
Standard CPU rack	JZNC-JRK34-□□□□-□□	97	97	1	
ACGC CPU rack	JZNC-JRK35-□□□□-□□	111	111	1	Ambient temperature: 0 to 35°C For CPU with built-in HDD
9-inch CRT panel		25	25	0	
9-inch LCD panel		10	10	0	Ambient temperature: 0 to 35°C
9-inch EL panel		7	7	0	
14-inch CRT panel		86	86	0	Ambient temperature: 0 to 40°C
14-inch LCD panel		13	13	0	Ambient temperature: 0 to 35°C
I/O module	JANCD-FC810	29	29	0	When 10.2 mA current is supplied to all of 112 input points from 96 output points.
	JANCD-FC860	29	29	0	
	JANCD-FC861	14.5	14.5	0	
Converter	CIMR-MR5N23P7			2.5	
	CIMR-MR5N25P5	84	44	2.5	
	CIMR-MR5N27P5	119	61	2.5	
	CIMR-MR5N2011	152	70	2.5	
	CIMR-MR5N2015	204	88	2.5	
	CIMR-MR5N2018	273	108	2.5	
	CIMR-MR5N2022	335	132	2.5	
	CIMR-MR5N2030	392	160	2.5	

Unit Name	Type	Total Heat Generation (W)	Internal Heat Generation (W)	Min. Wind Velocity for Cooling	Remarks
Spindle inverter	CIMR-M5N23P7			2.5	
	CIMR-M5N25P5	185	58	2.5	
	CIMR-M5N27P5	244	77	2.5	
	CIMR-M5N2011	307	89	2.5	
	CIMR-M5N2015	454	119	2.5	
	CIMR-M5N2018	565	144	2.5	
	CIMR-M5N2022	717	180	2.5	
	CIMR-M5N2030	869	219	2.5	
Reactor	20A	35	35	0	
	30A	45	45	0	
	40A	50	50	0	
	60A	65	65	0	
	80A	75	75	0	
	90A	90	90	0	
	120A	90	90	0	
	160A	100	100	0	
Servo unit	SGDC-05AJ A	28	10	2.5	
	SGDC-10AJ A	48	12	2.5	
	SGDC-15AJ A	73	15	2.5	
	SGDC-20AJ A	108	18	2.5	
	SGDC-30AJ A	148	22	2.5	
	SGDC-50AJ A	208	28	2.5	

1. The heat generation of the CNC unit varies with addition of options.
   The heat generation of the I/O module varies with the I/O status.
2. Internal heat generation amount is the heat generation amount remaining inside the enclosure when the fin of the servo unit is exposed outside the enclosure and external air over 2.5 m/s is applied to the fin.
3. Thermal design of the enclosure to contain the servo unit varies with specifications for the machines, but it is generally acknowledged to use a value of 70% of the load factor.

1.6 Dustproof Design

This section describes dustproof design.

1.6.1 Dustproof Countermeasures

The inside of the CPU units and other boards (especially CRTs) to be packaged in enclosure designed and manufactured by the machine tool builders are subject to airborne matter (dust, oil mist, etc.) and may cause malfunction. Therefore, structures should be constructed so as to prevent such matter from entering into the enclosure.

- Use an air-tight enclosure.
- Seal the cable inlet with packing material. (Refer to Fig. 1.8.)
- Secure the rear door lid with packing material. (Refer to Fig. 1.9.)
- The front sides of units on the surface of the enclosure such as CNC operation panels and tape readers are of dustproof type, however, avoid installing them at places subject to coolant liquids. And seal the circumference of the mounting portion securely.
- Note that the CRT unit will attract airborne dust owing its high voltage. For the mounting pendant box of the CRT unit, observe the following points:
- Seal the clearance at the cable inlet, door, rear lid, etc. with packing material. (Refer to Fig. 1.10.)
- The CRT unit mounting surface has already been sealed with packing material, so use it as it is.
- Close all the clearance.
- Oil will collect on the ceiling and enter the inside of the enclosure through screw holes, therefore, carry out special countermeasures using oil preventive packing material, etc.

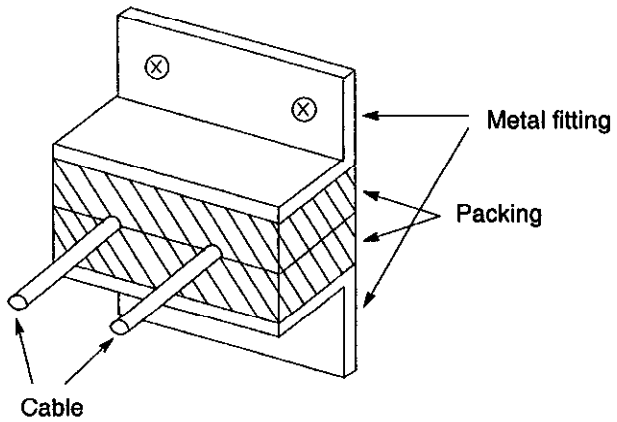


Fig. 1.8 Cable Inlet

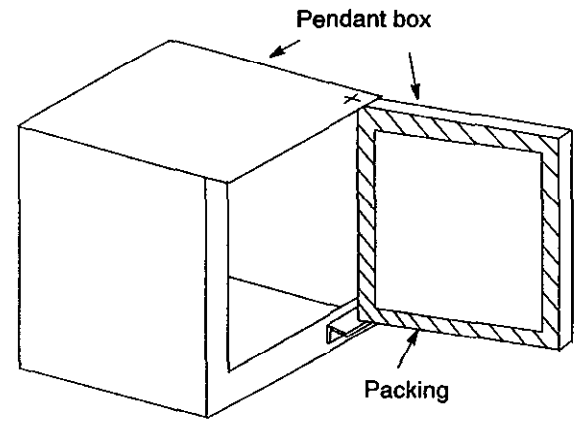


Fig. 1.9 Door Packing

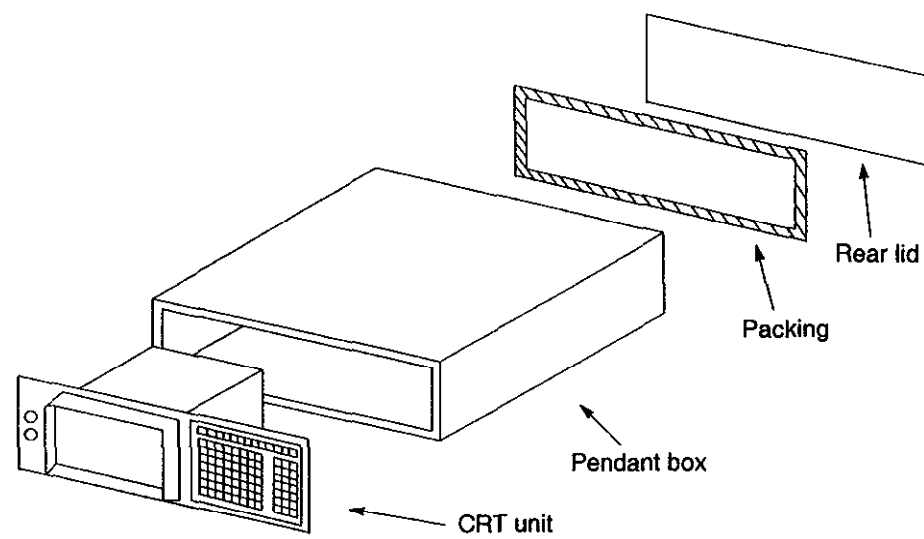


Fig. 1.10 CRT Unit

1.7 Countermeasures against Magnetic Fields

The screen of CRT display may fluctuate owing to ambient magnetic fields.

1.7.1 CRT Display

Keep magnetism generating materials (for example, transformers, reactors, fans, electromagnetic switches, solenoid relays, exchange power supply cables, etc.) 300 mm from the CRT display. This value of 300 mm is a general standard and may vary with different situations, therefore, pay sufficient attention to determining the layout of magnetism generating sources, and finally check them with the machine.

2

CABLE LEAD-IN DIAGRAM

Chapter 2 describes the connector layout and cable.

2.1 Connector Layout

This section shows the arrangement of connectors.

2.1.1 JZNC-JRK34

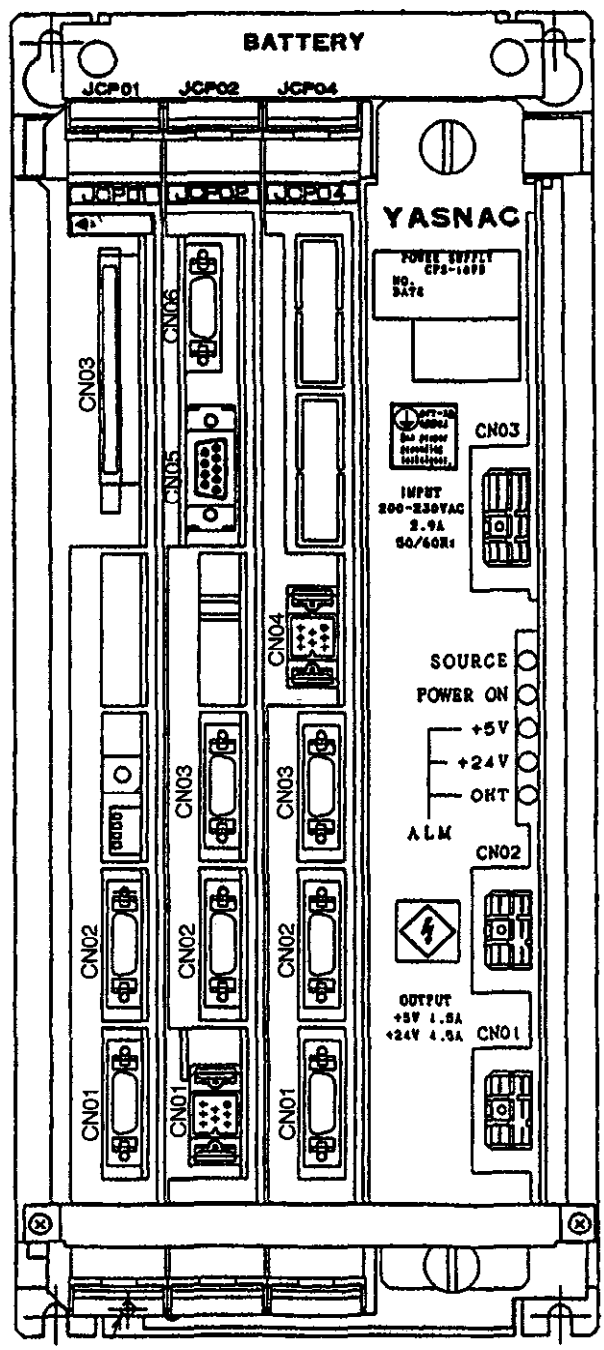


Fig. 2.1

2.1.2 JZNC-JRK35

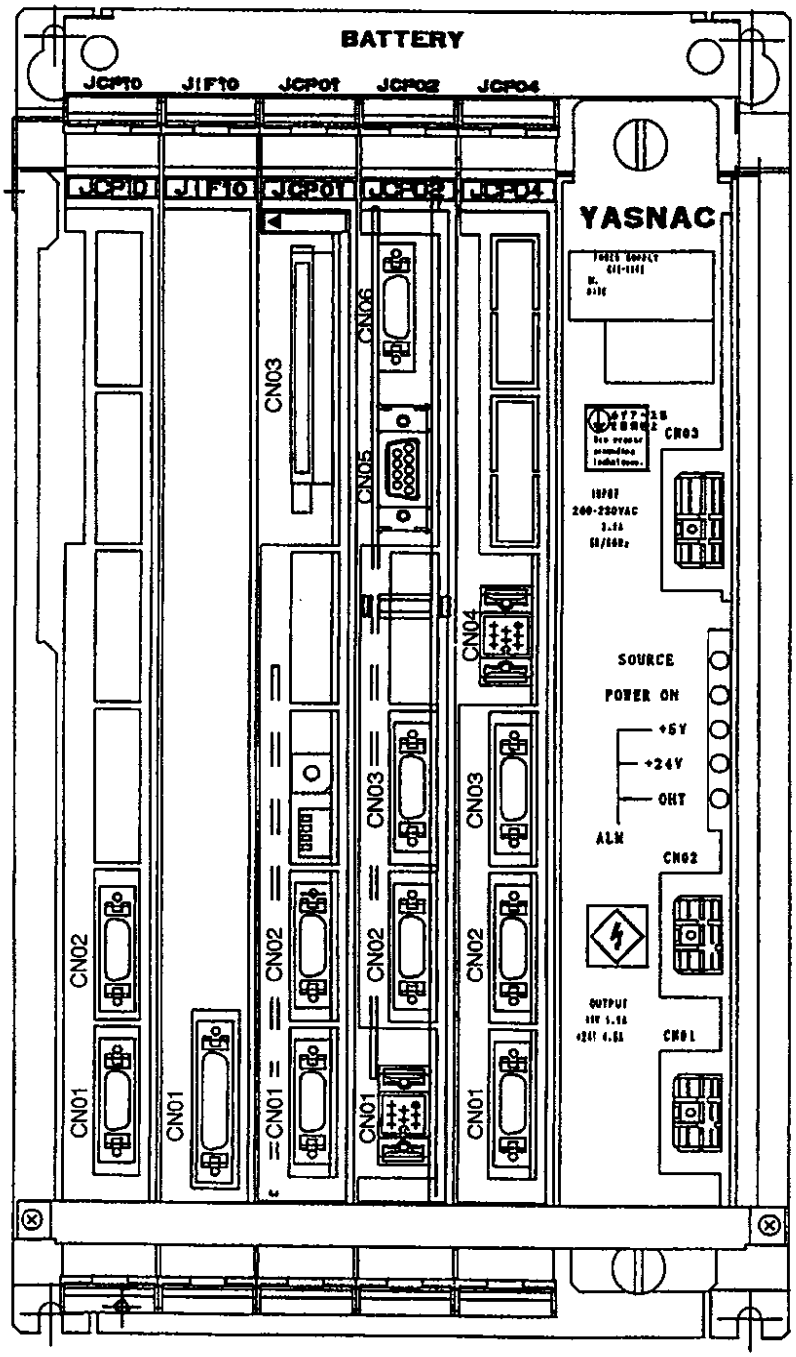


Fig. 2.2

2.2 Cable Clamp and Shielding

2.2.1 Shielding Method

Clamp the cables indicated below that connect the CNC operation panel and the CPU unit securely from cables to be connected to YASNAC to the grounding plate by using "cable clamp metal fitting" as shown in Fig. 2.3.

- CN01 of JANCD-JCP01 - CN03 of JANCD-JSP∗∗ (without ACGC)
- CN01 of JANCD-JIF10 - CN02 of JANCD-JSP∗∗ (with ACGC)

This clamp not only supports cables but also functions as a shield, therefore, it is very important, particular for system safety.

- Remove part of the cable sheath as shown in Fig. 2.3 to expose the shield, and clamp the part to the grounding plate using a cable clamp.
- Arrange the grounding plate by the cable lead-in portion.
- When clamping a cable without a shield, there is no need to remove the cable sheath.

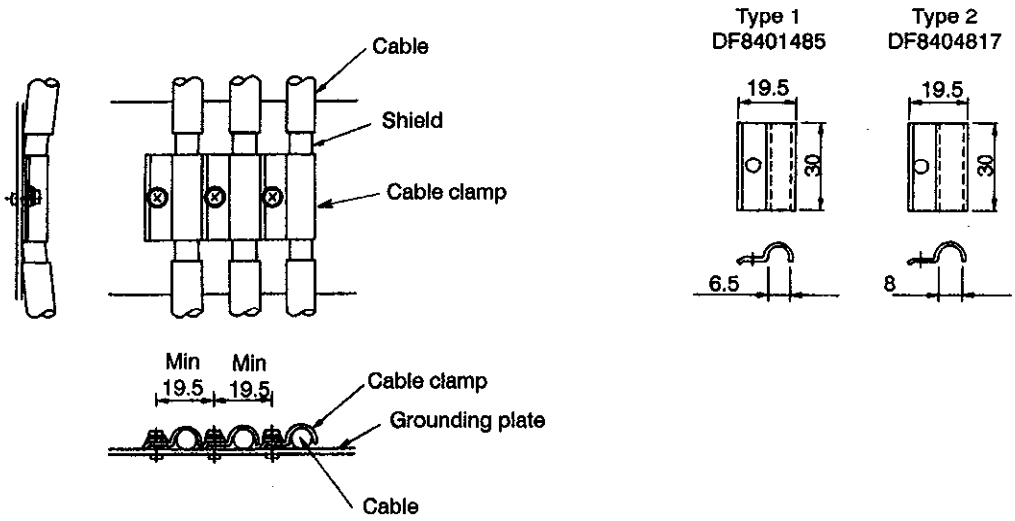


Fig. 2.3

3

POWER SUPPLY CONNECTION

Chapter 3 describes the power supply connection.

3.1 Connection between Devices

This section describes outline of connection between devices, connector numbers and connector type.

3.1.1 Power Supply to CNC Unit

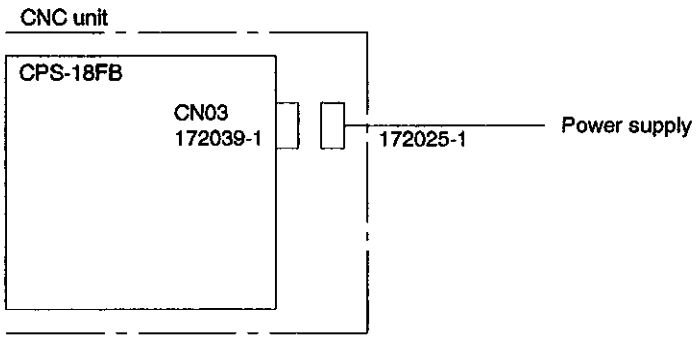


Fig. 3.1 Connection between Devices

3.1.2 Power Supply to Converter Unit

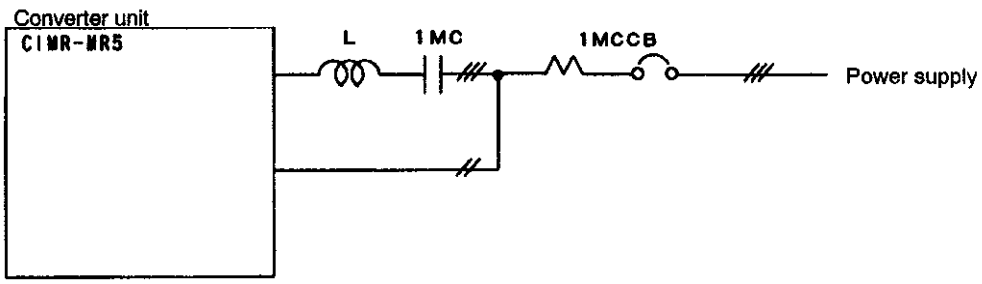


Fig. 3.2 Connection between Devices

Table 3.1 Component Selection for Power Supply Circuit

Converter Type CIMR-MR5N2□□□	Applicable Capacity (kW)	Output Capacity (kW)	Power Source Capacity (kVA)	Breaker 1MCCB	Electro-magnetic Contactor 1MC	Reactor (Note) 1L
3P7	3.7	4.6	7	30 A	20 A	20 A 0.53 mH (×002491) (×010057)
5P5	5.5	6.8	9	40 A	30 A	30 A 0.35 mH (×002492) (×010058)
7P5	7.5	9.3	12	50 A	40 A	40 A 0.265 mH (×002493) (×010059)
011	11	13.6	19	75 A	60 A	60 A 0.18 mH (×002495) (×010060)
015	15	18.6	24	100 A	75 A	80 A 0.13 mH (×002497) (×010061)
018	18.5	22.9	30	125 A	100 A	90 A 0.12 mH (×002498) (×010062)
022	22	27.2	36	150 A	125 A	120 A 0.09 mH (×002555) (×010063)
030	30	37.1	48	175 A	150 A	160 A 0.07 mH (×002556) (×010064)

Note: Code in upper row: With leads
Code in lower row: With terminals

3.2 Detailed Connection

This section describes the detailed connection of power supply.

3.2.1 Power Supply to CNC Unit

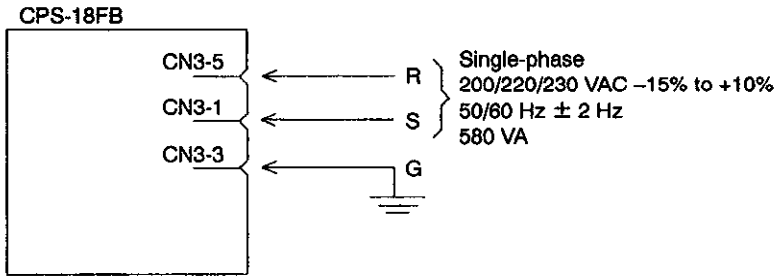


Fig. 3.3 Detailed Connection of Power Supply

3.2.2 Power Supply to Converter Unit

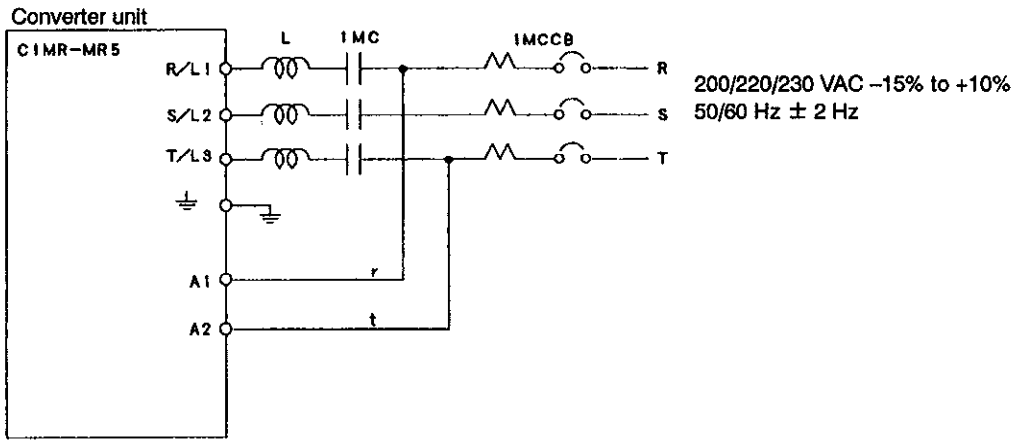


Fig. 3.4 Detailed Connection of Power Supply

3.2.3 Example of Circuit Diagram

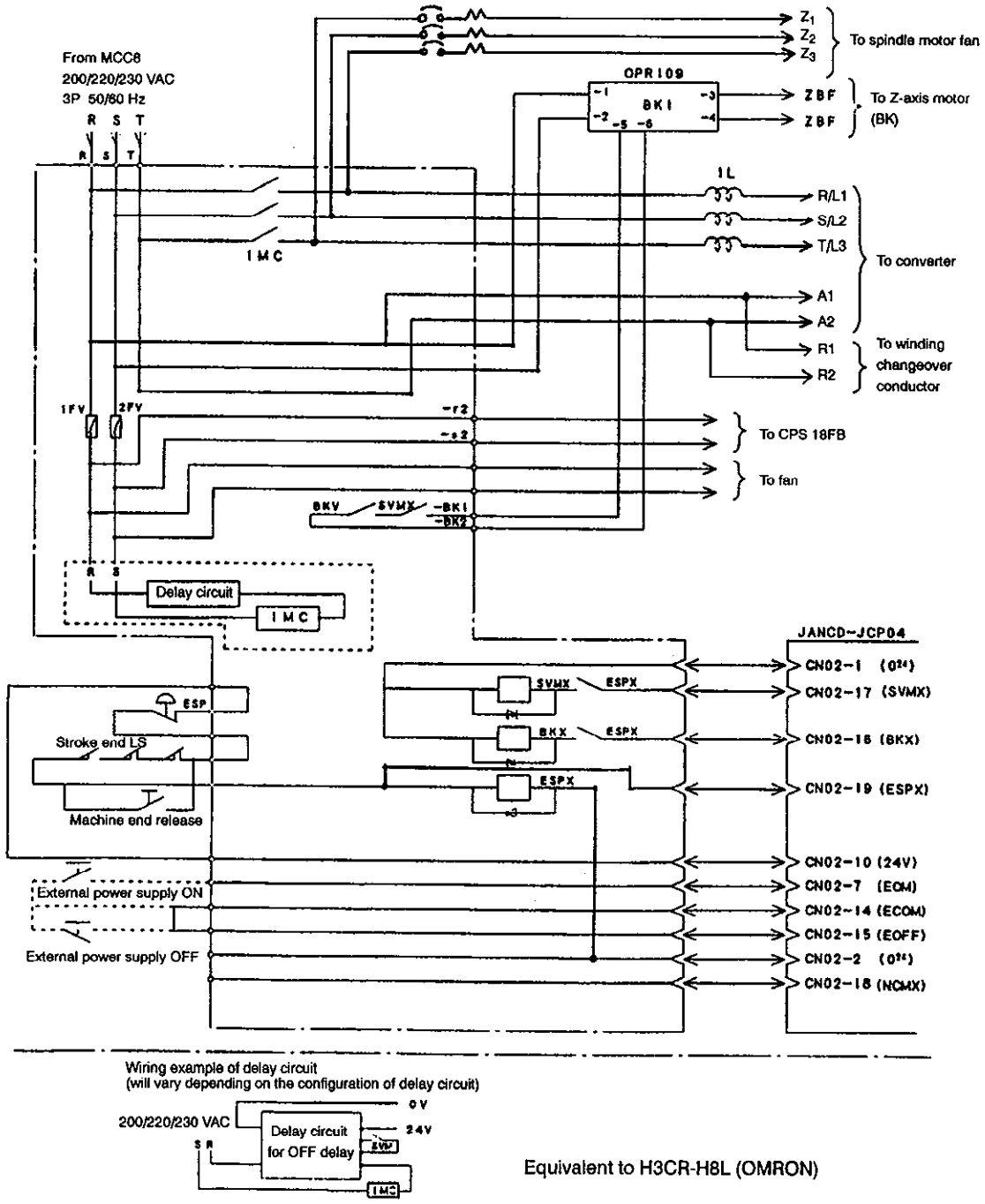


Fig. 3.5

4

CONNECTION OF CNC OPERATION PANEL

Chapter 4 describes the connection between the CNC unit and the CNC operation panel.

4.1 Connection between Devices

This section describes the connection between CNC unit (including the power supply unit) and CNC operation panel and the type of connector as well as the cable specifications.

4.1.1 Connection with CNC Operation Panel

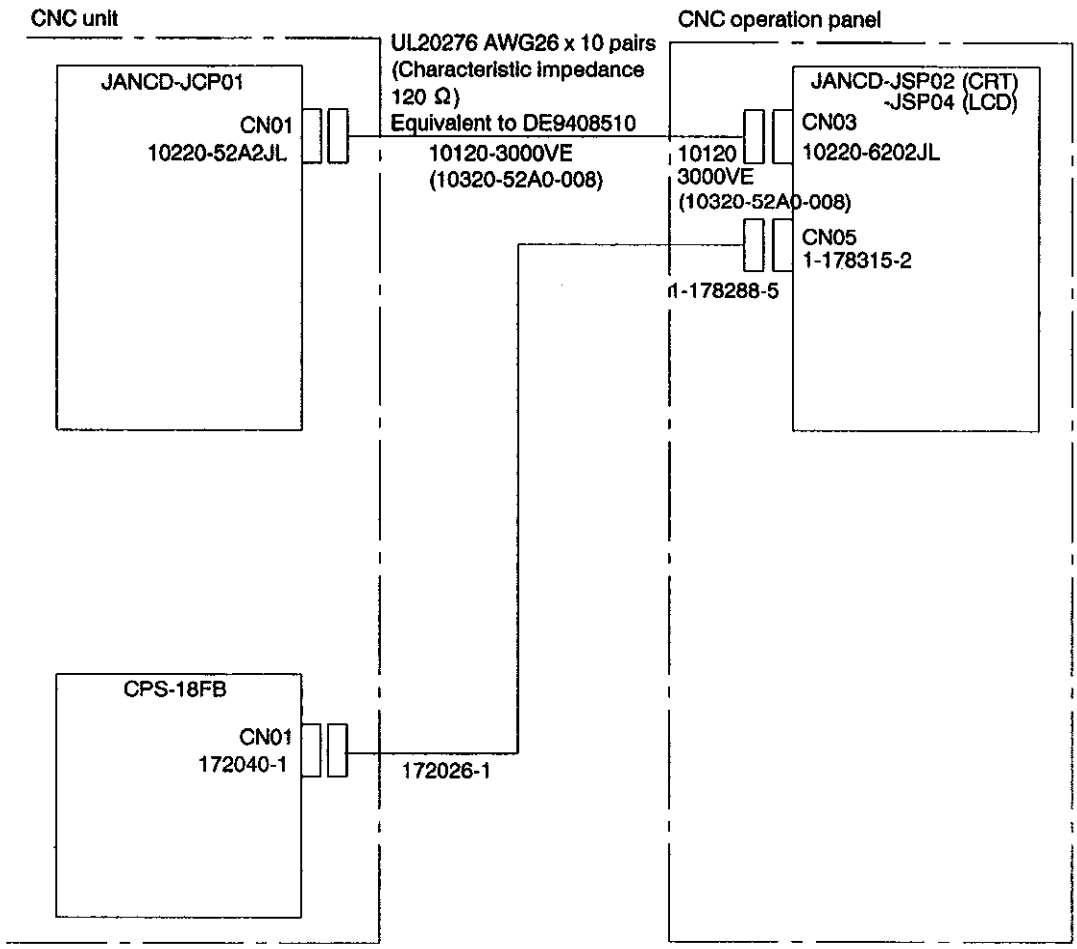


Fig. 4.1 Connection between Devices

4.1.2 Connection to ACGC Operation Panel

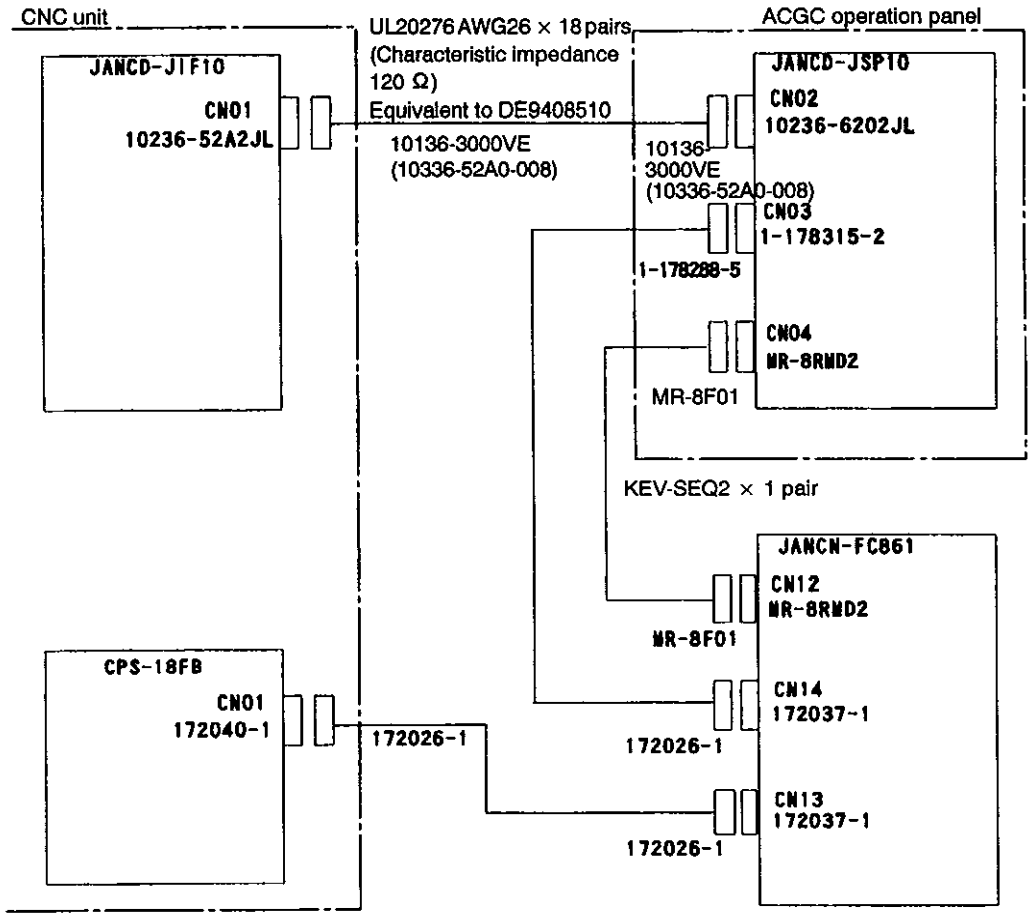


Fig. 4.2

4.2 Detailed Connection of CNC Operation Panel

This section describes the detailed connection between CNC unit (including the power unit) and CNC operation panel and the type of connector as well as the cable specifications.

4.2.1 Connection with CNC Operation Panel

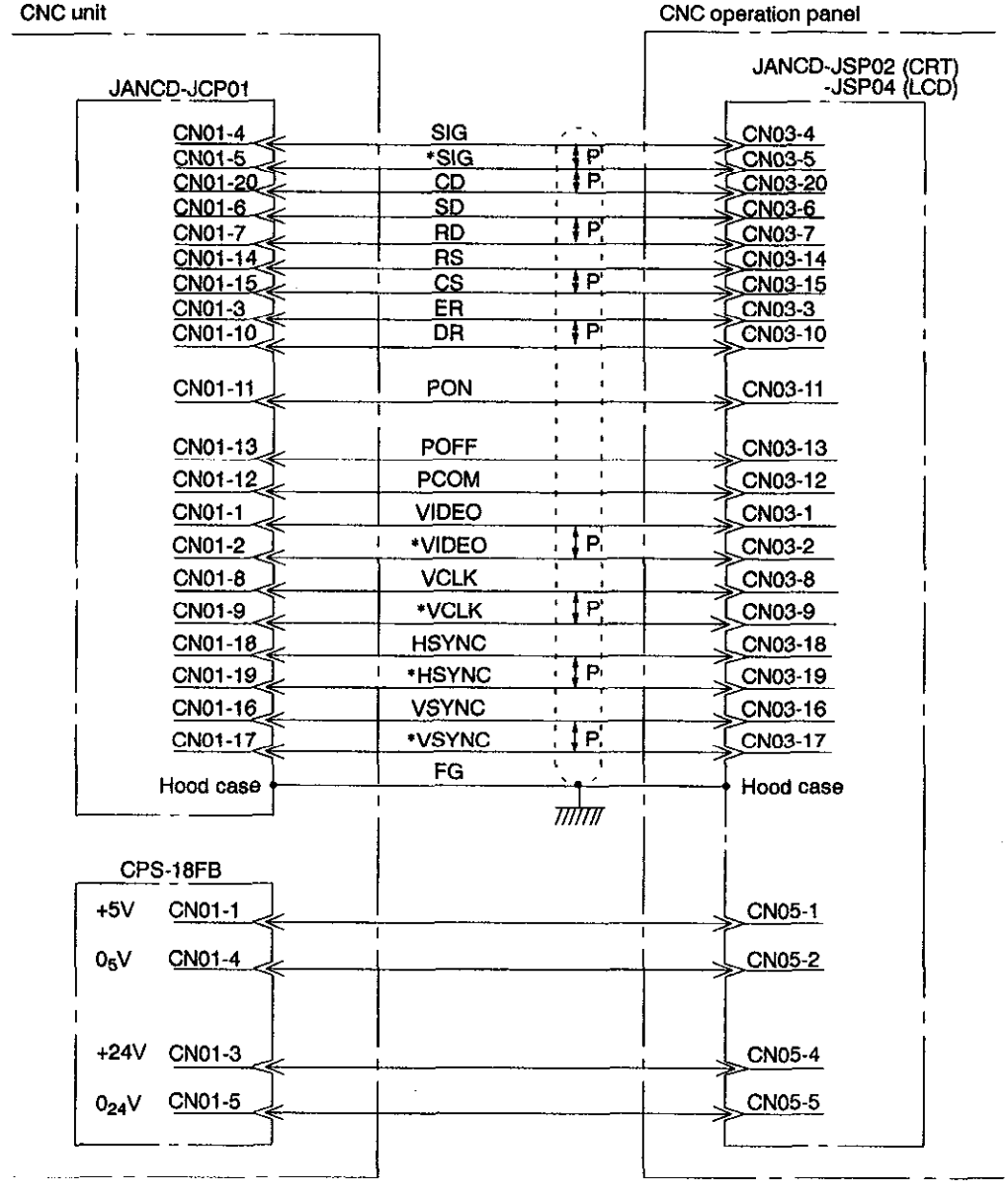


Fig. 4.3 Connection with CNC Operation Panel

POINT

Connect the FG to the case with cables using cable clamp.

4.2.2 Connection of ACGC Operation Panel

(1) Connection between CNC Unit and Color CRT Operation Panel

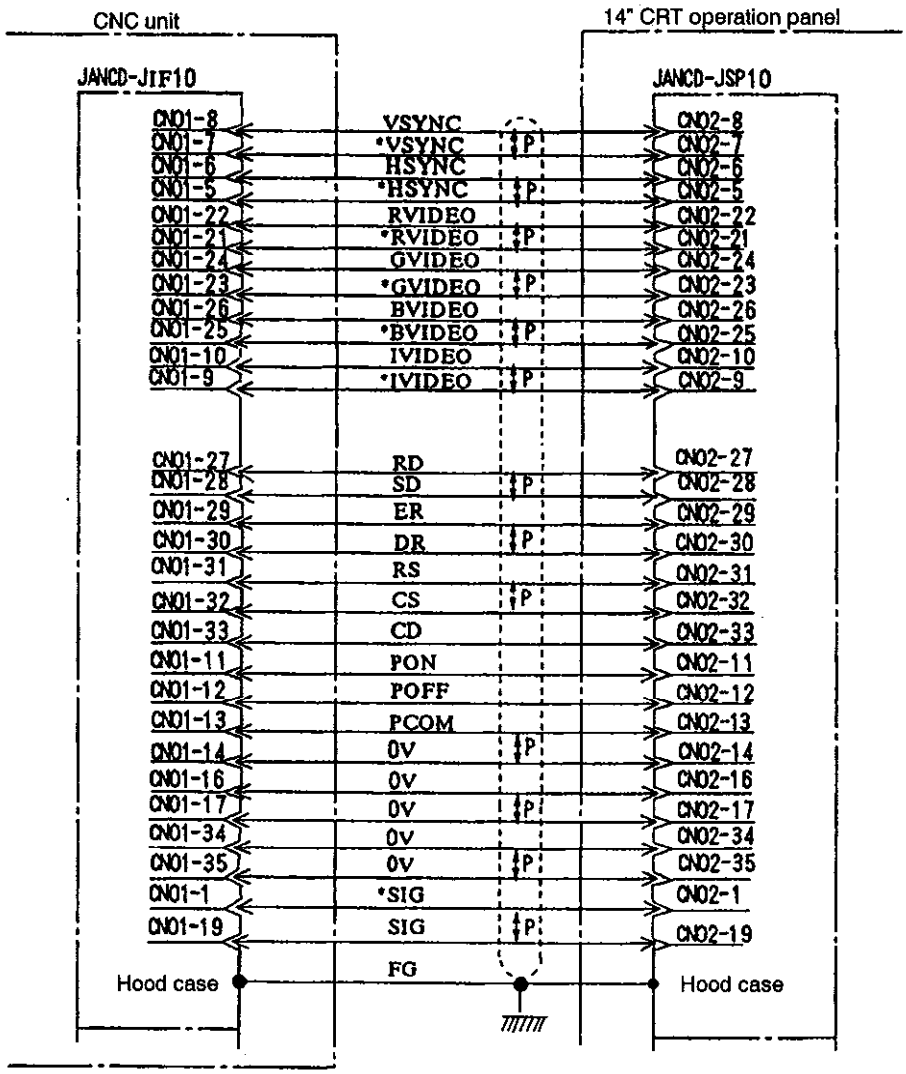


Fig. 4.4 Connection between CNC Unit and Color CRT Operation Panel

(2) Connection between CNC Unit and Color LCD Operation Panel

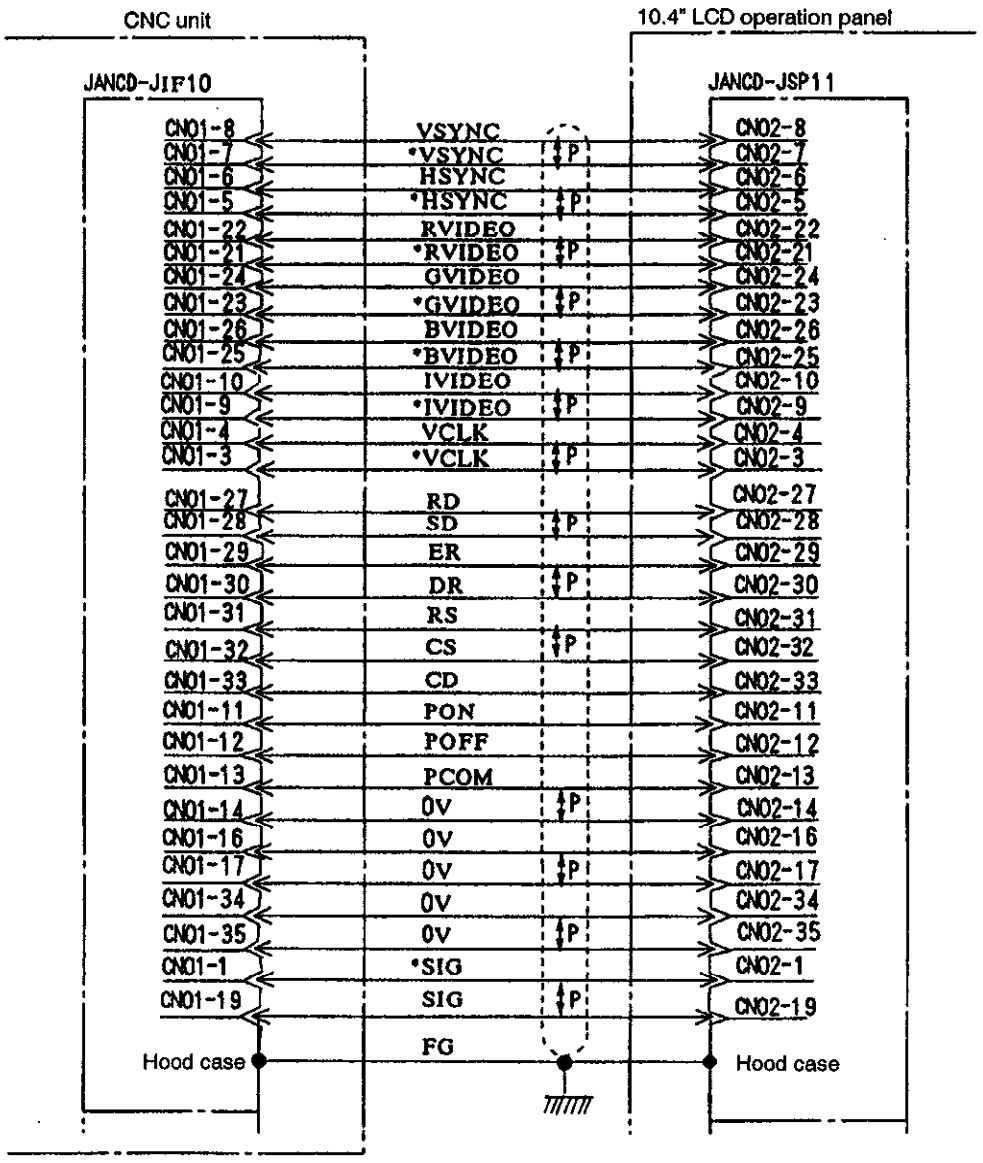


Fig. 4.5 Connection between CNC Unit and Color LCD Operation Panel

(3) Connection between Operation Panel with ACGC and I/O Module

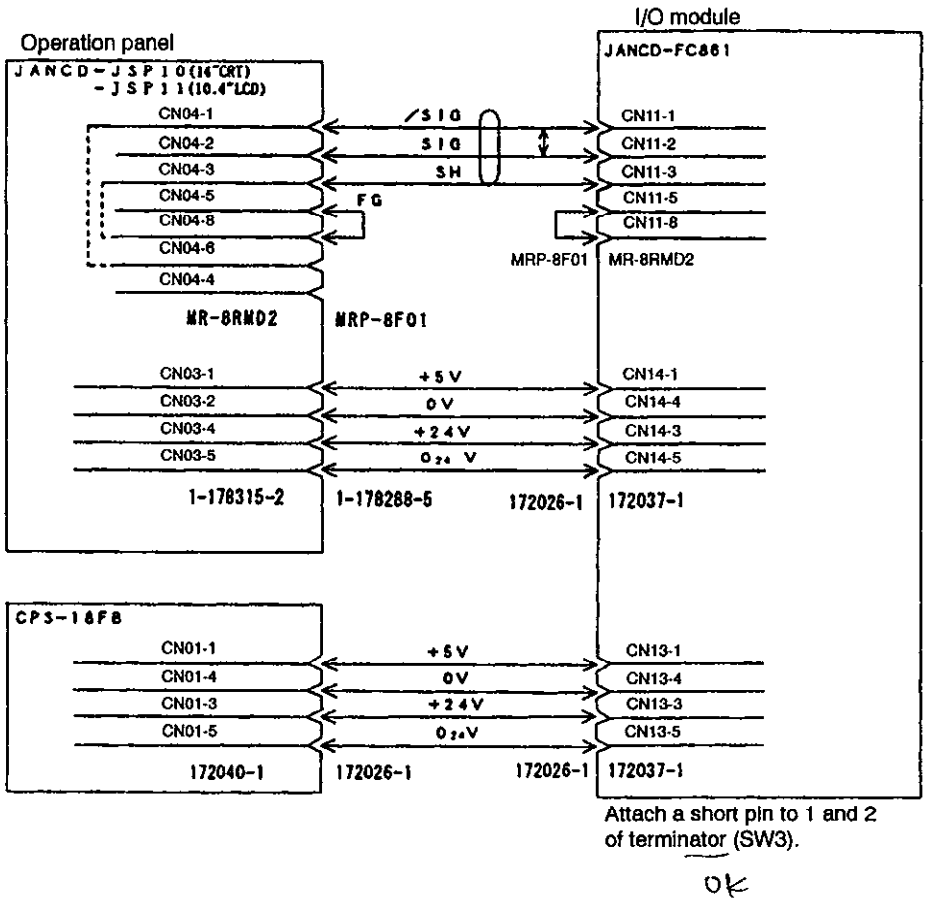


Fig. 4.6 Connection with Panel I/O Module

4.2.3 General Notes on the Connection of CNC Operation Panel

(1) Wiring of the Power ON/OFF Switch

For a standard horizontal CNC operation panel, the wiring of the power ON/OFF switch has been made by Yaskawa. For a vertical type, use the wiring in the figure below or external ON/OFF switch.

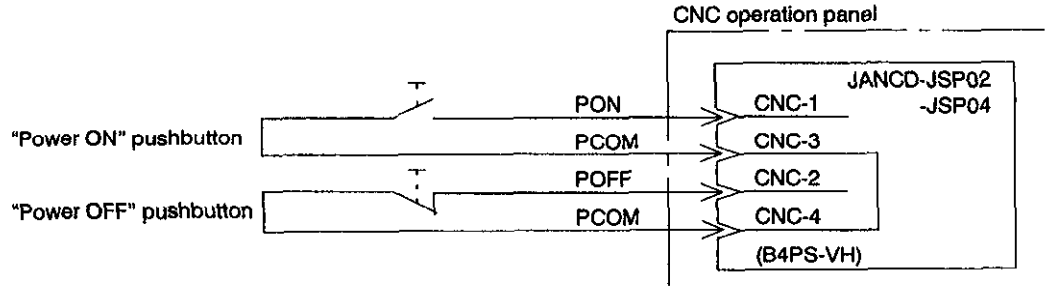
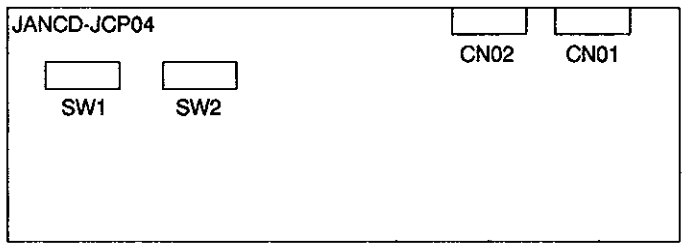


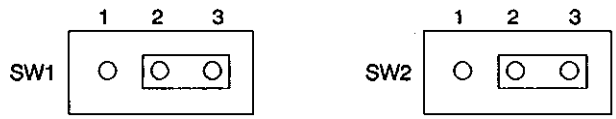
Fig. 4.7

(2) Switches for External Power Supply

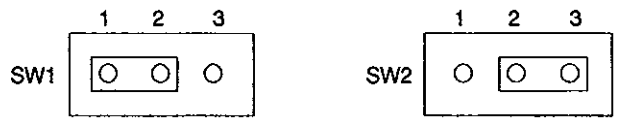
External power supply ON/OFF is selected by the following switches:
Switches (SW1, 2) are arranged on JANCD-JCP04.



- For setting external power ON/OFF effective, and operation panel power ON/OFF effective



- For setting external power ON/OFF invalid, and operation panel power ON/OFF effective



- For setting external power ON/OFF effective, and operation panel power ON/OFF invalid

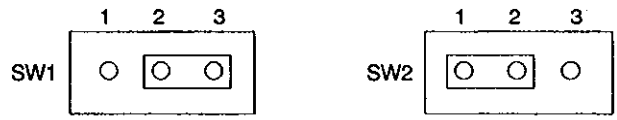


Fig. 4.8

(3) Factory Setting

Before shipment, the operation panel power ON/OFF is set to "Effective," and the external power ON/OFF is set to "Invalid."

- Setting shown below disables the power ON/OFF.

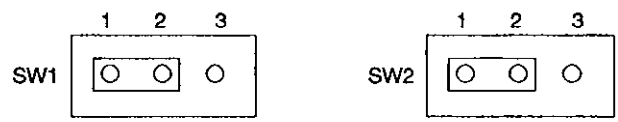


Fig. 4.9

5

CONNECTION OF MANUAL PULSE GENERATOR

Chapter 5 describes the connection between the CNC operation panel and the manual pulse generator and type of the connector as well as the cable specifications.

5.1 Connection between Devices

This section describes the connection between the CNC operation panel and devices of the manual pulse generator, and the type of connector, and the cable specifications.

5.1.1 Connection with CNC Operation Panel

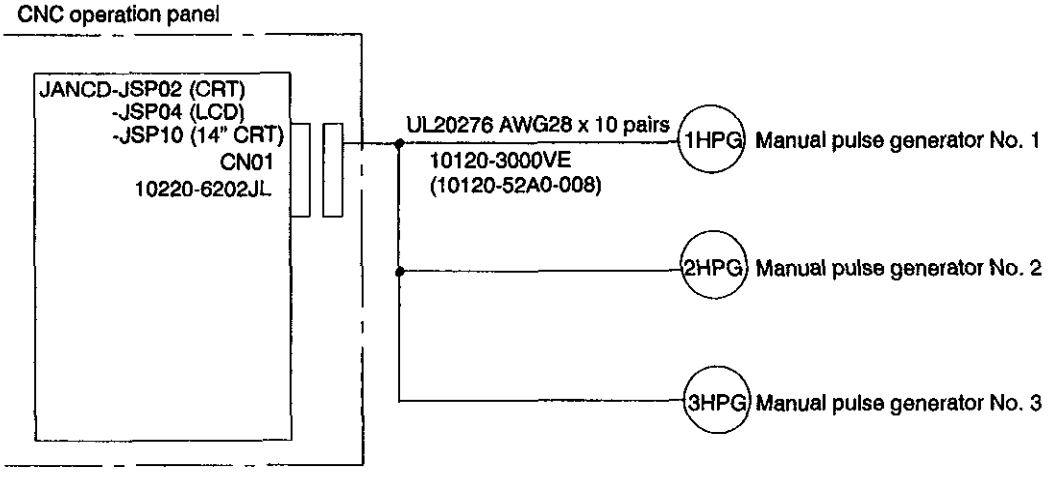


Fig. 5.1 Connection between Devices

5

5.2 Detailed Connection of Manual Pulse Generator

This section describes the detailed connection between the CNC operation panel and the manual pulse generator.

5.2.1 Non-parallel I/F

Example of OSM-01-2GA-15

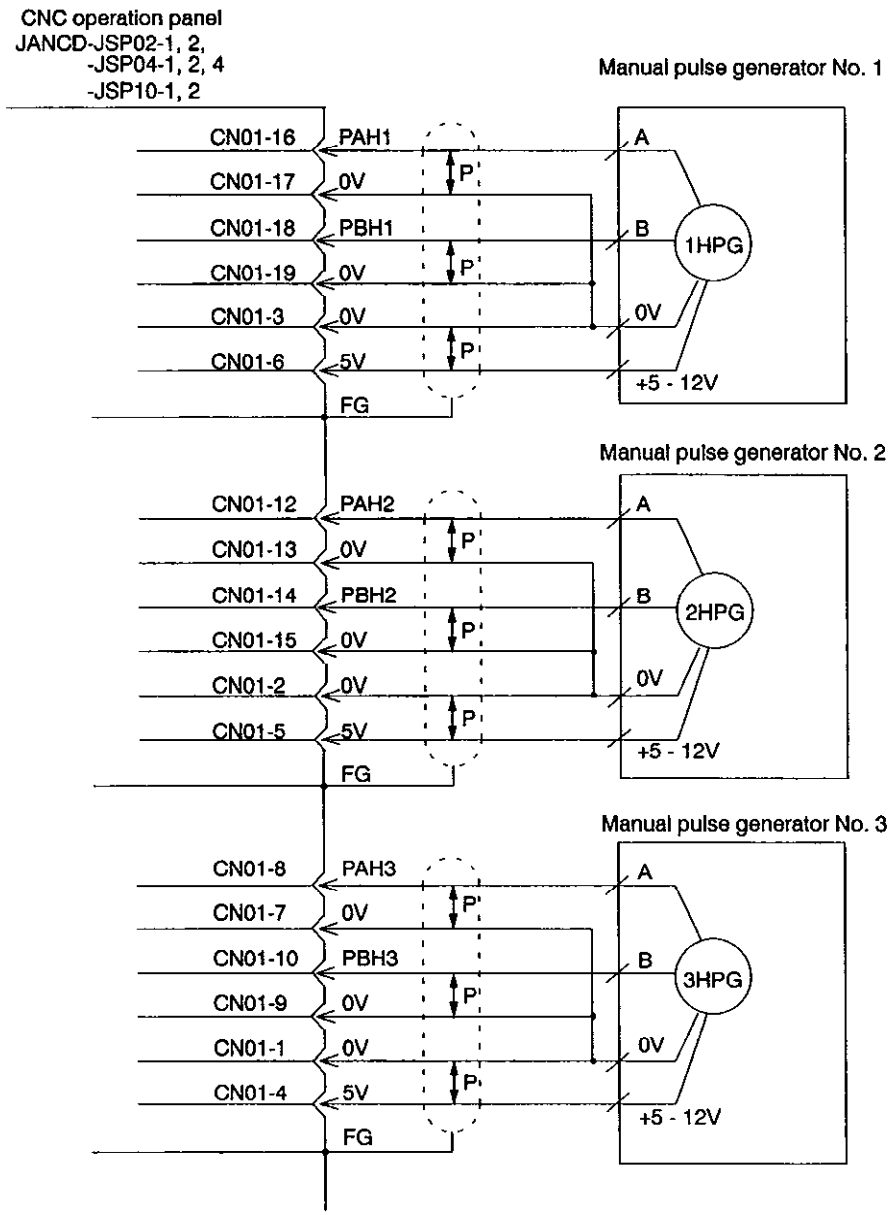


Fig. 5.2 Detailed Connection of Manual Pulse Generator

1. JSP∗∗-1 and JSP∗∗-2 are both provided with non-parallel I/F.

   With JSP02-1, JSP04-1 and JSP10-1, only one manual pulse generator can be connected (one axis).

   With JSP02-2, JSP04-2 and JSP10-2, three manual pulse generators can be connected (three axes).

2. Use the cable within 5 m for non-parallel type I/F.
   Connect FG and the cable to the case using cable clamp metal fitting.

5.2.2 Parallel I/F

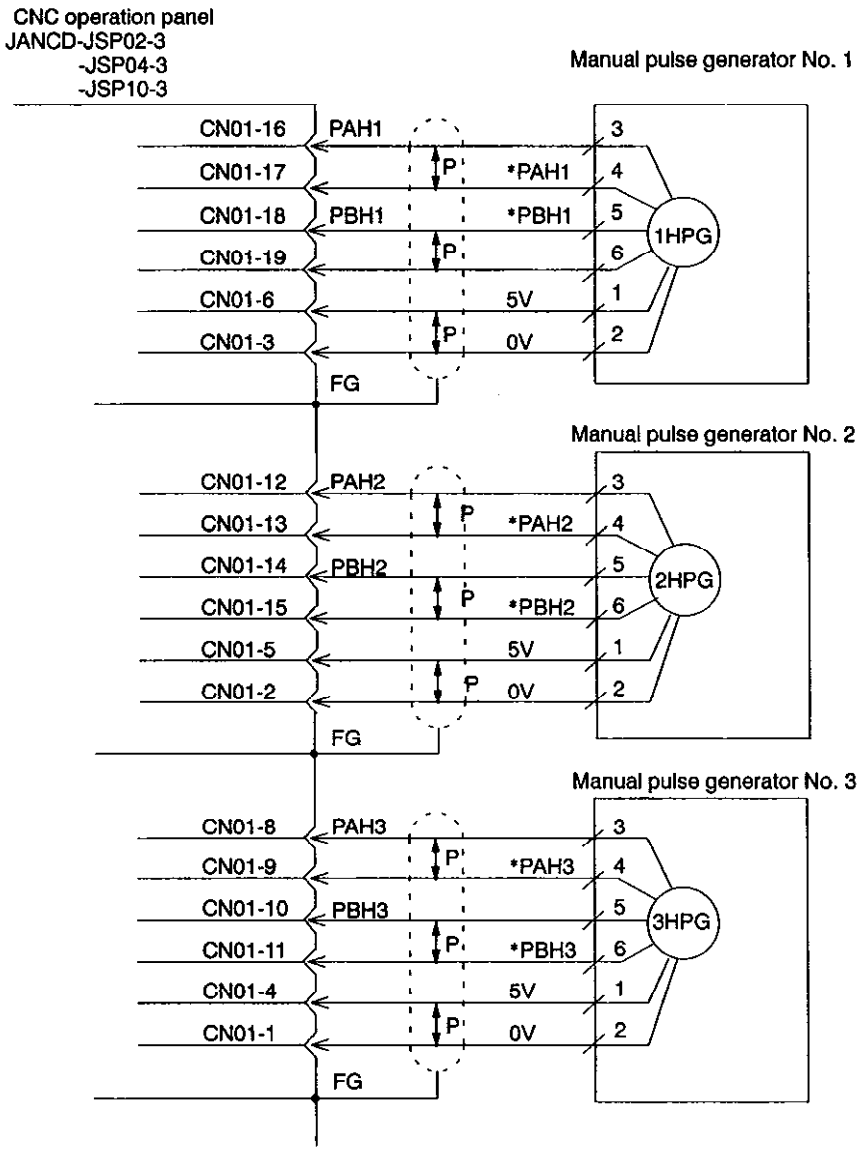


Fig. 5.3 Detailed Connection of Manual Pulse Generator (Parallel I/F)

5

1. JSP∗∗-3 is provided with parallel I/F.

   With JSP02-3, JSP04-3 and JSP10-3, three manual pulse generators can be connected (three axes).

2. Use the cable within 15 m in the case of parallel I/F.
   Parallel type manual pulse generator is not provided by Yaskawa.
   Connect FG and the cable to the case using cable clamp metal fitting.

5

6

CONNECTION OF POWER ON/OFF EXCLUSIVE SIGNAL

Chapter 6 describes the connection of the power ON/OFF exclusive signal.

6.1 Connection between Devices

This section describes the connection between devices related to the power ON/OFF exclusive signal, the type of connector, and the cable specifications.

6.1.1 Connection to CNC Unit

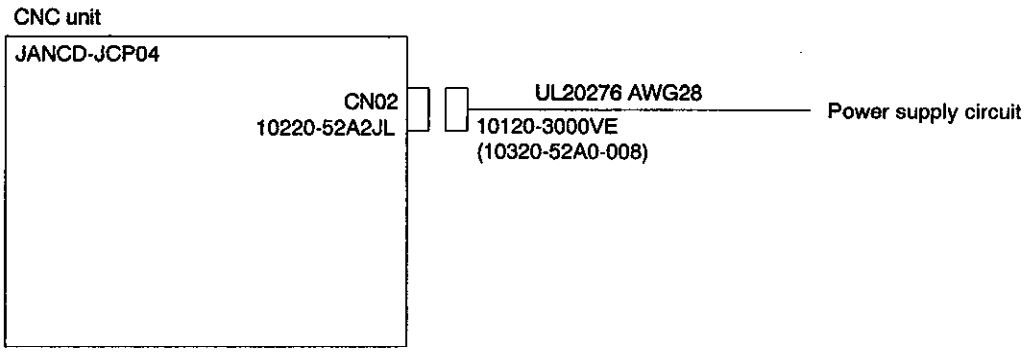


Fig. 6.1 Connection between Devices

6.2 Detailed Connection of Power ON/OFF Exclusive Signal

This section describes the detailed connection of the power ON/OFF exclusive signal.

6.2.1 Connection to CNC Unit

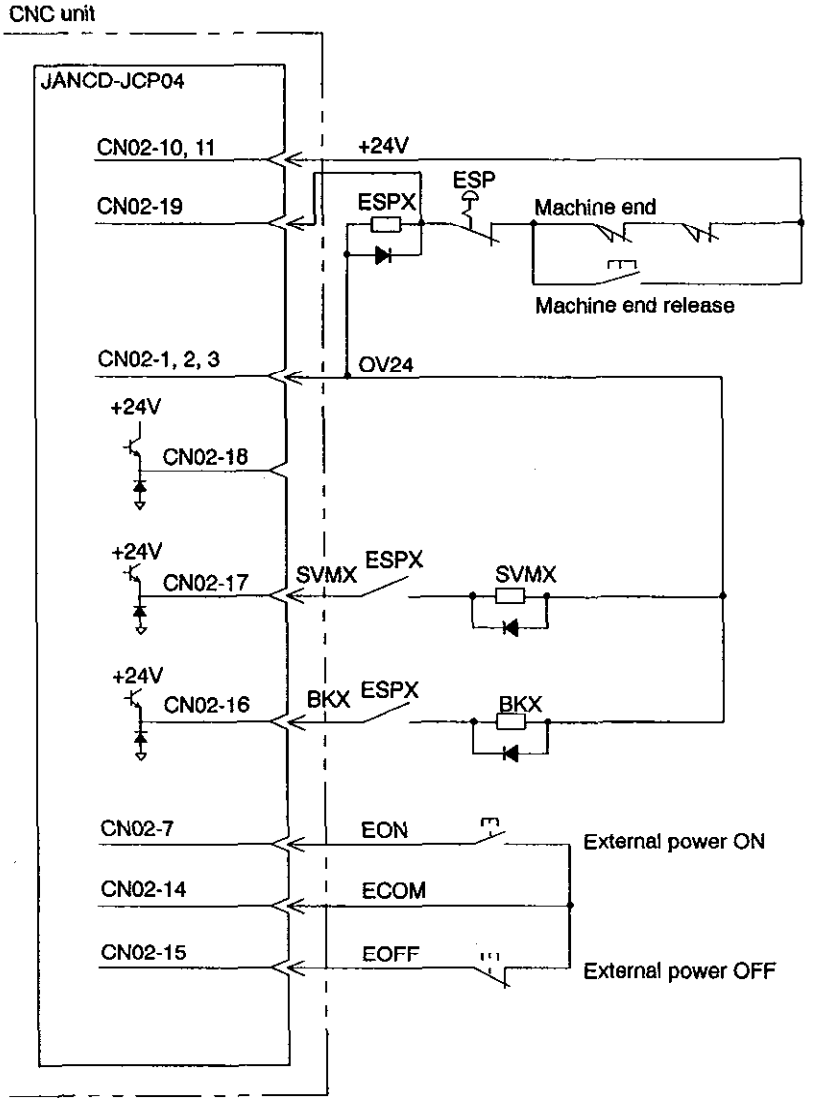


Fig. 6.2 Detailed Connection of Power ON/OFF Exclusive Signal

POINT

For the relay of SVMX, BKX, use miniature relay 24 VDC.
(Recommended part: MY-4Z by OMRON)

6.3 Details of Signal

This section describes the signals to be used in the power supply sequence.

6.3.1 Servo Power ON (SVMX), Brake Release (BKX) Output

(1) Signal Names and Descriptions

SVMX : This is the output that is closed in the second throw of the power. Turn ON the main connector 1MC in response to this signal.

BKX : This is the output to release the holding brake of the feed axis (vertical axis).

(2) Power Supply Sequence

Power supply sequence is executed as shown below:

① Supply power to the controller.

② Perform the power supply operation (Press [POWER ON] pushbutton on the CNC operation panel, or close the circuit between the external EON and ECOM.), and the logic circuit power is turned ON.

③ Perform the power supply operation again. SVMX output is closed and the servo power is turned ON.

④ After completion of servo ready (servo clamp status), BKX output is closed after the time set by parameter. For the motor equipped with a brake, release the brake by this signal.

⑤ After SVMX output is closed and the controller is ready, if external preparation has been completed, close the MRD (machine ready completed) input of the general-purpose output module. "RDY" is displayed on the CRT screen, and operation is possible .

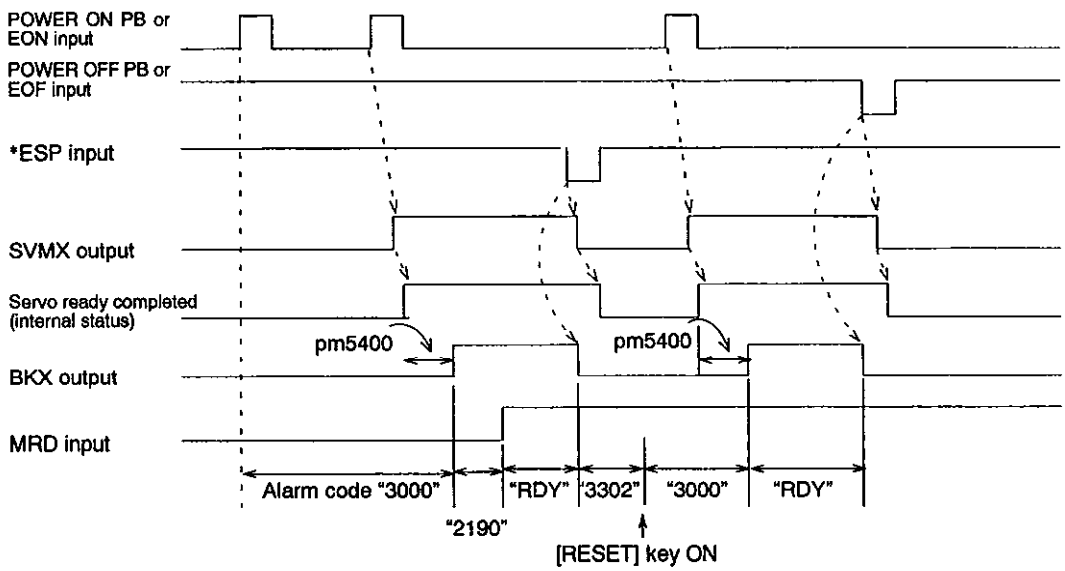


Fig. 6.3 Power Supply Sequence

6.3.2 Emergency Stop (*ESP) Input

When the emergency stop input circuit is opened, the controller stops all the actions and turns SVMX and BKX OFF. During emergency stop of the general-purpose I/O module, it makes output (*ESPS) "open."

In response to the emergency stop input, the servo should DB stop and the spindle stop with brake using the delay circuit. (The spindle coasts after the main connector 1MC is "opened" by the delay timer.)

6.3.3 External Power ON/OFF (EON, EOF, ECOM) Input

The controller may be turned ON/OFF by external input in the same manner as by the POWER ON/OFF pushbutton on the CNC operation panel.

Setting the portion between EON and ECOM "closed" in the state the EOF and ECOM is "closed" turns ON the logic circuit of the controller or the servo power.

Setting the portion between EON and ECOM "open" turns OFF the logic circuit of the controller and the servo power.

7

CONNECTION WITH SERVOPACK

Chapter 7 describes the connection with the Servopack (servo unit, inverter unit and converter unit).

7.1 Connection between Devices

This section describes the connection diagrams for the connection with the Servopack (servo unit, inverter unit and converter unit).

7.1.1 Connection between CNC Unit, Servopack, and Motor

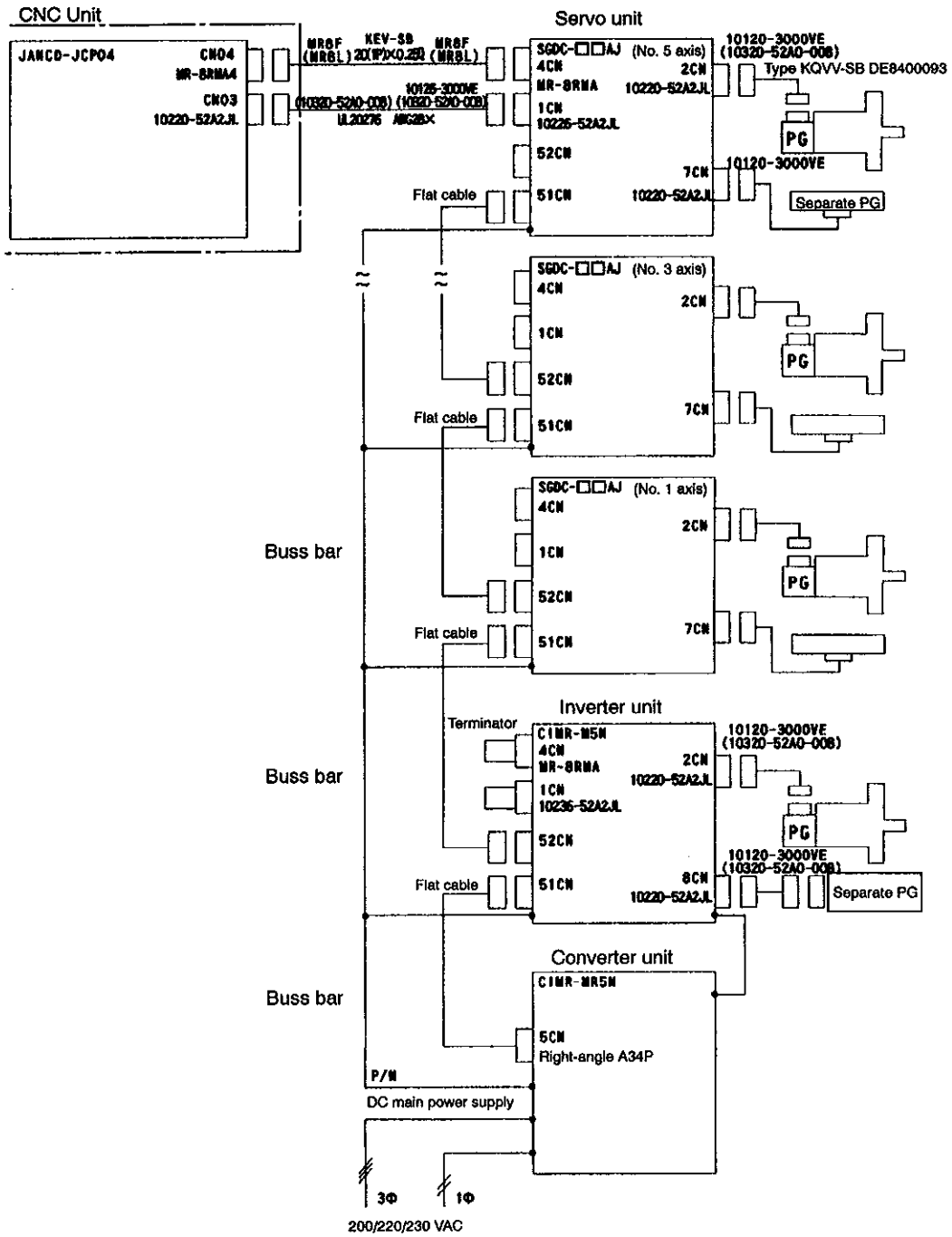


Fig. 7.1

7.2 Detailed Connection

This section describes the detailed connection between the CNC unit and the Servopack.

7.2.1 Connection between CNC Unit and Servopack

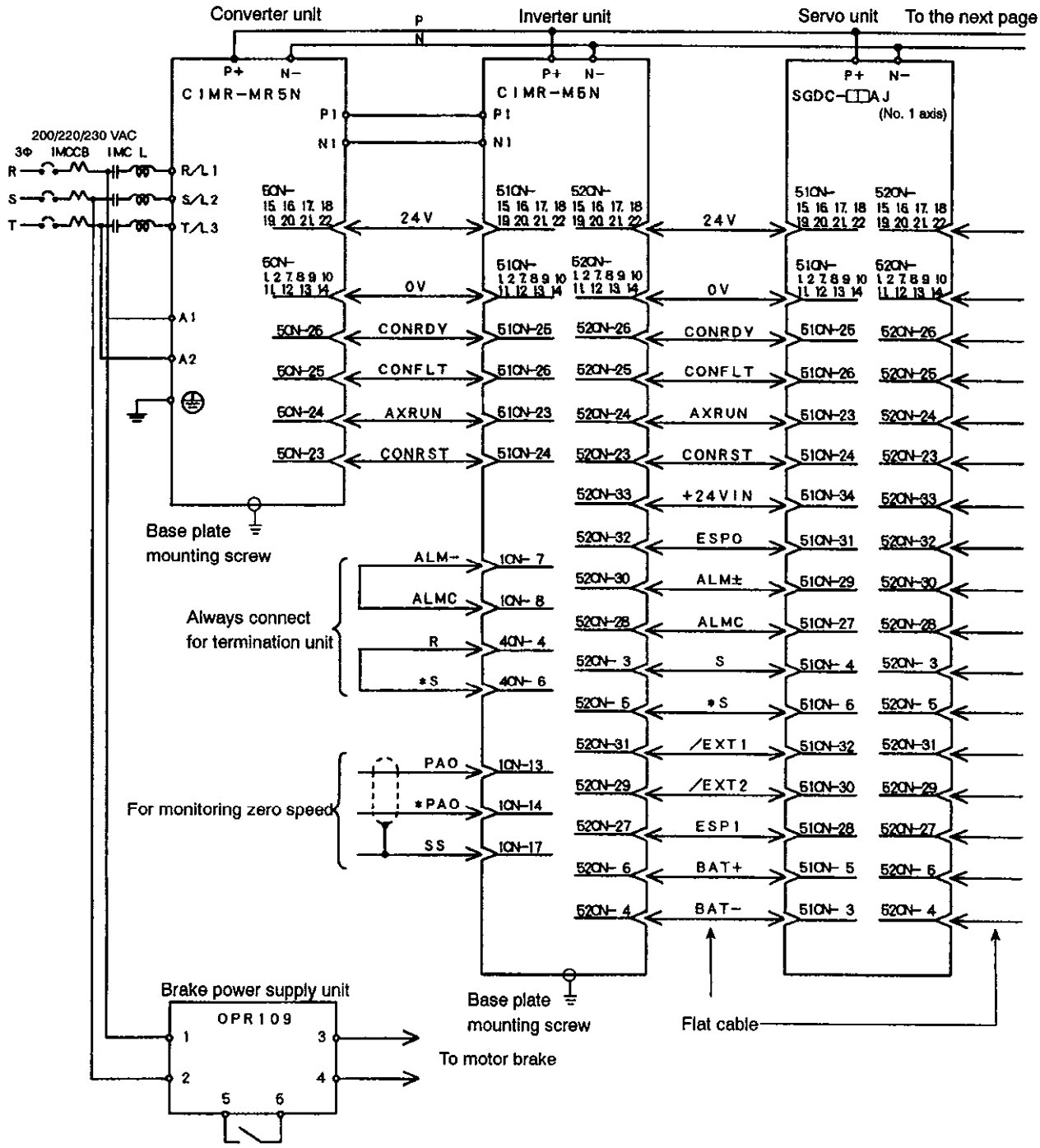


Fig. 7.2

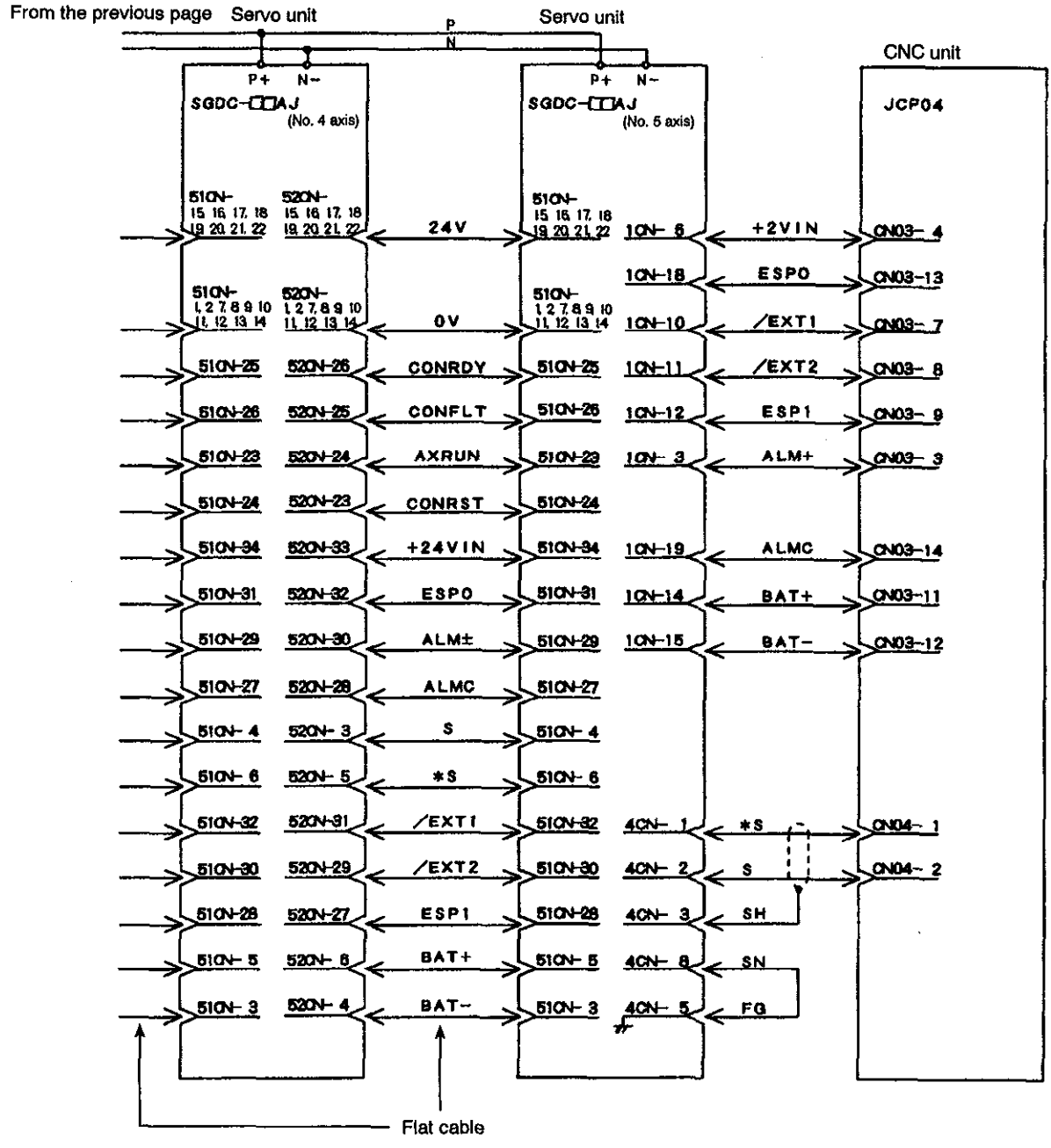

From the previous page
Servo unit
Servo unit
CNC unit
P
N
P+ N−
SGDC-□□AJ
(No. 4 axis)
SGDC-□□AJ
(No. 5 axis)
JCP04
51CN-
15 16 17 18
19 20 21 22
52CN-
15 16 17 18
19 20 21 22
51CN-
1 2 7 8 9 10
11 12 13 14
52CN-
1 2 7 8 9 10
11 12 13 14
24V
0V
CONRDY
CONFLT
AXRUN
CONRST
+24VIN
ESPO
ALM±
ALMC
S
*S
/EXT1
/EXT2
ESP1
BAT+
BAT−
1CN- 6
1CN-18
1CN-10
1CN-11
1CN-12
1CN- 3
1CN-19
1CN-14
1CN-15
4CN- 1
4CN- 2
4CN- 3
4CN- 6
4CN- 5
+2VIN
ESPO
/EXT1
/EXT2
ESP1
ALM+
ALMC
BAT+
BAT−
*S
S
SH
SN
FG
CN03- 4
CN03-13
CN03- 7
CN03- 8
CN03- 9
CN03- 3
CN03-14
CN03-11
CN03-12
CN04- 1
CN04- 2
Flat cable

Fig. 7.3

For the I/O signals directly connected to the inverter previously, use the general-purpose I/O ports.
The I/O addresses at the NC are shown below. For details of the signals, refer to the Instruction Manual for the inverter.

Table 7.1 No. 1 Spindle Control Inputs with M-series (PLC → CNC)

Signal No.	Bit No.	Symbol	Name
#3120	D0	SPRDY-1	Machine ready
	D1	SPEMG-1	Emergency stop
	D2	SPFWD-1	Forward rotation
	D3	SPREV-1	Reverse rotation
	D4	SPTLH-1	Torque limit H
	D5	SPTLL-1	Torque limit L
	D6	SPSSC-1	Soft start cancel
#3121	D0	SPCHW-1	Winding changeover signal
	D1	SPPPI-1	Speed controller P-PI changeover signal
	D2	SPORT-1	Orientation signal
	D3	SPLGR-1	L gear selection signal
	D4	SPMGR-1	M gear selection signal

Table 7.2 No. 1 Spindle Control Outputs with M-series (PLC → CNC)

Signal No.	Bit No.	Symbol	Name
#3660	D0	SPZSPD-1	Zero-speed signal
	D1	SPAGR-1	Speed match signal
	D2	SPSDET-1	Speed detection signal
	D3	SPTDET-1	Torque detection signal
	D4	SPTLE-1	In torque limit signal
	D5	SPORG-1	Load axis zero point signal
	D6	SPORE-1	Orientation completed signal
	D7	SPCHWE-1	Winding changeover signal
#3661	D0	SPFLT-1	Fault signal
	D1	SPTALM-1	Error/Alarm signal

7.2.2 Connection of the Servomotor

(1) Servomotor with Built-in PG
(common to absolute type and incremental type)

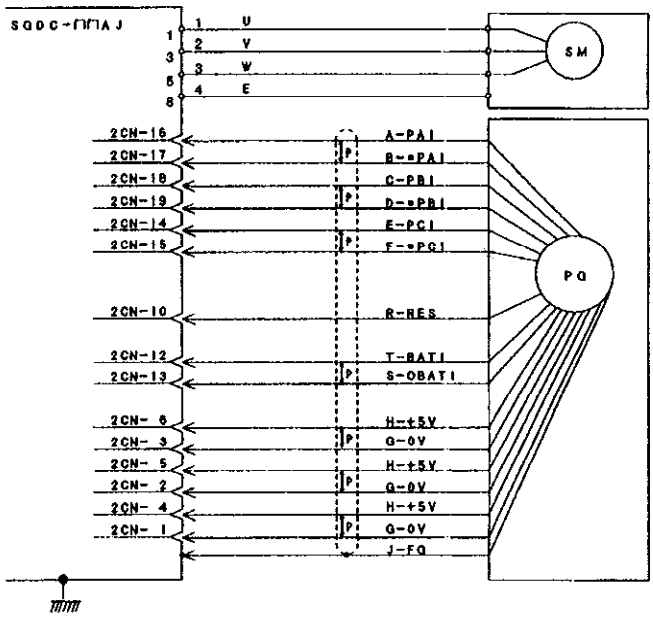


Fig. 7.4

7

(2) Servomotor with Separate Feedback Unit

Connection indicated below is necessary in addition to the connection indicated in item (1) above.

Note that the feedback unit of the same specifications as the Yaskawa model must be used.

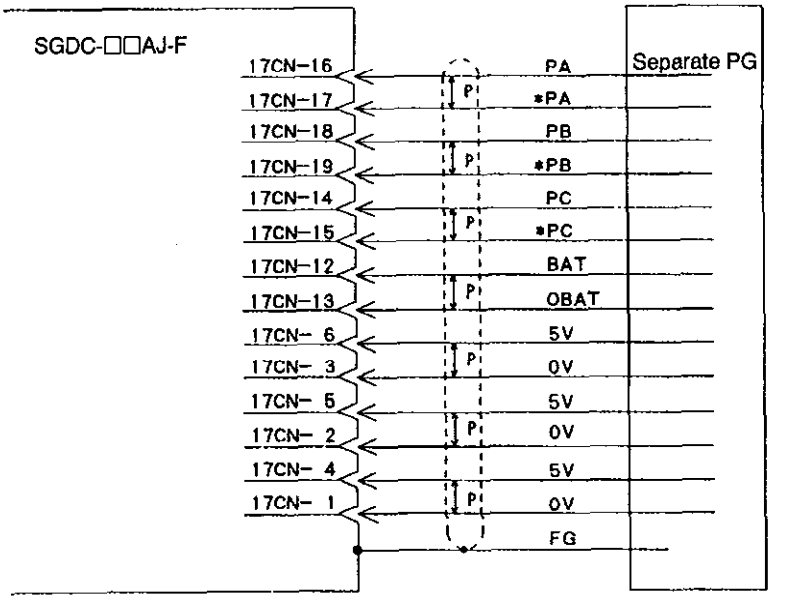


Fig. 7.5

7

7.2.3 Connection of the Spindle Motor

(1) Servomotor with Built-in PG

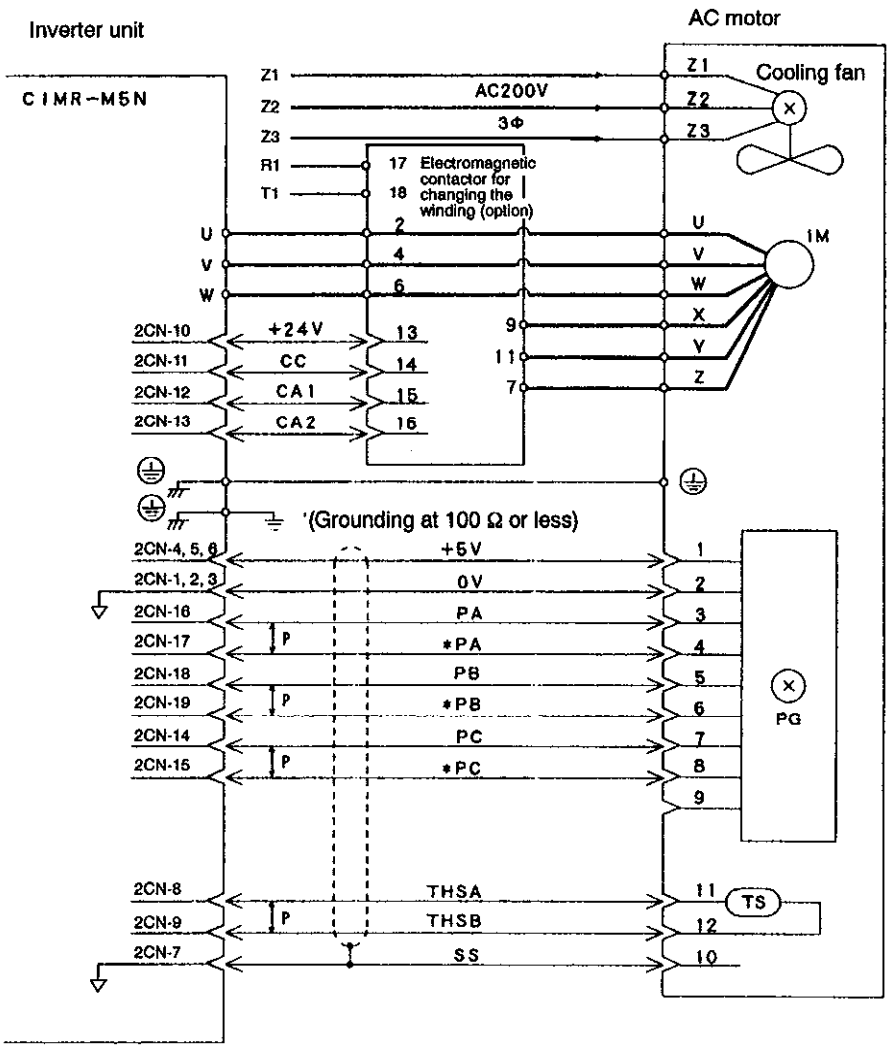


Fig. 7.6

(2) Separate Spindle Drive PG

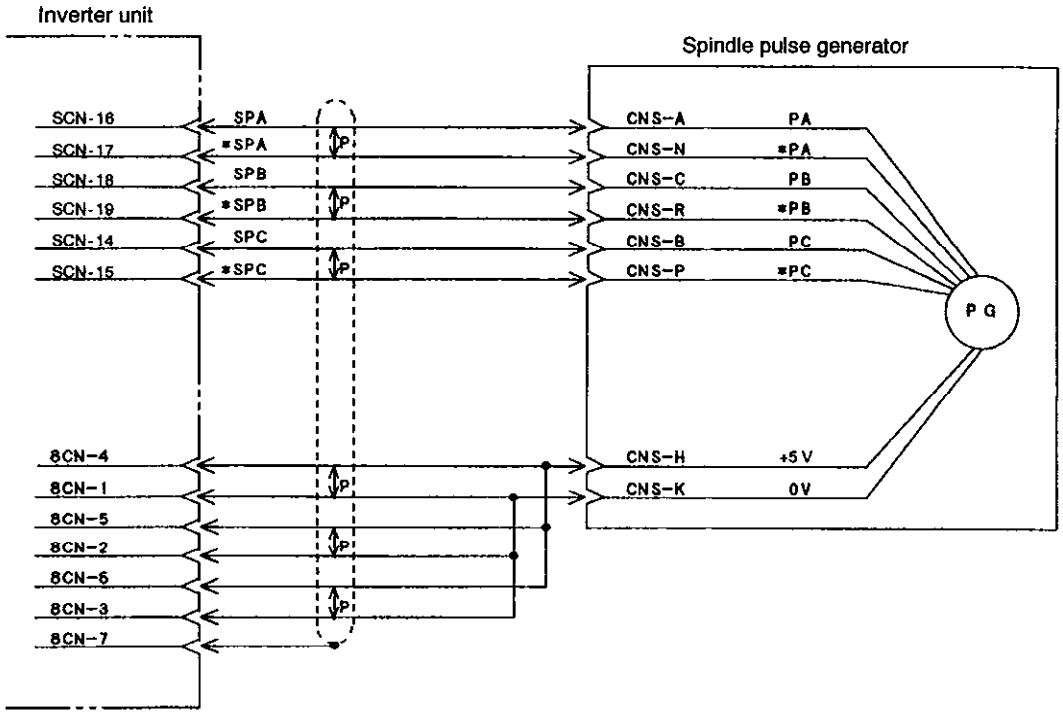
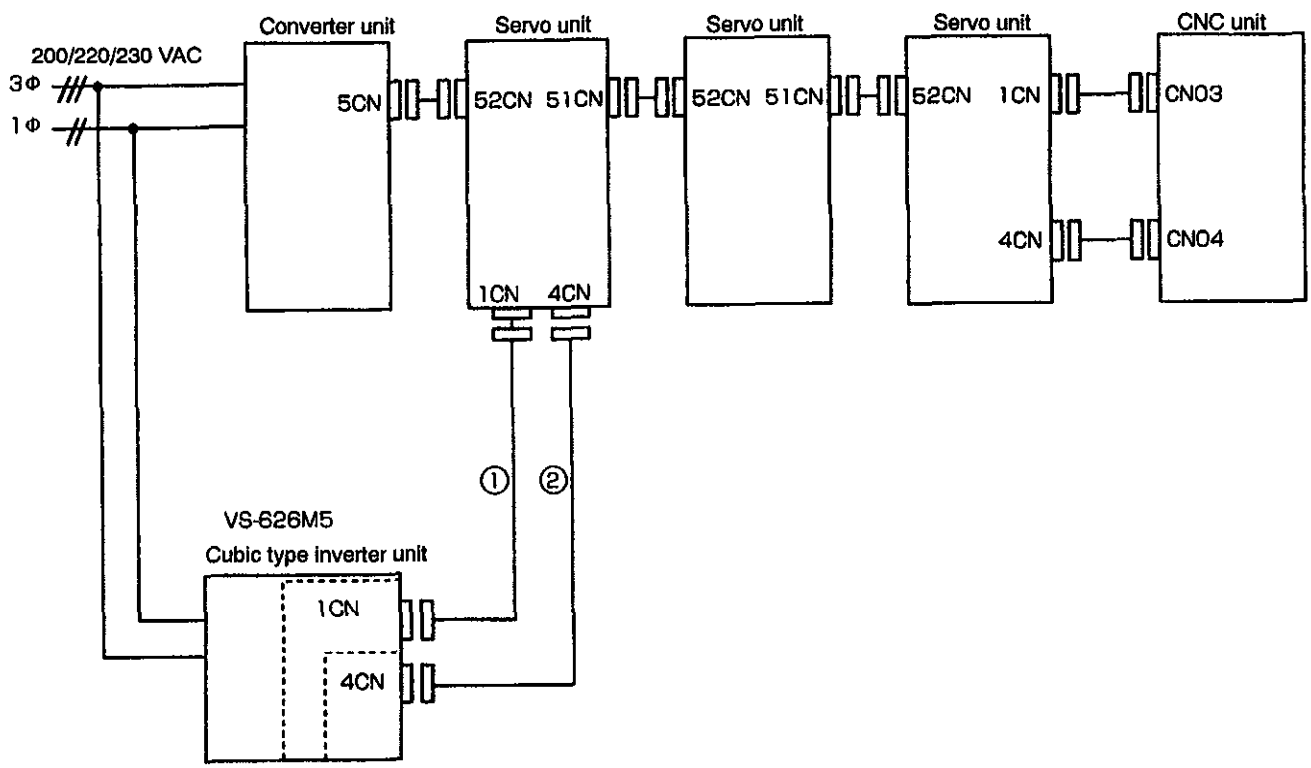


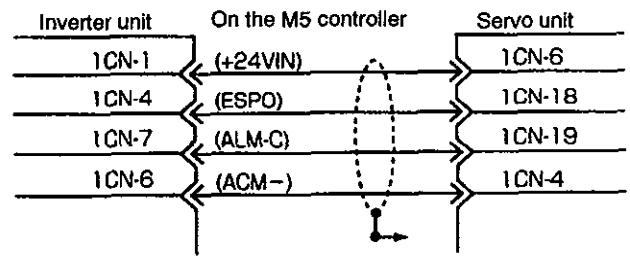
Fig. 7.7

7.2.4 Connection of the Cubic Type Inverter Unit

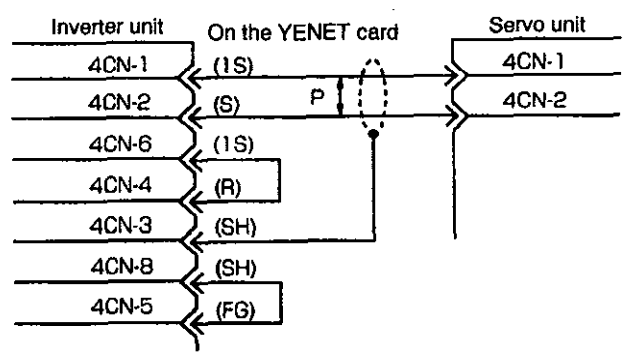


7

① Connection of 1CN (I/O connection)



② Connection of 4CN (YENET connection)



7.2.5 Selection of the Converter

It is necessary to select the converter that satisfies the following three conditions:

- Condition 1:

  The rated output of the selected converter must be larger than the following value:

  (Rated spindle output × 1.1)
  + (Total rated outputs of feed servomotors × 0.6)

- Condition 2:

  The 1-second rating of the selected converter (two times the continuous rating) must be larger than the following value.

- Condition 3:

  The 1-minute rating of the selected converter (1.2 times the continuous rating) must be larger than the following value.

An example of converter selection procedure is shown below.

Motors used: X-axis SGMG-20 (Max. 2000 r/min)
Y-axis SGMG-20 (Max. 2000 r/min)
Z-axis SGMG-30 (Max. 3000 r/min)
Spindle UAASWD-22CX1 7.5 kW (10 HP) (cont. rating)
11 kW (15 HP) (30-min. rating)
26 kW (34.8 HP) (1-min rating)

- Condition 1 (continuous rating)
  7.5 kW × 1.1 + (1.08 kW × 2 + 1.74 kW) = 12.12 kW
  (converter with 15 kW rating)
- Condition 2 (maximum momentary output of servo)
  5.99 kW × 2 + 8.54 kW = 20.52 kW
  (converter with 11 kW rating)
- Condition 3 (spindle acceleration/deceleration)
  Momentary max. output value of spindle motor: 26 kW
  (converter with 22 kW rating)

  From the calculation indicated above, the converter with 22 kW rating that satisfies all conditions should be selected.

8

CONNECTION OF RS-232C

Chapter 8 describes the connection between the CNC unit and the devices having RS-232C interface.

8.1 Connection between Devices

This section describes the connection between the CNC operation panel and devices having RS-232C interface, the type of connector, and the cable specifications.

8.1.1 Connection with CNC Operation Panel

For the port of RS-232C, No. 1 port is CN02 of JCP01, while No. 2 port is CN02 of JSP02 (CRT) or of JSP04 (LCD).

If the CNC has an ACGC, CN05 of JSP10 is treated as No. 2 port.

The example connection above shows the CN02 of JANCD-JSP02 and JANCD-JSP04. Pin numbers and the types of cable connectors are identical to those indicated above if other ports are used for the connection of a device having RS-232C interface.

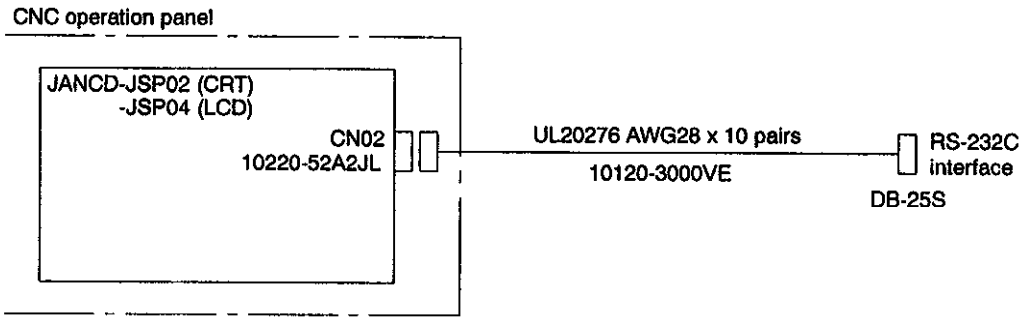


Fig. 8.1 Connection between Devices

8

8.2 Detailed Connection of RS-232C

This section describes the detailed connection between the CNC operation panel and devices having RS-232C interface.

8.2.1 Connection with CNC Operation Panel

Besides No. 1 and No. 2 ports, there are PLC exclusive ports (CN02, CN03 of JCP02), DNC exclusive port (CN06 of JIF01), and ACGC exclusive ports (CN01, CN02, of JCP10).

If the CNC panel has an ACGC, whether or not No. 2 port (CN05 of JSP10) is used for CNC or ACGC can be determined by the application software of the ACGC. If this port is used for ACGC, CN02 of JCP10 cannot be used.

The pin number to each signal on the CNC side is the same as that for No. 1 and No. 2 ports.

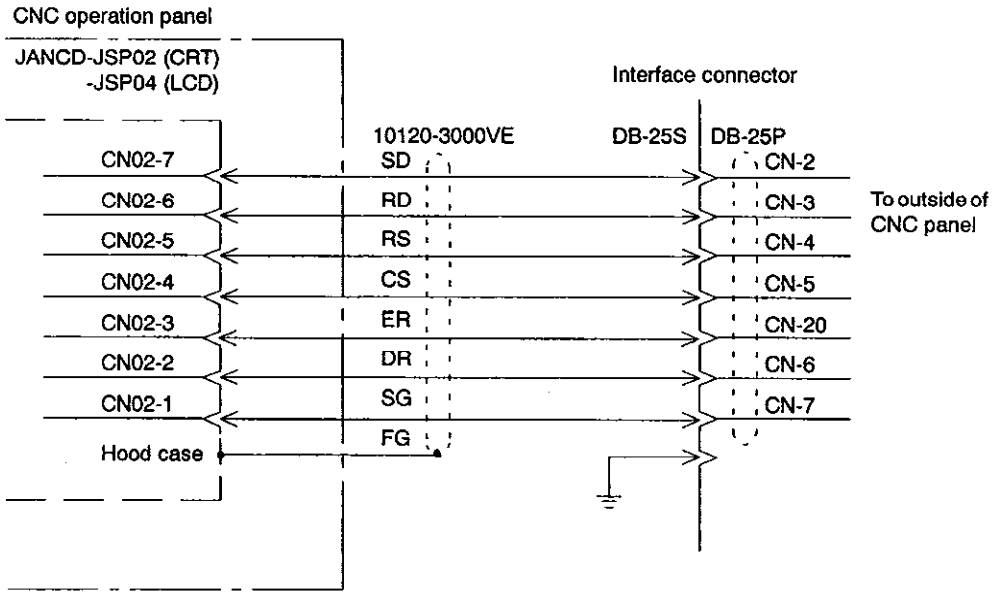


Fig. 8.2 Detailed Connection of RS-232C

8.2.2 Connection of Tape Reader

When the tape reader of MODEL 2801E is used, connect it in the manner shown in Fig. 8.3.

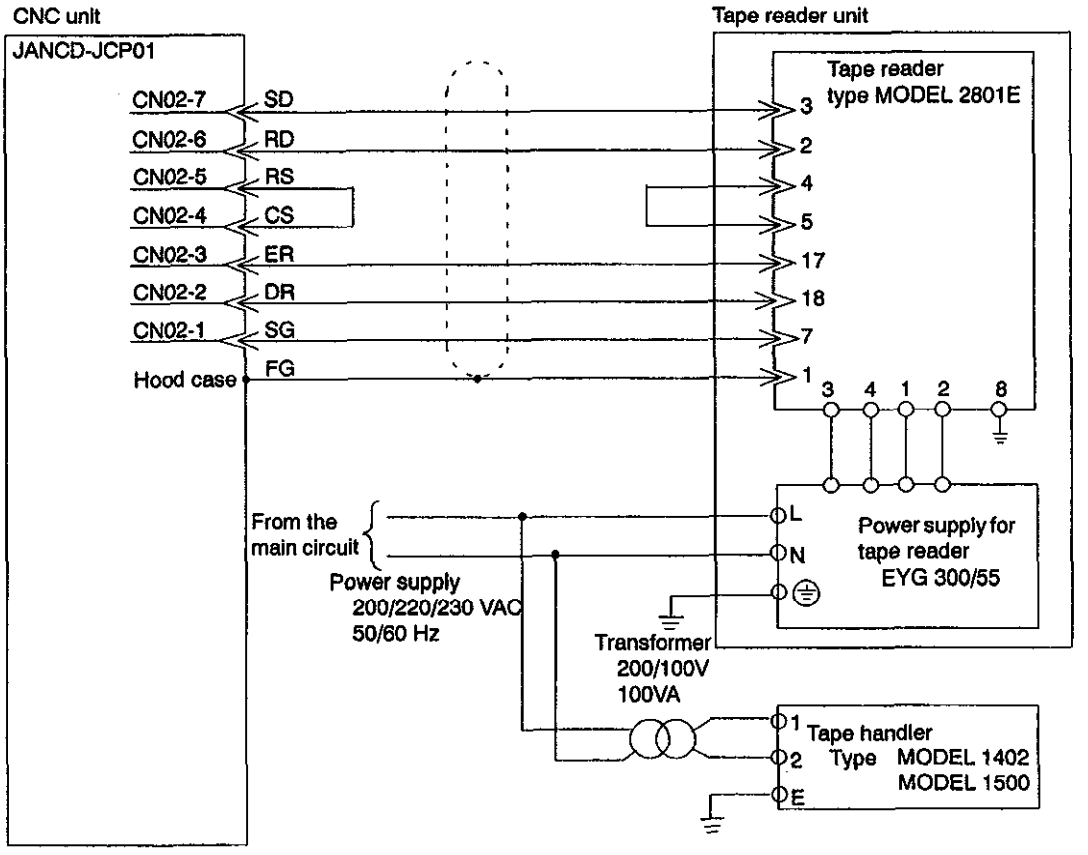


Fig. 8.3 Detailed Connection of Tape Reader

8

POINT

1. The length of wire from the tape reader to the CNC unit shall be within 3 m. If the length exceeds 3 m, contact your Yaskawa representative.
2. Connect to the case with the FG cable using the cable clamp metal fitting.

8.3 RS-232C Interface

This section describes the specifications for RS-232C interface, including important related data.

8.3.1 Transmission Method

Start-stop transmission, where the start signal goes ahead of information bits, and the stop signal follows the information bits.

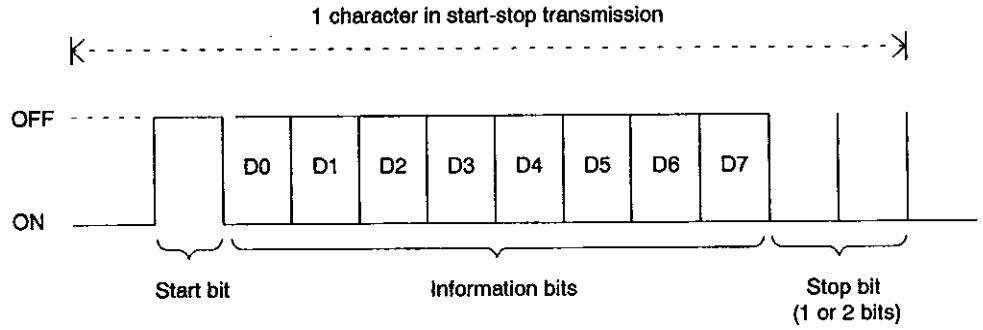


Table 8.1 RS-232C Voltage Level

	$V_0 < -3V$	$V_0 > +3V$
Function	OFF	ON
Signal status	Mark	Space
Logic	1	0

8.3.2 Codes to be Used

There are the following 2 kinds of codes to be used, and they may be switched by parameters.

- EIA code or ISO code
- EIA code or ISO code + control code (DC1 to DC4)

When using the control code, it is necessary for the objective device to be able to discriminate codes from DC1 to DC4.

Pattern of the codes and characters of DC1 to DC4 are as shown in Table 8.2.

Table 8.2 Codes and characters of DC1 to DC4

Character		D7	D6	D5	D4	D3	D2	D1	D0
DC1	Tape reader start				○				○
DC2	Tape punch designation				○			○	
DC3	Tape reader stop	○			○			○	○
DC4	Tape punch				○		○		

8.3.3 Communication Baud Rate

Communication baud rate may be designated by parameters.

8.3.4 Cable Length

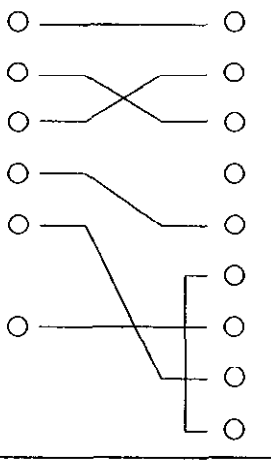
The maximum cable length varies with devices, so follow the operation manual for each device. (Standard maximum cable length: 15 m)

8.3.5 Connection between Devices

(1) Connection Cable for RS-232C Interface

Connection is shown in Table 8.3.

Table 8.3 Connection Cable for RS-232C Interface for End Connection (A)

NC Side			Connection	External Device Side
Code	Signal Name	Pin No.		Code
FG	Frame grounding	Frame		FG
SD	Send data	7		SD
RD	Receive data	6		RD
RS	Send request	5		RS
CS	Send possible	4		CS
DR	Data set ready	2		DR
SG	Signal grounding	1		SG
ER	Data end ready	3		IO BUSY
				ER

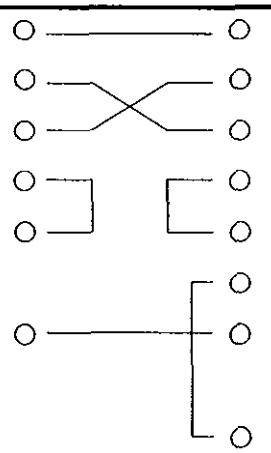
CNC can start and stop the objective device by sending out control codes DC1 to DC4. However, the objective device cannot control CNC by sending out control codes.

But, if the processing of the objective device is not in time, the data sending from CNC can be stopped temporarily by controlling CS signal at CNC side.

When the CS signal is not used at CNC side, short CS and RS as shown in Table 8.4.

Table 8.4 Connection Cable for RS-232C Interface for End Connection (B)

NC Side			Connection	External Device Side
Code	Signal Name	Pin No.		Code
FG	Frame grounding	Frame		FG
SD	Send data	7		SD
RD	Receive data	6		RD
RS	Send request	5		RS
CS	Send possible	4		CS
DR	Data set ready	2		DR
SG	Signal grounding	1		SG
ER	Data end ready	3		
				ER (or IO alarm)



(2) Description of Signals

FG : Frame grounding
SD : Send data (output)
RD : Receive data (input)
RS : Send request (output) —— This is the output signal that turns ON upon send start of data from CNC and turns OFF upon completion of send.
CS : Send possible (input) —— When this input signal is ON, data may be sent out from CNC.

Therefore, when the processing of the objective device is not in time, turning OFF this signal causes send data from CNC to stop within 2 characters.
When this signal is not used, connect as shown in Table 8.4.

SG : Signal ground
ER : Data end ready —— This is used as a tape rewind signal when using RS-232C interface for a tape reader.

When this signal is ON, tape reader rewind is possible.

DR : Data set ready
ER : Data end ready

If "1" is set to pm0012 D2, pm0014 D2, pm0017 D2 or pm0019 D2, interlock of DR is added.

Normally, signals DR and ER of RS-232C interface are not used on CNC side .

8.3.6 Signal Communication Timing

(1) When CNC Receives Data

Receiving is accomplished in the following order and timing.

① CNC sends out DC1 code.

② Upon receiving DC1 code, the objective device starts sending data to CNC.

③ When the processing of CNC side is not in time, CNC sends out DC3 code.

④ Upon receiving DC3 code, the objective device stops sending data within 10 characters.

⑤ After completion of processing, CNC sends out DC1 code again.

⑥ Upon receiving DC1 code, the objective device sends out the remainder of the previous data.

⑦ Upon completion of data reading, CNC sends out DC3 code.

⑧ The objective device stops sending data.

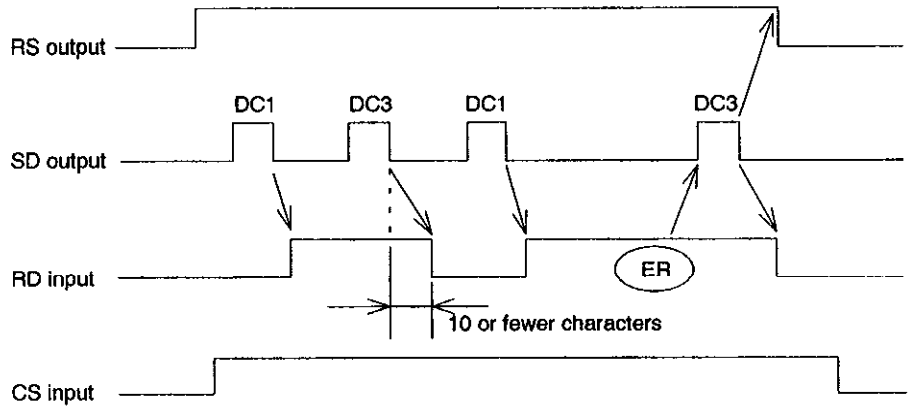


Fig. 8.4

(2) When CNC Sends Out Data

Sending is made in the following order and timing.

① CNC sends out DC2 code and data.

② When the processing of the objective device is not in time, IO BUSY signal turns CS OFF at CNC side. CNC stops sending data within 2 characters.

③ After completion of the processing of the objective device, CS at CNC side is turned ON. CNC sends out the remainder of the previous data.

④ After completion of sending data, CNC sends out DC4 code.

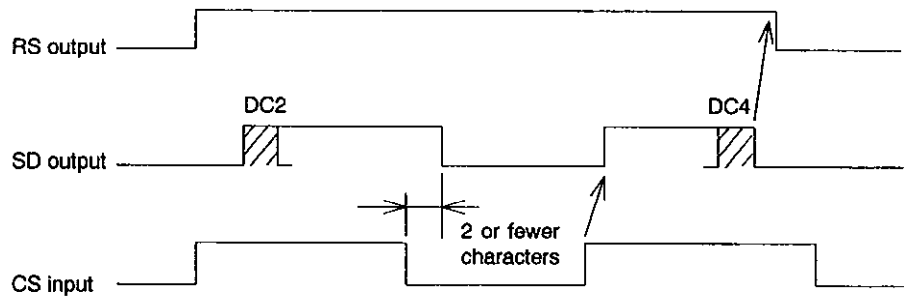


Fig. 8.5

9

CONNECTION OF DIRECT-IN

Chapter 9 describes the connection of direct IN signal to be input directly into CNC unit.

9.1 Connection between Devices

This section describes the connection of direct IN signal to be input directly into CNC unit, the type of connector, and the cable specifications.

9.1.1 Connection to CNC Unit

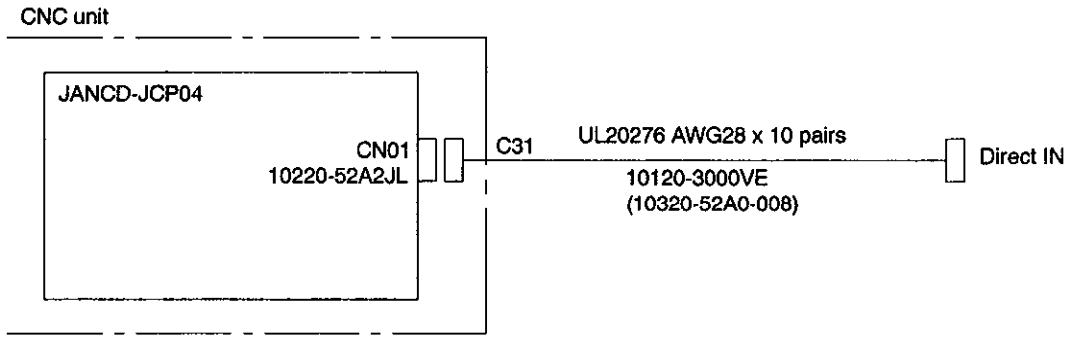


Fig. 9.1 Connection between Devices

9

9.2 Detailed Connection of Direct-in

This section describes the detailed connection of the direct IN signal to be input directly into CNC unit.

9.2.1 Connection to CNC Unit

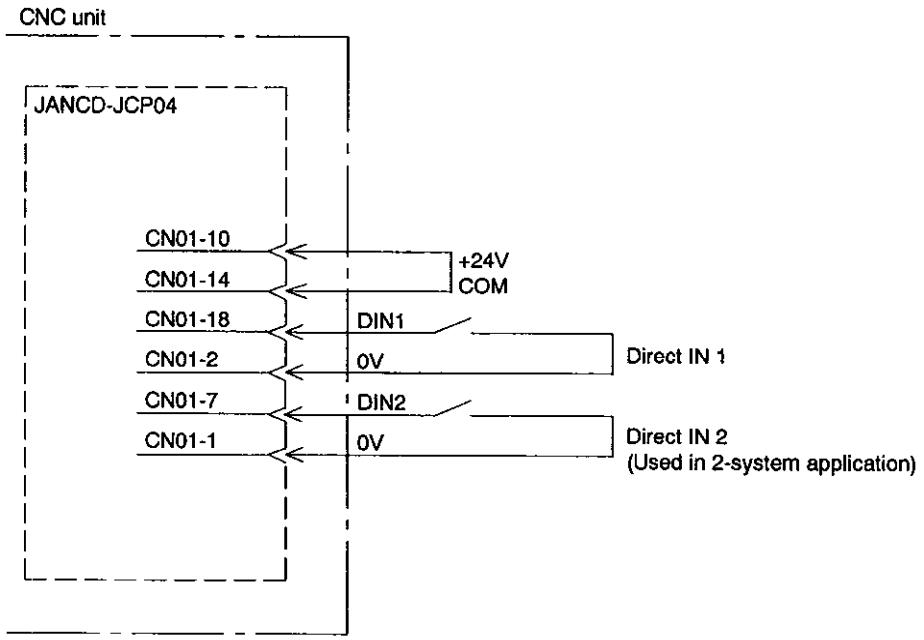


Fig. 9.2 Detailed Connection of Direct IN (for 0V common)

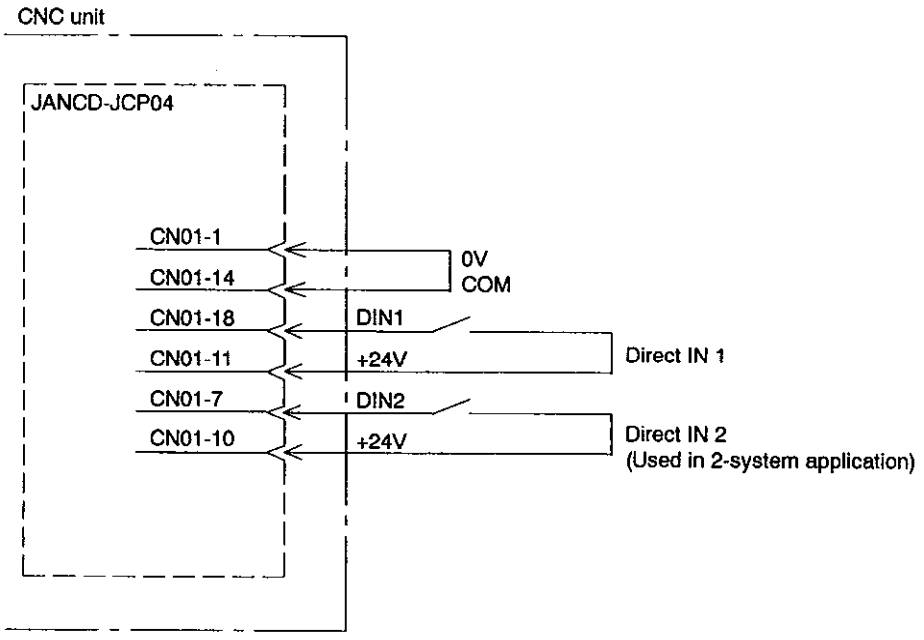


Fig. 9.3 Detailed Connection of Direct IN (for 24V common)

9.3 Description of Signal

This section describes the contents of the direct IN signal to be input directly into CNC unit.

9.3.1 Input Circuit on CNC Side

Direct In signal is the signal to be input directly into CNC without using general-purpose I/O when high speed processing is necessary. The time chart of signal is as shown in Fig. 9.4. Input circuit is as shown in Figs. 9.5 and 9.6.

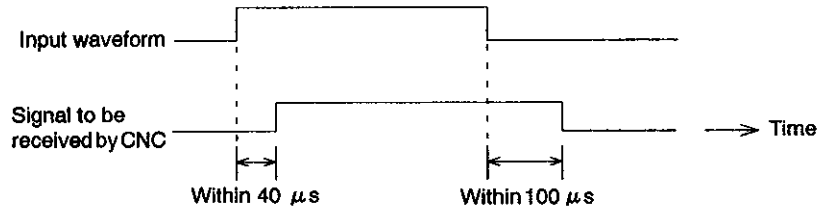


Fig. 9.4 Time Chart

(1) For 0V Common

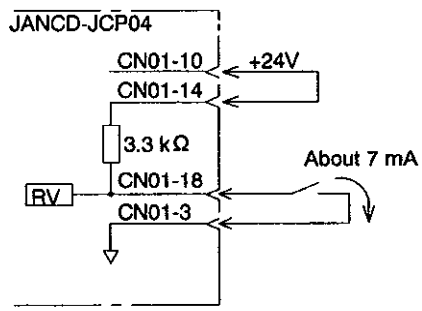


Fig. 9.5 Input Circuit

(2) For 24V Common

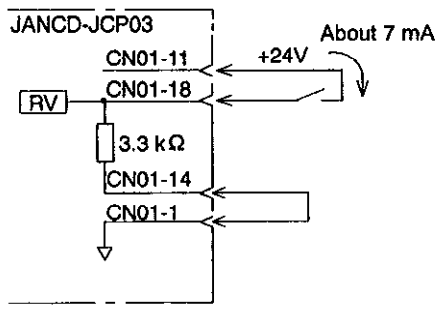


Fig. 9.6 Input Circuit

10

CONNECTION OF I/O MODULE

Chapter 10 describes the connection between CNC unit and I/O module.

10.1 Connection between Devices

This section describes the connection between the CNC unit and the I/O module, the type of connector, and the cable specifications.

10.1.1 Connection between Units

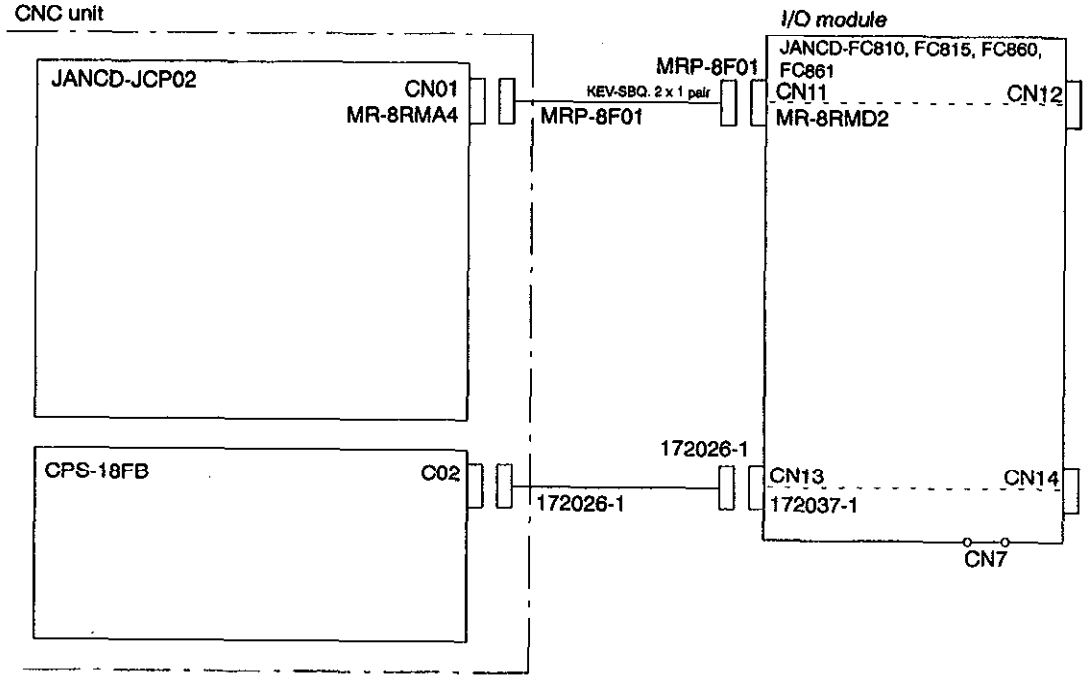


Fig. 10.1 Connection between Devices

Make the wiring cable between the CNC unit and the I/O module shortest.

10.2 Detailed Connection of I/O Module

This section describes the detailed connection between the CNC unit and the I/O module.

10.2.1 Connection between Units

If FC810, FC815, or FC860 is used, +24V of an internal power supply is output to CN7-1 and CN7-2 terminals. When an internal power supply is used, supply the power from the terminals.

Use the twisted-pair shielded cable with characteristic impedance of 120 Ω for the signal cable of /SIG and SIG signals (equivalent to cable diagram DE9405671).

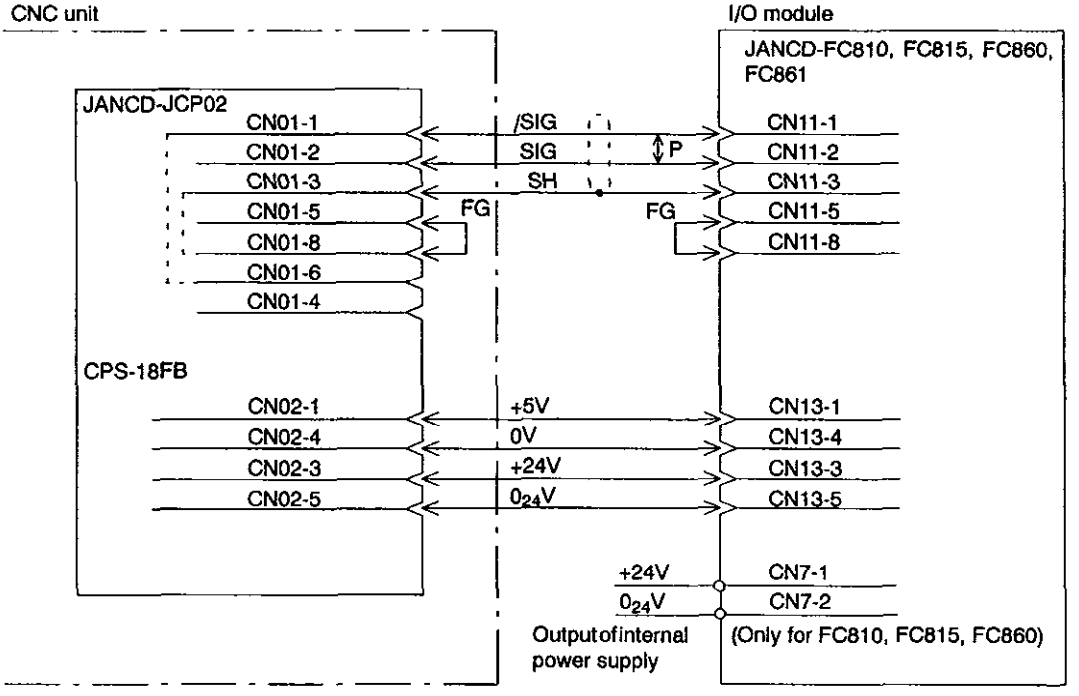


Fig. 10.2 Detailed Connection of I/O Module

10.3 Connection between Devices of Additional I/O Module

This section describes the connection between the CNC unit and the additional I/O module, the type of connector, and the cable specifications.

10.3.1 Connection between Units

10

CN7 is arranged only in FC810, FC815, and FC860, and is a 24V output terminal from the internal power supply (CPS 18FB). When an internal power supply is used, supply the power from this terminal.

Note that CN7 is not arranged in FC861.

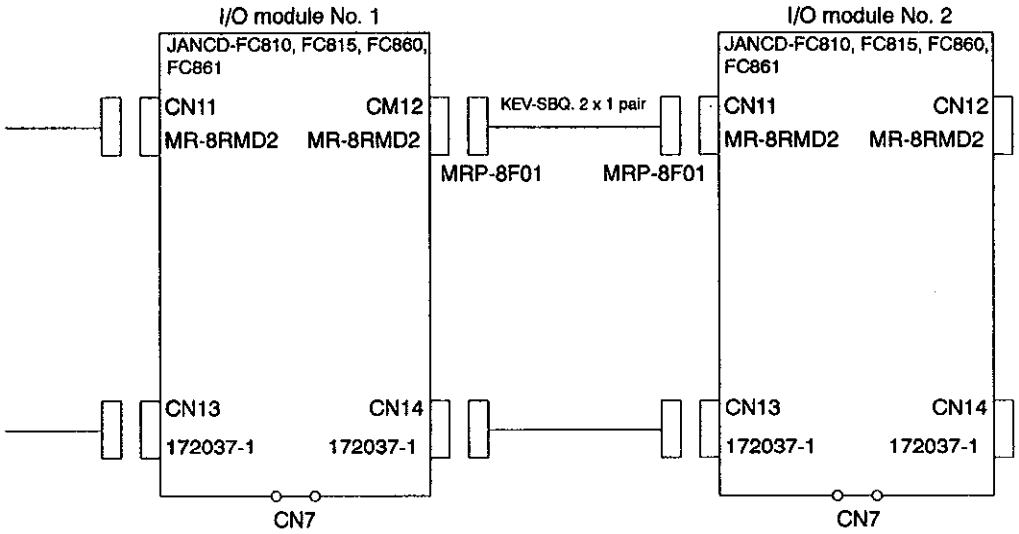


Fig. 10.3 Connection between Devices of Additional I/O Module

10.4 Detailed Connection of Additional I/O Module

This section describes the detailed connection between the CPU unit and the additional I/O module.

10.4.1 Connection between Units

Use the twisted-pair shielded cable with characteristic impedance of 120 Ω for the signal cable of /SIG and SIG signals (equivalent to cable diagram DE9405671).

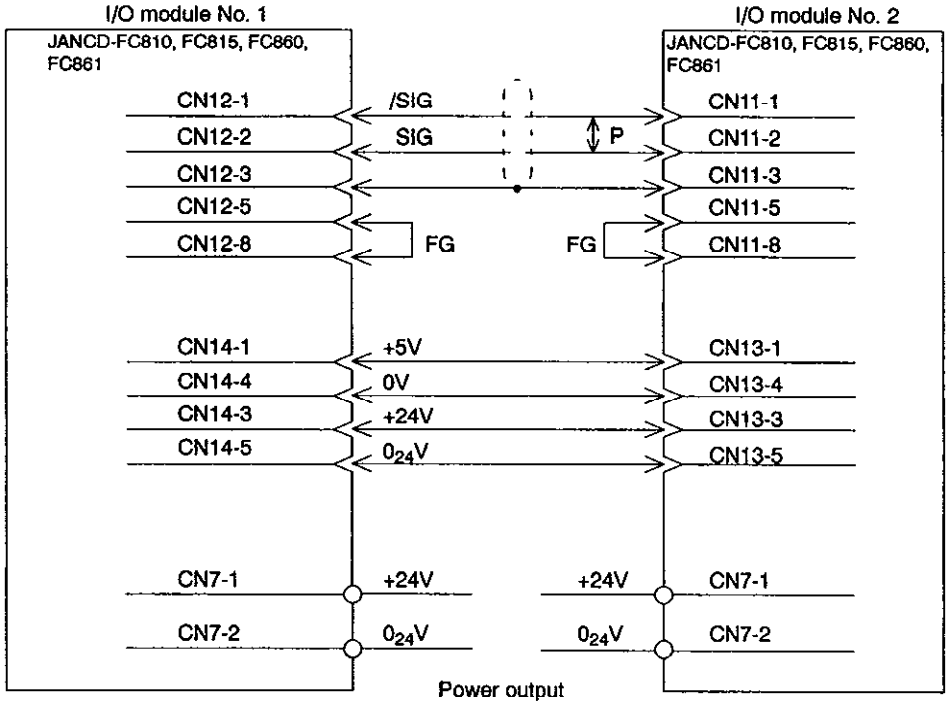


Fig. 10.4 Detailed Connection of Additional I/O Module

(1) Connection of General-purpose I/O Module

- Up to 4 general-purpose I/O modules can be connected. (when using FC810, FC815, or FC860)
- It is necessary to carry out end processing at the last module of general-purpose I/O modules.

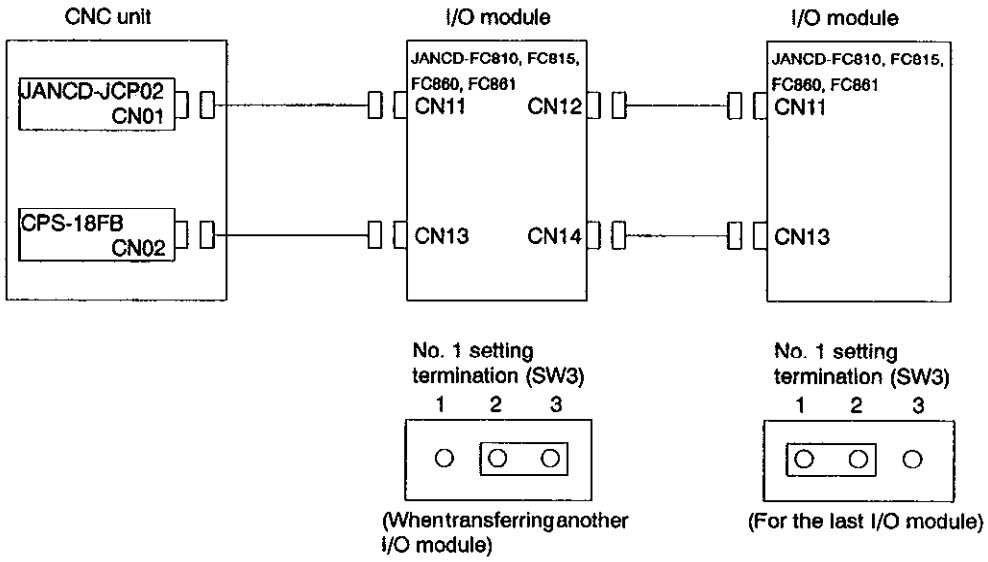


Fig. 10.5

(2) Setting of Short Pin (SW2)

By setting shorting pin SW2 of the I/O module (FC810, FC815, FC860, FC861), it is possible to make logic "1" when the input contact is "closed" irrespective of common 0V/24V.

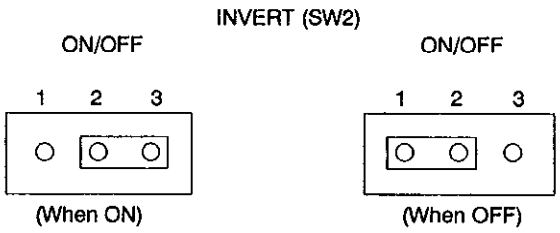


Fig. 10.6

(3) Address Setting of I/O Module

I/O port address of I/O module can be set by the rotary switch (SW1).

- I/O module (JANCD-FC810, FC815, FC860)

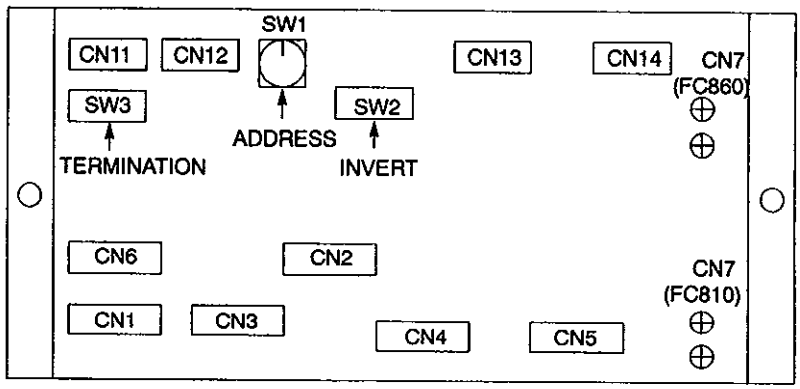


Fig. 10.7

- I/O module (JANCD-FC861)

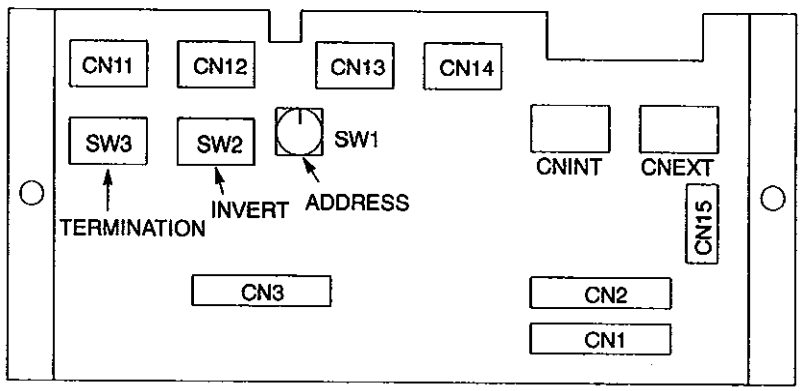


Fig. 10.8

- I/O module (JANCD-JSP02, JSP04)

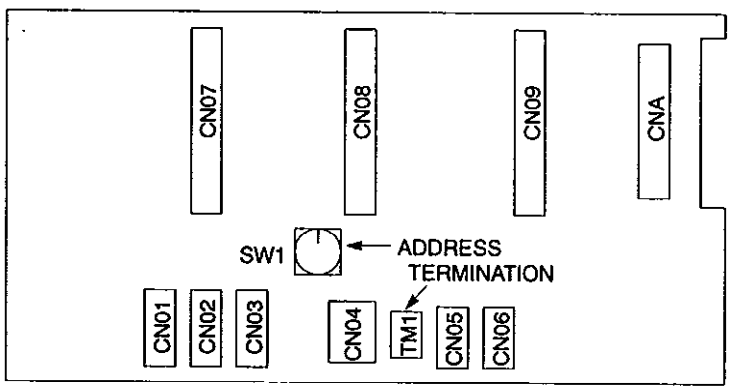


Fig. 10.9

(4) Reverse Bit Area of the Board

The reverse bit area by the common status of each board is shown in Table 10.1 and Table 10.2.

Table 10.1 Table of Bit Reverse Area

Common Connector Terminal Name	FC810, FC815, FC860 Reverse Area				
	SW1=1	SW1=3	SW1=5	SW1=7	SW1=9
COM30	#1000, #1001	#1016, #1017	#1032, #1033	#1048, #1049	#1064, #1065
COM31	#1002, #1003	#1018, #1019	#1034, #1035	#1050, #1051	#1066, #1067
COM32	#1004	#1020	#1036	#1052	#1068
COM40	#1005, #1006	#1021, #1022	#1037, #1038	#1053, #1054	#1069, #1070
COM41	#1007, #1008	#1023, #1024	#1039, #1040	#1055, #1056	#1071, #1072
COM42	#1009	#1025	#1041	#1057	#1073
COM20	#1010, #1011	#1026, #1027	#1042, #1043	#1058, #1059	#1074, #1075
COM21	#1012	#1028	#1044	#1060	#1076
COM10	#1013	#1029	#1045	#1061	#1077

Table 10.2 Table of Bit Reverse Area

Common Connector Terminal Name	FC861 Reverse Area				
	SW1=1	SW1=2	SW1=3	SW1=4	SW1=5
COM00	#1000, #1001	#1008, #1009	#1016, #1017	#1024, #1025	#1032, #1033
COM01	#1002	#1010	#1018	#1026	#1034
COM02	#1003, #1004	#1011, #1012	#1019, #1020	#1027, #1028	#1035, #1036
COM03	#1005	#1013	#1021	#1029	#1037
COM04	#1006, #1007	#1014, #1015	#1022, #1023	#1030, #1031	#1038, #1039
	SW1=6	SW1=7	SW1=8	SW1=9	SW1=A
COM00	#1040, #1041	#1048, #1049	#1056, #1057	#1064, #1065	#1072, #1073
COM01	#1042	#1050	#1058	#1066	#1074
COM02	#1043, #1044	#1051, #1052	#1059, #1060	#1067, #1068	#1075, #1076
COM03	#1045	#1053	#1061	#1069	#1077
COM04	#1046, #1047	#1054, #1055	#1062, #1063	#1070, #1071	#1078, #1079

11

CONNECTION OF GENERAL-PURPOSE I/O

Chapter 11 describes the connection between the I/O module and the device I/O signal.

11.1 Connection between Devices

This section describes the connection between the I/O module and the device I/O signal, the type of connector, and the cable specifications.

11.1.1 Connection of Signal Line with I/O Module

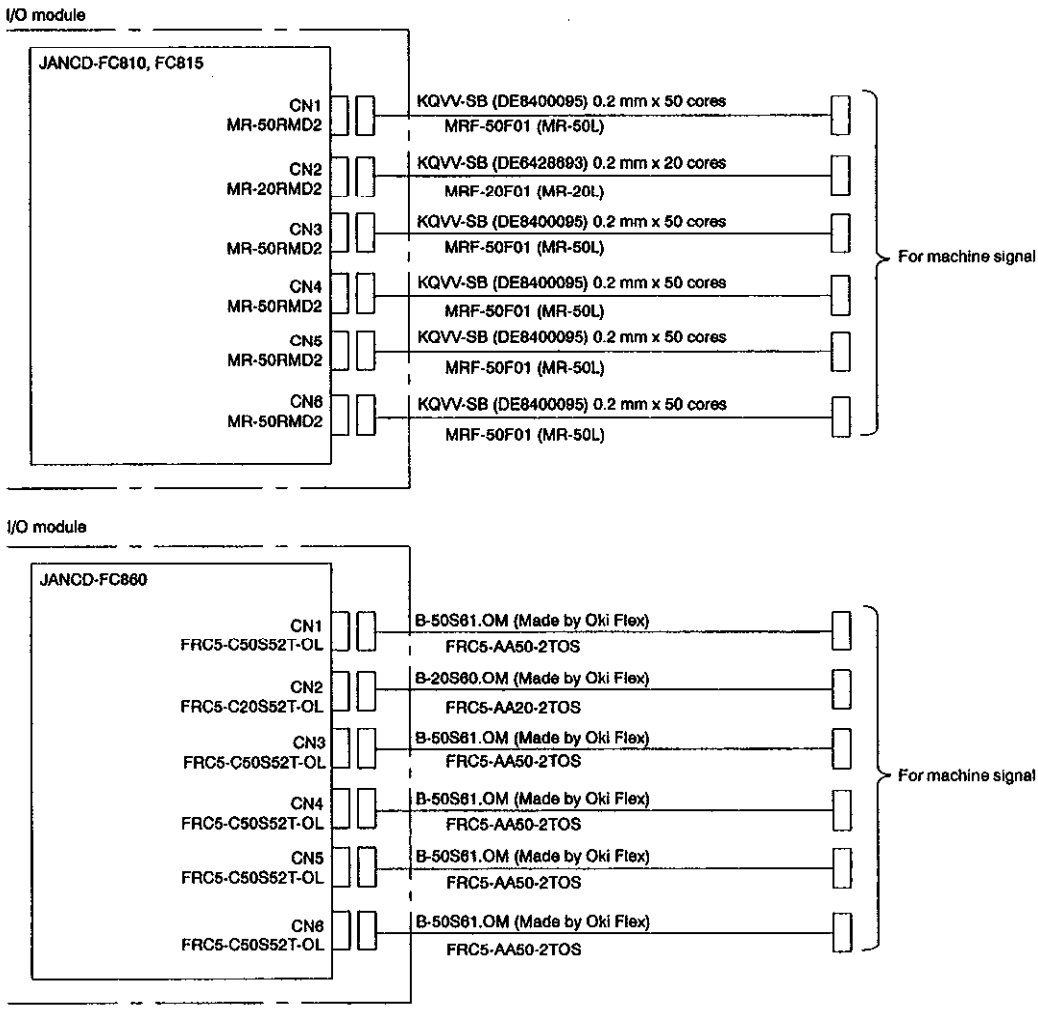


Fig. 11.1

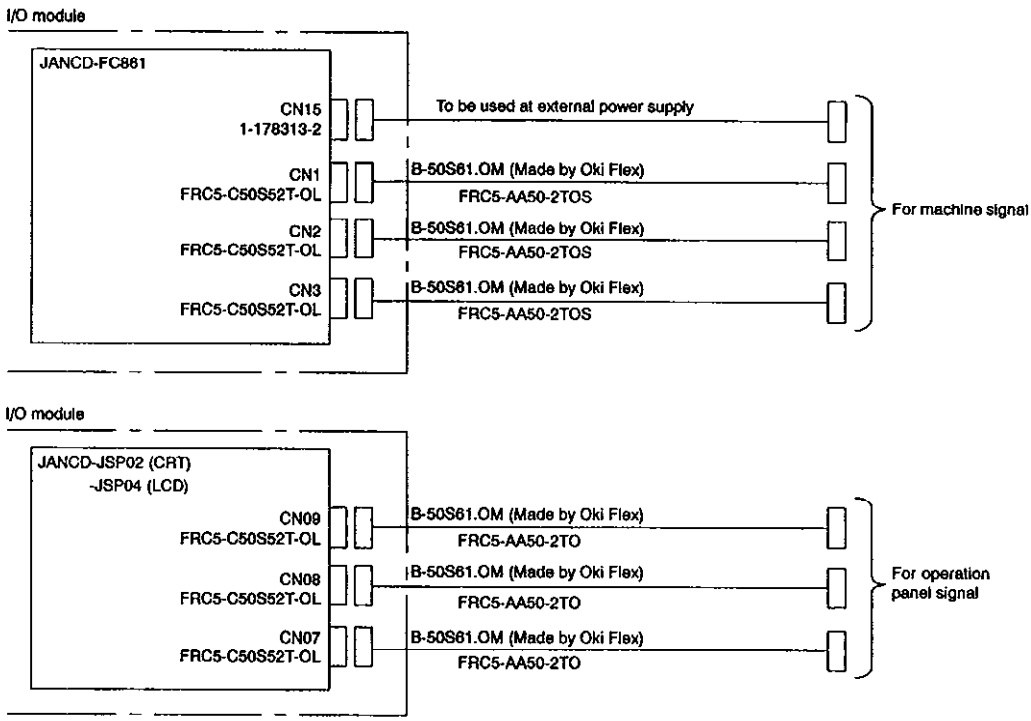


Fig. 11.2 Connection between Devices

11.2 Detailed Connection of General-purpose I/O

This section describes the detailed connection between the I/O module and the device I/O signal.

11.2.1 FC810/FC815/FC860 Module

When an internal power supply is used, supply the power from CN7-1 and CN7-2 pins.

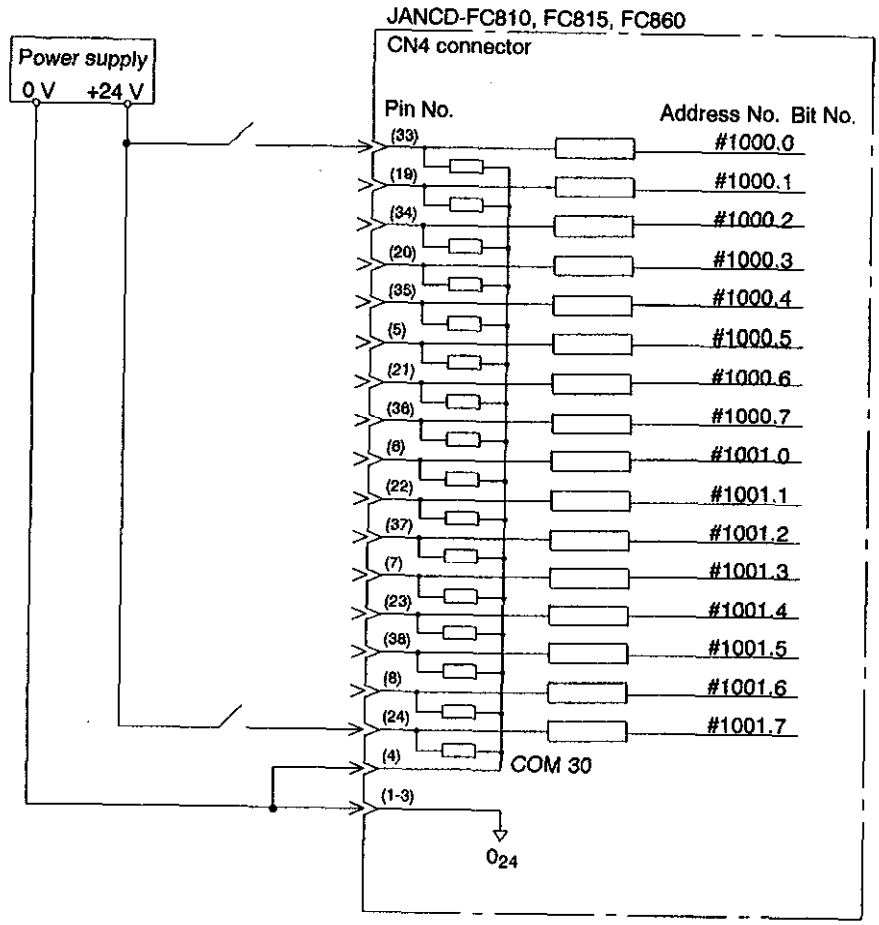


Fig. 11.3 FC810, FC815, FC860 Module Connection
(Address number and bit number: #1000.0 to #1001.7)

POINT

1. The above example shows one connection of +24V common. As for the connection of 0V common, refer to "11.3.2 (1) I/O Module (JANCD-FC810, FC815, FC860)."
2. The address is that of module No. 1. (#1000.0 to #1001.7)
   In modules No. 2 and No. 3, the layout is as shown above starting from the smaller address number. For details, refer to "11.3.1 I/O Port."

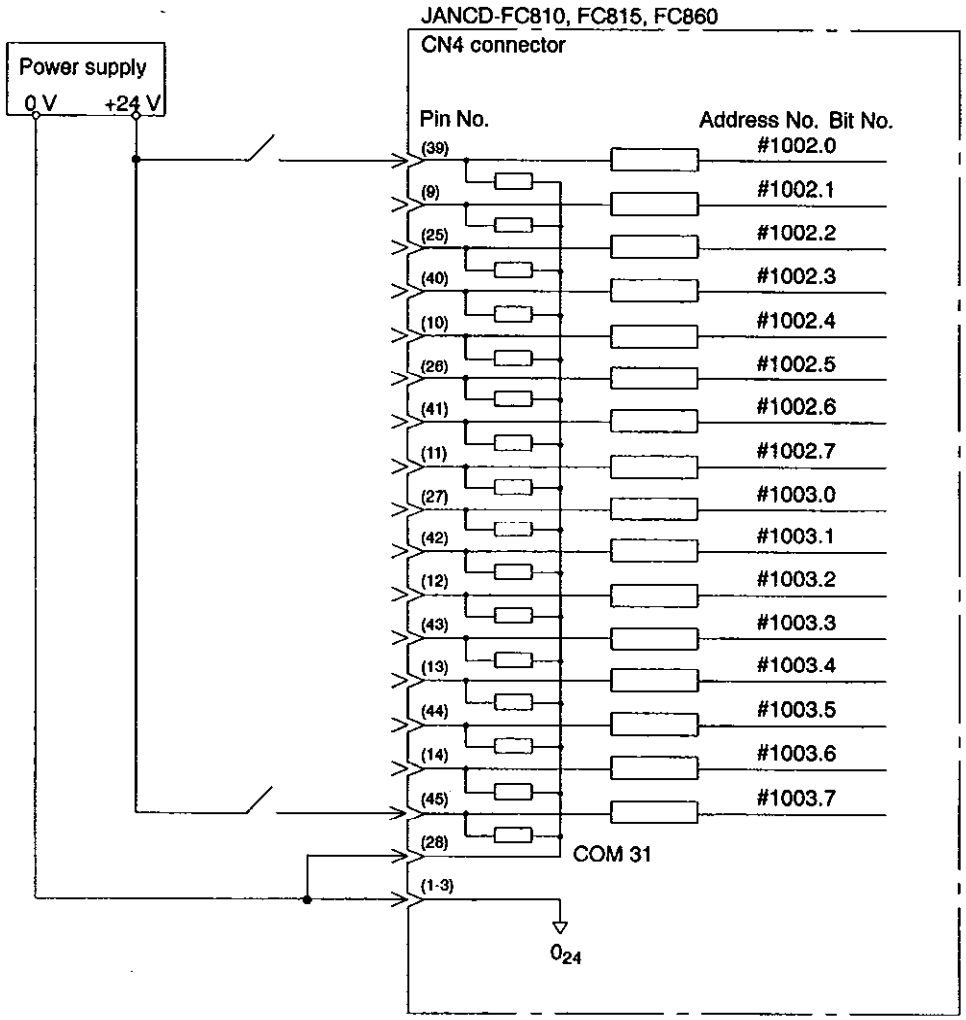


Fig. 11.4 FC810, FC815, FC860 Module Connection
(Address number and bit number: #1002.0 to #1003.7)

1. The above example shows connection of +24V common. As for the connection of 0V common, refer to "11.3.2 (1) I/O Module (JANCD-FC810, FC815, FC860)."
2. The address is that of module No. 1. (#1002.0 to #1003.7)
   In modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number. For details, refer to "11.3.1 I/O Port."

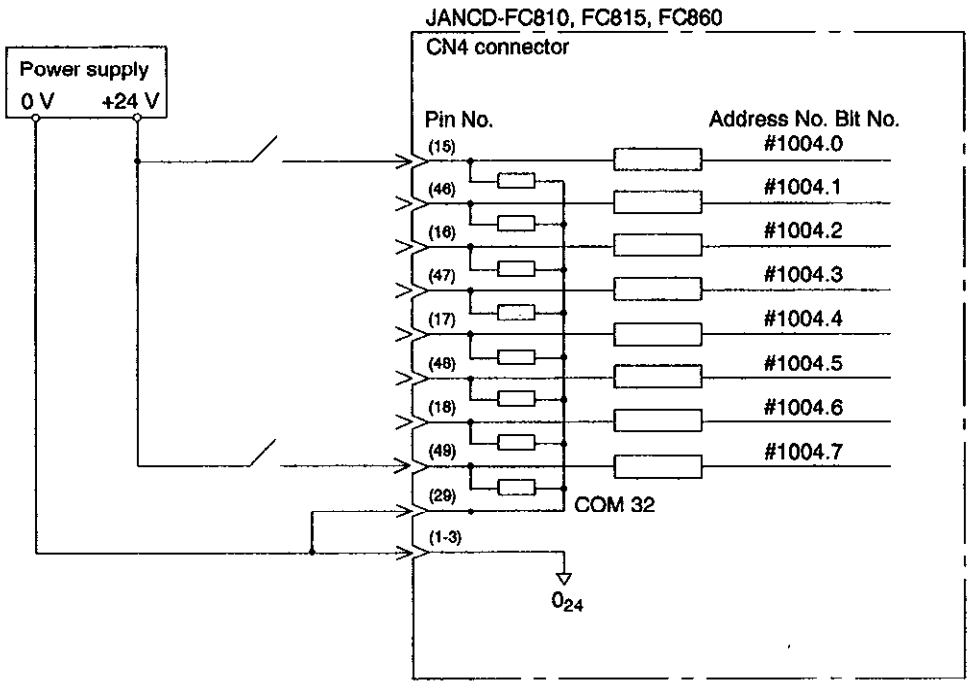


Fig. 11.5 FC810, FC815, FC860 Module Connection
(Address number and bit number: #1004.0 to #1004.7)

POINT

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (1) I/O Module (JANCD-FC810, FC815, FC860)."
2. The address is that of module No. 1. (#1004.0 to #1004.7)
   For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number. For details, refer to "11.3.1 I/O Port."

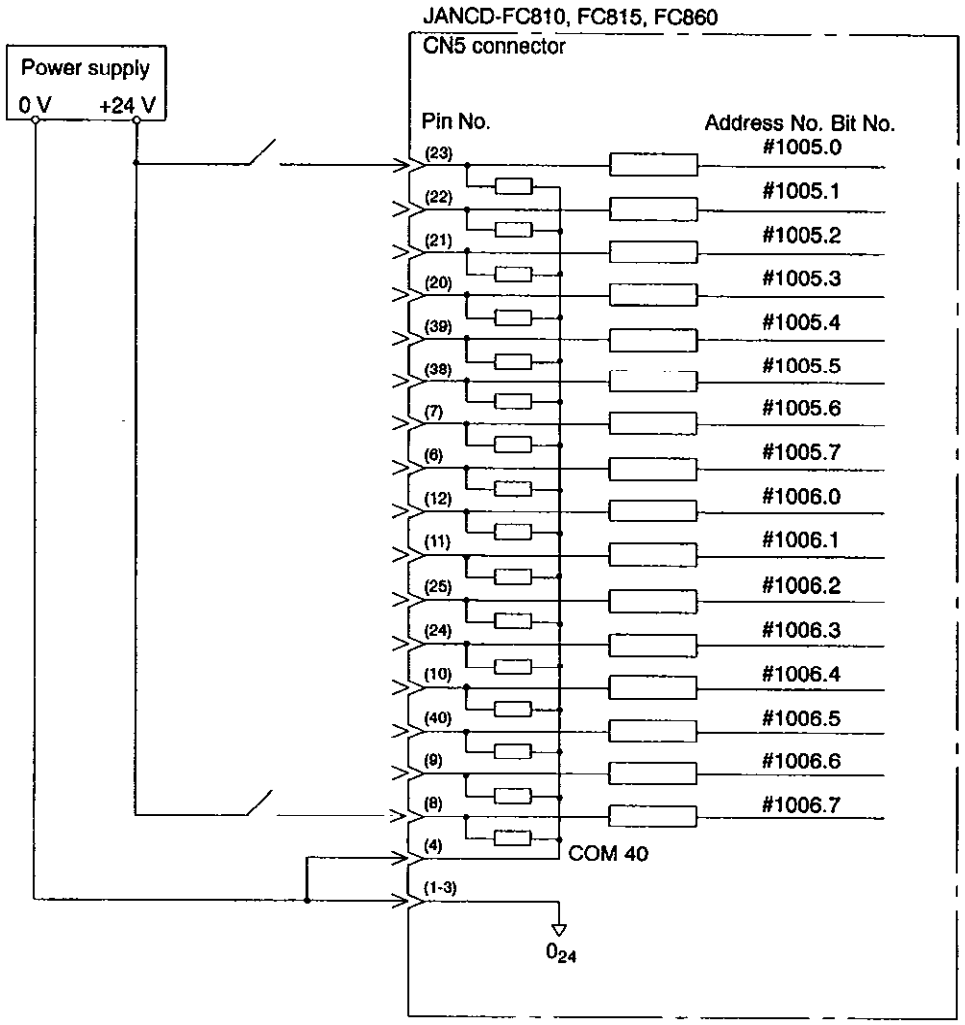


Fig. 11.6 FC810, FC815, FC860 Module Connection
(Address number and bit number: #1005.0 to #1006.7)

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (1) I/O Module (JANCD-FC810, FC815, FC860)."
2. The address is that of module No. 1. (#1005.0 to #1006.7)
   For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number. For details, refer to "11.3.1 I/O Port."

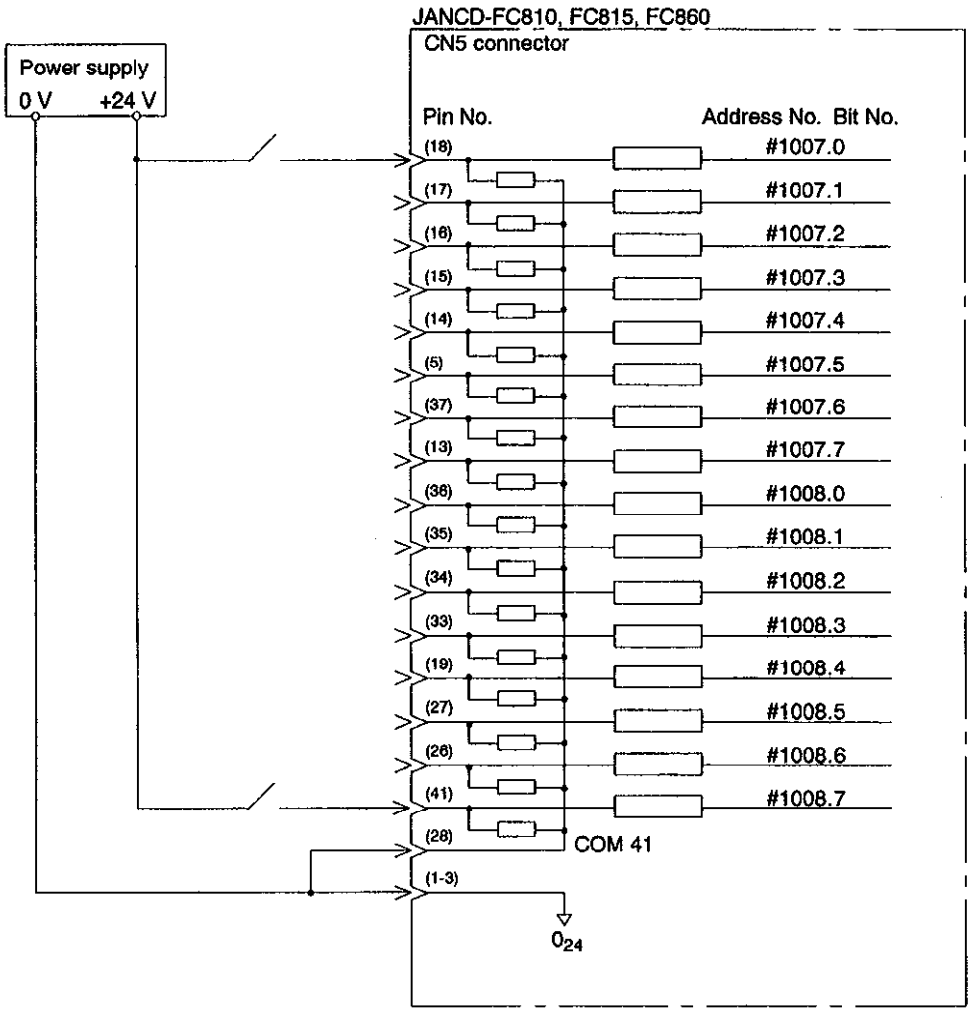


Fig. 11.7 FC810, FC815, FC860 Module Connection
(Address number and bit number: #1007.0 to #1008.7)

POINT

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (1) I/O Module (JANCD-FC810, FC815, FC860)."
2. The address is that of module No. 1. (#1007.0 to #1008.7)
   For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number. For details, refer to "11.3.1 I/O Port."

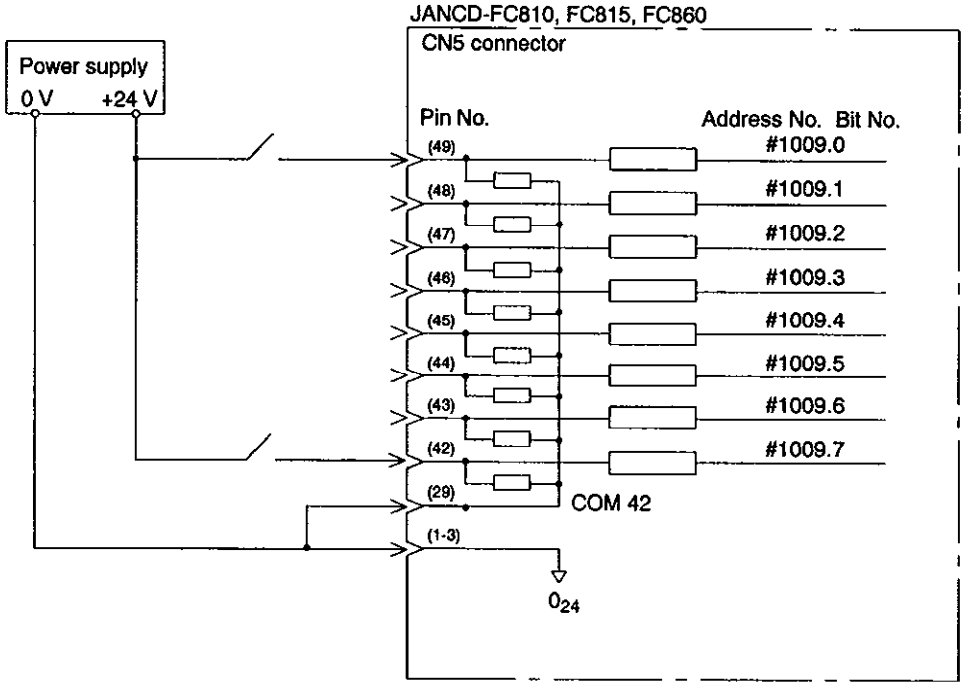


Fig. 11.8 FC810, FC815, FC860 Module Connection
(Address number and bit number: #1009.0 to #1009.7)

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (1) I/O Module (JANCD-FC810, FC815, FC860)."
2. The address is that of module No. 1. (#1009.0 to #1009.7)
   For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number. For details, refer to "11.3.1 I/O Port."

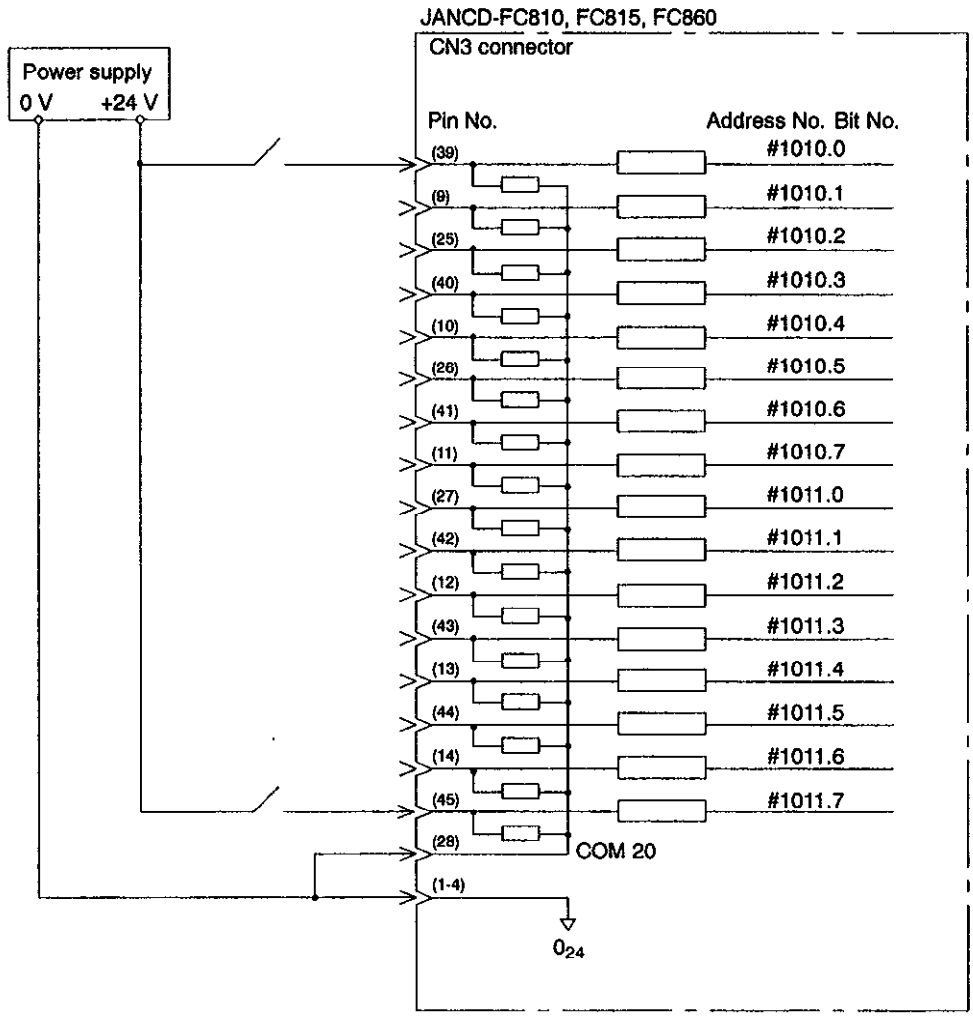


Fig. 11.9 FC810, FC815, FC860 Module Connection
(Address number and bit number: #1010.0 to #1011.7)

POINT

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (1) I/O Module (JANCD-FC810, FC815, FC860)."
2. The address is that of module No. 1. (#1010.0 to #1011.7)
   For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number. For details, refer to "11.3.1 I/O Port."

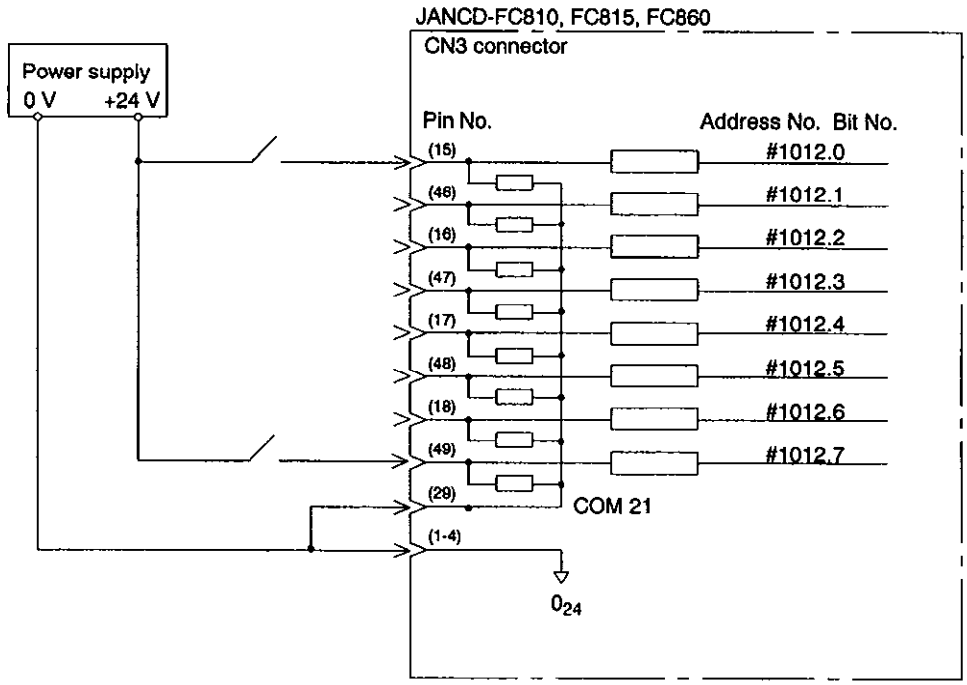


Fig. 11.10 FC810, FC815, FC860 Module Connection
(Address number and bit number: #1012.0 to #1012.7)

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (1) I/O Module (JANCD-FC810, FC815, FC860)."
2. The address is that of module No. 1. (#1012.0 to #1012.7)
   For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number. For details, refer to "11.3.1 I/O Port."

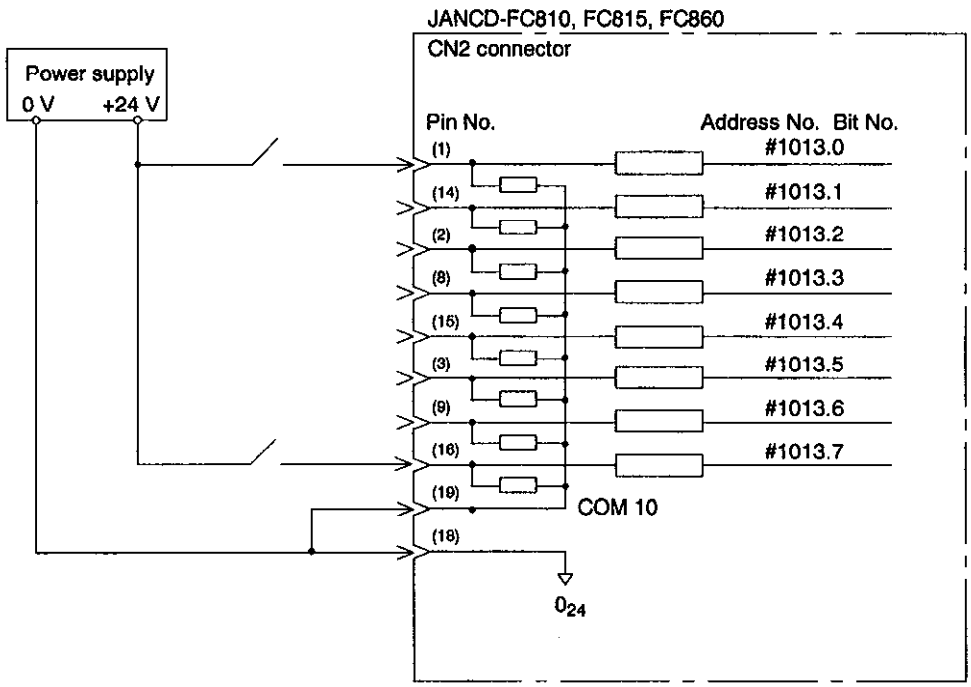


Fig. 11.11 FC810, FC815, FC860 Module Connection
(Address number and bit number: #1013.0 to #1013.7)

POINT

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (1) I/O Module (JANCD-FC810, FC815, FC860)."
2. The address is that of module No. 1. (#1013.0 to #1013.7)
   For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number. For details, refer to "11.3.1 I/O Port."

When an internal power supply is used, supply the power from CN7-1 and -2 pins.

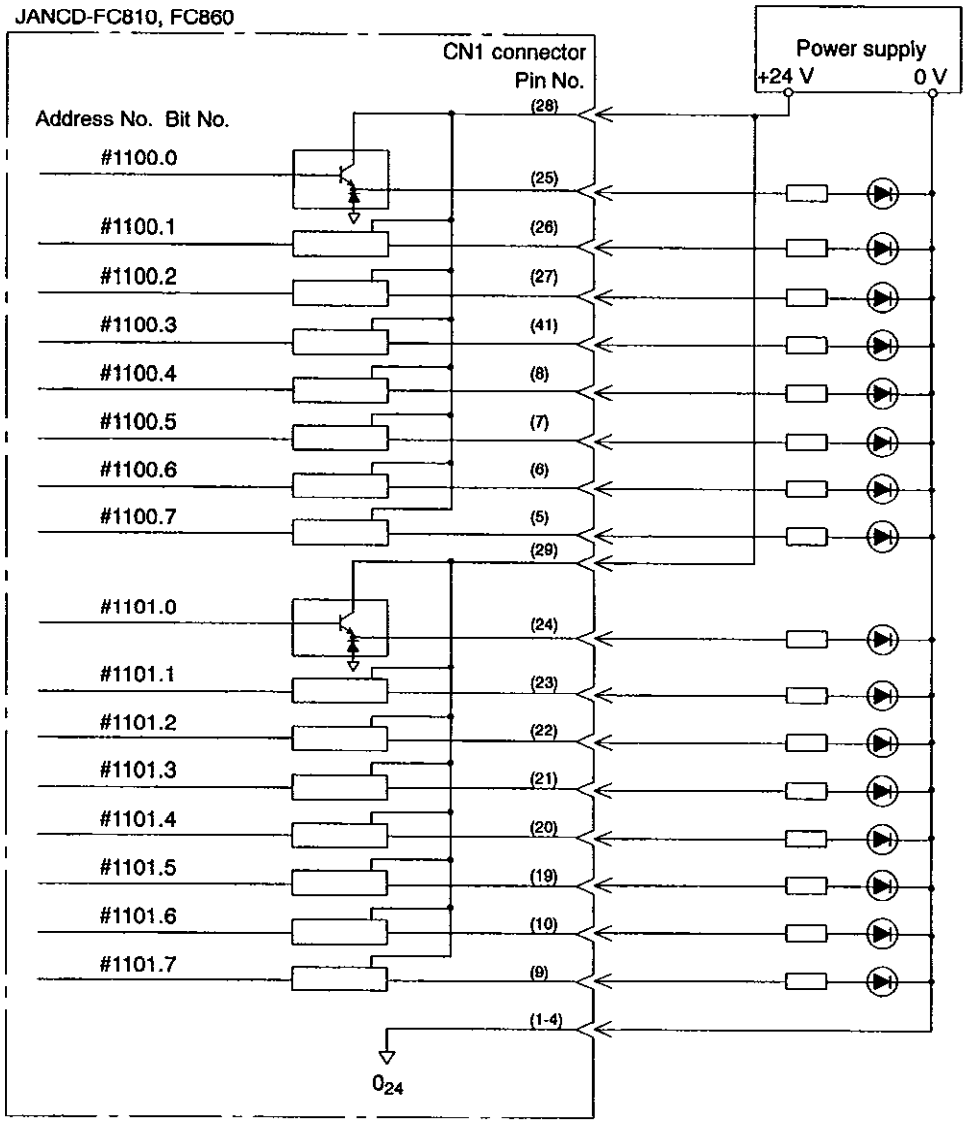


Fig. 11.12 FC810/FC860 Module Connection
(Address number and bit number: #1100.0 to #1101.7)

POINT

The address is that of module No. 1. (#1100.0 to #1101.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

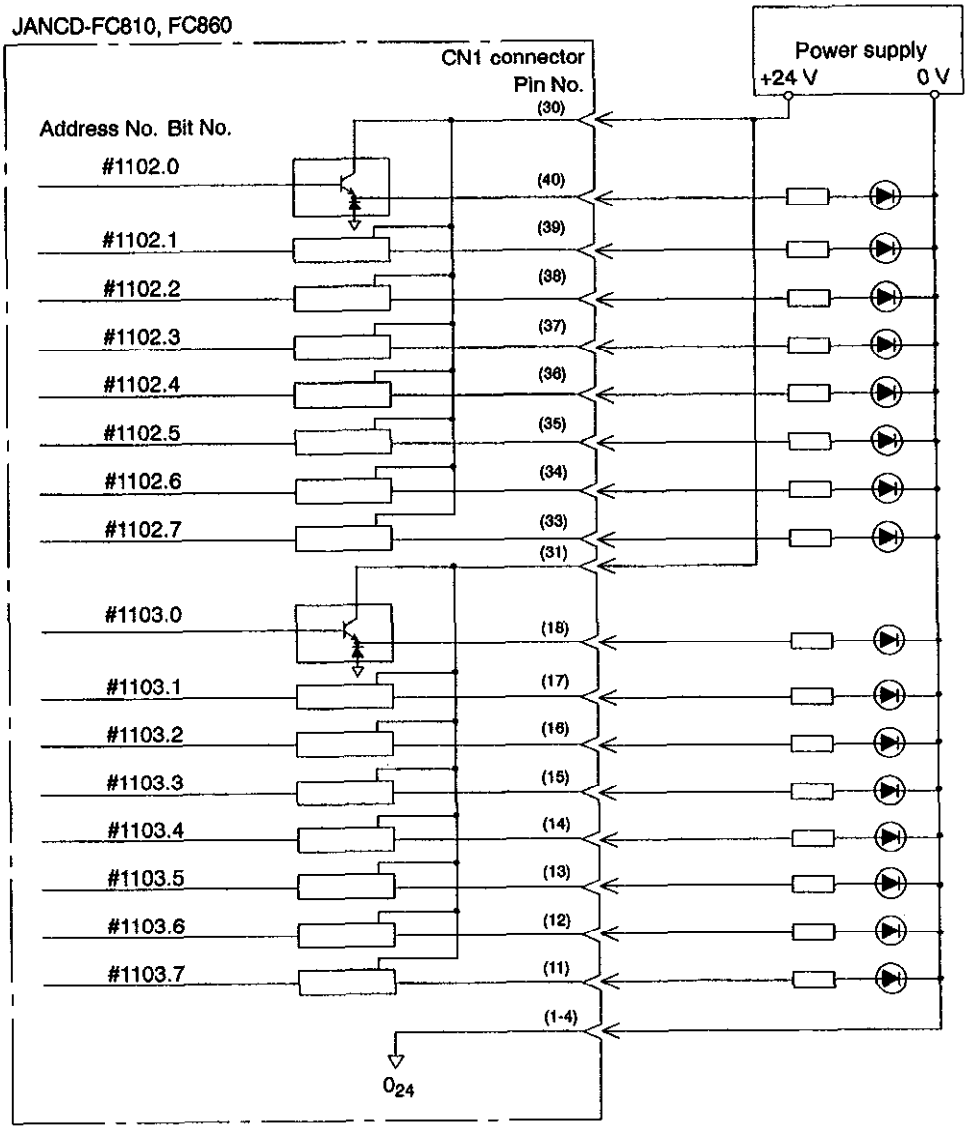


Fig. 11.13 FC810/FC860 Module Connection
(Address number and bit number: #1102.0 to #1103.7)

The address is that of module No. 1. (#1102.0 to #1103.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

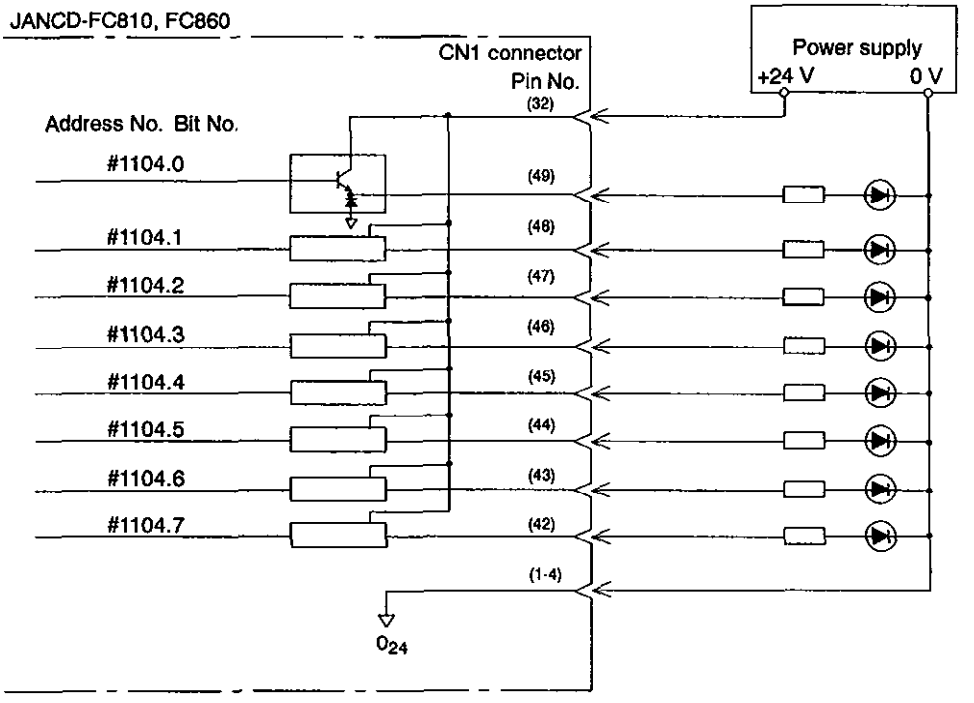


Fig. 11.14 FC810/FC860 Module Connection
(Address number and bit number: #1104.0 to #1104.7)

The address is that of module No. 1. (#1104.0 to #1104.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

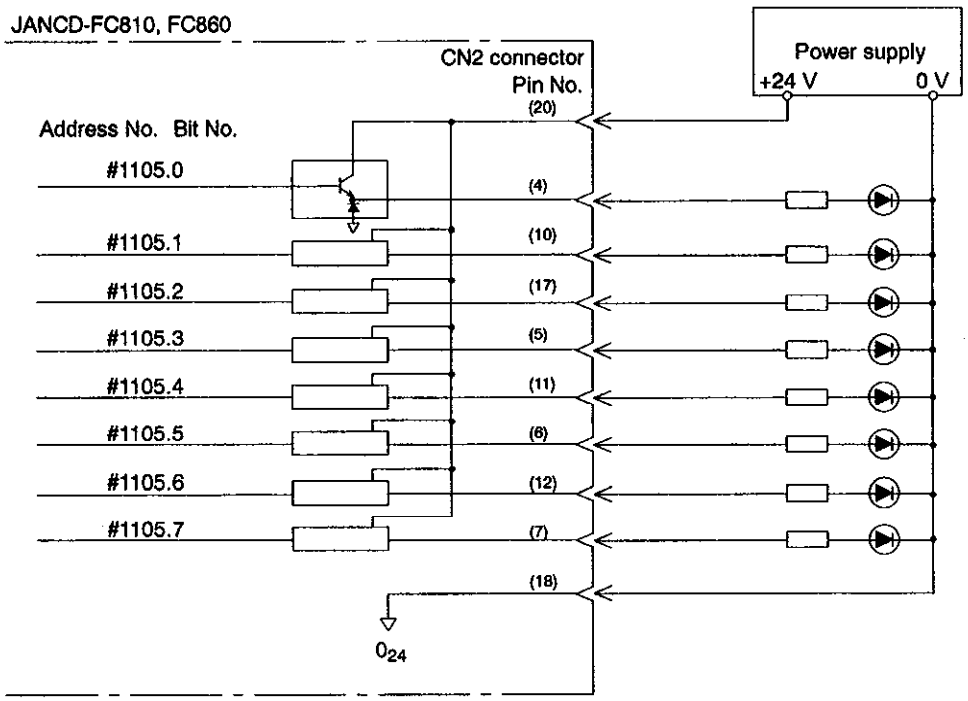


Fig. 11.15 FC810/FC860 Module Connection
(Address number and bit number: #1105.0 to #1105.7)

The address is that of module No. 1. (#1105.0 to #1105.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

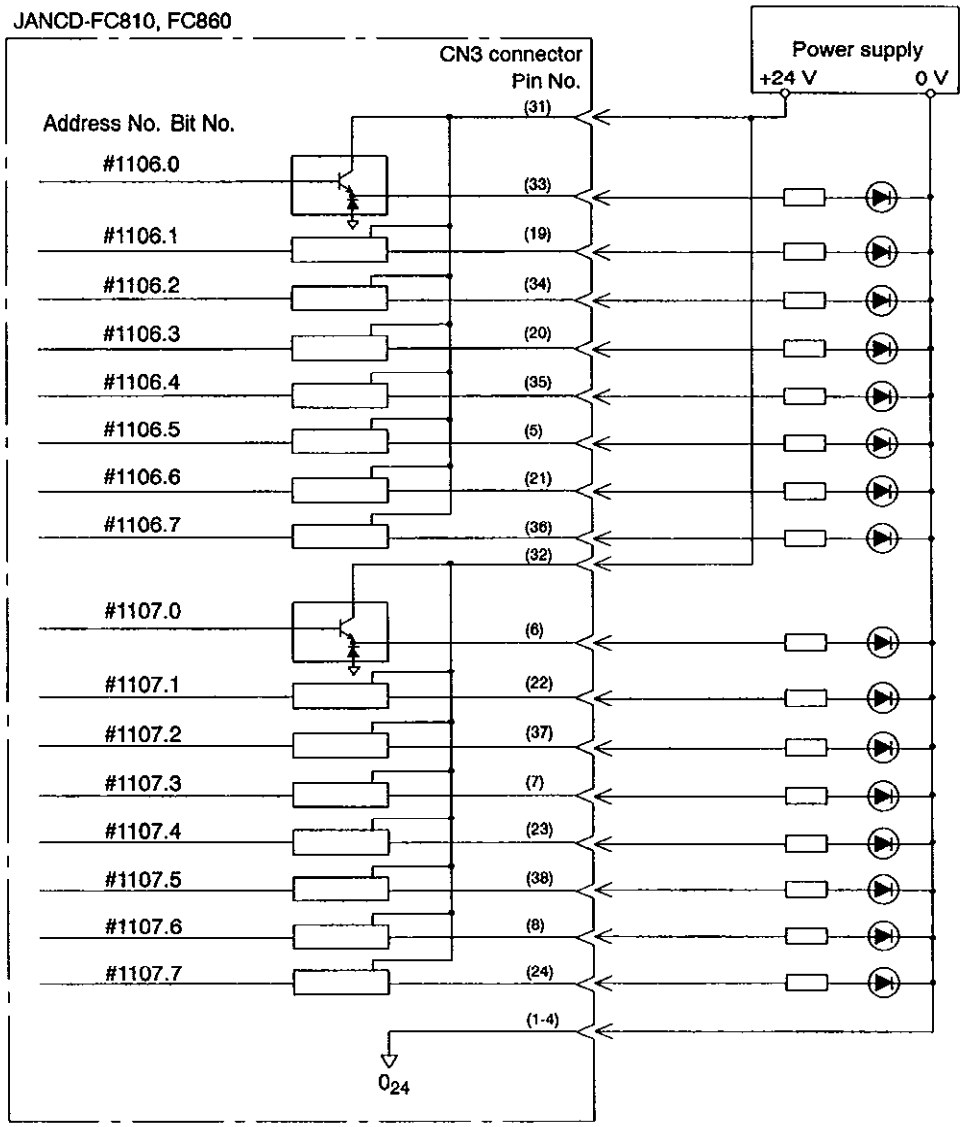


Fig. 11.16 FC810/FC860 Module Connection
(Address number and bit number: #1106.0 to #1107.7)

The address is that of module No. 1. (#1106.0 to #1107.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

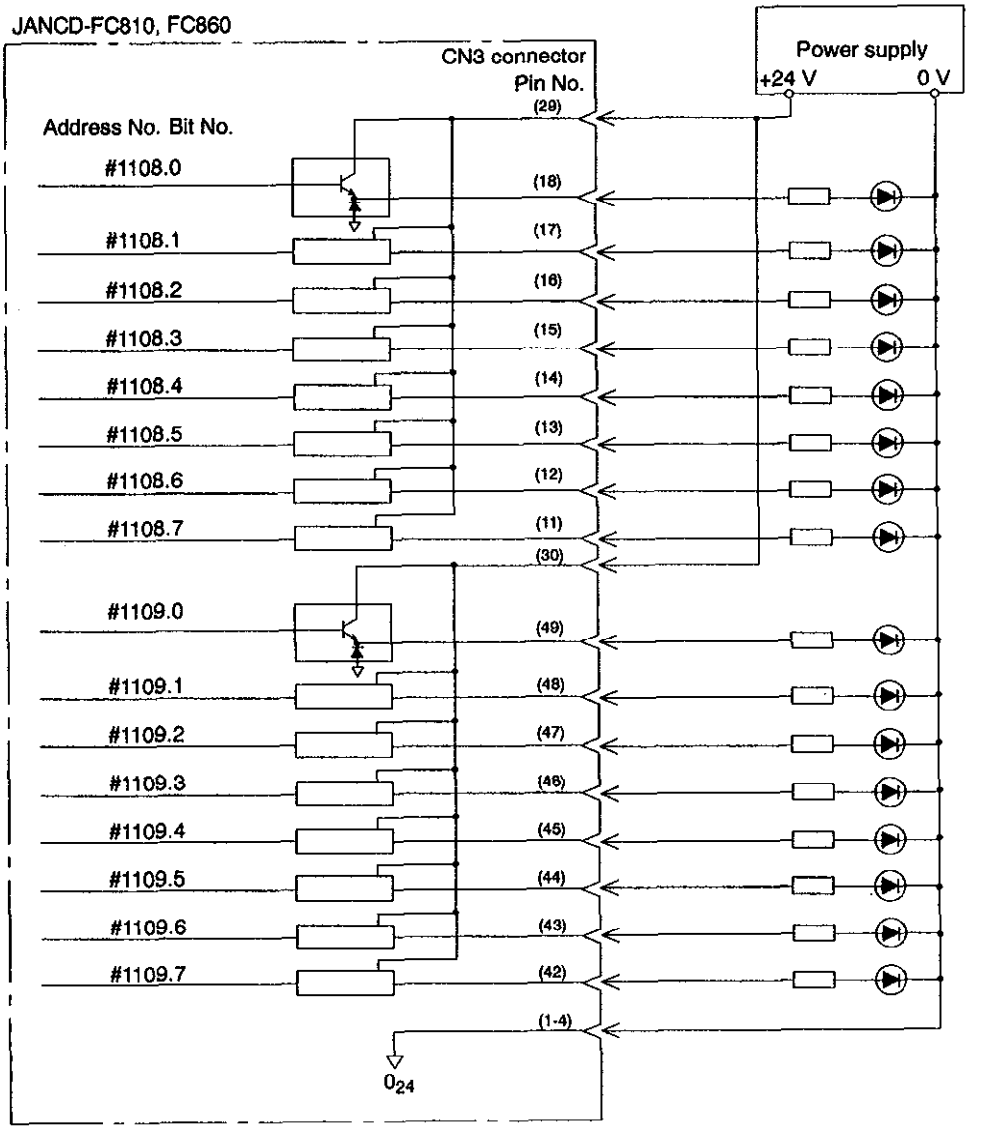


Fig. 11.17 FC810/FC860 Module Connection
(Address number and bit number: #1108.0 to #1109.7)

POINT

The address is that of module No. 1. (#1108.0 to #1109.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

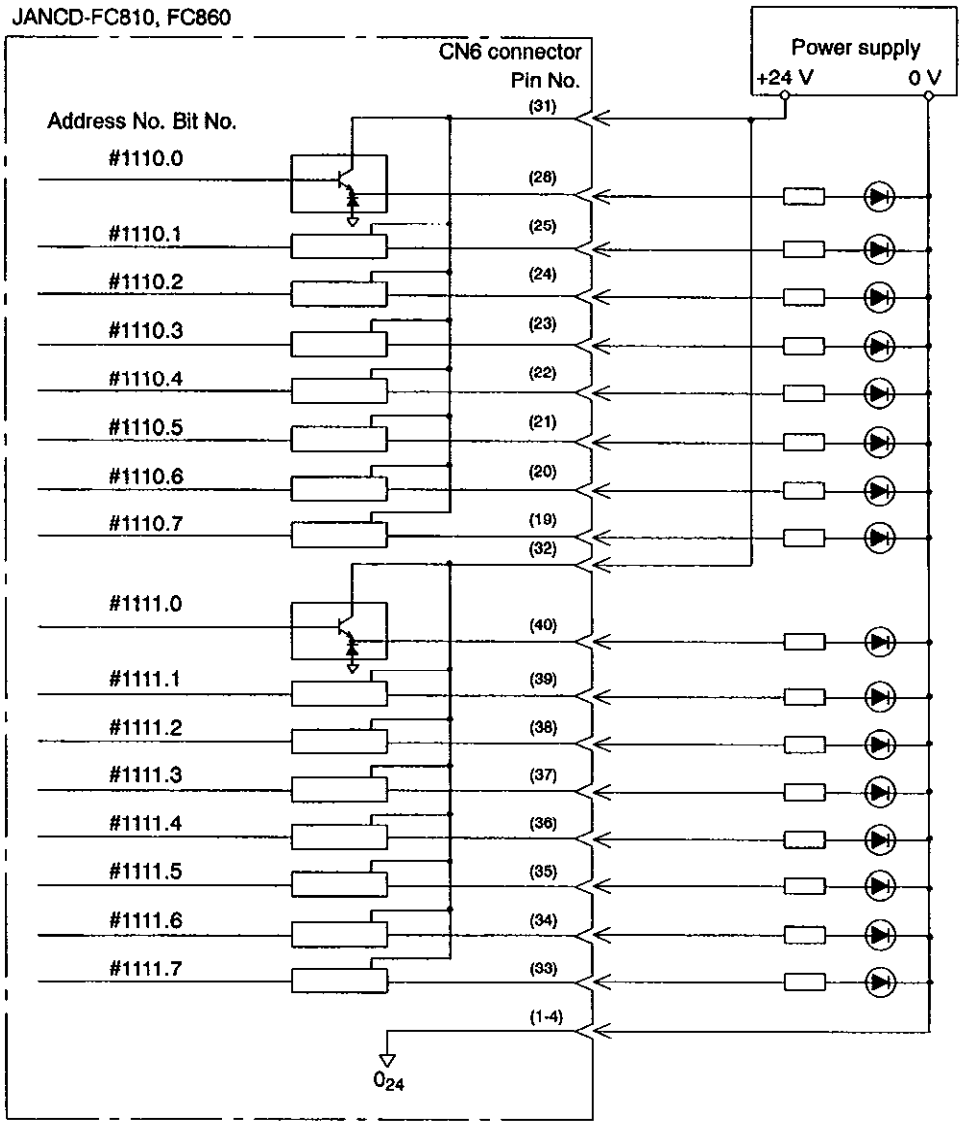


Fig. 11.18 FC810/FC860 Module Connection
(Address number and bit number: #1110.0 to #1111.7)

POINT

The address is that of module No. 1. (#1110.0 to #1111.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

When an internal power supply is used, supply the power from CN7-1 and -2 pins.

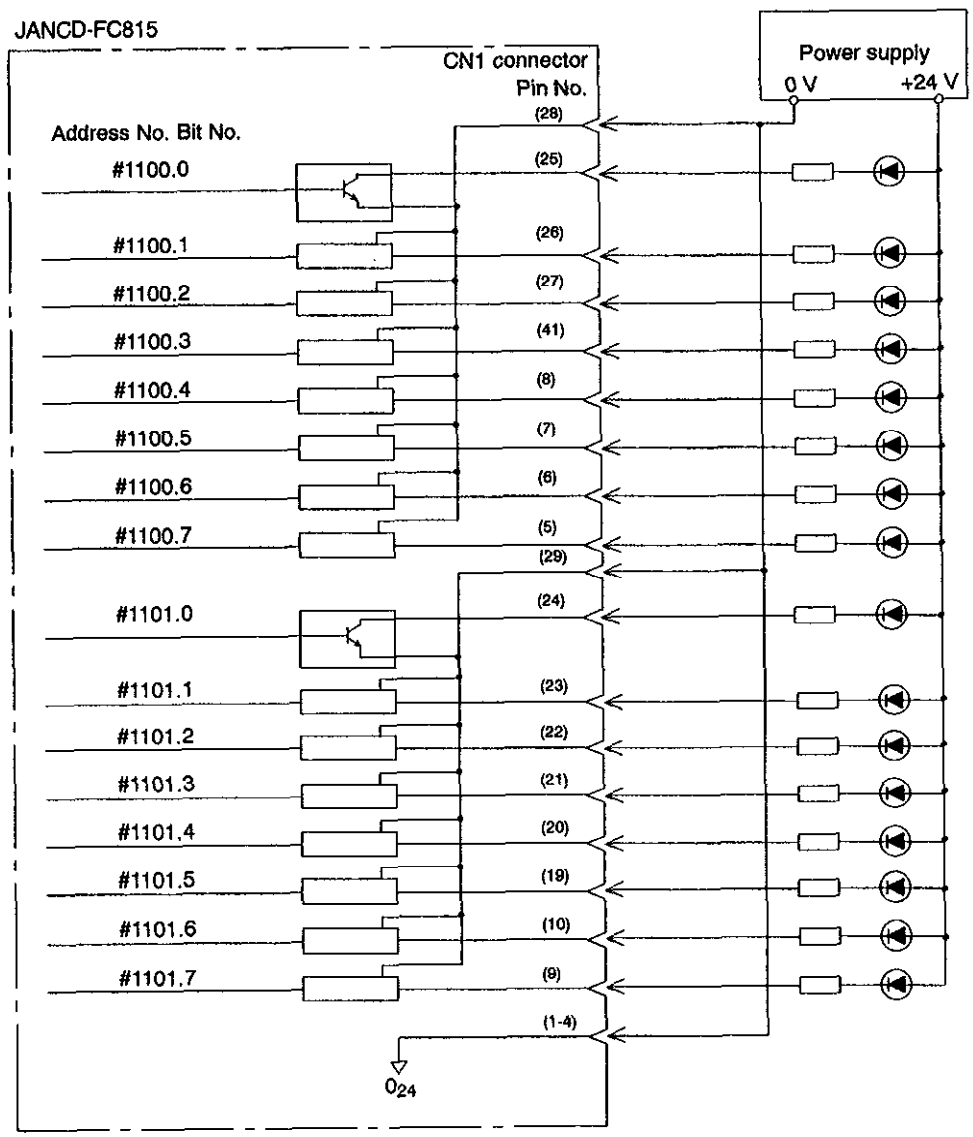


Fig. 11.19 FC815 Module Connection
(Address number and bit number: #1100.0 to #1101.7)

POINT

The address is that of module No. 1. (#1100.0 to #1101.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

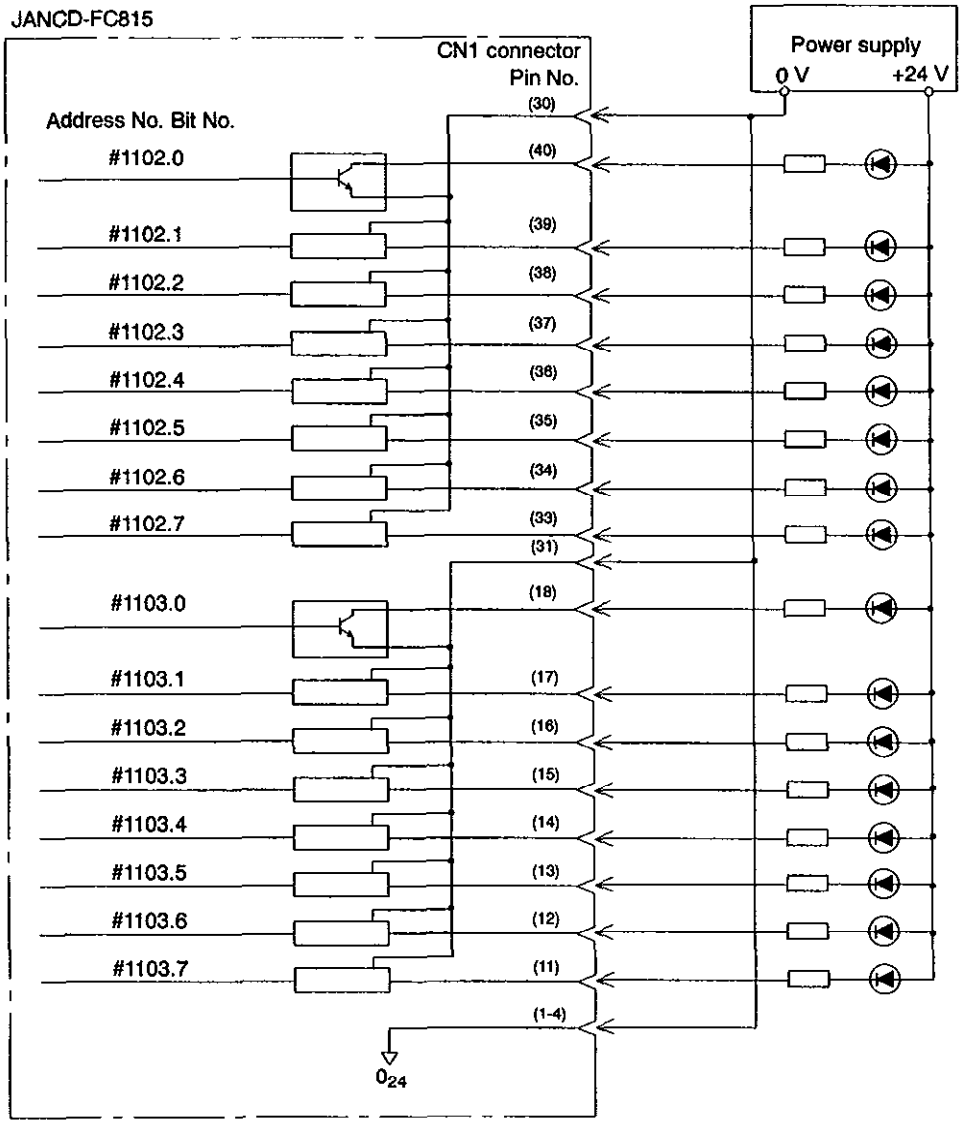


Fig. 11.20 FC815 Module Connection
(Address number and bit number: #1102.0 to #1103.7)

The address is that of module No. 1. (#1102.0 to #1103.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

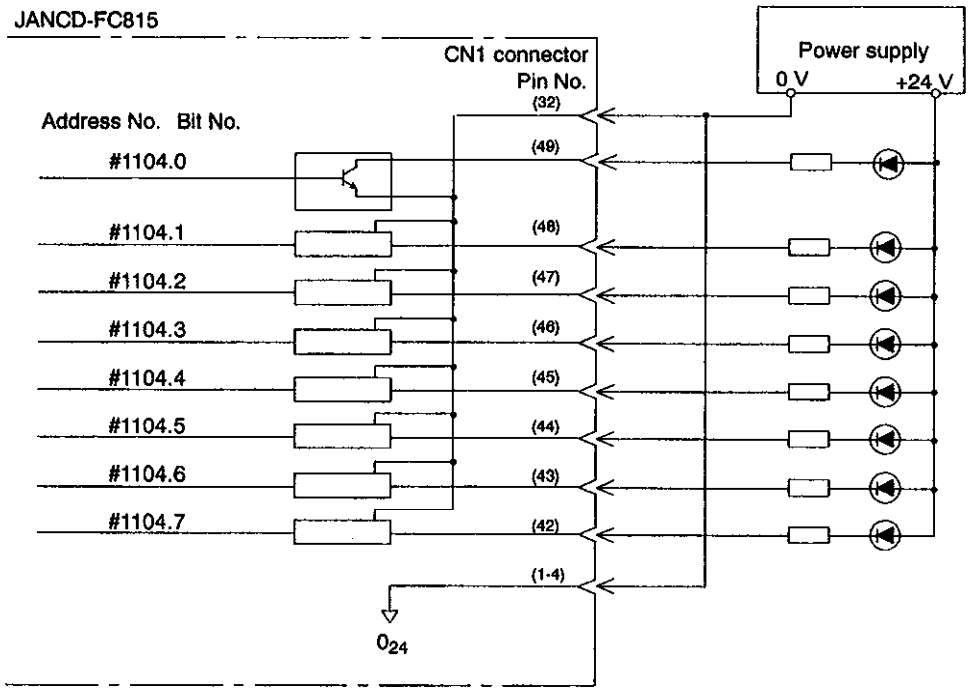


Fig. 11.21 FC815 Module Connection
(Address number and bit number: #1104.0 to #1104.7)

The address is that of module No. 1. (#1104.0 to #1104.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

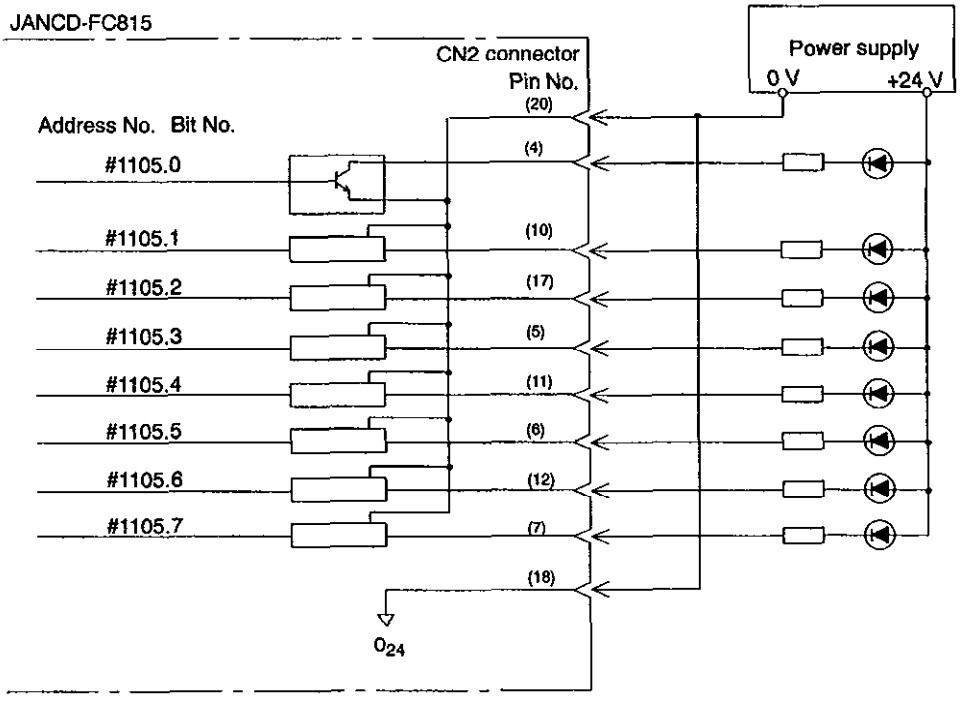


Fig. 11.22 FC815 Module Connection
(Address number and bit number: #1105.0 to #1105.7)

The address is that of module No. 1. (#1105.0 to #1105.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

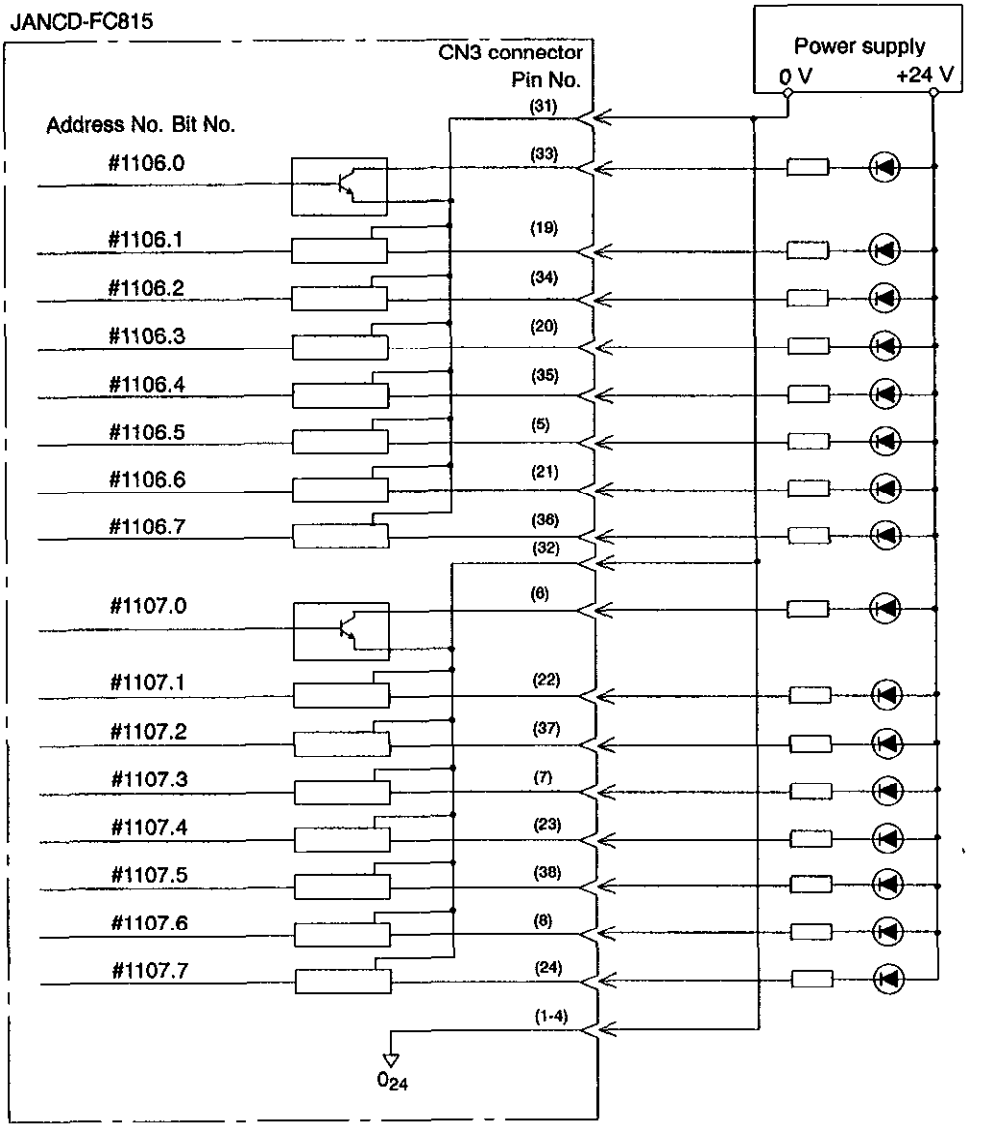


Fig. 11.23 FC815 Module Connection
(Address number and bit number: #1106.0 to #1107.7)

The address is that of module No. 1. (#1106.0 to #1107.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

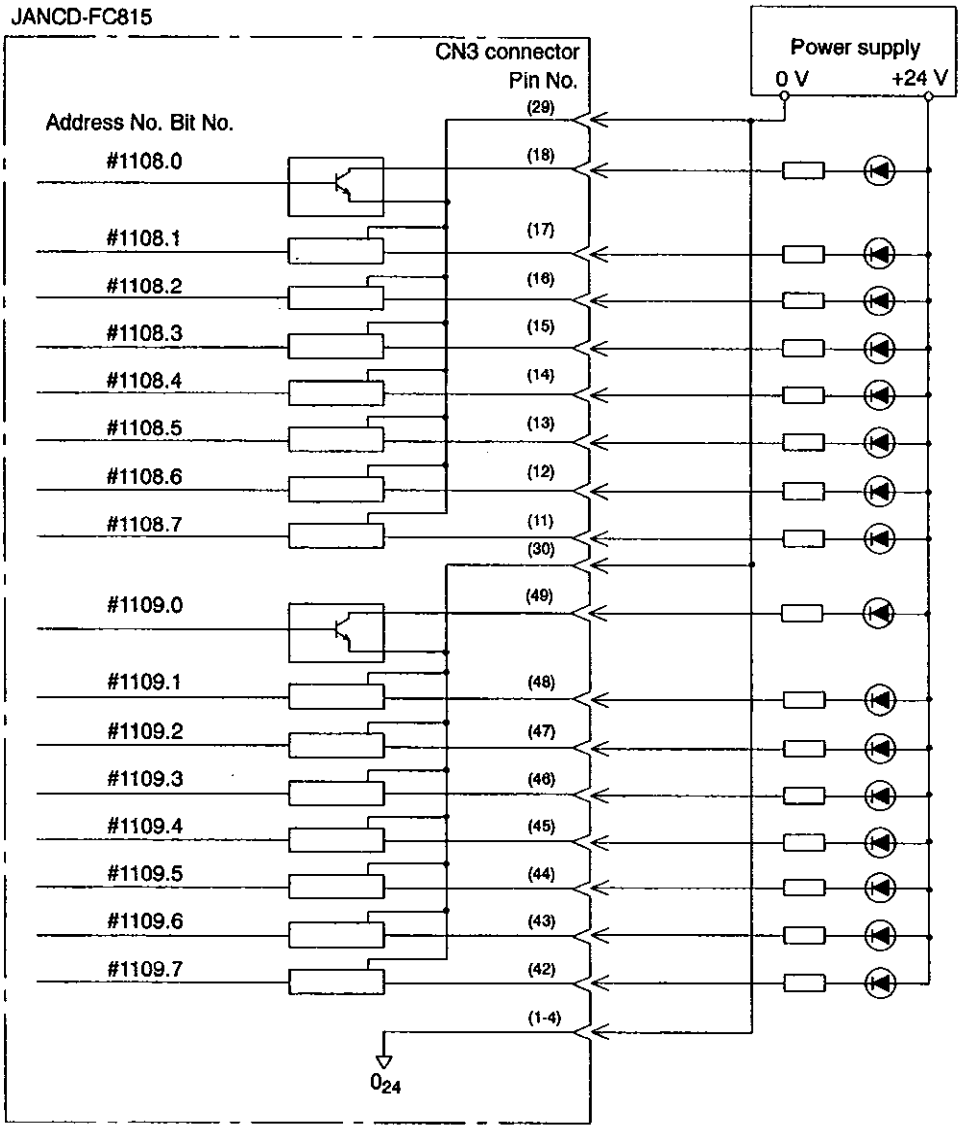


Fig. 11.24 FC815 Module Connection
(Address number and bit number: #1108.0 to #1109.7)

The address is that of module No. 1. (#1108.0 to #1109.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

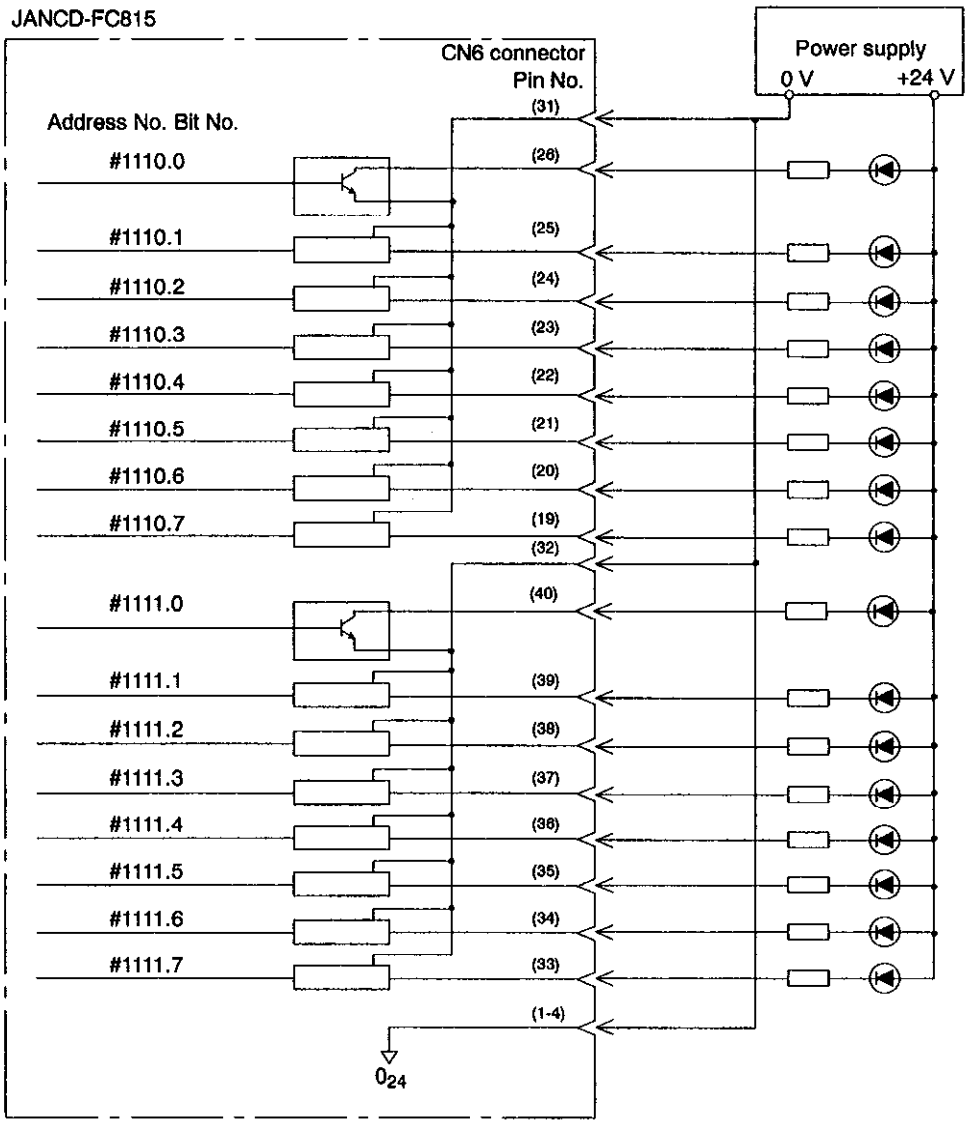


Fig. 11.25 FC815 Module Connection
(Address number and bit number: #1110.0 to #1111.7)

The address is that of module No. 1. (#1110.0 to #1111.7)
For modules No. 2 and No. 3, the layout is as shown above, starting from the smaller address number.

11.2.2 FC861 Module

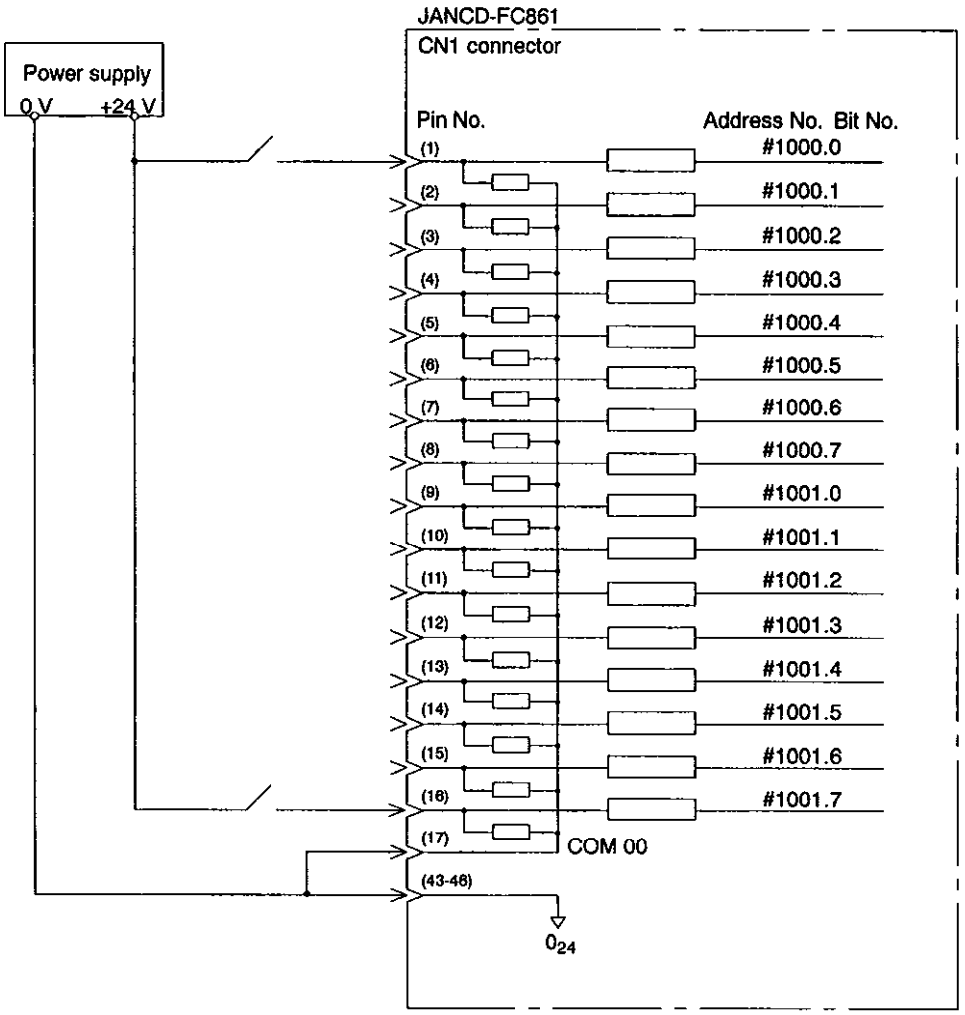


Fig. 11.26 FC861 Module Connection
(Address number and bit number: #1000.0 to #1001.7)

POINT

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (2) I/O Module (JANCD-FC861)."
2. The address is that of module No. 1-1. (#1000.0 to #1001.7)
   For modules No. 2 to No. 7, the layout is as shown above, starting from the smaller address number.

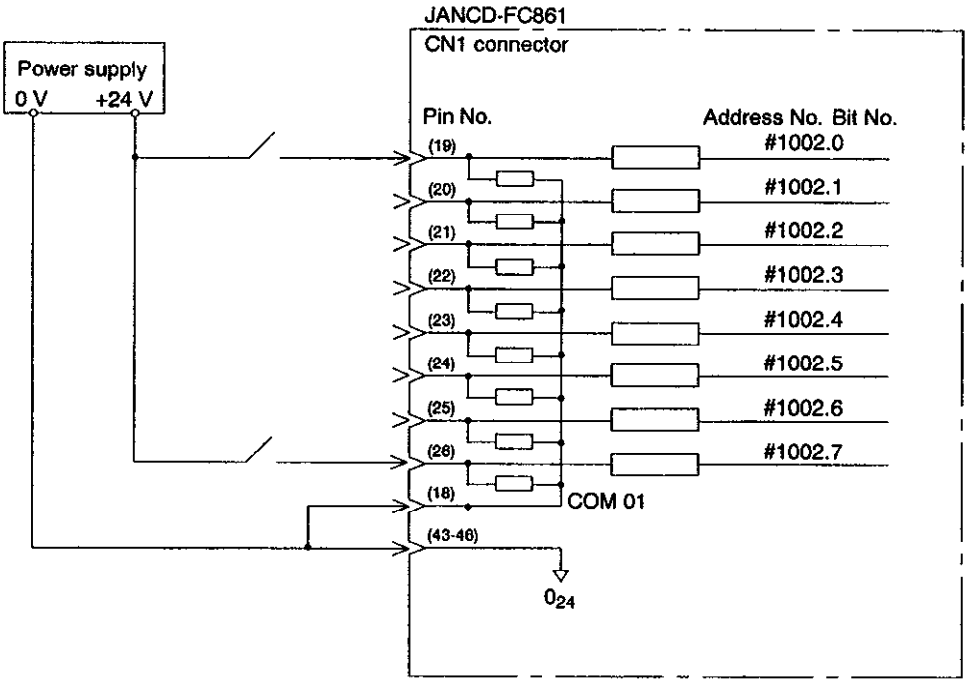


Fig. 11.27 FC861 Module Connection
(Address number and bit number: #1002.0 to #1002.7)

POINT

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (2) I/O Module (JANCD-FC861)."
2. The address is that of module No. 1-1. (#1002.0 to #1002.7)
   For modules No. 2 to No. 7, the layout is as shown above, starting from the smaller address number.

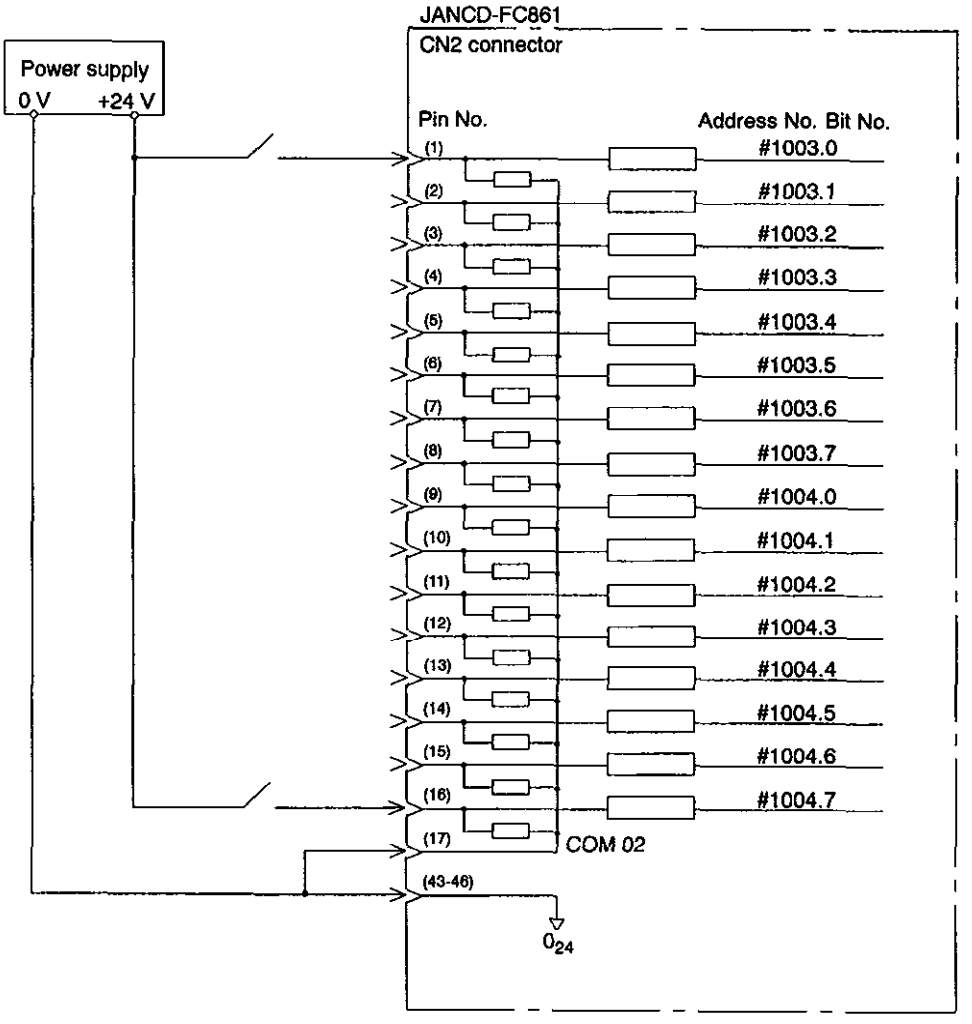


Fig. 11.28 FC861 Module Connection
(Address number and bit number: #1003.0 to #1004.7)

POINT

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (2) I/O Module (JANCD-FC861)."
2. The address is that of module No. 1-1. (#1003.0 to #1004.7)
   For modules No. 2 to No. 7, the layout is as shown above, starting from the smaller address number.

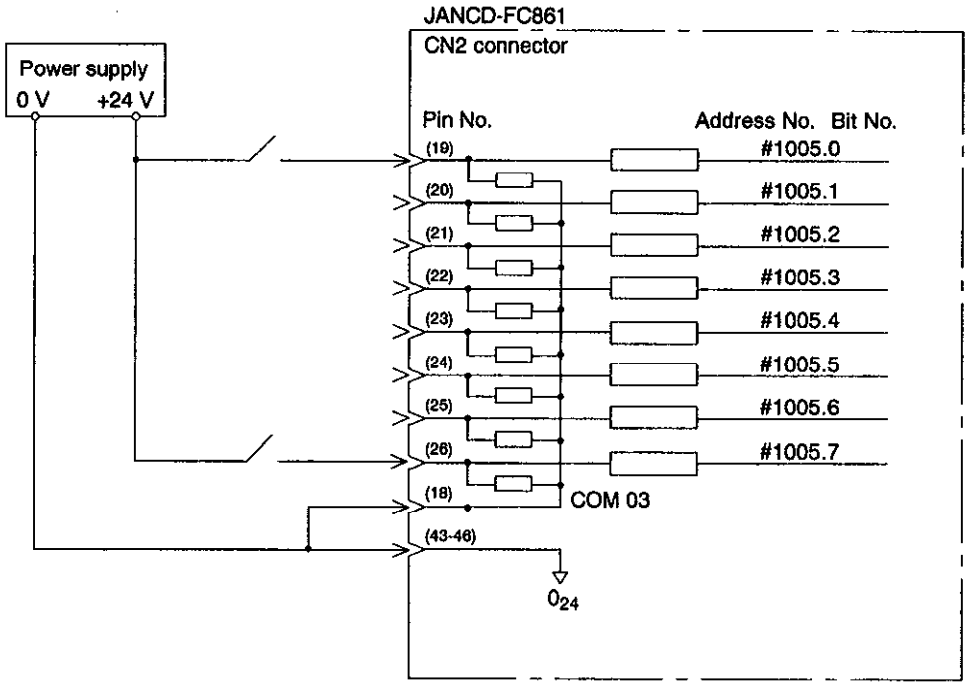


Fig. 11.29 FC861 Module Connection
(Address number and bit number: #1005.0 to #1005.7)

1. The above example shows the connection of +24V common. For the connection of 0V common, refer to "11.3.2 (2) I/O Module (JANCD-FC861)."
2. The address is that of module No. 1-1. (#1005.0 to #1005.7)
   For modules No. 2 to No. 7, the layout is as shown above, starting from the smaller address number.

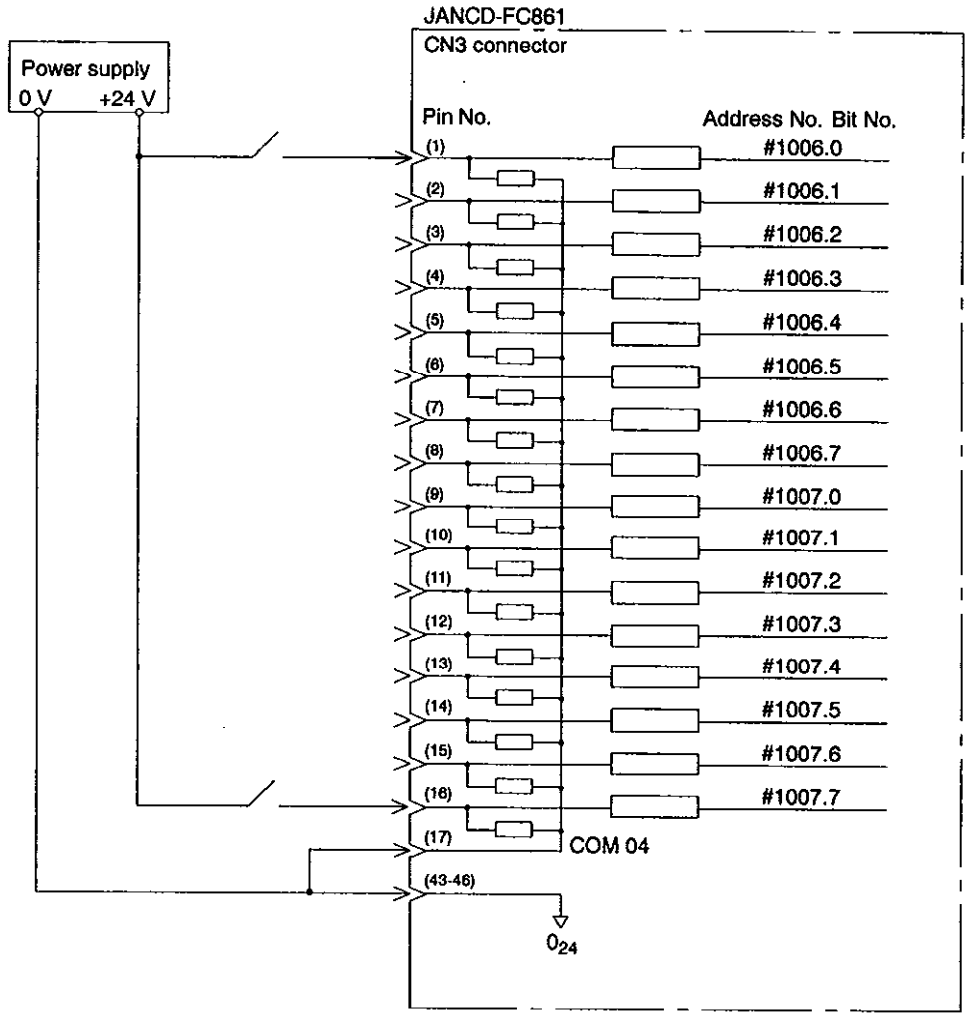


Fig. 11.30 FC861 Module Connection
(Address number and bit number: #1006.0 to #1007.7)

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (2) I/O Module (JANCD-FC861)."
2. The address is that of module No. 1-1. (#1006.0 to #1007.7)
   For modules No. 2 to No. 7, the layout is as shown above, starting from the smaller address number.

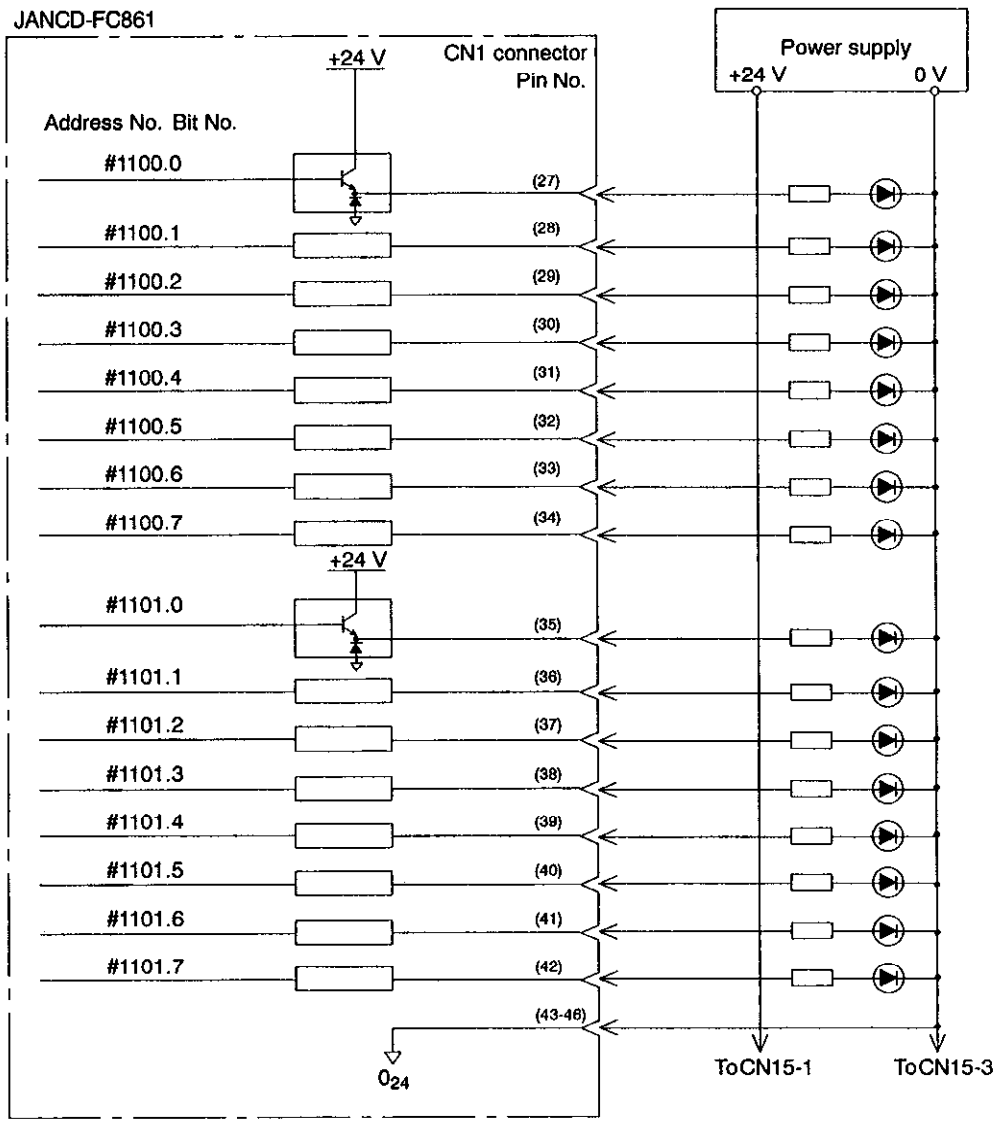


Fig. 11.31 FC861 Module Connection
(Address number and bit number: #1100.0 to #1101.7)

The address is that of module No. 1-1. (#1100.0 to #1101.7)
For modules No. 2 to No. 7, the layout is as shown above, starting from the smaller address number.

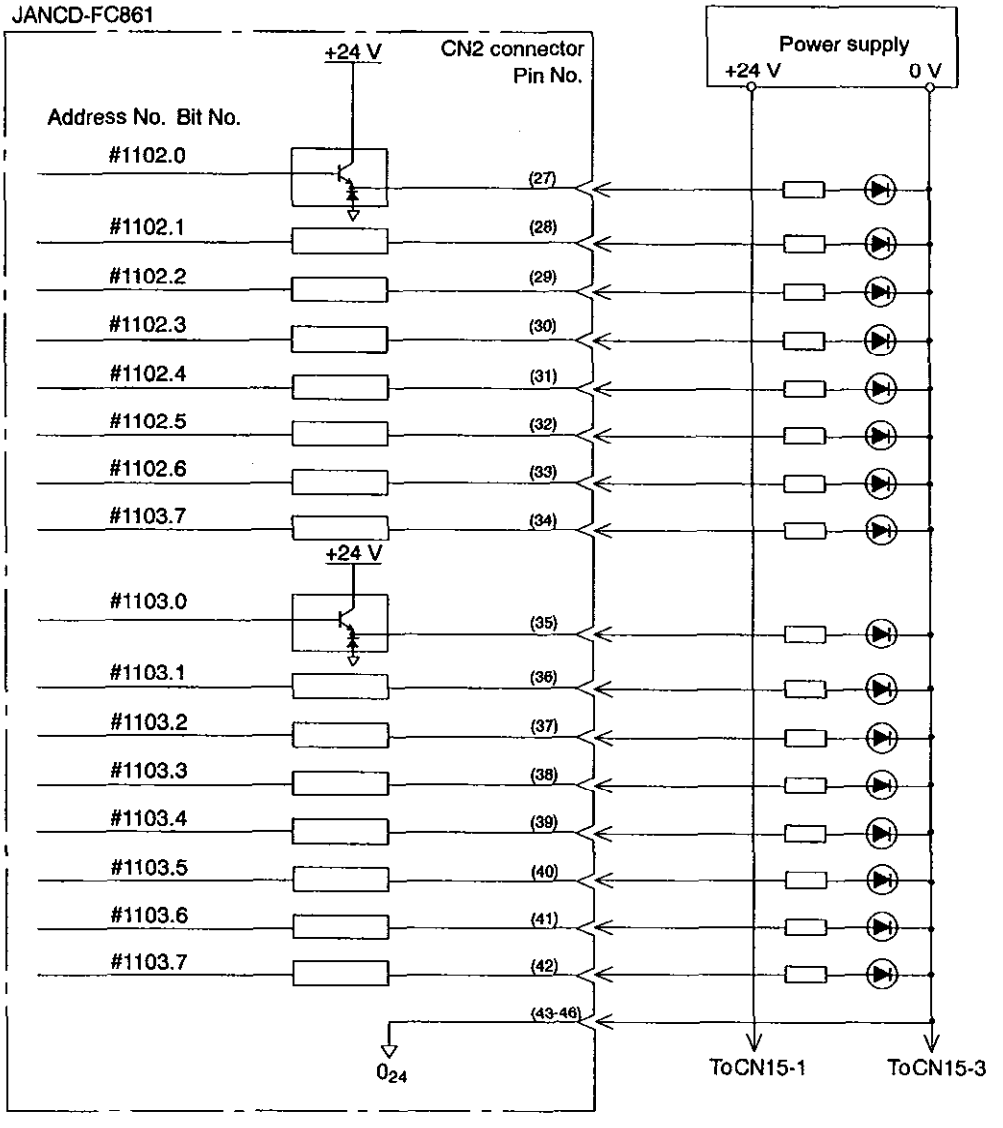


Fig. 11.32 FC861 Module Connection
(Address number and bit number: #1102.0 to #1103.7)

The address is that of module No. 1-1. (#1102.0 to #1103.7)
For modules No. 2 to No. 7, the layout is as shown above, starting from the smaller address number.

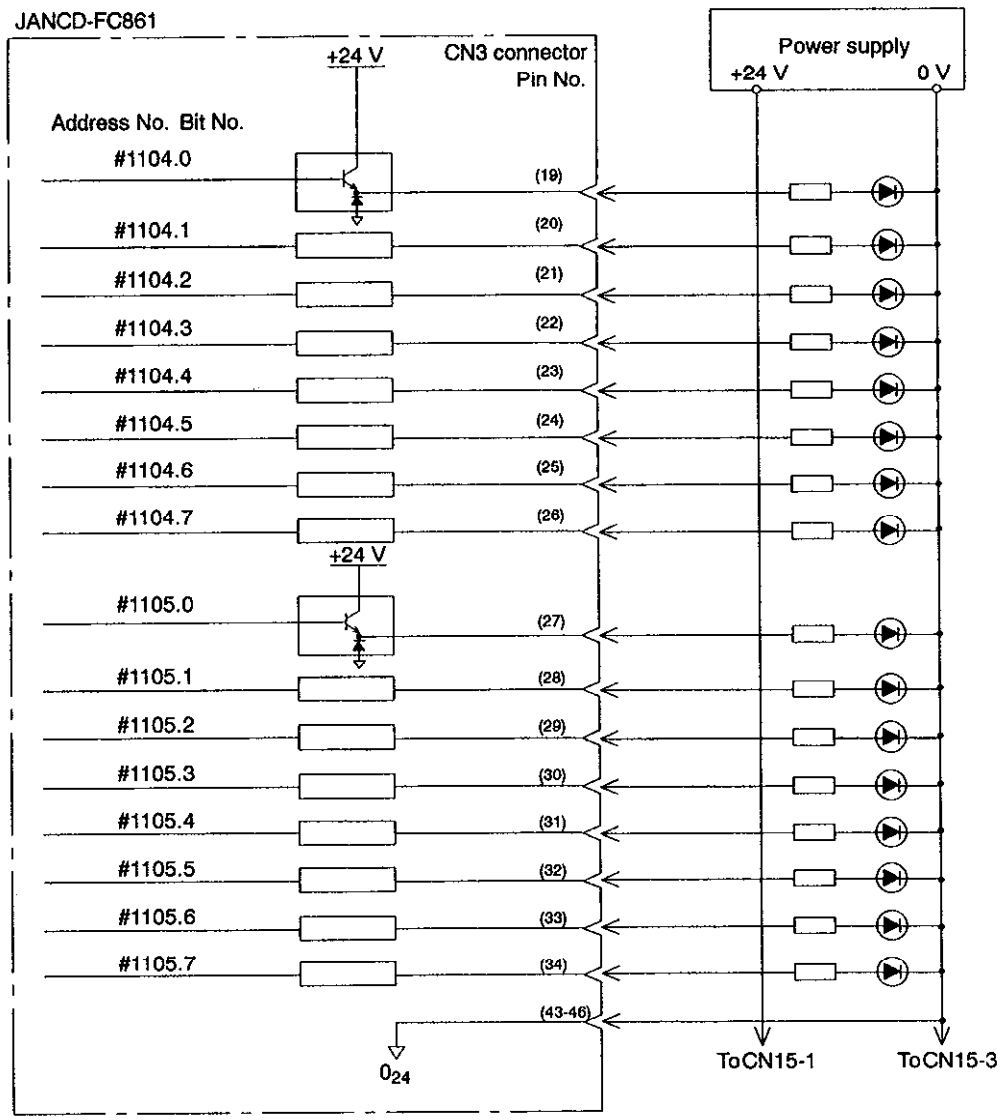


Fig. 11.33 FC861 Module Connection
(Address number and bit number: #1104.0 to #1105.7)

POINT

The address is that of module No. 1-1. (#1104.0 to #1105.7)
For modules No. 2 to No. 7, the layout is as shown above, starting from the smaller address number.

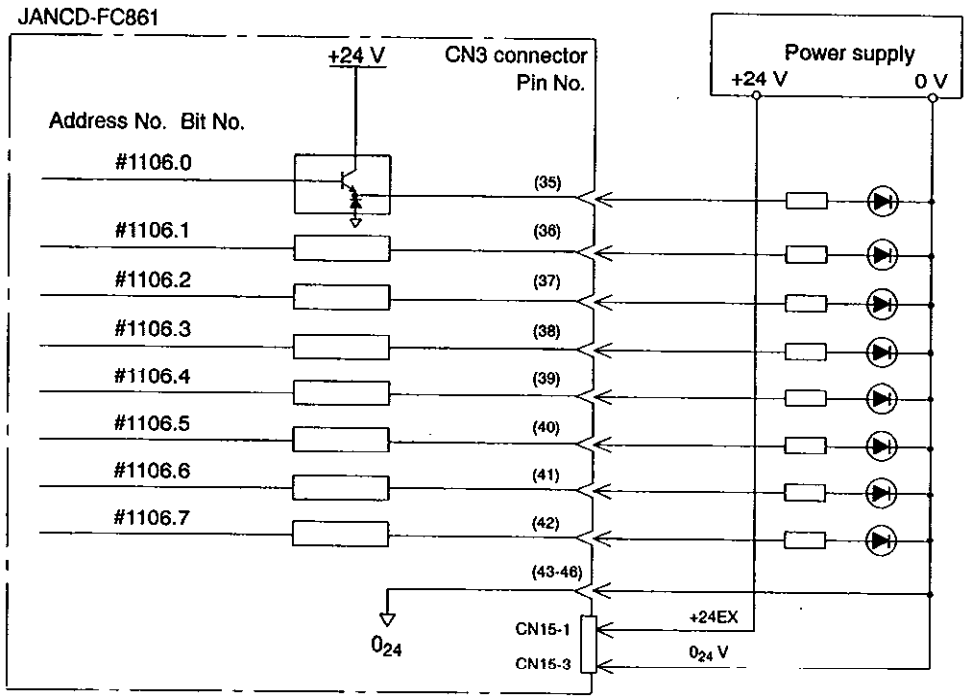


Fig. 11.34 FC861 Module Connection
(Address number and bit number: #1106.0 to #1106.7)

The address is that of module No. 1-1. (#1106.0 to #1106.7)
For modules No. 2 to No. 7, the layout is as shown above, starting from the smaller address number.

11.2.3 JSP02/JSP04 Module

The I/O port in JSP02 module and the one in JSP04 module are compatible with each other.

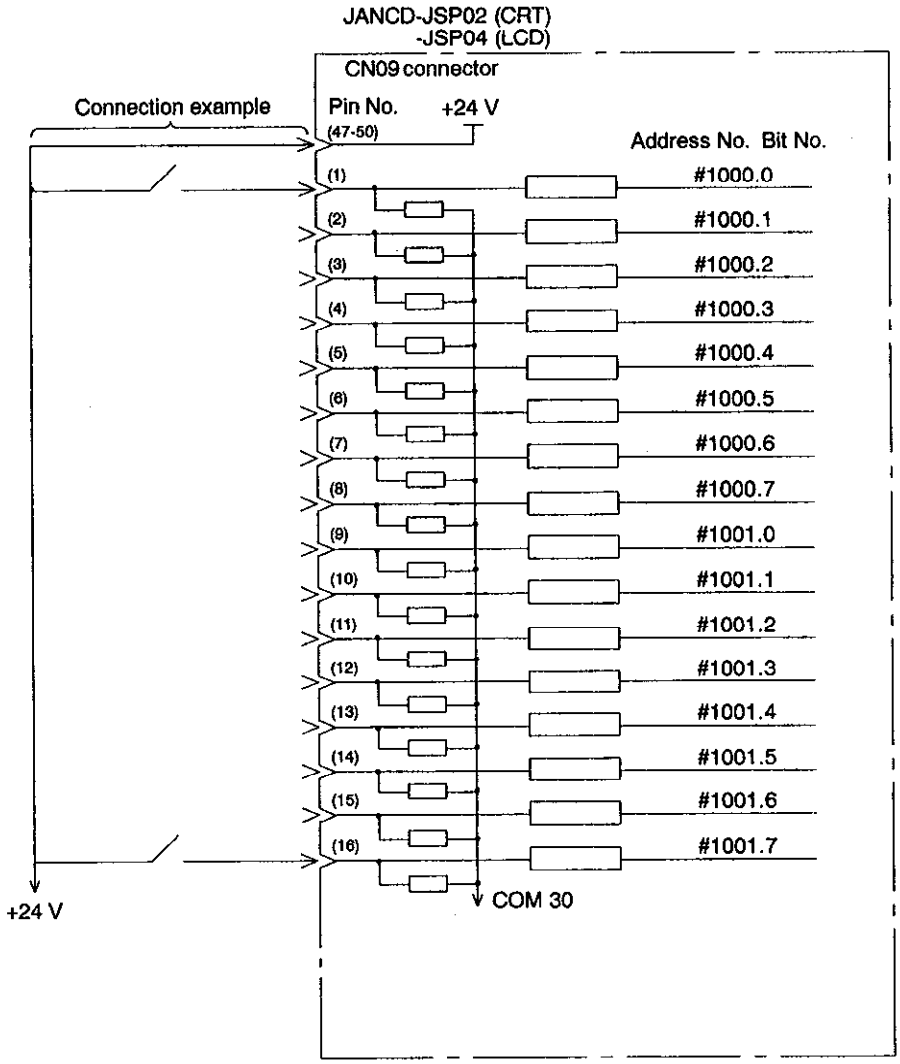


Fig. 11.35 JSP02/JSP04 Module Connection
(Address number and bit number: #1000.0 to #1001.7)

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (3) I/O Module (JSP02)."
2. The address is that of module No. 1-1. (#1000.0 to #1001.7)
   For modules No. 2 to No. 8, the layout is as shown above, starting from the smaller address number.

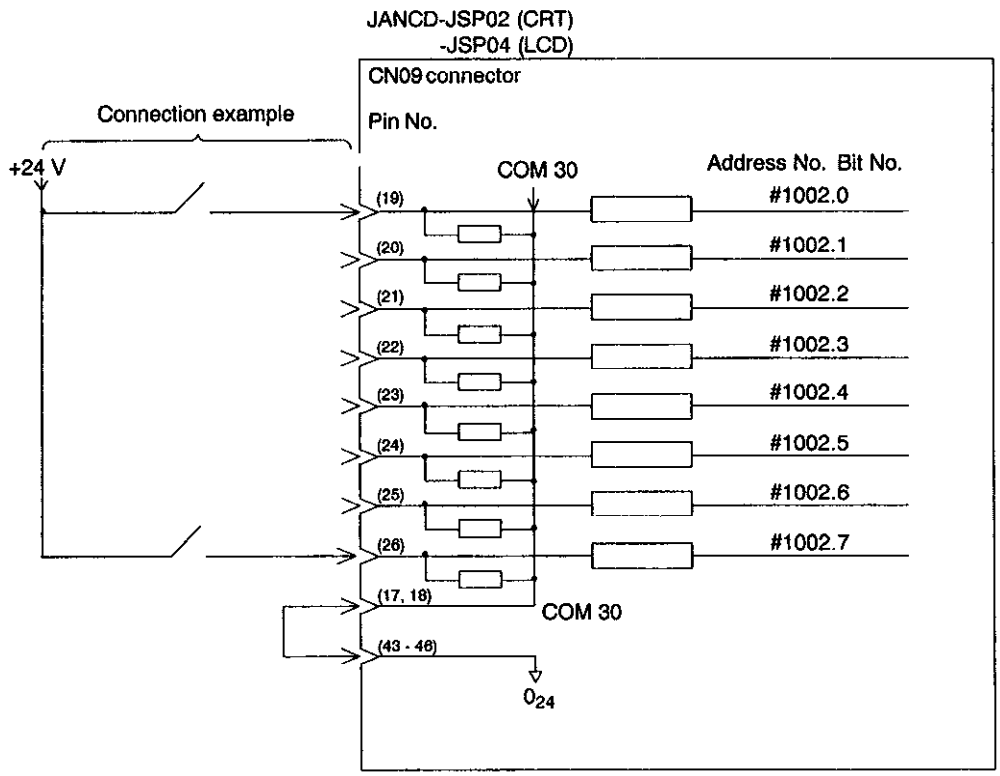


Fig. 11.36 JSP02/JSP04 Module Connection
(Address number and bit number: #1002.0 to #1002.7)

POINT

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (3) I/O Module (JSP02)."
2. The address is that of module No. 1-1. (#1002.0 to #1002.7)
   For modules No. 2 to No. 8, the layout is as shown above, starting from the smaller address number.

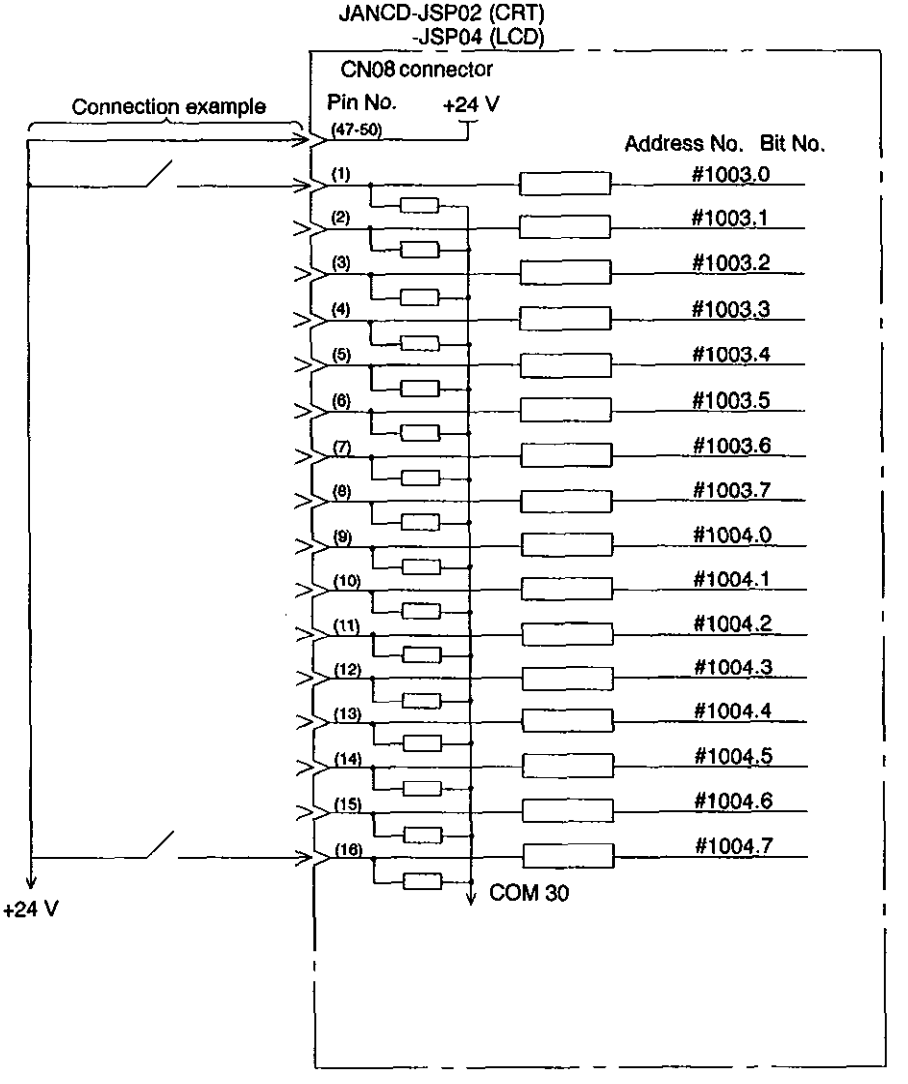


Fig. 11.37 JSP02/JSP04 Module Connection
(Address number and bit number: #1003.0 to #1004.7)

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (3) I/O Module (JSP02)."
2. The address is that of module No. 1-1. (#1003.0 to #1004.7)
   For modules No. 2 to No. 8, the layout is as shown above, starting from the smaller address number.

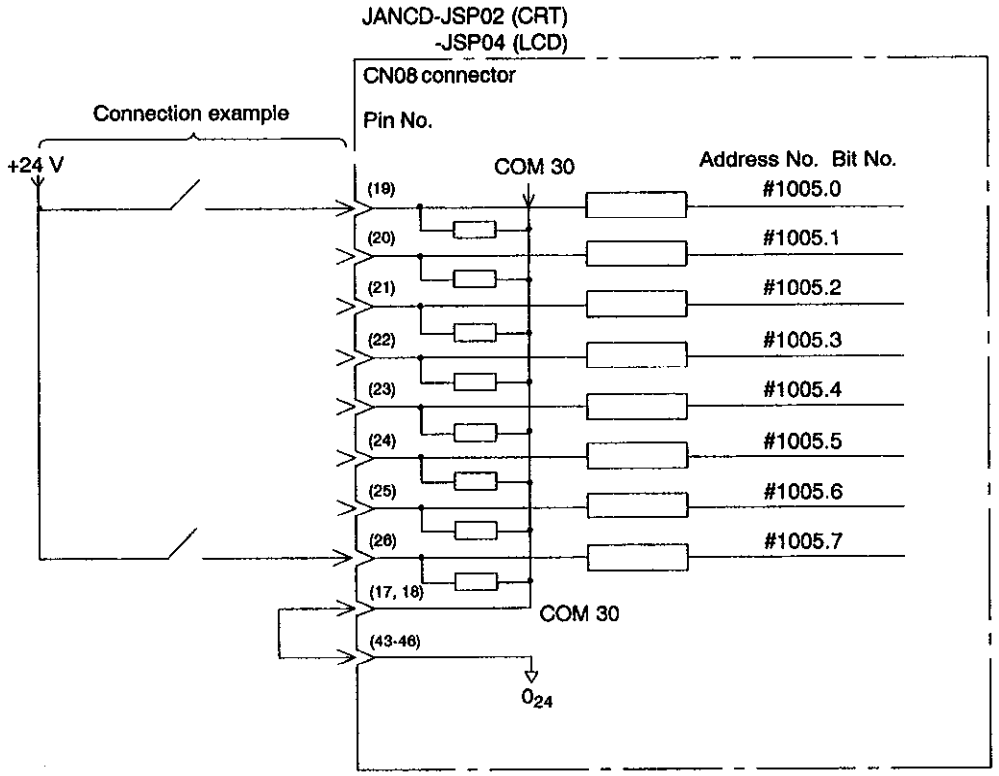


Fig. 11.38 JSP02/JSP04 Module Connection
(Address number and bit number: #1005.0 to #1005.7)

POINT

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (3) I/O Module (JSP02)."
2. The address is that of module No. 1-1. (#1005.0 to #1005.7)
   For modules No. 2 to No. 8, the layout is as shown above, starting from the smaller address number.

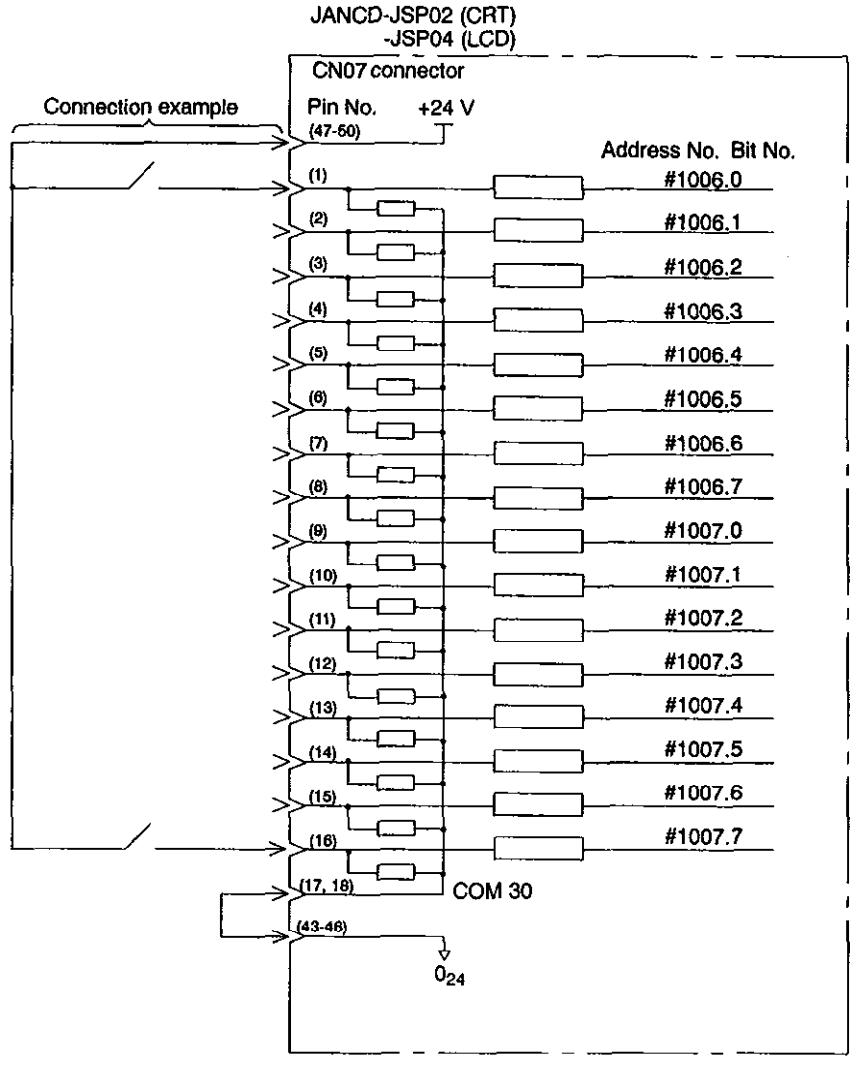


Fig. 11.39 JSP02/JSP04 Module Connection
(Address number and bit number: #1006.0 to #1007.7)

1. The above example shows connection of +24V common. For the connection of 0V common, refer to "11.3.2 (3) I/O Module (JSP02)."
2. The address is that of module No. 1-1. (#1006.0 to #1007.7)
   For modules No. 2 to No. 8, the layout is as shown above, starting from the smaller address number.

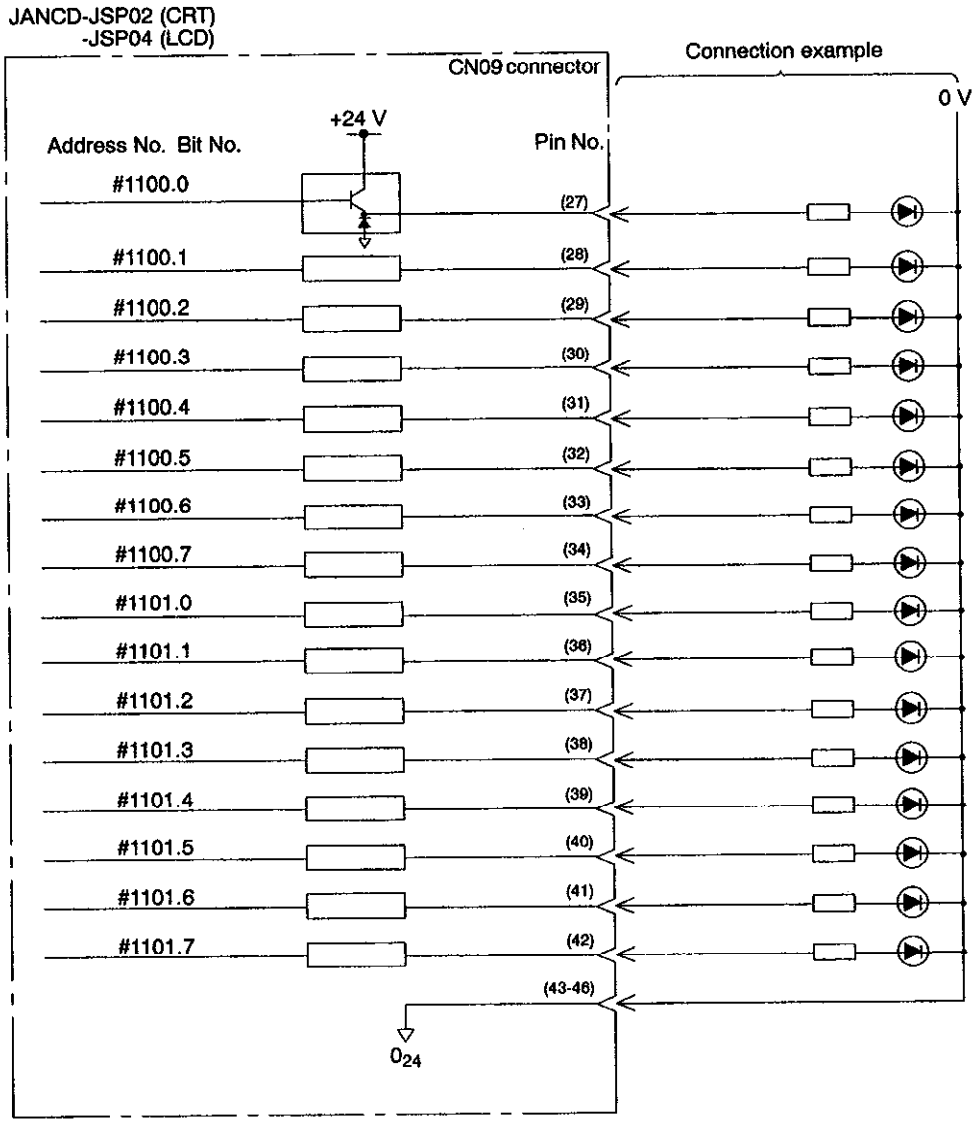


Fig. 11.40 JSP02/JSP04 Module Connection
(Address number and bit number: #1100.0 to #1101.7)

POINT

The address is that of module No. 1-1. (#1100.0 to #1101.7)
For modules No. 2 to No. 8, the layout is as shown above, starting from the smaller address number.

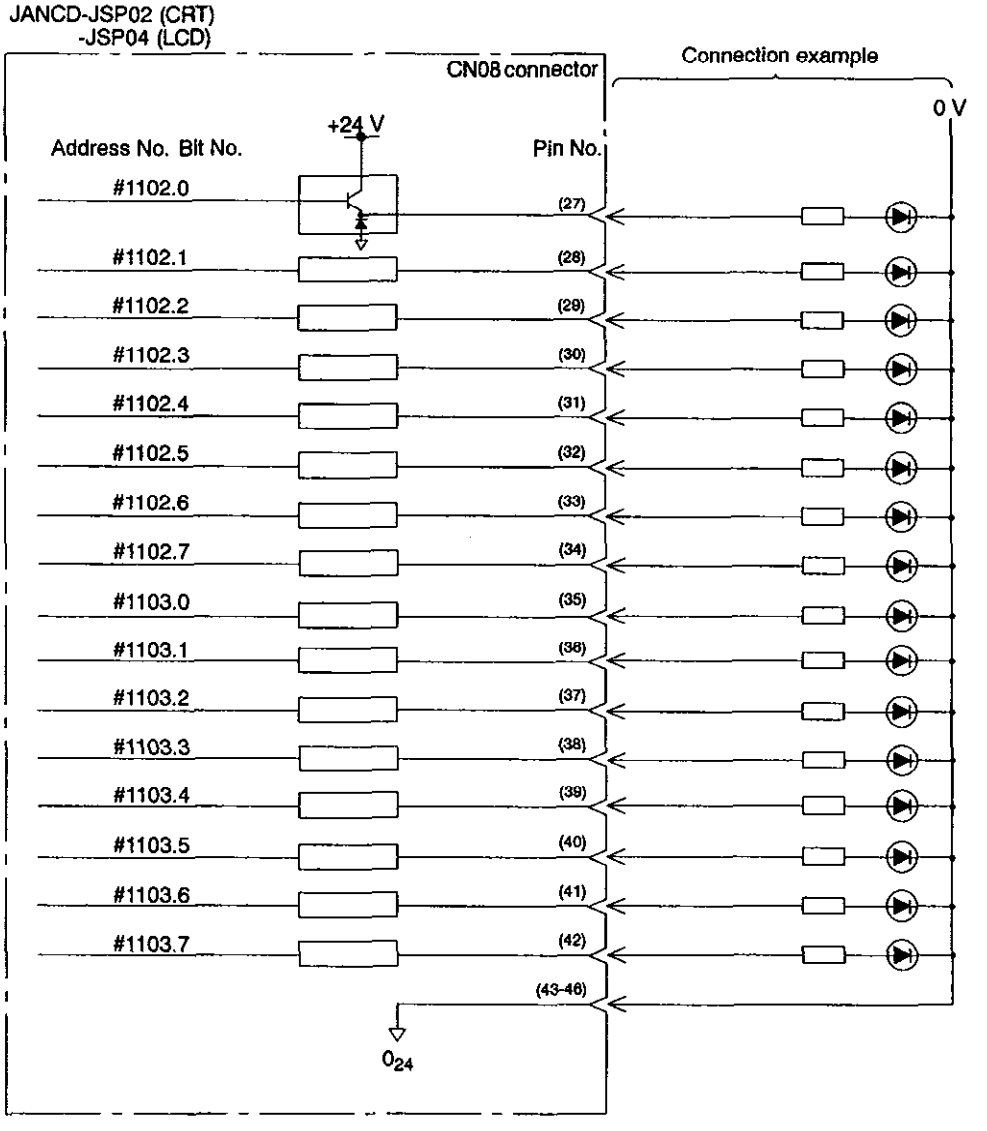


Fig. 11.41 JSP02/JSP04 Module Connection
(Address number and bit number: #1102.0 to #1103.7)

The address is that of module No. 1-1. (#1102.0 to #1103.7)
For modules No. 2 to No. 8, the layout is as shown above, starting from the smaller address number.

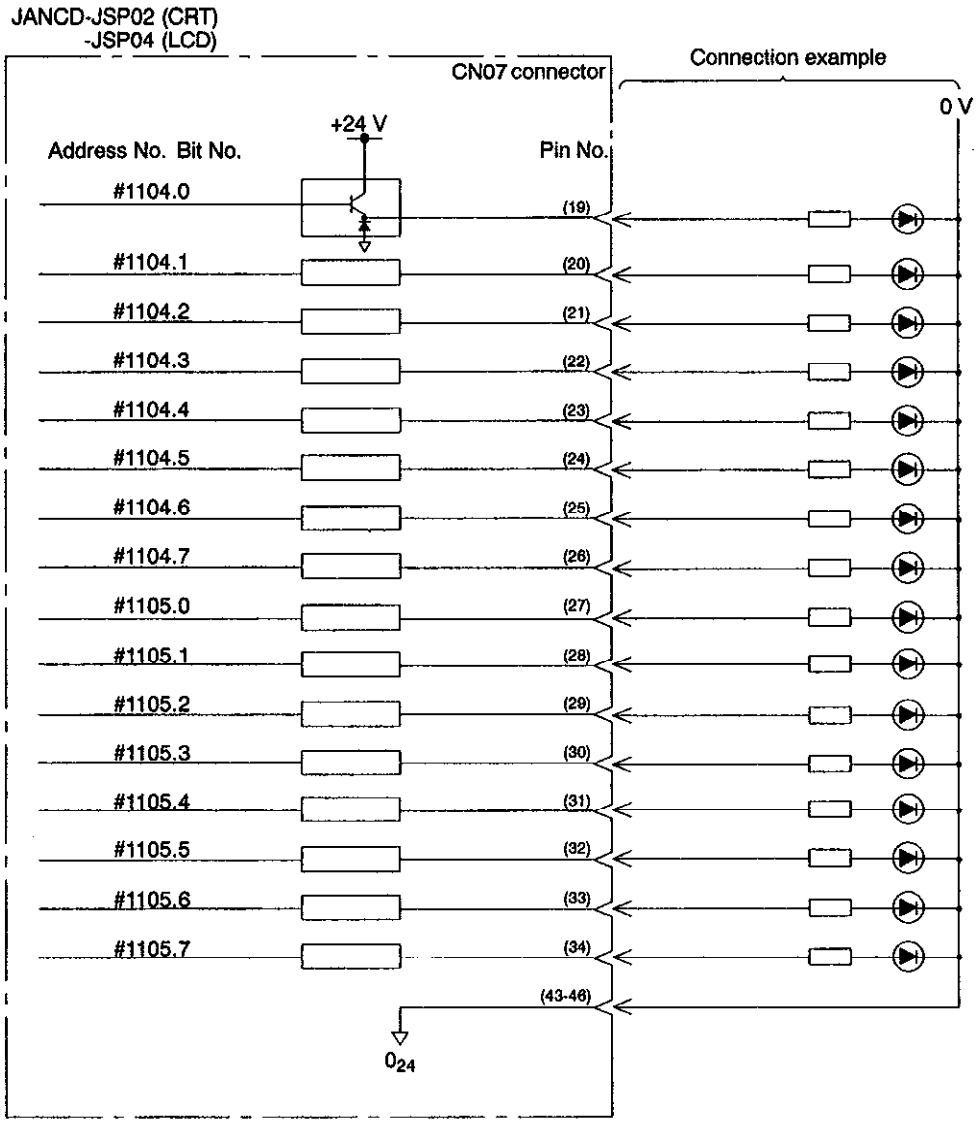


Fig. 11.42 JSP02/JSP04 Module Connection
(Address number and bit number: #1104.0 to #1105.7)

The address is that of module No. 1-1. (#1104.0 to #1105.7)
For modules No. 2 to No. 8, the layout is as shown above, starting from the smaller address number.

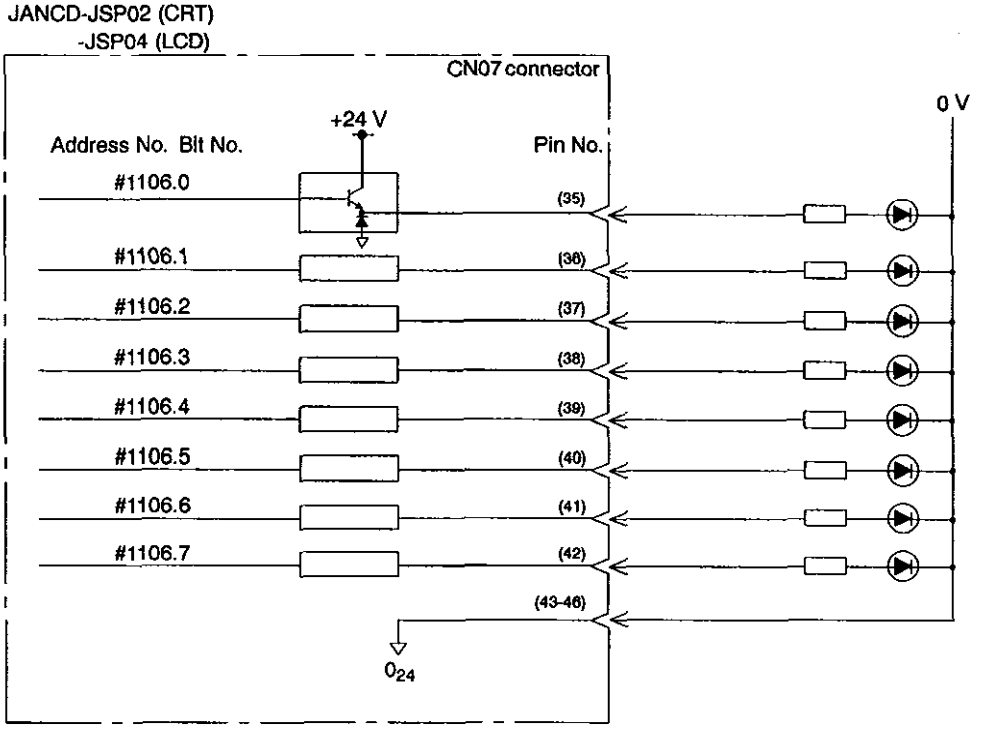


Fig. 11.43 JSP02/JSP04 Module Connection
(Address number and bit number: #1106.0 to #1106.7)

The address is that of module No. 1-1. (#1106.0 to #1106.7)
For modules No. 2 to No. 8, the layout is as shown above, starting from the smaller address number.

11.3 Description of General-purpose I/O Signal

This section describes the I/O module and the machine side I/O signal.

11.3.1 I/O Port

YASNAC is a system with a built-in machine sequencer (PLC).

Therefore, when a machine tool builder designs a built-in machine sequencer, the assignment of external signals to the I/O port may be set freely.

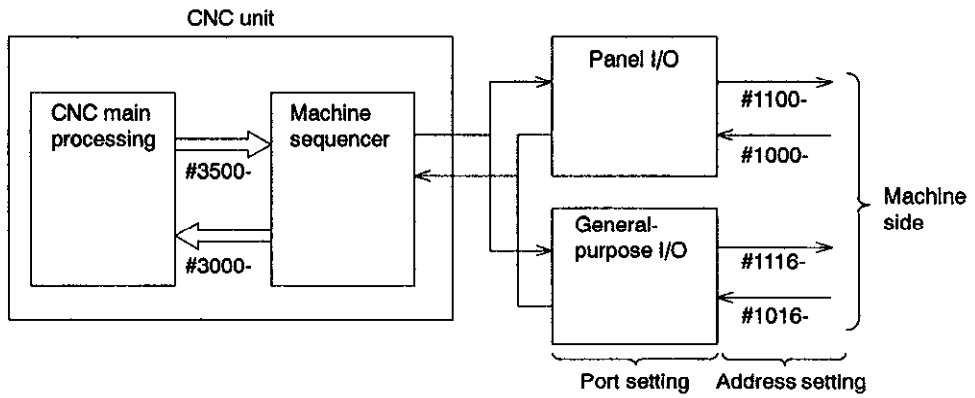


Fig. 11.44 CNC Unit and External Signals

The general-purpose I/O port is loaded on I/O modules (JANCD-FC810, FC815, FC860, FC891) and JSP02 or JSP04 of the CNC operation panel.

The number of I/O points to each module is as shown in Table 11.1.

Table 11.1 Number of I/O points to each module

Module Type JANCD-	Points of Input	Points of Output	Remarks
FC810, FC815, FC860	112	96	For machine panel
FC861	64	56	
JSP02, JSP04	64	56	

1. The I/O port is built-in the control board (JSP02, JSP04) of the CNC operation panel. Therefore, up to 4 sheets (maximum input: 512 points, maximum output: 440 points) may be connected for addition of FC810, FC815, FC860, and up to 9 sheets (maximum input: 640 points, maximum output: 560 points) may be connected for addition of FC861.
2. Mixture of each I/O module is possible, but they must be set so that there is no duplication in I/O area number.

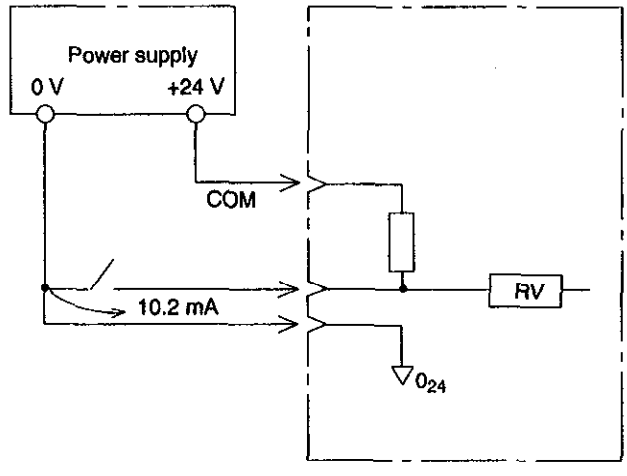
(1) Address Setting

The address and connector are as shown in Table 11.2. Setting is made with port 1, so when specifying another port, the address should be changed. Refer to Table 11.3 and Table 11.4.

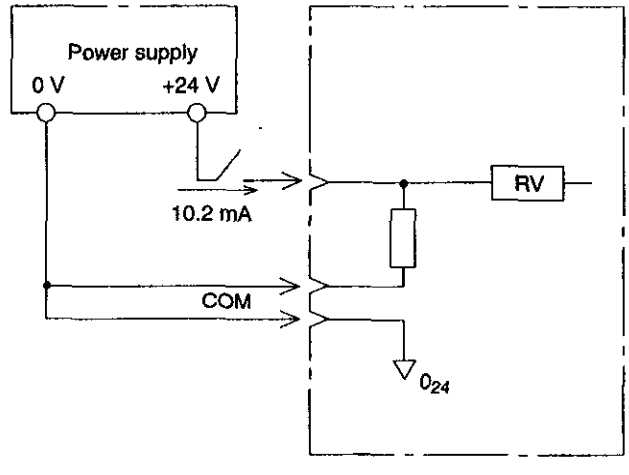
Table 11.2 Address and Connector

Address		Panel I/O (JANCD-JSP02, JSP04)		General-purpose I/O (JANCD-FC810, FC815, FC860)		General-purpose I/O (JANCD-FC861)	
Input	Output						
#1000		CN9		CN4		CN1	
#1001		CN9		CN4	COM30	CN1	COM00
#1002		CN9		CN4		CN1	COM01
#1003		CN8	COM30	CN4	COM31	CN2	
#1004		CN8		CN4	COM32	CN2	COM02
#1005		CN8		CN5		CN2	COM03
#1006		CN7		CN5	COM40	CN3	
#1007		CN7		CN5		CN3	COM04
#1008		–		CN5	COM41		
#1009		–		CN5	COM42		
#1010		–		CN3			
#1011		–		CN3	COM20		
#1012		–		CN3	COM21		
#1013		–		CN2	COM10		
	#1100	CN9		CN1		CN1	
	#1101	CN9		CN1		CN1	
	#1102	CN8		CN1		CN2	
	#1103	CN8		CN1		CN2	
	#1104	CN7		CN1		CN3	
	#1105	CN7		CN2		CN3	
	#1106	CN7		CN3		CN3	
	#1107	–		CN3			
	#1108	–		CN6			
	#1109	–		CN6			
	#1110	–		CN6			
	#1111	–		CN6			
Total		64 inputs, 56 outputs		112 inputs,96 outputs		64 inputs,56 outputs	

- When using external power



(a) For 0V common



(b) For +24V common

Fig. 11.46 Input Circuit (When using external power)

In the input circuits (e.g, COM10, COM20, COM21, —9 in total), as shown in "11.2 Detailed Connection of General-purpose I/O," +24V common or 0V common may be selected freely per 8 inputs, or 16 inputs. For setting, use wire at the cable side.

(b) Output circuit (FC810, FC860)

Output uses non-contact polarity points. Limit the current at operation up to 60 mA (per circuit).

For 24V power, both the internal power and the external power may be used.

- When using internal power

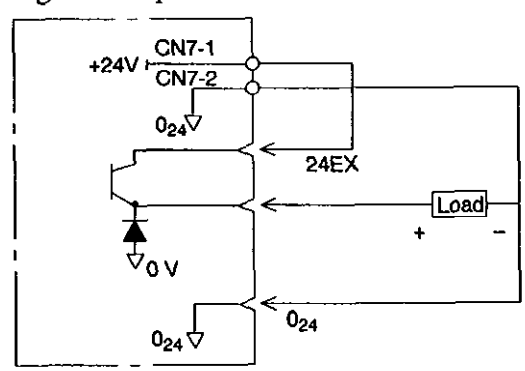


Fig. 11.47 Output Circuit (When using internal power)

- When using the external power

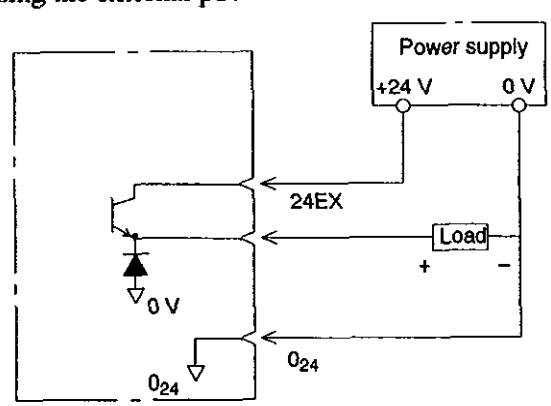


Fig. 11.48 Output Circuit (When using external power)

1. 96 outputs are non-contact polarity points (transistor, source driver), and limit the current at ON up to 60 mA (per circuit).
2. For 96 outputs, every 8 outputs may be connected to more than one external power supply.
3. Up to 3.0 A in the entire internal circuit (including JSP board).

(c) Output circuit (FC815)

Output uses non-contact polarity points. Limit the current at operation up to 60 mA (per circuit).

For 24V power, both the internal power and the external power may be used.

- When using internal power

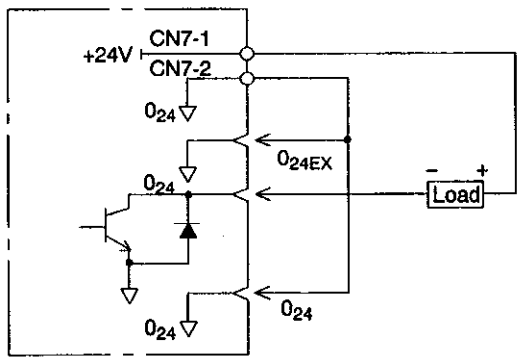


Fig. 11.49 Output Circuit (When using internal power)

- When using the external power

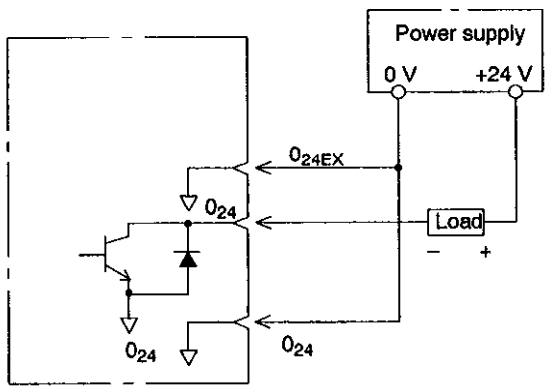


Fig. 11.50 Output Circuit (When using external power)

POINT

1. 96 outputs are non-contact polarity points (transistor, source driver), and limit the current at ON up to 60 mA (per circuit).
2. For 96 outputs, every 8 outputs may be connected to more than one external power supply.
3. Up to 3.0 A in the entire internal circuit (including JSP board).

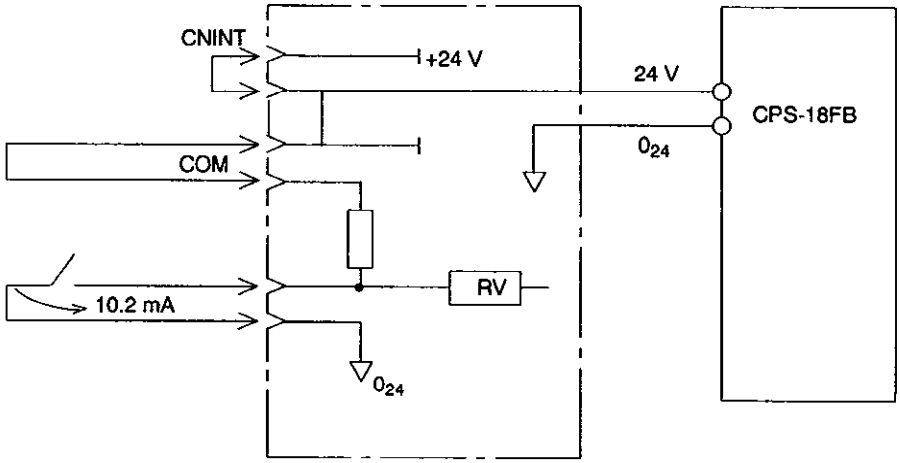
(2) I/O Module (JANCD-FC861)

(a) Input circuit

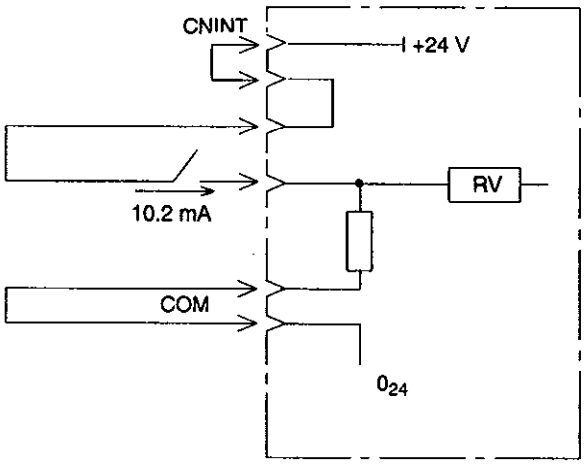
In the input circuit, 0V common and 24V common may be set externally.
For 24V power, both the internal power and the external power may be used.
When using internal power, connect the power selection connector to CNINT.

When using external power, connect the power selection connector to CNEXT.

- When using the internal power



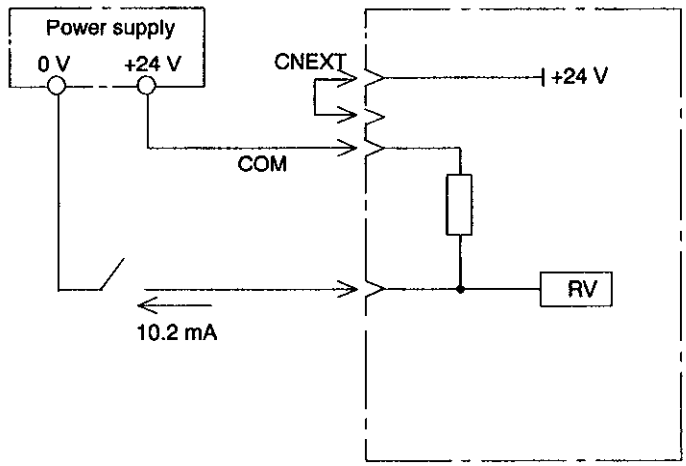
(a) For 0V common



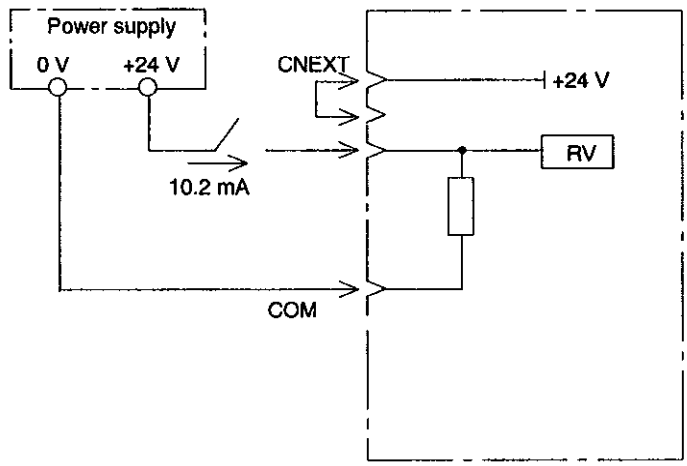
(b) For +24V common

Fig. 11.51 Input Circuit (When using internal power)

- When using external power



(a) For 0V common



(b) For +24V common

Fig. 11.52 Input Circuit (When using external power)

1. The power selection connector for CNINT and CNEXT is installed on CNINT when the board is shipped.
2. In the input circuits (e.g, COM00, COM01, COM02, —— 5 in total), as shown in "11.2 Detailed Connection of General-purpose I/O," +24V common or 0V common may be selected freely per 8 inputs, or 16 inputs. For setting, use wire at the cable side.

(b) Output circuit

Output uses non-contact polarity points. Limit the current at operation up to 60 mA (per circuit).

For 24V power, both the internal power and the external power may be used.

- When using internal power

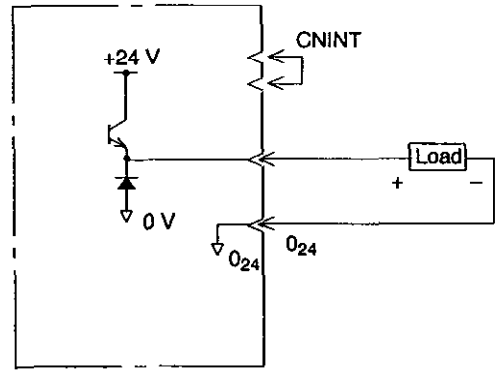


Fig. 11.53 Output Circuit (When using internal power)

- When using external power

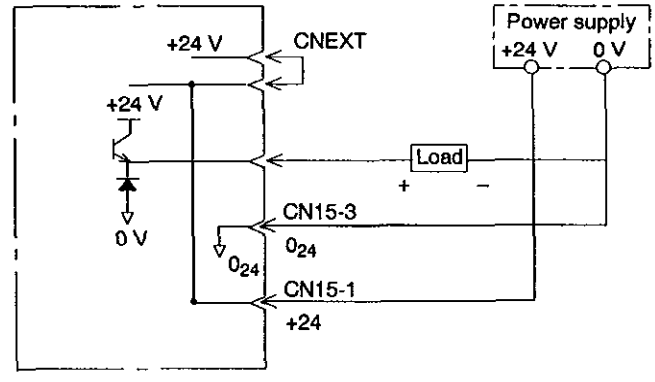


Fig. 11.54 Output Circuit (When using external power)

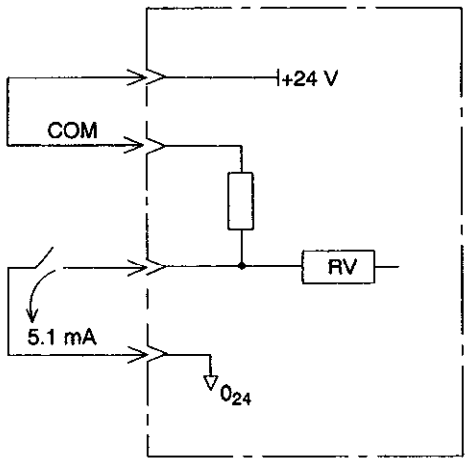
POINT

1. 56 outputs are non-contact polarity points (transistor, source driver), and limit the current at ON up to 60 mA (per circuit).
2. When driving LEDs, etc. using internal power (+24V), up to 3.5 A in the entire I/O circuit (including JSP board).

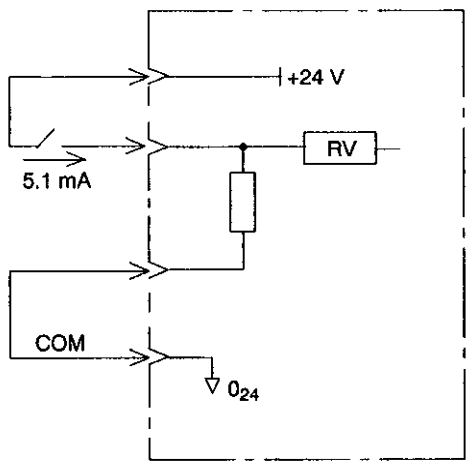
(3) I/O Module (JANCD-JSP02)

With JSP04, the circuit is the same as shown below.

(a) Input circuit



(a) For 0V common



(b) For +24V common

Fig. 11.55 Input Circuit

(b) Output circuit

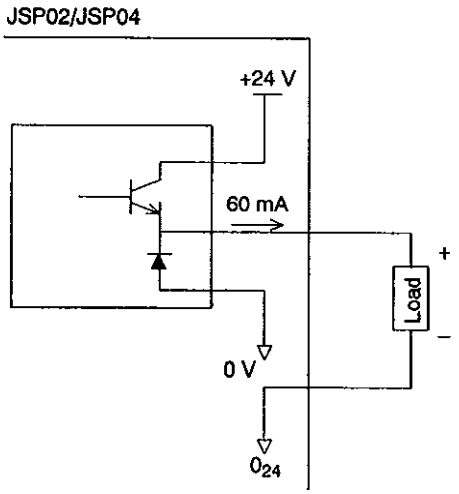


Fig. 11.56 Output Circuit

1. 56 outputs are non-contact polarity points (transistor, source driver), and limit the current at ON up to 60 mA (per circuit).
2. The I/O circuit of JSP02 and JSP04 boards is designed to have the following functions for the devices in the operation panel (very close to the JSP02 or JSP04 board): reading the operation switches, resistive load for LED indicators, and for display devices.

11.3.3 I/O Circuits of I/O Ports

(1) Internal Power Capacity Restriction

For +24V power supply for I/O, external power should be supplied by machine tool builder.

Use of internal power is possible, but current capacity is restricted by the number of I/O ON points, therefore, calculate the load current by the number of I/O points and make sure it is within the allowable limit value.

+24V internal power current capacity: 3.0 A

(a) Power supply unit current consumption (when using internal power): 100 mA

(b) Panel I/O JANCD-JSP02/JSP04 current consumption (when using internal power)

Input current (1 point) : 5.1 mA (at ON)
Output current (1 point) : Varies with load, but up to 60 mA

(c) General-purpose I/O signal I/O module (JANCD-FC810, FC860, FC861)

Input current (1 point) : 10.2 mA (at ON)

Calculation example
When all I/O points ON at JANCD-JSP02/JSP04 LED load (2.7 kΩ).

5.1 mA × 64 = 326.4 mA (JANCD-JSP02/JSP04 input current consumption)
24 V/2.7 K × 56 = 497.8 mA (JANCD-JSP02/JSP04 output current consumption)
3000 mA - 326 mA - 498 mA -100 mA = 2076 mA (Feedable capacity)

In this status, if internal power is supplied to JANCD-FC810, over 203 inputs are ON, so overcurrent alarm of internal power supply (CPS18FB) results.

2076 mA / 10.2 mA = 203 inputs

(2) External Power Supply Specifications

Voltage 24 VDC ± 5 %
Ripple 10 % (P-P)

Use power supply with overcurrent detection function.

APPENDIX 1

A1

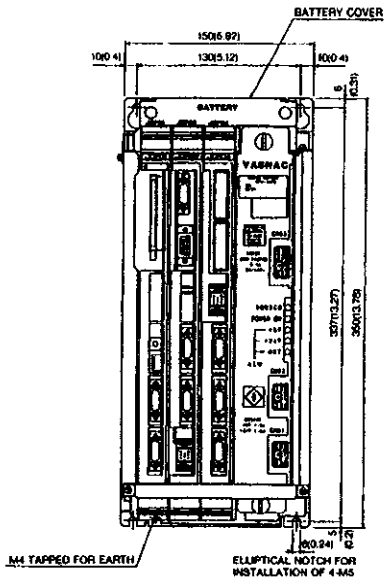
DIMENSIONS

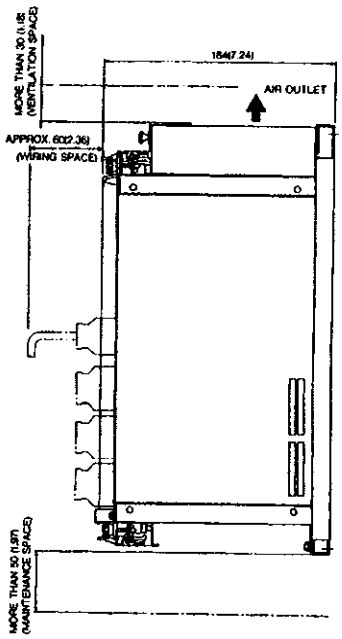
Appendix 1 shows the external dimensions of the J300 component parts.

APPENDIX 1.1 CNC Module

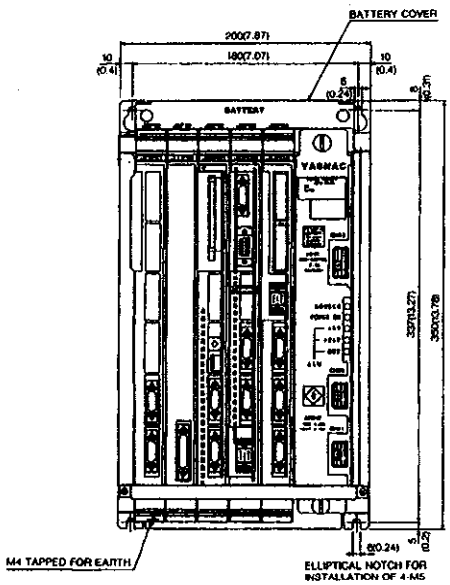
A1

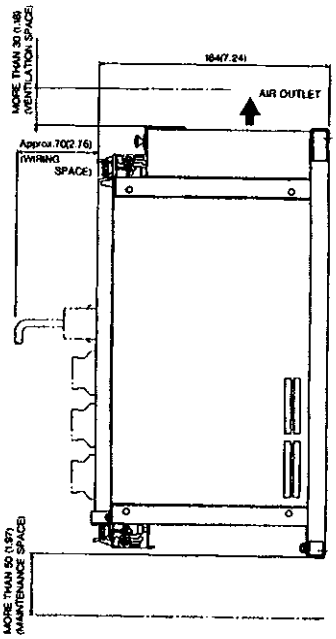
(1) CPU Unit (3 slots)





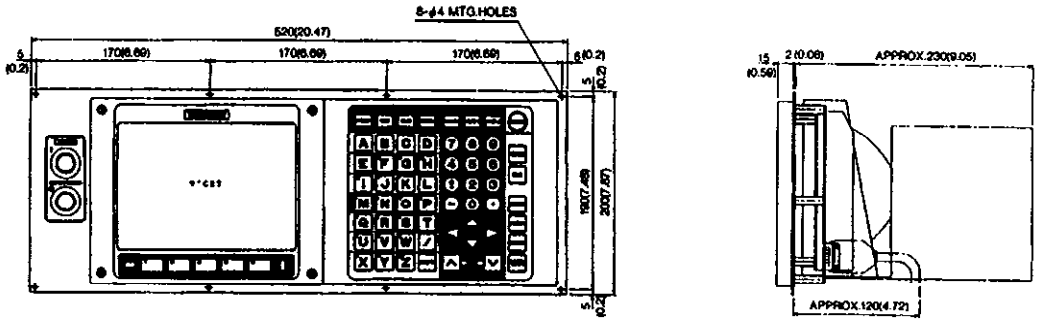
(2) CPU Unit (5 slots)



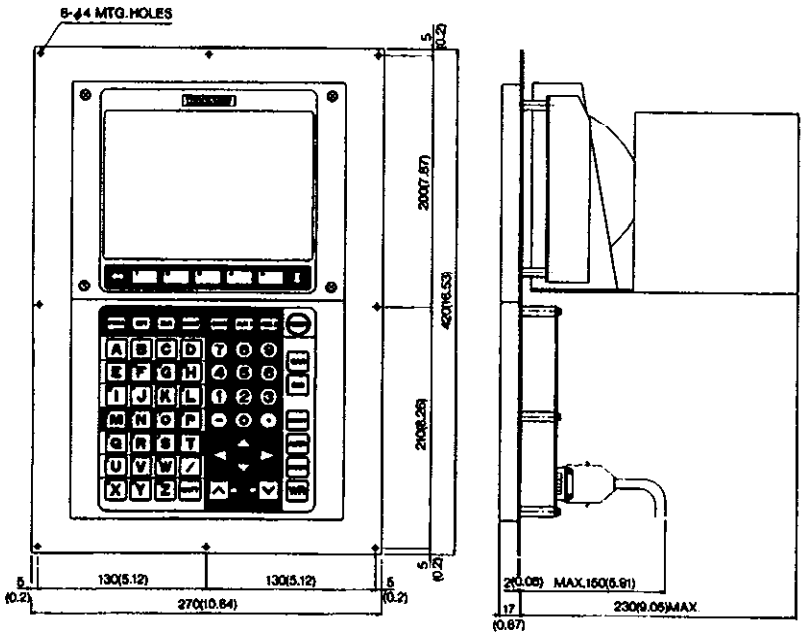


APPENDIX 1.2 Control Panel

(1) Horizontal 9" Monochrome CRT Display

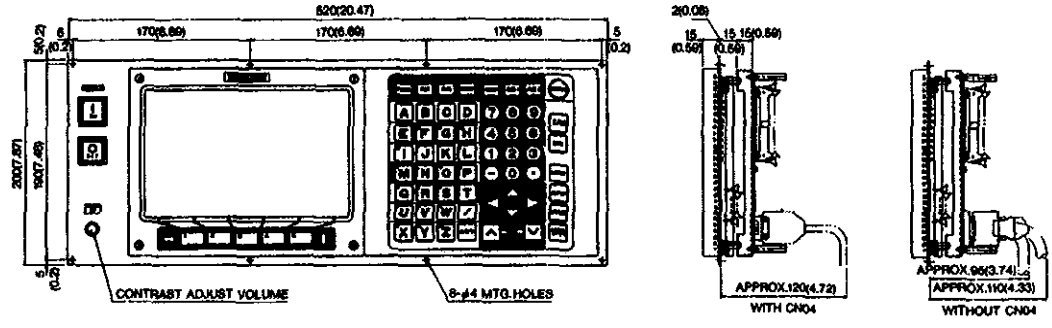


(2) Vertical 9" Monochrome CRT Display

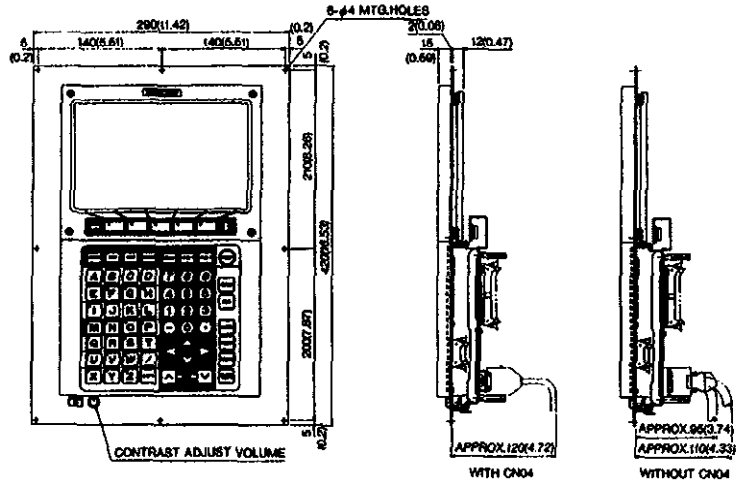


A1

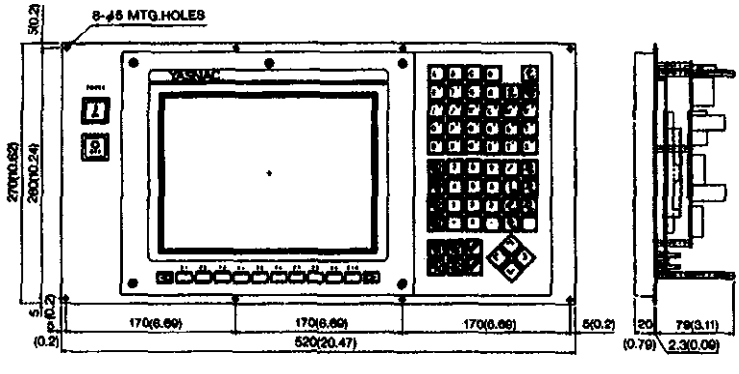
(3) Horizontal Monochrome LCD Display



(4) Vertical Monochrome LCD Display

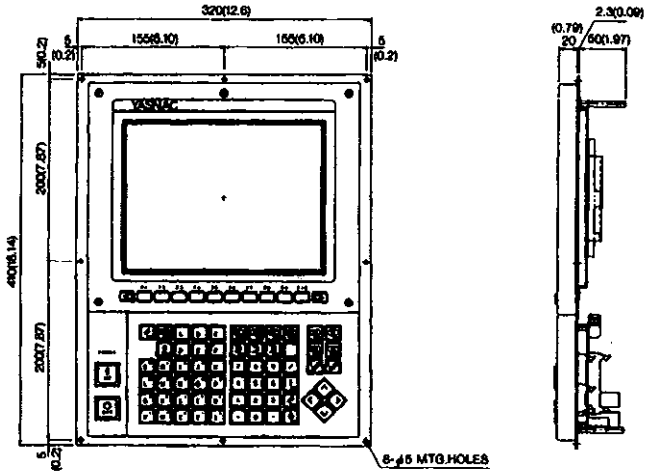


(5) ACGC160 (Horizontal Color LCD Display)

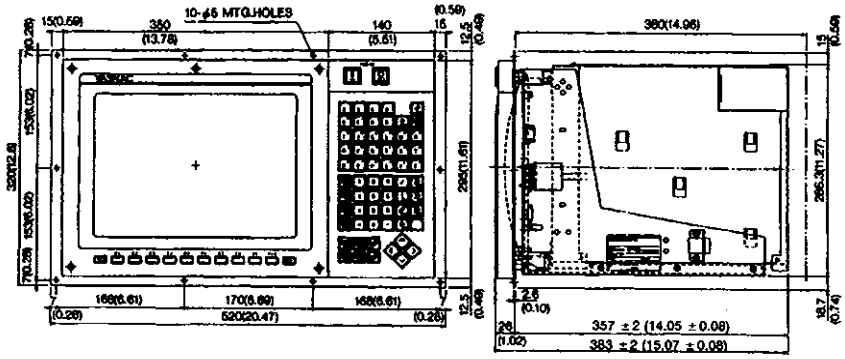


A1

(6) ACGC160 (Vertical Color LCD Display)

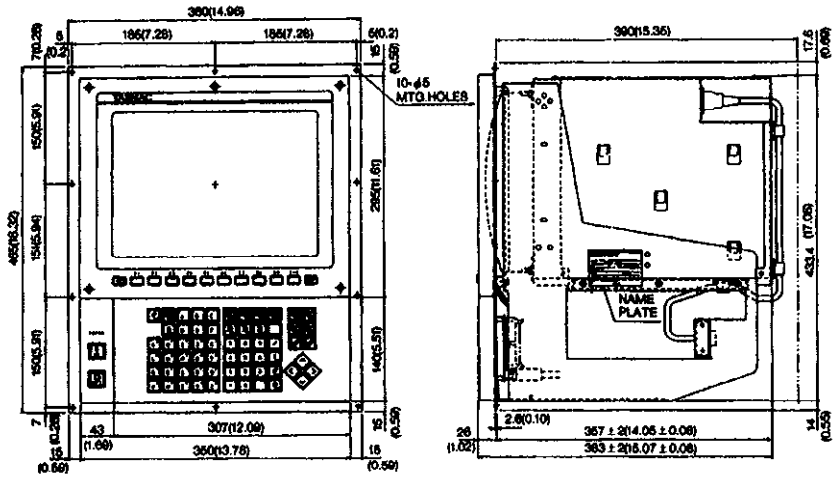


(7) ACGC 160 (Horizontal 14" Color CRT Display)



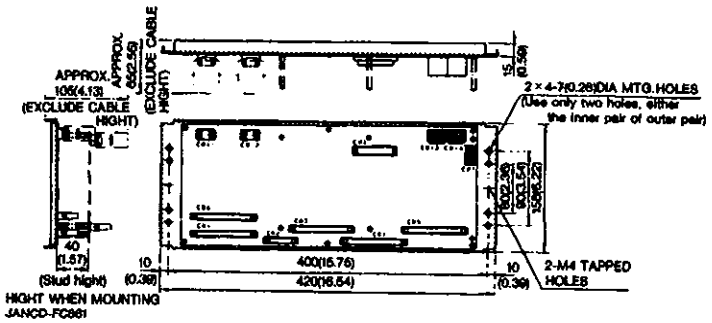
A1

(8) ACGC160 (Vertical 14" Color CRT Display)

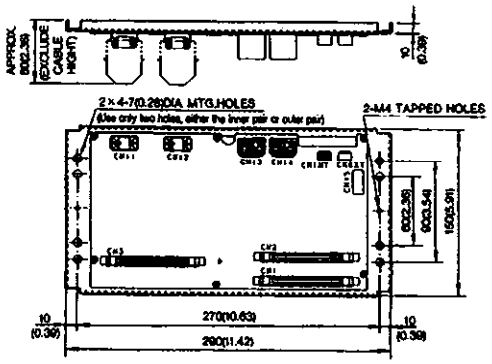


APPENDIX 1.3 I/O Module

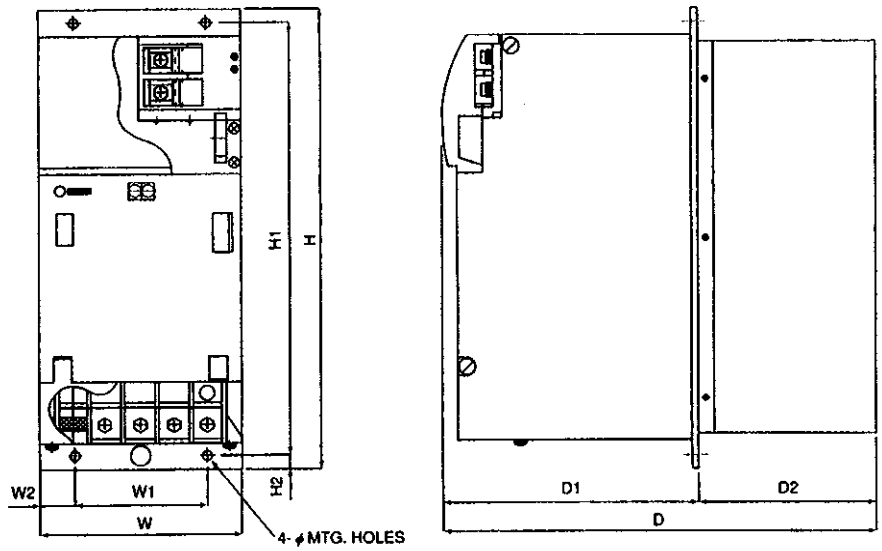
(1) Model JANCD-FC810/815/860



(2) Model JZNC-IAU59 (JANCD-FC861)



APPENDIX 1.4 AC Servopack (Including Converter and Spindle Drive)



Unit	Capacity kW (HP)	Dimensions in mm (inches)									
		W	H	D	W1	W2	H1	H2	D1	D2	φ
Converter	5.5 (7.5) 7.5 (10)	99 (3.90)	350 (13.78)	320 (12.60)	75 (2.95)	12 (0.47)	330 (12.99)	10 (0.39)	190 (7.48)	130 (5.12)	M5
	11 (15) 15 (20) 18.5 (24.8) 22 (30)	149 (5.87)	350 (13.78)	320 (12.60)	100 (3.94)	24.5 (0.96)	330 (12.99)	10 (0.39)	190 (7.48)	130 (5.12)	M5
	30 (40)	199 (7.83)	350 (13.78)	320 (12.60)	150 (5.91)	24.5 (0.96)	330 (12.99)	10 (0.39)	190 (7.48)	130 (5.12)	M5
Inverter (Spindle Axis)	3.7 (5) 5.5 (7.5) 7.5 (10)	99 (3.89)	350 (13.78)	320 (12.60)	75 (2.95)	12 (0.47)	330 (12.99)	10 (0.39)	190 (7.48)	130 (5.12)	M5
	11 (15) 15 (20) 18.5 (24.8) 22 (30)	149 (5.87)	350 (13.78)	320 (12.60)	100 (3.94)	24.5 (0.96)	330 (12.99)	10 (0.39)	190 (7.48)	130 (5.12)	M5
	30 (40)	199 (7.83)	350 (13.78)	320 (12.60)	150 (5.91)	24.5 (0.96)	320 (12.60)	10 (0.39)	190 (7.48)	130 (5.12)	M6
Servopack	0.5 (0.7) 1 (1.3) 1.5 (2)	50 (1.97)	350 (13.78)	320 (12.60)	–	25 (0.98)	330 (12.99)	10 (0.39)	190 (7.48)	130 (5.12)	M5
	2 (2.7) 3 (4)	50 (1.97)	350 (13.78)	320 (12.60)	–	25 (0.98)	330 (12.99)	10 (0.39)	190 (7.48)	130 (5.12)	M5
	5 (6.7)	75 (2.95)	350 (13.78)	320 (12.60)	50 (1.97)	12.5 (0.49)	330 (12.99)	10 (0.39)	190 (7.48)	130 (5.12)	M5

APPENDIX 1.5 AC Servomotor Σ Series (Model SGMG, for 200 VAC)

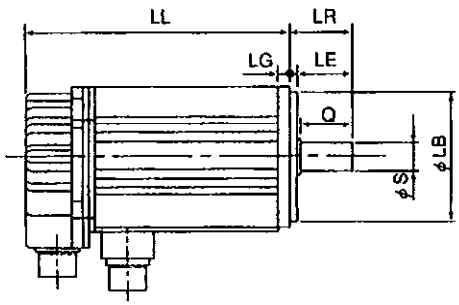
(1) Standard Specifications

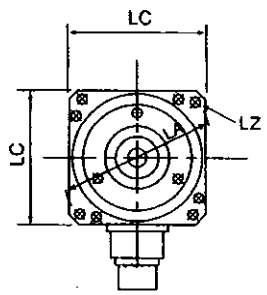
Model: SGMG-□□		-05	-09	-13	-20	-30	-44
Rated Output	kW (HP)	0.45 (0.6)	0.85 (1.1)	1.3 (1.7)	1.8 (2.4)	2.9 (3.9)	4.4 (5.9)
Rated Torque	N·m	2.84	5.39	8.34	11.5	18.6	28.4
	kgf·cm	29	55	86	117	190	290
Instantaneous Peak Torque	N·m	8.92	13.3	23.3	28.0	45.1	66.3
	kgf·cm	91	136	238	286	460	676
Rated Rotation Speed	r/min	1500					
Max. Rotation Speed	r/min	3000					
Rotor GD^2	$\times 10^{-4}$kg·m^2	7.37	14.1	20.9	31.9	47.3	69.4
Rated Power Rating	kW/S	10.9	20.6	33.2	41.4	73.3	116

- Time Rating: Continuous
- Insulation Class: Class F
- Withstand Voltage: AC 1500V 1 min
- Insulation Resistance: 500 VDC, 10 MΩ or more
- Enclosure: Totally-enclosed, self-cooled type
- Ambient Temperature: 0 to +40°C
- Ambient Humidity: 20 to 80% (non-condensing)
- Vibration: V15 (15 μm or below)
- Finish in Munsell Notation: N1.5
- Excitation: Permanent magnet
- Mounting: Flange mounted
- Drive Method: Direct drive

A1

(2) Dimensions in mm (inches)



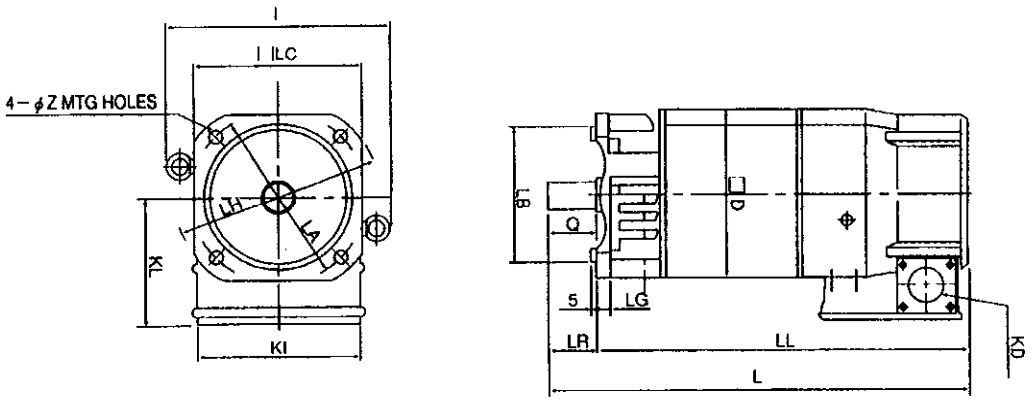


Model	LL	LC	LA	LZ	LG	LB	LE	Q	S	LR	Mass kg (lb)
SGMG-05A212	134 (5.28)	130 (5.12)	145 (5.71)	9 (0.35)	12 (0.47)	$110^{\ 0}_{-0.035}$ $\left(4.3307^{\ 0}_{-0.0014}\right)$	6 (0.24)	40 (1.575)	$19^{\ 0}_{-0.013}$ $\left(0.7480^{\ 0}_{-0.0005}\right)$	58 (2.28)	6.5 (14.3)
SGMG-09A212	157 (6.18)										8.5 (18.7)
SGMG-13A212	181 (7.13)										10.5 (23.1)
SGMG-20A212	154 (6.06)	180 (7.09)	200 (7.87)	13.5 (0.53)	18 (0.71)	$114.3^{\ 0}_{-0.025}$ $\left(4.5^{\ 0}_{-0.001}\right)$	3.2 (0.13)	76 (2.992)	$35^{\ +0.01}_{\ 0}$ $\left(1.3779^{\ +0.0004}_{\ 0}\right)$	79 (3.11)	14.5 (32.0)
SGMG-30A212	180 (7.09)										18.5 (40.8)
SGMG-44A212	214 (8.43)										24 (52.9)

APPENDIX 1.6 Spindle Motor M5 Series
(Model UAASKA, for 200 VAC)

Model: UAASKA-□□		A-04	A-06	A-08	A-11	A-15	A-19	A-22	J-30
Short-time Rating	kW (HP)	3.7 (5)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)	22 (30)	30 (40)
Continuous Rating	kW (HP)	2.2 (3)	3.7 (5)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)	22 (30)
Continuous Rated Torque	kgf·m	1.43	2.40	3.57	4.87	7.14	9.74	12.0	18.6
Based Speed	r/min	1500	1500	1500	1500	1500	1500	1500	1150
Max. Speed	r/min	8000	8000	8000	6000	6000	6000	6000	4500
Rotor $GD^2 \times 10^{-3}$	$kg \cdot m^2$	35.3	74.3	120	149	290	400	480	1170
Vibration	μm	V5	V5	V5	V5	V5	V5	V5	V10
Noise Level	dB	75	75	75	75	75	75	75	80
Approx. Mass	kg (lb)	36 (79.4)	58 (127.9)	63 (138.9)	76 (167.5)	105 (231.5)	120 (264.5)	134 (295.4)	241 (531.3)

(1) Flange-Mounted Type Motor Dimensions in mm (inches)



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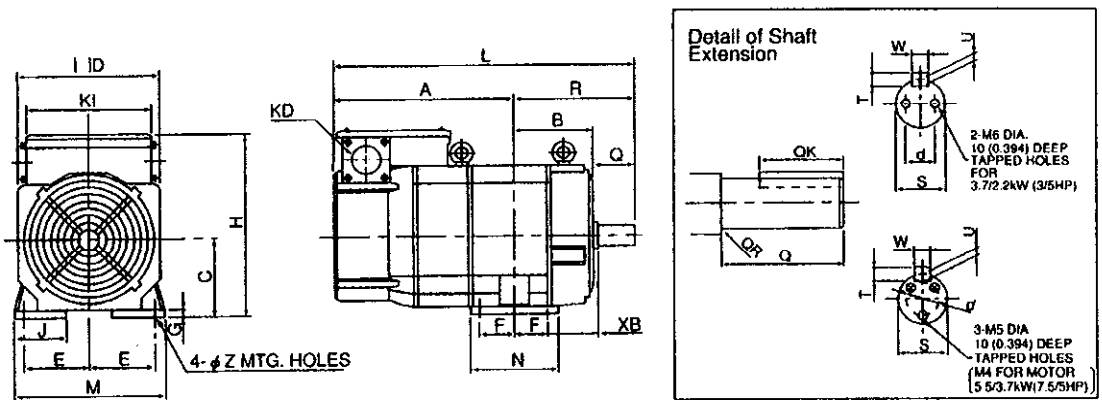
Rated Output kW (HP)		L	LA	LB	LC	LG	LH	LL	LR	Z	D
30-min Rating	Continuous Rating										
3.7 (5)	2.2 (3)	392 (15.4)	185 (7.28)	$150\ ^{0}_{-0.040}$ ($5.9\ ^{0}_{-0.0016}$)	174 (6.85)	12 (0.47)	220 (8.66)	332 (13.1)	60 (2.36)	11 (0.43)	174 (6.85)
5.5 (7.5)	3.7 (5)	502 (19.8)						442 (17.4)			
7.5 (10)	5.5 (7.5)	515 (20.3)	215 (8.46)	$180\ ^{0}_{-0.040}$ ($7.09\ ^{0}_{-0.0016}$)	204 (8.03)	16 (0.63)	250 (9.84)	435 (17.1)	80 (3.15)	15 (0.59)	204 (8.03)
11 (15)	7.5 (10)	585 (23.0)						475 (18.7)	110 (4.33)		
15 (20)	11 (15)	568 (22.4)	265 (10.4)	$230\ ^{0}_{-0.046}$ ($9.06\ ^{0}_{-0.0018}$)	250 (9.84)	20 (0.79)	300 (11.8)	458 (18.0)	110 (4.33)	15 (0.59)	260 (10.2)
18.5 (25)	15 (20)	606 (23.8)						496 (19.5)			
22 (30)	18.5 (25)	642 (25.3)						532 (20.9)			
30 (40)	22 (30)	794 (31.8)	350 (13.8)	$300\ ^{0}_{-0.052}$ ($11.8\ ^{0}_{-0.002}$)	320 (12.6)	20 (0.79)	385 (15.2)	654 (25.7)	140 (5.51)	19 (0.75)	320 (12.6)

I	KD	KL	KI	Shaft Extension (See drawings below.)							
				Q	QK	QR	S	T	U	W	d
227 (8.94)	34 (1.34)	142 (5.59)	174 (6.85)	60 (2.36)	45 (1.77)	1 (0.04)	28j6 (1.1j6)	7 (0.28)	4 (0.16)	8 (0.31)	16 (0.63)
											22 (0.87)
270 (10.6)	42.5 (1.67)	159 (6.26)	204 (8.03)	80 (3.15)	70 (2.75)	1 (0.04)	$28\ ^{0}_{-0.013}$ ($1.1\ ^{0}_{-0.0005}$)	8 (0.31)	5 (0.20)	10 (0.39)	22 (0.87)
				110 (4.33)	90 (3.54)	0.5 (0.02)	$32\ ^{0}_{-0.016}$ ($1.26\ ^{0}_{-0.0006}$)	9 (0.35)	5.5 (0.22)	14 (0.55)	40 (1.57)
345 (13.6)	42.5 (1.67)	181 (7.12)	250 (9.84)	110 (4.33)	90 (3.54)	1 (0.04)	$48\ ^{0}_{-0.016}$ ($1.89\ ^{0}_{-0.0006}$)	9 (0.35)	5.5 (0.22)	14 (0.55)	40 (1.57)
							$55\ ^{+0.033}_{+0.013}$ ($2.16\ ^{+0.0014}_{+0.0005}$)	10 (0.39)	6 (0.24)	16 (0.63)	45 (1.77)
442 (17.4)	61 (2.40)	223 (8.78)	320 (12.6)	140 (5.51)	110 (4.33)	2 (0.08)	$60\ ^{+0.035}_{+0.013}$ ($2.36\ ^{+0.0014}_{+0.0005}$)	11 (0.43)	7 (0.28)	18 (0.71)	50 (1.97)

Note: Model 3.7/2.2 kW (5/3 HP) is 15-minutes rating/continuous rating. The model is not furnished with eyebolts. Dimensions of the shaft extension key and keyway are based on JIS (Japan Industrial Standard) B1301.

A1

(2) Foot-Mounted Type Motor Dimensions in mm (inches)

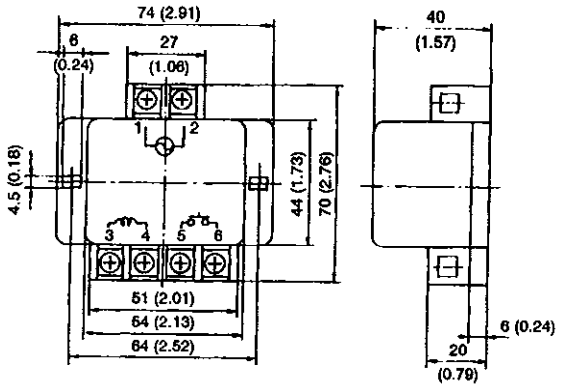


Rated Output kW (HP)		A	B	$\begin{pmatrix}0\\-0.5\\0\\-0.02\end{pmatrix}$ C	D	E	F	G	H	J	KD	L
30-min Rating	Continuous Rating											
3.7 (5)	2.2 (3)	237 (9.33)	93 (3.66)	100 (3.94)	174 (6.85)	80 (3.15)	50 (1.97)	9 (0.35)	241 (9.49)	34 (1.34)	34 (1.34)	392 (15.4)
5.5 (7.5)	3.7 (5)	308 (12.1)	132 (5.20)				100 (3.94)					502 (19.8)
7.5 (10)	5.5 (7.5)	295 (11.6)	137 (5.39)	112 (4.41)	204 (8.03)	95 (3.74)	70 (2.76)	10 (0.39)	267 (10.5)	75 (2.95)	42.5 (1.67)	515 (20.3)
11 (15)	7.5 (10)	315 (12.4)	157 (6.18)				90 (3.54)					585 (23)
15 (20)	11 (15)	261 (10.3)	198 (7.80)	160 (6.30)	260 (10.2)	127 (5)	89 (3.50)	16 (0.63)	341 (13.4)	55 (2.16)	42.5 (1.67)	568 (22.4)
18.5 (25)	15 (20)	283 (11.1)	212 (8.35)				105 (4.13)					605 (23.8)
22 (30)	18.5 (25)	297 (11.7)	234 (9.21)				127 (5)					642 (25.3)
30 (40)	22 (30)	406 (16.0)	245 (9.65)	180 (7.09)	320 (12.6)	139.5 (5.49)	127 (5)	16 (0.63)	403 (15.9)	55 (2.16)	61 (2.40)	764 (30.1)

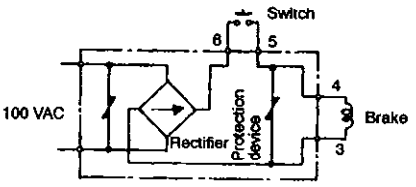
M	N	R	XB	Z	KI	Shaft Extension						
						Q	QK	QR	S	T	U	W
188 (7.40)	125 (4.92)	155 (6.10)	45 (1.77)	12 (0.47)	104 (4.09)	60 (2.36)	45 (1.77)	1 (0.04)	28j6 (1.1j6)	7 (0.28)	4 (0.16)	8 (0.31)
	206 (8.11)	194 (7.64)										
220 (8.66)	177 (6.97)	220 (8.66)	70 (2.76)	12 (0.47)	204 (8.03)	80 (3.15)	70 (2.75)	1 (0.04)	$\begin{pmatrix}28\ ^{0}_{-0.013}\\1.1\ ^{0}_{-0.0005}\end{pmatrix}$	8 (0.31)	5 (0.20)	10 (0.39)
	217 (8.54)	270 (10.6)				110 (4.33)	90 (3.54)	0.5 (0.02)	$\begin{pmatrix}32\ ^{0}_{-0.016}\\1.26\ ^{0}_{-0.0006}\end{pmatrix}$	9 (0.35)	5.5 (0.22)	14 (0.55)
290 (11.4)	224 (8.82)	307 (12.1)	108 (4.25)	15 (0.59)	250 (9.84)	110 (4.33)	90 (3.54)	1 (0.04)	$\begin{pmatrix}48\ ^{0}_{-0.016}\\1.89\ ^{0}_{-0.0006}\end{pmatrix}$	9 (0.35)	5.5 (0.22)	14 (0.55)
	256 (10.1)	323 (12.7)										
	300 (11.8)	345 (13.6)							$\begin{pmatrix}55\ ^{+0.035}_{+0.013}\\2.16\ ^{+0.0014}_{+0.0005}\end{pmatrix}$	10 (0.39)	6 (0.24)	16 (0.63)
320 (12.6)	298 (11.7)	388 (15.3)	121 (4.76)	19 (0.75)	320 (12.6)	140 (5.51)	110 (4.33)	2 (0.08)	$\begin{pmatrix}60\ ^{+0.033}_{+0.013}\\2.36\ ^{+0.0014}_{+0.0005}\end{pmatrix}$	11 (0.43)	7 (0.28)	18 (0.71)

Note: Model 3.7/2.2 kW (5/3 HP) is 15-minutes rating/continuous rating. The model is not furnished with eyebolts.

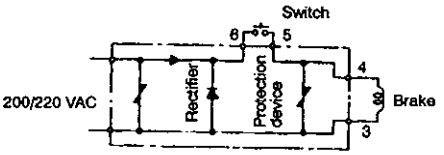
APPENDIX 1.7 Power Supply Unit for Brake (OPR109F, OPR109A)



Type OPR109F Circuit Diagram



Type OPR109A Circuit Diagram



Note 1: Do not short output terminals 3 and 4.

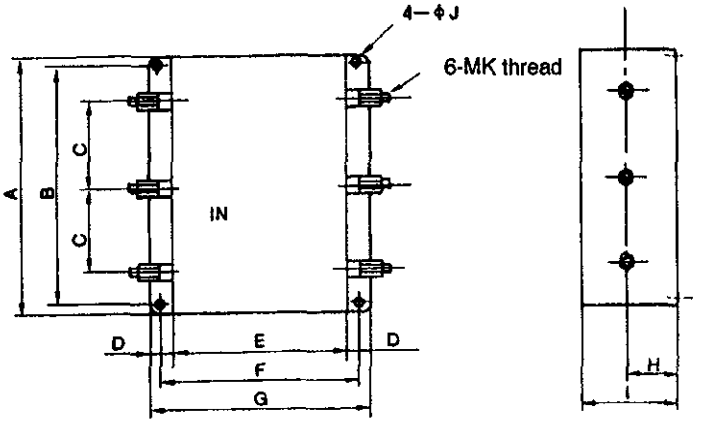
2: Tighten the terminal block screws securely.

3: A protection device is provided internally and external connection of such a device is not necessary.

4: The operation capacity of contacts used at "5" and "6" in the circuit diagram must be 5 to 10 times the current rating of the brake. Use the contacts operating in DC.

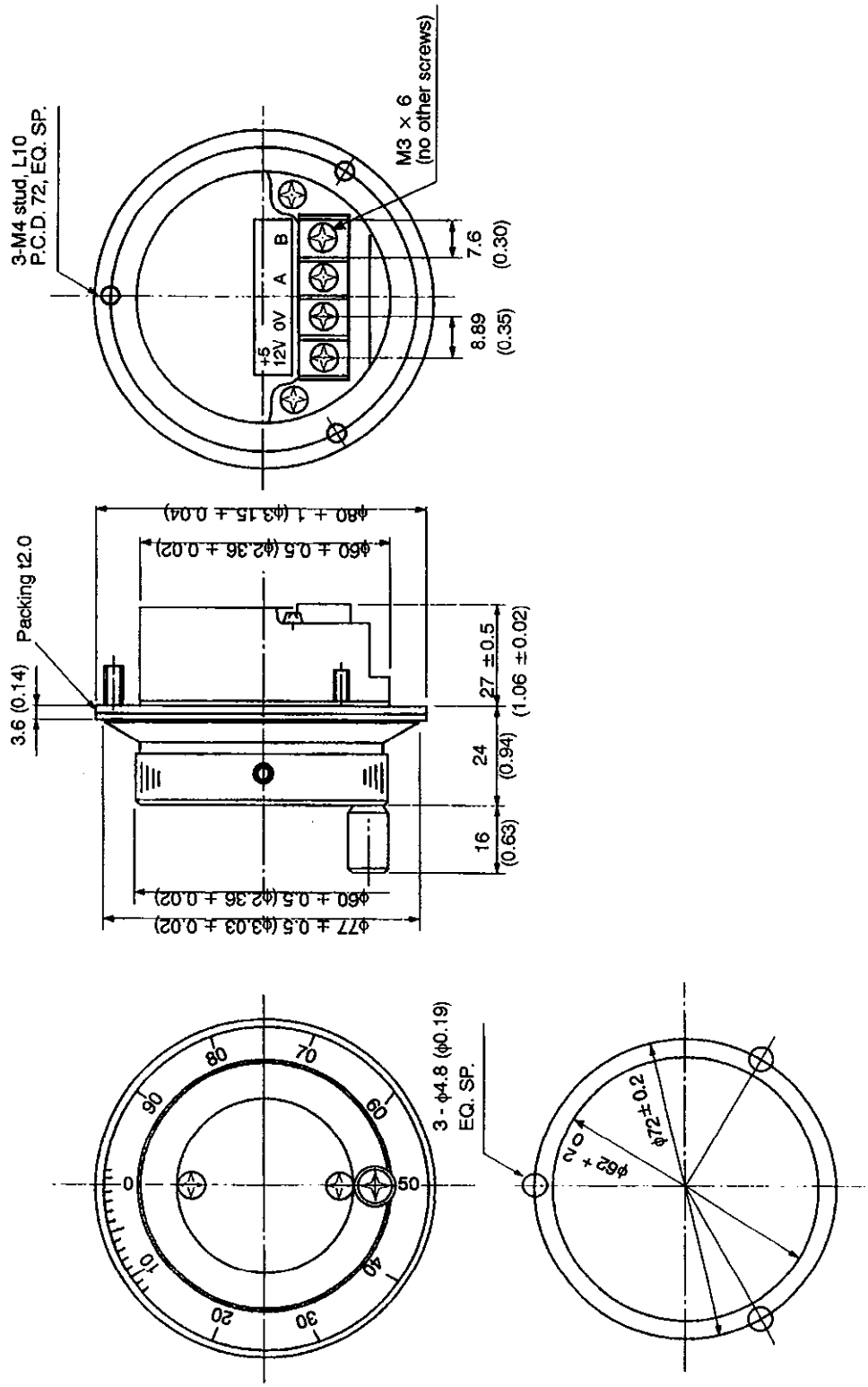
Type	Rectifying Method	Frequency Hz	AC Input Voltage (AC) V	DC Output Voltage (DC) V	DC Output Current A	Approximate Weight kg
OPR-109A	Single-phase half-wave	50/60	200	90	1	0.1
OPR-109F	Single-phase full-wave	50/60	100	90	1	0.1

APPENDIX 1.8 Noise Filter



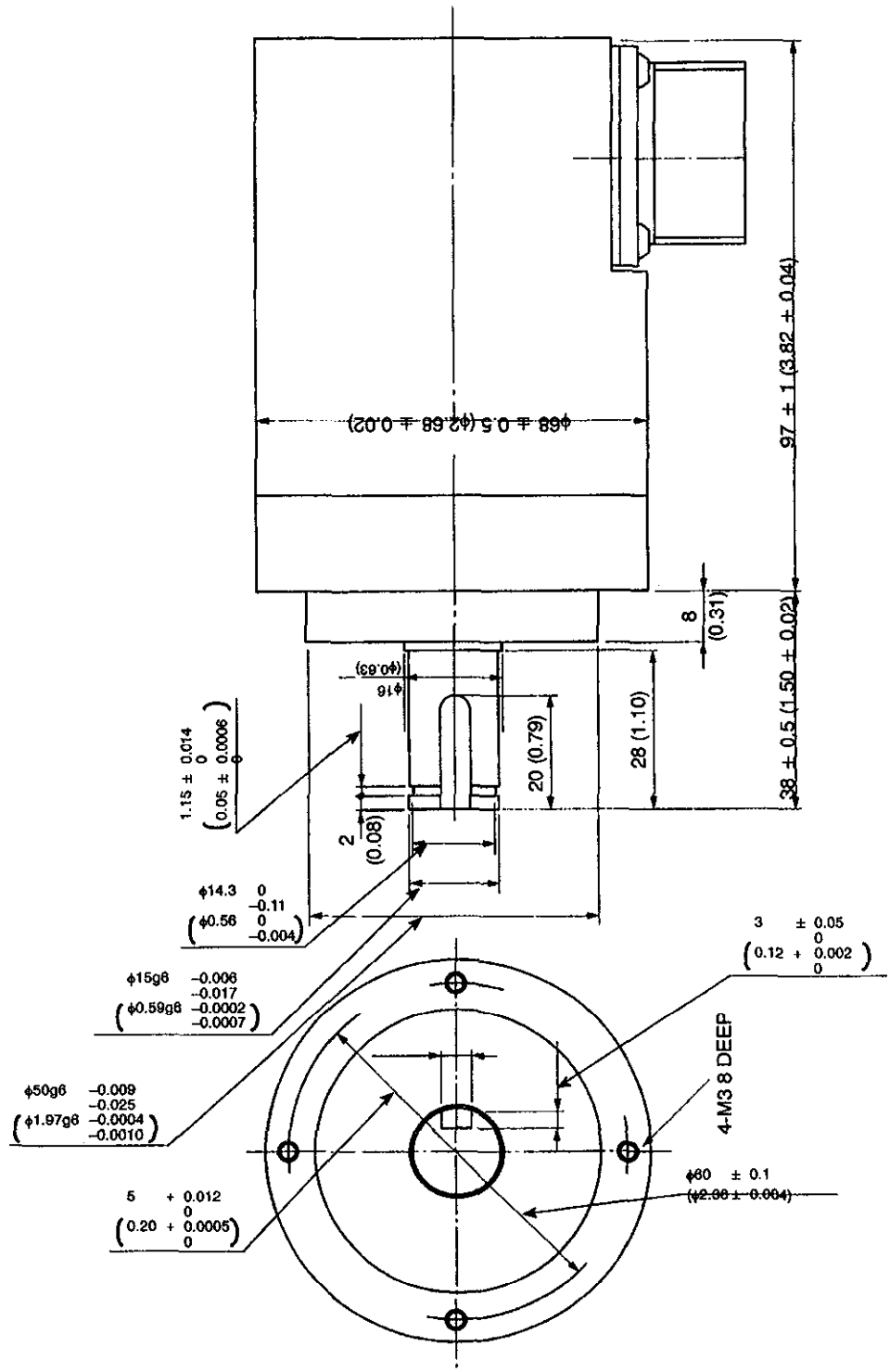
Part Name	A	B	C	D	E	F	G	H	I	J	K	Weight [kg (lbs)]
LF310	180 (7.09)	170 (6.69)	60 (2.36)	25 (0.98)	120 (4.72)	135 (5.31)	150 (5.91)	35 (1.38)	65 (2.56)	4.5 (0.18)	4 (0.16)	1.9 (4.18)
LF320	180 (7.09)	170 (6.69)	60 (2.36)	29 (1.14)	120 (4.72)	135 (5.31)	150 (5.91)	35 (1.38)	65 (2.56)	4.5 (0.18)	6 (0.24)	2.4 (5.28)
LF330	180 (7.09)	170 (6.69)	60 (2.36)	29 (1.14)	120 (4.72)	135 (5.31)	150 (5.91)	35 (1.38)	65 (2.56)	4.5 (0.18)	6 (0.24)	2.4 (5.28)
LF340	180 (7.09)	160 (6.30)	50 (1.97)	30 (1.18)	200 (7.87)	220 (8.66)	240 (9.45)	40 (1.57)	80 (3.15)	6.5 (0.26)	6 (0.24)	5 (11)
LF350	180 (7.09)	160 (6.30)	50 (1.97)	30 (1.18)	200 (7.87)	220 (8.66)	240 (9.45)	40 (1.57)	80 (3.15)	6.5 (0.26)	5 (0.20)	5 (11)
LF360	200 (7.87)	180 (7.09)	60 (2.36)	30 (1.18)	300 (11.81)	320 (12.60)	340 (13.39)	50 (1.97)	100 (3.94)	6.5 (0.26)	6 (0.24)	7 (15.4)

APPENDIX 1.9 Manual Pulse Generator (OSM-01-2GA-15)



APPENDIX 1.10 Spindle Pulse Generator

(1) NE-1024-2MDF-068-11 (6000 rpm)
NE-1024-2MDF-068-12 (8000 rpm)



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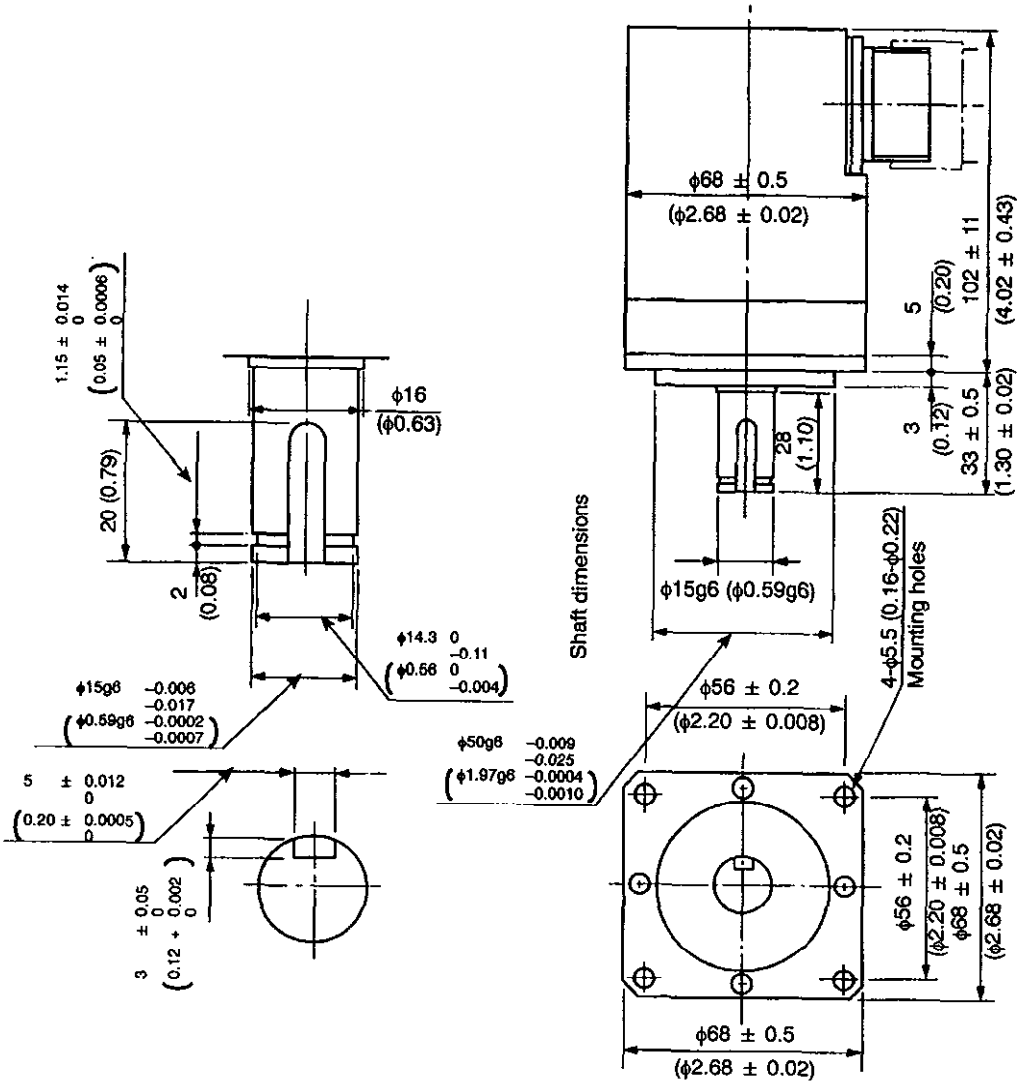
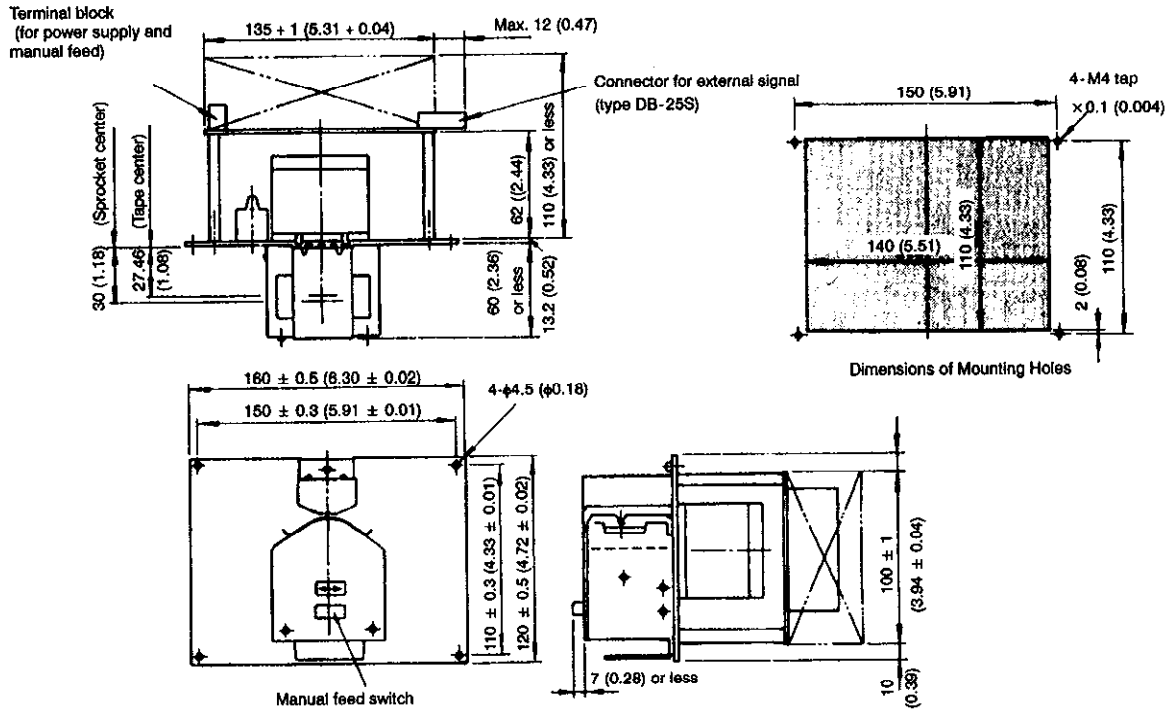
(2) NE-1024-2MD-11 (6000 rpm)

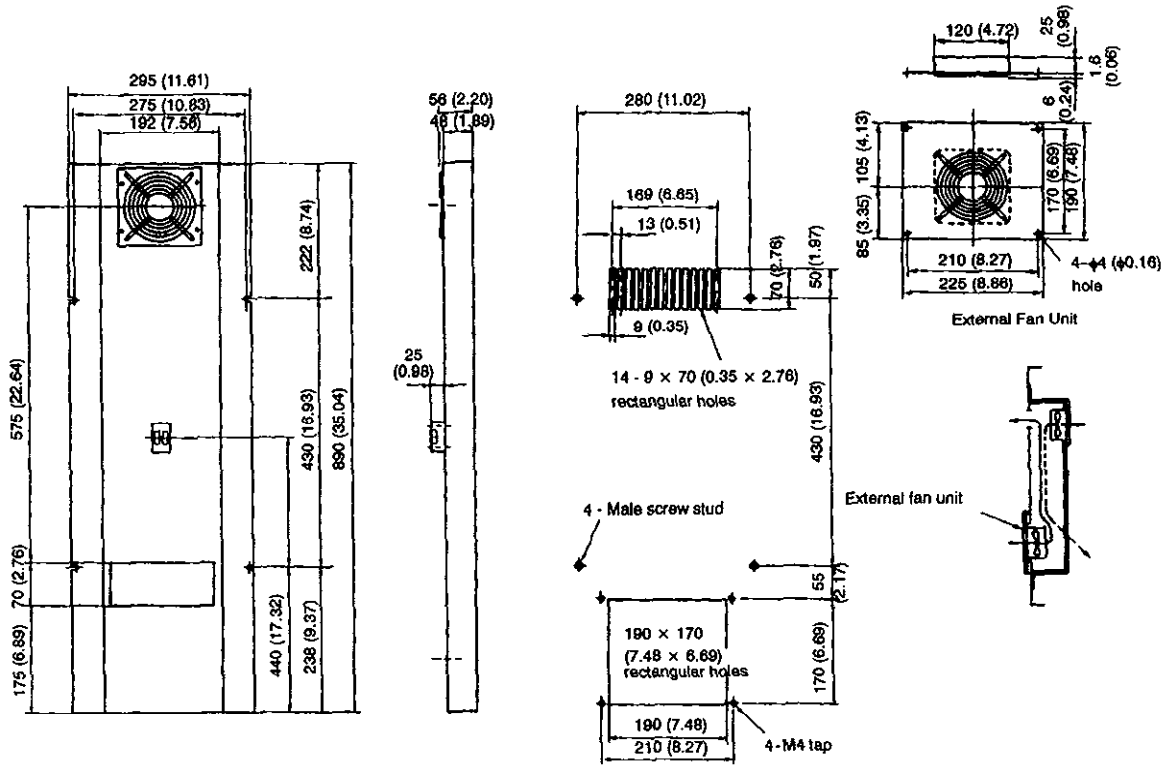


APPENDIX 1.11 Tape Reader (Model 2801)



APPENDIX 1.12 Heat Exchanger

(1) External Dimensions of REX1550



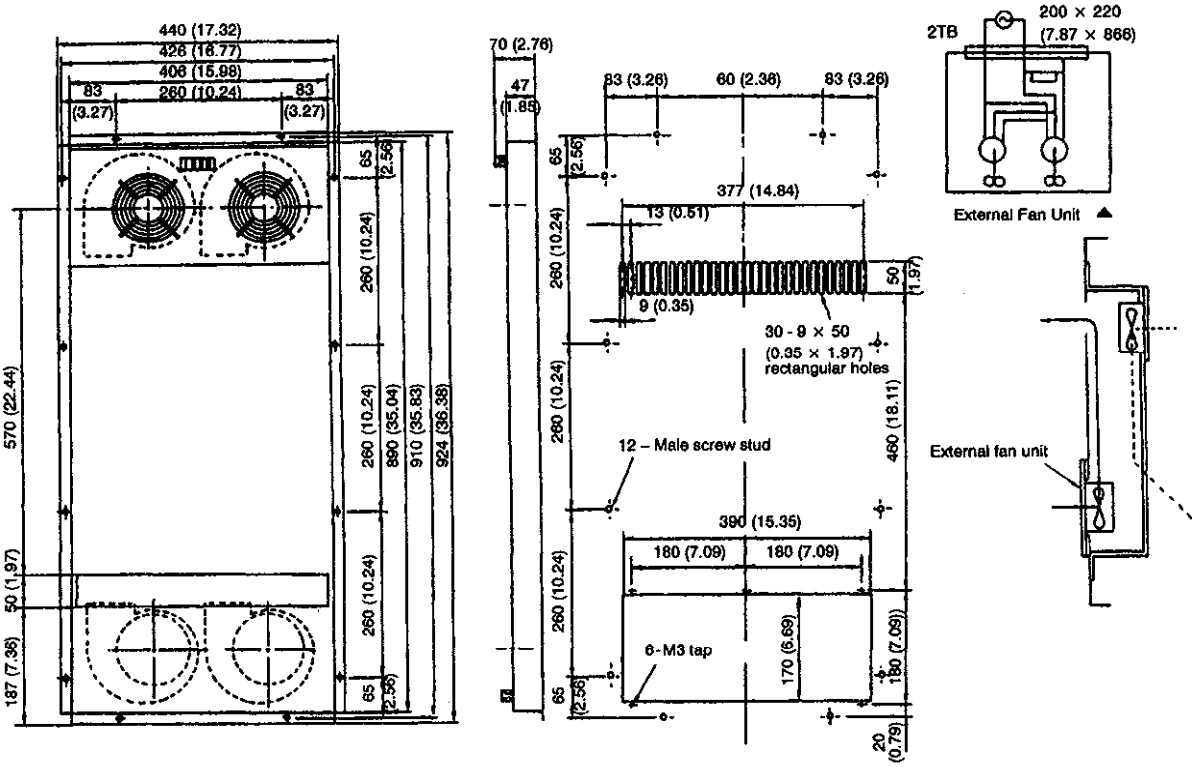
Mounting Hole Machining Drawing

Note 1: Fan power supply: 200/220 VAC

2: A mounting plate for external fan is not supplied with the heat exchanger. Please prepare the mounting plate at the machine tool builder.

A1

(2) HEATEX02



External Dimensions Mounting Hole Machining Drawing

Note 1: Connect the power supply (200/220 VAC) for the fan at #2 and #3 of 1TB and 2TB.

2: A mounting plate for external fan is not supplied with the heat exchanger. Please prepare the mounting plate at the machine tool builder.

3: The following parts used for the external fan unit are supplied as accessories.

- Fan motor 2 pcs.
- Fan motor starting capacitor 2 pcs.
- Fan guard 2 pcs.

APPENDIX 2

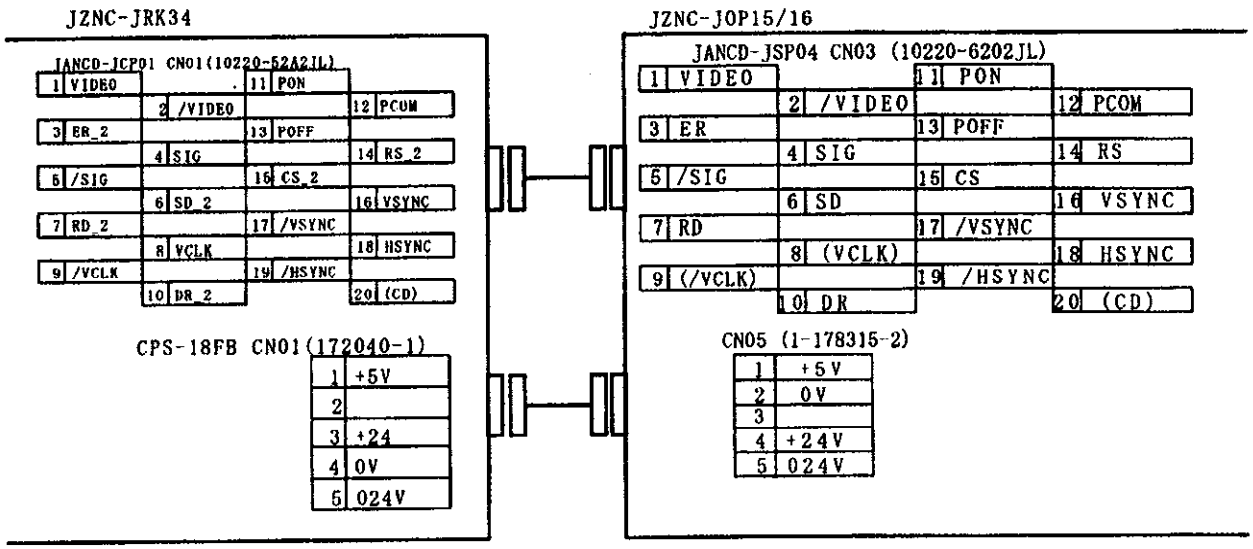
SPECIFICATIONS OF CABLE

A2

Appendix 2 shows the cable manufacturing drawings and the specifications of cable.

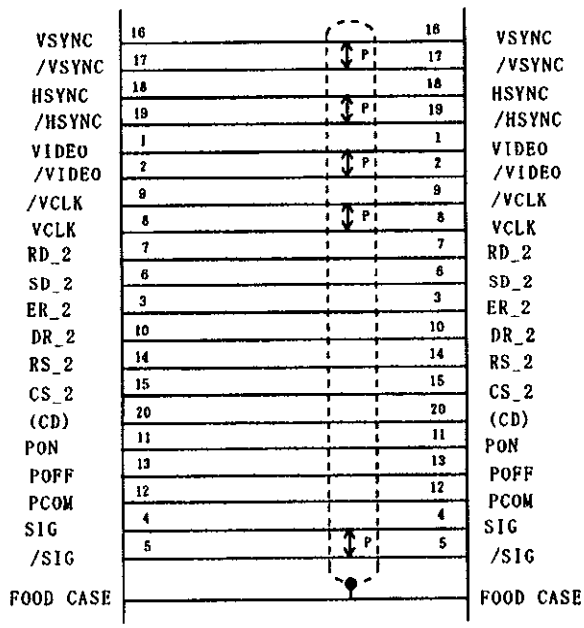
APPENDIX 2.1 Cable Manufacturing Drawings

2.1.1 Connection with the Operation Panel



Cable Connection
JANCD-JCP01 CN01

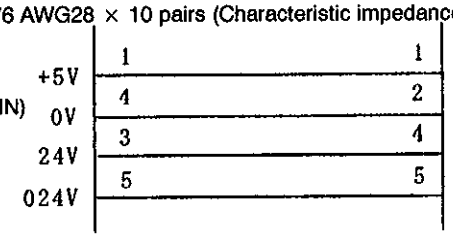
JANCD-JSP02 CN03



Connector specifications
Connector: 10120-3000VE (solder type)
Hood: 10320-52A0-008
Manufacturer: Sumitomo 3M

Connector specifications
Connector: 10120-3000VE (solder type)
Hood: 10320-52A0-008
Manufacturer: Sumitomo 3M

Recommended cable: UL20276 AWG28 × 10 pairs (Characteristic impedance 120 Ω)

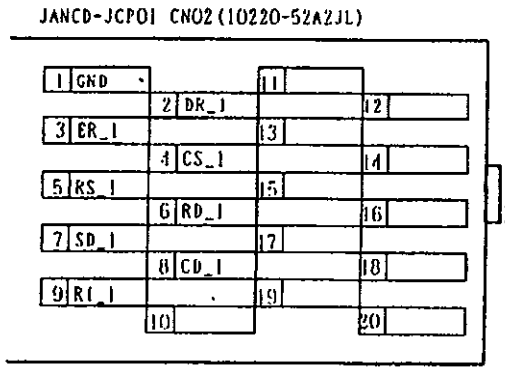


Connector specifications
Connector: 172026-1 (MIC 5PIN)
Manufacturer: AMP

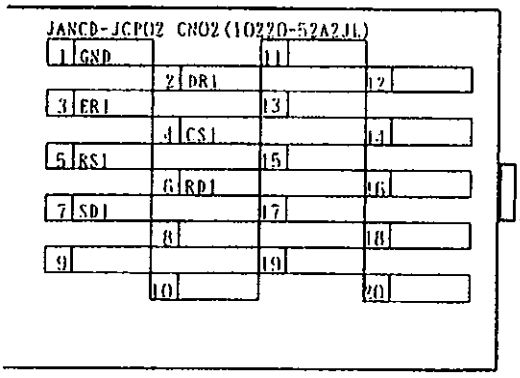
Connector specifications
Connector: 1-178288-5 (5PIN)
Manufacturer: AMP

Recommended cable: Type VCT, 2 mm² × 5-core (DE8402398)

2.1.2 RS-232C Cable Connection

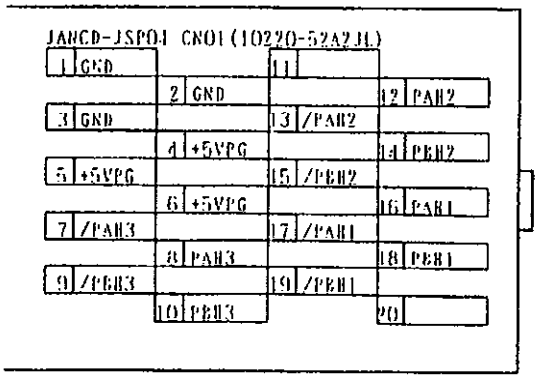


Cable connector specifications
Connector: 10120-3000VE
(solder type)
Hood: 10320-52A0-008
Manufacturer: Sumitomo 3M
Recommended cable:
UL20276 AWG28 × 10 pairs



Cable connector specifications
Connector: 10120-3000VE
(solder type)
Hood: 10320-52A0-008
Manufacturer: Sumitomo 3M
Recommended cable:
UL20276 AWG28 × 10 pairs

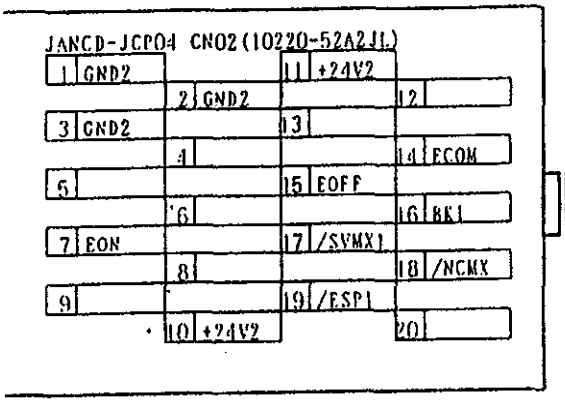
2.1.3 Connection with the Pulse Generator



Cable connector specifications
Connector: 10120-3000VE
(solder type)
Hood: 10320-52A0-008
Manufacturer: Sumitomo 3M
Recommended cable:
UL20276 AWG28 × 3 pairs × 3 pcs.

A2

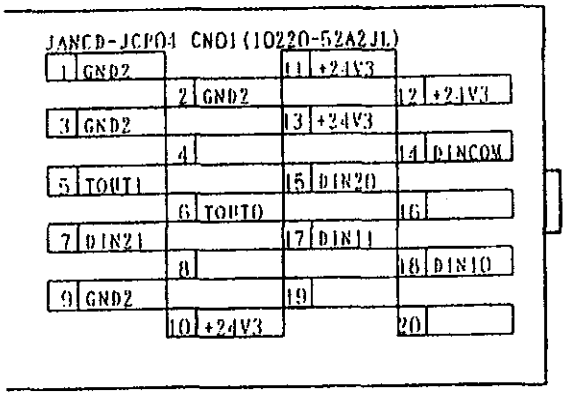
2.1.4 Connection with the Power Supply Unit



Cable connector specifications
Connector: 10120-3000VE
(solder type)
Hood: 10320-52A0-008
Manufacturer: Sumitomo 3M
Recommended cable:
Type KQVV, 2 mm^2 × 20-core
(DE6428673)

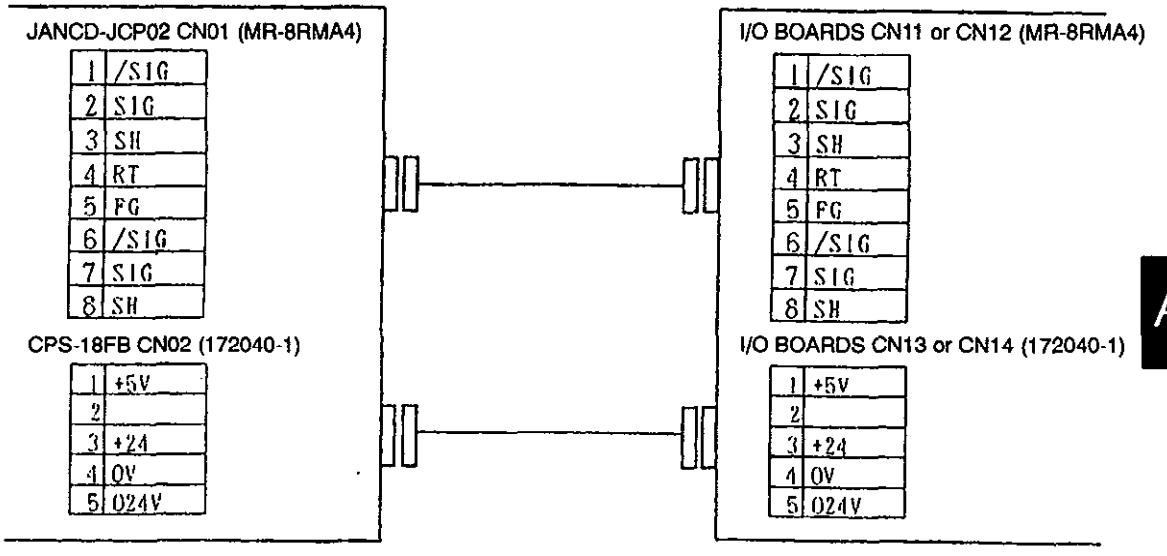
A2

2.1.5 Connection of the Direct IN Signals



Cable connector specifications
Connector: 10120-3000VE
(solder type)
Hood: 10320-52A0-008
Manufacturer: Sumitomo 3M
Recommended cable:
UL20276 AWG28 × 10 pairs

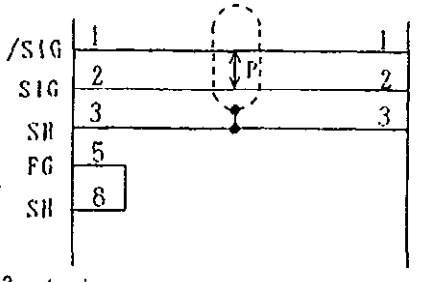
2.1.6 Connection with the I/O Board



A2

Cable Connection
JANCD-JCP02 CN01

Connector specifications
Connector: MR-8F
(solder type)
Hood: MR-8L
Manufacturer: Honda Tsushin Kogyo



I/O BOARDS CN11 or CN12

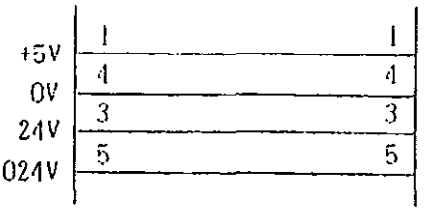
/SIG
SIG
SH

Connector specifications
Connector: MR-8F
(solder type)
Hood: MR-8L
Manufacturer: Honda Tsushin Kogyo

Recommended cable:
Type KEV-SB, 0.2 mm^2 × 1 pair
(DE9405671)

CPS-18FB CN02

Connector specifications
Connector: 172026-1 (MIC 5PIN)
Manufacturer: AMP



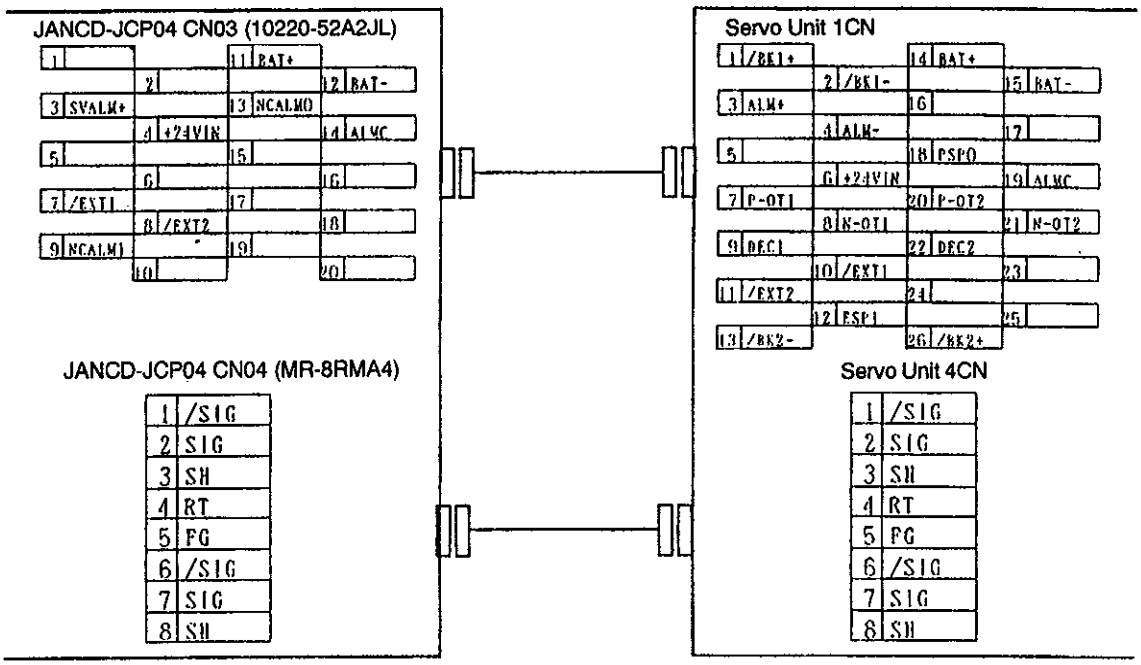
I/O BOARDS CN13 or CN14

+5V
0V
24V
024V

Connector specifications
Connector: 1-178288-5 (5PIN)
Manufacturer: AMP

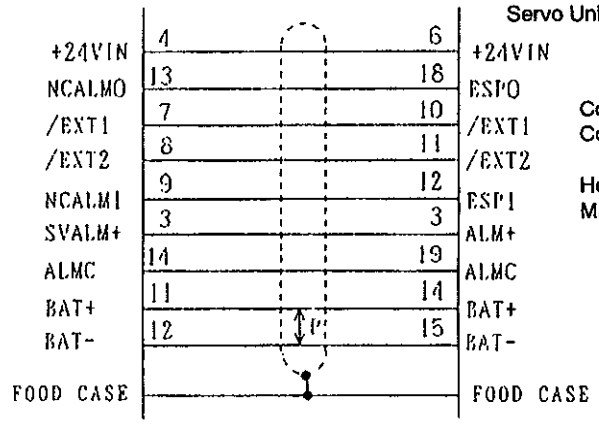
Recommended cable:
Type VCT, 2 mm^2 × 5-core
(DE8402398)

2.1.7 Connection with the Servo Unit



Cable Connection
JANCD-JCP04 CN03

Connector specifications
Connector: 10120-3000VE
(solder type)
Hood: 10320-52A0-008
Manufacturer: Sumitomo 3M



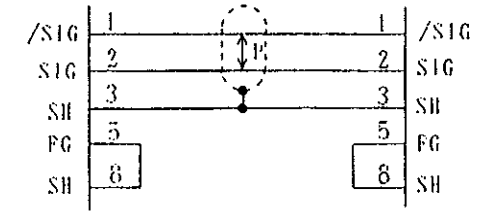
Servo Unit 1CN

Connector specifications
Connector: 10120-3000VE
(solder type)
Hood: 10320-52A0-008
Manufacturer: Sumitomo 3M

Recommended cable: AWG24 (0.2 sq.) [cable outer diameter: smaller than 12 mm]

JANCD-JCP01 CN01

Connector specifications
Connector: MR-8F
(solder type)
Hood: MR-8L
Manufacturer: Honda Tsushin Kogyo



Servo Unit 4CN

Connector specifications
Connector: MR-8F
(solder type)
Hood: MR-8L
Manufacturer: Honda Tsushin Kogyo

Recommended cable: KEV-SB 0.2 mm^2 × 1 pair (DE9405671)

APPENDIX 2.2 Specifications of Cable

(1) Cable Dwg. No. DE 8400093 (Type KQVV-SB, 0.2 mm^2 × 20 pairs)

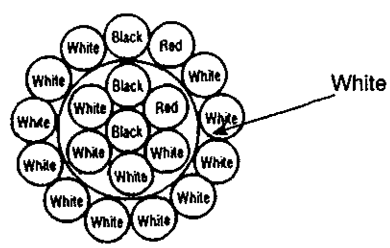
Appendix Table 2.1 Construction

Item		Cable Configuration
No. of Pairs		20
Conductor	Material	Tinned annealed copper stranded wire
	Nominal Sectional Area mm^2	0.2
	No. of Conductors per mm	16/0.12
	Dimensions mm	0.55
Insulation	Material	Cross-linked vinyl
	Thickness mm	0.3
Strand		Strand the cores in the following manner.
Winding		Paper tape lap winding
Sheath	Material and Color	Soft Vinyl, black
	Thickness mm	1.2
Finished Cable Diameter mm		8.0
Approx. Mass kg/km		90

Note: Place appropriate wadding in the cable if necessary.

Appendix Table 2.2 Characteristics

Item		Characteristic Value
Max. Conduction Resistance (20°C)	Ω/km	113
Min. Insulation Resistance (20°C)	MΩ · km	50
Withstand Voltage	VAC/min	1000
Continuous Operation Temperature Range	°C	–30 to +60



Details of Cable Dwg.

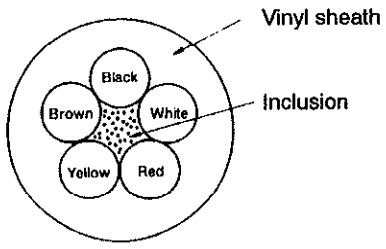
(2) Cable Dwg. No. DE8402398 (Type VCT, 2 mm^2 × 5 pairs)

Appendix Table 2.3 Construction

Item		Cable Configuration
No. of Pairs		5
Conductor	Material	Tinned annealed copper stranded wire
	Nominal Sectional Area mm^2	2.0
	No. of Conductors per mm	37/0.26
	Dimensions	Approx. 1.8
Insulation	Material	Insulation vinyl
	Thickness mm	Approx. 0.8
	Diameter mm	Approx. 3.4
Stranding		Rightward twisted, cotton thread at the center as wadding, pitches: less than 20 times the layer core diameter, outer diameter: Approx. 9.2 mm (See the figure below.)
Sheath	Material and Color	Vinyl, black
	Thickness mm	Approx. 1.9
Finished Cable Diameter mm		Approx. 13.0

Appendix Table 2.4 Characteristics

Item		Characteristic Value
Max. Conduction Resistance (20°C)	Ω/km	10.2
Min. Insulation Resistance (20°C)	MΩ·km	50 or more
Withstand Voltage	VAC/min	3000



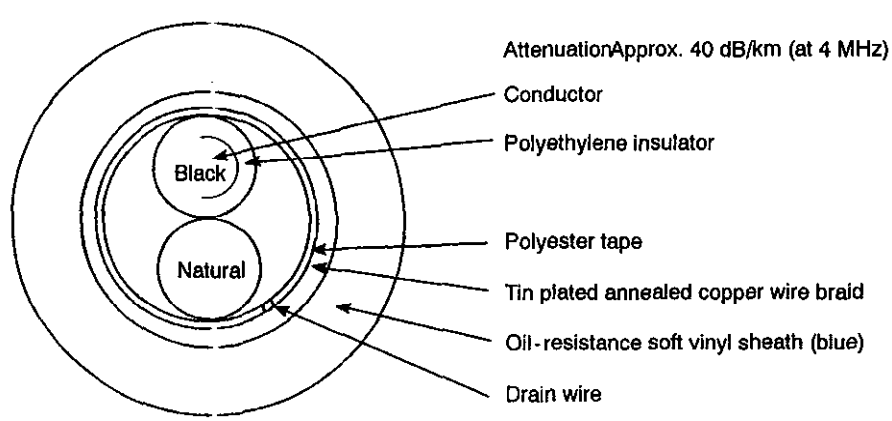
(3) Cable Dwg. No. DE9405671

Appendix Table 2.5 Construction

Item		Cable Configuration
No. of Pairs		2
Conductor	Material	Tinned annealed copper stranded wire
	Nominal Sectional Area mm^2	0.2
	No. of Conductors per mm	7/0.2
	Dimensions mm	0.6
Insulation	Material	Polyethylene
	Thickness mm	0.3
Stranding		O.D. 2.4 mm
Winding		Polyester tape lap winding
Sheath	Material and Color	Oil-resistance soft vinyl
	Thickness mm	1.5
Finished Cable Diameter mm		Approx. 6.1
Approx. Mass kg/km		50

Appendix Table 2.6 Characteristics

Item		Characteristic Value
Max. Conduction Resistance (20°C)	Ω/km	92.2
Min. Insulation Resistance (20°C)	MΩ · km	2000
Withstand Voltage	VAC/min	1000



(4) Cable Dwg. No. DE9408510

Appendix Table 2.7 Construction

Item		Cable Configuration	
		DE9408510-1	DE9408510-2
No. of Pairs		10	18
Conductor	Material	Tinned annealed copper wire	
	No. of Conductors per mm	7/0.16	
	Thickness mm	0.48	
Insulation	Material	PE foam	
	Thickness mm	0.04	
Stranding		Two core wires are stranded in pairs.	
Sheath	Color	Black	
	Thickness mm	1.0	

Appendix Table 2.8 Characteristics

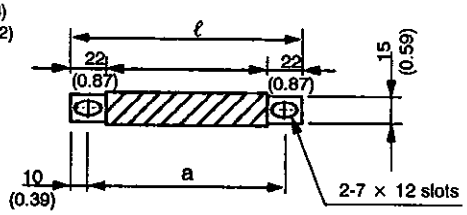
Item		Characteristic Value
Max. Conduction Resistance (20°C)	Ω/km	146
Min. Insulation Resistance (20°C)	MΩ · km	1000
Withstand Voltage	VAC/min	350

APPENDIX 2.3 Special Cable for Servopack

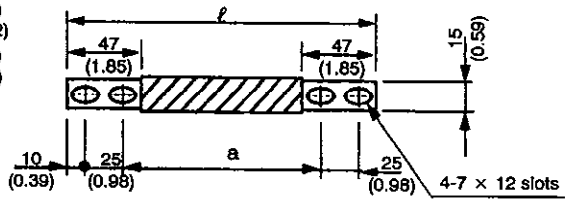
(1) P/N Bus Bar

Material: Copper/Thickness: 3 mm (0.12 in.)/ ▨ : Heat shrink tube/Surface treatment: Glossy tin plating

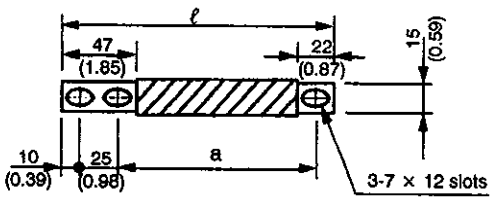
- BRQT46061-1
  - ℓ = 195 (7.68)
  - a = 125 (4.92)



- BRQT46061-1
  - -1: ℓ = 195 (7.68), a = 125 (4.92)
  - -2: ℓ = 245 (9.65), a = 175 (6.89)



- BRQT46083
  - -1: ℓ = 147.5 (5.81), a = 102.5 (4.04)
  - -2: ℓ = 158 (6.22), a = 113 (4.45
  - -3: ℓ = 167.5 (6.59), a = 122.5 (4.82)
  - -4: ℓ = 208 (8.19), a = 163 (6.42)
  - -5: ℓ = 217.5 (8.56), a = 172.5 (6.79)



Unit: mm (in.)

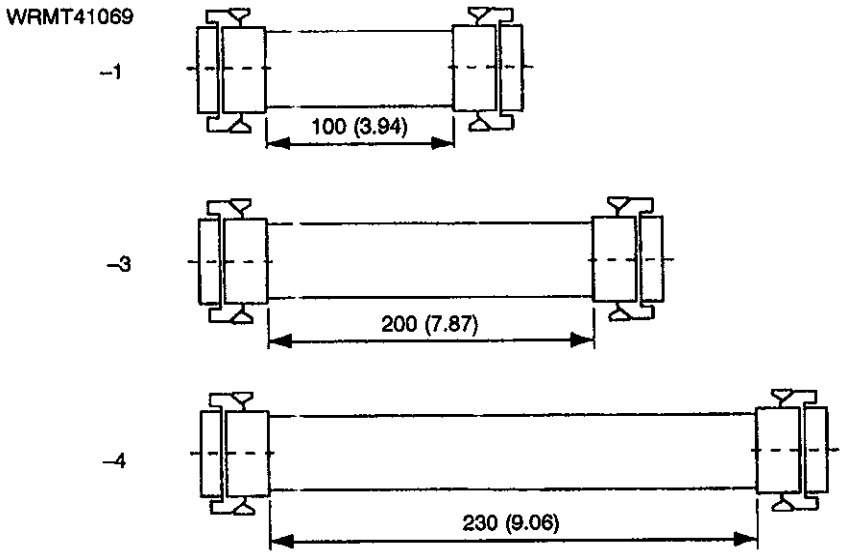
A2

A2

(2) I/O Cable

Connector: 8822E-034-171D (34 pins, KEL)
Cable: Flat cable
UL 2651/300V/105°C/17-core/AGW28

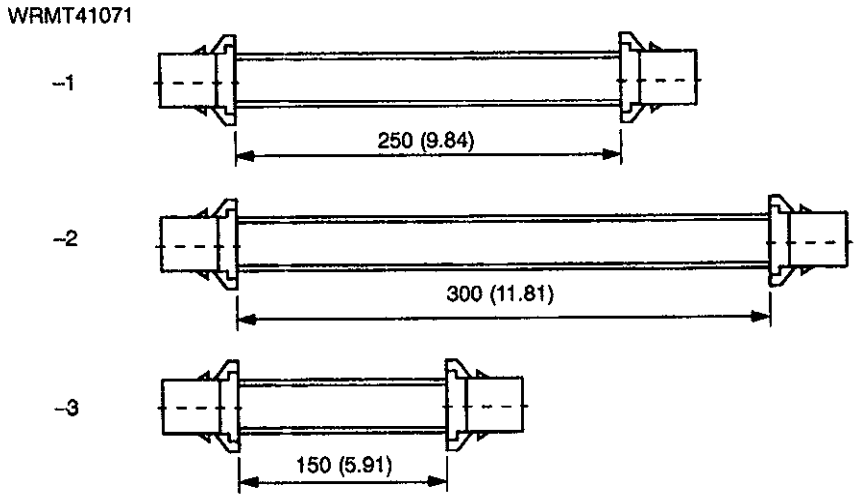
WRMT41069



(3) P1/N1 Cable

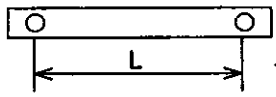
Housing: 1-178288-3 (3 pins, AMP)
Cable: UL 1015/AGW20

WRMT41071



(4) Example of Cable Selection

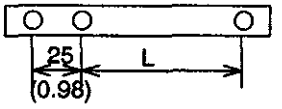
(a) When units are installed at the standard pitches (close pitch)

	Bus Bar  T: Thickness				Flat Cable	
	Actual Dimension L (Note 1)	Product Dimension L (Note 2)	T	DWG. No.	A	DWG. No.
100-mm wide inverter to 75-mm wide inverter A	95	93.5	1.6	DF9401846-2	75	DE9409002-4
100-mm wide inverter to 50-mm wide inverter C	91.9	93.5	1.6	DF9401846-2	60	DE9409002-1
75-mm wide inverter A to 75-mm wide inverter A	75	75	1.6	DF9401846-4	75	DE9409002-4
75-mm wide inverter A to 50-mm wide inverter C	71.9	72	1.6	DF9401846-5	60	DE9409002-1
50-mm wide inverter C to 50-mm wide inverter C	50	50	1.6	DF9401846-6	75	DE9409002-4
100-mm wide inverter to 75-mm wide inverter B	97	98	1.6	DF9401846-7	60	DE9409002-1
75-mm wide inverter A to 75-mm wide inverter B	77	75	1.6	DF9401846-4	75	DE9409002-4
75-mm wide inverter B to 75-mm wide inverter A	73	75	1.6	DF9401846-4	60	DE9409002-1
75-mm wide inverter B to 75-mm wide inverter B	75	75	1.6	DF9401846-4	75	DE9409002-4
75-mm wide inverter B to 50-mm wide inverter C	69.9	72	1.6	DF9401846-5	75	DE9409002-4

Note 1: Actual dimension L indicates actual pitches between units.

2: Product dimension L indicates pitches between bus bars.

(b) When 200-mm wide inverter or 150-mm wide inverter and servo unit are installed at the standard pitches (close pitch)

	Bus Bar  T: Inverter - Servo				Flat Cable	
	Actual Dimension L	Product Dimension L	T	DWG. No.	A	DWG. No.
200-mm wide inverter to 75-mm wide inverter A	97.6	98	1.6	DF9401938-2	75	DE9409002-4
200-mm wide inverter to 75-mm wide inverter B	99.6	98	1.6	DF9401938-2	60	DE9409002-1
200-mm wide inverter to 50-mm wide inverter C	94.5	93.5	1.6	DF9401938-1	60	DE9409002-1
150-mm wide inverter to 75-mm wide inverter A	97.6	98	1.6	DF9401938-2	75	DE9409002-4
150-mm wide inverter to 75-mm wide inverter B	99.6	98	1.6	DF9401938-2	60	DE9409002-1
150-mm wide inverter to 50-mm wide inverter C	94.5	93.5	1.6	DF9401938-1	60	DE9409002-1

YASNAC J300
CONNECTING MANUAL(TYPE B)

TOKYO OFFICE New Pier Takeshiba South Tower, 1-16-1, Kaigan, Minatoku, Tokyo 105 Japan
Phone 81-3-5402-4511 Fax 81-3-5402-4580
YASKAWA ELECTRIC AMERICA, INC.
Chicago-Corporate Headquarters 2942 MacArthur Blvd. Northbrook, IL 60062-2028, U.S.A.
Phone 1-847-291-2340 Fax 1-847-498-2430
Chicago-Technical Center 3160 MacArthur Blvd. Northbrook, IL 60062-1917, U.S.A.
Phone 1-847-291-0411 Fax 1-847-291-1018
MOTOMAN INC.
805 Liberty Lane West Carrollton, OH 45449, U.S.A.
Phone 1-937-847-6200 Fax 1-937-847-6277
YASKAWA ELÉTRICO DO BRASIL COMÉRCIO LTDA.
Avenida Brigadeiro Faria Lima 1664-5° CJ 504/511, São Paulo, Brazil
Phone 55-11-815-7723 Fax 55-11-870-3849
YASKAWA ELECTRIC EUROPE GmbH
Am Kronberger Hang 2, 65824 Schwalbach, Germany
Phone 49-6196-569-300 Fax 49-6196-888-301
Motoman Robotics AB
Box 504 S38525 Torsås, Sweden
Phone 46-486-48800 Fax 46-486-41410
Motoman Robotec GmbH
Kammerfeldstraße1, 85391 Allershausen, Germany
Phone 49-8166-900 Fax 49-8166-9039
YASKAWA ELECTRIC UK LTD.
Unit2 Centurion Court Brick Close, Kiln Farm, Milton Keynes MK11 3JA, United Kingdom
Phone 44-1908-565874 Fax 44-1908-565891
YASKAWA ELECTRIC KOREA CORPORATION
Paik Nam Bldg. 901 188-3, 1-Ga Euljiro, Joong-Gu Seoul, Korea
Phone 82-2-776-7844 Fax 82-2-753-2639
YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.
151 Lorong Chuan, #04-01, New Tech Park Singapore 556741, Singapore
Phone 65-282-3003 Fax 65-289-3003
YATEC ENGINEERING CORPORATION
Shen Hsiang Tang Sung Chiang Building 10F 146 Sung Chiang Road, Taipei, Taiwan
Phone 886-2-563-0010 Fax 886-2-567-4677
BEIJING OFFICE Room No. 301 Office Building of Beijing International Club, 21
Jianguomenwai Avenue, Beijing 100020, China
Phone 86-10-532-1850 Fax 86-10-532-1851
SHANGHAI OFFICE 27 Hui He Road Shanghai 200437 China
Phone 86-21-6553-6060 Fax 86-21-6553-6060
YASKAWA JASON (HK) COMPANY LIMITED
Rm. 2909-10, Hong Kong Plaza, 186-191 Connaught Road West, Hong Kong
Phone 852-2803-2385 Fax 852-2547-5773
TAIPEI OFFICE Shen Hsiang Tang Sung Chiang Building 10F 146 Sung Chiang Road, Taipei, Taiwan
Phone 886-2-563-0010 Fax 886-2-567-4677

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NOTICE: To enable ongoing product modifications and improvements, specifications are subject to change without notice.

SIE-C843-13.5