FANUC

GE Fanuc Automation

Computer Numerical Control Products

Panel i

Connection and Maintenance Manual

GFZ-64223EN/01 *September 2004*

Warnings, Cautions, and Notes as Used in this Publication

Warning

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where equipment might be damaged if care is not taken.

Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations in hardware or software, nor to provide for every possible contingency in connection with installation, operation, or maintenance. Features may be described herein which are not present in all hardware and software systems. GE Fanuc Automation assumes no obligation of notice to holders of this document with respect to changes subsequently made.

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DEFINITION OF WARNING, CAUTION, AND NOTE

This manual includes safety precautions for protecting the user and preventing damage to the machine. Precautions are classified into Warning and Caution according to their bearing on safety. Also, supplementary information is described as a Note. Read the Warning, Caution, and Note thoroughly before attempting to use the machine.

⚠ WARNING
Applied when there is a danger of the user being injured or when there is a damage of both the user being injured and the equipment being damaged if the approved procedure is not observed.

⚠ CAUTION
Applied when there is a danger of the equipment being damaged, if the approved procedure is not observed.

NOTE
The Note is used to indicate supplementary information other than Warning and Caution.

- Read this manual carefully, and store it in a safe place.

PREFACE

This manual explains information (electrical and structural specifications) required for connecting the FANUC PANEL *i* equipped with a 733-MHz Celeron, 866-MHz Pentium III, or 1.26-GHz Pentium III processor (called the PANEL *i* below) and the PANEL *i* for AUTOMOTIVE to a CNC control unit or machine tool and for maintaining the PANEL *i* and the PANEL *i* for AUTOMOTIVE.

Attention

⚠ CAUTION

1 If an operation error or mishap occurs, the data on the hard disk may be lost, even if all the installation conditions are satisfied. Therefore, always maintain a backup copy of the data on the hard disk in case the stored data is lost or damaged.
Especially, the power-off on accessing the hard disk must not be done because that possibility is very high. Please concern for the end-users.

2 Be sure to finish the OS and the applications through the proper operation of shutdown before turning the power off. Without the above-mentioned operation, there is no assurance of the following action. At worst, the hard disk drive may be damaged and may not be able to be recognized by the BIOS and OS.

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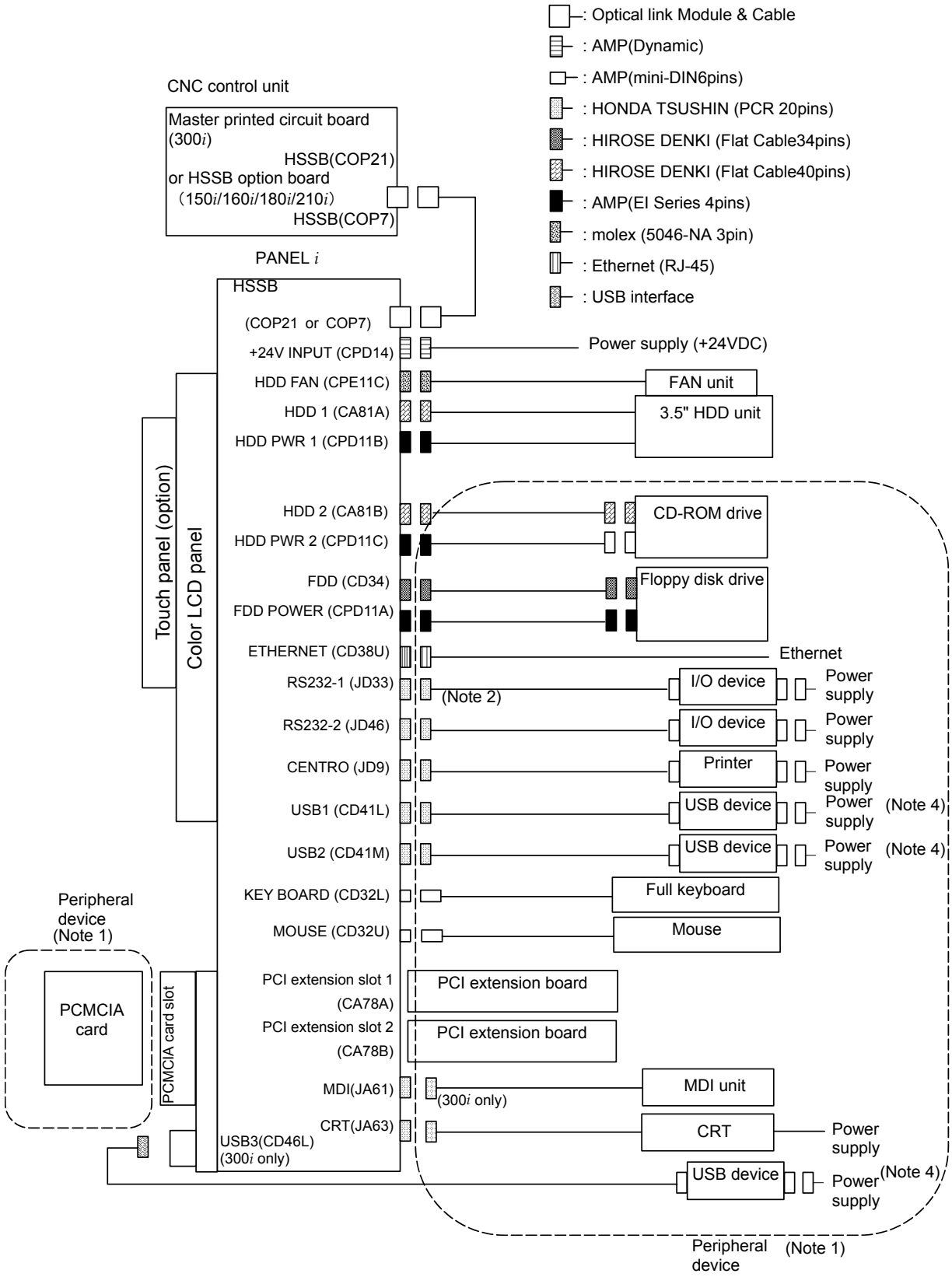
I. CONNECTION

1 TOTAL CONNECTION DIAGRAMS

1.1 PANEL *i*


: Optical link Module & Cable
: AMP(Dynamic)
: AMP(mini-DIN6pins)
: HONDA TSUSHIN (PCR 20pins)
: HIROSE DENKI (Flat Cable34pins)
: HIROSE DENKI (Flat Cable40pins)
: AMP(EI Series 4pins)
: molex (5046-NA 3pin)
: Ethernet (RJ-45)
: USB interface
CNC control unit
Master printed circuit board (300*i*)
HSSB(COP21)
or HSSB option board
(150*i*/160*i*/180*i*/210*i*)
HSSB(COP7)
PANEL *i*
HSSB
(COP21 or COP7)
+24V INPUT (CPD14)
Power supply (+24VDC)
HDD FAN (CPE11C)
FAN unit
HDD 1 (CA81A)
3.5" HDD unit
HDD PWR 1 (CPD11B)
Touch panel (option)
Color LCD panel
HDD 2 (CA81B)
CD-ROM drive
HDD PWR 2 (CPD11C)
FDD (CD34)
Floppy disk drive
FDD POWER (CPD11A)
ETHERNET (CD38U)
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KEY BOARD (CD32L)
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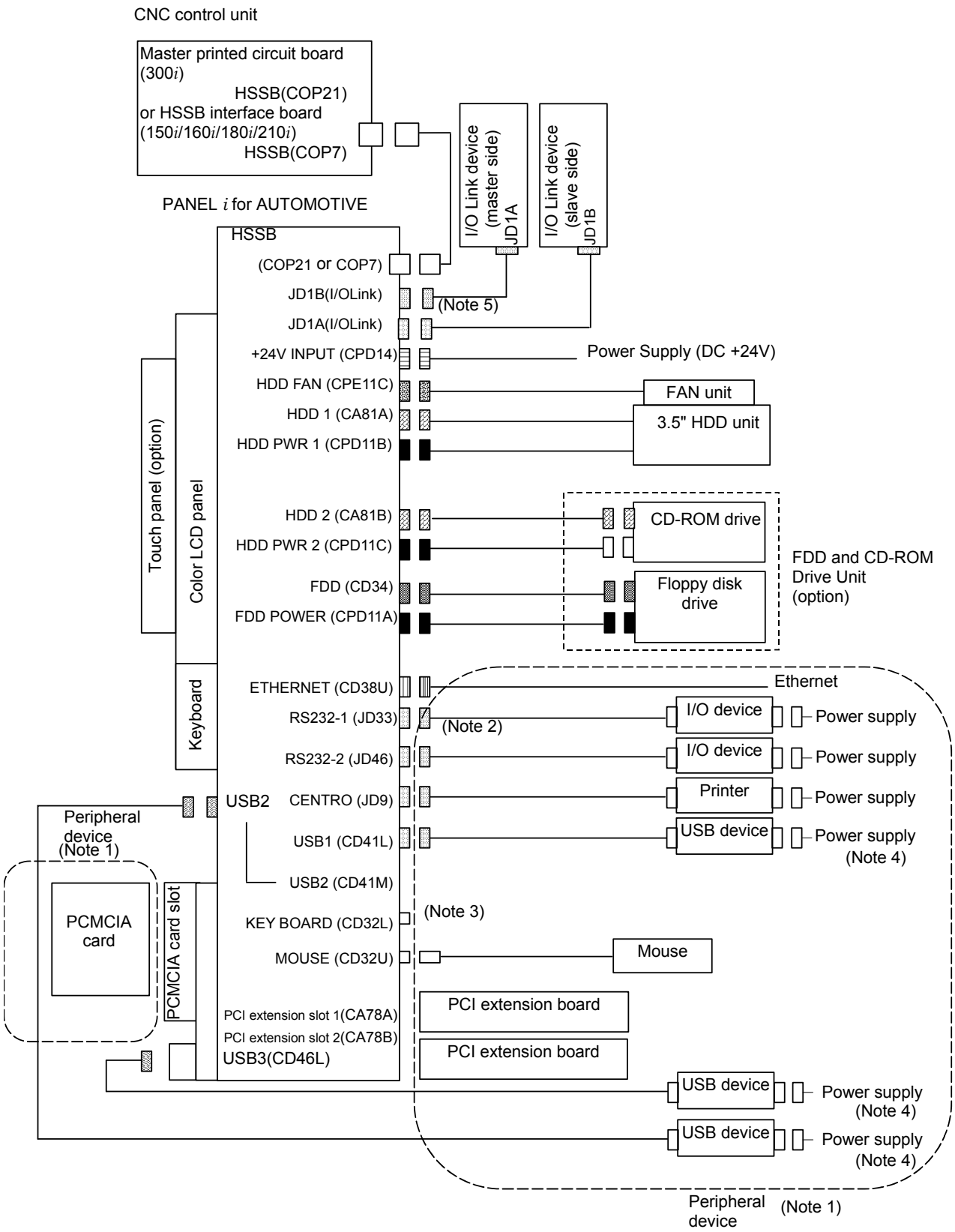
Mouse
Peripheral device (Note 1)
PCMCIA card
PCMCIA card slot
PCI extension slot 1 (CA78A)
PCI extension board
PCI extension slot 2 (CA78B)
PCI extension board
MDI(JA61)
(300*i* only)
MDI unit
CRT(JA63)
CRT
Power supply
USB3(CD46L)
(300*i* only)
USB device
Power supply
(Note 4)
Peripheral device
(Note 1)

1.2 PANEL *i* for AUTOMOTIVE



NOTE

1 Some peripheral devices are not suitable for being connected to the PANEL *i* for environmental durability reasons, and others are not suitable for use during machine operation. So, carefully read the operator's manuals of the peripheral devices to be used.
2 With a unit with a touch panel, the RS232-1 connector (JD33, serial port channel 1) cannot be used.
3 The keyboard port cannot be used because it is used by this unit.
4 If a USB device requires a current larger than the specification of the PANEL *i*, another power supply is required.
5 The I/O Link interface is optional.

2 SPECIFICATIONS

2.1 HARDWARE SPECIFICATIONS

2.1.1 PANEL *i*

Item				Specification	
PC Unit (Basic Unit)					
	CPU			Pentium III 1.26GHz or Pentium III 866MHz or Celeron 733MHz	
	Memory			512MB, 256M or 128MB	
	Display Unit	LCD	for 150*i*/160*i* /180*i*/210*i*/300*i*	15.0” color TFT LCD (1024x768dots, 16M colors) or 12.1” color TFT LCD (800x600dots, 260K colors) or 10.4” color TFT LCD (640x480dots, 260K colors)	Note) Windows XP cannot be used on 10.4” VGA type
		Touch-Panel		Option (1024x1024 dots) It is not possible to push 2 points as same time Serial port 1 is used by this touch panel.	It is possible to order both options
		Soft key	for 150*i*/160*i* /180*i*/210*i*	Horizontal 12 keys (Option)	
			for 300*i*	Vertical 9 keys and Horizontal 12 keys (Basic)	
	I/O port	Serial Port		2 ports (Serial port 1 is not available in case of the unit with touch panel)	
		USB		Rear 2 ports (for 150*i*/160*i*/180*i*/210*i*) / Front 1 port, Rear 2 ports (for 300*i*) (based on Universal Serial Bus Revision 1.1, connector compatible) (Note) This port can't be used with Windows NT® 4.0.	
		Parallel port		1 port (Data transfer mode is by-directional mode)	
		Full Keyboard		1 port (PS/2 compatible)	
		Mouse		1 port (PS/2 compatible)	
		IDE		2 port/4 devices (Signal connector : IBM PC compatible)	
		Floppy disk		1 port (Signal connector : IBM PC compatible)	
		Ethernet		1 port (10BASE-T/100BASE-TX)	
		Video port		1 port (Analog RGB output)	
		HSSB (High Speed Serial Bus)		1 port (An optical connector for the connection with CNC controller)	
		PCMCIA Card slot		1 port (Type I/ II, based on PCMCIA 2.1) (Note) This port can't be used with Windows NT® 4.0.	
	PCI Extension			2 slots of the short card based on PCI specification 2.2 5V/32bit, 33MHz, Maximum dimension of card : 176.41mm x 106.68mm	
	Real time clock			Monthly error is within 3 minutes.	
	Dimension Weight	10.4” LCD type		Height: 290mm, Width: 220mm, Depth: 125mm, Weight: 3.5kg	
		12.1” LCD type		Height: 340mm, Width: 280mm, Depth: 125mm, Weight: 4.9kg (for 150*i*/160*i*/180*i*/210*i*), Weight: 4.3kg (for 300*i*)	
		15.0” LCD type		Height: 400mm, Width: 320mm, Depth: 125mm, Weight: 5.7kg (for 150*i*/160*i*/180*i*/210*i*), Weight: 5.1kg (for 300*i*)	
				Depth of current unit is 110mm, but one of next unit may be 125mm	
Hard Disk Drive Unit					
	Hard Disk Drive			3.5” Hard Disk Drive, 40GB or more over, Ultra ATA/100	
	Weight			1.2kg (A08B-0084-H131), 1.1kg (A08B-0084-H100, A08B-0084-H130)	
CD-ROM Drive				5-inch bay type, Weight 1.0kg	
Floppy Disk Drive				3.5-inch type, Weight 0.4kg (A08B-0084-K001), Weight 0.8kg (A02B-0207-C009) Note) It is necessary to change setting of plug on the master P.C.B. in PANEL *i* when current FDD is used with this PANEL *i*.	
OS				Windows® XP, Windows® 2000	

2.1.2 PANEL *i* for AUTOMOTIVE

Item			Specification
PANEL *i* (Basic Unit)			
	CPU		Pentium III 1.26GHz or Pentium III 866MHz or Celeron 733MHz
	Memory		128MB,256M or 512MB
	Display Unit	LCD	15.0” color LCD (1024x768 dots, 16,000,000 colors)
		Touch-Panel	Option (1024x1024 dots. It is not possible to push 2 points as same time. Serial port 1 is used by this touch panel.)
	keyboard	Control-Key Function-Key / Alphabet Key Vert. Soft-Key	33 (Note 1) 26 (Note 1) 16 (Note 2)
	I/O port	Serial Port 1	1 port (Not available if touch panel option exists.)
		Serial port 2	1 port
		USB	2 ports (front) 1 port (rear) (based on Universal Serial Bus Revision 1.1, connector compatible) (Note) This port can't be used with Windows NT®4.0.
		Parallel port	1 port (Data transfer mode is by-directional mode)
		Full Keyboard	Keyboard port isn't available because this port is used internally.
		Mouse	1 port (PS/2 compatible)
		IDE	2 port/4 devices (Signal connector : IBM PC compatible) 1 port for HDD unit (basic) 1 port for CD-ROM drive (option)
		Floppy disk	1 port (Signal connector : IBM PC compatible)
		Ethernet	1 port (10BASE-T/100BASE-TX)
		HSSB (High Speed Serial Bus)	1 port (An optical connector for the connection with CNC controller)
		PCMCIA Card slot	1 port (Type I/ II, based on PCMCIA 2.1) (Note) This port can't be used with Windows NT®4.0.
		I/O Link	Option, 1 port to master device, 1 port to slave device
	Hard Disk Drive		3.5” Hard Disk Drive, 40GB Ultra ATA/100
	PCI Extension		2 slots of the short card based on PCI specification 2.2 5V/32-bit, 33MHz Maximum dimension of card : 176.41mm x 106.68mm
	Real time clock		Monthly error is within 3 minutes.
	Dimension		Height: 354.8mm, Width: 482.6mm, Depth: 145mm (without FDD,CD Drive) / Depth: 180mm (with FDD,CD Drive)
	Weight		10.0kg (without FDD&CD-ROM drive unit)
Floppy Disk Drive and CD-ROM Drive Unit			(Option)
		Floppy Disk Drive	3.5-inch type 2 mode
		CD-ROM Drive	5-inch bay type
		Weight	1.4kg

NOTE
1 Key arrangement is different from MDI.
2 In case of A08B-0084-B400, B401, B402, B403, B422, B423, A13B-0196-B400, B401, B402, B403, B422, B423, vertical soft keys signals go to only PC. In case of A08B-0084-B410, B411, A13B-0196-B410 and B411, vertical soft keys signals go to only I/O Link. In case of A08B-0084-B412, B413, B432, B433, A13B-0196-B412, B413, B432, B433, vertical soft keys signals go to both PC and I/O Link. (Refer to Appendix C “KEY CODE OF SOFT KEYS AND FUNCTION KEYS OF PANEL *i* FOR AUTOMOTIVE” about key code to PC.)

2.2 ENVIRONMENT

When the PANEL *i* is used, the following environmental conditions (as measured top of the unit inside the cabinet) must be ensured for the unit.

Ambient temperature	Operating : +5 to +45°C Non-operating : - 20 to +60°C
Change in temperature	Up to 20 degrees/hour
Ambient relative humidity	Standard : 10 to 75% (non-condensing) Short-term (within one month) : 10 to 90% (non-condensing) Maximum Wet Bulb Temperature : 29°C (Recommended)
Vibration	Operating : up to 0.5G Non-operating : up to 1.0G
Environment	Installed in a hermetically sealed cabinet
Altitude	Operating : - 60m to 1000m Non-operating : - 60m to 12000m

2.2.1 Ambient Temperature during Operation

If the temperature of CPU and HDD at power-on are beyond the allowable range, it is indicated as follows.

In the case of the CPU temperature error (More than 75°C)
CPU Temperature = 76°C (Actual temperature is indicated.)
CPU Temperature Exceeds the Upper Limit - FATAL

In the case of the HDD temperature error (High temperature side : 55°C)
Ambient Temperature Exceeds the Upper Limit – FATAL

In the case of the HDD temperature error (Low temperature side : 5°C)
Ambient Temperature Exceeds the Lower Limit – HDD stopped

2.2.2 Vibration

The PANEL *i* and built-in hard disk drive may suffer resonance at certain frequencies. Careful checking is required on the PANEL *i* has been mounted on a machine.
When a PCI extension board is used, the permissible vibration level may be lower than that mentioned above, depending on the specifications of the board.

> ⚠ **CAUTION**
> If an operation error or mishap occurs, the data on the hard disk may be lost, even if all the installation conditions are satisfied. Therefore, always maintain a backup copy of the data on the hard disk in case the stored data is lost or damaged.
> Especially, the power-off on accessing the hard disk must not be done because that possibility is very high. Please concern for the end-users.

Some development or maintenance options may not satisfy the above specifications.

2.2.3 Maximum Wet Bulb Temperature

Recommended specification.

2.3 POWER SPECIFICATION

2.3.1 Power Supply Requirement

2.3.1.1 Specification

When the PANEL *i* is used, following power supply is required.

Input Voltage	+24VDC ± 10%
Current capacity	10A or more over

* If Handy File or other unit made by FANUC is connected to RS232C port, this value will increase by +1A.

2.3.1.2 Timing

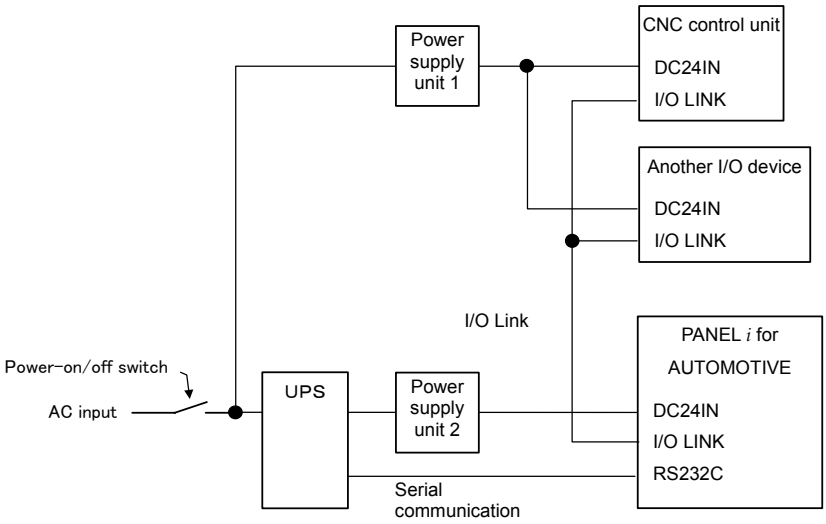
Input power can be turned on/off without relation to CNC power on/off.

In case that CNC and the PANEL *i* are connected with HSSB, the rotary switch on the CNC side HSSB interface board decides if CNC and the PANEL *i* start independently or synchronously.

2.3.1.3 Power-on/off of the PANEL *i* for AUTOMOTIVE with I/O Link

The PANEL *i* for AUTOMOTIVE with I/O Link operates as a slave I/O device of I/O Link.
For this reason, the power to the PANEL *i* must be turned on or off at the same time when the power to the CNC control unit or cell controller having the I/O Link master functions is turned on or off. (For the allowable time difference, refer to the relevant CNC connection manual. An example for the Series 16*i* is shown below.)
If this power-on/off sequence is not followed, an error may occur in the CNC control unit or cell controller or the I/O Link adapter built into the PANEL *i* may not normally be connected to I/O Link.

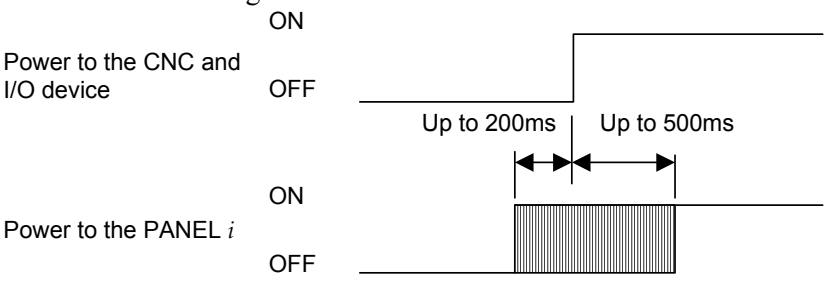
Example 1



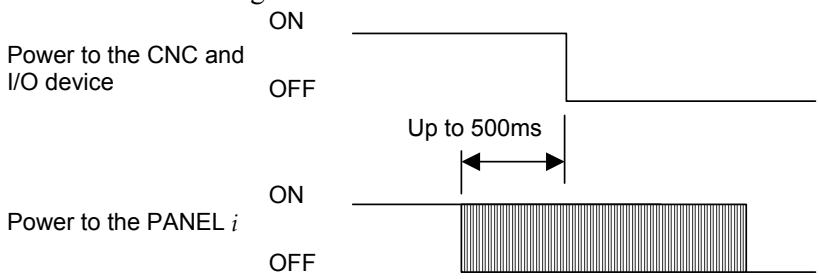
For a connection like this example, be careful about the power-on/off timing of individual units.

- Example for the Series 16*i*

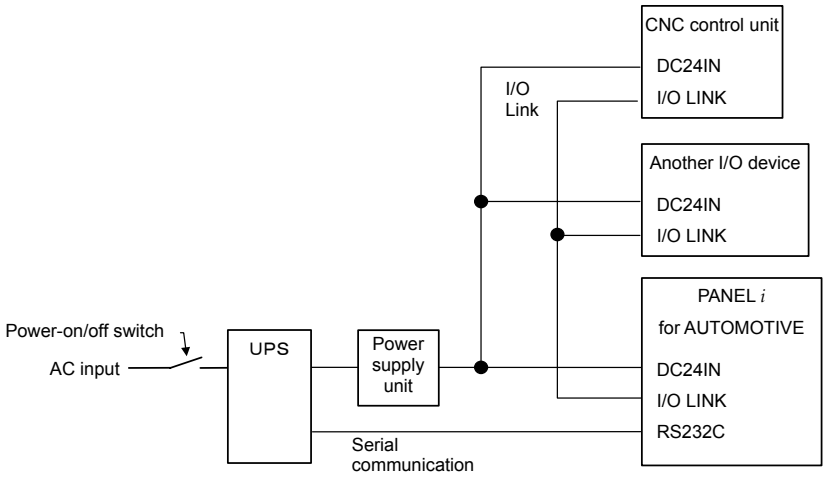
- Power-on timing



- Power-off timing



Example 2



2.3.2 Power Supply

When a power supply which satisfies the above specifications is prepared, the PANEL *i* and PANEL *i* for AUTOMOTIVE can supply the following power to peripheral devices.
Check the power supply current of each peripheral device you want to connect and use peripheral devices so as not to exceed the maximum current.

PANEL *i*

Voltage	Equipment	Max. Current	
+5V	Key board, Mouse PCI extension board	4000mA in total	
	IDE/ATAPI		Max. 2000mA
	USB device		Max. 500mA/port
	PCMCIA card		Max. 500mA
+3.3V	PCI extension board	3000mA in total	
	PCMCIA card		Max. 1000mA
+12V	PCI extension board IDE/ATAPI	2500mA in total	
-12V	PCI extension board	150mA in total	

PANEL *i* for AUTOMOTIVE

Voltage	Equipment	Max. Current	
+5V	Mouse PCI extension board	1400mA in total	
	USB device		Max.500mA/port
	PCMCIA card		Max.500mA
+3.3V	PCI extension board PCMCIA card	1000mA in total	
+12V	PCI extension board PCMCIA card	500mA in total	
-12V	PCI extension board	100mA in total	

2.3.3 Power Consumption

PANEL *i*

Approx.64W (12.1” LCD type, 15.0” LCD type)
Approx.58W (10.4” LCD type)

PANEL *i* for AUTOMOTIVE

Approx.60W

Above operating includes the following devices.

PANEL *i*, HDD Unit, FAN for HDD, Keyboard, and Mouse.

Above operating does not include the following devices.

FDD Unit, CD-ROM Drive, PCMCIA Card, PCI Extension board, USB device, and Devices to connect by Serial or Parallel Interface, Additional IDE/ATAPI device.

NOTE

Above power consumption is reference. If peripherals are connected or PCI extended boards are mounted, the power consumption will increase. Also, please consider the cabinet design and the cooling method which is most suitable to the total power consumption.

2.4 SHUTDOWN OPERATION

> ⚠ **CAUTION**
> Be sure to finish the OS and the applications through the proper operation of shutdown before turning the power off. Without the above-mentioned operation, there is no assurance of the following action. At worst, the hard disk drive may be damaged and may not be able to be recognized by the BIOS and OS.

To observe the above restrictions, a machine tool system using the PANEL *i* for AUTOMOTIVE with I/O Link requires the following measures:

(1) Use of a UPS
To circumvent the above restrictions when a power failure or momentary power supply interruption occurs, it is advisable to use a UPS with a power disconnection output signal.

(2) Shutdown of the system using an application software product on the personal computer
It is advisable to shut down the system using the dedicated software product supplied with the UPS.

2.5 CNC SCREEN DISPLAY FUNCTION (ONLY FOR THE PANEL *i* FOR AUTOMOTIVE)

Expand and use CNC Screen Display Function for 10.4-inch.
Use POP-UP menu for the operation.
Be sure to install CNC Screen Display Function for the maintenance.

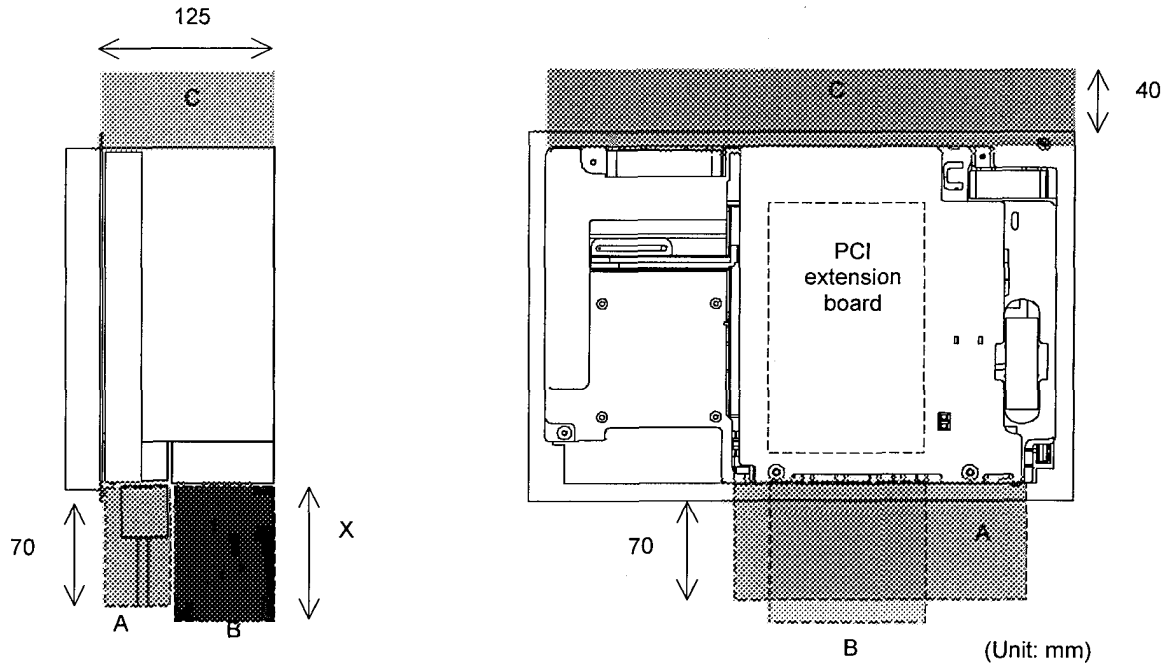
3 MOUNTING

3.1 MOUNTING SPACE

The following three spaces are required around the PANEL *i* and PANEL *i* for AUTOMOTIVE.

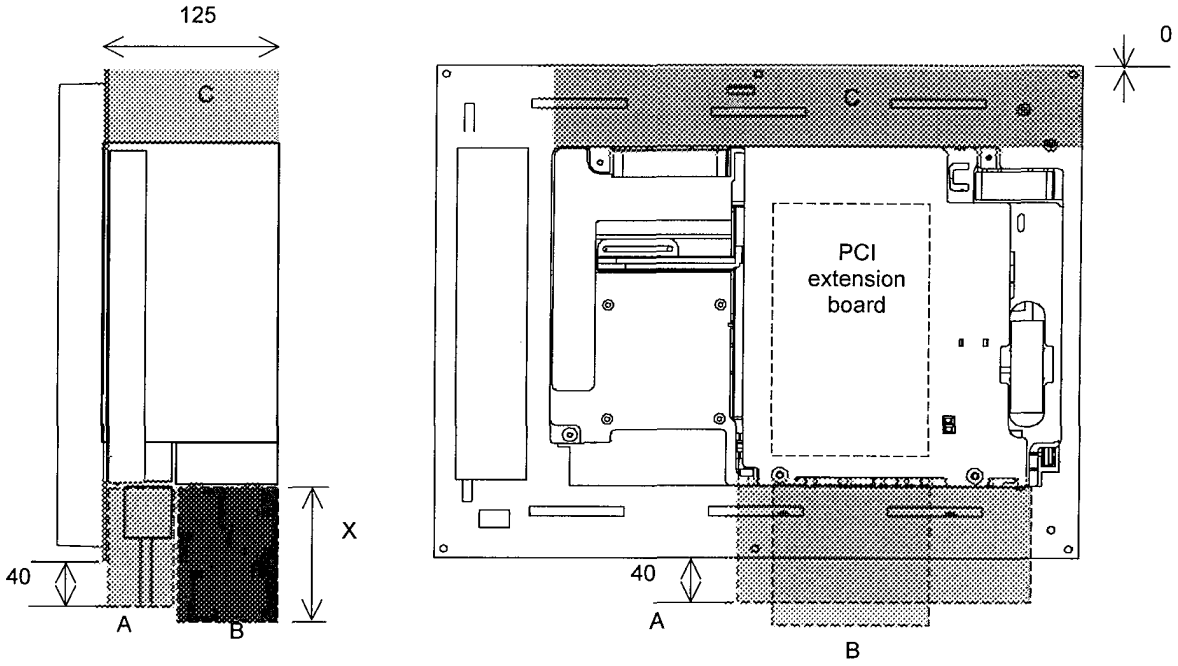
A: Space for connecting cables.
B: If PCI extension board exists, this space B is required for cable connection. The dimension X depends on cables connected to the PCI Extension board.
C: This space is required for airflow.

3.1.1 Installation Space of the 10.4" LCD Type Basic Unit



⚠ CAUTION
1 Cable connecting area is necessary under this unit.
2 When the vertical MDI or the FA full keyboard is assembled under the above display unit, the HDD unit cannot is assembled behind them. Please put the HDD unit on another place.

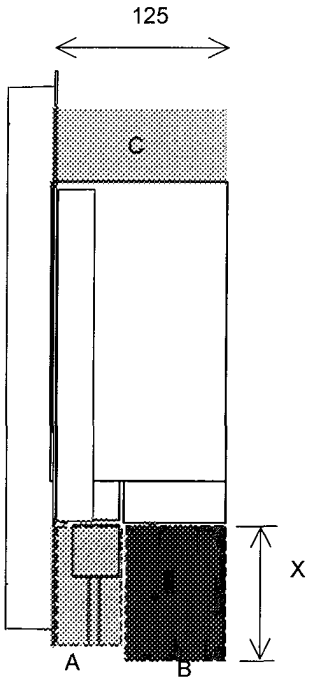
3.1.2 Installation Space of the 12.1" LCD Type Basic Unit

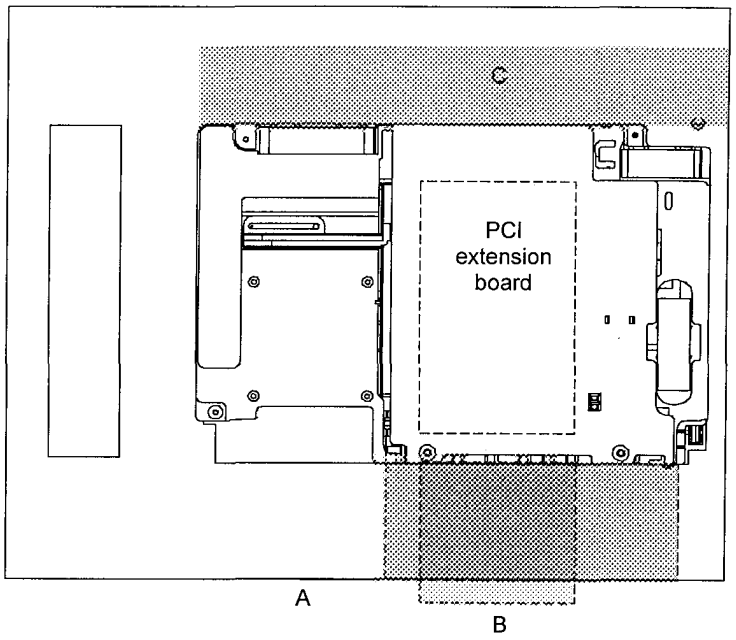


(Unit: mm)

NOTE
Cable connecting area is necessary under this unit.

3.1.3 Installation Space of the 15.0" LCD Type Basic Unit

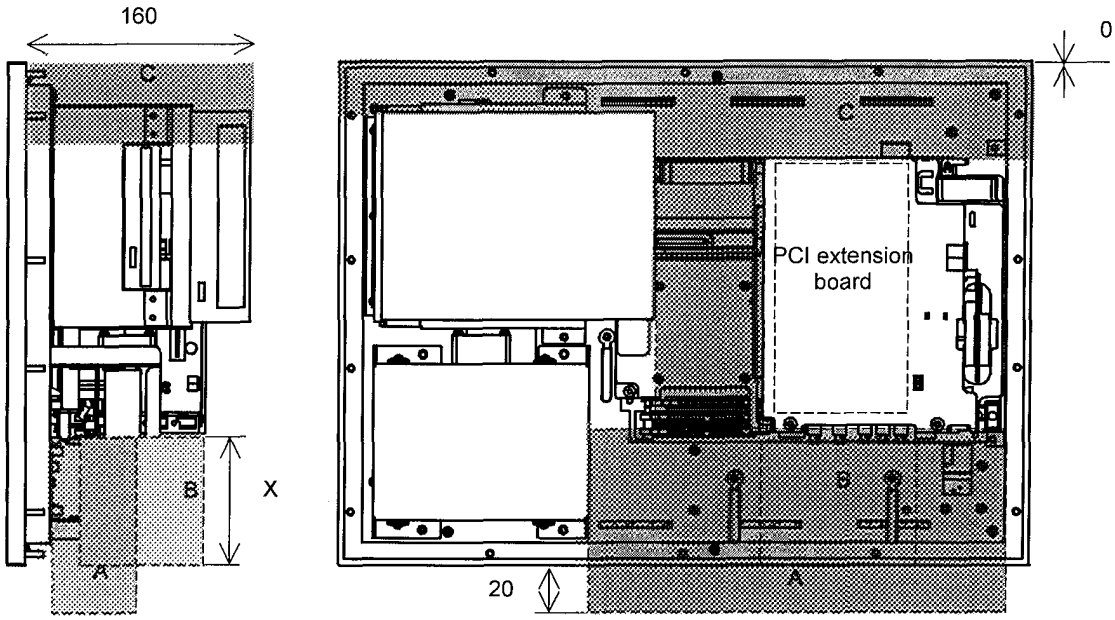




(Unit: mm)

NOTE
Cable connecting area is necessary under this unit.

3.1.4 Installation Space of the PANEL *i* for AUTOMOTIVE



(Unit: mm)

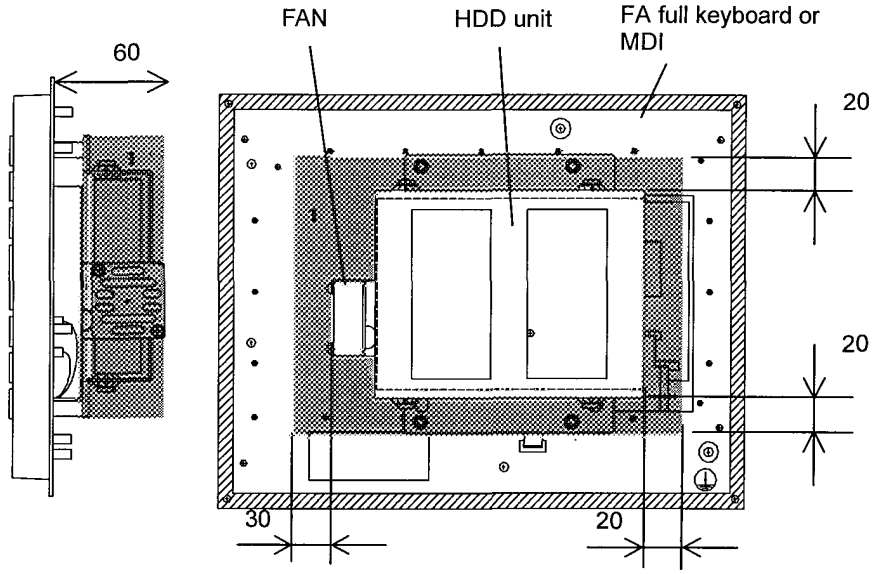
NOTE
Cable connecting area is necessary under this unit.

3.2 HDD UNIT

The HDD unit is mounted on the backside of the MDI or the FA Full-Keyboard.
(Except the PANEL *i* for AUTOMOTIVE)

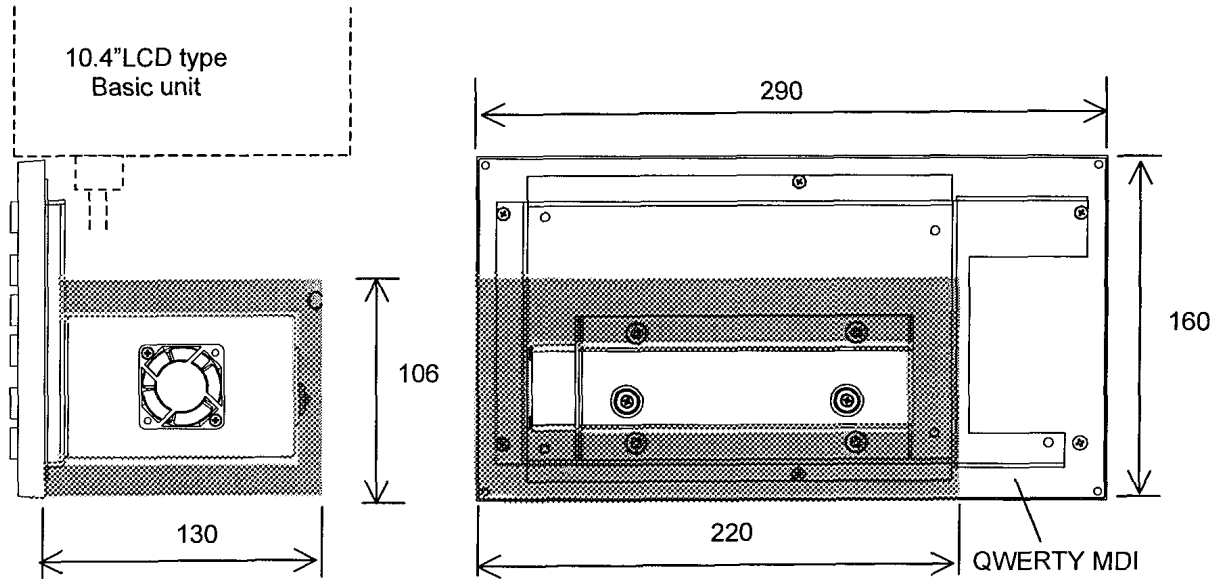
Obtain space for air circulation as shown in the figure below, and then obtain space for the cables used to connect the signals, power supply, and fan. Provide for heat dissipation from the HDD unit as well as the basic unit, because the HDD unit also generates heat.

3.2.1 FA Full Keyboard and an MDI Unit Other than QWERTY MDI



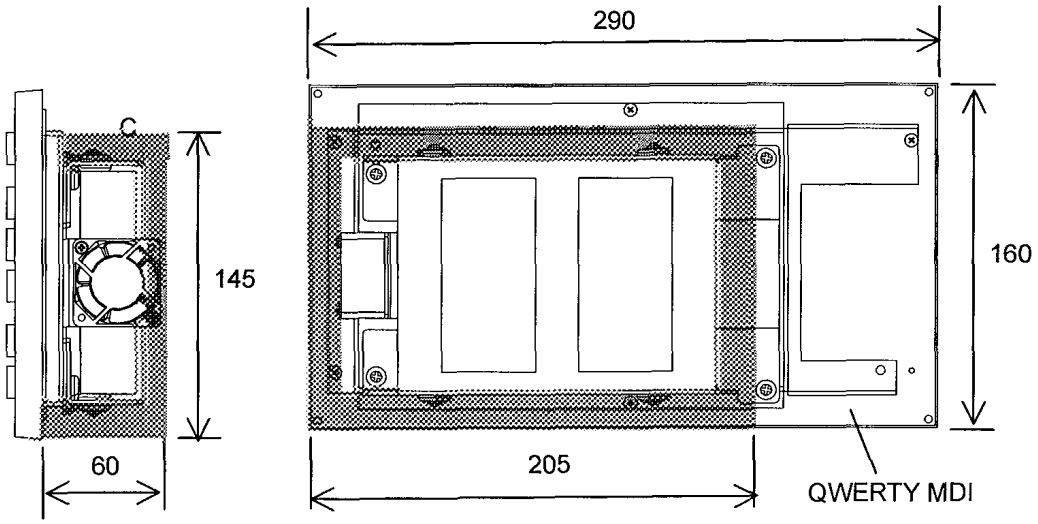
For the external dimensions of the unit, see Chapter 6 “Outline Drawings”. Unit: mm

3.2.2 When the QWERTY MDI and 10.4" LCD Type Basic Unit Are Used



For the external dimensions of the unit, see Chapter 6 "Outline Drawings". Unit: mm

3.2.3 QWERTY MDI Used in Cases Other than Combination Subsection 3.2.2

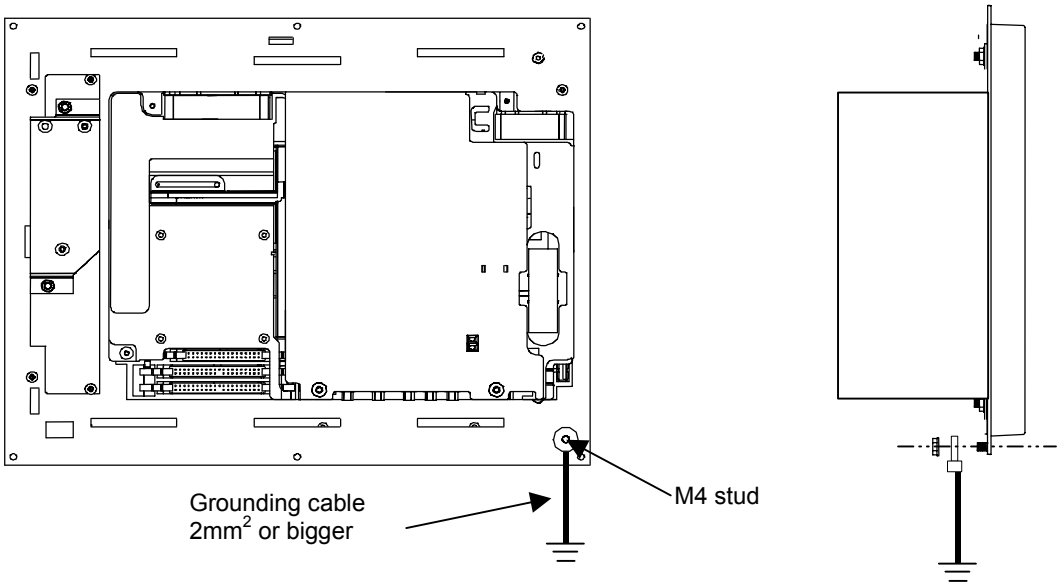


For the external dimensions of the unit, see Chapter 6 "Outline Drawings". Unit: mm

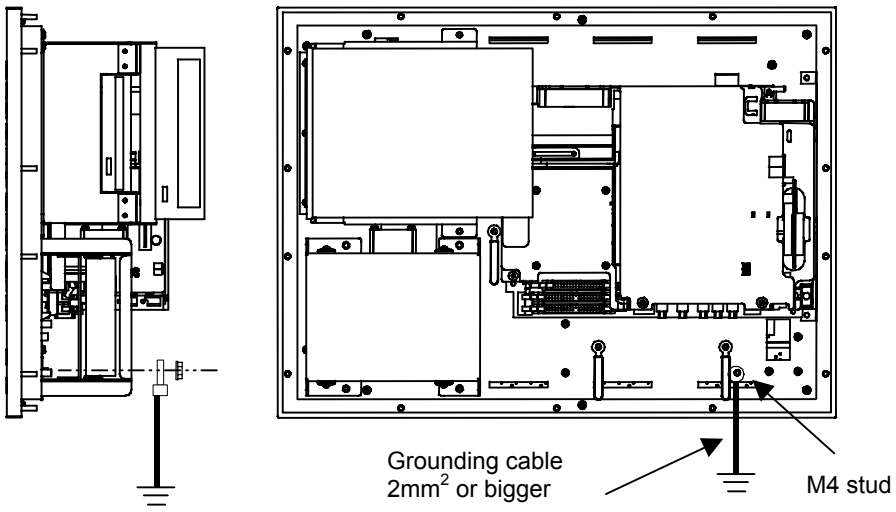
3.3 FRAME GROUNDING OF THE UNITS

Connect every units (basic, FA full keyboard or MDI) to the grounding plate of the cabinet via grounding terminal.

3.3.1 PANEL *i*



3.3.2 PANEL *i* for AUTOMOTIVE



3.4 CABLE CLAMP AND SHIELD PROCESSING

If a cable connected to the PANEL *i* requires shielding, clamp the cable as shown below. The clamp both supports and shields the cable. Use this clamp to ensure stable operation of the system.
Partially peel out the sheath and expose the shield. Push and clamp by the plate metal fittings for clamp at the part. The ground plate must be made by the machine tool builder, and set as follows :

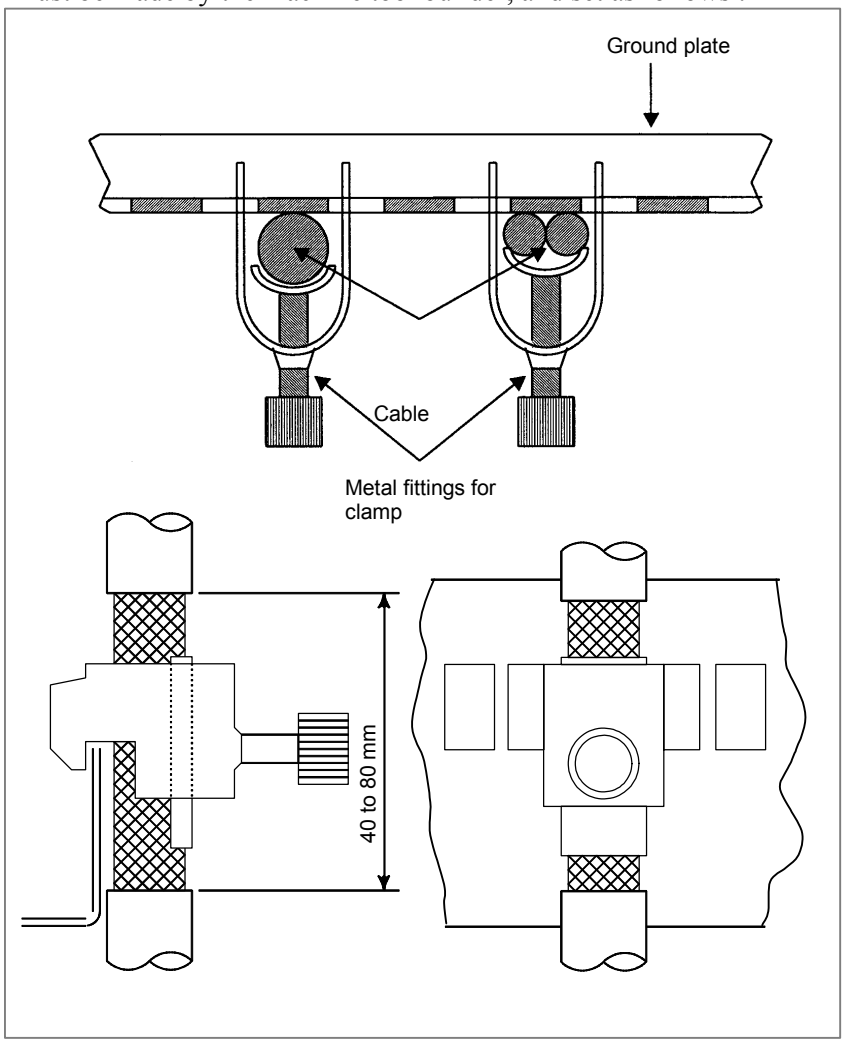


Fig. 3.4 (a) Cable clamp (1)

NOTE
1 Select a cable with a proper length.
If the cable is too long, the noise immunity may be reduced or noise may be caused on other cables. In addition, when the excess length is coiled, the inductance is increased and a high voltage is induced during turning on or off of signals. This may cause malfunction due to a failure or noise.
2 Bring together the cables connected to a CNC or amplifier near the unit and shield them.

Prepare ground plate like the following figure.

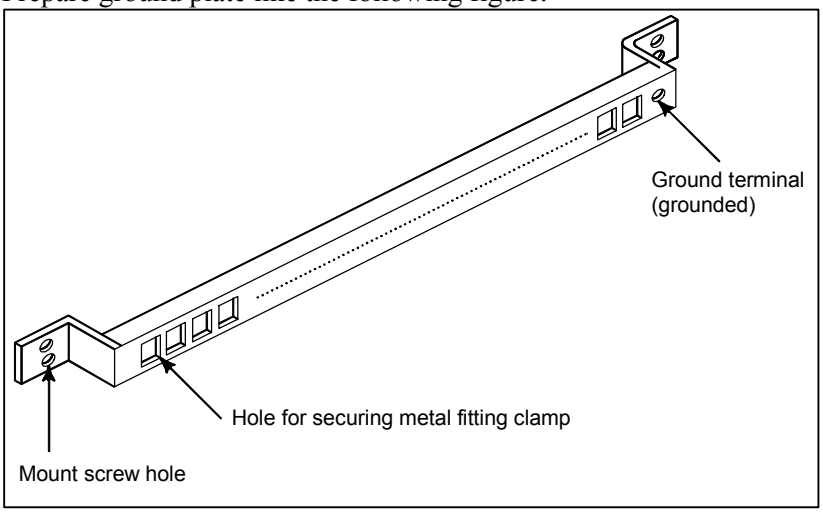


Fig. 3.4 (b) Ground plate

For the ground plate, use a metal plate of 2 mm or thicker, which surface is plated with nickel.

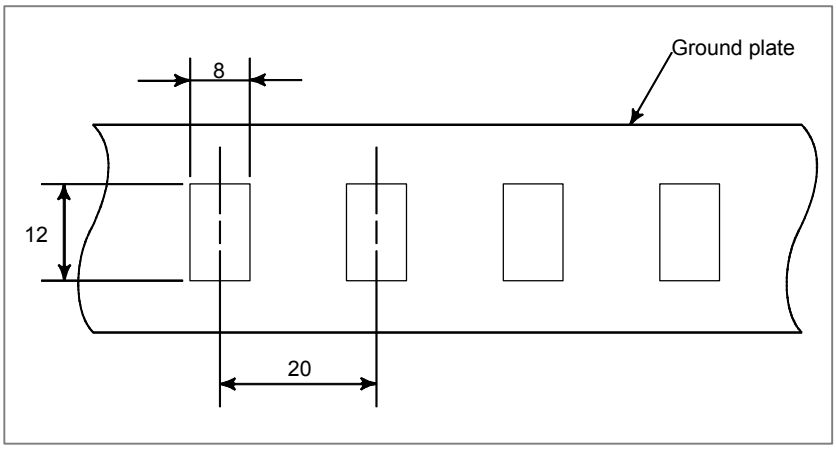


Fig. 3.4 (c) Ground plate holes

(Reference) Outer drawings of metal fittings for clamp.

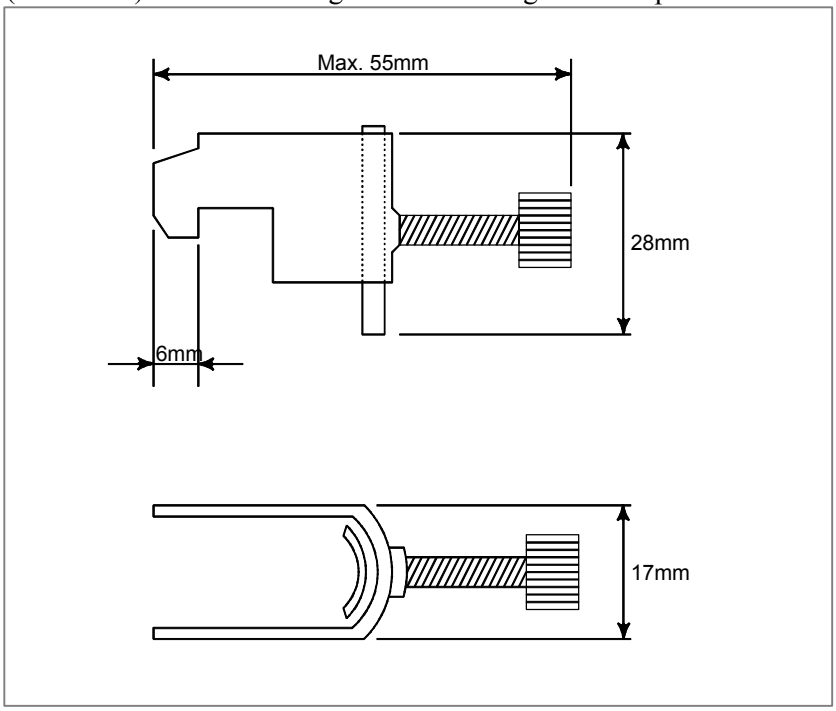


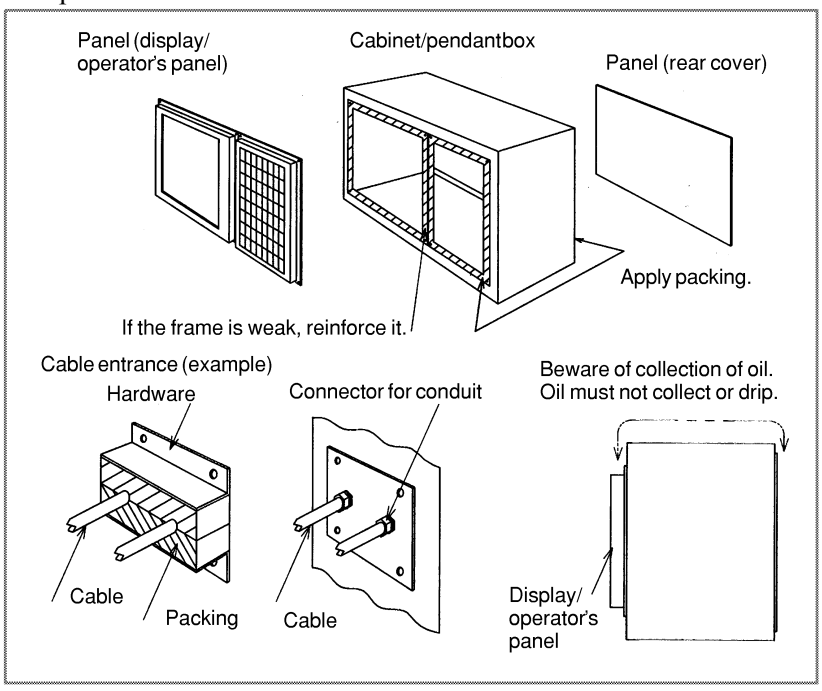
Fig. 3.4 (d) Outer drawings of metal fittings for clamp

Ordering specification for metal fittings for clamp
A02B-0124-K001 (8 pieces)

3.5 DUSTPROOF MEASURES FOR CABINETS AND PENDANT BOXES

The cabinet and pendant box that house a display and a operator's panel that are to be designed and manufactured by the machine tool builder are susceptible to dust, cutting debris, oil mist, etc. Note the following and make sure that they are structured to prevent their entry.

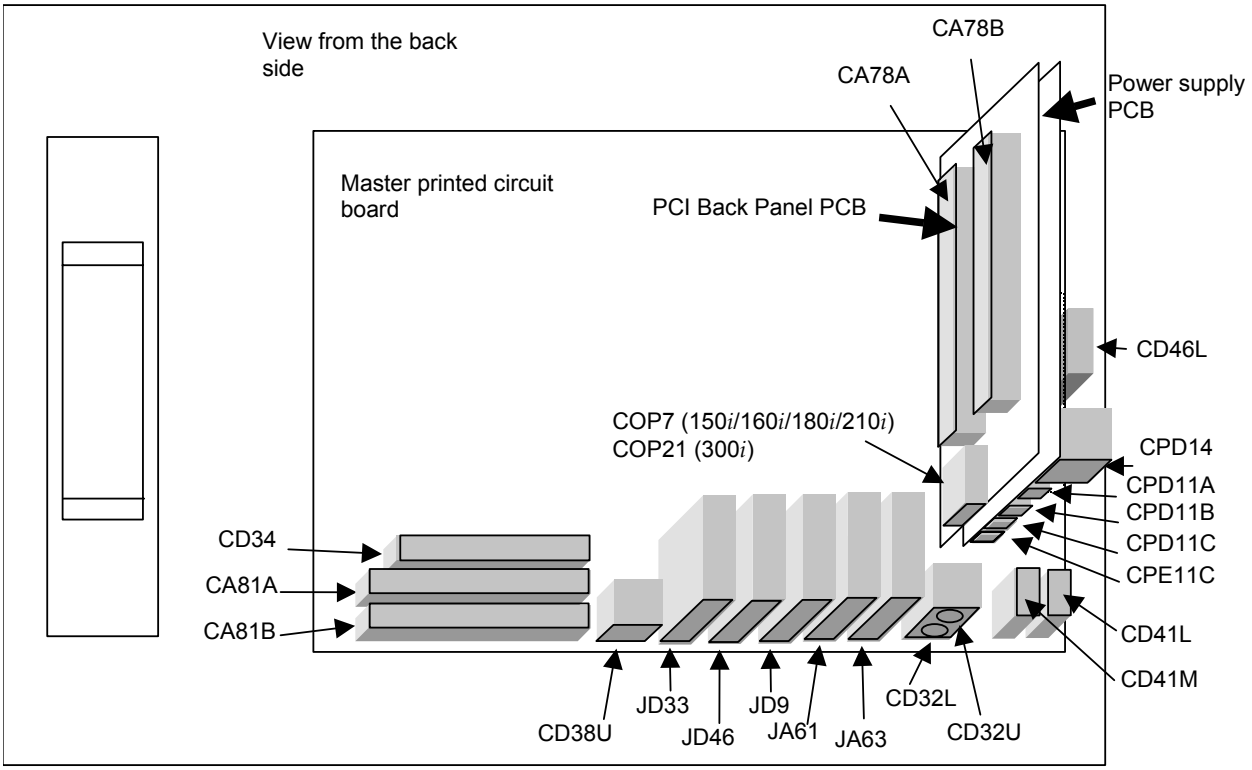
(1) The cabinet and pendant box must be of a hermetically sealed structure.
(2) Apply packing to the panel mounting surface to which a display and operator's panel are to be mounted.
(3) Make sure that the door packing of the cabinet and pendant box is sealed firmly.
(4) For a cabinet or pendant box with a rear cover, apply packing to the mounting surface.
(5) Make sure that the cable entrance is sealed with packing, connectors for conduits, etc.
(6) Make sure that all other openings are blocked, if any.
(7) Make sure that the display and operator's panel do not receive cutting debris and coolant directly.
(8) Oil can easily stay on the top of the cabinet and pendant box, possibly dripping down the display and operator's panel. Make sure that the cabinet and pendant box is of such a structure that oil do not collect or that oil do not drip down the display or panel.



4 CONNECTION TO PERIPHERAL

4.1 CONNECTOR LOCATION

4.1.1 PANEL *i*



Master PCB

Connector Number	Connector Name	Function	Reference
CA81A, B	HDD1, HDD2	HDD signal (Primary, Secondary)	Section 4.8
CD34	FDD	FDD signal	Section 4.9
CD38U	ETHERNET	Ethernet	Section 4.11
JD33	232-1	Serial Port1	Section 4.3
JD46	232-2	Serial Port 2	Section 4.4
JD9	CENTRO	Parallel Port	Section 4.5
JA61	MDI	MDI (300*i*)	Section 4.13
JA63	CRT	Video port	Section 4.12
CD32L	KEY BOARD	Keyboard	Section 4.7
CD32U	MOUSE	Mouse	Section 4.7
CD41L,M CD46L	USB1,USB2 USB3	USB port (channel 1, 2, 3) (USB3 provided only for the 300*i*)	Section 4.10

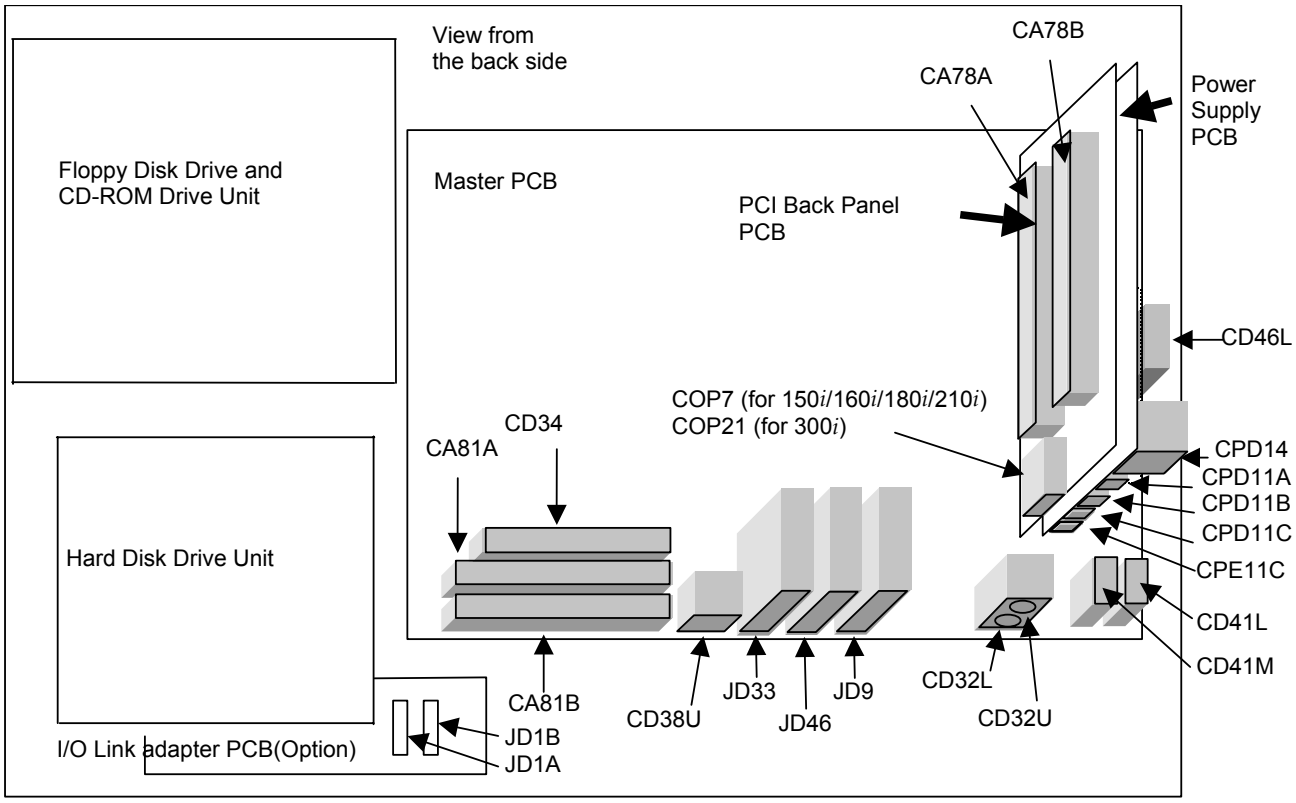
PCI Back Panel PCB

Connector Number	Connector Name	Function	Reference
COP7 or COP21	HSSB	High Speed Serial Bus (HSSB)	Section 4.6
CA78A,B	PCI SLOT1,2	PCI extension slot	Chapter 5

Power Supply PCB

Connector Number	Connector Name	Function	Reference
CPD14	+24V INPUT	Main Power Input	Section 4.2
CPD11A	FDD PWR	FDD Power Output	Section 4.9
CPD11B	HDD PWR 1	HDD 1 Power Output	Section 4.8
CPD11C	HDD PWR 2	HDD 2 Power Output	Section 4.8
CPE11C	HDD FAN	FAN for HDD	Section 4.8

4.1.2 PANEL *i* for AUTOMOTIVE



Master PCB

Connector Number	Connector Name	Function	Reference
CA81A	HDD1	HDD signal	-
CA81B	HDD2	CD-ROM Drive signal	-
CD34	FDD	FDD signal	-
CD38U	ETHERNET	Ethernet	Section 4.11
JD33	232-1	Serial Port1	Section 4.3
JD46	232-2	Serial Port 2	Section 4.4
JD9	CENTRO	Parallel Port	Section 4.5
CD32L	KEY BOARD	Keyboard (This connector can not be used, because this connector is used on this unit	
CD32U	MOUSE	Mouse	Section 4.7
CD41L,M CD46L	USB1,USB2 USB3	USB port (channel1,2,3) (USB2 and USB3 are located in front.)	Section 4.10

PCI Back Panel PCB

Connector Number	Connector Name	Function	Reference
COP7 or COP21	HSSB	High Speed Serial Bus (HSSB)	Section 4.6
CA78A,B	PCI SLOT1,2	PCI extension slot	Chapter 5

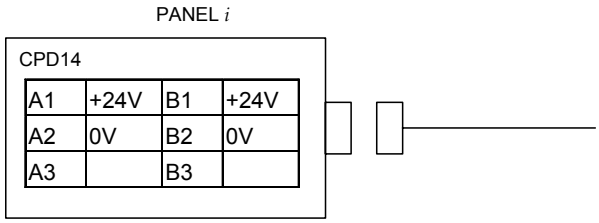
Power Supply PCB

Connector Number	Connector Name	Function	Reference
CPD14	+24V INPUT	Main Power Input	Section 4.2
CPD11A	FDD PWR	FDD Power Output	-
CPD11B	HDD PWR 1	HDD Power Output	-
CPD11C	HDD PWR 2	HDD Power Output	-
CPE11C	HDD FAN	FAN for HDD	-

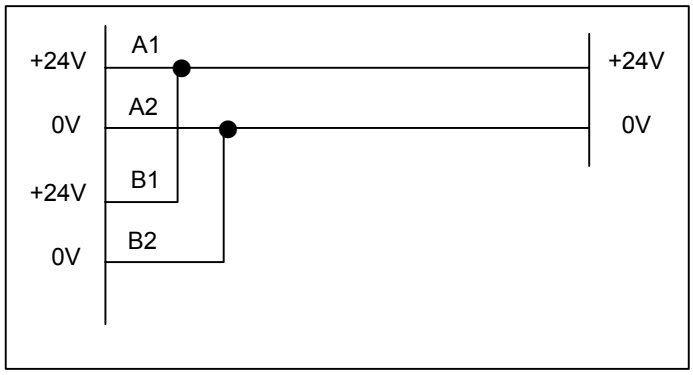
I/O Link adapter PCB (Option)

Connector Number	Connector Name	Function	Reference
JD1A	I/O Link	I/O Link (connect to master device)	Section 4.14
JD1B	I/O Link	I/O Link (connect to slave device)	Section 4.14

4.2 MAIN POWER SUPPLY INPUT



Cable connection



Cable conductor

Use wire of AWG#16 (1.3mm^2)or thicker.

Recommended contact and housing for cable

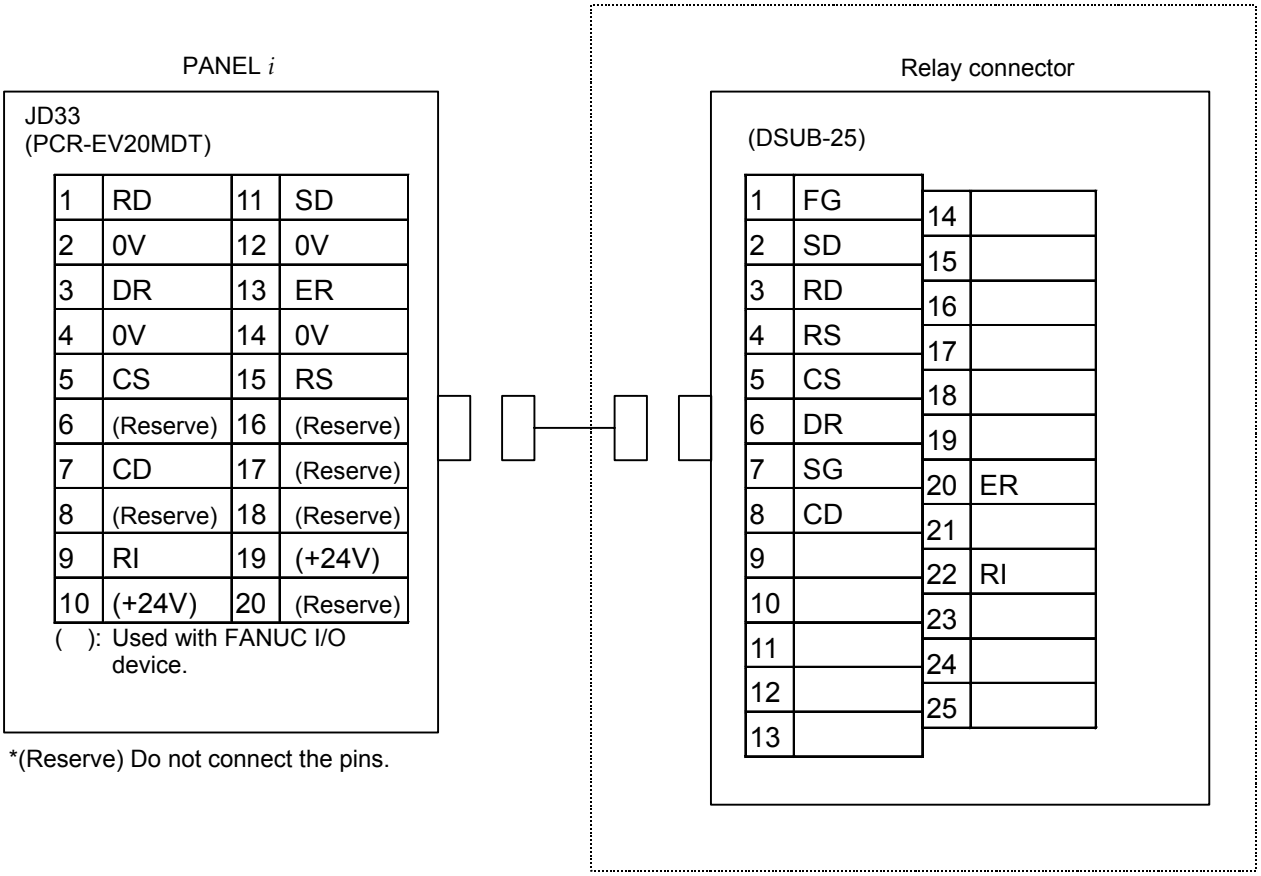
Contact	Housing	Manufacture
1-175218-5 (single) 1-175196-5 (connection)	2-178127-6	Tyco Electronics AMP

Recommended connector for cable

A08B-0084-K050 (housing + contact 6pcs)

NOTE
Please wire this cable separately from the other cables connected to the PANEL *i*.

4.3 SERIAL PORT 1

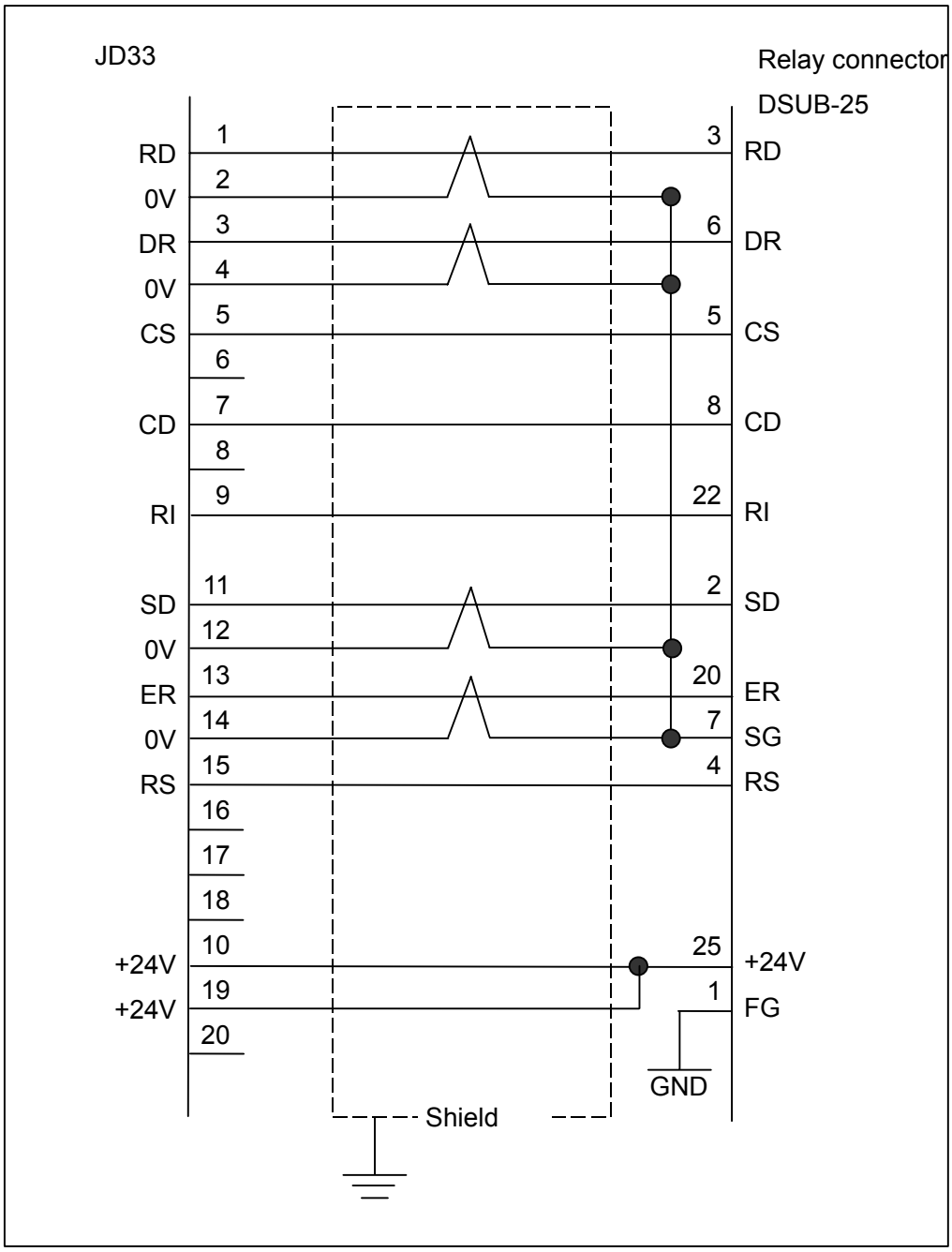


NOTE

1 The figure shows a sample relay connector interface. Design the cable to suit the interface of the actual device to be connected.

2 The +24V pins of the interface for the PANEL *i* shown above can be used only with the FANUC I/O unit (such as FANUC CASSETTE and FANUC Handy File). Do not use these pins for other purposes. Also, do not attempt to simultaneously connect two or more FANUC I/O units to one the PANEL *i*.
If two or more I/O units are connected simultaneously, the power supply capacity of the +24 V pins may be exceeded.

Cable connection



Recommended cable conductor

A66L-0001-0284#10P : 10 pairs of 0.08 mm^2 wires

Recommended punch panel

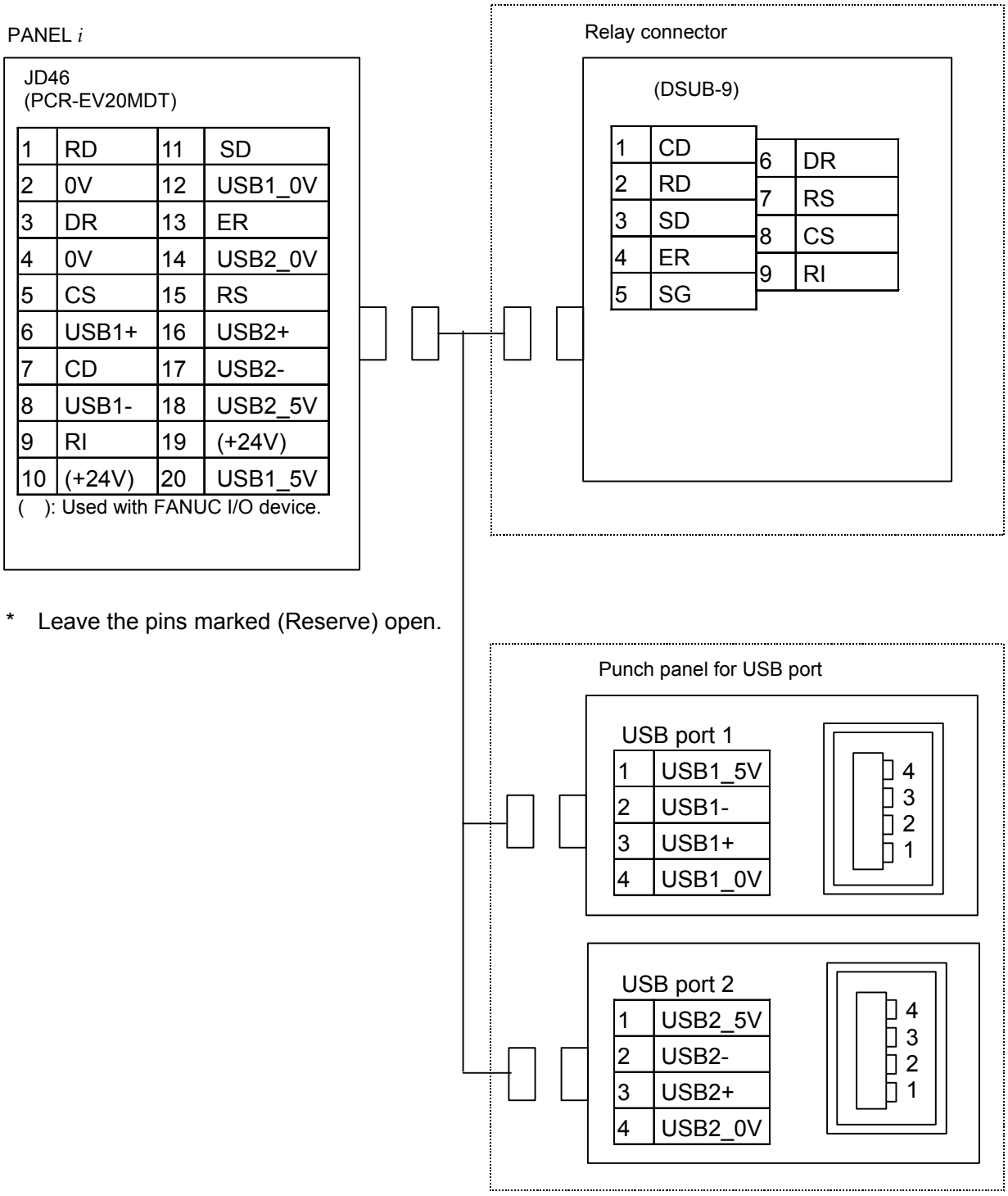
A02B-0236-C191(1m), A02B-0236-C192(2m),
A02B-0236-C193(5m)

> ⚠ **CAUTION**
> CNC punch panels (A02B-0120-C191 to A02B-0120-C193, etc.) other than the panels indicated above cannot be used with this interface. Use of such an incorrect punch panel can lead to a serious problem, e.g., incapability of starting the system.

Recommended connector and housing for cable (JD33 side)

Connector	Housing	Manufacture
PCR-E20FA	PCR-V20LA/PCS-E20LA	Honda Tsushin Kogyo
FI30-20S	FI-20-CV2/FI-20-CV7	Hirose Electric
FCN-247J020-G/E	FCN-240C020-Y/S	Fujitsu
52622-2011	52624-2015	Molex Japan

4.4 SERIAL PORT 2



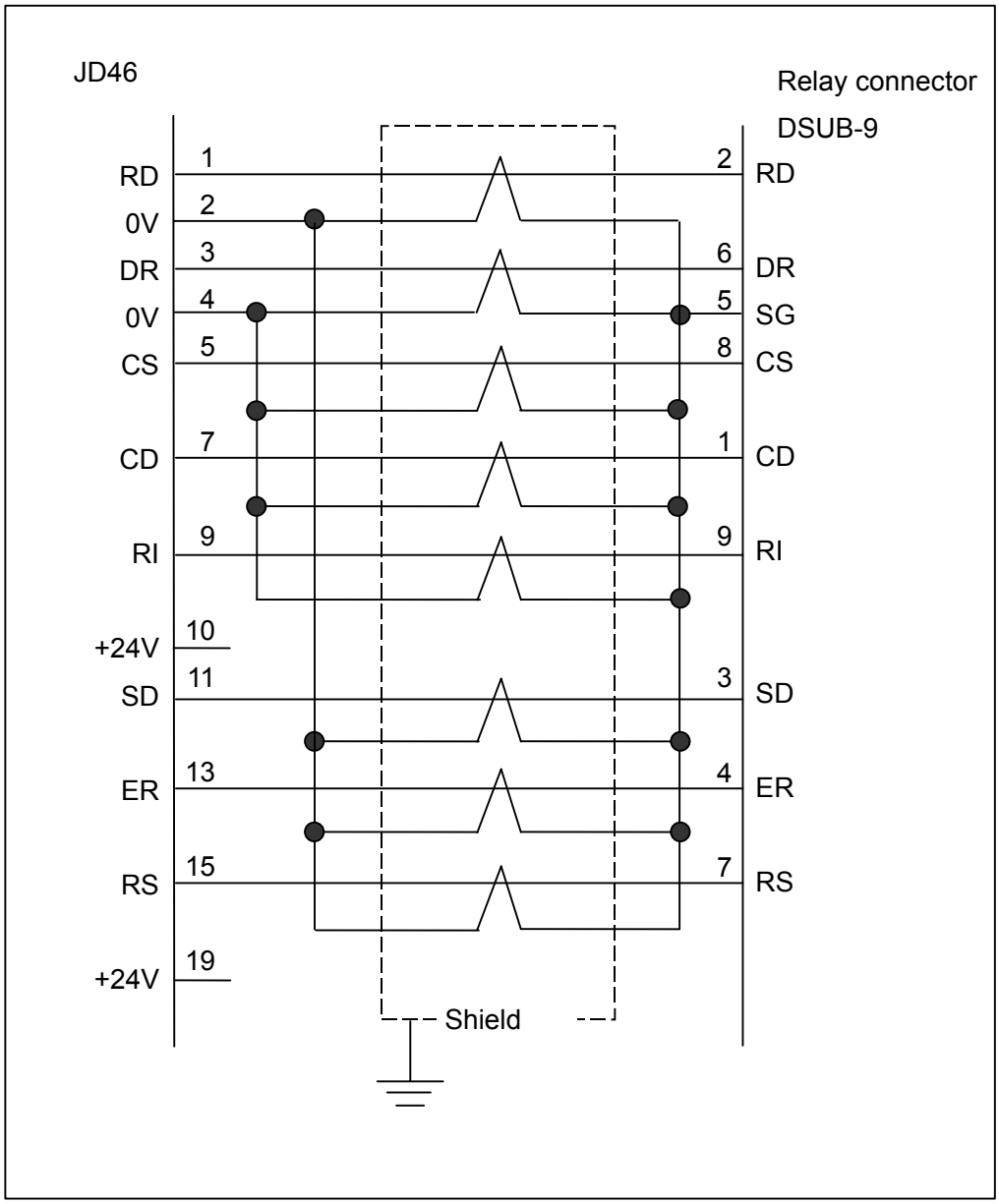
* Leave the pins marked (Reserve) open.

NOTE

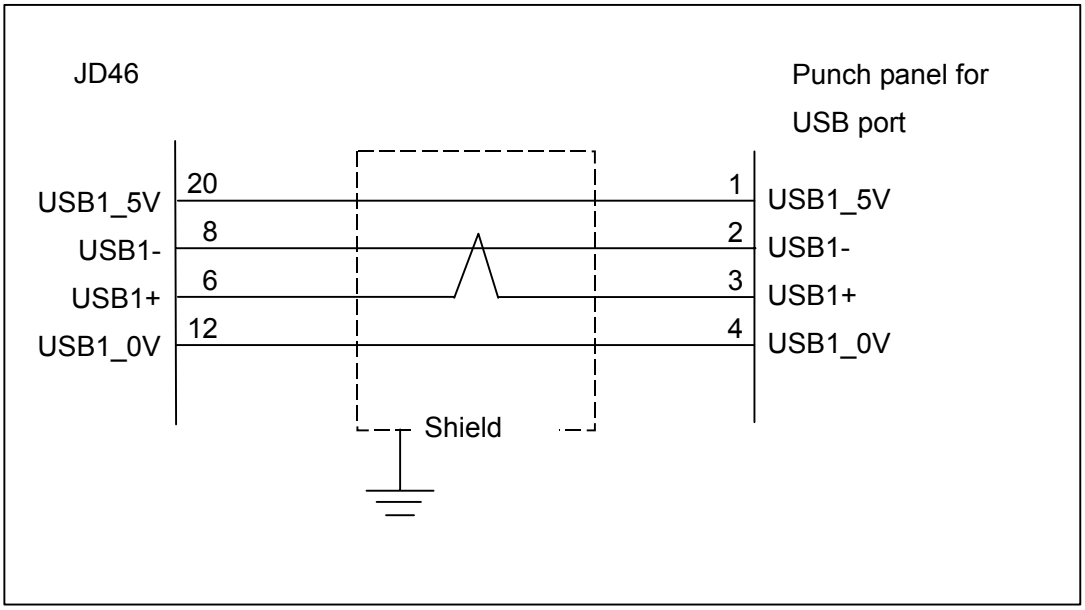
1 The figure shows a sample relay connector interface and USB. Design the cable to suit the interface of the actual device to be connected.
2 The +24V pins of the interface for PANEL *i* shown above can be used only with the FANUC I/O unit (such as FANUC CASSETTE and FANUC Handy File). Do not use these pins for other purposes. Also, do not attempt to simultaneously connect two or more FANUC I/O units to one PANEL *i*.
If two or more I/O units are connected simultaneously, the power supply capacity of the +24 V pins may be exceeded.
3 Commercial USB devices cannot be guaranteed its proper work with PANEL *i*. Careful checking by the customer will be required. And please be aware that those devices in the market are not almost considered about waterproof and dustproof.
4 Signals for USB 1 and 2 are short-circuited with signals for USB 1 and 2 in Section 4.10. When one of these connector is used, the other connector cannot be used.

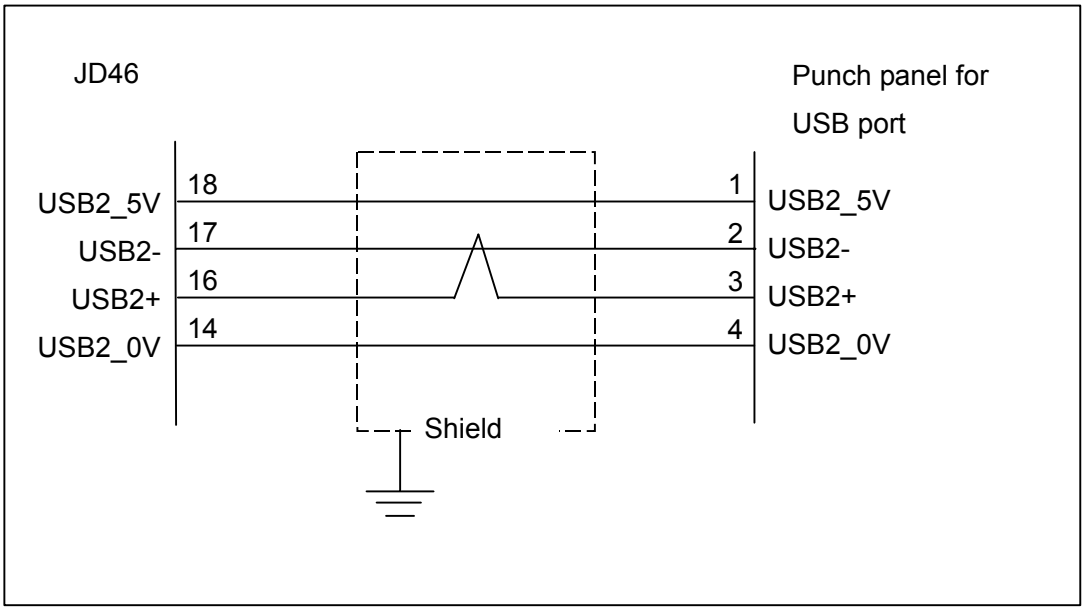
Cable connection

- When an RS-232C connector is used

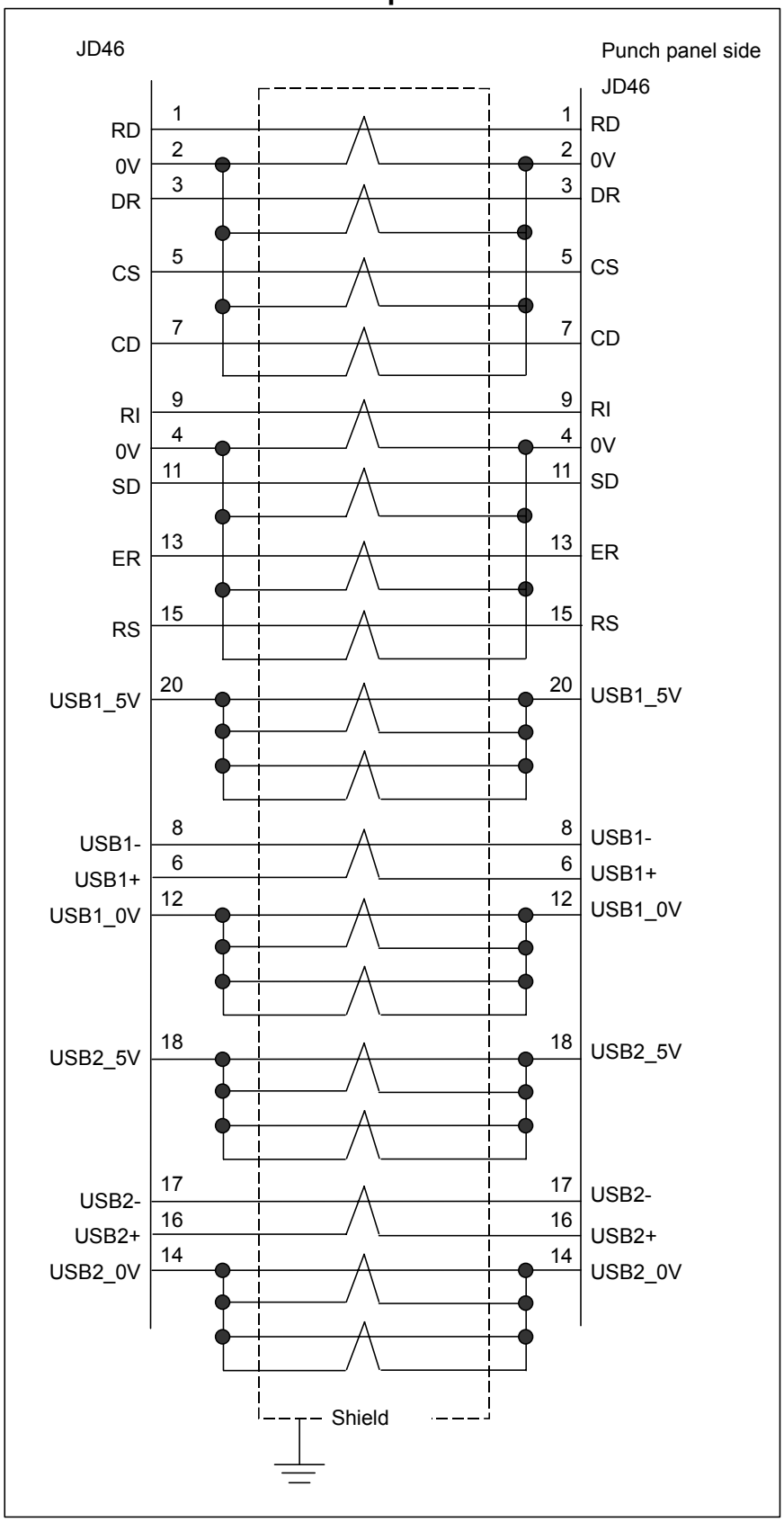


- When a USB port is used





- When an RS-232C connector and USB port are used



Recommended cable specifications

For RS-232C signals : A66L-0001-0284#10P (0.08 mm^2, 10 pairs)
For USB ports : Use dedicated cables.
For RS-232C signals and USB ports :
A66L-0001-0285#25P AWG28 25 pairs

Recommended punch panel

For RS-232C signals : A02B-0236-C191(1m), A02B-0236-C192(2m), A02B-0236-C193(5m)

> ⚠ **CAUTION**
> CNC punch panels (A02B-0120-C191 to A02B-0120-C193, etc.) other than the panels indicated above cannot be used with this interface. Use of such an incorrect punch panel can lead to a serious problem, e.g., incapability of starting the system.

Punch panel for RS232-C, USB, parallel port : A08B-0082-C200
Cable for punch panel (A08B-0082-C200) (RS232-C, USB) :
A08B-0082-K810
Cable for punch panel (A08B-0082-C200) (parallel port) :
A08B-0082-K811
Cable for punch panel (A08B-0082-C200) (keyboard, mouse) :
A08B-0082-K812

Recommended connector and housing for cable (JD46 side)

When the A66L-0001-0284#10P is used:

Connector	Housing	Manufacture
PCR-E20FA	PCR-V20LA/PCS-E20LA	Honda Tsushin Kogyo
FI30-20S	FI-20-CV2/FI-20-CV7	Hirose Electric
FCN-247J020-G/E	FCN-240C020-Y/S	Fujitsu
52622-2011	52624-2015	Molex Japan

When the A66L-0001-0285#25P is used:

Connector	Housing	Manufacture
FI40B-20S	FI-20-CV5	Hirose Electric

4.5 PARALLEL PORT

PANEL *i*

JD9
(PCR-EV20MDT)

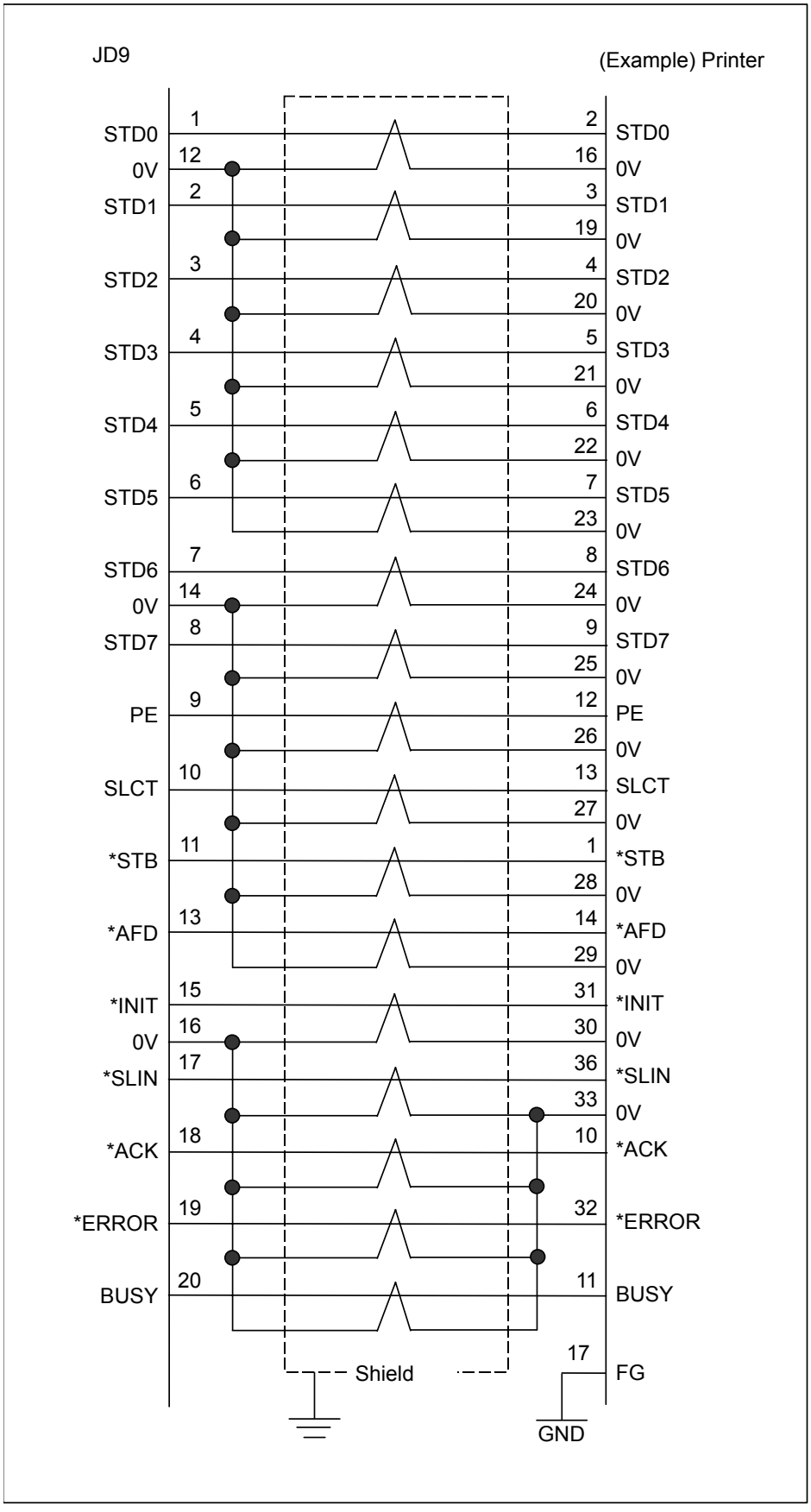
1	STD0	11	*STB
2	STD1	12	0V
3	STD2	13	*AFD
4	STD3	14	0V
5	STD4	15	*INIT
6	STD5	16	0V
7	STD6	17	*SLIN
8	STD7	18	*ACK
9	PE	19	*ERROR
10	SLCT	20	BUSY

(Example) Printer

1	*STB	19	0V
2	STD0	20	0V
3	STD1	21	0V
4	STD2	22	0V
5	STD3	23	0V
6	STD4	24	0V
7	STD5	25	0V
8	STD6	26	0V
9	STD7	27	0V
10	*ACK	28	0V
11	BUSY	29	0V
12	PE	30	0V
13	SLCT	31	*INIT
14	*AFD	32	*ERROR
15		33	0V
16	0V	34	
17	FG	35	
18		36	*SLIN

NOTE
1 The figure shows a sample printer interface. Design the cable to suit the interface of the actual device to be connected.
2 Some kinds of Printers and other devices may not work properly with the PANEL *i*, so careful checking by the customer will be required. And please be aware that I/O devices in the market are not almost considered about waterproof and dust-proof.

Cable connection



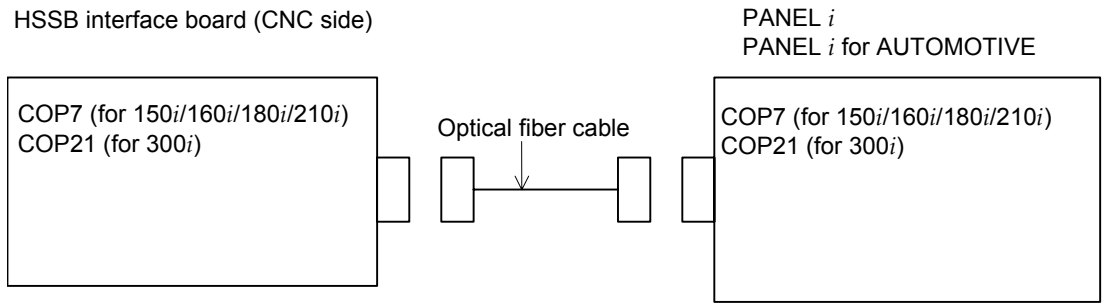
RECOMMENDED CABLE MATERIAL SPEC.

A66L-0001-0285#25P: AWG28 25 pairs

RECOMMENDED CONNECTOR FOR CABLE and HOUSING (JD9 side)

Connector	Housing	Manufacture
FI40B-20S	FI-20-CV5	Hirose Electric

4.6 HIGH SPEED SERIAL BUS (HSSB)



RECOMMENDED CABLE（Optical Fiber Cable）

A66L-6001-0026#L1R003: Cable Length = 1 m
A66L-6001-0026#L3R003: Cable Length = 3 m
A66L-6001-0026#L5R003: Cable Length = 5 m
A66L-6001-0026#L7R003: Cable Length = 7 m
A66L-6001-0026#L10R03: Cable Length = 10 m
A66L-6001-0026#L15R03: Cable Length = 15 m
A66L-6001-0026#L20R03: Cable Length = 20 m
A66L-6001-0026#L30R03: Cable Length = 30 m
A66L-6001-0026#L40R03: Cable Length = 40 m
A66L-6001-0026#L50R03: Cable Length = 50 m
A66L-6001-0026#L100R3: Cable Length = 100m (only for 150*i*/160*i*/180*i*/210*i*)

Use the following cable and a relay connector when an optical cable is relayed with the relay adapter and it wants to use it.

Low-loss optical fiber cable for junction only

A66L-6001-0029#L1R003: Cable Length = 1 m
A66L-6001-0029#L3R003: Cable Length = 3 m
A66L-6001-0029#L5R003: Cable Length = 5 m
A66L-6001-0029#L7R003: Cable Length = 7 m
A66L-6001-0029#L10R03: Cable Length = 10 m
A66L-6001-0029#L15R03: Cable Length = 15 m
A66L-6001-0029#L20R03: Cable Length = 20 m
A66L-6001-0029#L30R03: Cable Length = 30 m
A66L-6001-0029#L40R03: Cable Length = 40 m
A66L-6001-0029#L50R03: Cable Length = 50 m

NOTE
Total cable length is less than 35m incase of 300*i*

Low-loss optical junction adapter

A63L-0020-0004

For HSSB, optical fiber cables, and relay adapters, also refer to the relevant CNC connection manual and the following technical report.

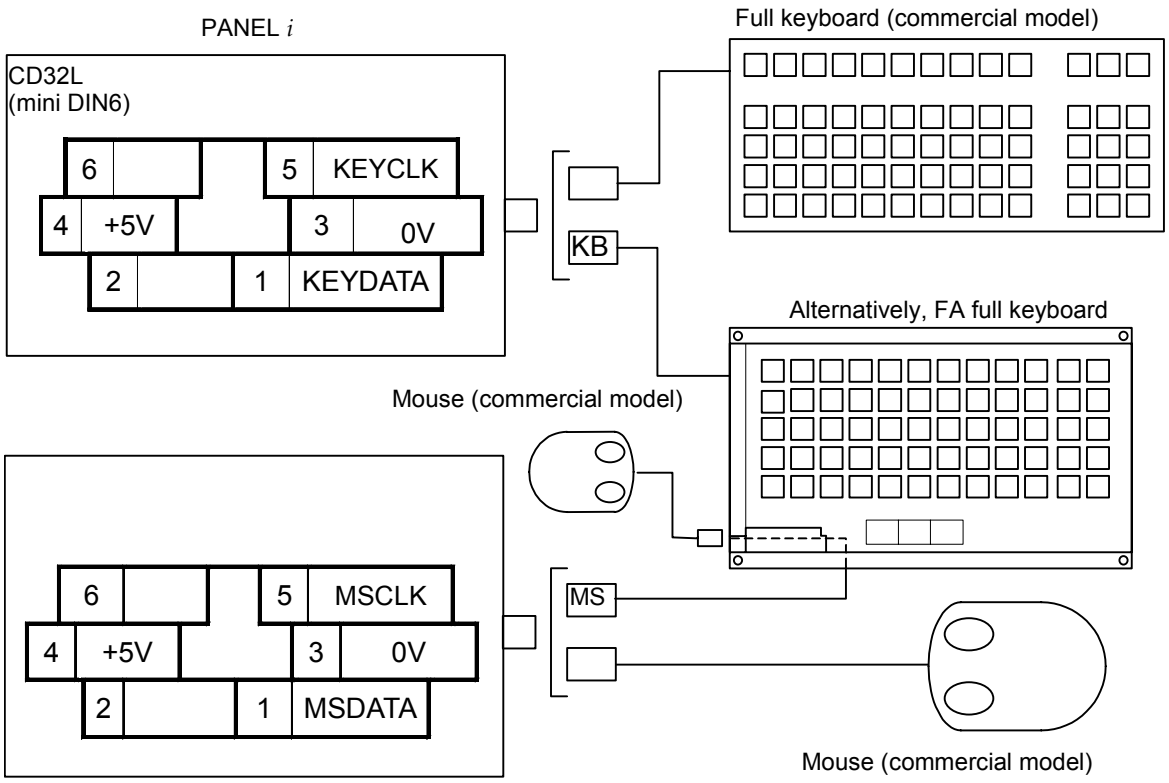
Name	Specification number
FANUC High-speed serial Bus Type 2 Connection and Maintenance Manual	A-73527E

⚠ CAUTION

1 Optical fiber cable used for FANUC I/O Link, for FSSB inside wiring and for Serial Spindle can not be used.

2 Optical fiber cable can not be cut or joined by customer. Use one of above cables.

4.7 KEYBOARD AND MOUSE



NOTE

1 Commercial full keyboards are prone to compatibility problems with personal computers to some degree. It is not guaranteed that a personal computer can operate with every commercial full keyboard. Machine tool builders are requested to check the operability of the full keyboards they select. Keep in mind that general commercial full keyboards are neither dust-proof nor moisture-resistant.

2 The keyboard port cannot be used for the PANEL *i* for AUTOMOTIVE.

Recommended full keyboard

A86L-0001-0210 : 101 type (commercial model) Only for application development or maintenance
A86L-0001-0211 : 106 type (commercial model) Only for application development or maintenance
A02B-0236-C131#JC : FA Full Keyboard (Japanese) for 10.4" LCD type
A02B-0236-C131#EC: FA Full Keyboard (English) for 10.4" LCD type
A02B-0236-C132#JC : FA Full Keyboard (Japanese) for 12.1" LCD type
A02B-0236-C132#EC: FA Full Keyboard (English) for 12.1" LCD type
A08B-0082-C150#JC : FA Full Keyboard (Japanese) for 15.0" LCD type
A08B-0082-C150#EC: FA Full Keyboard (English) for 15.0" LCD type

For FA full keyboards, also refer to the following manual.

Document name	Specification number
FA FULL-KEYBOARD FOR FANUC NC BOARD -CONNECTION MANUAL	A-73159

Recommended mouse

A86L-0001-0212 : Standard PS/2 mouse (commercial model) for development and maintenance use only

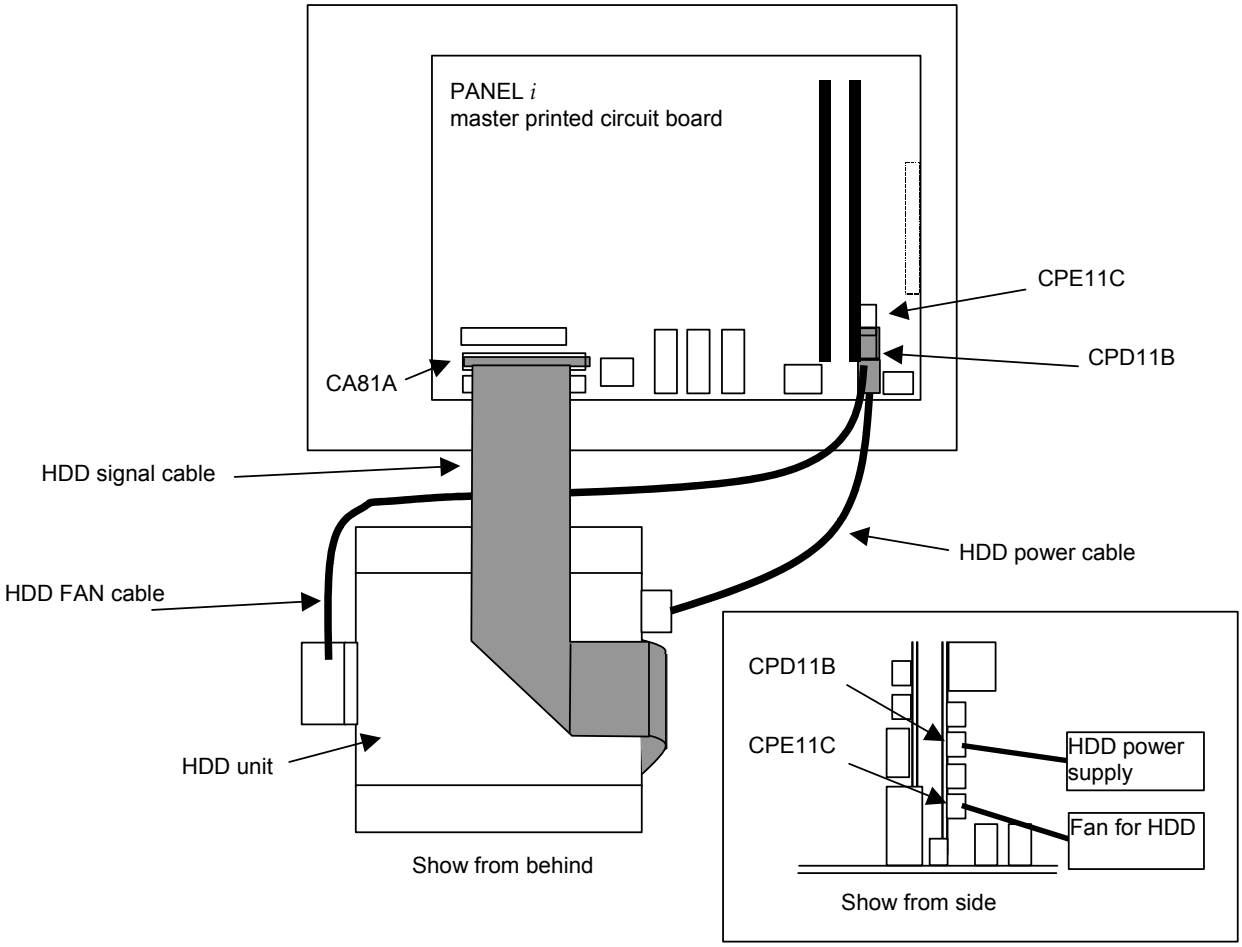
4.8 HARD DISK UNIT

Cable Connection

Connect HDD signal cable to CA81A.
Connect HDD power cable to CPD11B.
Connect FAN cable to CPE11C.
Connect the above cables.
These cables are factory-connected to the hard disk unit.

Cable Length

HDD power cable : 40cm
HDD signal cable : 30cm
HDD FAN cable : 65cm



⚠ CAUTION
1 Connect the HDD signal cable with extra slack.
2 Use a dedicated HDD unit and cables.
HDD units and cables for other devices cannot be used.

4.9 FLOPPY DISK DRIVE

Recommended floppy disk drive

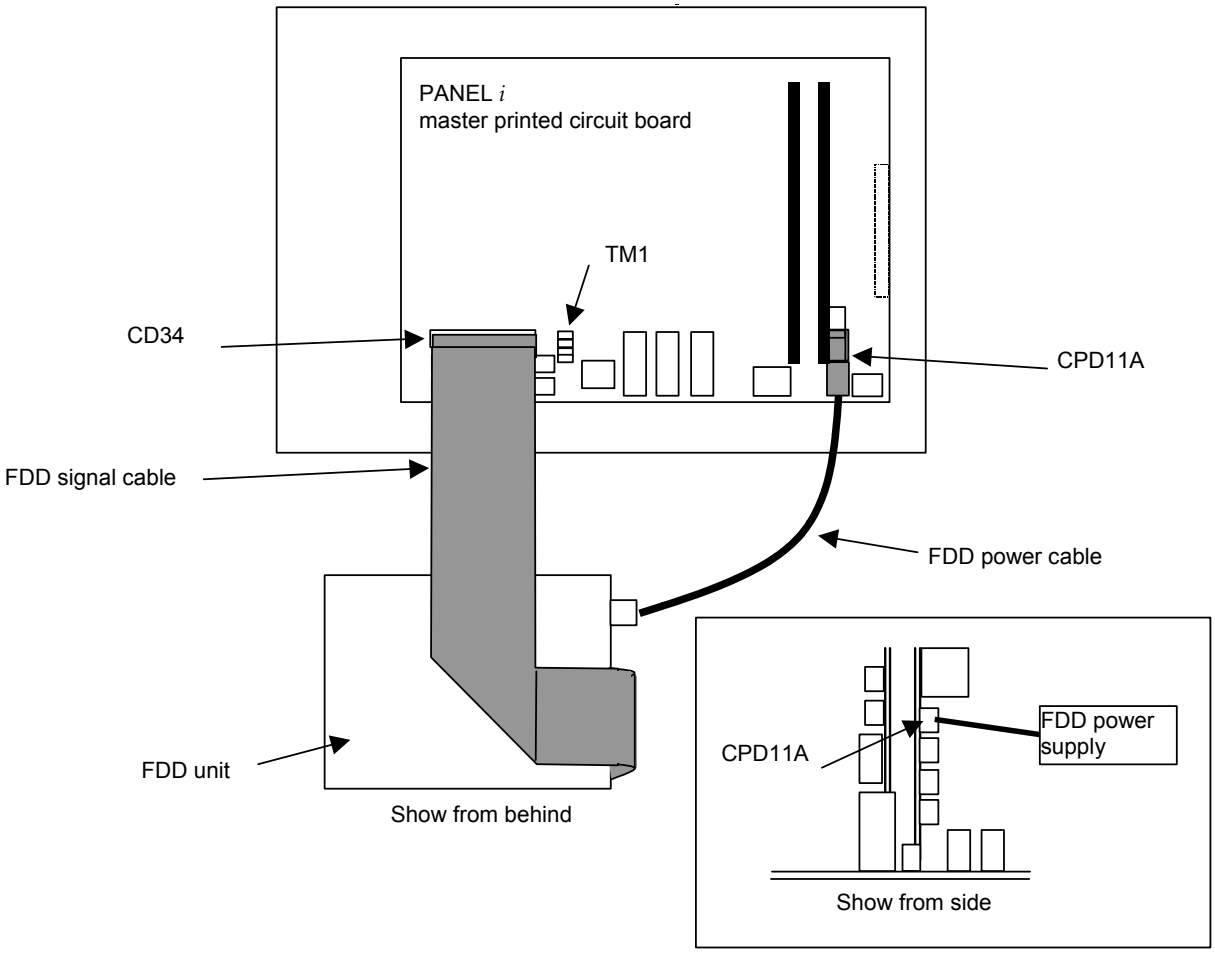
Drive unit (separate type): A08B-0084-K001
Panel-mounted type: A02B-0207-C009
When a conventional FDD unit is used, a setting on the master printed circuit board must be changed. (Make TM1 open.)

Recommended cable

A02B-0207-K801 (FDD power and signal lines: 1m)

Cable connection

Connect FDD signal cable to CD34.
Connect FDD power cable to CPD11A.
Connect these cables.

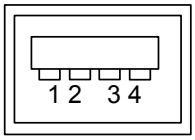


4.10 USB

USB port 1

JD41L

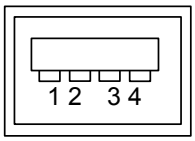
1	USB1_5V
2	USB1-
3	USB1+
4	USB1_0V



USB port 2

JD41M

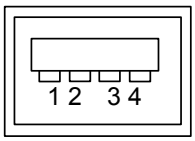
1	USB2_5V
2	USB2-
3	USB2+
4	USB2_0V



USB port 3

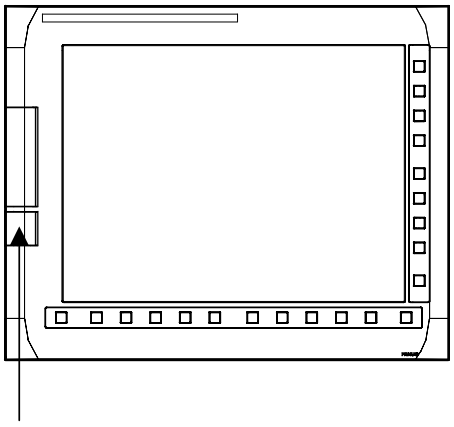
CD46L

1	USB2_5V
2	USB2-
3	USB2+
4	USB2_0V



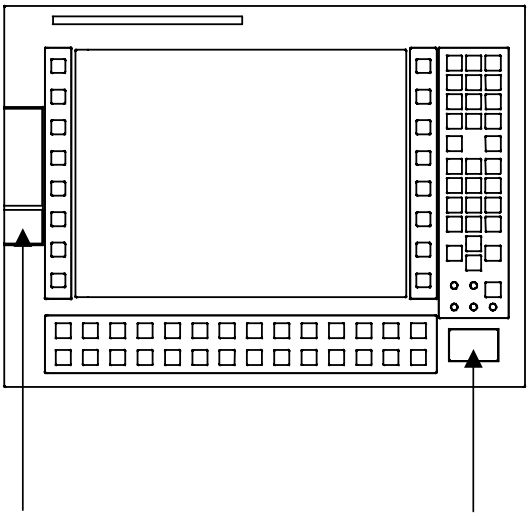
USB port 1 is located on the back.
USB port 2 is located on the back of the PANEL *i* or on the front of the PANEL *i* for AUTOMOTIVE.
USB port 3 is located on the front.
(Only on the PANEL *i* and PANEL *i* for AUTOMOTIVE for the 300*i*)

PANEL *i* for 300*i*



USB port 3

PANEL *i* for AUTOMOTIVE



USB port 3 USB port 2

NOTE

1 Commercially available USB devices are prone to compatibility problems with personal computers to some degree. It is not guaranteed that every commercially available USB device can operate properly with personal computers. Machine tool builders are requested to check the operability of the USB devices they select. Keep in mind that commercially available USB devices are generally neither dust-proof nor moisture-resistant.

2 The maximum supply current from each USB port is 500 mA/port.
The maximum supply current to peripheral devices is 1400 mA in total. The peripheral devices include the PCI extension board, PCMCIA card, and mouse.

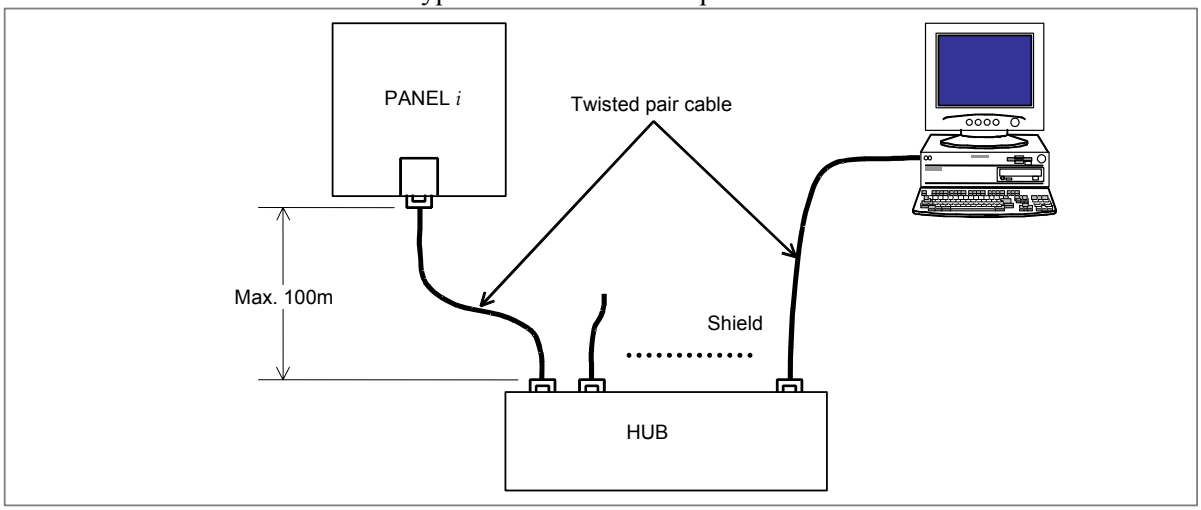
3 The signals of USB port 1 and 2 are connected to the connector explained in Section 4.4. When one of the ports is used, the other port cannot be used.

4.11 ETHERNET

> ⚠ **CAUTION**
> Before attaching or detaching cables, turn off the power to the PANEL *i*, and ensure that the power is off.
> Please inquire of each manufacturer about the construction of network or the condition of using the equipment except the CNC unit (media converter, hub, transceiver, cable etc.). When configuring your network, you must take other sources of electrical noise into consideration to prevent your network from being influenced by electrical noise. Make sure that network wiring is sufficiently separated from power lines and other sources of electrical noise such as motors, and ground each of the devices as necessary. Also, a high and insufficient ground impedance may cause interference during communications. After installing the machine, conduct a communications test before you actually start operating the machine.
> We cannot ensure operation that is influenced by network trouble caused by a device other than the CNC unit.

4.11.1 Connecting to Ethernet

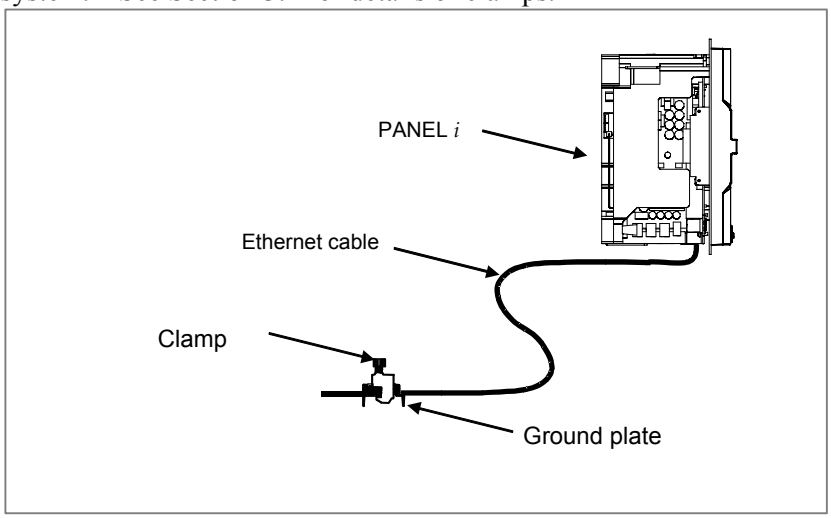
Connection to the Ethernet Interface
The 10BASE-T and 100BASE-TX interfaces are available. A hub (line concentrator) is used to connect the CNC unit to a system. A typical connection example is shown below.



Some devices (hub, transceiver, etc.) that are needed for building a network do not come in a dust-proof construction. Using such devices in an atmosphere where they are subjected to dust or oil mist will interfere with communications or damage these devices. Be sure to install such devices in a dust-proof cabinet.

Leading out the Ethernet cable

The Ethernet cable must be fastened by a cable clamp to prevent tension being applied to the modular connector (RJ-45) that connects the cable to the control unit even if the Ethernet cable is pulled directly. This clamp is also used to ground the cable shield. This clamp is also used to ground the cable shield, and clamping must always be performed because it is essential to stable operation of the system. See Section 3.4 for details of clamps.



10BASE-T/100BASE-TX Connector (CD38U) pin assignments

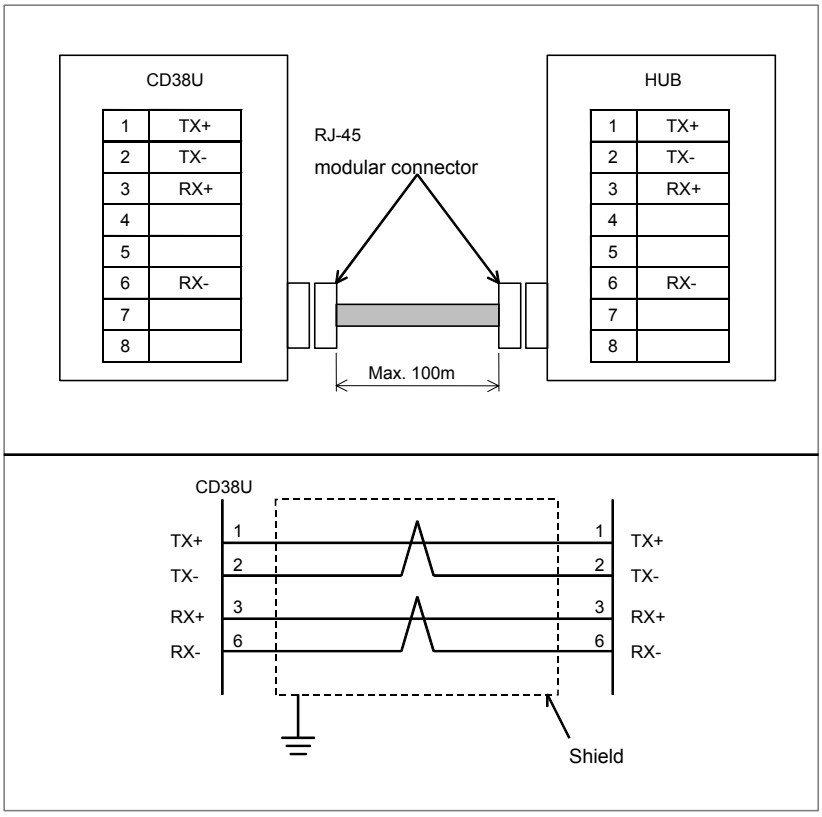
CD38U

Pin No.	Signal name	Description
1	TX+	Send +
2	TX-	Send -
3	RX+	Receive +
4		Not used
5		Not used
6	RX-	Receive -
7		Not used
8		Not used

4.11.2 Twisted-Pair Cable Specification

Cable Connection

The cable used for connection between the 10BASE-T/100BASE-TX interface CD38U and the hub is connected as follows:



NOTE
1 The cable can be up to 100 m long (for the FANUC- recommended cable for movable sections, up to 50 m). Do not make the cable longer than necessary.
2 There are two types of commercially available cables: straight-connection and cross-connection types. Select an appropriate cable according to the purpose.

Cable Materials

Many cables without a shield (UTP cables) are commercially available as twisted pair cables conforming to 10BASE-T or 100BASE-TX. To improve noise immunity in factory automation environments, however, be sure to use twisted pair cables (STP cables) with a common shield in category 5.

Recommended cables (for fixed parts)

Manufacturer	Specification	Remark
Furukawa Electric Co., Ltd.	DTS5087C-4P	Twisted wires
Nissei Electric Co., Ltd.	F-4PFWMF	Single-wire cable

Inquiries

Manufacturer		Contact address
Furukawa Electric Co., Ltd. Sales Headquarters		2-6-1 Marunouchi, Chiyoda-ku. Tokyo 100-8322 TEL: 03-3286-3126 FAX: 03-3286-3979
Nissei Electric Co., Ltd. Machida Branch		3F MU Bldg., 1-9-1 Minami-narise, Machida City, Tokyo 194-0045 TEL: 0427-29-2531
	Overseas Sales Office	IWATANI International Corporation Tokyo Head Office 21-8 Nishi-shinbashi 3-chome, Minato-ku, TOKYO, 105-8458, JAPAN TEL: 03-5405-5810 Telex: 2524256 IWATYO J

NOTE
These recommended cables for fixed parts must not be used for movable sections. Be sure to use the following recommended cables for movable sections.

Recommended cable (for movable sections)

Manufacturer	Specification	Remark
Oki Electric Cable	AWG26 4P TPMC-C5-F(SB)	Dedicated to FANUC products

Cable specification (FANUC original product, with no connector)
Drawing number: A66L-0001-0453
Manufacturer: Oki Electric Cable Co., Ltd.

Specification

- Electrical characteristic:
  Complying with EIA/TIA 568A categories 3 and 5
  The length of the cable to the hub must be kept within 50 m because of its attenuation performance.
- Structure : Common-shield braided cable with drain wire
  The conductors of the cable are AWG26 annealed-copper strand wire, with a sheath 0.8 mm thick and an outer diameter of 6.7±0.3 mm
- Fire resistance : UL1581 VW-1
- Oil resistance : As per FANUC's internal standard (Equivalent to conventional oil-resistant electrical cable)
- Flex resistance : Million or more bending cycles with a bending radius of 50 mm (U-shaped bend test)
- UL style No. : AWM20276 (80°C/30V/VW-1)

NOTE
Use the TM21CP-88P(03) connector made by Hirose Electric Co., Ltd. to this cable.

About cable assemblies

Oki Electric Cable Co., Ltd. can offer a cable assembly that uses the TM21CP-88P(03) connector made by Hirose Electric Co., Ltd. To get this cable assembly, negotiate directly with the manufacturer on its specifications (cable length, shipping test, package, etc.).
Manufacturer: Oki Electric Cable Co., Ltd.

Connector specification

An 8-pin modular connector called the RJ-45 is used with a twisted-pair cable for Ethernet interfaces. Use the connector listed below or equivalent.

	Specification	Manufacturer	Remark
Connector used with cable AWG26 4P TPMC-C5-F(SB)	TM21CP-88P(03)	Hirose Electric Co., Ltd.	(*)

NOTE
About TM21CP-88P(03)
Connector (manufacturer's standard product)
Drawing number: A63L-0001-0823#P
Manufacturer: Hirose Electric Co., Ltd.
Manufacturer's model number: TM21CP-88P(03)
Complying with EIA/TIA 568A categories 3 and 5
Ask Hirose Electric Co., Ltd. for explanations about how to attach the connector to a cable.

(Hirose Electric Co., Ltd. offers the TM21CP-88P(03) Wiring Procedure Specification (Engineering Specification No. ATAD-E2367) to explain the related technical information.)

4.11.3 Electrical Noise Countermeasures

Separating signal lines

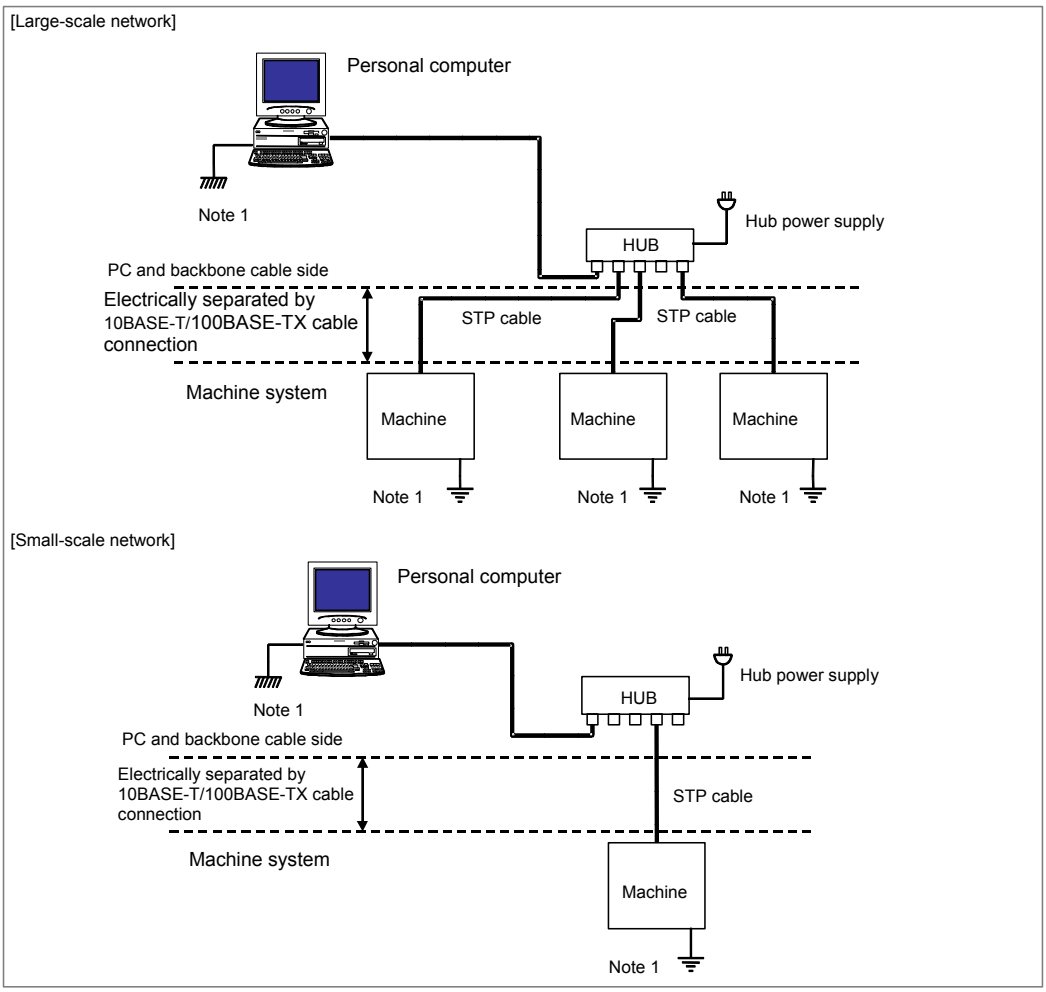
Ethernet cable wires belong to group C. See descriptions elsewhere for explanations about how to separate them from wires in group A or B.

Group	Signal line	Action
A	Primary AC power line	Bind the cables in group A separately (Note 1) from groups B and C, or cover group A with an electromagnetic shield (Note 2). Connect spark killers or diodes with the solenoid and relay.
	Secondary AC power line	
	AC/DC power lines (containing the power lines for the servo and spindle motors)	
	AC/DC solenoid	
	AC/DC relay	
B	DC solenoid (24VDC)	Connect diodes with DC solenoid and relay. Bind the cables in group B separately from group A, or cover group B with an electromagnetic shield. Separate group B as far from Group C as possible. It is more desirable to cover group B with the shield.
	DC relay (24VDC)	
	DI/DO cable between the I/O unit and power magnetics cabinet	
	DI/DO cable between the I/O unit and machine	
	24-VDC input power cables connected to the control unit and its peripherals	
C	Cable between the CNC and I/O Unit	Bind the cables in group C separately from group A, or cover group C with an electromagnetic shield. Separate group C as far from Group B as possible. Be sure to perform shield processing in Section 3.4.
	Cable for position and velocity feedback	
	Cable between the CNC and spindle amplifier	
	Cable for the position coder	
	Cable for the manual pulse generator	
	Cable between the CNC and the MDI (Note 3)	
	RS-232C and RS-422 interface cable	
	Cable for the battery	
	Other cables to be covered with the shield	

NOTE
1 The groups must be 10 cm or more apart from one another when binding the cables in each group.
2 The electromagnetic shield refers to shielding between groups with grounded steel plates.
3 The shield is not required when the cable between the CNC and MDI is shorter than 30 cm.

4.11.4 Grounding the Network

Even if the grounding condition on the machine side is satisfied, the communication line can pick up noise from the machine, depending on the machine installation condition and environment, thus resulting in a communication error. To protect against such noise, the machine should be separated and insulated from the Ethernet trunk cable and personal computer. Examples of connection are given below.

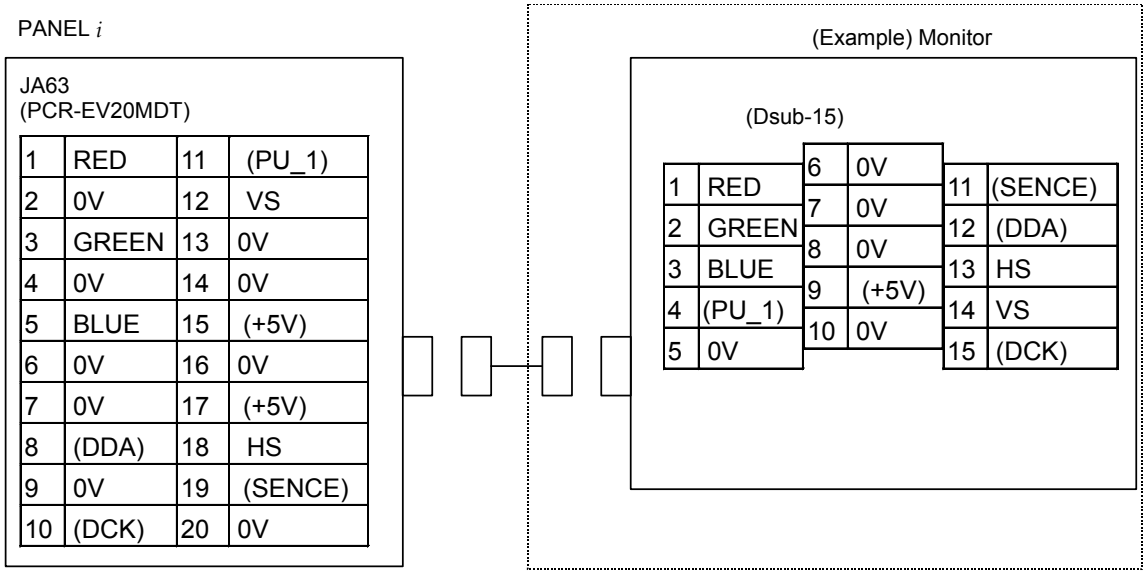


NOTE

1 Ground the PC and backbone cable separately from the machine system.
If this is impossible because there is only one grounding point, use separate grounding wires for the PC/backbone cable and the machine system up to the grounding point.
The grounding resistance must not be higher than 100 Ω (class 3 grounding).
The grounding wire must not be thinner than the AC power line conductor, and its cross-sectional area must not smaller than 5.5 mm^2.

2 There is possibility that noise makes the obstacle of communication even if the ground is separated using the 10BASE-T/100BASE-TX. In the case of using the FAST Ethernet board under the worst environment, please separate between the PC/Trunk line side and machine system side completely using the optical fiber media.

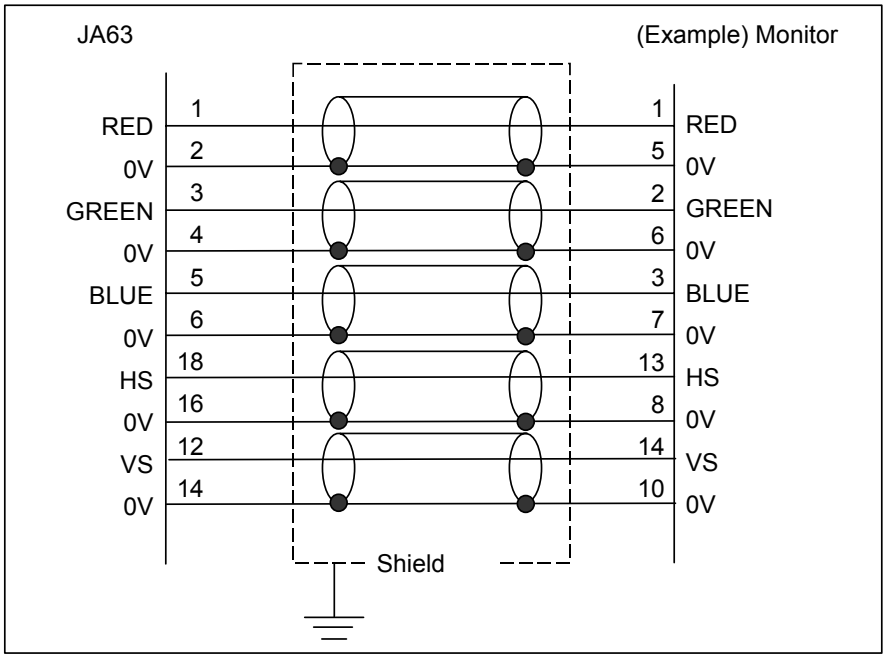
4.12 VIDEO PORT



1	RED	11	(PU_1)
2	0V	12	VS
3	GREEN	13	0V
4	0V	14	0V
5	BLUE	15	(+5V)
6	0V	16	0V
7	0V	17	(+5V)
8	(DDA)	18	HS
9	0V	19	(SENCE)
10	(DCK)	20	0V

1	RED	6	0V	11	(SENCE)
2	GREEN	7	0V	12	(DDA)
3	BLUE	8	0V	13	HS
4	(PU_1)	9	(+5V)	14	VS
5	0V	10	0V	15	(DCK)

Cable connection



Specification of the recommended cable conductor

A66L-0001-0371: Coaxial 5 conductors (when the signals in parentheses in the above figure need not be connected)

Recommended connector and housing for cable (JA63 side)

Connector	Housing	Manufacture
FI40B-20S	FI-20-CV5/6	Hirose Electric

Notes

(1) Use of this port does not require any special setting on the PANEL *i*.

(2) When an external monitor is connected to this port directly, the maximum cable length is 2 m if the above recommended cable is used.
To extend the cable beyond the maximum cable length, use a commercially available video extender. (Example: CAT5 KVM Extender manufactured by BLACK BOX)
In this case, the cable between the PANEL *i* and video extender should be as short as possible.

(3) The specifications for selecting a video extender are as follows:
Interface: Analog RGB
Resolution: XGA (1024 × 768 dots)
Vertical refresh rate: 60Hz

(4) When an external monitor is connected, the video quality varies significantly depending on the performance and power supply status of the external monitor, cable quality, noise environment, and so on. Sufficient checking should be made in the environment in which the monitor is actually used.

(5) The power to the external monitor and video extender must be supplied from other than the PANEL *i*.

(6) The above figure shows a sample interface on the monitor side. Design the cable according to the interfaces of the external monitor and video extender actually connected.

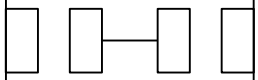
(7) The display on the monitor has the same resolution as that of the display on the LCD. For the 10.4" LCD type, the resolution is 640 by 480 dots; for the 12.1" LCD type, the resolution is 800 by 600 dots; for the 15.0" LCD type, the resolution is 1024 by 768 dots.

4.13 MDI (FOR 300*i*)

PANEL *i*

JA61
(PCR-EV20MDT)

1	*KEY00	11	*KEY01
2	*KEY02	12	*KEY03
3	*KEY04	13	*KEY05
4	*KEY06	14	*KEY07
5	*COM00	15	*COM01
6	*COM02	16	*COM03
7	*COM04	17	*COM05
8	*COM06	18	*COM07
9	*COM08	19	*COM09
10	*COM10	20	*COM11

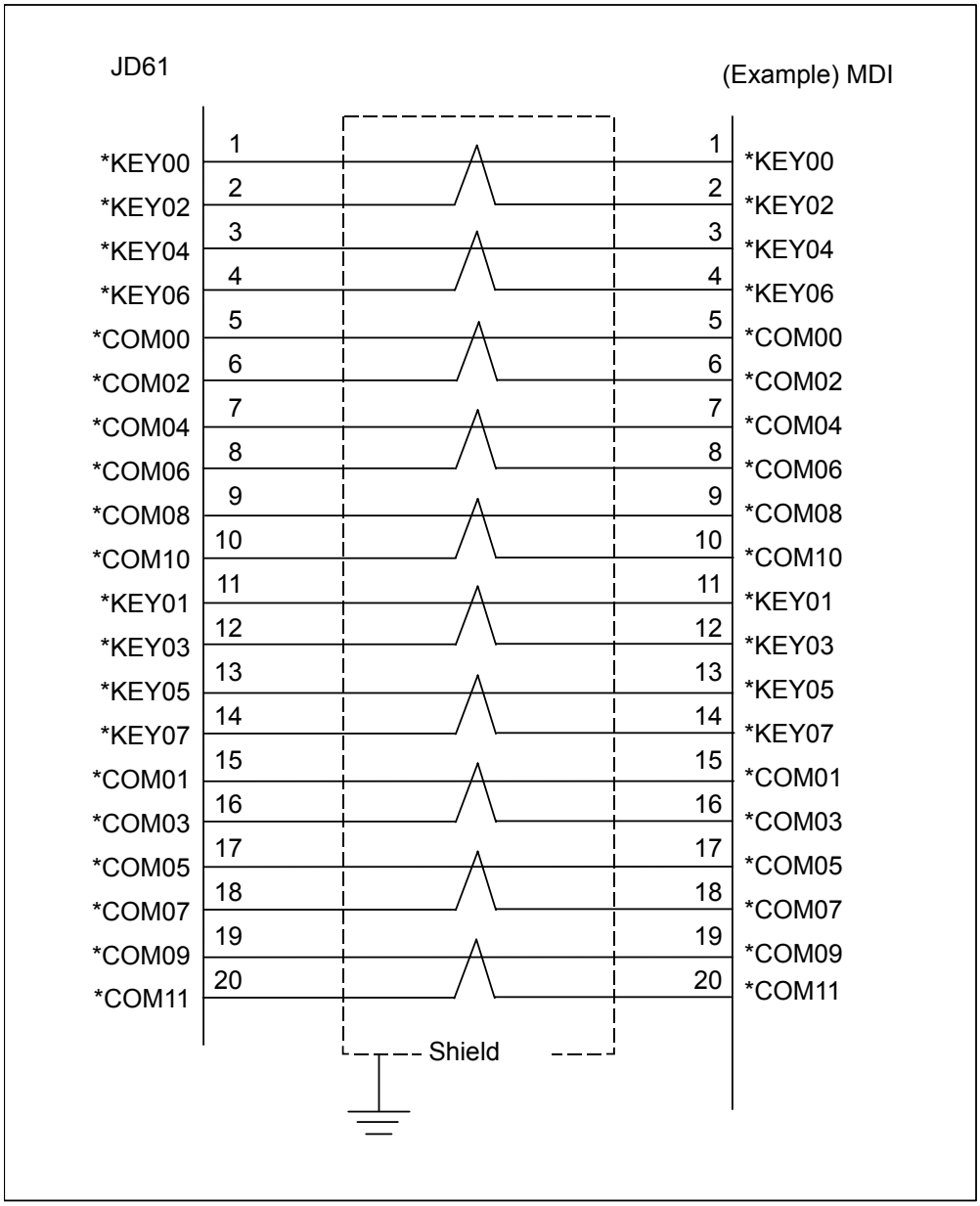


MDI

CK1
(PCR-E20MDK-SL-A)

1	*KEY00	11	*KEY01
2	*KEY02	12	*KEY03
3	*KEY04	13	*KEY05
4	*KEY06	14	*KEY07
5	*COM00	15	*COM01
6	*COM02	16	*COM03
7	*COM04	17	*COM05
8	*COM06	18	*COM07
9	*COM08	19	*COM09
10	*COM10	20	*COM11

Cable connection



Specification of the recommended cable conductor

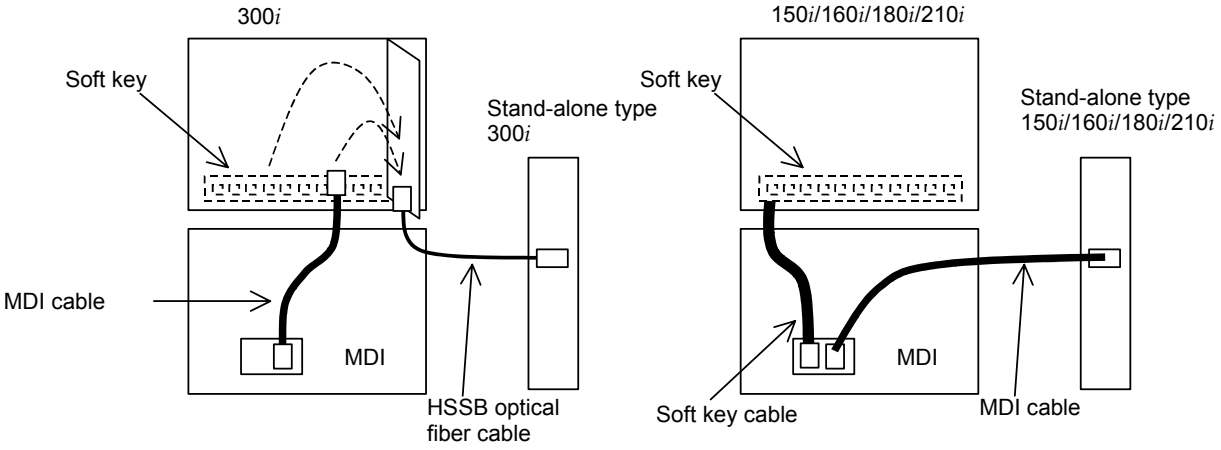
A66L-0001-0284#10P : $0.08mm^2 \times 10$ pairs

Recommended connector and housing for cable

Connector	Housing	Manufacture
PCR-E20FA	PCR-V20LA/PCS-E20LA	Honda Tsushin Kogyo
FI30-20S	FI-20-CV2/FI-20-CV7	Hirose Electric
FCN-247J020-G/E	FCN-240C020-Y/S	Fujitsu
52622-2011	52624-2015	Molex Japan

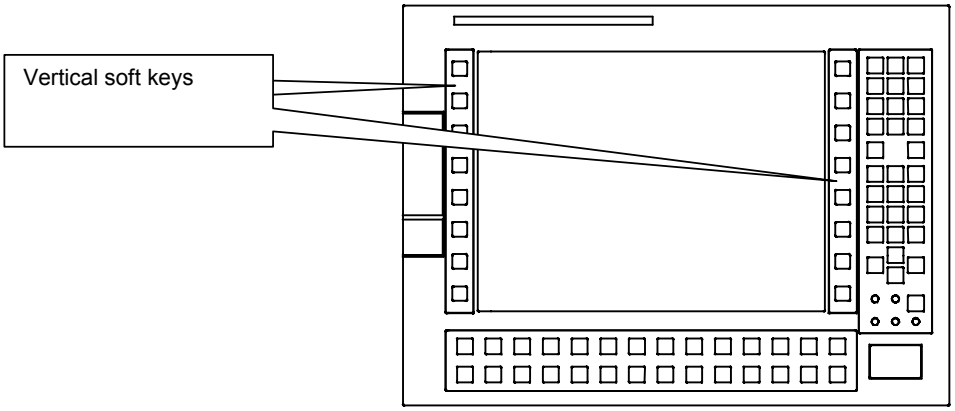
MDI connection to CNC

In case of 300*i*, the soft key is connected internally and MDI signals are connected to CNC via HSSB.

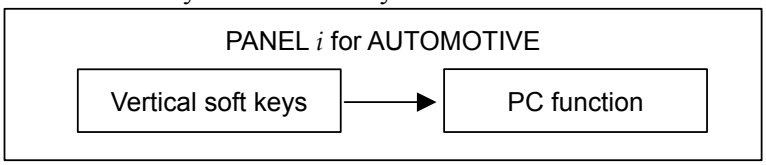


4.14 CONVERSION OF VERTICAL SOFT KEYS AND I/O LINK

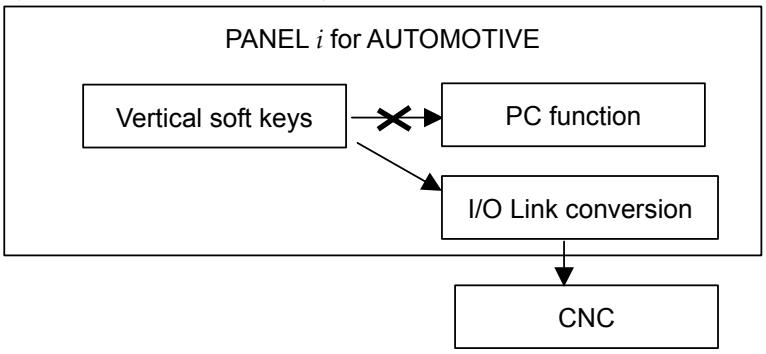
Vertical soft keys can be read from CNC directly via I/O Link if the PANEL *i* for AUTOMOTIVE have I/O Link conversion function.
It depends on the specification of the unit the way of connection to vertical soft keys.



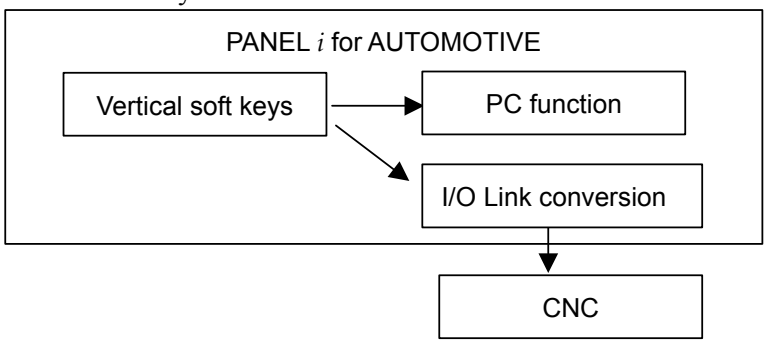
a. No I/O Link conversion function
(A08B-0084-B400~3,-B422,-B423,
A13B-0196-B400~3,-B422,-B423)
Vertical soft keys are usable only in PC.



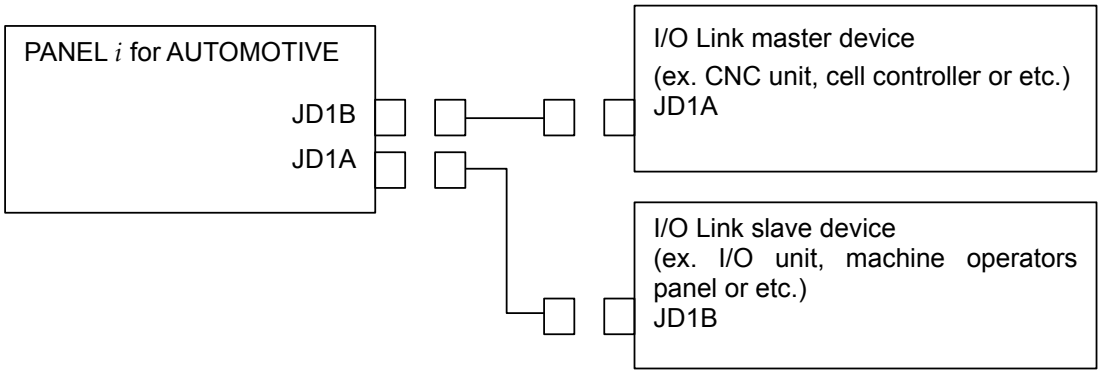
b. With I/O Link conversion function (A08B-0084-B410~1,
A13B-0196-B410~1)
Vertical soft keys are usable only in CNC. Not usable in PC.
(These can not be ordered.)



c. With I/O Link conversion function
(A08B-0084-B412~3,-B432,-B433,
A13B-0196-B412~3,-B432,-B433)
Vertical soft keys are usable both in CNC and in PC.



Connection to CNC or I/O link device



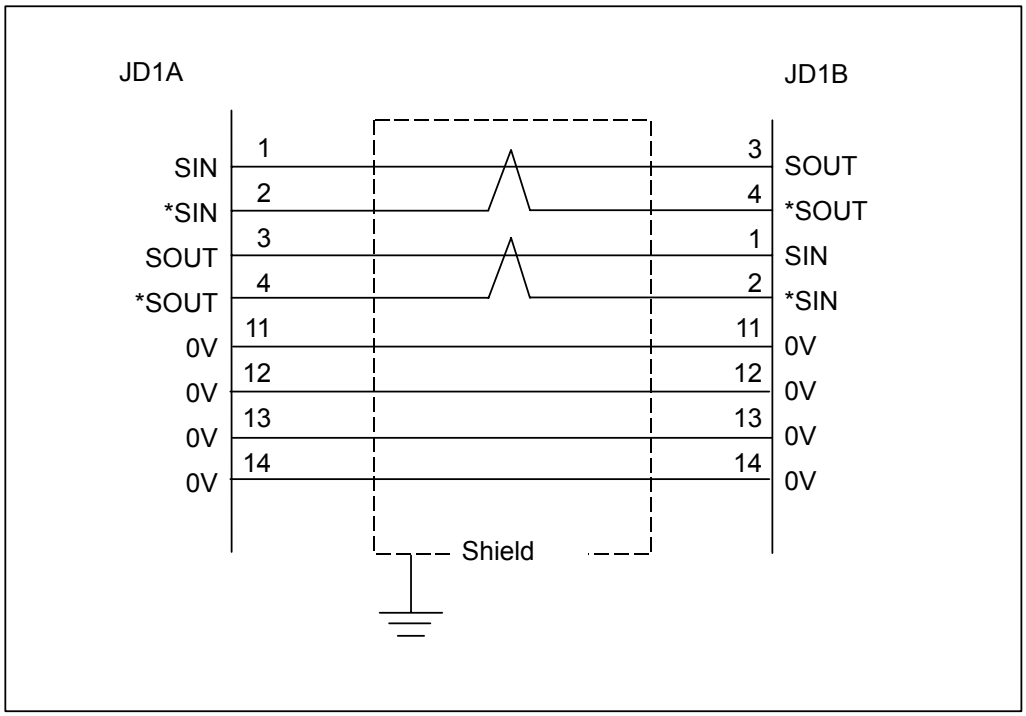
JD1A
(PCR-E20MDA)

1	SIN	11	0V
2	*SIN	12	0V
3	SOUT	13	0V
4	*SOUT	14	0V
5	(Reserve)	15	(Reserve)
6	(Reserve)	16	(Reserve)
7	(Reserve)	17	(Reserve)
8	(Reserve)	18	(Reserve)
9	(Reserve)	19	(Reserve)
10	(Reserve)	20	(Reserve)

JD1B
(PCR-E20MDA)

1	SIN	11	0V
2	*SIN	12	0V
3	SOUT	13	0V
4	*SOUT	14	0V
5	(Reserve)	15	(Reserve)
6	(Reserve)	16	(Reserve)
7	(Reserve)	17	(Reserve)
8	(Reserve)	18	(Reserve)
9	(Reserve)	19	(Reserve)
10	(Reserve)	20	(Reserve)

Cable connection



NOTE
1 Do not connect the (Reserve) pins.
2 Make sure to use twisted pair wires for signal SIN and *SIN, and signals SOUT and *SOUT.
3 Shielding wires should be connected to ground at the JD1A side.
4 Maximum cable length = 10m.

Recommended cable material

A66L-0001-0284#10P: 0.08mm^2 × 10 pairs

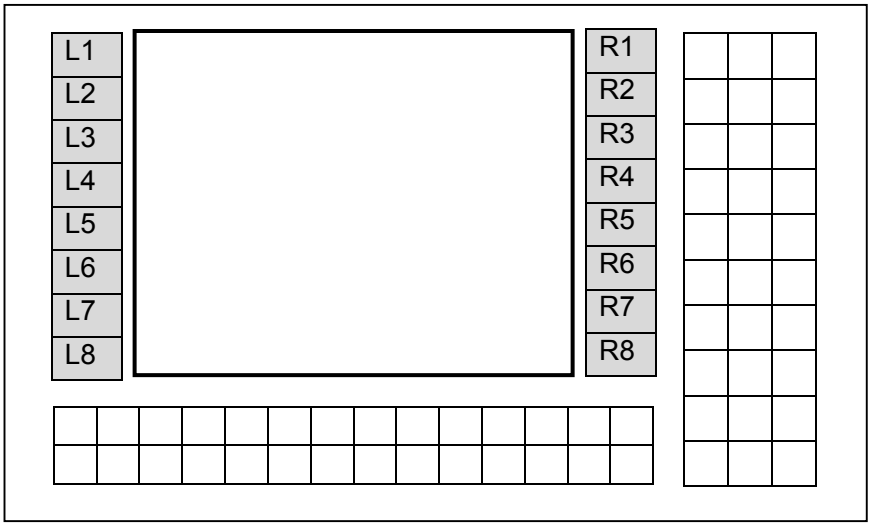
Recommended connector and housing for cable

Connector	Housing	Manufacture
PCR-E20FA	PCR-V20LA/PCS-E20LA	Honda Tsushin Kogyo
FI30-20S	FI-20-CV2/FI-20-CV7	Hirose Electric
FCN-247J020-G/E	FCN-240C020-Y/S	Fujitsu
52622-2011	52624-2015	Molex Japan

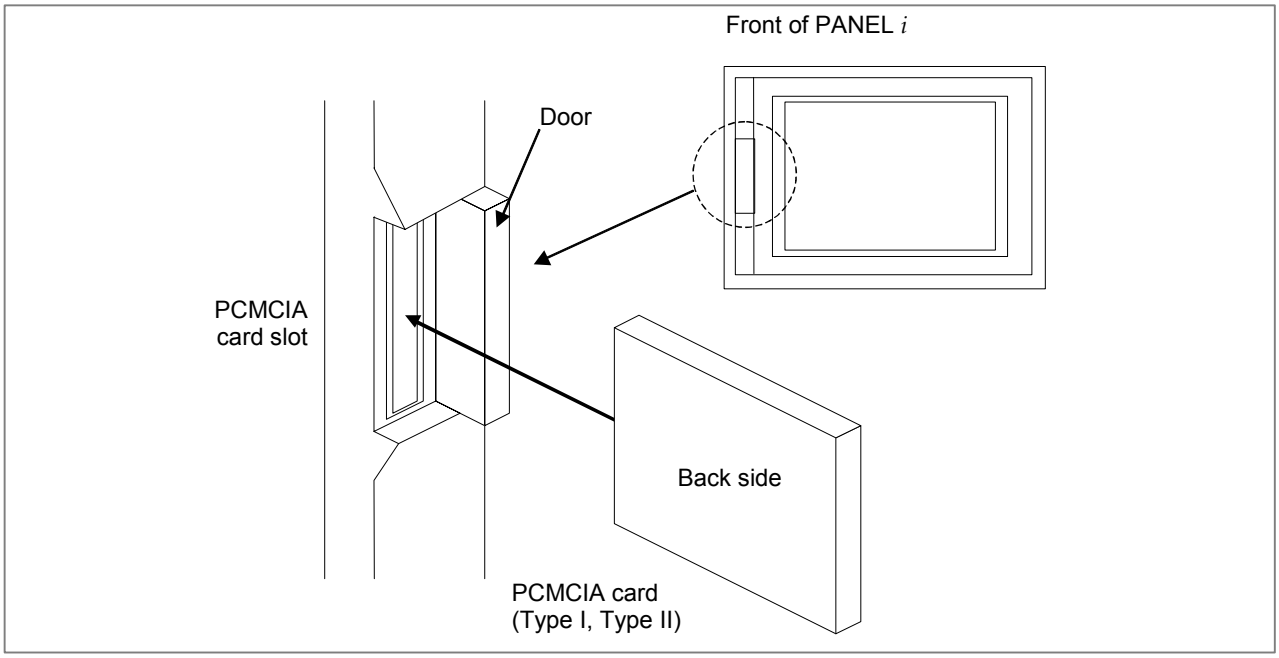
Assinment of vertical softkeys to I/O Link

Assign 2 bytes input on the I/O Link. (Assign name : /2)
DI address of soft keys are as follows in assignment from Xm.

address \ bit	7	6	5	4	3	2	1	0
Xm+0	L8	L7	L6	L5	L4	L3	L2	L1
Xm+1	R8	R7	R6	R5	R4	R3	R2	R1



4.15 PCMCIA CARD



NOTE
1 Only Type I or Type II PCMCIA card is usable. The following card cannot be used.
- Card-bus card
- Dual mode card (Card-bus mode/PCMCIA mode) with Card-bus mode
- Type III card

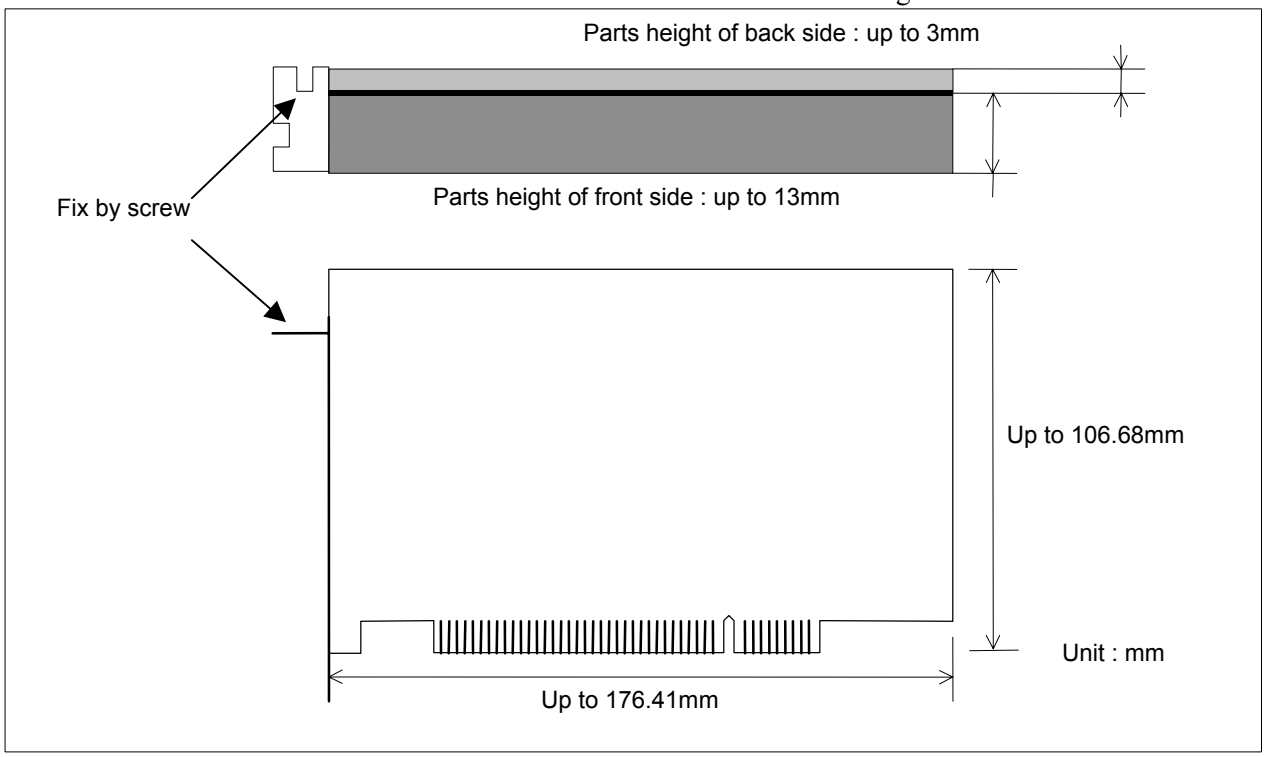
2 Care about the direction of the card, and insert certainly.

⚠ **CAUTION**
If the door is opened, dust or coolant would enter and might cause any troubles. Please pay attention.

5 METHOD OF MOUNTING PCI EXTENSION BOARD

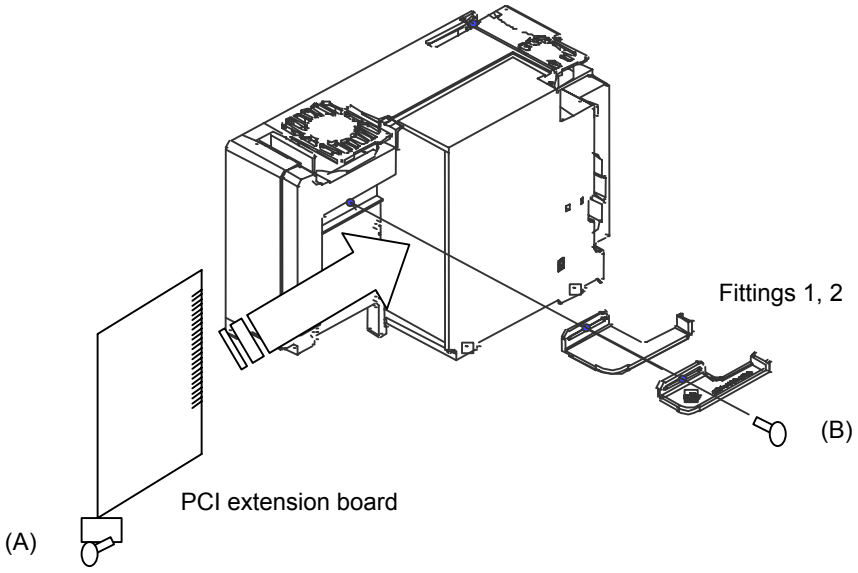
5.1 USABLE BOARD

The size of usable board on the PANEL *i* is defined as below figure, and one or two boards can be mounting on the PANEL *i*.



5.2 METHOD OF MOUNTING PCI EXTENSION BOARD

(1) Release vibration-proof fittings 1, 2 by loosening the screw at point (B).
(2) Push the board fully into the PCI connector.
(3) Tighten the screw at point (A).
(4) Press down vibration-proof fittings to the PCI extension board and tighten the screw at point (B).



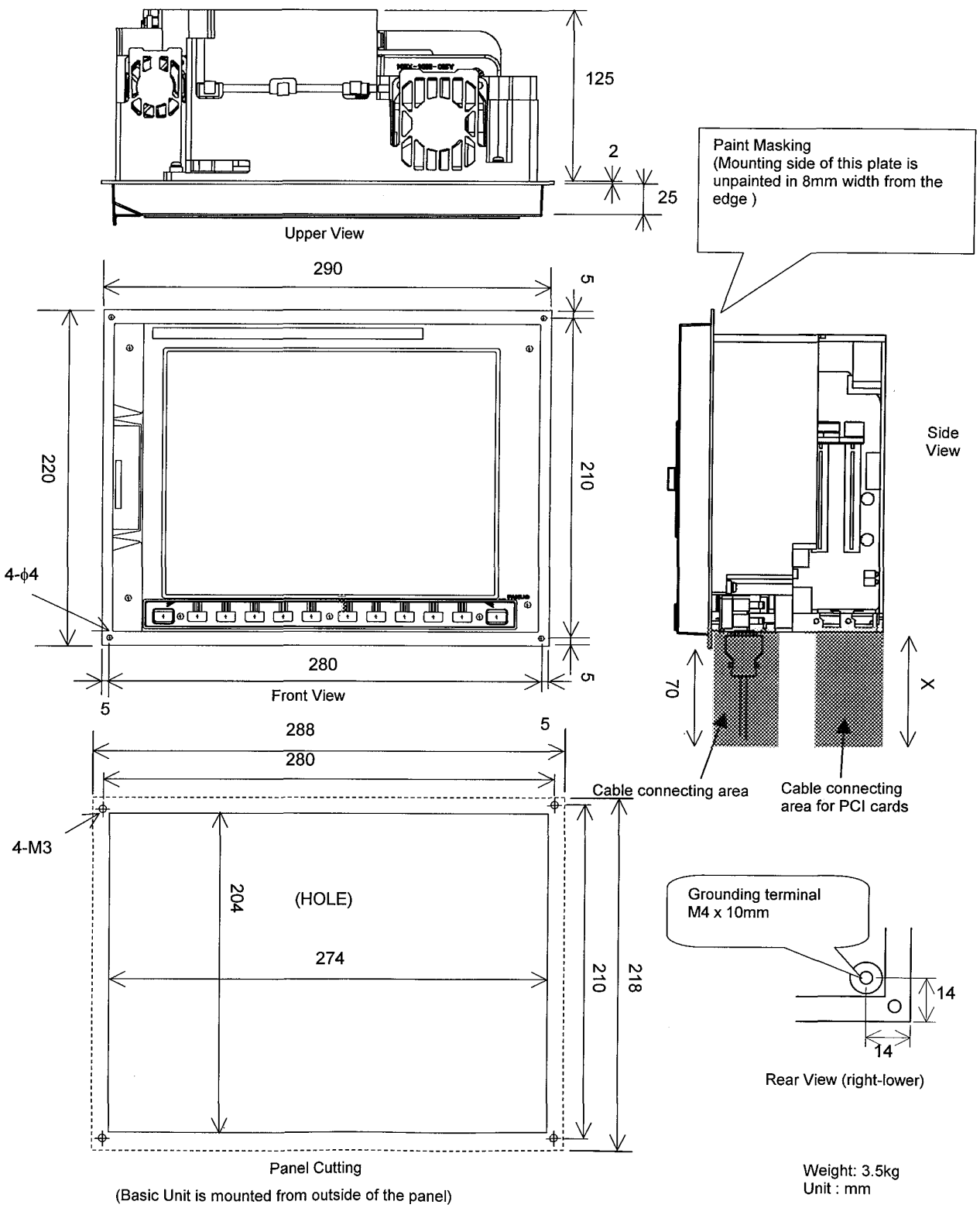
5.3 CONDITIONS FOR THE INSTALLATION ENVIRONMENT OF A PCI EXTENSION BOARD

For the conditions for the installation environment of a PCI extension board, see the specifications of the PCI extension board. If the specifications of the PCI extension board are stricter than the conditions described in Section 2.2, "Installation Environmental Conditions", the conditions for the installation environment of the PANEL *i* are restricted to the conditions for the PCI extension board accordingly.

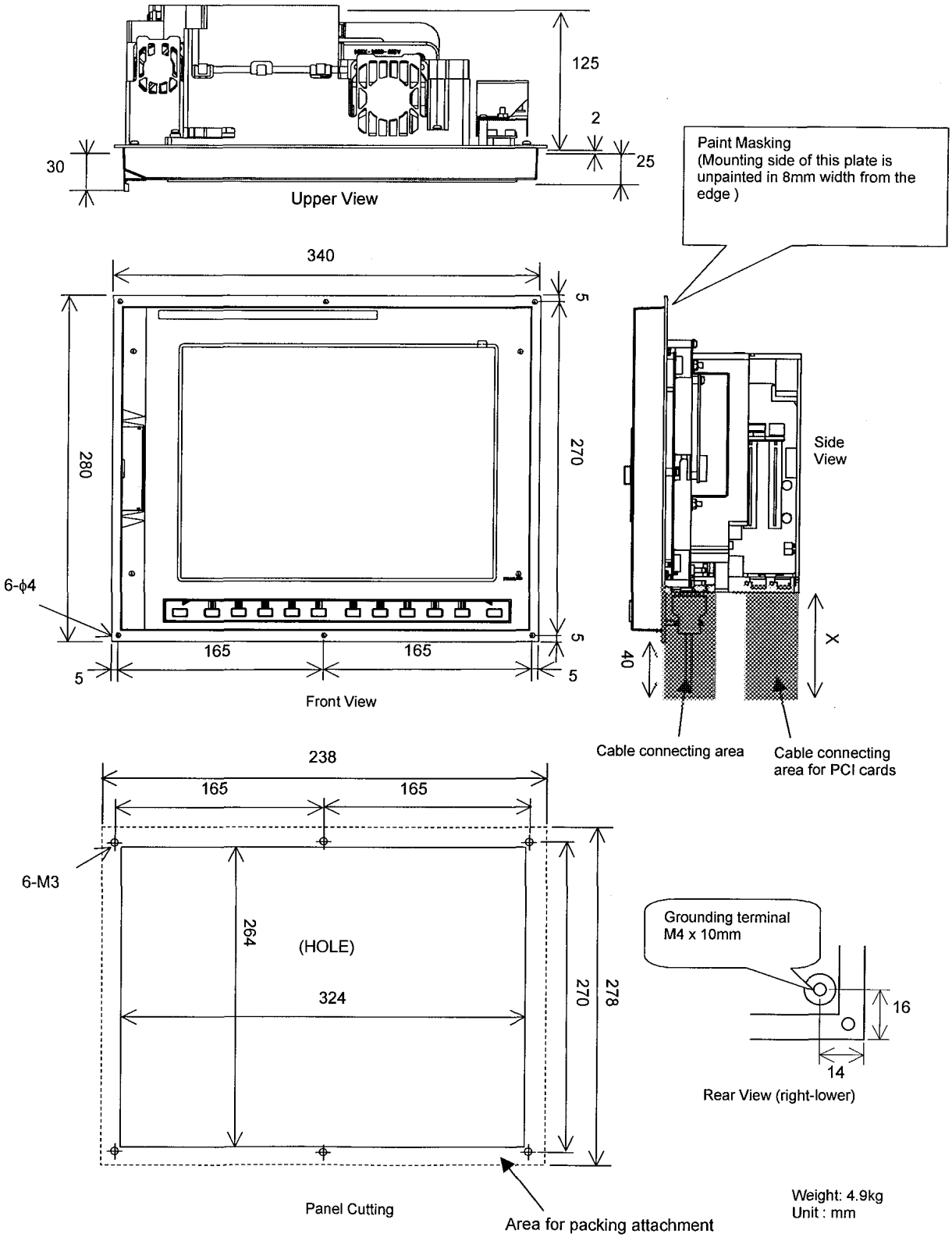
NOTE
FANUC cannot take any responsibility for a guarantee of operation, troubles during use, and maintenance when PCI extension boards are used.

6 OUTLINE DRAWINGS

6.1 BASIC UNIT 10.4" LCD TYPE FOR 150*i*/160*i*/180*i*/210*i*

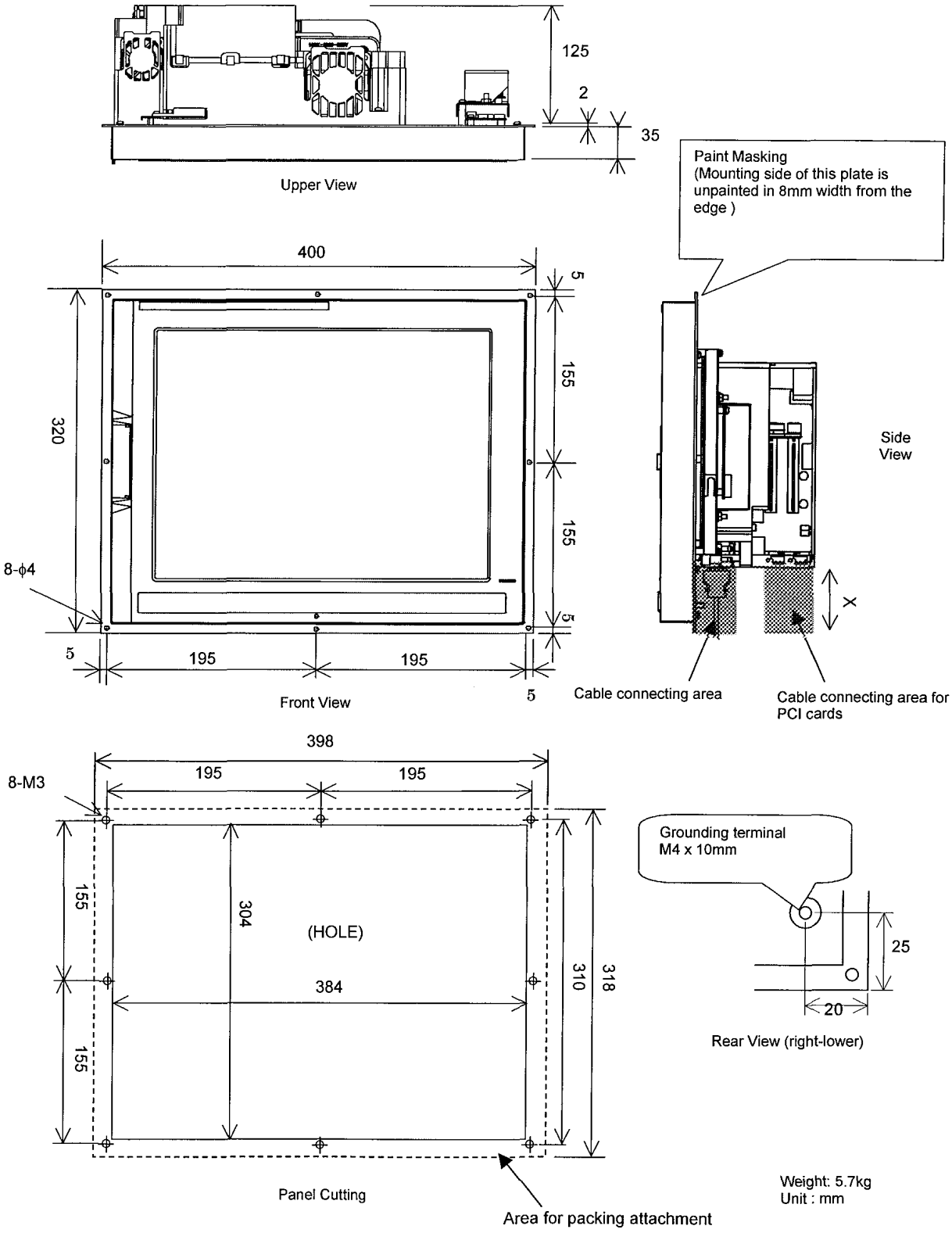


6.2 BASIC UNIT 12.1" LCD TYPE FOR 150*i*/160*i*/180*i*/210*i*



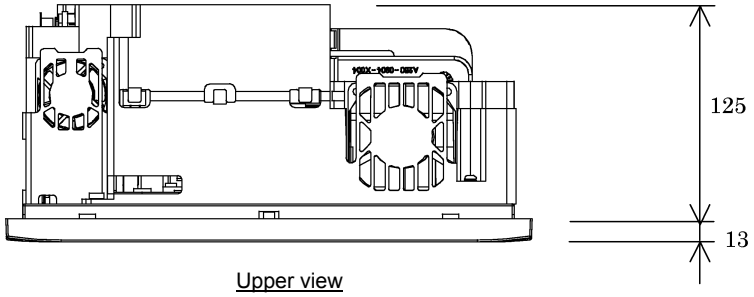
(Basic Unit is mounted from outside of the panel)

6.3 BASIC UNIT 15.0" LCD TYPE FOR 150*i*/160*i*/180*i*/210*i*



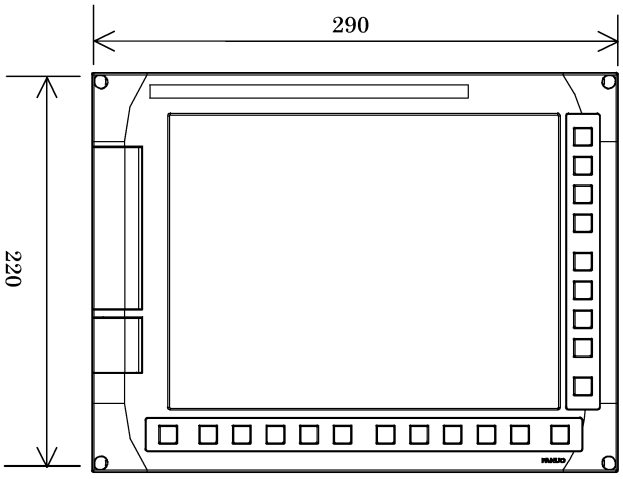
(Basic Unit is mounted from outside of the panel)

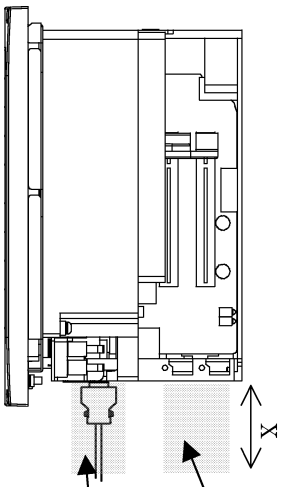
6.4 BASIC UNIT 10.4” LCD TYPE FOR 300*i*



Upper view

Front view

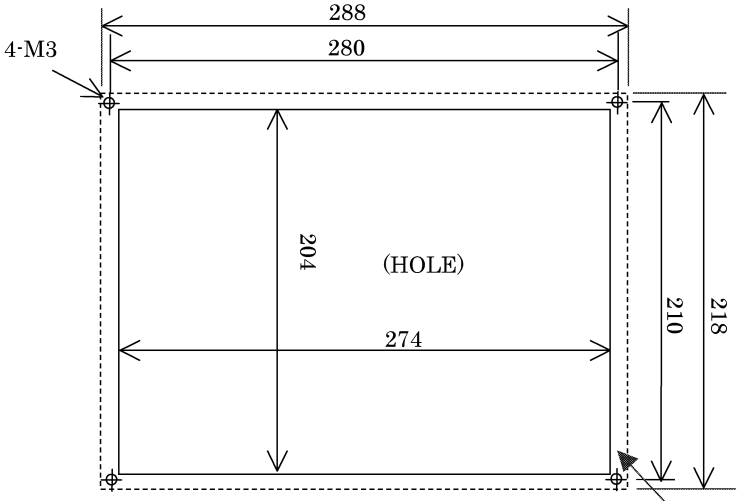




Side view

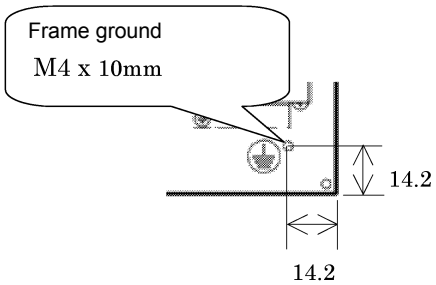
PCI card cable connection area

Cable connection area



Panel cut drawing

(Screw the unit from the outside of the cabinet then attach a cap to the screw holes.)

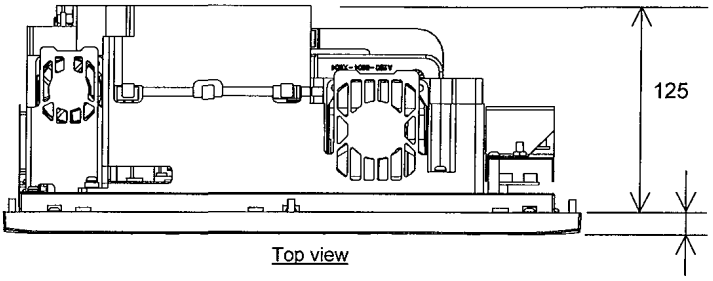


Drawing of the lower-right corner on the rear

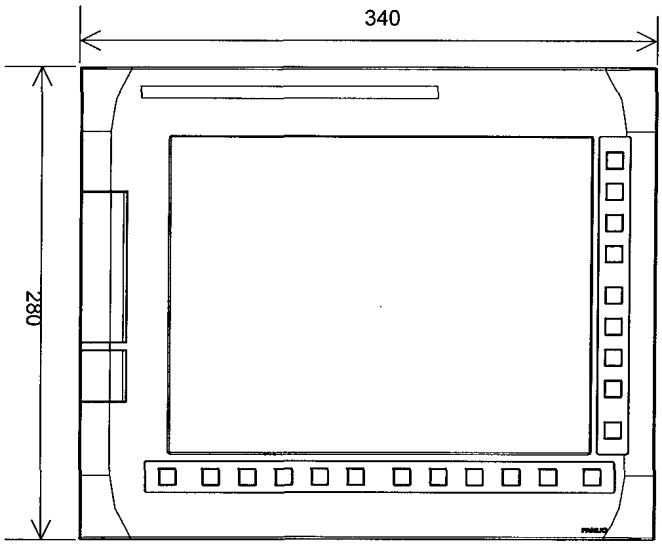
Area for packing attachment

Weight: 3.5 kg
(Unit: mm)

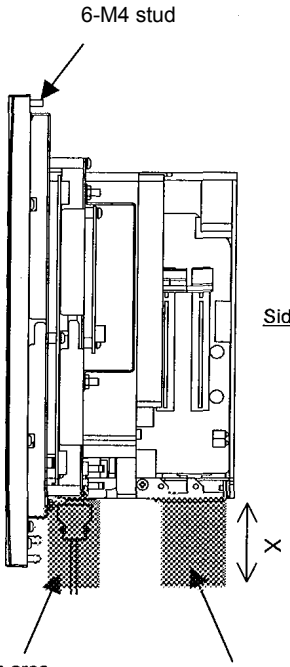
6.5 BASIC UNIT 12.1" LCD TYPE FOR 300*i*



Top view



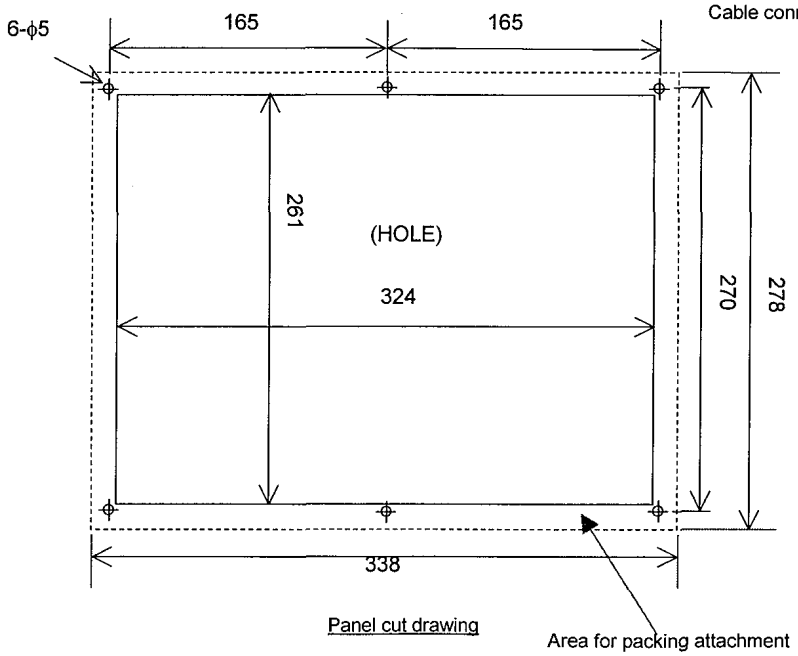
Front view



Side view

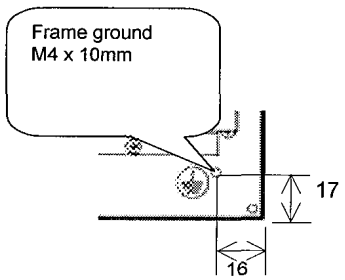
Cable connection area

PCI card cable connection area



Panel cut drawing

Area for packing attachment

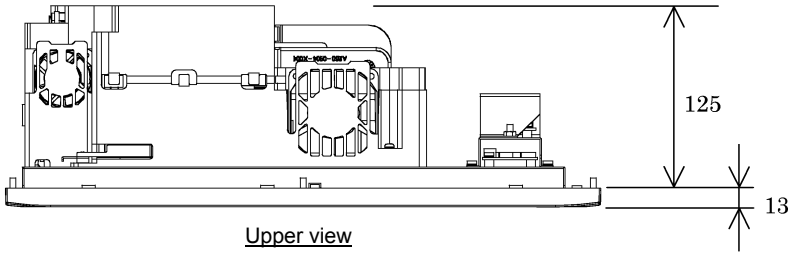


Drawing of the lower-right corner on the rear

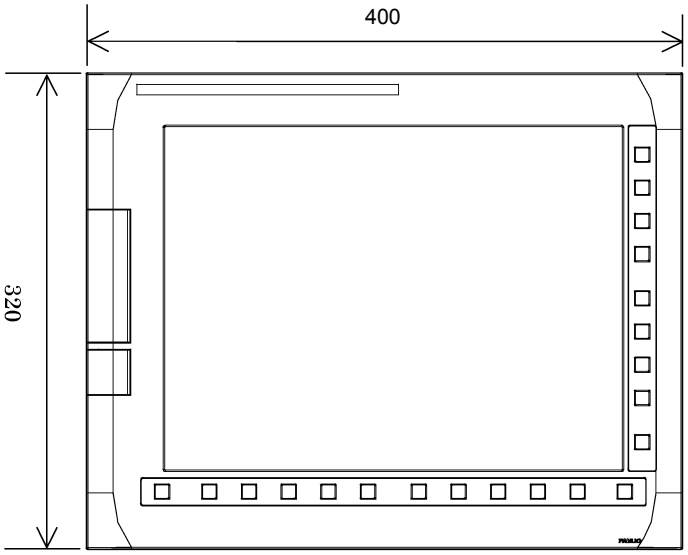
Weight: 4.3 kg
(Unit: mm)

(Screw the unit from the outside of the cabinet then attach a cap to the screw holes.)

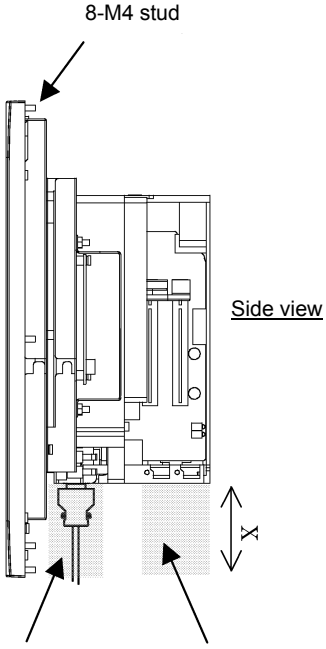
6.6 BASIC UNIT 15.0" LCD TYPE FOR 300*i*



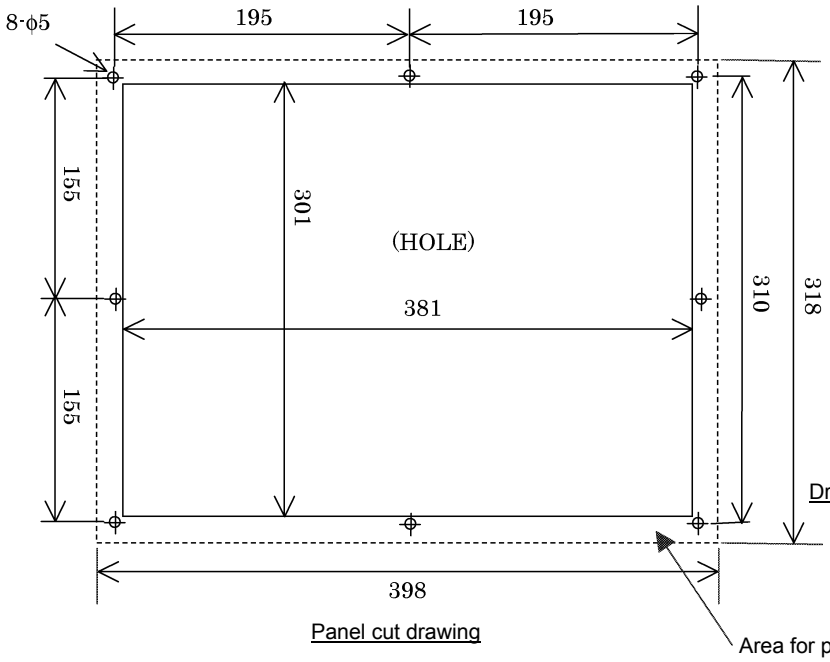
Upper view



Front view

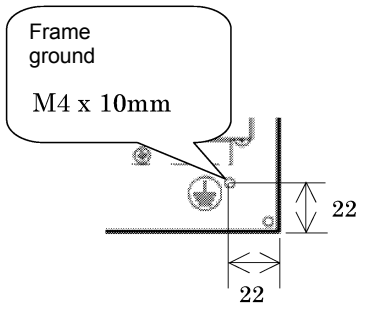


Side view



Panel cut drawing

(Mount the unit onto the outside of the cabinet then secure the unit with nuts from the inside.)

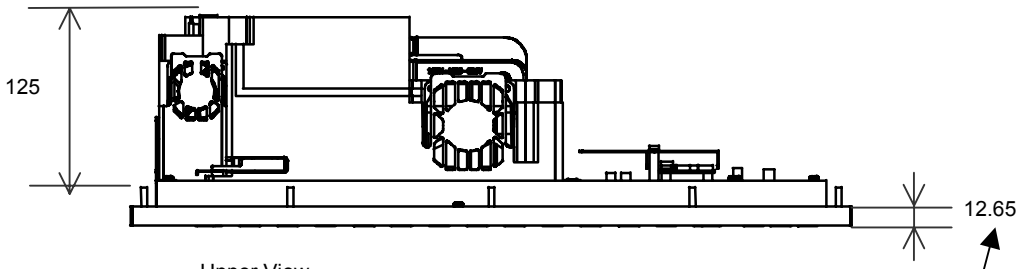


Drawing of the lower-right corner on the rear

Area for packing attachment

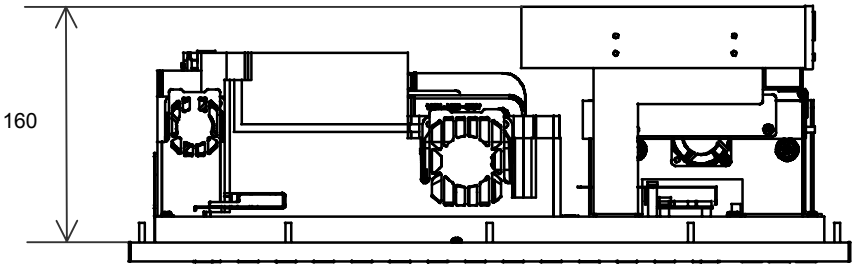
Weight: 5.1 kg
(Unit: mm)

6.7 BASIC UNIT (PANEL *i* for AUTOMOTIVE)

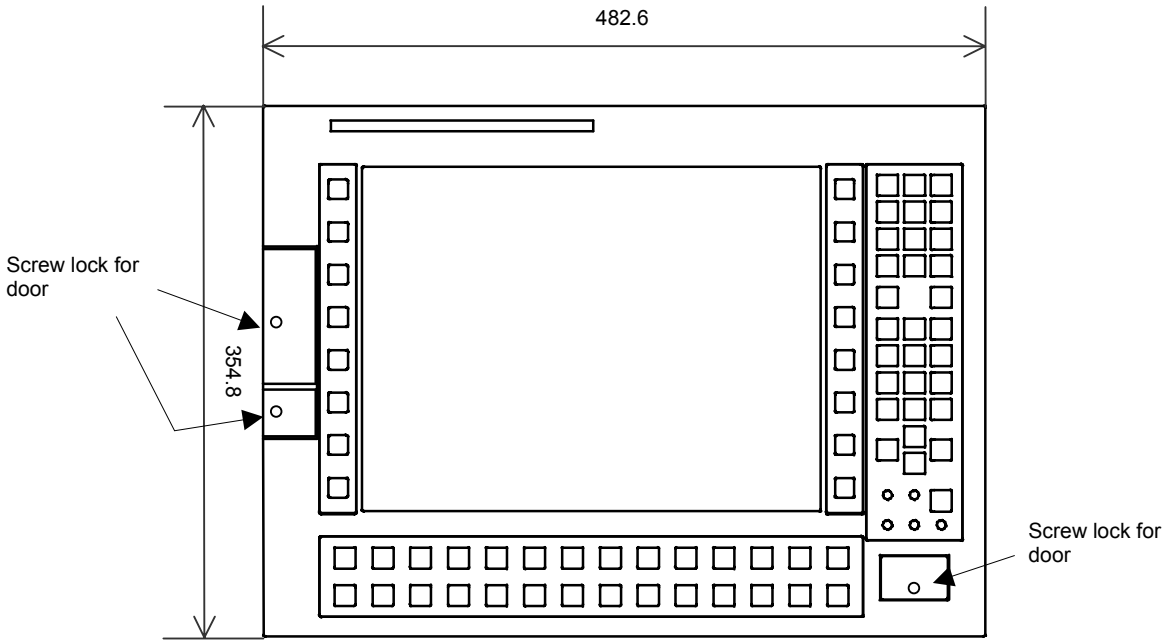


Upper View
(Without FDD&CD-ROM Drive Unit)

This size is 20mm at the screw of the doors of PCMCIA slot and USB interface.



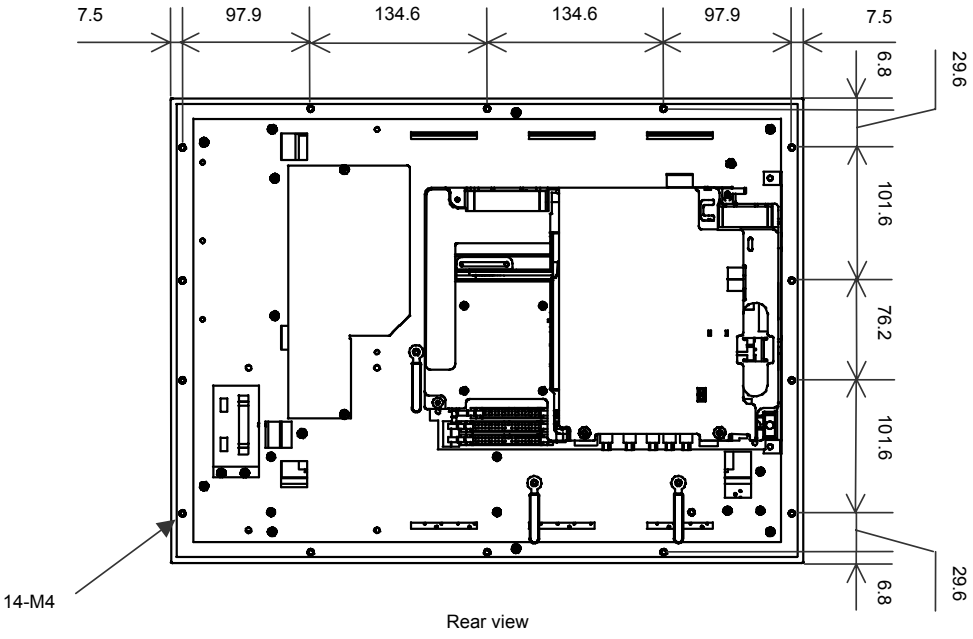
Upper View
(With FDD&CD-ROM Drive Unit)



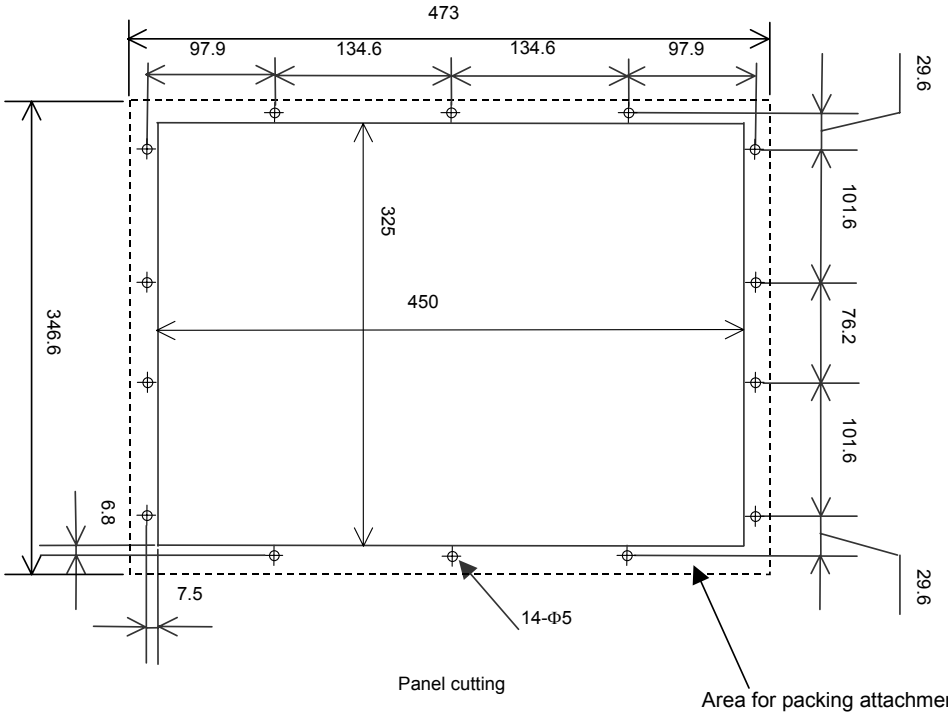
Front View

Weight : 10kg
(Unit : mm)

There is no screw lock for doors in A08B-0084-B400~1, B410~1, A13B-0196-B400~1, B410~1.



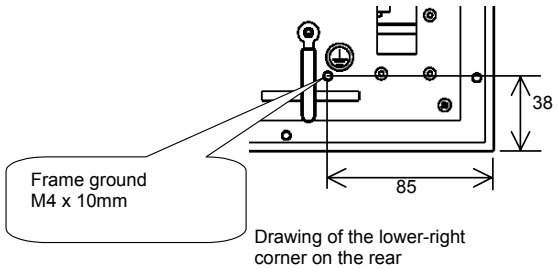
Rear view



Panel cutting

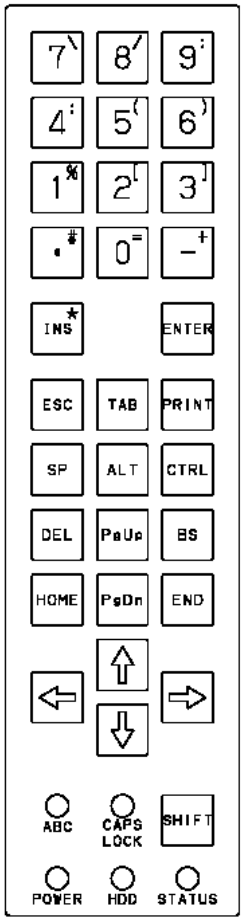
Area for packing attachment

(Mount the unit from the outside of the cabinet and secure it from the inside with nuts.)

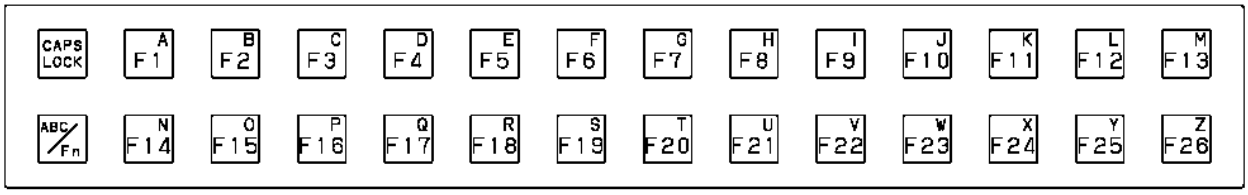


Drawing of the lower-right corner on the rear

Details of the vertical key sheet

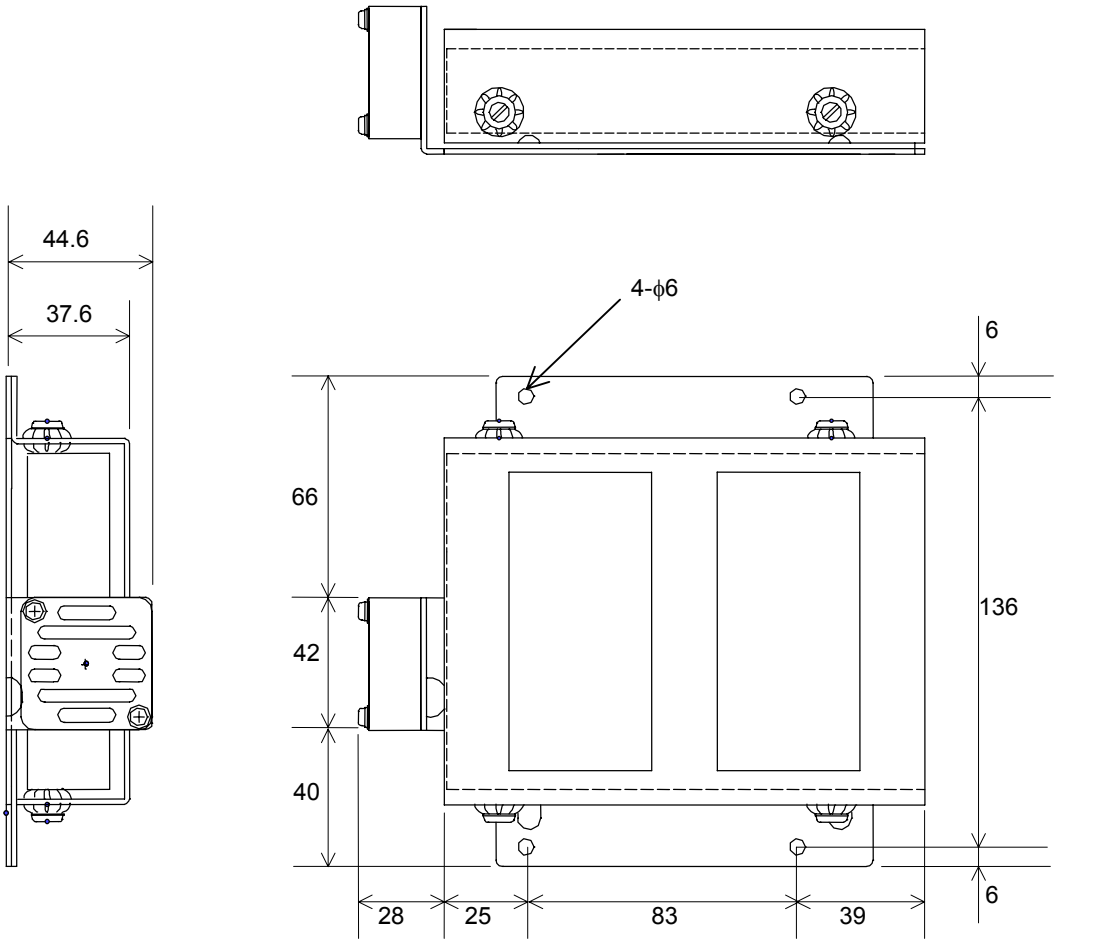


Details of the horizontal key sheet



6.8 HARD DISK DRIVE UNIT A (FOR 150*i*/160*i*/180*i*/210*i* AND 300*i*)

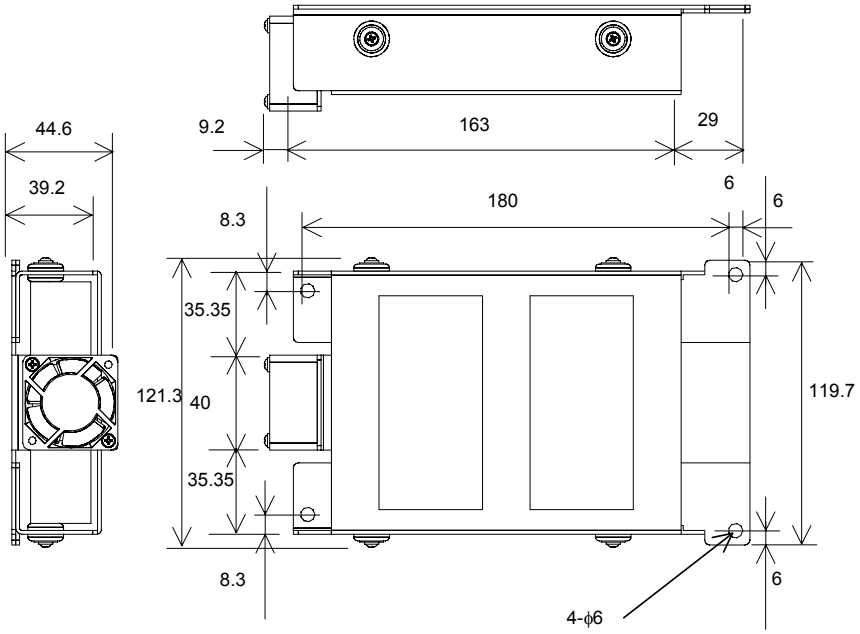
A08B-0084-H100



Weight: 1.1 kg
(Unit: mm)

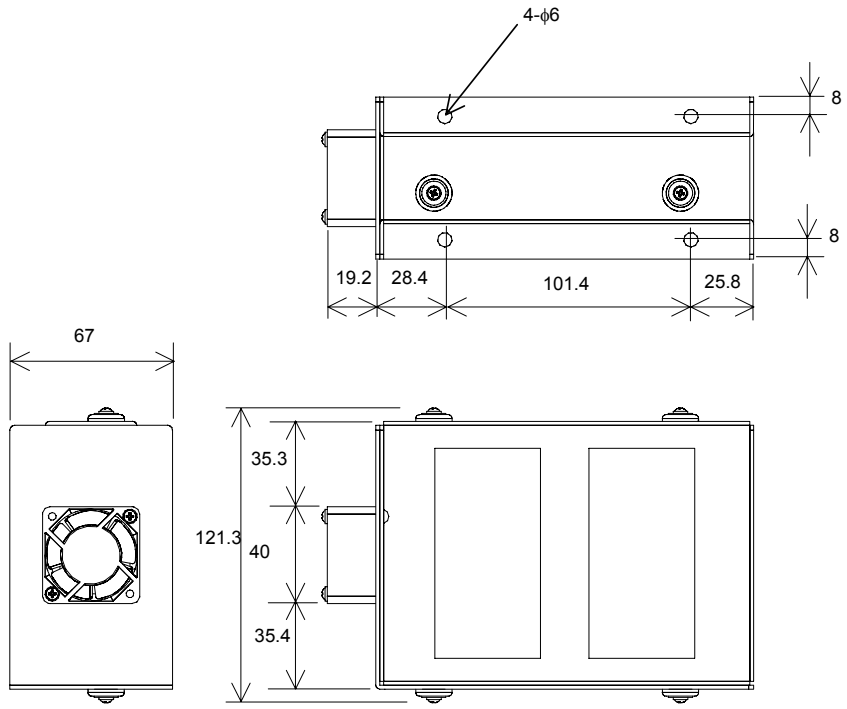
6.9 HARD DISK DRIVE UNIT B, C (FOR 300*i*)

A08B-0084-H130



Weight: 1.1 kg
(Unit: mm)

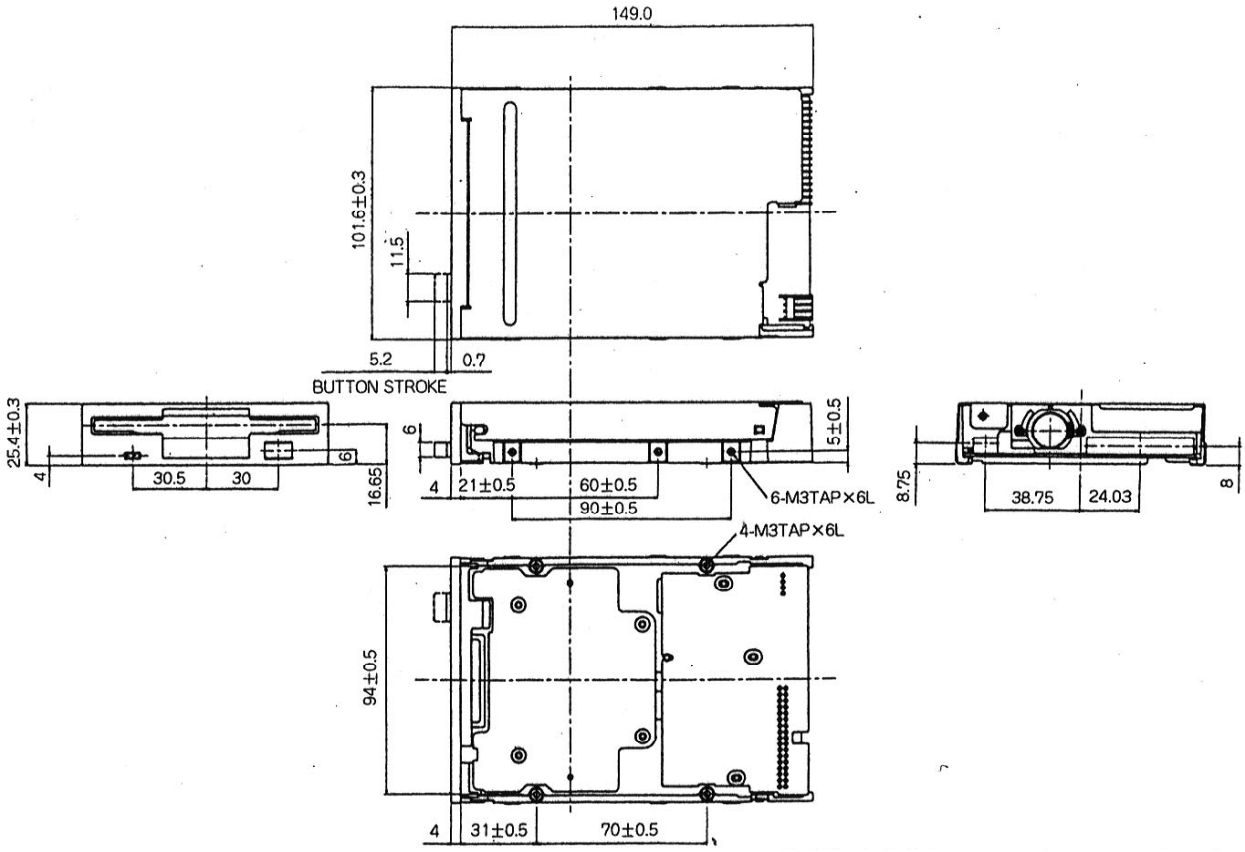
A08B-0084-H131



Weight: 1.2 kg
(Unit: mm)

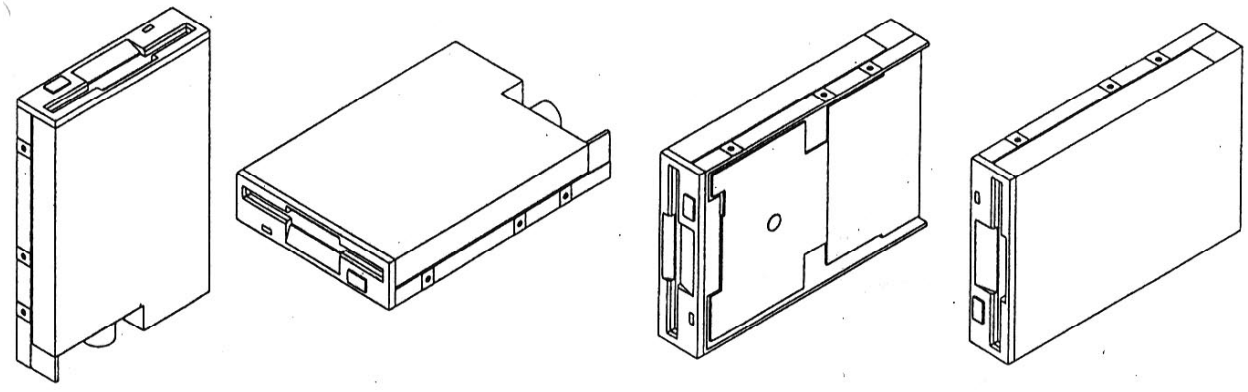
6.10 FLOPPY DISK DRIVE

A08B-0084-K001



The tolerance shall be ±1.0 unless otherwise specified.
(Unit: mm)

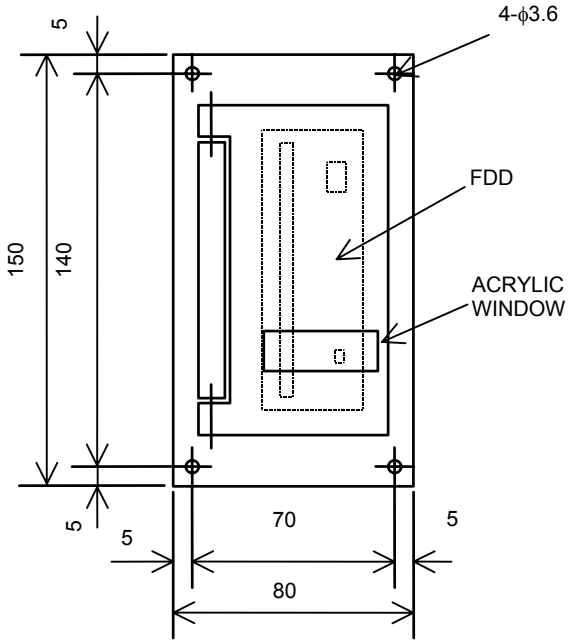
Fig. 6.9(a) External View



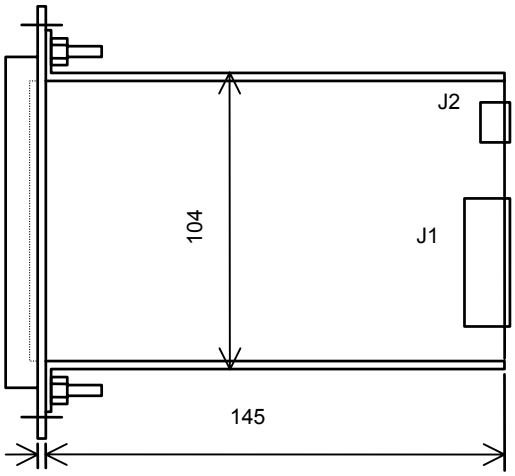
Weight: 0.4Kg
Unit: mm

Fig. 6.9(b) Installation Orientations

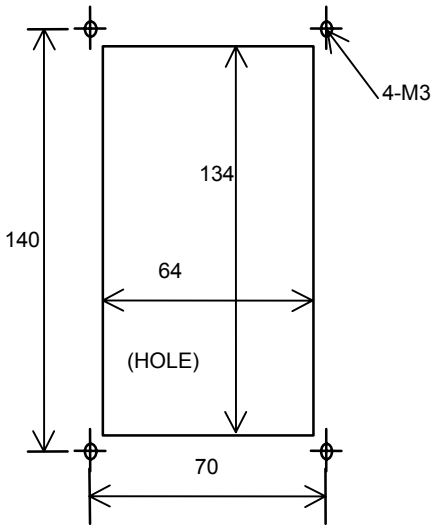
A02B-0207-C009



Front View



Side view

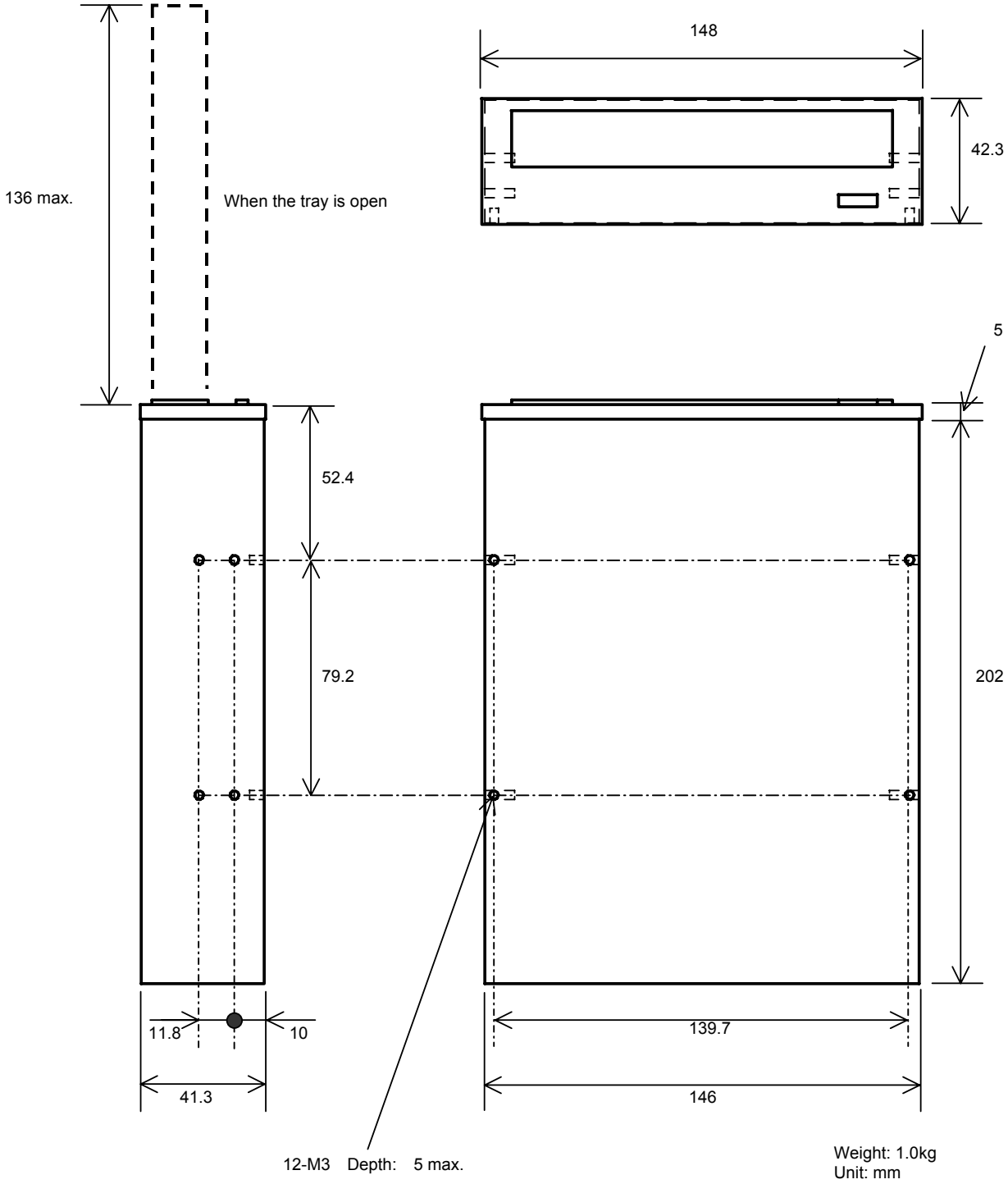


Panel Cutting

Weight: 0.8Kg
Unit: mm

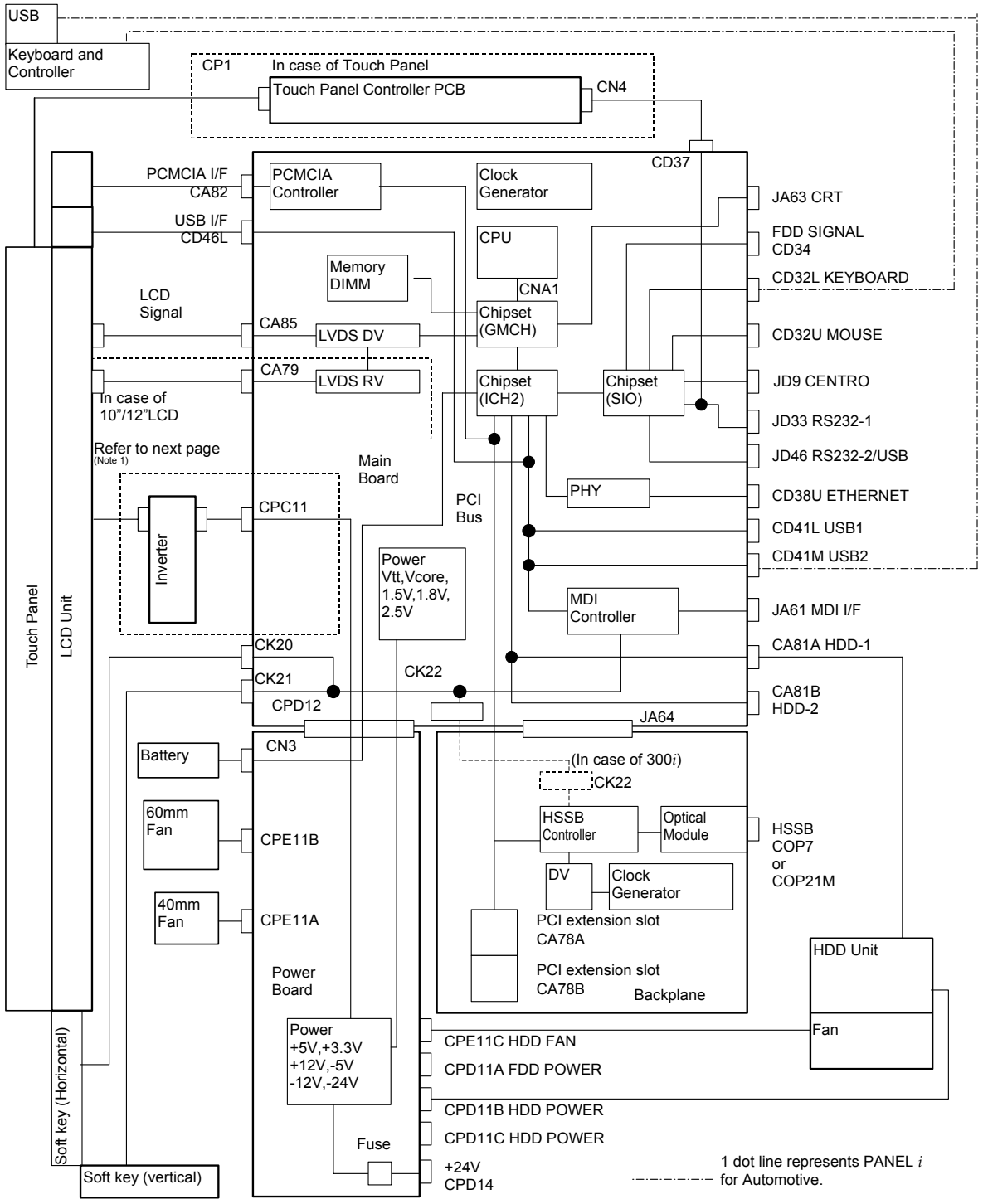
6.11 CD-ROM DRIVE

A08B-0084-K010



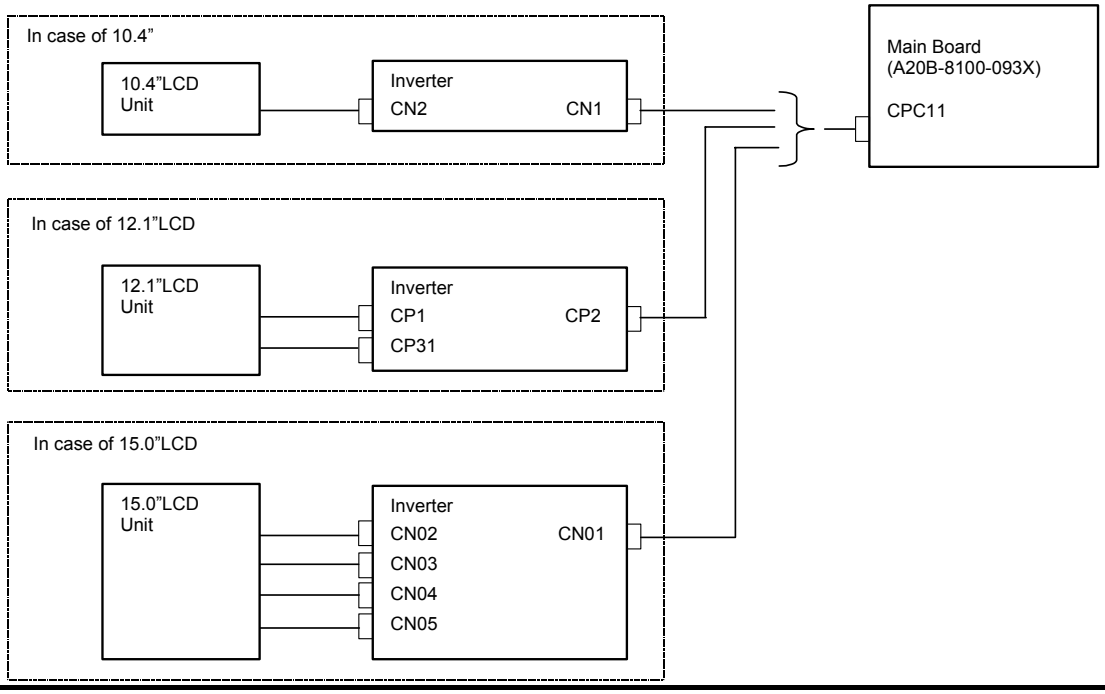
II. MAINTENANCE

1 SYSTEM BLOCK DIAGRAM



NOTE

1 Detail of Inverter



2 LIST OF THE PCBS, UNITS, MAINTENANCE SUPPLIES AND TOOLS

2.1 LIST OF PCBS

2.1.1 Main PCB

CNC	Unit	LCD type	Specification of Main PCB	Applied Basic Unit
160*i* /180*i* /210*i*	PANEL *i*	10.4"/12.1"	A20B-8100-0930	A08B-0084-B001~4, -B011~4 A13B-0196-B001~4, -B011~4
		15.0"	A20B-8100-0931	A08B-0084-B021, -B023 A13B-0196-B021, -B023
	PANEL *i* for Automotive	15.0"	A20B-8100-0934	A08B-0084-B400~3, -B410~3 A13B-0196-B400~3, -B410~3
300*i*	PANEL *i*	10.4"/12.1"	A20B-8100-0935	A08B-0084-B501~4, -B511~4 A13B-0196-B502, -B504 A13B-0196-B512, -B514
		15.0"	A20B-8100-0936	A08B-0084-B521~4 A13B-0196-B522, -B524
	PANEL *i* for Automotive	15.0"		A08B-0084-B422~3, -B432~3 A13B-0196-B422~3, -B432~3

2.1.2 Backplane PCB

CNC	Specification of Backplane PCB	Applied Basic Unit	
160*i* /180*i* /210*i*	A20B-8002-0250	A08B-0084-B001~4 A08B-0084-B011~4 A08B-0084-B021, -B023 A08B-0084-B400~3, -B410~3	A13B-0196-B001~4 A13B-0196-B011~4 A13B-0196-B021, -B023 A13B-0196-B400~3, -B410~3
300*i*	A20B-8002-0330	A08B-0084-B422~3, -B432~3 A08B-0084-B501~4 A08B-0084-B521~4	A13B-0196-B422~3, -B432~3 A13B-0196-B502, -B504 A13B-0196-B522, -B524

2.1.3 Inverter PCB

LCD type	Specification of Inverter PCB	Applied Basic Unit	
10.4"	A14L-0132-0001#A	A08B-0084-B001~4 A08B-0084-B501~4	A13B-0196-B001~4 A13B-0196-B502, -B504
12.1"	A14L-0143-0001#A	A08B-0084-B011~4	A13B-0196-B011~4
15.0"	A14L-0143-0002	A08B-0084-B021, -B023 A08B-0084-B400~3, -B410~3 A08B-0084-B422~3, -B432~3 A08B-0084-B521~4	A13B-0196-B021, -B023 A13B-0196-B400~3, -B410~3 A13B-0196-B422~3, -B432~3 A13B-0196-B522, -B524

2.1.4 Touchpanel PCB

CNC	Unit	Specification of Touch panel PCB	Applied Basic Unit	
160*i* /180*i* /210*i*	PANEL *i*	A20B-8001-0620	A08B-0084-B003~4 A08B-0084-B013~4 A08B-0084-B023	A13B-0196-B003~4 A13B-0196-B013~4 A13B-0196-B023
	PANEL *i* for Automotive	A20B-8002-0310	A08B-0084-B401, -B403 A08B-0084-B411, -B413	A13B-0196-B401, -B403 A13B-0196-B411, -B413
300 *i*	PANEL *i*	A20B-8002-0310	A08B-0084-B504 A08B-0084-B524	A13B-0196-B504 A13B-0196-B524
	PANEL *i* for Automotive		A08B-0084-B422, -B423 A08B-0084-B432, -B433	A13B-0196-B422, -B423 A13B-0196-B432, -B433

2.1.5 Other PCB

Name	Unit	Specification of PCB	Applied Basic Unit
Power Supply PCB	(Common to All unit)	A20B-2100-0920	(Common to All unit)
I/O Link Adapter PCB	PANEL *i* for Automotive	A20B-8002-0270	A08B-0084-B410~1 A13B-0196-B410~1
I/O Link Adapter 2 PCB	PANEL *i* for Automotive	A20B-8002-0500	A08B-0084-B412~3 A08B-0084-B432~3 A13B-0196-B412~3 A13B-0196-B432~3
Softkey Adapter PCB	PANEL *i* for Automotive	A20B-1008-0320	A08B-0084-B410~1 A13B-0196-B410~1

2.2 LIST OF MAINTENANCE UNITS

2.2.1 Drive Unit

Name	Unit	Specification of Maintenance Unit	Supplied Order Specification	Remark
3.5" HDD Unit *1 *2	PANEL *i* for 160*i* /180*i* /210*i*	A08B-0082-C102#D	A08B-0084-H100	
	PANEL *i* for Automotive	A08B-0084-C120#D	A08B-0084-H120	
	PANEL *i* for 300*i*	A08B-0084-C130#D	A08B-0084-H130	In other case of below condition
		A08B-0084-C131#D	A08B-0084-H131	In case of 10.4" LCD and QWERTY MDI
FDD Unit	(Common to All unit)	A02B-0207-C009	-	Panel Mount Type.
FDD Cables	(Common to All unit)	A02B-0207-K801	-	Length = 1m.
FDD	(Common to All unit)	A08B-0084-K001	-	Only FDD.
CD-ROM Drive Unit	PANEL *i* for Automotive	A08B-0084-K010	-	Only CD-ROM drive.
FDD & CD-ROM Unit	PANEL *i* for Automotive	A08B-0084-C480	A08B-0084-J020	FDD and CD-ROM drive combined into one unit

NOTE
*1 Specification of 3.5" HDD Unit may be updated.
*2 HDD unit is included fan unit for HDD, but is not included signal/power cables.

⚠ **CAUTION**
HDD, FDD or CD-ROM drive without FANUC designation may not work properly.

2.2.2 Base Unit

Unit	CNC	LCD type	I/O Link Adapter	Soft key	Touch panel	Specification of Base Unit *1	Applied Unit	
PANEL *i*	160*i* /180*i* /210*i*	10.4" LCD	None	X	X	A08B-0084-D001	A08B-0084-B001	A13B-0196-B001
				O	X	A08B-0084-D002	A08B-0084-B002	A13B-0196-B002
				X	O	A08B-0084-D003	A08B-0084-B003	A13B-0196-B003
				O	O	A08B-0084-D004	A08B-0084-B004	A13B-0196-B004
		12.1" LCD	None	X	X	A08B-0084-D015	A08B-0084-B011	A13B-0196-B011
				O	X	A08B-0084-D016	A08B-0084-B012	A13B-0196-B012
				X	O	A08B-0084-D017	A08B-0084-B013	A13B-0196-B013
				O	O	A08B-0084-D018	A08B-0084-B014	A13B-0196-B014
		15.0" LCD	None	X	X	A08B-0084-D021	A08B-0084-B021	A08B-0196-B021
				X	O	A08B-0084-D023	A08B-0084-B023	A08B-0196-B023
	300*i*	10.4" LCD	None	X	X	A08B-0084-D501	A08B-0084-B501	
				O	X	A08B-0084-D502	A08B-0084-B502	A13B-0196-B502
				X	O	A08B-0084-D503	A08B-0084-B503	
				O	O	A08B-0084-D504	A08B-0084-B504	A13B-0196-B504
		12.1" LCD	None	X	X	A08B-0084-D511	A08B-0084-B511	
				O	X	A08B-0084-D512	A08B-0084-B512	A13B-0196-B512
				X	O	A08B-0084-D513	A08B-0084-B513	
				O	O	A08B-0084-D514	A08B-0084-B514	A13B-0196-B514
		15.0" LCD	None	X	X	A08B-0084-D521	A08B-0084-B521	
				O	X	A08B-0084-D522	A08B-0084-B522	A13B-0196-B522
				X	O	A08B-0084-D523	A08B-0084-B523	
				O	O	A08B-0084-D524	A08B-0084-B524	A13B-0196-B524
PANEL *i* for Automotive	160*i* /180*i* /210*i* or 300*i*	15.0" LCD	None	O	X	A08B-0084-D400	A08B-0084-B400	A13B-0196-B400
				O	O	A08B-0084-D401	A08B-0084-B401	A13B-0196-B401
				O	X	A08B-0084-D402	A08B-0084-B402 A08B-0084-B422	A13B-0196-B402 A13B-0196-B422
				O	O	A08B-0084-D403	A08B-0084-B403 A08B-0084-B423	A13B-0196-B403 A13B-0196-B423
			Exist	O	X	A08B-0084-D410	A08B-0084-B410	A13B-0196-B410
				O	O	A08B-0084-D411	A08B-0084-B411	A13B-0196-B411
				O	X	A08B-0084-D412	A08B-0084-B412 A08B-0084-B432	A13B-0196-B412 A13B-0196-B432
				O	O	A08B-0084-D413	A08B-0084-B413 A08B-0084-B433	A13B-0196-B413 A13B-0196-B433

NOTE

*1 Base Unit is a Unit that main PCB, backplane PCB, power supply PCB, inverter PCB, and rear cover are excluded from Basic Unit. Consequently this unit consists chiefly of base plate, LCD unit, plastic front cover, touch panel and softkey.

2.3 LIST OF CPU AND MEMORY

Name		Specification of Maintenance Parts	Applied Order Specification
CPU	Celeron 733MHz	A08B-0084-C210	A08B-0084-H010
	Pentium III 866MHz	A08B-0084-C220	A08B-0084-H020
	Pentium III 1260MHz	A08B-0084-C230	A08B-0084-H030
Memory	128MB	A76L-0500-0020	A08B-0084-H001
	256MB	A76L-0500-0021	A08B-0084-H002
	512MB	A76L-0500-0022	A08B-0084-H003

2.4 LIST OF MAINTENANCE PARTS

Name		Specification of Maintenance Parts	Quantity
Fuse		A08B-0084-K020	1
Battery		A02B-0200-K102	1
40mm fan unit for base unit.		A08B-0084-K100	1
60mm fan unit for base unit		A08B-0084-K101	1
Fan unit for HDD unit		A08B-0084-K102	1
LCD Backlight	10.4” LCD	A02B-0236-K116	1
	12.1” LCD	A02B-0236-K117	1
Pen for Touch Panel	-	A02B-0236-K111	1
Protection Sheet for Touch Panel	10.4” LCD for 300*i* or for 160*i* /180*i* /210*i* with Softkey	A02B-0236-K110	1
	10.4” LCD for 160*i* /180*i* /210*i* without Softkey	A02B-0236-K130	1
	12.1” LCD	A02B-0236-K118	1
	15.0” LCD	A08B-0082-K020	1

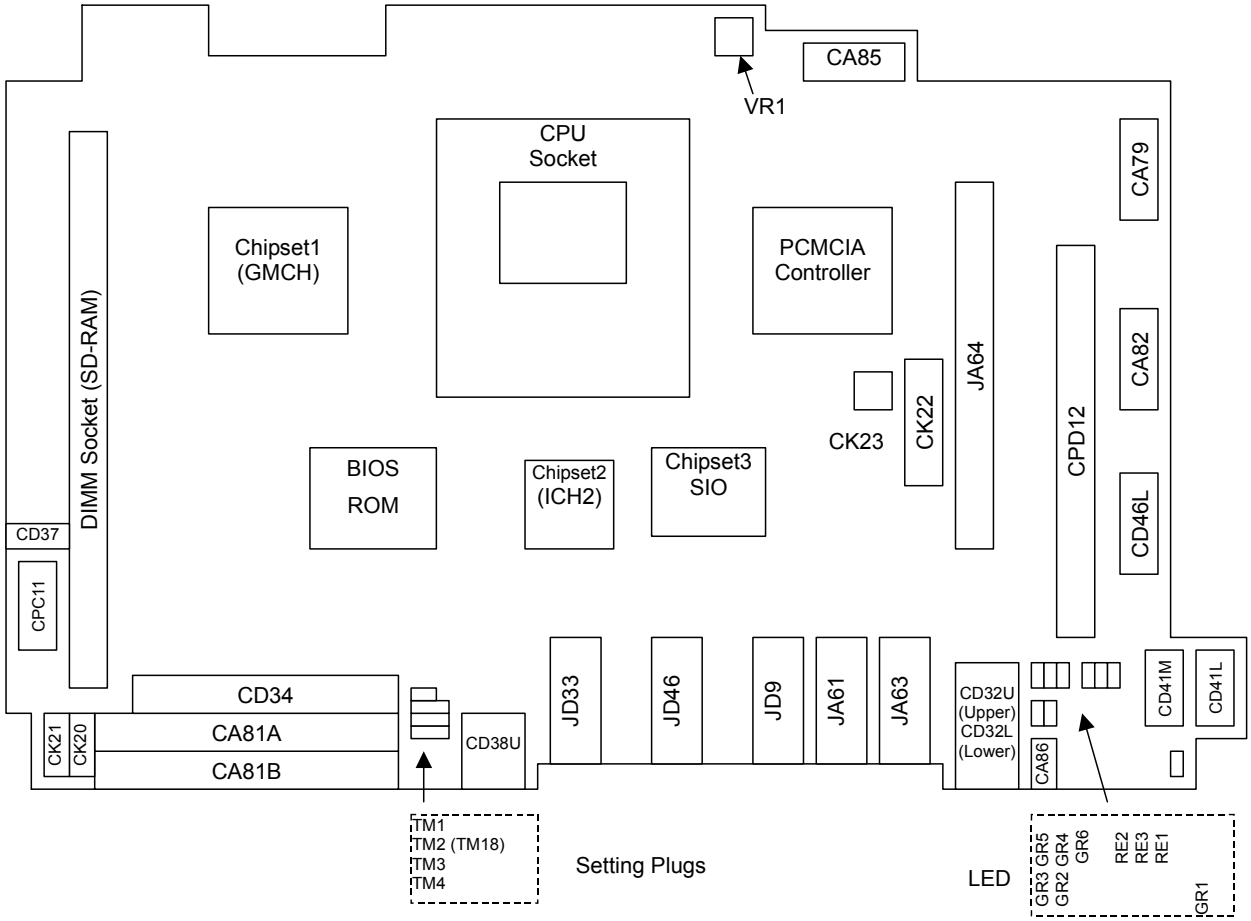
2.5 LIST OF MAINTENANCE TOOLS

Following tools may be needed to install the application software or maintenance.

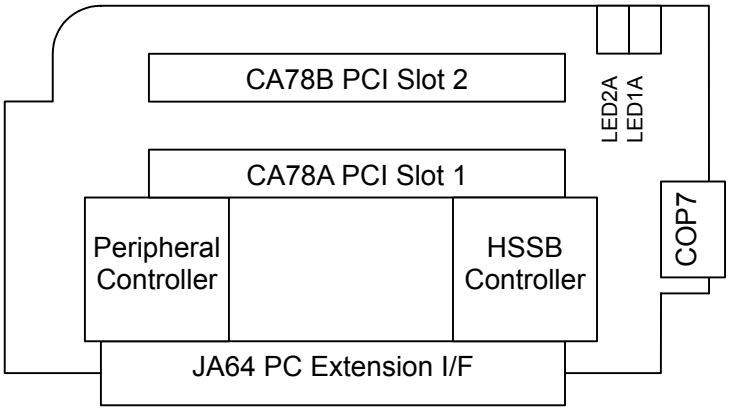
Name		Specification
Full Keyboard (PS/2 I/F)	101 Type	A86L-0001-0210
	106 Type	A86L-0001-0211
Mouse (PS/2 I/F)		A86L-0001-0212

3 CONFIGURATION AND SETTING OF THE PCB

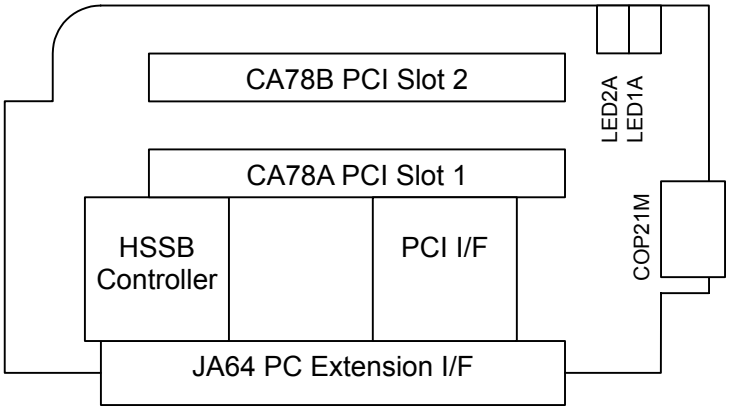
3.1 PARTS LAYOUT



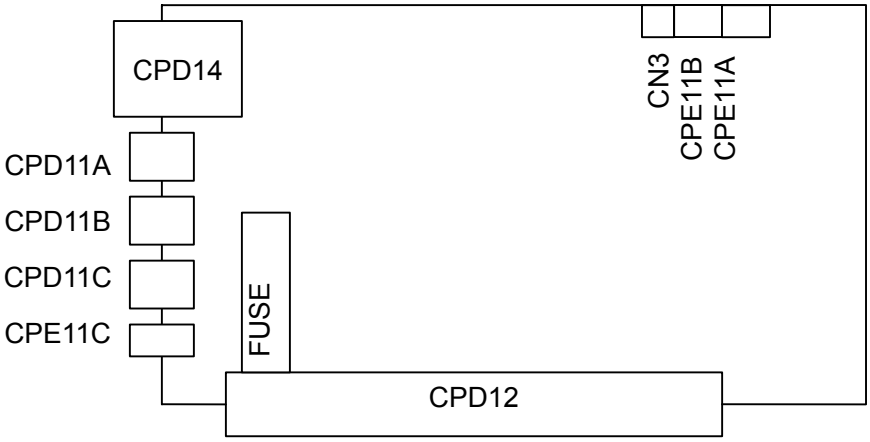
Mainboard (A20B-8100-093X) Parts Layout



Backplane for 160*i*/180*i*/210*i* (A20B-8002-0250) Parts Layout



Backplane for 300*i* (A20B-8002-0330) Parts Layout



Power PCB (A20B-2100-0920) Parts Layout

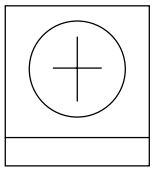
3.2 ADJUSTMENT

3.2.1 Setting of Short Plug

Name	Meaning	Settings		Remark
TM1	FDD Mode	■ TM1	Short	Setting for designated FDD. Default on manufacture.
		□ TM1	Open	Setting for old FANUC FDD.
TM2(TM18) TM3 TM4	Reserved	□■ ■□ ■□ TM2 TM3 TM4	PWB revision is 03 or less. □ : Open ■ : Short	Default on manufacture. Never change. (TM4 will be set to right temporary at maintenance)
		■ ■□ ■□ TM18 TM3 TM4	PWB revision is 04 or more. □ : Open ■ : Short	

NOTE
In case of special function settings will be changed.

3.2.2 Setting of Variable Register

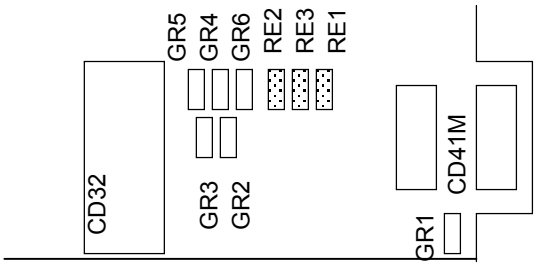


VR1

VR1: Video signal adjusting Register for 15”LCD.
Never change because this is set as best setting.

3.3 LED DISPLAY

3.3.1 LED on Main Board



Name1	Name2	Color	Status
RE1	TRM	Red	Thermal Alarm. Thermal is not in regulated range.
RE2	BAT	Red	Battery alarm. The battery on PANEL *i* is exhausted. Please exchange it.
RE3	FAN	Red	FANs for basic unit or FAN for HDD is stopped. Please exchange
GR1	5V	Green	Power on LED.(+5V).
GR2	HDD	Green	HDD access LED.
GR3	PCM	Green	PCMCIA access LED.
GR4	LINK	Green	Ethernet link LED.
GR5	100M	Green	Ethernet 100MHz link LED.
GR6	ACT	Green	Ethernet activity LED.

3.3.2 LED on Backplane PCB

In case of Backplane for 160*i* /180*i* /210*i* (A20B-8002-0250)

Name1	Color	Status
LED1A	Red	HSSB is not ready
LED1B	Green	CNC status is normal.

In case of Backplane for 300*i* (A20B-8002-0330)

Name1	Color	Status
LED1A	Red	Parity Alarm on Backplane.
LED1B	Green	HSSB is ready

4 MAINTENANCE OF OPEN CNC (BOOT-UP AND IPL)

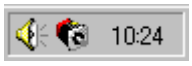
4.1 OVERVIEW

Ncboot32.exe can be used for the maintenance of the CNC.

Unless otherwise specified, the following examples assume the use of Ncboot32.exe of the Windows 2000/XP version.
Ncboot32.exe provides the following functions:

- BOOT screen (for CNC system data maintenance, SRAM backup, and so forth)
- IPL screen (for clearing SRAM, and so forth)
- Display of the CNC power-on screen
- Display of CNC alarm screen
- Re-connection in case of the occurrence of a communication error
- Start of a registered application program

For Windows 2000/XP, Ncboot32.exe is copied to the System 32 folder of Windows during driver installation.
At the start of Windows, Ncboot32.exe starts automatically, and resides in the system tray.



(Icon at the center)

Supplementary 1: Multi-connection (Windows 2000/XP only)
Ncboot32.exe supports HSSB multi-connection. The CNCs connected by HSSB are managed as nodes. The boot, IPL, and system alarm screens are displayed in windows that are opened independently for each node.

Supplementary 2: Termination method
Normally, Ncboot32.exe need not be terminated. If you need to terminate it, however, see the "System tray" explanation, below: Display the popup menu and select "End".
When the Ncboot32.exe window is open, End cannot be selected.

System tray

Right-click the icon in the system tray, and the popup menu, shown below, appears at the lower left corner of the screen.

Selecting [Open] causes the status screen to open.
Selecting [About] causes the version information dialog box to appear.
Selecting [End] causes Ncboot32.exe to terminate.

Double-clicking the icon in the system tray causes Open in the menu to be automatically selected.

NOTE
Depending on when to tap, the popup menu may not be displayed normally. If this occurs, repeat tapping until it is displayed normally.

4.2 CHANGING START SEQUENCES

Placing the rotary switch on the HSSB board in the option slot to the 0 position (for the 160*i*/180*i*/210*i*) or the rotary switch on the CNC main board to the F position (for the 300*i*) allows you to perform maintenance using the BOOT and IPL screens.

During normal operation
(rotary switch 2 (for 160*i*/180*i*/210*i*), rotary switch 0 (for 300*i*))

1. The CNC starts without waiting for communication to be established.
2. After communication is established, the PC performs initialization described below.
3. Start FOCAS2.
4. Start a registered application program.
5. Perform monitoring for communication errors and CNC system alarms.

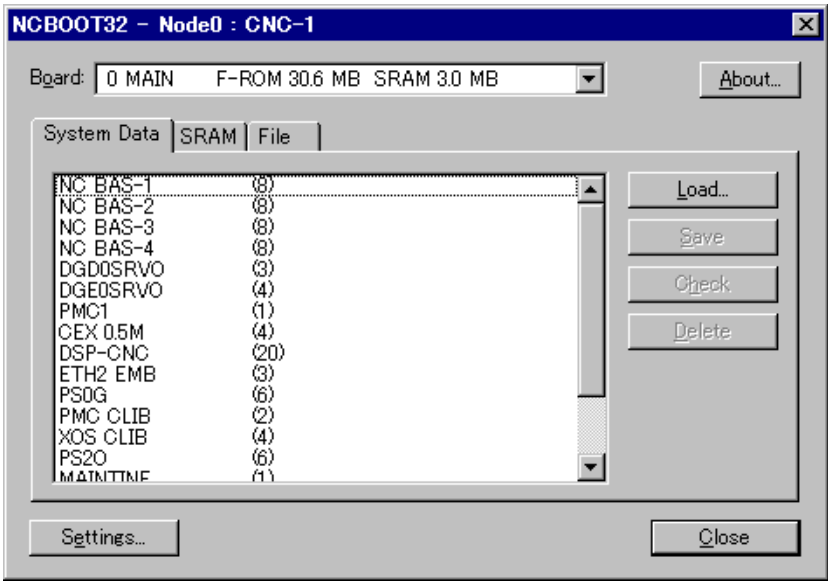
During maintenance
(rotary switch 0 (for 160*i*/180*i*/210*i*), rotary switch F (for 300*i*))

1. Wait until communication with the CNC is established.
2. Display the boot screen.
3. Display the IPL screen.
4. Display the CNC power-on screen.
5. Start FOCAS2.
6. Start a registered application program.
7. Perform monitoring for communication errors and CNC system alarms.

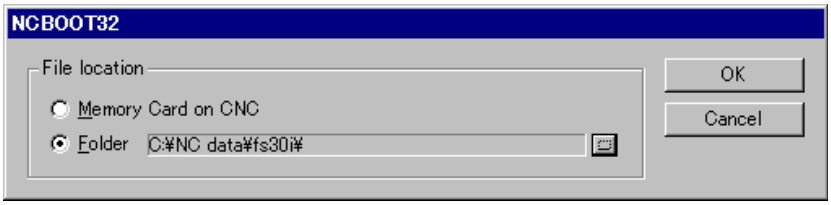
4.3 EXPLANATION OF SCREENS

NOTE
To open each screen of Ncboot32.exe, you are recommended to use either the mouse or touch panel.

4.3.1 BOOT Screen



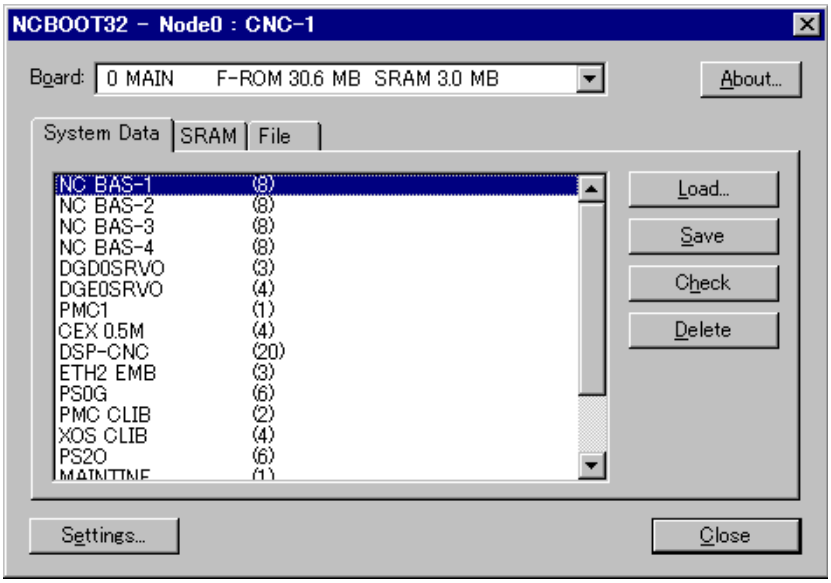
The area where the file is to be placed can be changed by using the [Setting...] button.



Select the memory card on the CNC or the PANEL *i* folder. The file location may be changed at any time.

4.3.1.1 System data manipulation

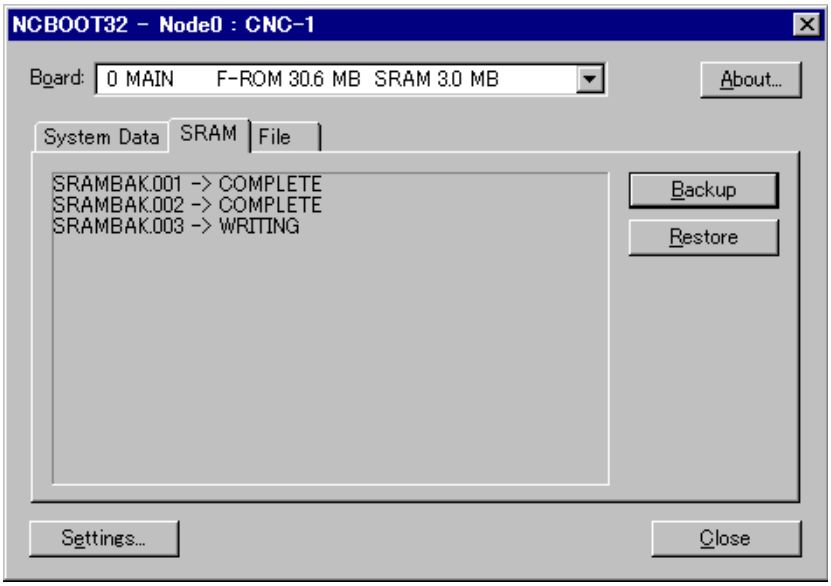
The following screen is used for manipulating system data (including control software and ladder programs) on the NC.



[Load...] opens the file selection screen. Specify a file to be loaded.
[Save] saves the selected NC system data in a file.
[Check] checks the selected NC system data.
[Delete] deletes the selected NC system data.

4.3.1.2 SRAM operation

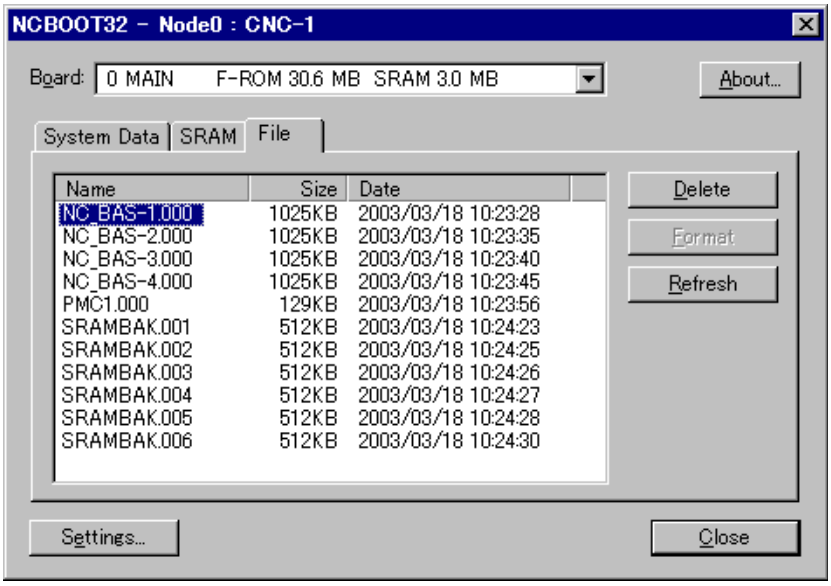
This screen is used to store and restore NC SRAM data.



[Backup] stores SRAM data, and [Restore] restores SRAM data. In the center of the screen, the progress status is displayed. As with the NC, the backup file name is determined automatically from the SRAM size, and cannot be renamed.

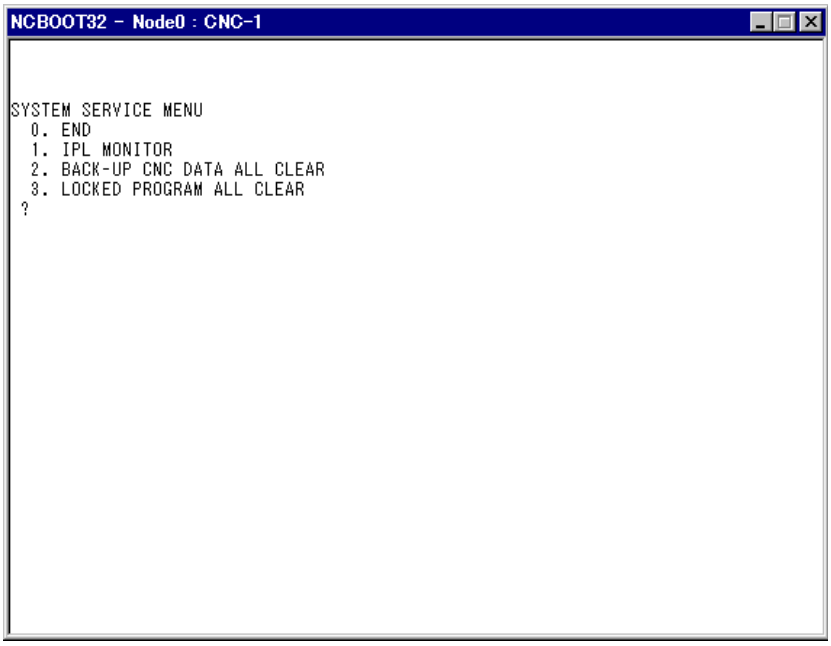
4.3.1.3 File operation

The following screen is used for operating files on a memory card in the CNC or in a folder of the PANEL *i*.



[Delete] deletes a selected file.
[Format] formats the memory card. This button is valid when the memory card is selected by [Setting...]
[Refresh] updates the file list to the latest state. After changing memory cards or floppy disks, click this button.

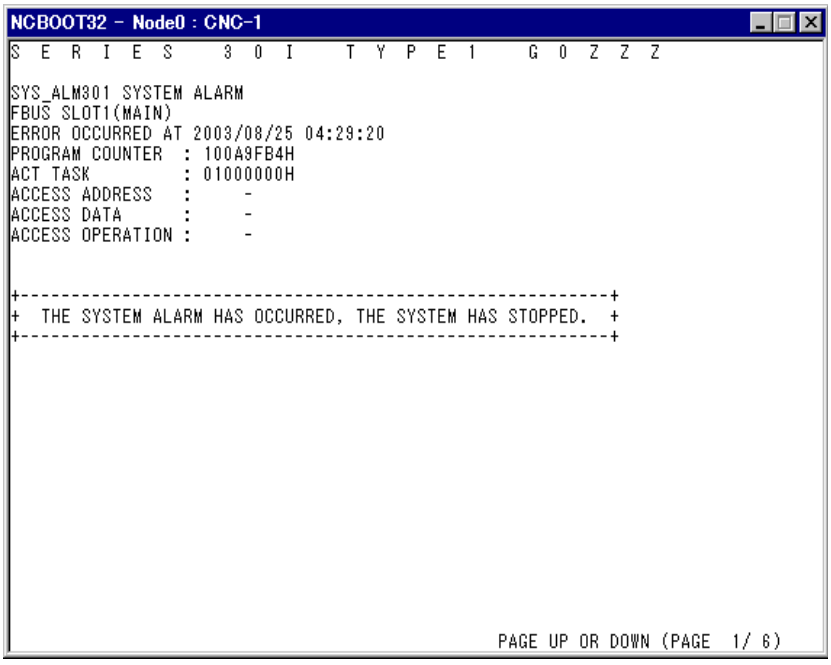
4.3.2 IPL Screen



NOTE
The contents of the IPL screen vary depending on the CNC model. Follow the instructions displayed in the menu.

4.4 OTHER SCREENS

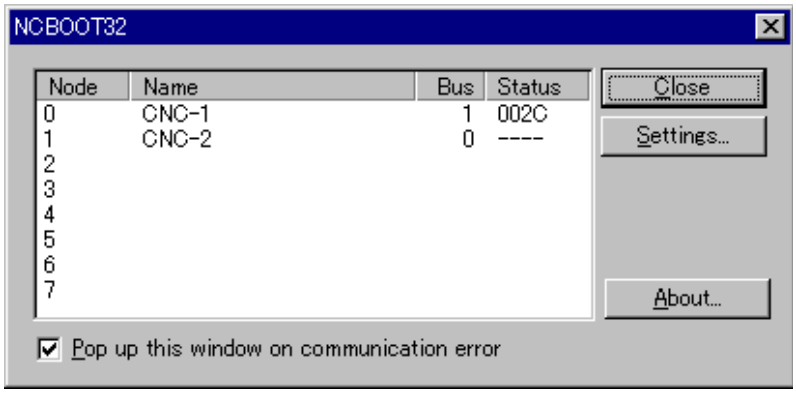
4.4.1 CNC Alarm Screen



This screen appears when a system alarm is issued in the CNC. (The above screen is an example. The displayed information varies depending on the system alarm issued in the CNC.)

4.4.2 Status Screen

To open the status screen, double-click the icon in the system tray. Alternatively, in the menu popped up by right-clicking, click OPEN.



Node: Node number
Name: Node name. (Define the node name in advance by using the HSSB applet on the control panel.)
Bus: Hardware communication status (0: Communication error, 1: Communication established)
Status: Status (in hexadecimal)
Bit 2: End of boot processing
Bit 3: End of IPL processing
Bit 4: Maintenance mode (Rotary switch position F)
Bit 5: Display of 30 lines on IPL/system alarm screen
Bit 8: CNC system alarm
Pop up this window on communication error: By checking this item, this screen is opened automatically when a communication error occurs.

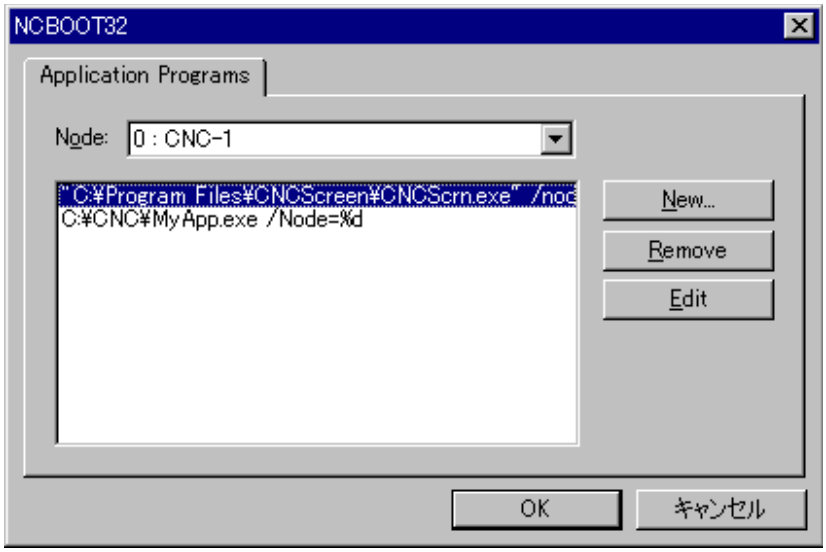
Clicking the [Close] button closes the screen.
Clicking the [Setting...] button opens the option setting screen.
Clicking the [About...] button opens the version information screen.

NOTE
The Series 300*i*s/310*i*s/320*i*s does not provide a status screen.

4.4.3 Option Setting Screen

On the option setting screen, application programs can be registered. Any programs for use with FOCAS2 will not run unless they are started after FOCAS2 starts. By registering these programs in Ncboot32.exe, they can be executed in synchronization with the start of FOCAS2.

Clicking the [Settings...] button on the status screen causes the option setting screen to open. On the option setting screen, an application must be registered with each node that requires it.



[Node] selects a node. In the list box in the center of the screen, the programs registered for the selected node are displayed.
[New...] registers a new program. When a blank character is included in the path, it is enclosed with double quotation marks.
[Remove] deletes a selected line.
[Edit] allows editing of a selected line. This button is used to edit arguments. The character string %d in the command line is replaced by a node number. To represent % itself, describe %%.

Example: To start the CNC screen display function after FOCAS2 starts at that node, code the following:
"C:¥Program Files¥CNCScreen¥CNCScrn.exe" /Node=%d

5 BIOS SETUP

5.1 WHAT IS 'BIOS SET-UP'

"BIOS Set-up" is a program to set up BIOS settings, and operating environment for the PANEL *i* is defined by these BIOS settings.
It is unnecessary to run the set-up program normally because default BIOS settings are set at shipping.
Use PANEL *i* with this default environment as far as possible because an inadvertent change to the operating environment may cause a failure.

The settings made using BIOS Set-up are stored in the internal memory. A battery is used to preserve the settings stored in the memory.

⚠ CAUTION
1 Use PANEL *i* with default BIOS settings as far as possible.
Fanuc has not checked behavior of PANEL *i* in case that any BIOS setting is changed from default settings. So if any setting is changed, make sufficient confirmations.
2 A keyboard is necessary at BIOS setup. Select one of following devices.
- A full keyboard connected to PS/2 port.
- A full keyboard connected to USB port.
- Front panel of PANEL *i* for Automotive.
MDI unit or softkey is not available. Connect other full keyboard.

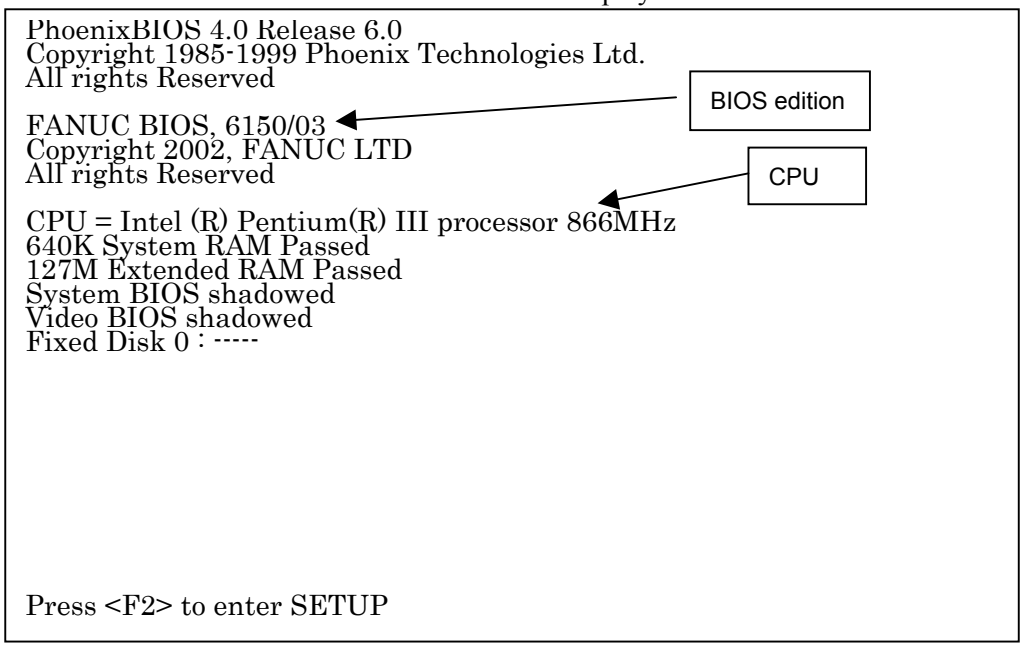
5.2 KEYS USED FOR OPERATION

The keys used for set-up have the following functions.

- [↓] [↑] keys : Move the cursor to the next or previous item.
- [←] [→] keys : Move the cursor to the next or previous menu.
- [Enter] key : Select the item on which the cursor is placed.
- [ESC] key : Exit.
- [-] [+] keys : Change values.
- [F1] key : Display helps.
- [F9] key : Setup defaults.
- [F10] key : Setup previous values

5.3 HOW TO BEGIN THE 'BIOS SET-UP'

1 Finish working and store the data.
2 Turn off and connect a full-keyboard, and turn on again.
3 BIOS set-up will run with pressing "F2" key while "Press <F2> to enter SETUP." is displayed.



Initial screen (At normal booting)

4 Menu screen is displayed. Change parameters if it is necessary.

5.4 HOW TO END THE 'BIOS SET-UP'

Changed settings become effective after saving settings and restarting the system.
Select either one of the following methods for saving and restarting.

(Method 1) : Set Exit mode by pressing ESC key or selecting "EXIT" item.
Then select "Exit Saving Changes" and press ENTER key.

(Method 2) : Press F10 key then message as "Save Configuration changes and exit now?" is displayed. Select "Yes" .

If you want to discard changes and restart the system, do as follows.
Set Exit mode by pressing ESC key or selecting "EXIT" item.
Select "Exit Discarding Changes" and press ENTER key.

5.5 BIOS DIAGNOSIS MESSAGE

After turning on the system POST (Power On Self Test) is executed. Diagnosis messages in the following table may be displayed.

Marks in item "To be solved" represent as bellow.
A: Something of hardware may be failure. Solve these troubles.
B: When battery supply is stopped, these messages are displayed once. If these are displayed time and again, something of hardware may be failure.

Error Code	To be solved	BIOS message	Description
	A	CPU Temperature Exceeds the Upper Limit – FATAL	CPU FIN may be not attached to CPU properly.
	A	Ambient Temperature Exceeds the Upper Limit –FATAL	Ambient Temperature in the cabinet may be too high.
	A	Ambient Temperature Exceeds the Lower Limit –HDD stopped	Ambient Temperature in the cabinet may be too low. Wait until temperature is in regulated range. (If BIOS revision is 06 or higher, PANEL *i* starts automatically after ambient temperature is in good range. If BIOS revision is 05 or lower, turn off and on at times.)
	A	CPU Fan Failure. – FATAL	60mm FAN for base unit is stopped.
	A	Case Fan Failure.	40mm FAN for base unit is stopped.
	A	HDD Fan Failure.	FAN for HDD unit is stopped.
	A	CMOS Battery Failure.	Battery cable may be not connected or battery is low.
0200	A	Failure Fixed Disk	Hard disk drive is defective.
0210	A	Stuck Key	Keyboard operation error. Confirm that keys are not pressed continuously
0211		Keyboard Error or not connected	Confirm connection of the keyboard.
0251	B	System CMOS checksum bad – Default configuration used.	Check sum of CMOS RAM is abnormal. Default values are loaded, then system restart automatically.
0271	B	Check date and time settings	Time data is not set. Set correct date and time in BIOS Set-up or utilities.
0280	B	Previous boot incomplete – Default configuration used	System has not started up normally at latest start-up. So default values are loaded, then system start up.
	B	Cursor blinking at the upper left of the screen (after the power on self test)	The hard disk was not recognized as the boot device. Follow the steps below: <1> Start BIOS setup, press ← once and ↓ twice to select "Load Setup Defaults," and press Enter. <2> The message "Load default configuration now?" appears. Select YES and press Enter. <3> Select "Exit Saving Changes" on the screen and press Enter. <4> The message "Save configuration changes and exit now?" appears. Select YES and press Enter.

NOTE
BIOS message may be changed by BIOS version.

6 MAINTENANCE SUPPLIES

6.1 METHOD OF EXCHANGING A BATTERY

⚠ CAUTION
The time from disconnecting the cable of old battery to connecting the cable of new battery should be shorter than 5 minutes.
BIOS settings will be not erased when bellow procedures are done correctly.
But if following message are displayed at power-on, BIOS settings may be erased.
"251: System CMOS checksum bad – Default configuration used." & "Press <F2> to enter SETUP"
In this case default BIOS settings are loaded, then BIOS setting will start.
If BIOS settings were changed from default setting before this message is displayed, change as same settings.
Usually default settings are used.

(1) Turn on PANEL *i* for 5 seconds or more, then turn off. Take off PANEL *i* from attached panel to work from rear side.
(2) Pull out the connector of the lithium battery, then remove the battery from the holder.
(3) Connect the new battery connector (BAT1) until five minutes, put the new battery in the holder.
(4) Mount PANEL *i* again.
(5) Turn on the power, then confirm that BIOS parameters have not been erased (confirm that error message is not displayed).

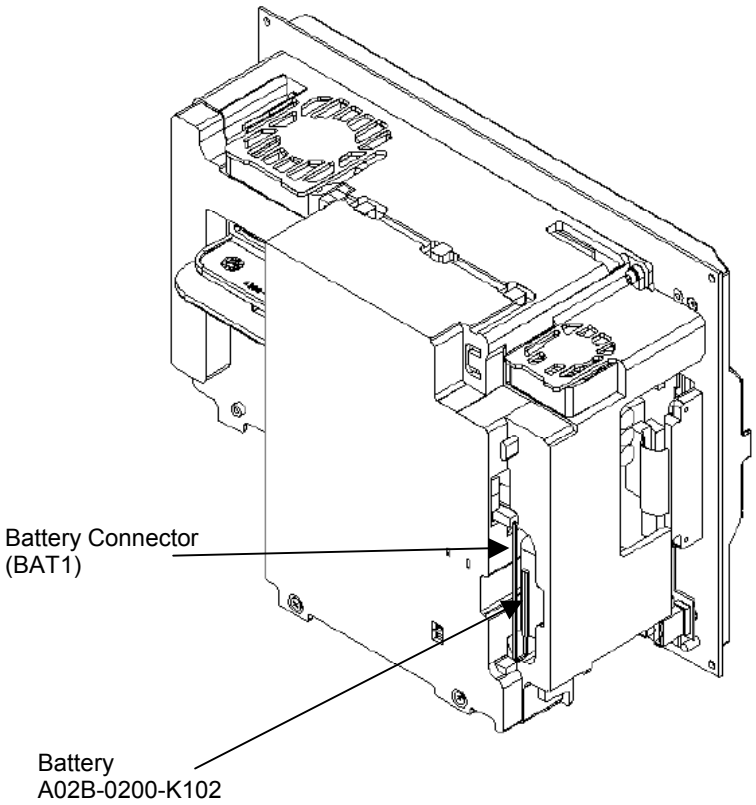
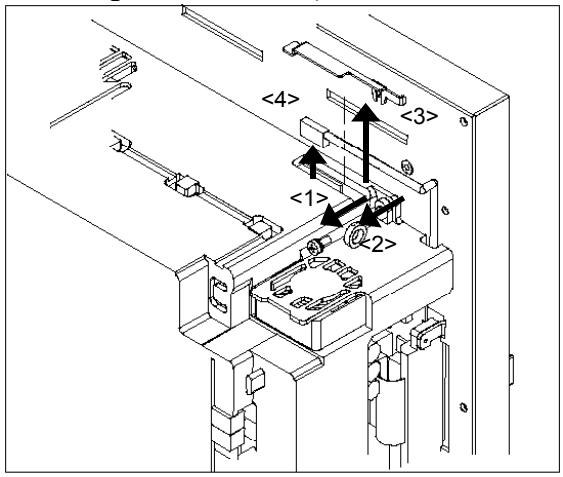


Fig. 6.1 Exchanging a battery

6.2 METHOD OF REMOVING CASE COVER

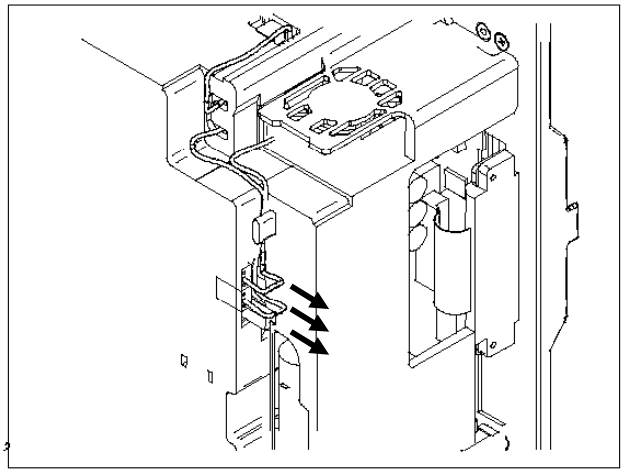
erased because battery cable is pulled out.
In that case "251: System CMOS checksum bad – Default configuration used." & "Press <F2> to enter SETUP" are displayed after next turning on.
Therefore in case of usage with changing BIOS settings, confirm changed items before this operating. If the messages are displayed, change BIOS settings as before.
In case of usage without changing BIOS setting (setting on manufacture), exit BIOS setting if the message is displayed.

(1) Removing the LCD cable (for the 15.0" LCD only)



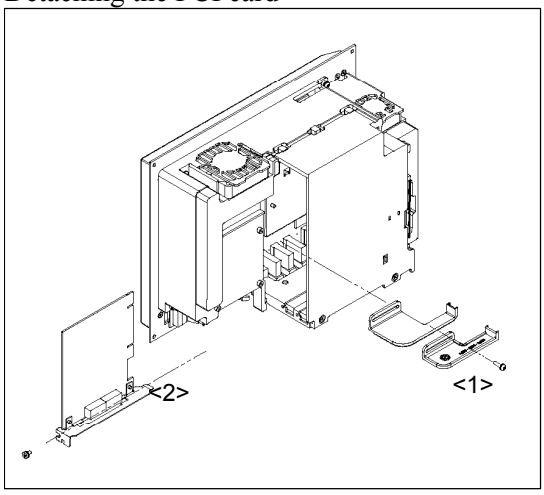
<1> Remove the screw from the upper right section of the unit.
<2> Cut the cable clamp.
<3> Remove the video connector fastener.
<4> Detach the video connector.

(2) Pulling out the fan and battery cables



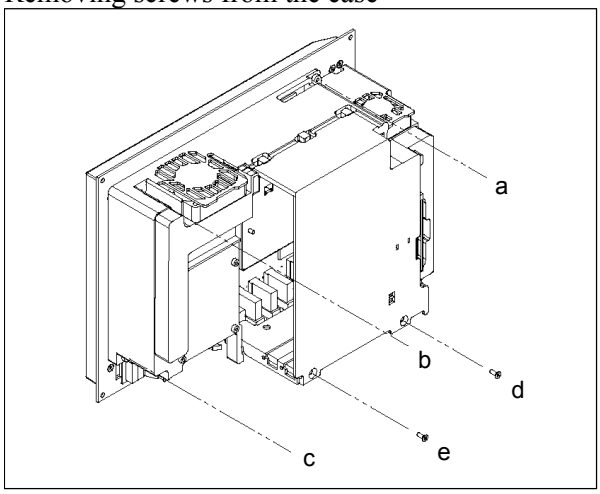
<1> Pull out the two fan cables. The connectors are latched in a simple manner. Pull them out by **holding down the latch with a flat-blade screwdriver**.
<2> Pull out the battery cable.

(3) Detaching the PCI card



<1> Remove the PCI holding part.
<2> Remove the screw, and pull out the PCI card.

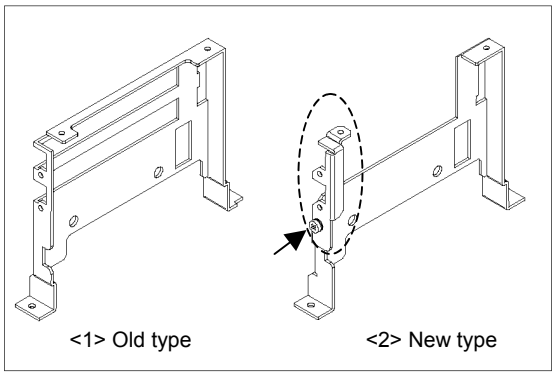
(4) Removing screws from the case



<1> For units other than the 15" LCD, remove the screw (a) from the upper right section of the unit.
<2> Remove the other screws (b to e) from the case.

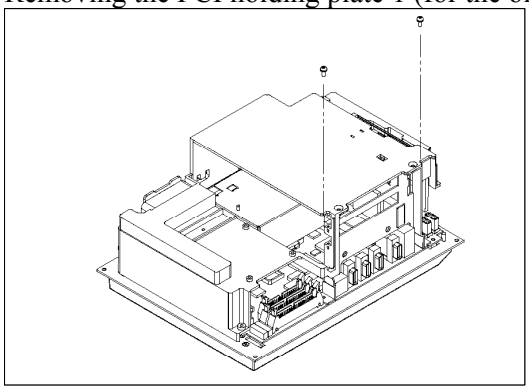
NOTE
Screws a to c are locked to prevent them from falling out of the case.

(5) Checking the shape of the PCI holding plate at the bottom of the unit



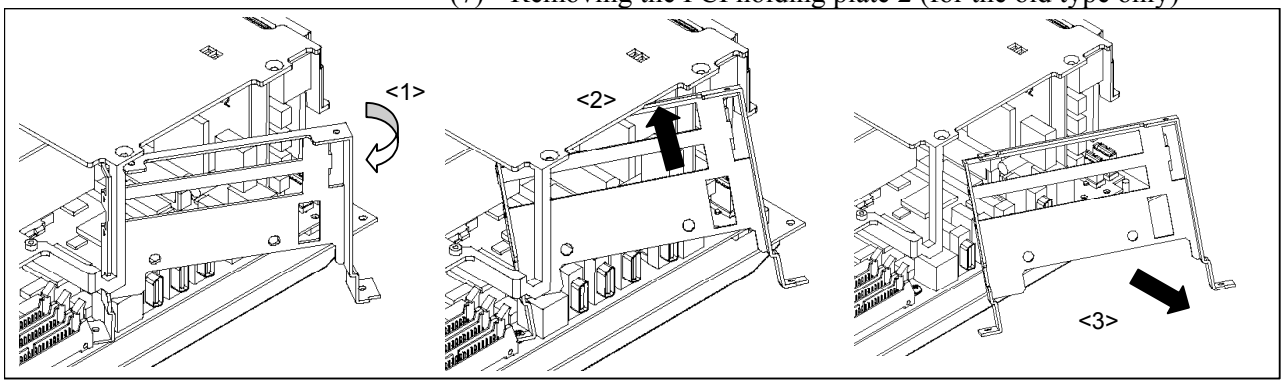
<1> If the holding plate is an old type, remove it first.
<2> If the holding plate is a new type, remove the screw indicated with an arrow, and loosen the fitting shown in a dotted circle. Remove the cover as shown in (8).

(6) Removing the PCI holding plate 1 (for the old type only)



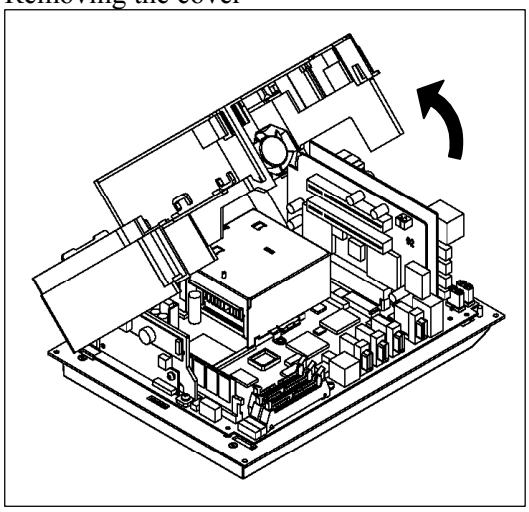
<1> Remove two screws from the PCI holder.

(7) Removing the PCI holding plate 2 (for the old type only)



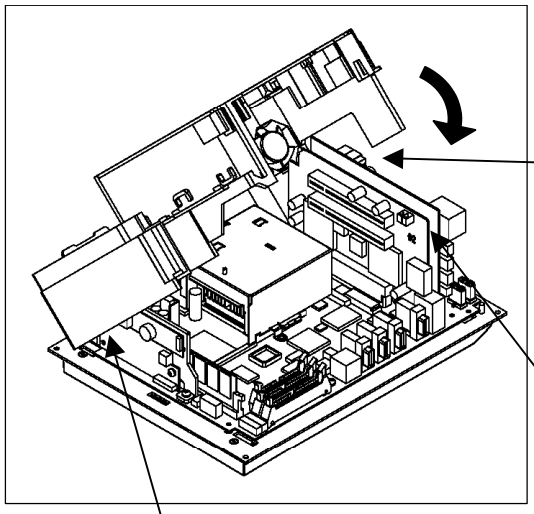
<1> Open the PCI holding plate to about 30 degrees.
<2> Tilt it a little to the far side.
<3> Pull it out.

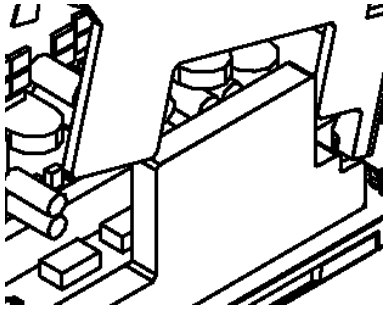
(8) Removing the cover



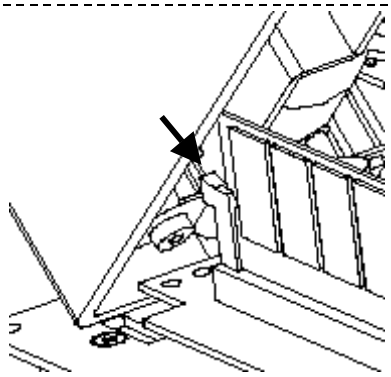
6.3 MOUNTING THE CASE COVER

(1) Position the upper side of the cover in the right place, and lower it.

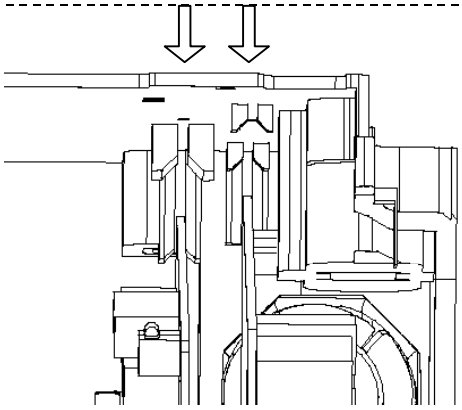




Series 300*i* : Be careful. They are tight.



Be careful not to have the case cover caught on the DIMM latch.

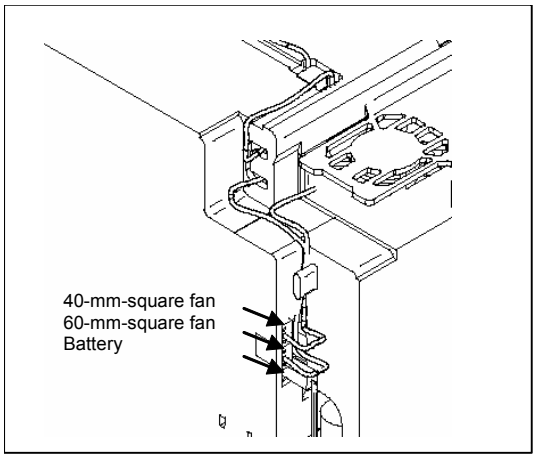


Make sure that the power supply PCB and backplane PCB get in grooves.

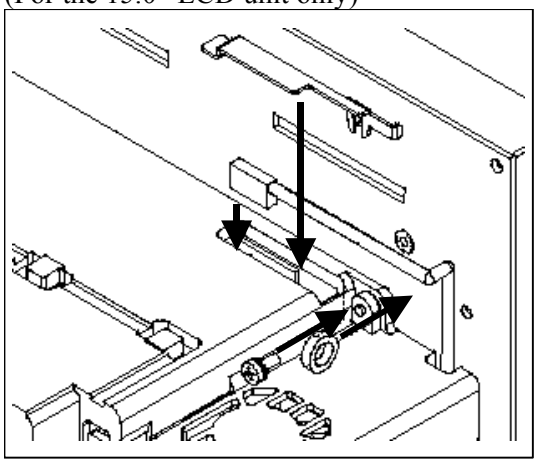
(2) Mount the PCI holder, and fasten the case cover with screws (4 or 5 places).

(3) Mount the PCI card and the PCI card holder.

(4) Attach the cable connector.



(5) Attach the LCD cable, and mount the metal fitting and cable clamp.
(For the 15.0” LCD unit only)



6.4 METHOD OF EXCHANGING FUSE

> ⚠ **CAUTION**
> Investigate the cause that fuse is blown out at first, then remove it.
> Fuse is blown out when power lines are shorted in PANEL *i*. If the fuse is blown out, check bellow points.
> - Any conductor is shorted to the main board.
> - Failure of PCI extended card or error at inserting PCI extended card.
> - Miss-connection of cables.
>
> When fuse is blown out, any damage may be existed in the main board. And the damaged parts must be exchanged.

(1) Take PANEL *i* off from cabinet after pulling out cables.
(2) Remove case cover (Refer to 6.2).
(3) Remove the old fuse, and put a new fuse to the socket exactly.
(4) Attach case cover (Refer to 6.3). Mount PANEL *i* again.
(5) Turn on the power, then confirm that PANEL *i* will start.

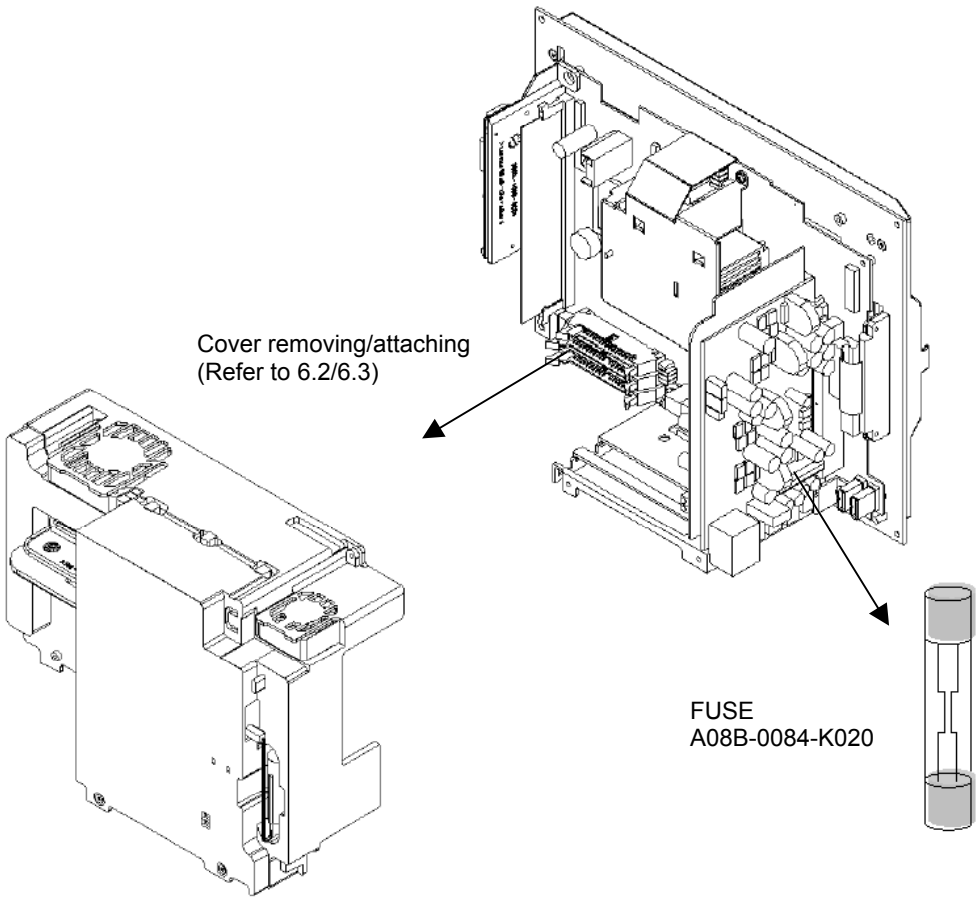


Fig. 6.4 Exchanging fuse

6.5 METHOD OF EXCHANGING FAN

6.5.1 Method of Exchange Fan of the PANEL *i*

(1) Make sure that PANEL *i* is turned off.
(2) Prepare a new FAN .
(3) Pull out the connector of fan power. This connector has a latch, therefore release the latch and pull out it as below figure.
(4) Exchange a fan. Attention to the direction of air flow.
(5) Connect a plug of 60mm FAN(-K101) to CPE11B. Connect a plug of 40mm FAN(-K100) to CPE11A.

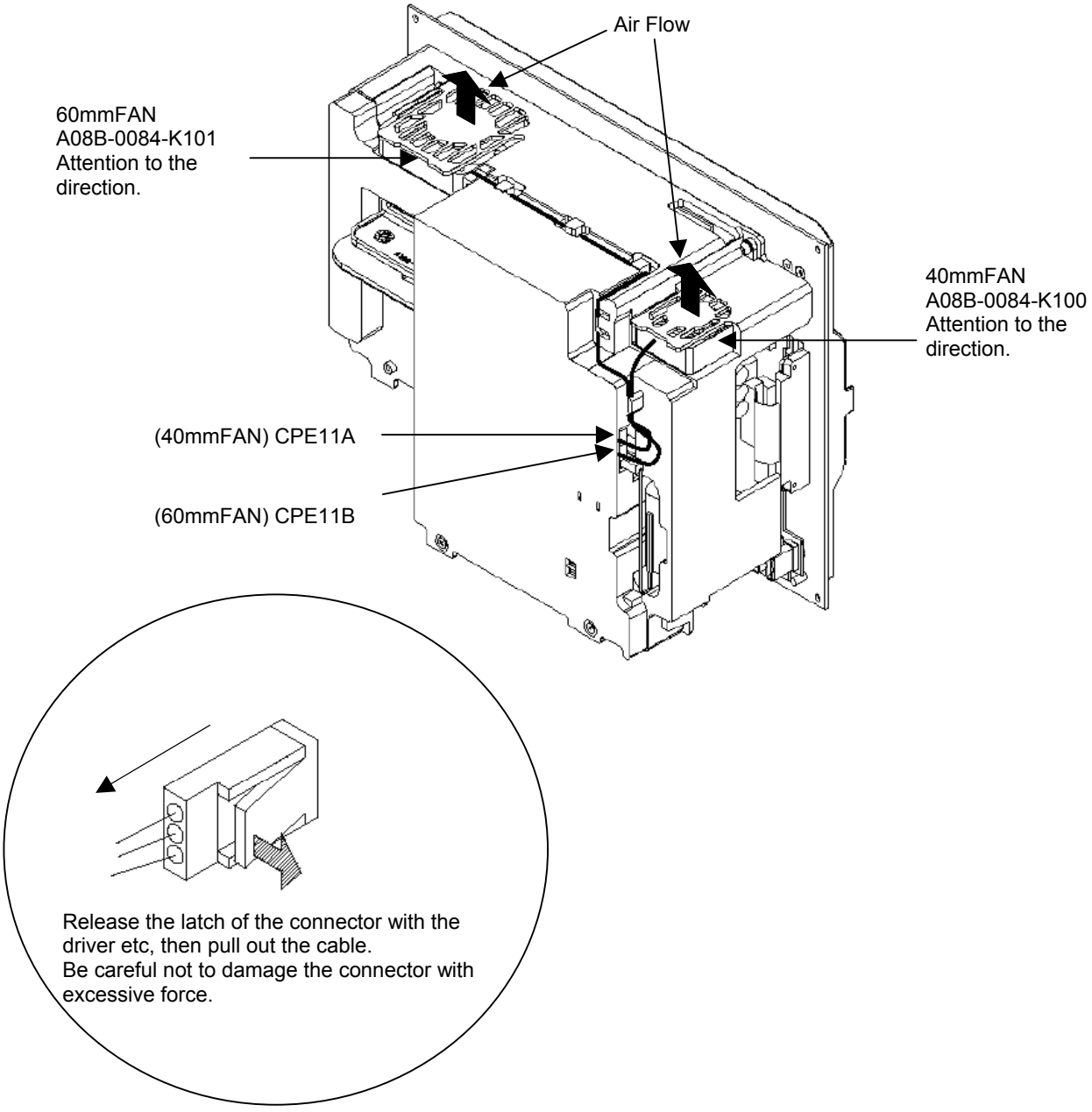


Fig. 6.5.1 Exchanging Fan of Basic Unit

6.5.2 Method of Exchanging Fan for the HDD Unit

(1) Make sure that PANEL *i* is turned off.
(2) Prepare a new fan.
(3) Disconnect the fan connector from CPE11C. The connector has a latch, therefore disconnect it while raising upward it a little.
(4) Screw the old fan off.
(5) Screw a new fan on, and connect the fan connector to CPE11C. Attention to the direction of air flow.

NOTE
In the case of PANEL *i* for Automotive, remove HDD unit at first.

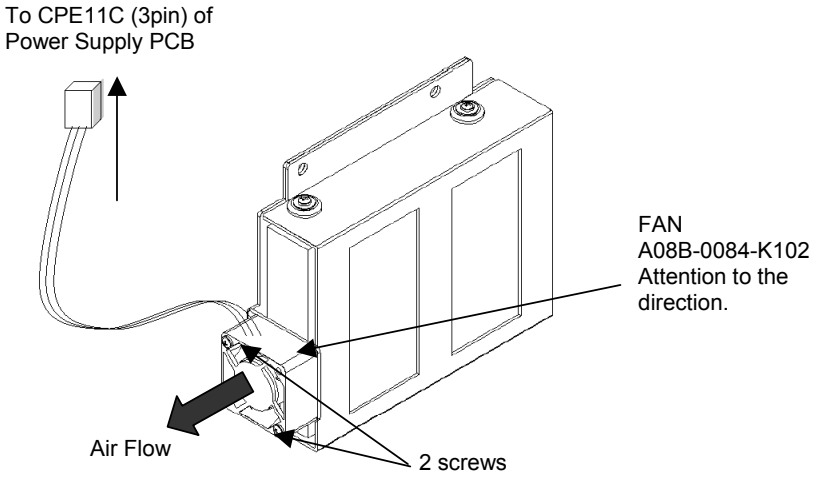


Fig. 6.5.2(a) Exchanging FAN for HDD unit

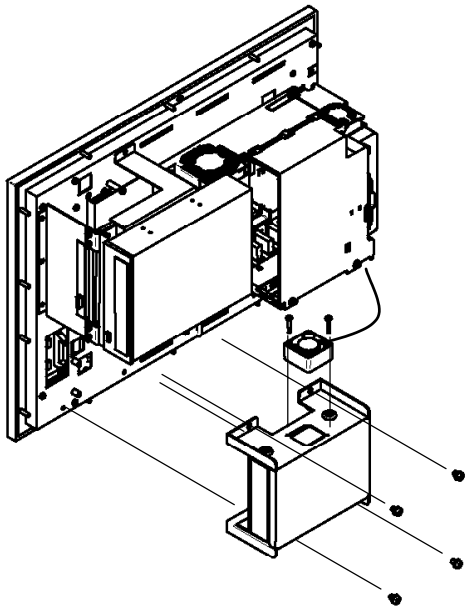


Fig. 6.5.2(b) Exchanging FAN for HDD unit (In case of PANEL *i* for Automotive)

6.6 METHOD OF EXCHANGING CPU UNIT

(1) Make sure that PANEL *i* is turned off.
(2) Remove case cover (Refer to 6.2).
(3) Screw off 2 screws, then remove holding plate of the CPU(A).
(4) Pull up the CPU socket lever, then remove CPU unit (B).
(5) Set new CPU unit. Mount parts in a reverse order.

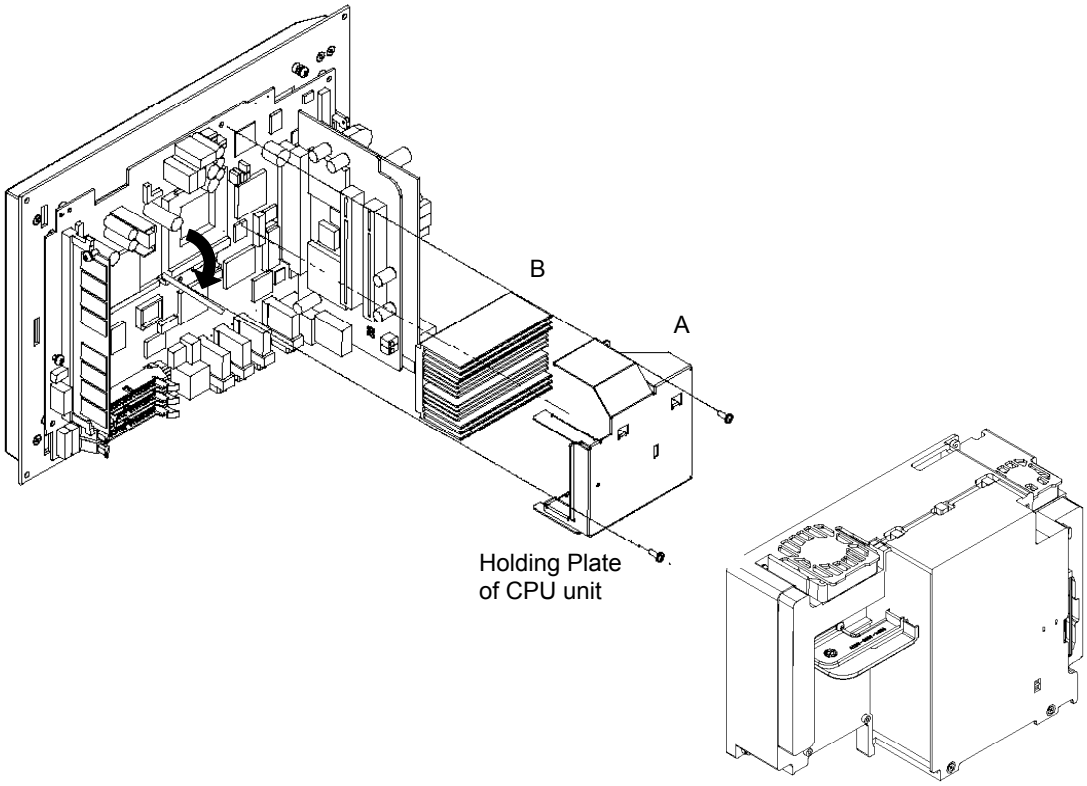


Fig. 6.6 Exchanging CPU Unit

6.7 METHOD OF EXCHANGING THE DIMM MODULE

(1) Turn the power to the PANEL *i* off.
(2) Remove the cover. (See Section 6.2.)
(3) Push the latch for fixing the module outward as shown in detail A. (The DIMM module is lifted.)
(4) Pull out the DIMM module.
(5) Insert a new DIMM module until it is fixed with the latch and mount it by reversing the removal procedure.

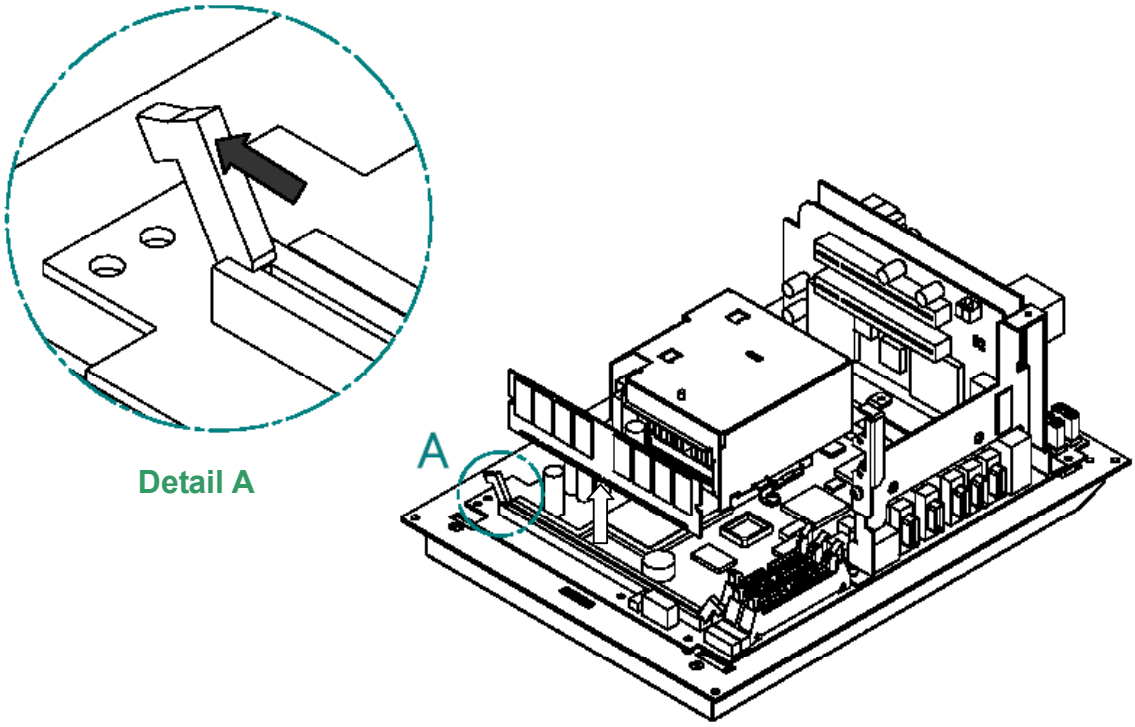


Fig. 6.7 Exchanging DIMM Module

6.8 METHOD OF EXCHANGING LCD BACKLIGHT

NOTE
It is not possible to exchange a backlight of 15.0”LCD. Exchanging of Base Unit for maintenance (A08B-0084-Dxxx) is available in case of 15.0”LCD.

6.8.1 Exchanging 10.4”LCD Backlight

(1) Make sure that PANEL *i* is turned off.
(2) Remove case cover (Refer to 6.2).
(3) Remove LCD backlight cable and LCD signal cable.
(4) If PANEL *i* has the Touch Panel, pull out flat cable for Touch Panel from CN1 on the Touch Panel Controller PCB.

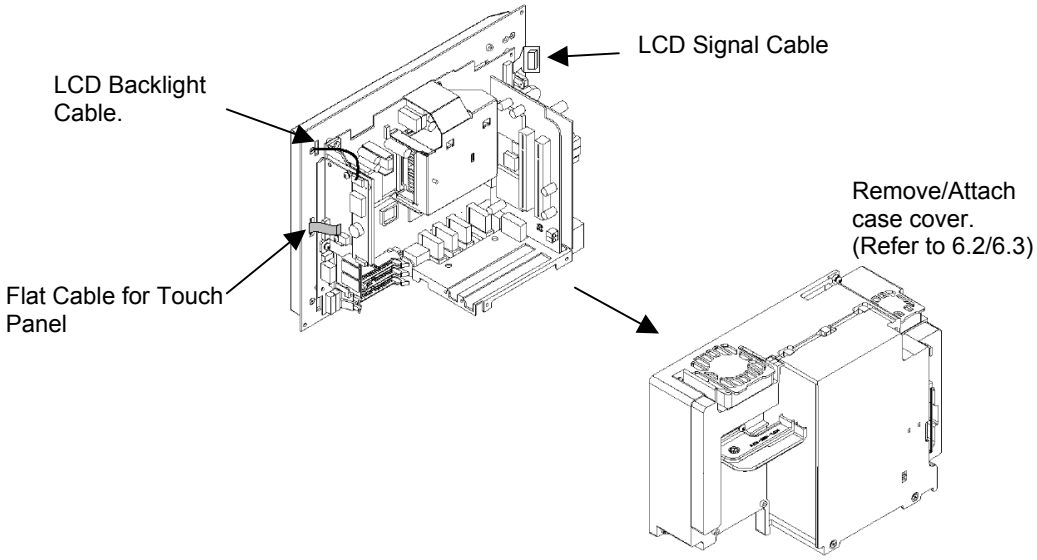


Fig. 6.8.1(a) Exchanging LCD Backlight at 10.4”LCD (1)

(5) Remove CPU holding plate and 2 screws. Then remove PCI holding plate and 2 screws (if PCI holding plate has not removed).
Remove Softkey cable, PCMCIA cable, USB cable and 3 screws. Then remove Main Board.

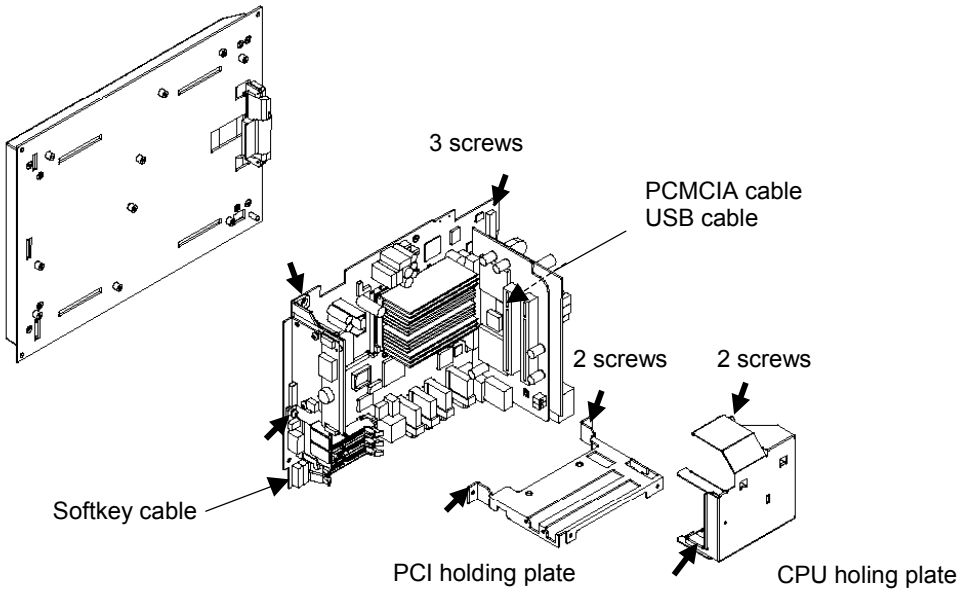


Fig. 6.8.1(b) Exchanging LCD Backlight at 10.4”LCD (2)

(6) Remove Plastic panel and 4 screws.

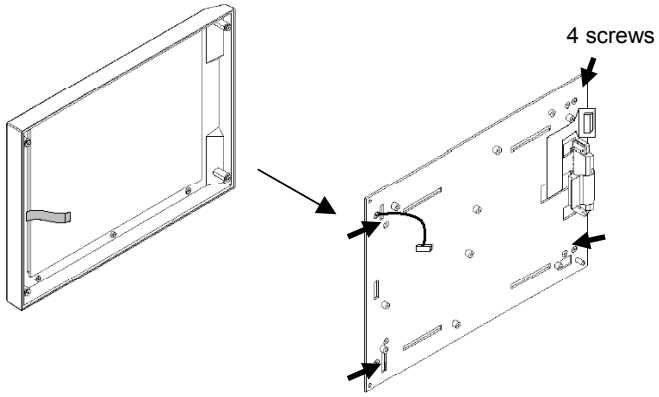


Fig. 6.8.1(c) Exchanging LCD Backlight at 10.4”LCD (3)

(7) Remove 4 screws and LCD unit.

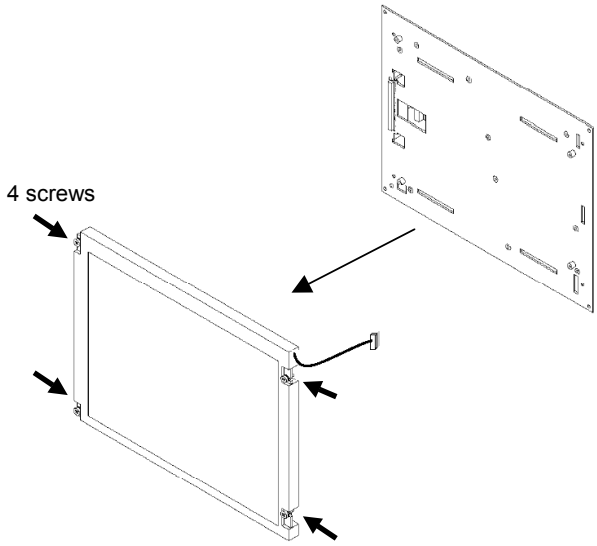
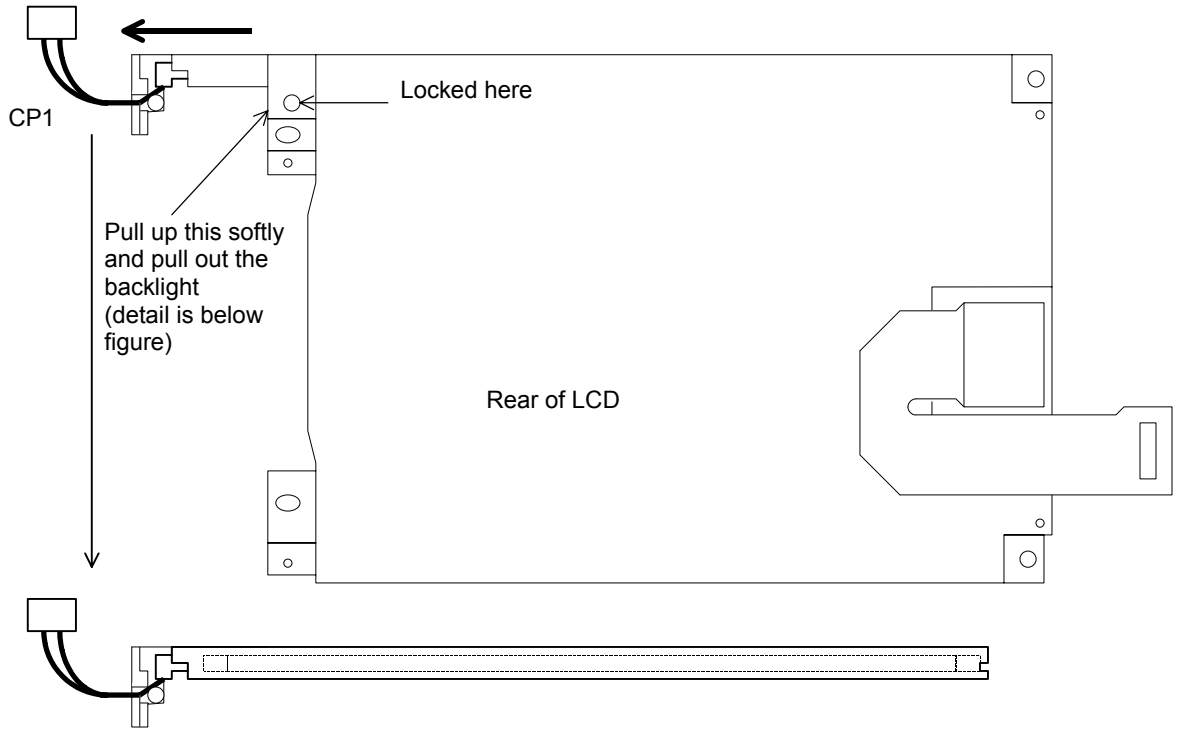


Fig. 6.8.1(d) Exchanging LCD Backlight at 10.4”LCD (4)

(8) Unlock like the below figure, pull out the case with the backlight, and exchange.



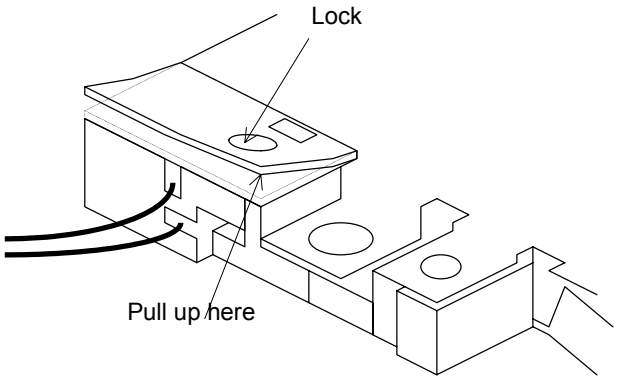


Fig. 6.8.1(e) Exchanging LCD Backlight at 10.4"LCD (5)

> ⚠ **CAUTION**
> Do not pull the cable when pull out the backlight.

(9) Assemble the unit in a reverse order of (1) - (8).
(Note that the cables don't put between the plate and one, etc.)

6.8.2 Exchanging 12.1”LCD Backlight

(1)-(7) Remove LCD unit in the same way as 5.7.1(1)-(7).
Note that LCD backlight cable is two in case of 12.1” LCD.

(8) In case of 12.1”LCD type, screw off at 2 points. And slide and pull out the LCD Backlights as below figure, and exchange them.

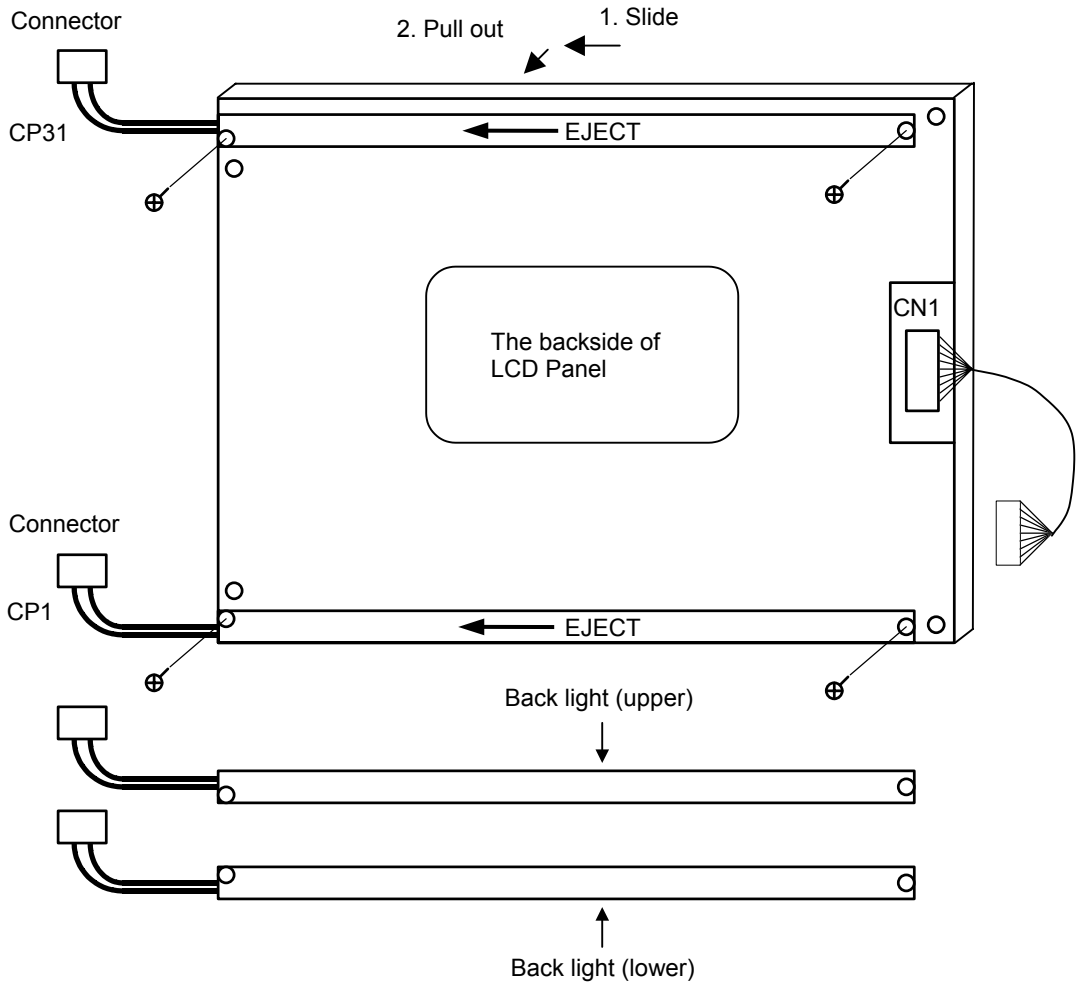


Fig. 6.8.2 Exchanging LCD Backlight at 12.1”LCD

> ⚠ **CAUTION**
> Do not pull the cable when pull out the backlight.

(9) Assemble the unit in a reverse order of (1) - (8).
(Note that the cables don’t put between the plate and one, etc.)

6.9 METHOD OF EXCHANGING TOUCH PANEL PROTECTION SHEET

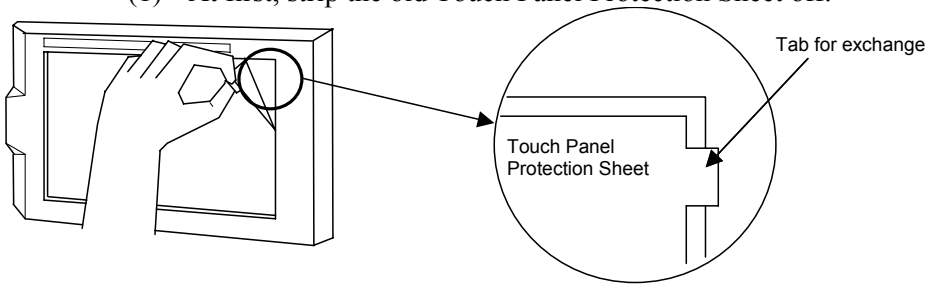
PANEL *i* has a Touch Panel Protection Sheet on the face of Touch Panel to protect the Touch Panel. When the screen cannot be watched clearly because of some damages or stains, exchange the Touch Panel Protection Sheet. Please prepare the following.

Name			Specification
Touch panel protection sheet	for 10.4"LCD	160*i* /180*i* /210*i* with softkey 300*i*	A02B-0236-K110
		160*i* /180*i* /210*i* without softkey	A02B-0236-K130
	for 12.1"LCD		A02B-0236-K118
	for 15.0"LCD		A08B-0082-K020
Neutral detergent (having good oil removal properties. Neutral detergents for kitchen are applicable.)			
Soft cloth (Towels are applicable.)			

⚠ CAUTION
Touch panel operations are performed by directly specifying items on the LCD screen. For these operations, be sure to use the touch panel pen (A02B-0236-K111) supplied by FANUC. If you use a pointed pen to specify an item on the LCD screen, the surface of the LCD may be scratched or damaged. If you touch the LCD screen with your finger, operability may degrade or the screen may become dirty. Do not touch the LCD screen with your fingers.

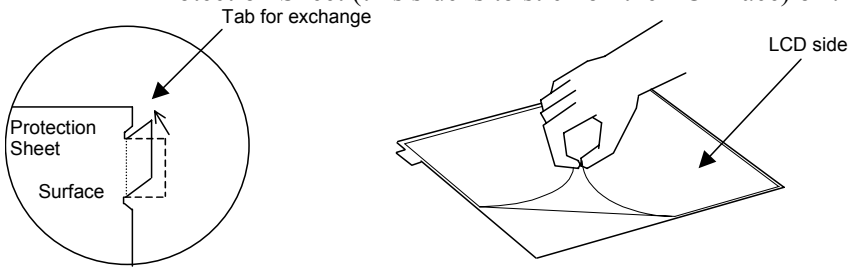
6.9.1 Method of Exchanging Touch Panel Protection Sheet (except A02B-0236-K130)

(1) At first, strip the old Touch Panel Protection Sheet off.

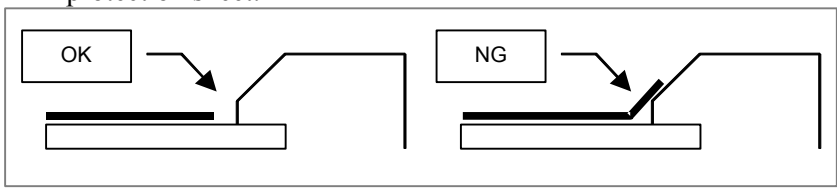


(2) Wipe off adhesive residue if any with alcohol.
(3) Use a neutral detergent to remove oil and dirt stuck to the surface of the touch panel.

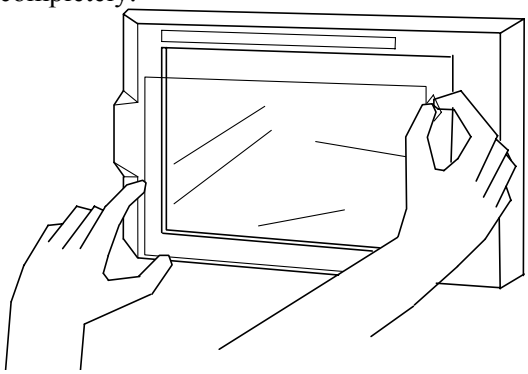
(4) With a soft, damp cloth, wipe off the detergent completely.
If the surface of the touch panel is cloudy, oil is still left. Remove oil completely.
If oil or detergent is left on the surface of the touch panel, the protection sheet cannot adhere to the panel completely and will sometimes peel off easily.
(5) With a soft, dry cloth, wipe off moisture completely.
(6) Bend a tab for exchange to surface side in accordance with the following left-side picture.(At an angle of about 60°)
(7) Strip the white film on the back of the new Touch Panel Protection Sheet (this side is to stick on the LCD face) off.



(8) Position the sheet, then attach the top and bottom sides of the sheet first so that the tab for exchange is placed at the upper-right corner.
At this time, check that each side of the protection sheet does not touch the escutcheon.
Be careful so as not to allow dirt to enter between the LCD and protection sheet.

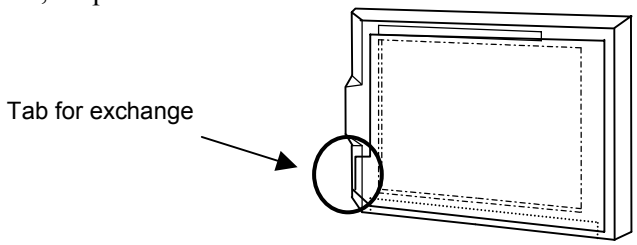


(9) Attach the right and left sides of the protection sheet while pushing out air between the touch panel and protection sheet.
With part of the protection sheet kept stuck to the touch panel, do not attempt to correct the position of the protection sheet by pulling the sheet.
(10) Press the adhesive parts of the four sides, and attach the entire sheet completely.

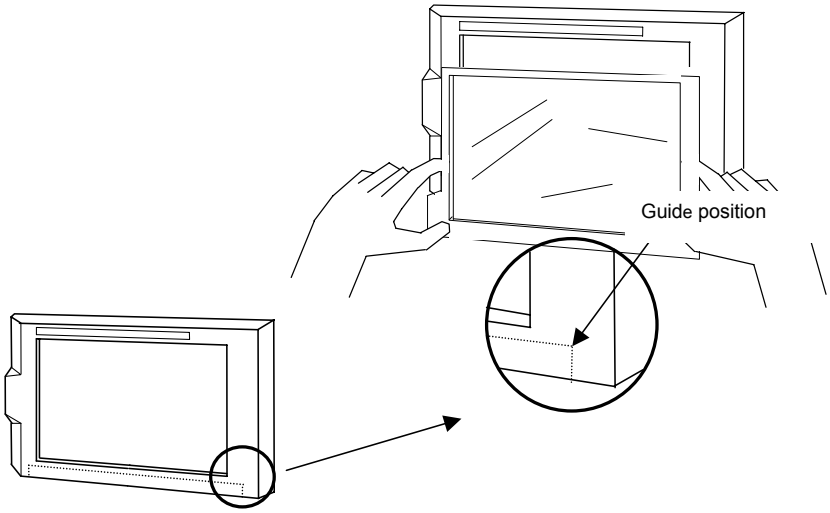


6.9.2 Method of exchanging Touch Panel Protection Sheet (A02B-0236-K130)

(1) At first, strip the old Touch Panel Protection Sheet off.



(2) Wipe off adhesive residue if any with alcohol.
(3) Use a neutral detergent to remove oil and dirt stuck to the surface of the touch panel.
(4) With a soft, damp cloth, wipe off the detergent completely.
If the surface of the touch panel is cloudy, oil is still left. Remove oil completely.
If oil or detergent is left on the surface of the touch panel, the protection sheet cannot adhere to the panel completely and will sometimes peel off easily.
(5) With a soft, dry cloth, wipe off moisture completely.
(6) Strip the film on the back of the new Touch Panel Protection Sheet (this side is to stick on the LCD face.)
(7) Put the tab of exchange on the lower left side of the new one, and stick the Touch Panel Protection Sheet. At this time, align the overhang edge at bottom of the gray plastic frame with the overhang edge of the Touch Panel Protection Sheet. In addition, prevent dust from entering between the LCD and the Touch Panel Protection Sheet.



(8) Stick the four sides while pushing out air between the touch panel and the Touch Panel Protection Sheet.
Do not pull the Touch Panel Protection Sheet to correct its position with the part of the sheet kept stuck to the touch panel.

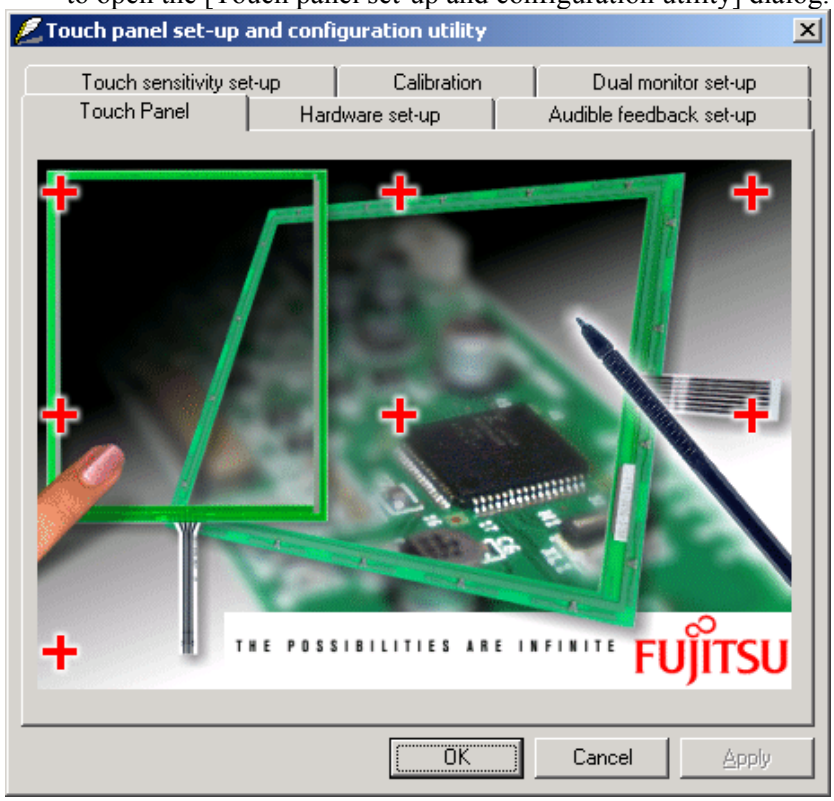
(9) Press the adhesive parts of the four sides, and stick the Touch Panel Protection Sheet completely.
Check that the four corners and four sides of the Touch Panel Protection Sheet is not floating.

6.9.3 Checks after Exchange

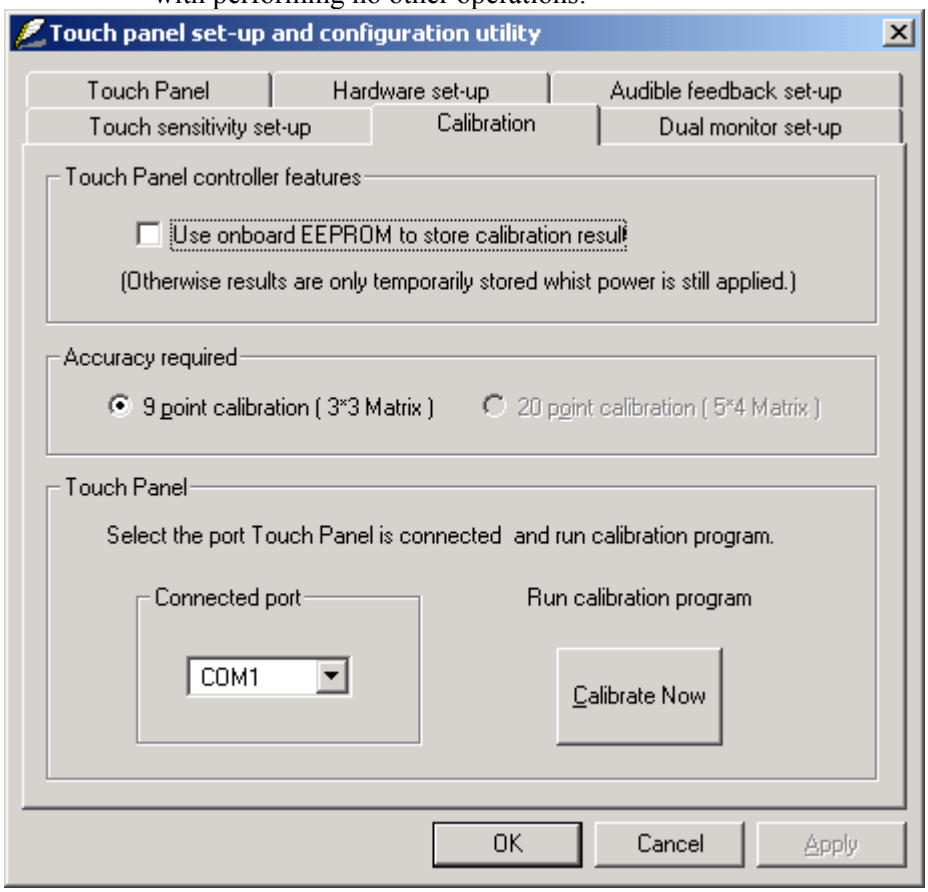
(1) Check that there is no wrinkle on the surface of the protection sheet.
(2) After power-on, check that there is no touch panel portion kept pressed.
(3) Press the touch panel, and check that correct operation takes place.

7 METHOD FOR CORRECTING POSITIONS ON THE TOUCH PANEL

(1) Open the Control Panel and double-click the [Touch Panel] icon to open the [Touch panel set-up and configuration utility] dialog.



(2) Click the [Calibration] tab. Click the [Calibrate Now] button with performing no other operations.



(3) The correction screen appears (a plus (+) sign appears at the upper left of the screen). Press and hold the center of the plus sign with a touch pen for about 1 second. Each time you press the plus sign, the plus sign moves to the next position.

(4) After pressing the plus sign nine times, press the Enter key.

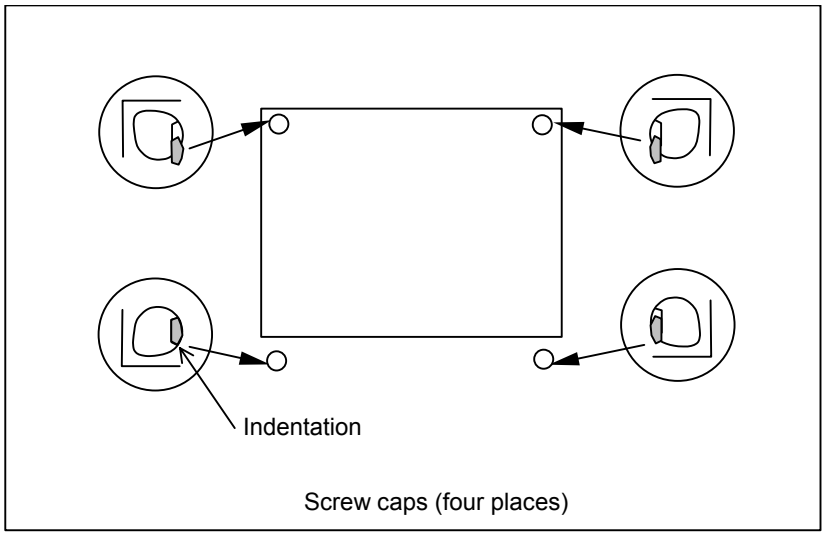
(5) Press the Enter key again and terminate the touch panel correction program.

(6) Click the [OK] button on the [Touch panel set-up and configuration utility] dialog.

8 METHOD OF MOUNTING AND REMOVING THE 10.4-INCH PANEL *i* (FOR THE 300*i*) AND MDI UNIT

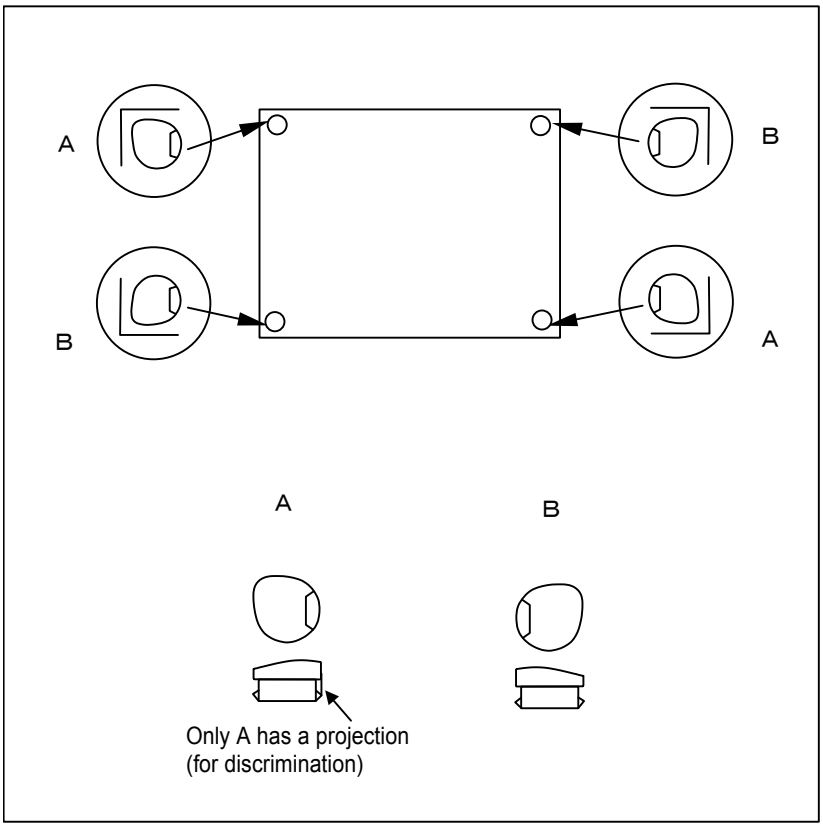
The 10.4-inch PANEL *i* (for the 300*i*) and MDI unit are secured on the front panel with screws. The screws are hidden with screw caps.

8.1 REMOVAL METHOD



(1) Insert a flat-blade precision screwdriver into the indentation of a screw cap to pull out the cap.
(2) Remove the screw under each screw cap and remove the unit.

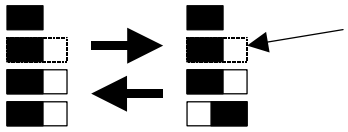
8.2 MOUNTING METHOD



(1) Fix the four corners with screws.
(2) There are two types of screw caps. Mount the screw caps as shown in the figure. Be careful about the orientation and push each cap until its top becomes level with the surface of the unit.

NOTE
If screw caps are lost or damaged, order them with the following specifications:
A02B-0303-K190: Screw caps A and B, 100 each
A02B-0303-K191: Screw caps A and B, 8 each

9 TROUBLE SHOOTING

	Status	Measure
1	Power supply is good, but nothing displayed.	LED all off? → (Yes) Power is not supplied, or fuse may be blown out. ↓ (No) After new device or cable is installed? → (Yes) Remove it and check again. ↓ (No) After case cover attached? → (Yes) DIMM latch may be unlocked. Check DIMM is inserted tightly. ↓ (No) LCD Backlight has blinked in a moment at power-on? → (No) LCD backlight, backlight cable or inverter PCB may be fault. ↓ (Yes) Power off. Then set setting plug TM4 (Refer to Section 3.2) right for a few second. Then return it. Power on. TM1 TM2(18) TM3 TM4  In case of TM2, right is default setting. ↓ (No change.) Below PCB/unit may be fault. 1. Main Board 2. CPU Unit 3. DIMM. 4. Power PCB 5. Backplane PCB Possibility High Possibility Low

APPENDIX

A PUNCH PANEL FOR PANEL *i*

A.1 OVERVIEW

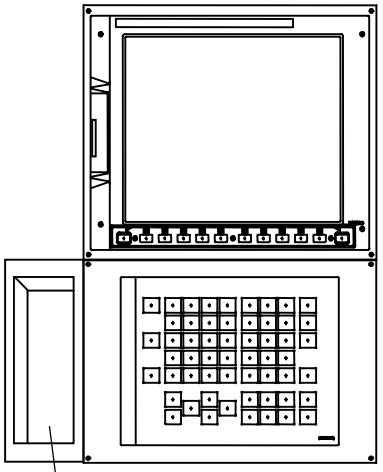
FANUC PANEL *i* is provided with the interface connectors for PC function for example a serial port or a parallel port. But it is not easy to connect/disconnect cables to these connectors for customer or end user after PANEL *i* is integrated in the machine tool because these connectors are arranged on the rear side of PANEL *i*.
Punch panel for PANEL *i* enables user to connect/disconnect cables with ease.

A.2 SPECIFICATION

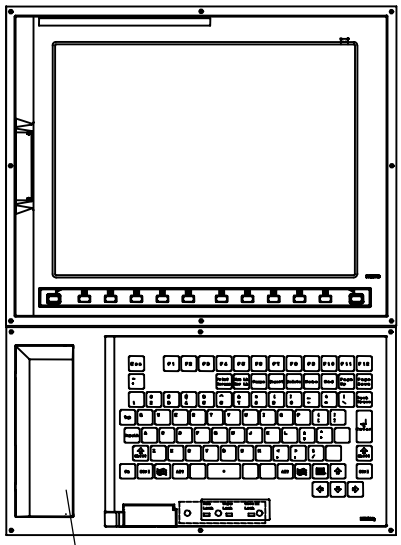
Name	Specification	
Punch panel for PANEL *i*	Punch panel (stand alone type)	A08B-0082-C200
	FA Full keyboard with punch panel (For 15"LCD type, English)	A08B-0082-C151#EC
	FA Full keyboard with punch panel (For 15"LCD type, Japanese)	A08B-0082-C151#JC
	Cable for serial/USB interface	A08B-0082-K810
	Cable for parallel interface	A08B-0082-K811
	Cable for Keyboard/Mouse	A08B-0082-K812

A.3 CONSTRUCTION

Punch panel (stand alone type) and FA Full keyboard with punch panel is as bellow figure.



Punch panel
(stand alone type)
USB x2
Serial port
Parallel port
Keyboard/Mouse



FA Full keyboard with
punch panel (15”LCD type)
USB x2
Serial port
Paralle port

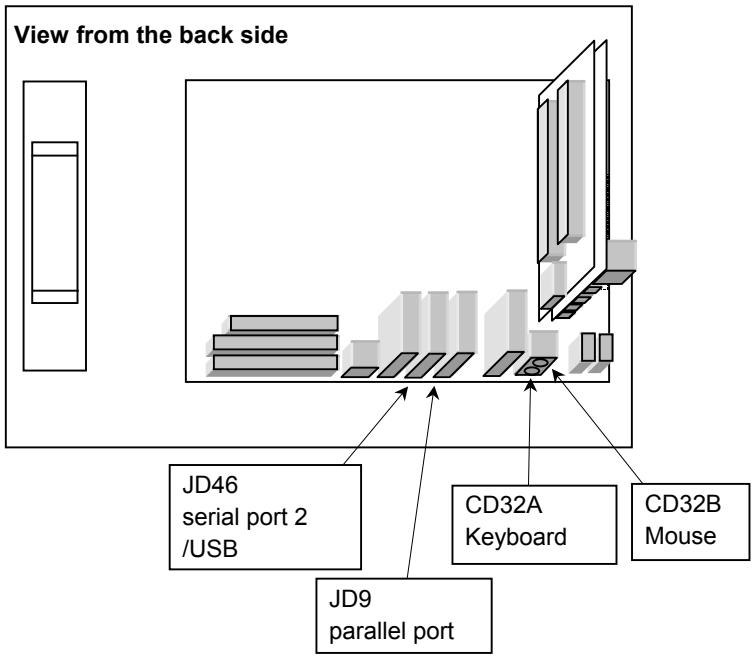
A.4 ENVIRONMENTAL REQUIREMENT

This unit should be mounted to the hermetically sealed cabinet because the connectors on the rear side of this punch panel are not covered with plates. The front door of this unit should be closed when the machine tool are operated. Environmental requirement of this unit is depend on that of PANEL *i*.

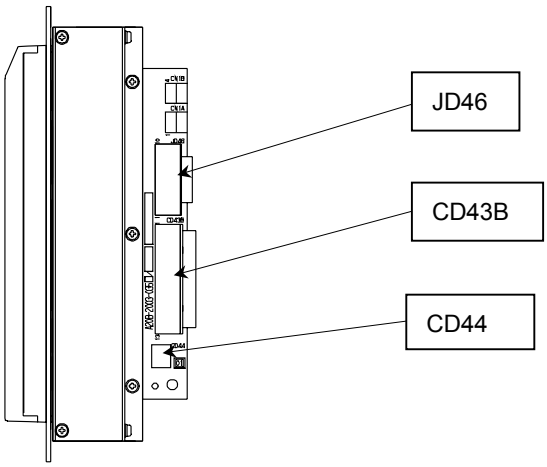
A.5 CONNECTION TO PANEL *i*

A.5.1 Connector Location

PANEL *i*



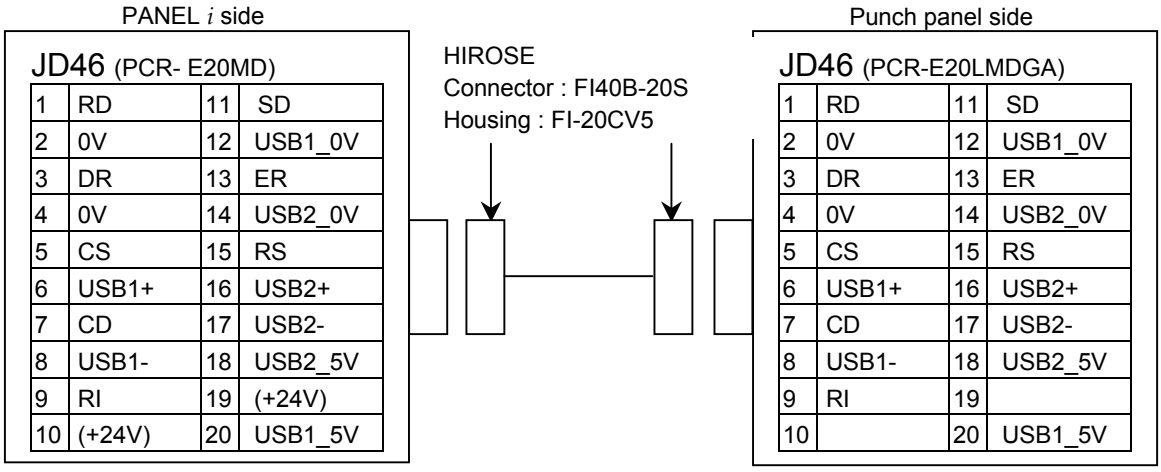
Punch panel



NOTE
In case of FA Full keyboard with punch panel(A08B-0082-C151#EC, A08B-0082-C151#JC) , there is not the connector "CD44".

A.5.2 Serial Port 2 + USB

Signal connections



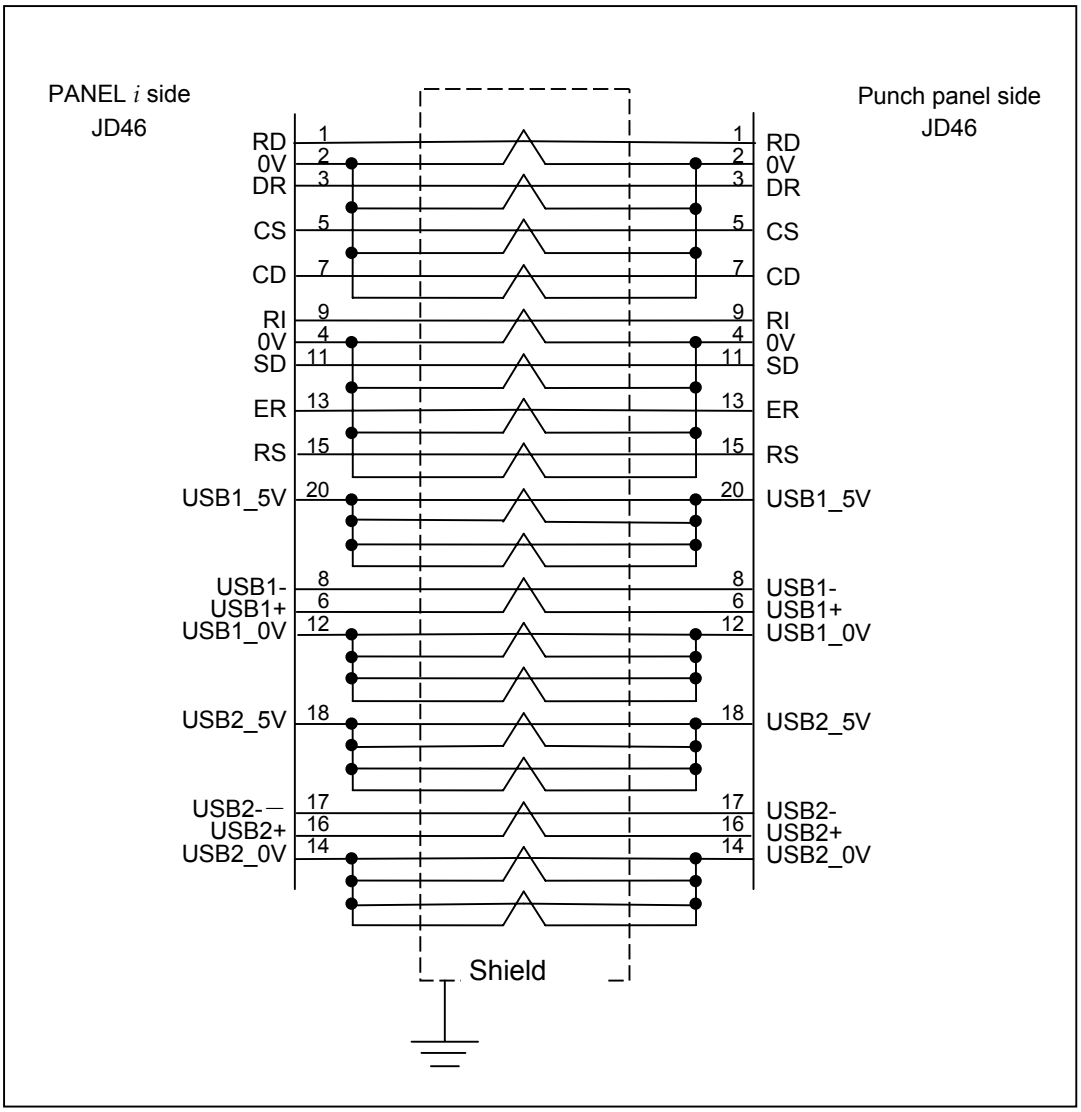
1	RD	11	SD
2	0V	12	USB1_0V
3	DR	13	ER
4	0V	14	USB2_0V
5	CS	15	RS
6	USB1+	16	USB2+
7	CD	17	USB2-
8	USB1-	18	USB2_5V
9	RI	19	(+24V)
10	(+24V)	20	USB1_5V

1	RD	11	SD
2	0V	12	USB1_0V
3	DR	13	ER
4	0V	14	USB2_0V
5	CS	15	RS
6	USB1+	16	USB2+
7	CD	17	USB2-
8	USB1-	18	USB2_5V
9	RI	19	
10		20	USB1_5V

Recommended cable

A08B-0082-K810 (Cable length : 80cm)

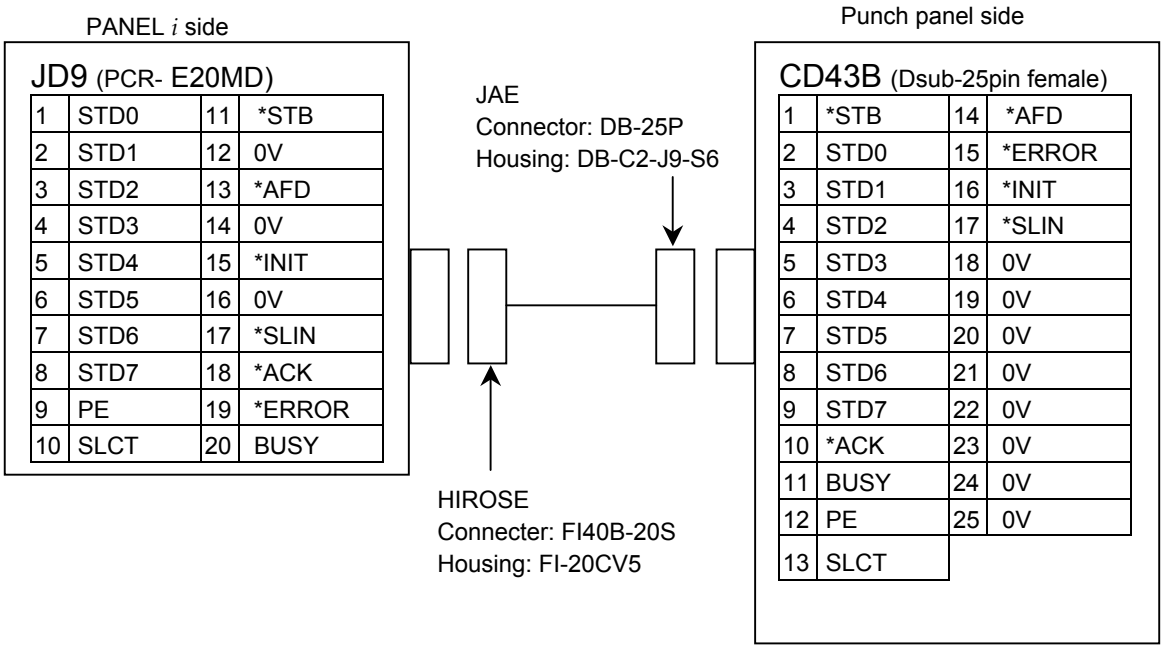
Cable connecting



Recommended Wire
A66L-0001-0285#25P : AWG28 25 pairs

A.5.3 Parallel Port

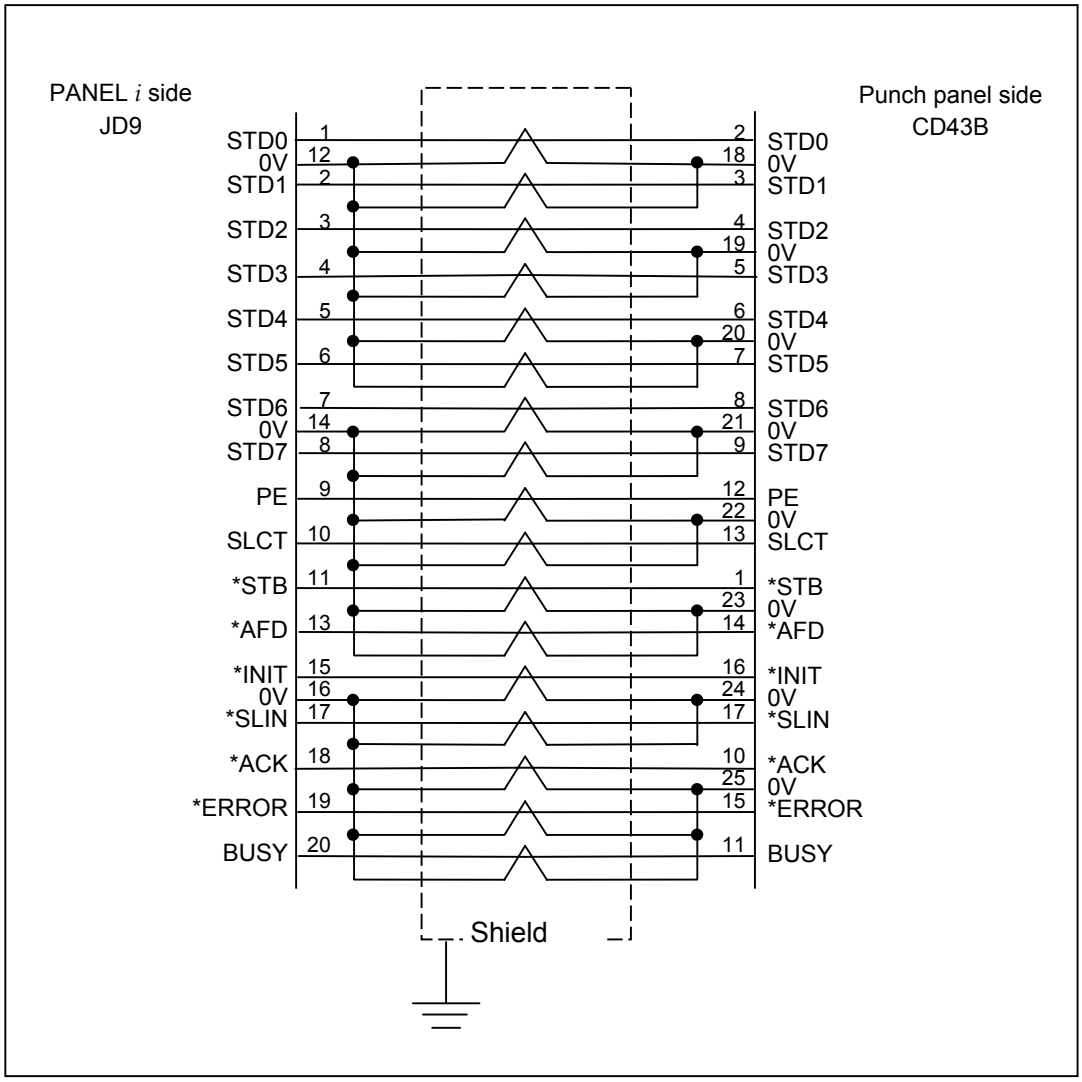
Signal connections



Recommended cable

A08B-0082-K812 (Cable length : 80cm)

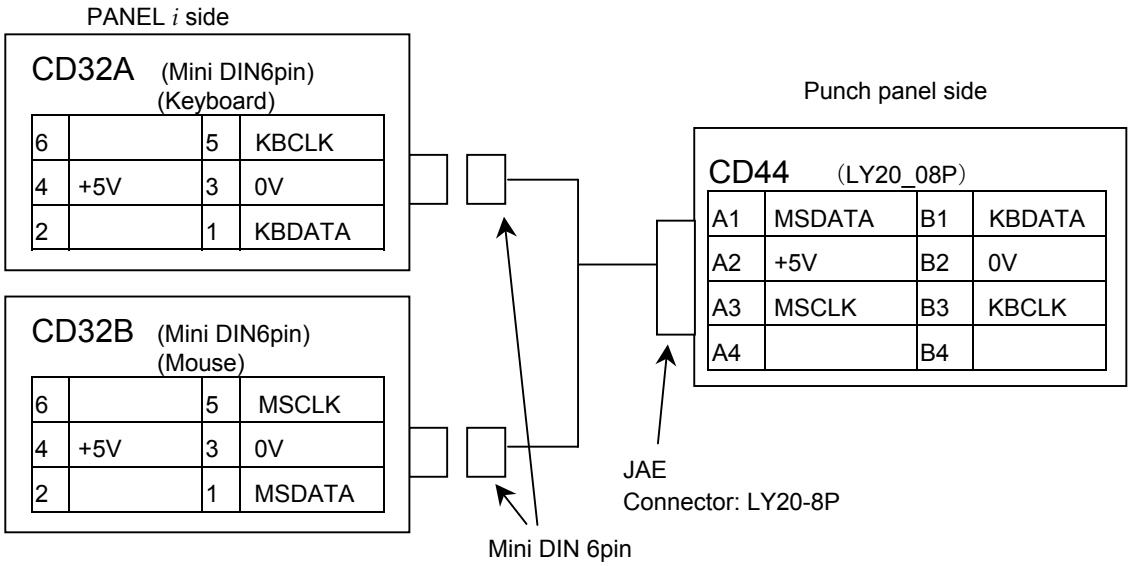
Cable Connecting



Recommended Wire
A66L-0001-0285#25P: AWG28 25 pairs

A.5.4 Keyboard / Mouse (For Stand-alone Type Punch Panel)

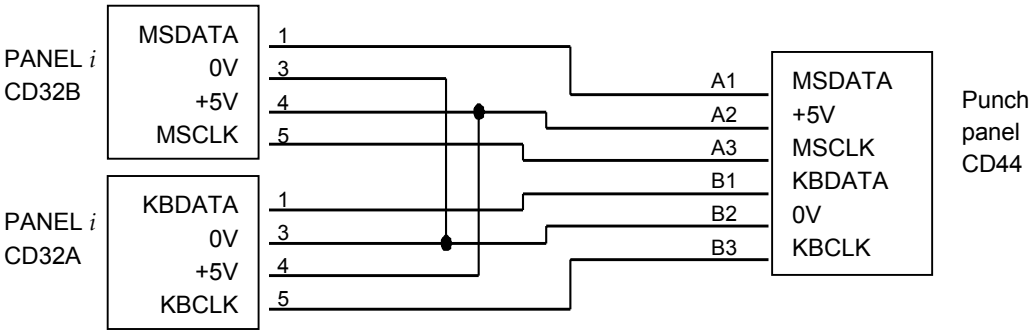
Signal connections



Recommended cable

A08B-0082-K812 (Cable length : 80cm)

Cable connecting

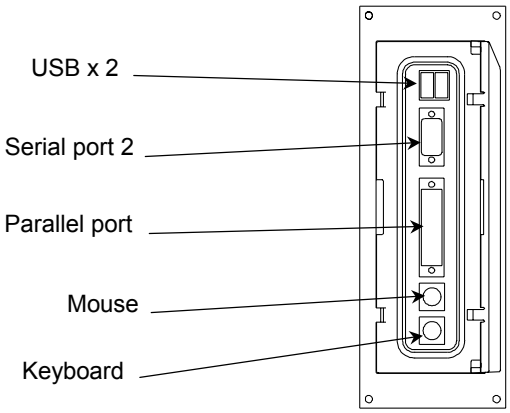


Recommended wire: AWG28 6 cores

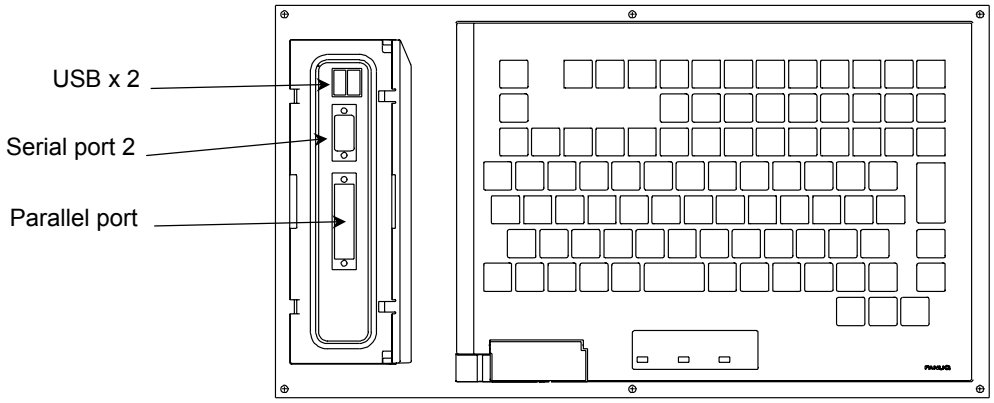
A.6 CONNECTION TO PERIPHERAL

A.6.1 Connector Location

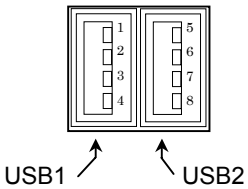
Punch panel (stand-alone type)



FA Full keyboard with punch panel (15"LCD type)

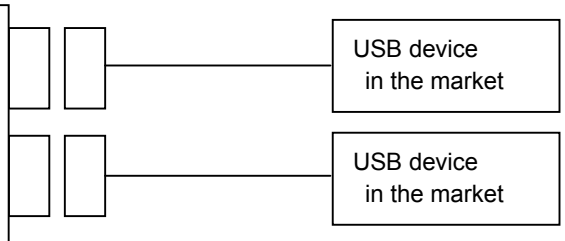


A.6.2 USB Port



CD41 (USB×2)

1	USB1_5V	5	USB2_5V
2	USB1-	6	USB2-
3	USB1+	7	USB2+
4	USB1_0V	8	USB2_0V

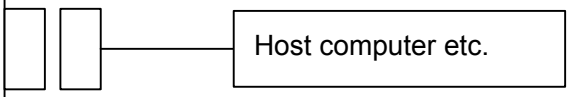


* Output voltage is Min. 4.81V (500mA / 25°C).

A.6.3 Serial Port 2

CD42 (D-sub9pin Male)

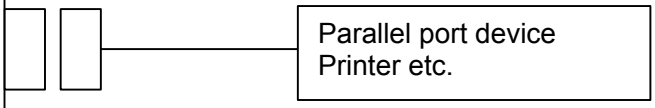
6	DR	1	CD
7	RS	2	RD
8	CS	3	SD
9	RI	4	ER
		5	SG



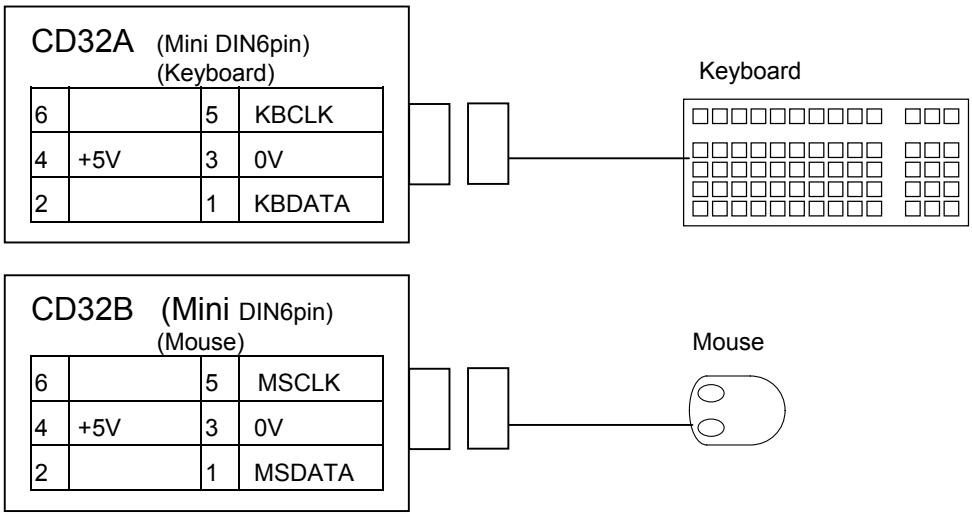
A.6.4 Parallel Port

CD43A (D-sub25pin Female)

14	*AFD	1	*STROBE
15	*ERROR	2	Data 0
16	*INIT	3	Data 1
17	*SLCT IN	4	Data 2
18	0V	5	Data 3
19	0V	6	Data 4
20	0V	7	Data 5
21	0V	8	Data 6
22	0V	9	Data 7
23	0V	10	*ACK
24	0V	11	BUSY
25	0V	12	PE
		13	SLCT



A.6.5 Keyboard / Mouse (for Stand-alone Type Punch Panel for PANEL *i*)



Recommended Keyboard

A86L-0001-0210 - 101 type(in the market):
Only for application development or maintenance.

A86L-0001-0211 - 106 type(in the market):
Only for application development or maintenance.

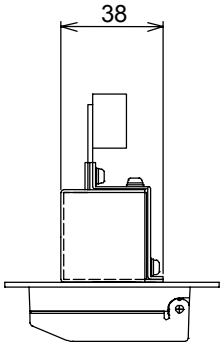
Recommended Mouse

A86L-0001-0212 - Standard PS/2 Mouse
Only for application development or maintenance.

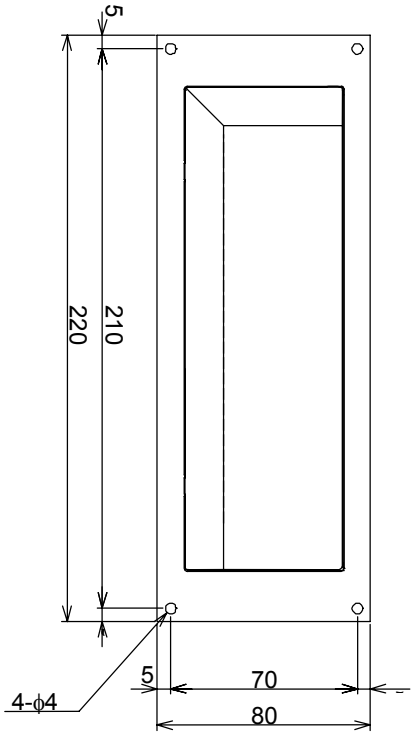
NOTE
Commercial devices cannot be guaranteed its proper work. Careful checking by the customer will be required. And please be aware that those devices in the market are not almost considered about waterproof and dustproof.

A.7 OUTLINE DIMENSIONS

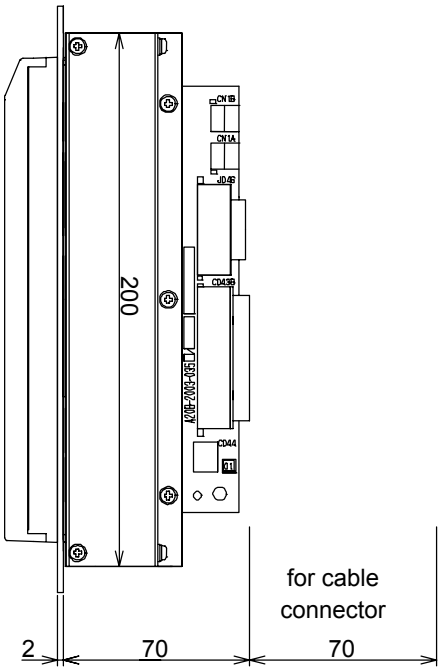
A.7.1 Punch Panel (Stand-alone Type)



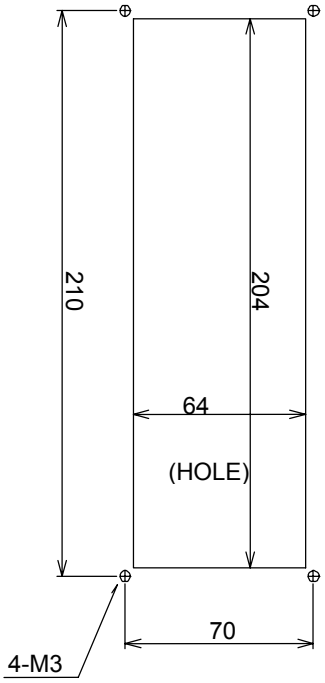
Upper View



Front View



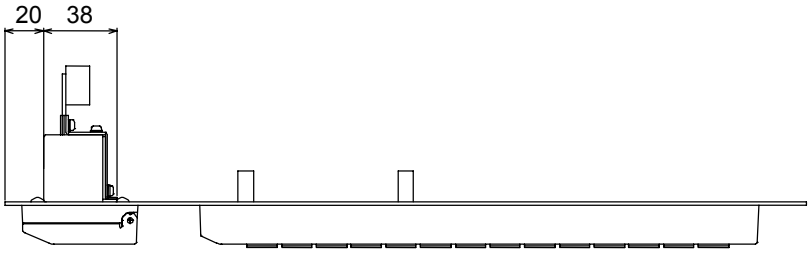
Side View



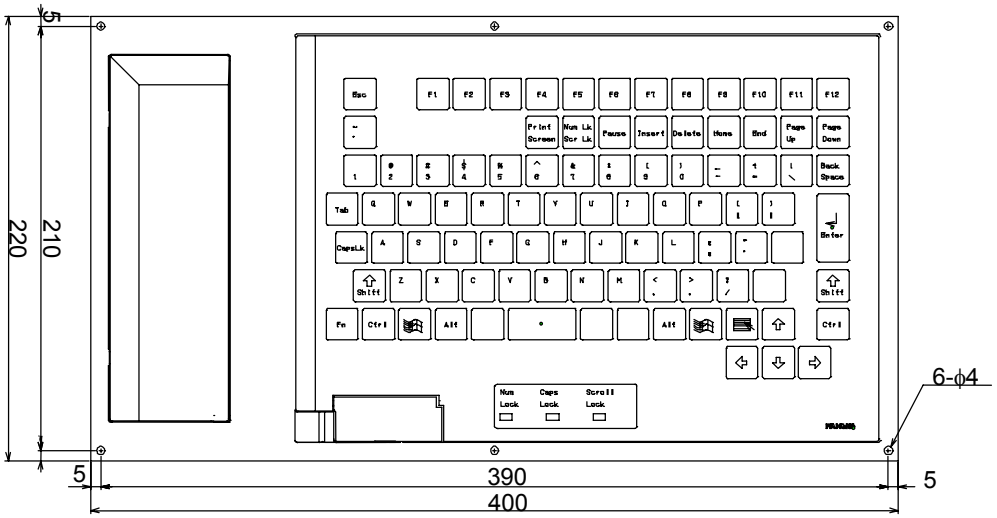
Panel Cutting

Weight: 0.6Kg
Unit : mm

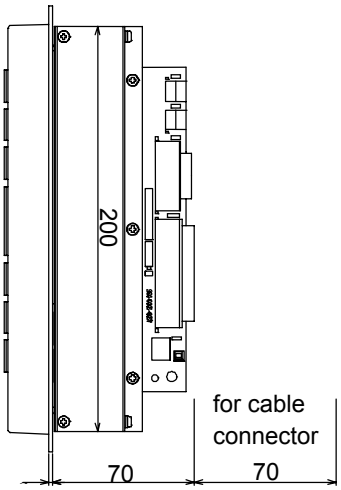
A.7.2 FA Full keyboard with Punch Panel (15”LCD Type)



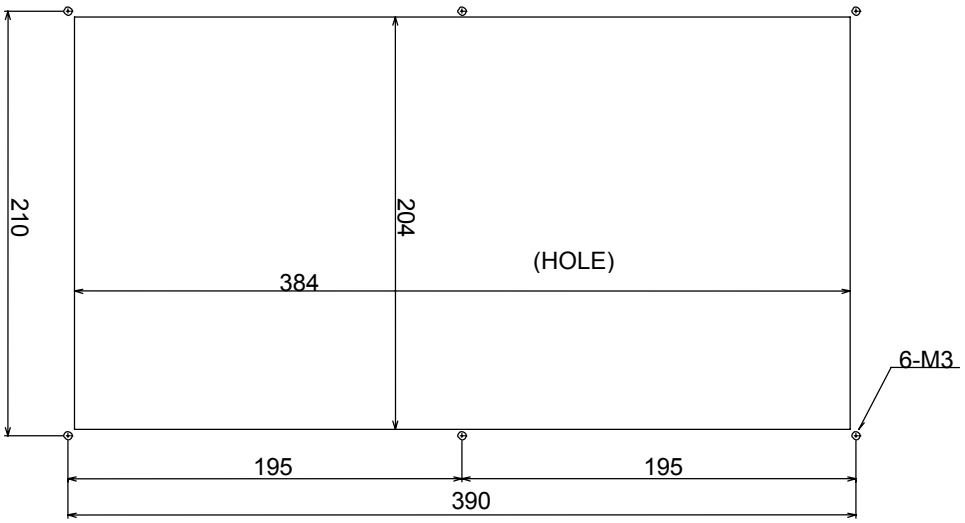
Upper View



Front View



Side View

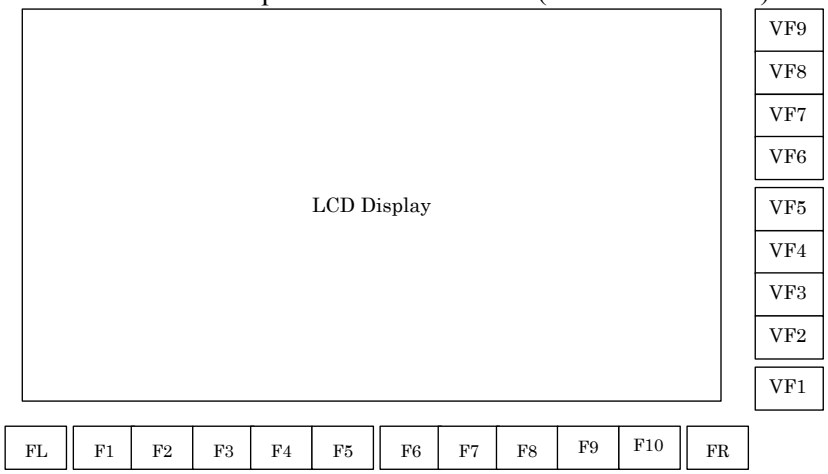


Panel Cutting

Weight: 3.2Kg
Unit : mm

B KEY CODES OF THE SOFT-KEYS

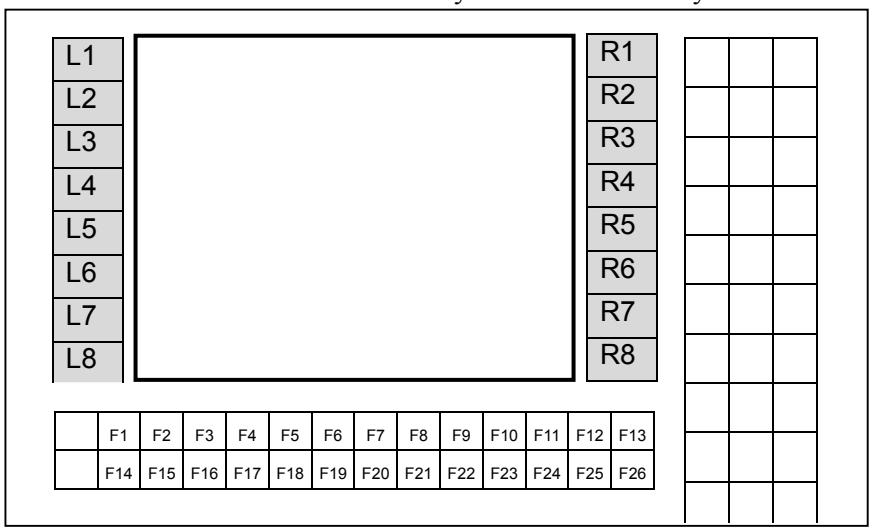
The key codes that are got when the Soft-key is pressed at the PANEL *i* are listed as follows.
As for the other key codes from MDI keyboard part, refer to each corresponding MDI key definition file that are located on the folder "MDI¥Common" of Open CNC Drivers Disk (A08B-0084-K790).



Key name	Character code		Corresponding key on PC full keyboard	Applied CNC	
	No SHIFT key pressed	SHIFT key pressed		150*i*/160*i*/ 180*i*/210*i*	300*i*
FL	8500	8700	F11	O	O
F1	3B00	5400	F1	O	O
F2	3C00	5500	F2	O	O
F3	3D00	5600	F3	O	O
F4	3E00	5700	F4	O	O
F5	3F00	5800	F5	O	O
F6	4000	5900	F6	O	O
F7	4100	5A00	F7	O	O
F8	4200	5B00	F8	O	O
F9	4300	5C00	F9	O	O
F10	4400	5D00	F10	O	O
FR	8600	8800	F12	O	O
VF1	64FE	64FF	F13	X	O
VF2	65FE	65FF	F14	X	O
VF3	66FE	66FF	F15	X	O
VF4	67FE	67FF	F16	X	O
VF5	68FE	68FF	F17	X	O
VF6	69FE	69FF	F18	X	O
VF7	6AFE	6AFF	F19	X	O
VF8	6BFE	6BFF	F20	X	O
VF9	6CFE	6CFF	F21	X	O

C KEY CODE OF SOFT KEYS AND FUNCTION KEYS OF PANEL *i* FOR AUTOMOTIVE

Key code of the soft keys at screens side are as follows.



Relation of Soft Keys and their Code

Key	Code	Key	Code
L1	Shift + F1	R1	Ctrl + F1
L2	Shift + F2	R2	Ctrl + F2
L3	Shift + F3	R3	Ctrl + F3
L4	Shift + F4	R4	Ctrl + F4
L5	Shift + F5	R5	Ctrl + F5
L6	Shift + F6	R6	Ctrl + F6
L7	Shift + F7	R7	Ctrl + F7
L8	Shift + F8	R8	Ctrl + F8

Key code of the function keys at the bottom of screen are as follow

Key	Code	Key	Code	Key	Code
F1	F1	F11	F11	F21	Ctrl+Alt+F11
F2	F2	F12	F12	F22	Ctrl+Alt+F12
F3	F3	F13	Ctrl+Alt+F3	F23	Shift+F11
F4	F4	F14	Ctrl+Alt+F4	F24	Shift+F12
F5	F5	F15	Ctrl+Alt+F5	F25	Ctrl+F11
F6	F6	F16	Ctrl+Alt+F6	F26	Ctrl+F12
F7	F7	F17	Ctrl+Alt+F7		
F8	F8	F18	Ctrl+Alt+F8		
F9	F9	F19	Ctrl+Alt+F9		
F10	F10	F20	Ctrl+Alt+F10		

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Revision Record

FANUC PANEL *i* CONNECTION AND MAINTENANCE MANUAL (B-64223EN)

01	Sep., 2004	———————————			
Edition	Date	Contents	Edition	Date	Contents