

FURUNO

OPERATOR'S MANUAL

INTERFACE UNIT

MODEL IF-7000



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NISHINOMIYA, JAPAN

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-Your Local Agent/Dealer

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IF-7000





SAFETY INSTRUCTIONS

"DANGER", "WARNING" and "CAUTION" notices appear throughout this manual. It is the responsibility of the operator of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.

The level of risk appearing in the notices is defined as follows:



DANGER

This notice indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.

 **WARNING**



Do not open the equipment.

Hazardous voltage which can cause electrical shock, burn or serious injury exists inside the equipment. Only qualified personnel should work inside the equipment.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

Turn off the power immediately if water leaks into the equipment or the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock.

Do not place liquid-filled containers on the top of the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.

Do not operate the equipment with wet hands.

Electrical shock can result.

Keep heater away from equipment.

Heat can alter equipment shape and melt the power cord, which can cause fire or electrical shock.

 **CAUTION**

Use the proper fuse.

Use of a wrong fuse can result in fire or permanent equipment damage.

Do not use the equipment for other than its intended purpose.

Personal injury can result if the equipment is used as a chair or stepping stool, for example.

Do not place objects on the top of the equipment.

The equipment can overheat or personal injury can result if the object falls.

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Specifications

The FURUNO Interface Unit IF-7000 receives inputs of own ship's position, speed and course data (fed from navigation devices; GPS, Satellite Navigator, Loran, Decca, etc.), water temperature, water current speed and direction, and wind speed and direction (fed from measuring instruments; Water Temperature Indicator, Current Indicator, Wind Indicator, etc.) and outputs them to devices such as Video Plotter and Course Plotter. It also converts CIF data to NMEA0183 data and vice versa.

- | | |
|--|--|
| 1. Data Format | CIF format
NMEA0183 format
User format (by special order)
<i>format according to port</i> |
| 2. Signal Level | Current loop
RS-232C level (by special order) |
| 3. I/O Port | Input: 8 ports standard, 16 ports maximum
Output: 10 ports standard, 18 ports maximum
Port 1: RS-232C level (I/O), by special order
Port 2: with DTR/DSR (I/O)
Ports 3–9: no DTR/DSR (I/O)
Port 10 no DTR/DSR (output only)

NOTE: <i>Ports 1–10 have two ports each, A and B.</i> |
| 4. Power Supply and Power Consumption | 100, 110 VAC, 1 ϕ , 50/60 Hz, less than 65 VA |
| 5. Dimensions and Weight | 344 mm (W) \times 163 mm (H) \times 330 (D), 8.5 kg |
| 6. Color | 2.5GY5/1.5 Newtone No. 3 |

Operation

Power The power to the interface unit is turned on or off by the switch behind the front panel. (In normal operation, nothing is required of the operator.)

Ports The standard supply IF-7000 comes with five I/O Boards. Each board contains two ports, for a total of 10 ports. Note however that port 10 is an output port, so there are 8 input ports.

Additional ports are available by installing I/O Boards. Up to five additional boards may be installed, thus the maximum number of input and output ports is 18 and 20, respectively.

Table 1 Number of I/O ports available

No. of I/O Boards	No. of Input Ports	No. of Output Ports
Five (standard)	8	10
Ten (maximum)	18	20

Data The IF-7000 can read CIF, NMEA0183 and user format data (special order unit). The data format each port handles depends on the type of I/O Board installed in the port. The CIF I/O Board outputs CIF data, and the NMEA I/O Board outputs NMEA0183 data.

The data signal level is current loop for ports 2–10 and RS-232C for port 1.

Table 2 Port number and I/O data

Port	I/O Data
1	RS-232C (by special order)
2	CIF (w/DTR/DSR control)
3–9	CIF, NMEA0183, or user format (no DTR/DSR control)
10	Output only

Data distribution

Input data is distributed to all ports except the source port and output.

Example: Data input to port 2A is output by all ports except 2A.

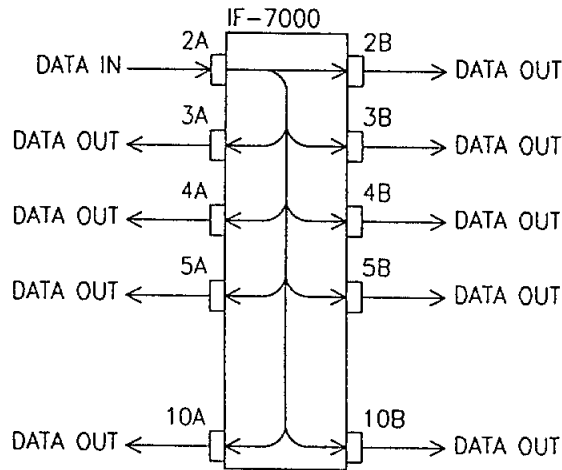


Figure 1 Example of data distribution

Data conversion

The IF-7000 converts CIF data to NMEA0183 data and vice versa. Figures 2 and 3 show how the IF-7000 converts data.

Example 1: CIF data input at port 2A is converted to NMEA0183 data at ports 3A, 3B, 5A and 5B and output.

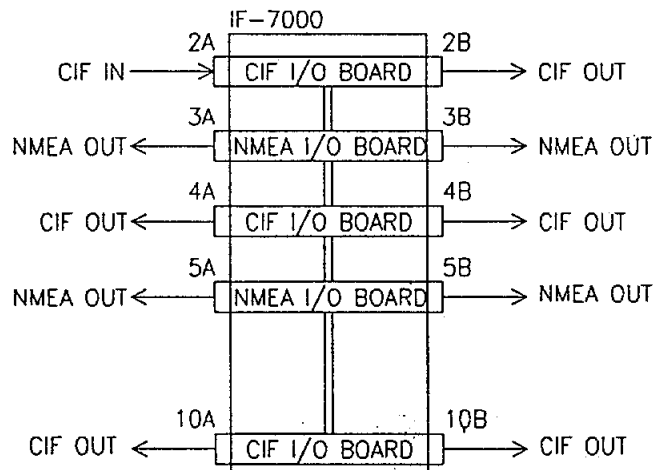


Figure 2 Example of data conversion (1)

Example 2: NMEA 0183 data input to the CIF I/O Board installed on port 2A is not received; that is, that data is not output.

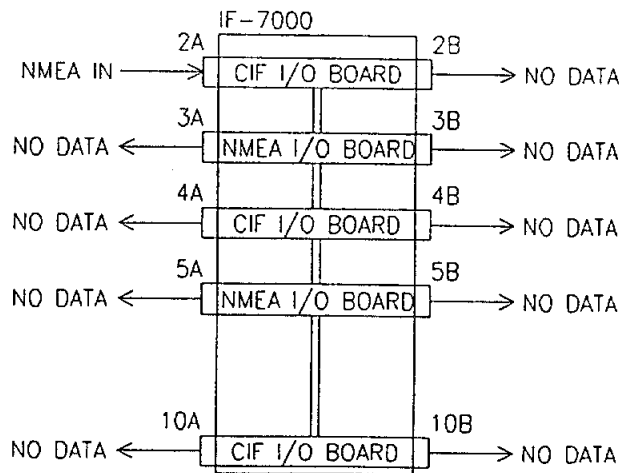


Figure 3 Example of data conversion (2)

Tables 3 and 4 shows what CIF and NMEA0183 data the IF-7000 can convert.

Table 3 Data converted from CIF to NMEA0183

CIF Data		NMEA 0183 Data
Time		IIZDA
Present position	Decca GPS Loran A Loran C Omega Dead Reckoning	DEGLL GPGLL LAGLL LCGLL OMGLL TRGLL
Range & bearing from present position to TO WPT#	Decca GPS Loran A Loran C Omega Dead Reckoning	DEWPL GPWPL LAWPL LCWPL OMWPL TRWPL
Speed & course†	Decca GPS Loran A Loran C Omega Dead Reckoning Current Indicator	DEVTG GPVTG LAVTG LCVTG OMVTG TRVTG VDVTG
Water temperature		YCMTW
Water depth		SDDBS
Current data‡	Speed only Direction Water tracking ship's speed	VDVCD VDVDR VDVHW
Wind data§	Relative bearing and velocity True bearing and velocity	IIVWR IIVWT

Not output

† Ground tracking data only

‡ 1st layer only

§ Model FW-200 outputs only true wind speed and direction

Table 4 Data converted from NMEA0183 to CIF

NMEA 0183 Data	CIF Data	
**ZDA	Time	
DEGLL GPGLL LAGLL LCGLL OMGLL IIIGLL TRGLL	Present position	Decca GPS Loran A Loran C Omega Dead Reckoning Dead Reckoning
DEWPL GPWPL LAWPL LCWPL OMWPL TRWPL	Range & bearing from present position to TO WPT#	Decca GPS Loran A Loran C Omega Dead Reckoning
DEVTG GPVTG LAVTG LCVTG TRVTG	Speed & course	Decca GPS Loran A Loran C Dead Reckoning
**MTW	Water temperature	
**DBS **DBT **DBK	Water depth†	
**VHW	Water tracking ship's speed	
**VWT	Wind data	Relative bearing and velocity True bearing and velocity

Not output

** Any ID talker

† Received in order of DBS, DBT, DBK

Maintenance & Troubleshooting

Fuse replacement

A 2A fuse in the unit protects it from overvoltage. If the fuse blows find out the cause before replacing it.

■ **CAUTION:** *Never use a fuse rated for more than 2A. Serious damage to the equipment can result.*

LED

LEDs on each printed circuit board inside the unit light, blink or are off to show operational status. The LEDs also function to show the results of the self test.

All boards have four LEDs except the SYSTEM Board which has one. That LED lights to show the board is receiving 5V electrical power.

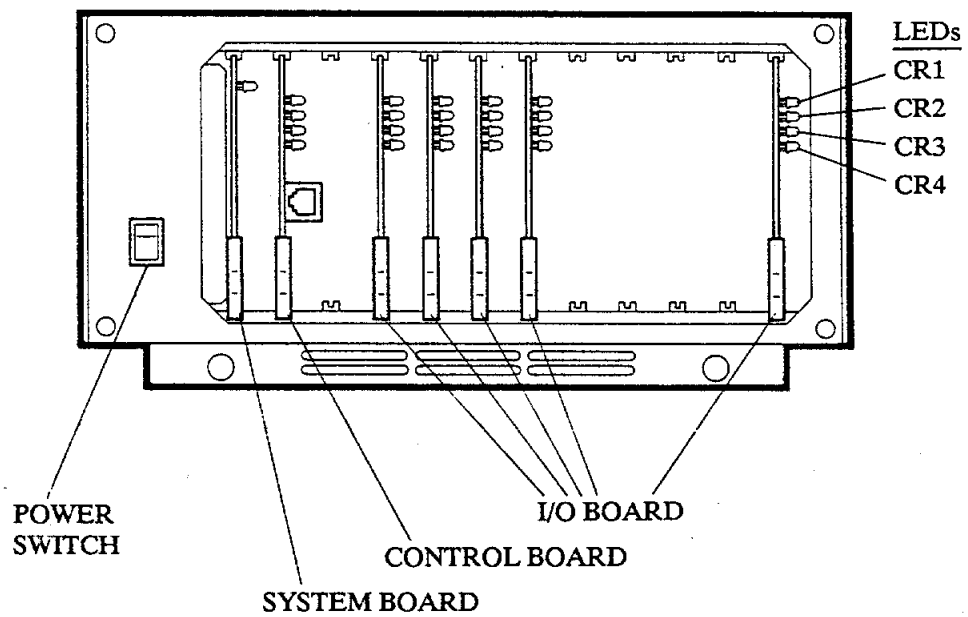


Figure 4 IF-7000, front view, front panel removed

Table 5 LED status and equipment status

LED	LED Status	Equipment Status
CR1	Blinking every second	Normal operation
CR2	Lighting	I/O trouble
CR3	Blinking every five seconds	Input buffer overload; processing cannot be performed because of data overload.
CR4	Lighting	Output buffer overload; DSR is off.
	Blinking every second	Data overload; only important data are output.

Self test

The built-in self test facility checks the unit for proper operation. Two types of tests are available: self test and I/O test.

Whenever test results show error, stop the interface unit, then contact a service technician.

self test

This test is automatically executed each time you turn on the power. Below is the sequence of events in the self test.

— sequence of events —

1. All LEDs light for two seconds then extinguish.
2. The following devices are checked
 - ROM
 - RAM, and
 - Common RAM.
3. Normal operation begins. LED CR1 on the CONTROL and I/O Boards blinks every second.

If the unit detects device error, LEDs CR1 and CR2 indicate the offending device as shown in Table 6.

Table 6 LED status for ROM, RAM, Common RAM error

LED CR1	LED CR2	Offending Device
Blinking	Off	None (normal operation)
Off	Lighting	ROM
Off	Blinking	RAM
Blinking	Blinking	Common RAM
Blinking	Lighting	ROM and RAM
Lighting	Off	ROM and Common RAM
Lighting	Blinking	RAM and Common RAM
Lighting	Lighting	ROM, RAM and Common RAM

■ **NOTE:** If LEDs CR1 and CR2 show device error, try replacing the offending board as shown in Table 7 to restore normal operation.

Table 7 Replacement boards

Board Name	Type	Code No.	Qty	Remarks
IF-70001	50P9033	000-041-384	1	CIF I/O Board
IF-70003	50P9033A	000-041-385	1	NMEA0183 I/O Board

I/O test

This test checks ports for proper input and output of data, as well as the devices checked in the power-on self test. To enable the test, you will need a jumper connector as shown in Figure 5.

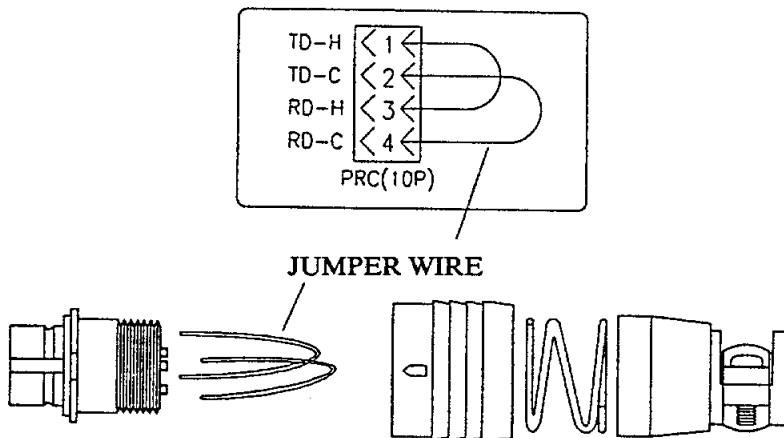
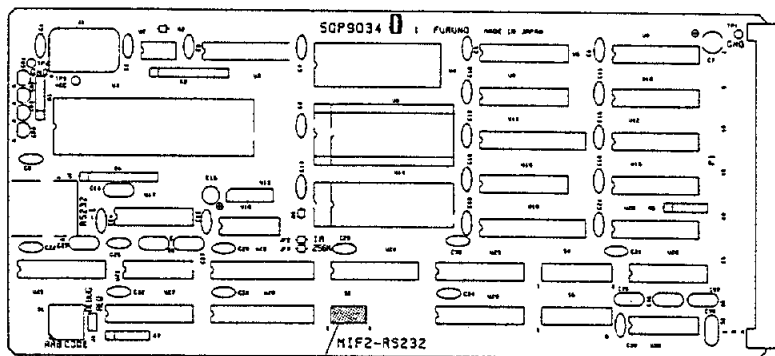


Figure 5 Jumper connector for I/O test

— to execute the test —

1. Disconnect I/O cable of the port to be tested then connect the jumper connector.
2. Turn off the power if it is not already off. Turn on DIP Switch S2 #1, then turn on the power.



Turn #1 on then turn on the power.

Figure 6 I/O board, showing location of DIP switch S2

3. To return to normal operation, turn off DIP Switch S2 #1 then turn off and on the power.

— sequence of events —

1. All LEDs light for two seconds then extinguish.
2. The following devices are checked
 - ROM
 - RAM
 - Common RAM, and
 - I/O Test (loopback test by jumper connection).
3. The test is repeated. If the unit detects I/O error, LEDs CR3 and CR4 indicate the offending port as shown in Table 8.

Table 8 I/O error and LED status

LED CR3	LED CR4	Offending Port
Off	Off	None (normal operation)
On	Off	Port A
Off	On	Port B
On	On	Ports A and B

■ **NOTE:** If LEDs CR3 and CR4 show port error, try replacing the offending board as shown in Table 7 to restore normal operation.

Priority

The data input to each port is processed according to priority order. A rotary switch (S4) on each I/O Board contains 16 settings for assigning board priority; setting 1 for highest, setting 16 for lowest. In the factory setting, priority order is assigned by port number; port 1, highest, port 5, lowest. If additional I/O Boards are installed we recommend that you use that method, to avoid confusion.

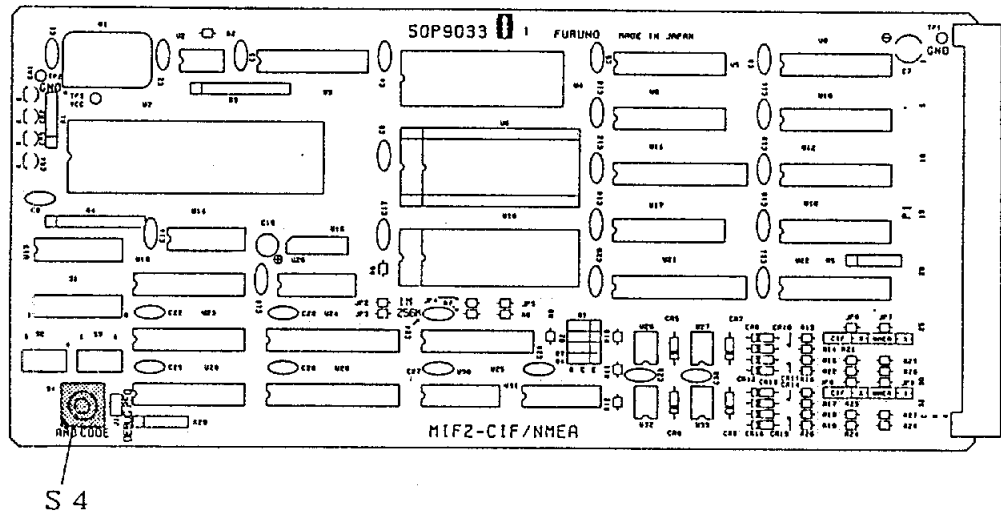


Figure 7 I/O board, showing location of switch S4

reason for priority order

Data is assigned priority order to determine which data to receive if several ports simultaneously receive the same type of data. For example, two ports receive Loran C position data. In this case, the data received from the board having the highest priority is received; the lower priority data is disregarded. In the case of Loran C and GPS position data, however, they have the same priority so both are received.

Difference between CIF I/O and NMEA0183 I/O boards

Some jumper wires are deleted and the program ROM (U8) is different depending on board. Figure 8 shows the location of the jumper wires and program ROM on the I/O Board.

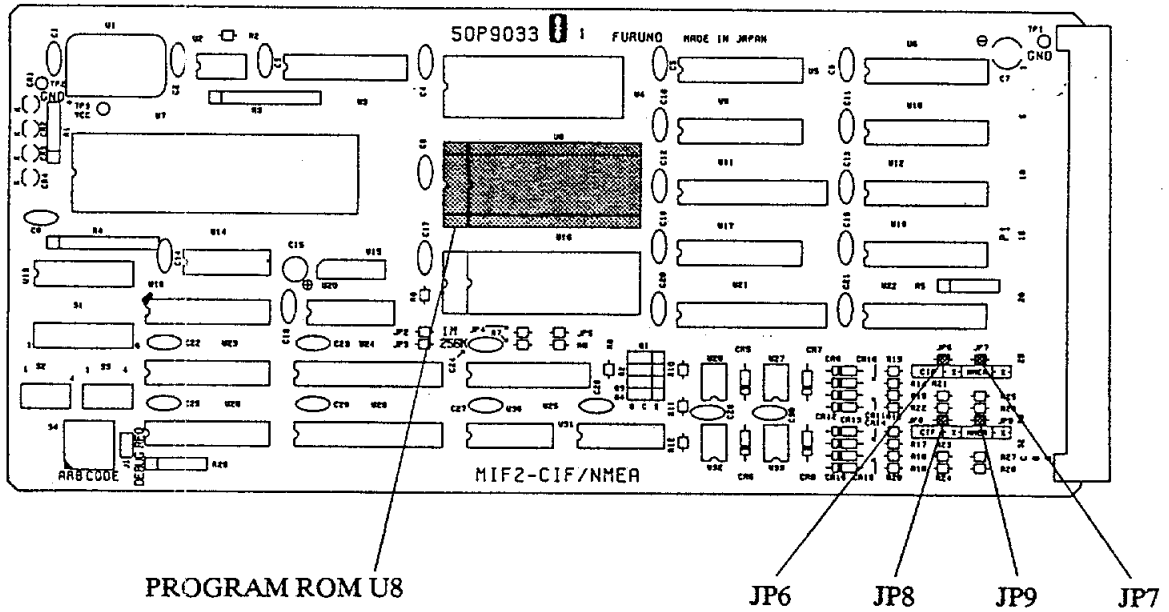


Figure 8 I/O Board, showing location of jumper wires and PROM

Table 9 compares the CIF I/O and NMEA I/O Boards.

Table 9 Comparison of CIF I/O and NMEA0183 I/O boards

Board	JP6	JP7	JP8	JP9	ROM Control No.	Board Name
CIF I/O Board	NO	YES	NO	YES	14502111**	IF-70001
NMEA I/O Board	YES	NO	YES	NO	14502131**	IF-70003

** Indicates version number

ROM code no. differs with each version number. Confirm current version number.

Installation

Mounting location

The IF-7000 is designed for tabletop mounting. When selecting a mounting location, select a location where the LEDs can be easily viewed and checking and maintenance can be easily performed. In addition to those points, the mounting location should satisfy the following conditions.

- The location should be free of water and water splash.
- Select a location where the temperature and humidity are moderate and stable.
- Locate the unit away from exhaust vents, air conditioner, heater, etc.
- The location should be well ventilated.
- Select a location where vibration and shock are minimal.
- Install the unit horizontally to allow circulation of cooling air.
- A ventilation fan is installed on the left side of the unit. Leave at least 8 cm space on that side of the unit.

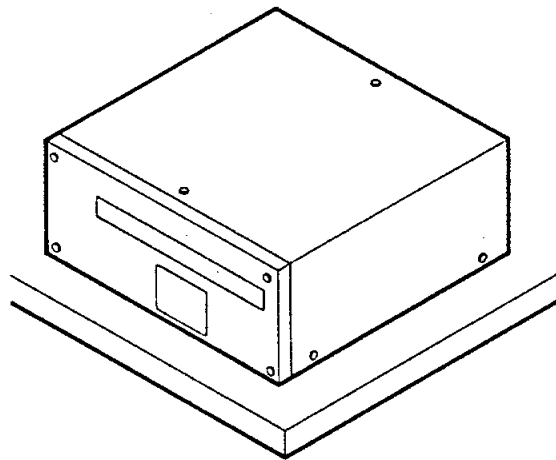
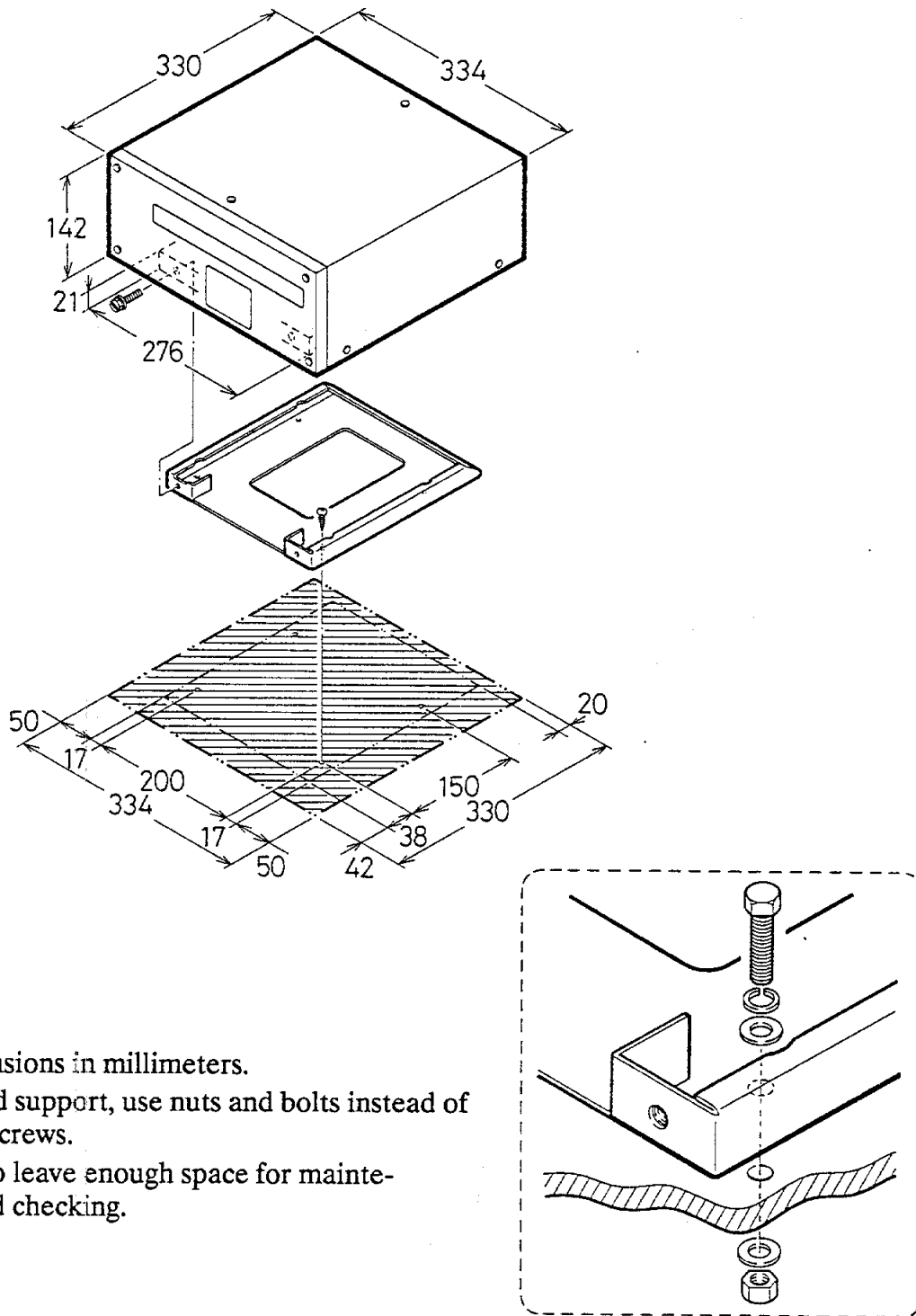


Figure 9 IF-7000, mounted on a tabletop

Mounting

mounting procedure

1. Separate the unit from the mounting base by loosening two screws. (Save screws for later use.)
2. Fix the mounting base to the mounting location with tapping screws (supplied) or nuts and bolts (local supply).
3. Fix the unit to the mounting base with the two screws loosened in step one.



- All dimensions in millimeters.
- For added support, use nuts and bolts instead of tapping screws.
- Be sure to leave enough space for maintenance and checking.

Figure 10 How to mount the IF-7000

Cable fabrication

Connect equipment with twisted pair cable, as shown in the procedure and figure which follows.

cable fabrication procedure

1. Process the outer sheath, armor, vinyl sheath and shield as shown in steps 1 – 4 in Figure 11.
2. Expose insulation of cores by 3 mm. Cut off and solder unused cores to the shield. (See "5.")
3. Solder vinyl wire to shield, as shown in "5."
4. Dress the shield with EMI tape. See "6."
5. As shown in "7," pass cable clamp, spring and housing onto cable.
6. Solder cores to pin. Refer to "7."
7. Assemble connector and tighten screws. See "8."

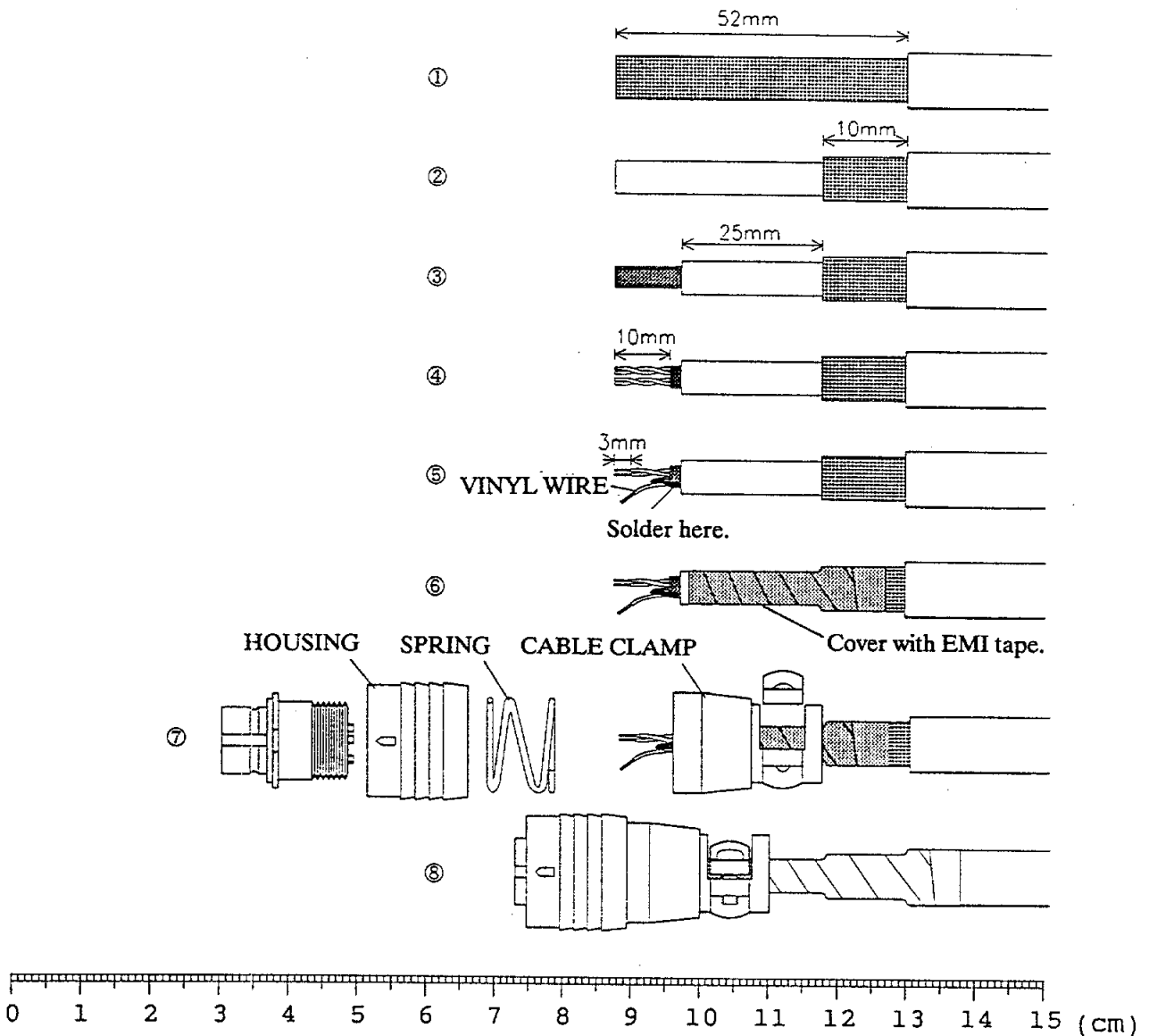


Figure 11 How to fabricate twisted pair cable

Power connection

The power supply should be 100 or 110 VAC. Other power supplies may be used with a rectifier. The power cable (local supply) should be type VCTF-1.25 or equivalent.

Earth

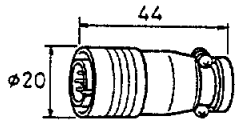
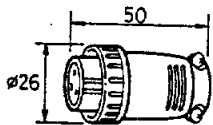
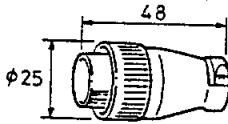
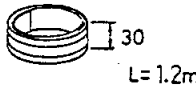
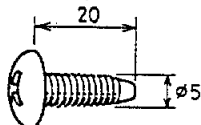



Run a copper plate (supplied) between the ship's hull and the earth terminal on the rear of the unit to prevent noise interference to the IF-7000 and other equipment.

Other

Note that this unit cannot be connected to the GD-101 or GD-102.

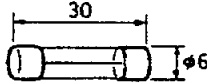
FURUNO

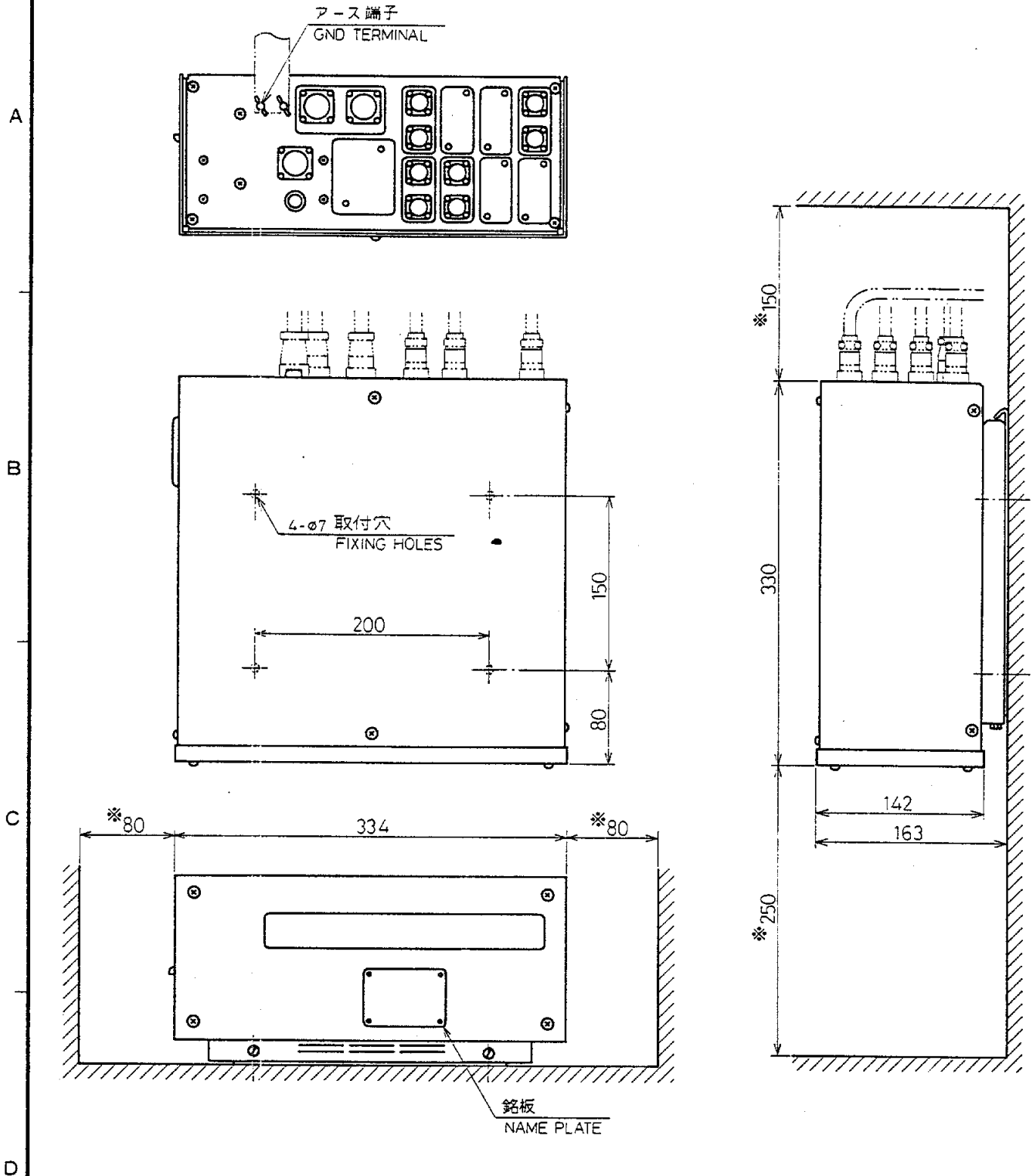
CODE No.	000-041-383	14BJ-X-9401
TYPE	CP14-03400	

工事材料表 INSTALLATION MATERIALS		IF-7000		インターフェイスユニット INTERFACE UNIT	
番号 No.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	コネクター CONNECTOR		PRC03-12A10-5M10.5	8	
			CODE No. 000-110-679		
2	コネクター CONNECTOR		NJC-203-PF	1	
			CODE No. 000-506-703		
3	コネクター CONNECTOR		SRCN6A16-10P	2	
			CODE No. 000-508-663		
4	アース銅板 COPPER STRAP		04S40801 30×1200×0.3	1	
			CODE No. 000-572-187		
5	⊕トラスタッピングネジ ⊕TAPPING SCREW		5×20 SUS304 1種	4	
			CODE No. 000-802-081		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			図番 DWG. No. C4343-M01-A	1/1	
			検図 CHECKED		
					

F U R U N O

CODE NO.	000-041-382	14BJ-X-9301-4
TYPE	SP14-01700	BOX NO. P

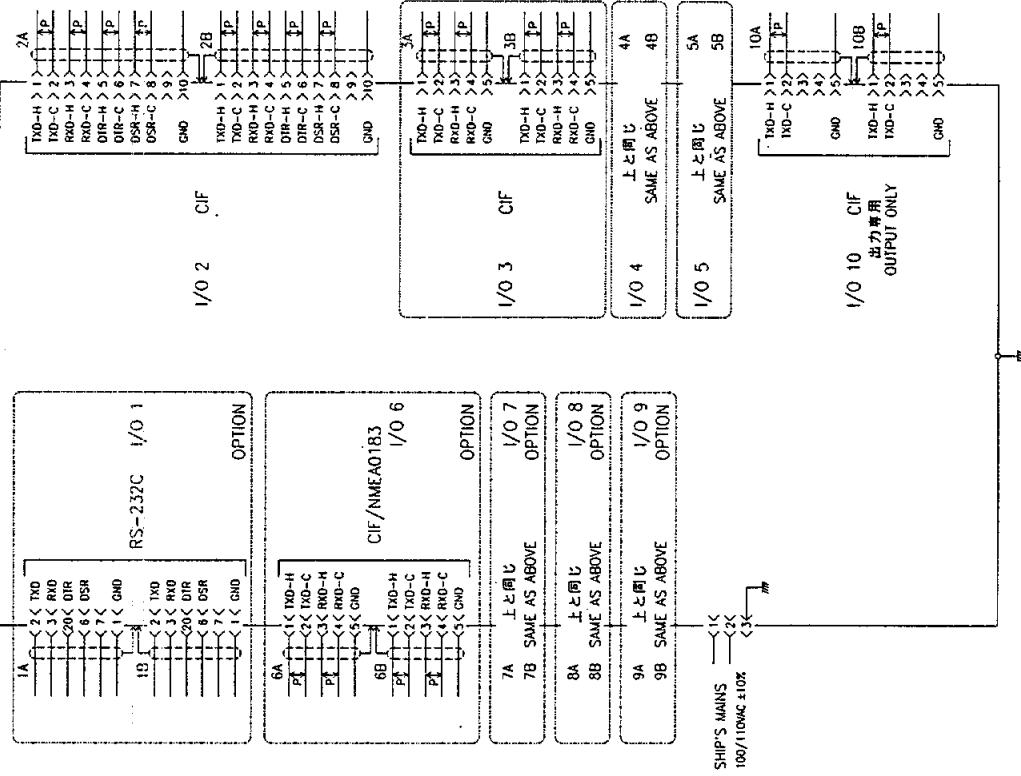
SHIP NO.	SPARE PARTS LIST FOR		U S E			SETS PER VESSEL
	IF-7000	インタフェイスユニット INTERFACE UNIT				
ITEM NO.	NAME OF PART	O U T L I N E	DWG NO. OR TYPE NO.	QUANTITY		REMARKS/CODE NO.
				WORKING	SPARE	
			PER SET	PER VES.		
1	管入りヒューズ GLASS TUBE FUSE		FGBO 2A AC250V	1	3	000-549-020
MFR'S NAME	FURUNO ELECTRIC CO., LTD		DWG NO.	C4343-P01-E		1/1



※ :推奨サービス空間
RECOMMENDED SERVICE SPACE

	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	DEC.17.90 T. WAKAWO	三角法 THIRD ANGLE PROJECTION				名称 TITLE インターフェイス ユニット INTERFACE UNIT
検図 CHECKED	DEC.17.90 N. SAITO	尺度 SCALE 1/5				
製図 DRAWN	Dec.14.90 S. Nishimura	重量 WEIGHT 9 kg			図番 DWG.NO. C4343-G01-C	

インターフェイスユニット INTERFACE UNIT IF-7000



注1:本機は、CIFとNMEA0183のデータを相互に変換することができます。
2:入出力できるデータフォーマットは装備するI/O基板に依ります。
3:NMEA I/O基板はオプションです。
4:最大10枚のI/O基板を装備できます。
5:各I/O基板にはポートが2つつあります。
6:I/O 10A、10Bポート番号(10A、10B)は出力専用です。
7:全てのケーブルは現地手配です。
8:DTR/DSR制御付きポートを使用する際は以下の2点にご注意下さい。
①DTR/DSRを持っていない機械を接続する場合は、
AまたはBのどちらか一方にしか接続できません。また、空いているポートのDTR/DSRは必ずショートして下さい。
②DTR/DSRを持っていない機械と同じ端子の端子のAとBに接続する場合は、
AとBのDTR/DSRは連動しているため、この様な接続はできません。
③DTR/DSRを持っていない機械を接続する場合は、
AとBの両方のDTRとDSRをそれぞれショートして下さい。この場合は両方のポートが使用できません。

9:データを入出力するケーブルは、ツイストペア線を使用して下さい。
10:各ポートとそのコネクタは下表の通りです。

NOTE 1: This interface unit converts CIF to NMEA0183 and vice versa.
2: The data format depends on the I/O board installed.
3: NMEA0183 board is optionally supplied.
4: Max. 10 I/O boards are available.
5: Each I/O board has two ports.
6: I/O 10 (ports 10A and 10B) is for output only.
7: Supply all cables locally.
8: While connecting an equipment to the board providing DTR and DSR, only following two cases are available.
Case 1: Connecting an equipment providing DSR and DTR.
Connect only one equipment to either port A or B. Short DTR and DSR of the vacant port.
Case 2: Connecting an equipment without DTR and DSR.
Short each DSR and DTR. In this case both A and B ports can be used.
9: Use twisted pair cables for data I/O cable.
10: The I/O ports and the corresponding connectors are as follows.

Port	Connector
1 A/B	XM2D-2501
2 A/B	SPCN6A16-10P
3 A/B	PRC03-12A10-5M10.5
4 A/B	PRC03-12A10-5M10.5
5 A/B	PRC03-12A10-5M10.5
6 A/B	PRC03-12A10-5M10.5
7 A/B	PRC03-12A10-5M10.5
8 A/B	PRC03-12A10-5M10.5
9 A/B	PRC03-12A10-5M10.5
10A/B	PRC03-12A10-5M10.5
Power Supply	NJC-203-PF

承 認 済 国 製 形 式 年 月 日 検 査 日 月 日 製 図 日 月 日

APPROVED T. A. K. / J. I. / S. A. / S. A. / S. A.

CHECKED 7-89. 1. 91

DRAWN Feb. 1. 91

5. A. / S. A. / S. A.

名 称 相互結線図

TITLE IF-7000

角 度 R 尺 寸 重 量

THIRD ANGLE PROJECTION

SCALE

WEIGHT

国 番 号 4343-C01-C

DWG. NO. C 4 3 4 3 - C 0 1 - C

INTERCONNECTION DIAGRAM

