

FURUNO

INSTALLATION MANUAL

MARINE RADAR/ARPA

MODEL FR/FAR-2835SW/2865SW



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SAFETY INFORMATION

"DANGER", "WARNING" and "CAUTION" notices appear throughout this manual. It is the responsibility of the installer 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.



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 an unsafe practice which, if not avoided, could result in minor or moderate injury, or property damage.

DANGER



Hazardous voltage.
Can shock, burn, or cause death.

Only qualified personnel should work in the units of a radar system.

Turn off the power at the ship's mains switchboard before beginning the installation. Post a warning sign near the switchboard to ensure the power will not be applied while the radar system is being installed.

Electrical shock, fire, serious injury or death can result if the power is not turned off, or is applied while the equipment is being installed.

WARNING



Microwave radiation can be harmful to the human body, particularly the eyes.

Distances at which radiation level of 100 and 10 W/m² exist are;

Model	Radiation level	SN5AF (9')	SN7AF (12')
FR-2835SW (S-band, 30kW)	100W/m ²	Nil	Nil
	10W/m ²	1.06 m	0.5 m
	RF power density antenna aperture	20W/m ²	16W/m ²
FR-2865SW (S-band, 60kW)	100W/m ²	Nil	Nil
	10W/m ²	1.2 m	1.0 m
	RF power density antenna aperture	46W/m ²	40W/m ²

WARNING



Turn off the radar power switch before working on the antenna unit. Post a warning sign near the switch to ensure it will not be turned on while the antenna unit is being installed.

Serious injury or death can result if the radiator starts rotating and strikes someone near the scanner unit.



Wear a safety belt and hard hat when working on the antenna unit.

Serious injury or death can result if someone falls from the scanner mast.

WARNING

The neck of the scanner unit becomes VERY HOT when the de-icer is working.

Before beginning any work on the scanner unit, turn off the breaker for the de-icer line at the main switchboard to remove the power (100VAC, 1Ø) to the de-icer.
(Turning off the power to the display unit has no effect.)



CAUTION



Ground both the display unit and the antenna unit.

Ungrounded equipment can give off or receive interference or cause electrical shock.

Confirm that the power supply voltage is compatible with the voltage rating of the equipment.

Connection to the wrong power supply can cause fire or equipment damage. The voltage rating appears on the label at the rear of the display unit.

Use only the supplied power cable.

Use of other power cables (particularly a cables whose diameter is smaller than the supplied cable) can cause fire or short circuit.

Use the correct fuse.

Use of a wrong fuse can cause fire or equipment damage.

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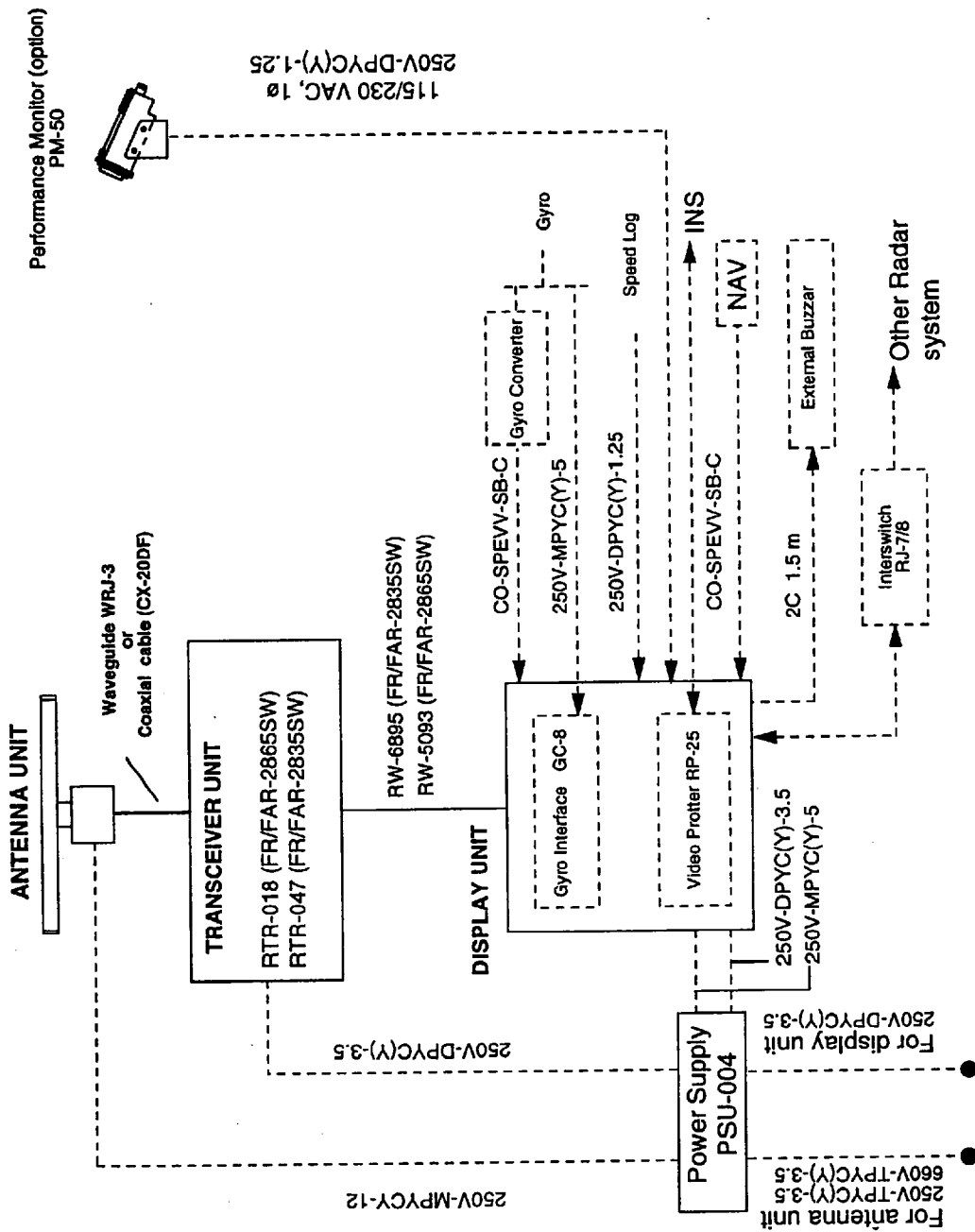
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FR/FAR-2835SW/65SW System Configuration



- Antenna unit**
- 200 VAC, 3ø, 50 Hz
- 230 VAC, 3ø, 60 Hz
- 380 VAC, 3ø, 50 Hz
- 440 VAC, 3ø, 60 Hz

- Display unit**
- 115/230 VAC, 1ø (FR/FAR-2835SW)
- 115 VAC, 1ø (FR/FAR-2865SW)

----- Optional Supply

EQUIPMENT LIST

Complete set

Name	Type	Code No.	Qty	Remarks
Scanner Unit	SN30AF-RSB0027N-2S-L	-	Select one	3090 mm, no de-icer
	SN30AF-RSB0027I-2S-L	-		3090 mm, w/de-icer
	SN30AF-RSB0032N-2S-L	-		3090 mm, no de-icer
	SN30AF-RSB0032I-2S-L	-		3090 mm, w/de-icer
	SN36AF-RSB0027N-2S-L	-		3765 mm, no de-icer
	SN36AF-RSB0027I-2S-L	-		3765 mm, w/deicer
	SN36AF-RSB0032N-2S-L	-		3765 mm, no de-icer
	SN36AF-RSB0032I-2S-L	-		3765 mm, w/de-icer
Display Unit	RDP-115	-	1	
Power Supply Unit	PSU-004-70-23-S	-	Select one	200/220 VAC, 2.3 A
	PSU-004-80-10-S	-		380/440 VAC, 1.0 A
Transceiver Unit	RTR-047-60S	-	Select one	100/115 VAC
	RTR-047-72S	-		220/230 VAC
Spare Parts	SP-11700	000-086-320	1 set	SP03-11301, SP03-11701, SP03-10320
Installation Materials	CP03-15900	000-086-655	1 set	For 2835SW CP03-14602 (for display) CP03-13943 (for scanner), CP03-13907 (for power supply), CP03-15801 (for transceiver), Signal cable: S03-63-15 (15 m)
	CP03-15910	000-086-656	1 set	For 2835SW CP03-14602 (for display), CP13943 (for scanner), CP03-13907 (for power supply), CP03-15801 (for transceiver), Signal cable: S03-63-30 (30 m)
	CP03-15920	000-086-657	1 set	For 2835SW CP03-14602 (for display) CP03-13943 (for scanner), CP03-13907 (for power supply), CP03-15801 (for transceiver), Signal cable: S03-63-50 (50 m)

Installation Materials	CP03-15300	000-086-485	1 set	For 2865SW CP03-14602 (for display) CP03-13943 (for scanner), CP03-13907 (for power supply), CP03-14801 (for transceiver), Signal cable: S03-57-15 (15 m)
	CP03-15310	000-086-486	1 set	For 2865SW CP03-14602 (for display) CP03-13943 (for scanner), CP03-13907 (for power supply), CP03-14801 (for transceiver), Signal cable: S03-57-30 (30 m)
	CP03-15320	000-086-487	1 set	For 2865SW CP03-14602 (for display) CP03-13943 (for scanner), CP03-13907 (for power supply), CP03-14801 (for transceiver), Signal cable: S03-57-50 (50 m)
Coaxial Cable Installation Materials	CP03-14900	000-086-325	Select one	Coax. Cable LHPX-20DASSY (L=20) (250 m), Converter PA-5600, CP03-13948
	CP03-14910	000-086-326		Coax. Cable LHPX-20DASSY (L=30) (30 m), Converter PA-5600, CP03-13948
Accessories	FP03-05810	008-086-317	1 set	FP03-05701, FP03-02710, FP03-05704, FP03-05705, Dust cover
	FP03-05730	000-086-163	1 set	FP03-05701, FP03-05703, FP03-05704, FP03-05705, Dust cover, for separate

Optional Equipment


Name	Type	Code No.	Remarks
M card fixing plate	OP03-70	008-423-420	For display unit
Display unit cover	OP03-126	008-459-820	Tabletop w/built-in control unit
	OP03-127	008-459-760	Tabletop w/separate control unit
	OP03-128	008-459-890	Pedestal mount
Display unit conversion kit	OP03-129-1	008-459-830	Converts from tabletop type/built-in control unit to pedestal mount
	OP03-129-2	008-452-410	
	OP03-130-1	008-452-430	Converts from tabletop type/separate control unit to pedestal mount
	OP03-130-2	008-452-430	
	OP03-131	008-459-910	Converts from pedestal mount to tabletop type/built-in control unit
	OP03-132-1	008-459-920	Converts from pedestal mount to tabletop type/separate control unit
OP03-132-2	008-452-450		
Control Panel fixing plate	OP03-134	008-461-340	For fastening separate type control unit to a tabletop
Video plotter	RP-25		
Gyro converter	GC-8-2	008-446-520	With installation materials
Interswitch	RJ-7		
	RJ-8		
External buzzer	OP03-21	000-030-097	1m, with connector
Performance monitor	PM-50		
Range unit conversion kit	OP03-110-1	008-446-610	To "km"
	OP03-110-2	008-452-200	To "sm"
Transformer unit	RU-1758	000-030-416	220 VAC to 100 VAC, for display unit
	RU-1803	000-030-420	440 VAC to 100 VAC, for display unit
	RU-6522	000-030-410	220 VAC to 100 VAC, 3 ϕ for scanner unit
	RU-3305	000-030-448	For deicer
	RU-5693	000-030-456	110 VAC 220 VAC, 3 ϕ for scanner unit
	RU-5466-1	000-030-453	440 VAC to 200 VAC, 3 ϕ for scanner unit
Interface unit	IF-2300	-	For IMO radar

1. MOUNTING

Note the following cautions before beginning work on the antenna unit.

- 1) To avoid as much as possible difficult and dangerous work atop the mast, the radiator should be assembled and fixed to the antenna unit and then raised to the mast. **HOWEVER, NEVER LIFT THE ANTENNA UNIT BY THE RADIATOR.** Antenna Unit lifting guidelines are shown on page 1-6.
- 2) Observe the antenna unit installation remarks on page 1-5.
- 3) Do not paint the radiator aperture.

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Turn off the power at the ship's mains switchboard before beginning the installation. Post a warning sign near the switchboard to ensure the power will not be applied while the radar system is being installed.


Electrical shock, fire, serious injury or death can result if the power is not turned off, or is applied while the equipment is being installed.

WARNING



Turn off the radar power switch before working on the antenna unit. Post a warning sign near the switch to ensure it will not be turned on while the antenna unit is being installed.

Serious injury or death can result if the radiator starts rotating and strikes someone near the scanner unit.



Wear a safety belt and hard hat when working on the antenna unit.

Serious injury or death can result if someone falls from the scanner mast.

1.1 Radiator Assembling Procedure

1. Screw the guide pins into the radiator. (2 pcs.)
2. Remove the protection cap from the choke guide. (Refer to page 1-3.)
3. Apply grease to the O-rings and fit them in the grooves of the choke guide.
4. Place the radiator on the radiator bracket. (Radiator direction is shown by the label on the bracket. If reversely oriented, the radiator can not be fitted to the bracket.)
5. Loosely fix the radiator to the radiator bracket with hexagon bolts (M10 x 25), spring washers and flat washers.
6. Remove the guide pins and tighten hexagon bolts.

The antenna unit is normally mounted with the cable gland facing the ship's stern, however the cable gland can be faced toward port or starboard as well.

For perfect watertightness, O-rings must be fitted in the grooves of the choke guide as shown below.

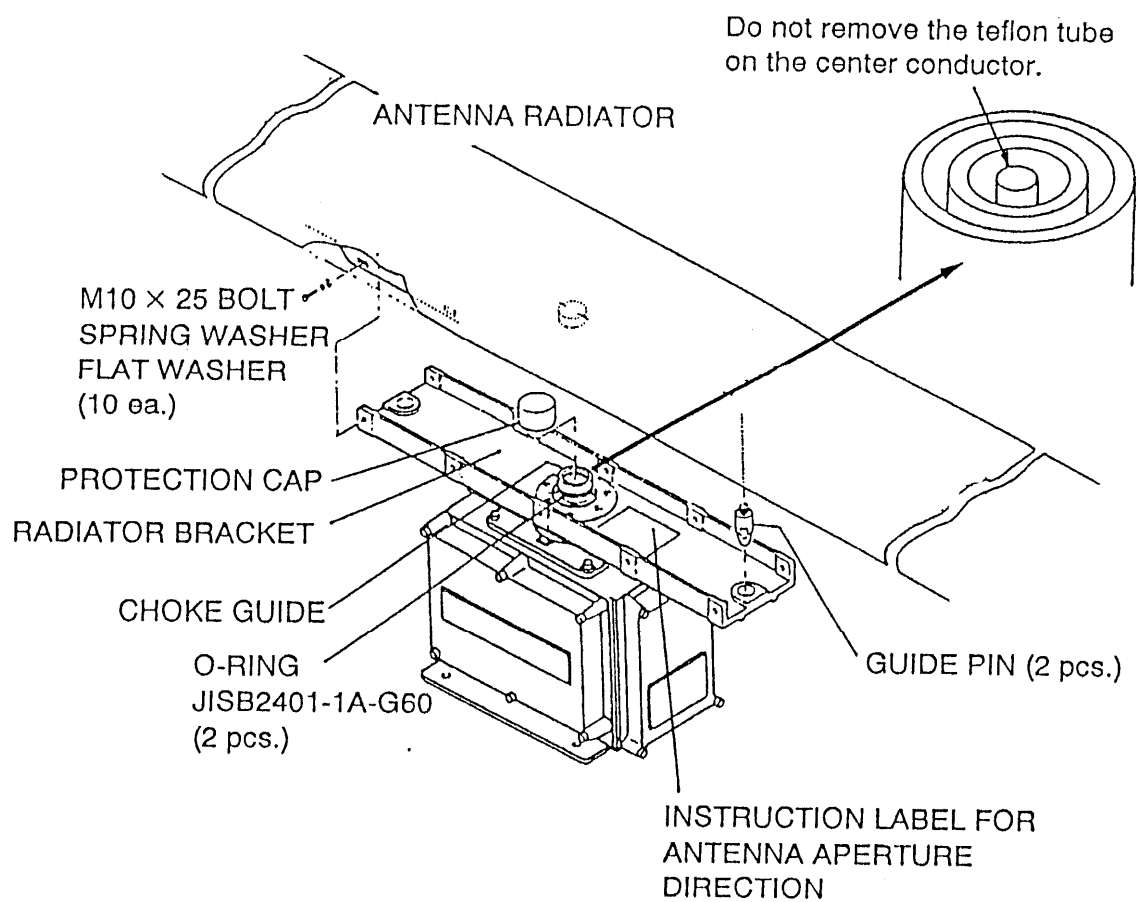


Fig. 1-1

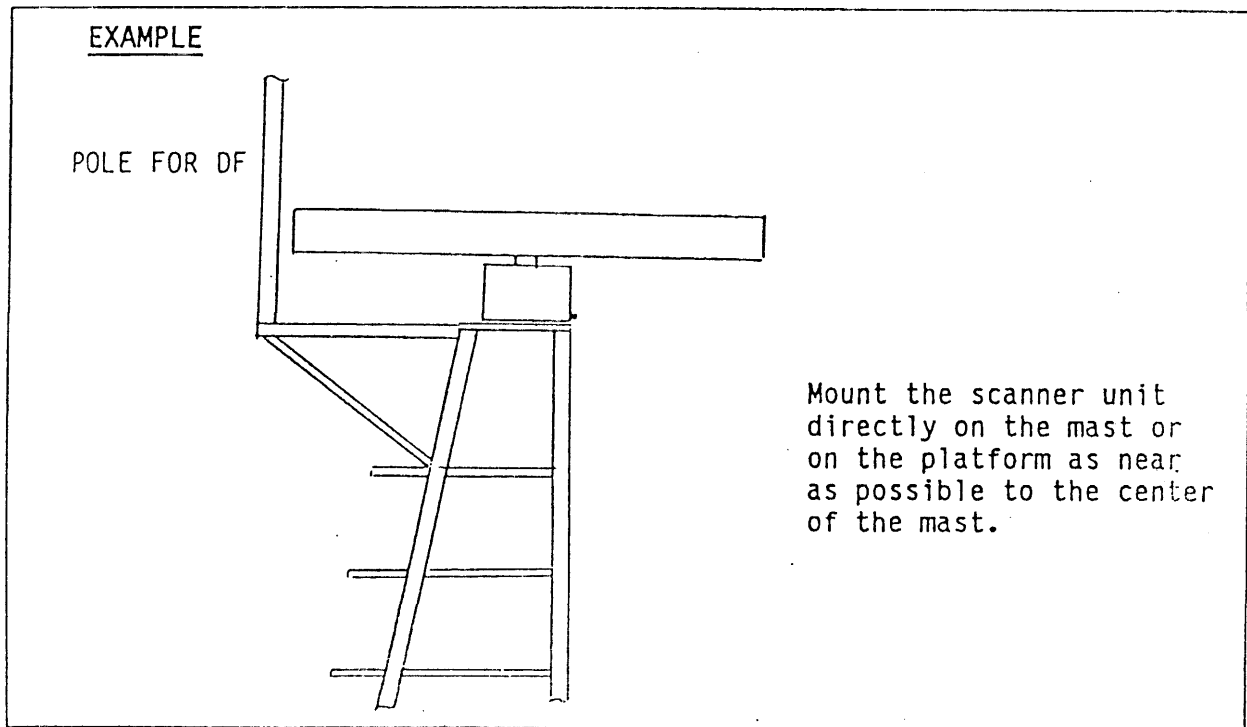
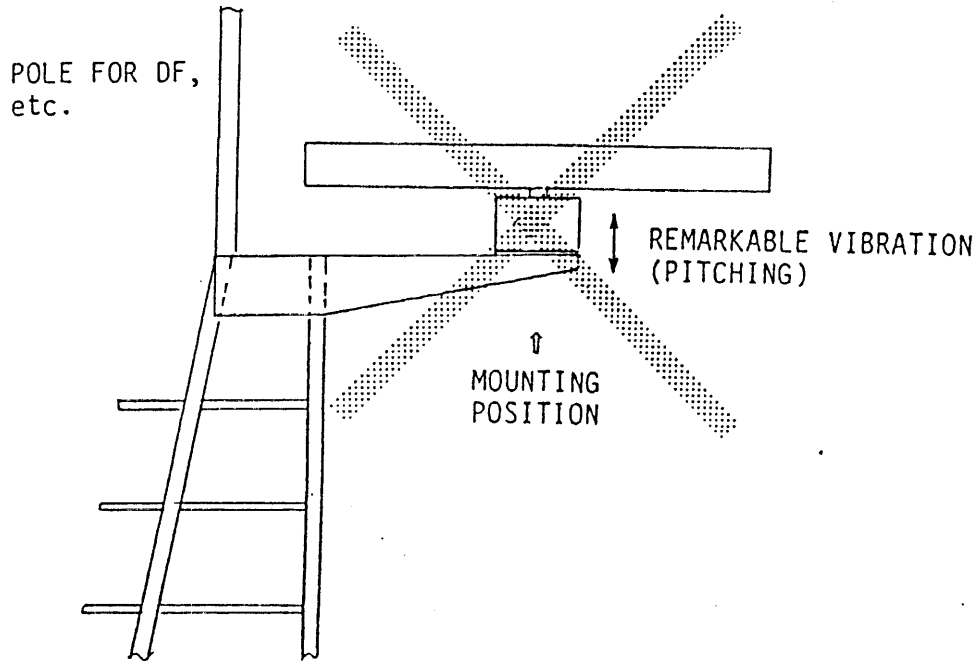
⚠ WARNING

Do not forget remove the guide pins.

Serious bodily injury may result should they loosen and fall to the deck.

1.2 Mounting Structures

Mounting structures must be designed to provide sure support for the antenna unit and safe access for service personnel. More than the static weight of the antenna unit must be taken into consideration when designing the support structure to account for harmonic vibration and high acceleration forces generated under dynamic conditions. Mount the scanner unit directly on the mast or on the platform as near as possible to the center of the mast.



1.3 Mounting the Scanner Unit on the Mounting Platform

General considerations

- The antenna radiator may be fastened to the rotating bracket before mounting the antenna unit. However, DO NOT lift the antenna unit by its housing. When using a crane or hoist, lift the unit by the hoist rings on the antenna housing.
- The antenna unit is constructed of aluminum and therefore subject to galvanic corrosion if improperly fastened to steel structures. To prevent galvanic corrosion, fasten the unit to the mounting platform using the rubber mat and washers (supplied).
- Do not paint the radiator. Performance will be affected.

Siting considerations

- A magnetic compass will be affected if placed too close to the antenna unit. Below are the minimum compass safe distances for magnetic compasses.

Radar model	Standard compass	Steering compass
FR/FAR-2835SW/2865SW	2.1 m	1.3 m

- No funnel, mast or derrick should be within the vertical beamwidth of the antenna (SN-5AF/SN-7AF, 25°) in the bow direction, especially zero degrees $\pm 5^\circ$, to prevent blind sectors and false echoes on the radar picture.
- Fumes from the funnel or other exhaust vent can adversely affect performance and hot gas can distort the radiator. The antenna unit must not be mounted in a place where the temperature may exceed 70°C.
- Leave sufficient space around the unit for maintenance and servicing. See the antenna unit outline drawing for recommended maintenance space.
- Locate the unit well away from the aerial of a radiotelephone or navigation receiver to prevent interference. Separation of more than two meters is recommended.

Antenna unit lifting method

- 1) Fix the antenna radiator to the antenna base.
- 2) Attach the lifting fixtures and collars as shown Fig. 1-3.
- 3) Position the radiator as shown in Fig. 1-4 and arrange the ropes A and B. The length of ropes A and B should be the same and more than 1m.

Protect the radiator with cardboard or cloth at the places marked by *.

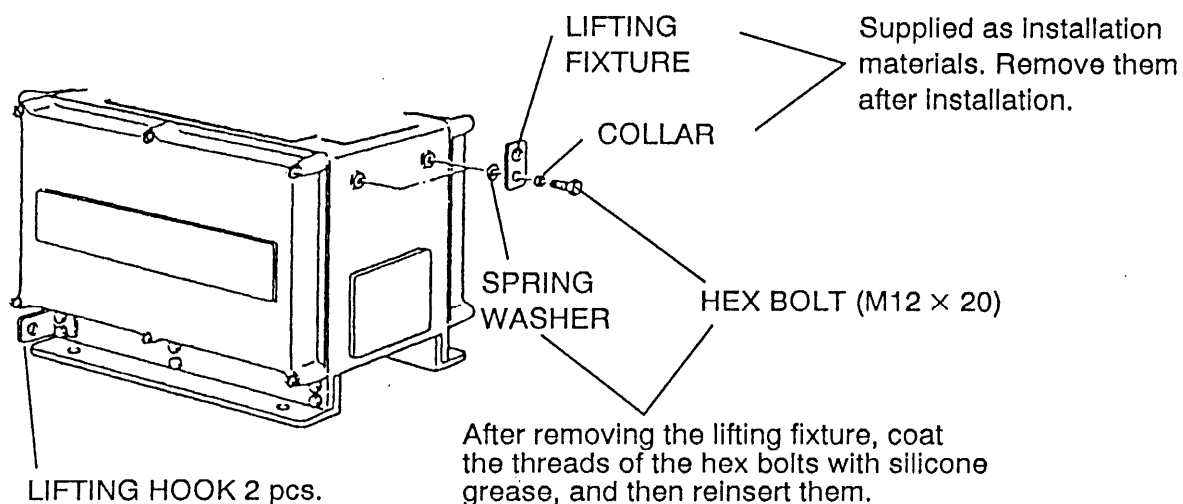


Fig. 1-2

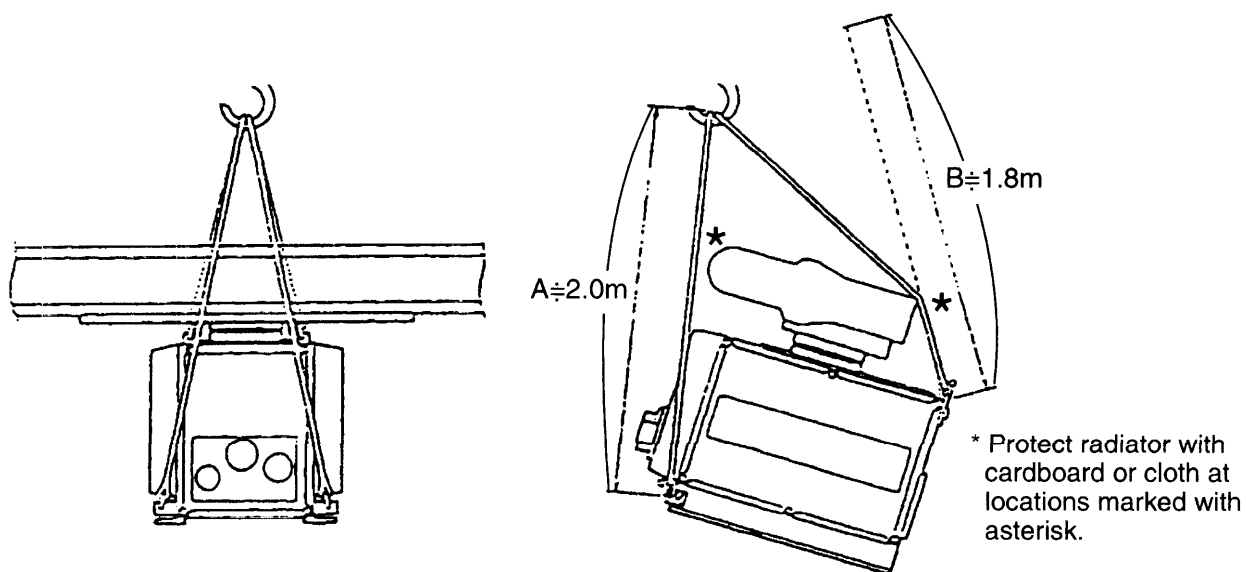
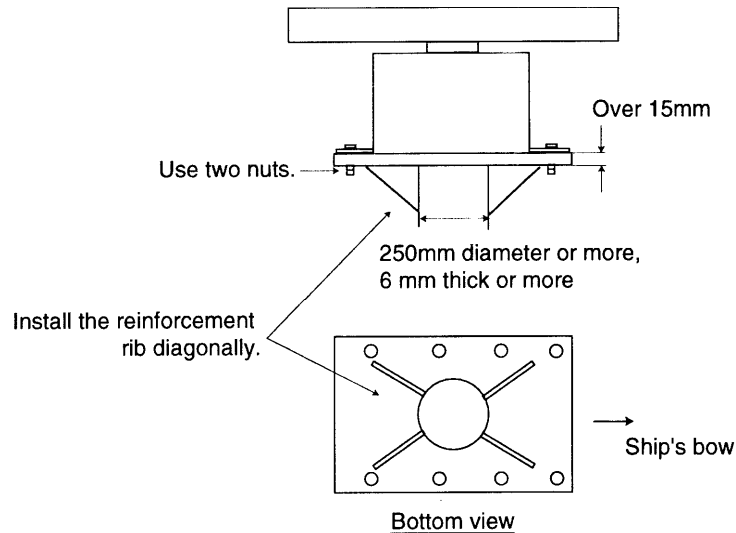


Fig. 1-3

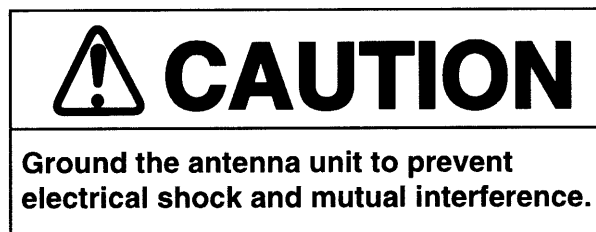
Mounting procedure

The installation method for the antenna unit is illustrated on the next page.

1. Drill eight bolt holes of 15 mm diameter in the radar mast platform or the deck. For antenna unit dimensions, see the antenna unit outline drawing on the page D-5.
 - The diameter of pole for fixing the antenna base must be over 250 mm. (thickness: over 6 mm)
 - The thickness of the antenna base must be over 15 mm.
 - The reinforcement rib must be installed diagonally as shown below.



2. Place the corrosion-proof rubber mat on the chosen mounting location.
3. Following the instructions on page 1-5, lift the antenna unit with radiator and place it on the rubber mat with the cable gland facing the ship's stern (or port, starboard). The lifting fixtures should be removed after installation.
4. Fix the antenna unit to the mounting place with M12 x 70 hexagon bolts, nuts and seal washers.
 - Use two nuts per bolt for strength.
5. Arrange a ground terminal near the antenna base. Use supplied hex bolt (M6 x 25), nut and washer. Fix the supplied ground wire (RW-4747) to the ground terminal.
6. Connect the other end of the ground wire to the ground terminal on the antenna unit.
7. Apply the supplied adhesive (Non-acid type silicone sealant) to the ground terminal and the fixing bolts.



Installing the antenna unit

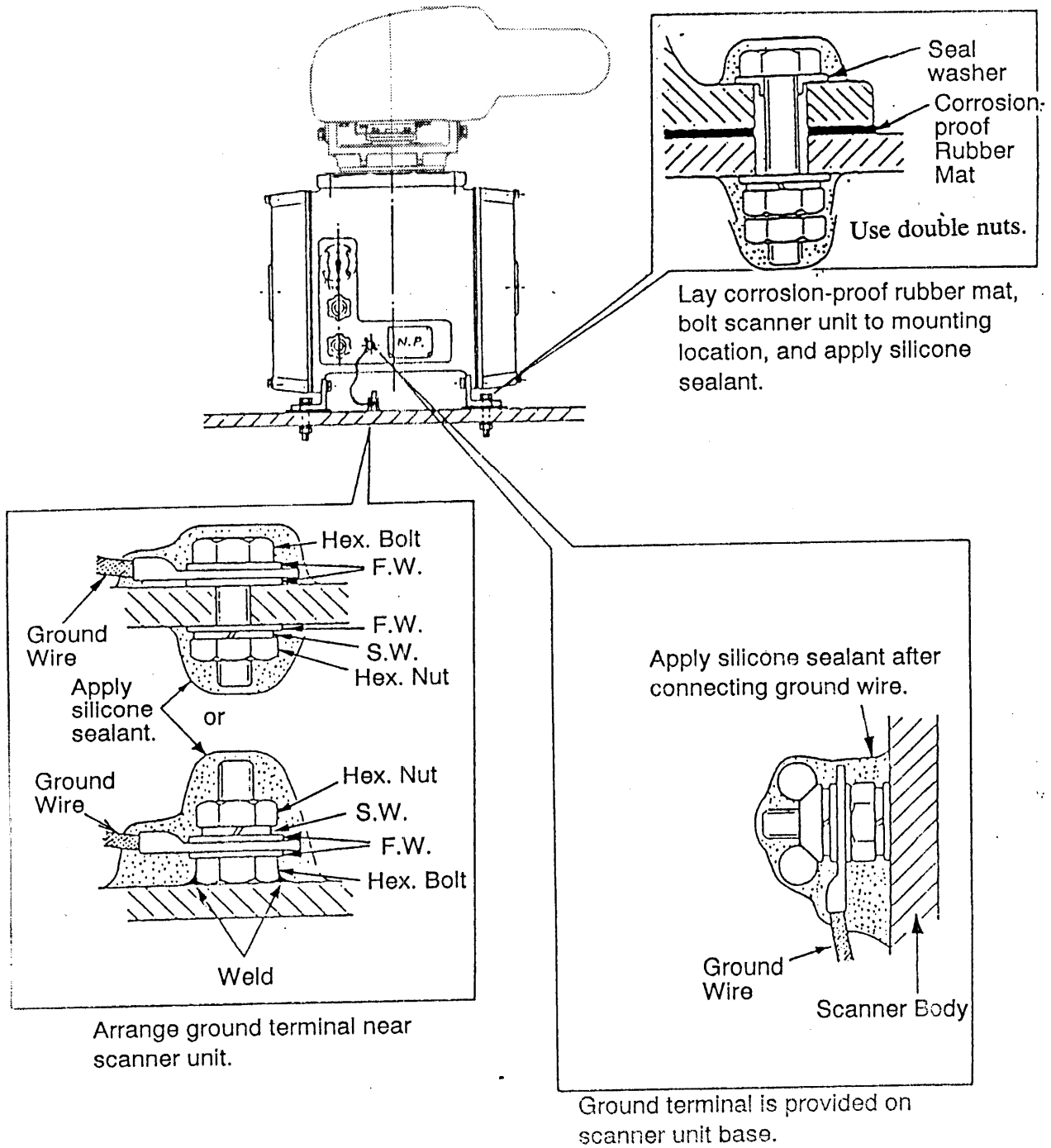


Fig. 1-4

1.4 Mounting the Display Unit

The display unit is designed to be mounted on a tabletop or on a pedestal (option).

Before mounting the display unit

If Gyro Converter GC-8 (option) is to be used, install and setup the GYRO PROCESSOR Board before mounting the display unit, because of the difficulty involved if done after the unit is mounted. Instructions for installation and setup are in Chapter 4.

Siting considerations

Locate the display unit on the bridge in a place where it can be viewed and operated conveniently. In addition, take the following points in mind.

- A magnetic compass will be affected if placed too close to the display unit. The minimum compass safe distances for magnetic compasses are
standard compass: 1.6 m
steering compass: 1.2 m
- The orientation of the display unit should be so the operator views the screen while facing the bow. This makes determination of position much easier.
- The location should be free of water spray.
- The daylight bright type radar display provides excellent visibility even in direct sunlight. However, locate the unit out of direct sunlight and away from heat sources because of heat that can build up inside the cabinet.
- The mounting location should be determined considering the length of the signal cable between the transceiver unit and the display unit. (The signal cable comes in length of 15, 30 or 50 meters; maximum 100 meters.)
- Leave sufficient space around the unit for maintenance and servicing. See the display unit outline drawing for recommended maintenance space.

Mounting procedure

Tabletop

- 1) Unfasten the three M10 bolts at the front of the display unit and separate the mounting base from the display unit.
- 2) Drill five holes of 12mm diameter in the tabletop.
- 3) Secure the mounting base to the tabletop by using M10 nuts, bolts and flat washers.
- 4) Place the display unit on the mounting base and fasten it to the mounting base with the bolts removed in step 1.

Pedestal

Fix the pedestal to the mounting location with M12 nuts, bolts and washers. (The cable gland is at the bottom of the pedestal.)

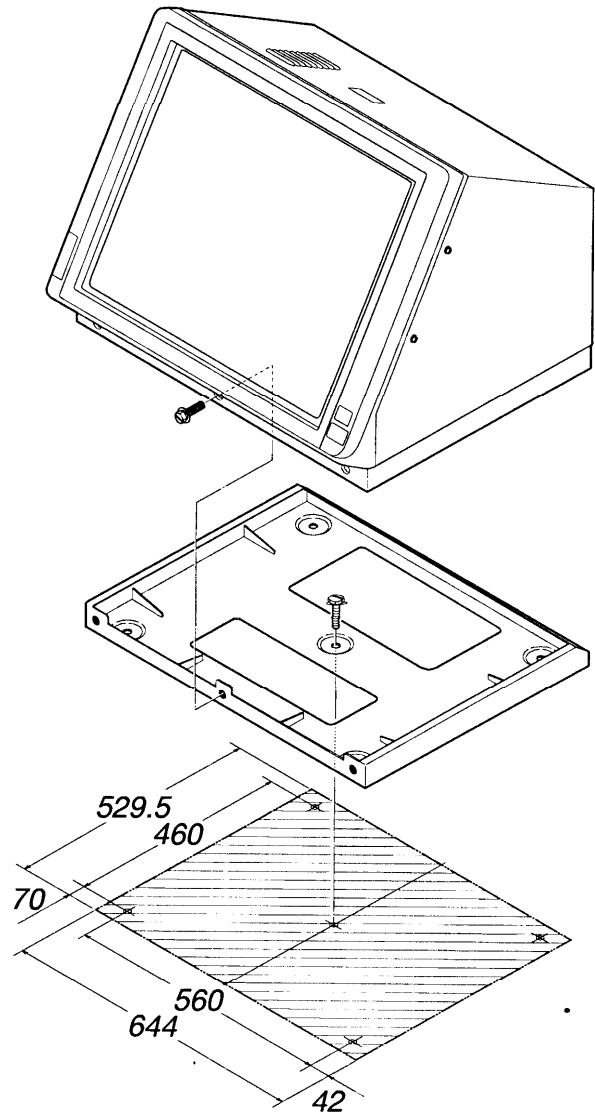


Fig. 1-5 Mounting dimensions for tabletop mount display unit

1.5 Mounting the Separate Type Control Panel

The separate type control panel connects to the display unit with a connection cable. Nonslip rubber feet (supplied) can be attached to the bottom of the control panel. The panel can be permanently fixed to a tabletop with the control panel fixing plate kit (option).

1.6 Power Supply Unit

The power supply unit can be installed almost anywhere provided the location is dry and well-ventilated, the compass safe distances are observed, and sufficient maintenance space is provided.

Power unit	Standard compass	Steering compass
PSU-004	0.7 m	0.5 m

The unit may be installed inside the display unit console type.

1.7 Mounting the Transceiver Unit

The transceiver unit is designed for bulkhead mounting, and must be mounted in any dry, well-ventilated place. Ensure the mounting location is strong enough to support the weight of the unit under the continued shock and vibration normally encountered onboard. The transceiver must not be installed in close proximity of a magnetic compass; observe the compass safe distances. Fix the unit to the bulkhead with four bolts (M12).

Transceiver unit	Standard compass	Steering compass
RTR-018 (FR-2865SW)	2.5 m	2.0 m
RTR-047 (FR-2835SW)	4.6 m	3.5 m

2. CONNECTIONS

2.1 Antenna Unit

Antenna cable (Multicore cable)

- 1) Loosen the clamping gland of the upper cable gland, and remove the rubber packing and flat washers from the antenna unit.
- 2) Referring to the drawing below, shorten the cable to a suitable length. Remove the vinyl sheath by 600mm. Cut off the armor by 590mm.

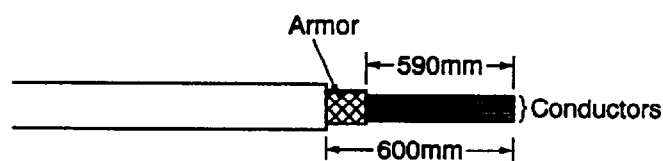


Fig. 2-1

- 3) Slide the clamping gland, washers and rubber gasket over the cable. Fold back the armor by 5mm, then put it between washer and cable gland body as below.

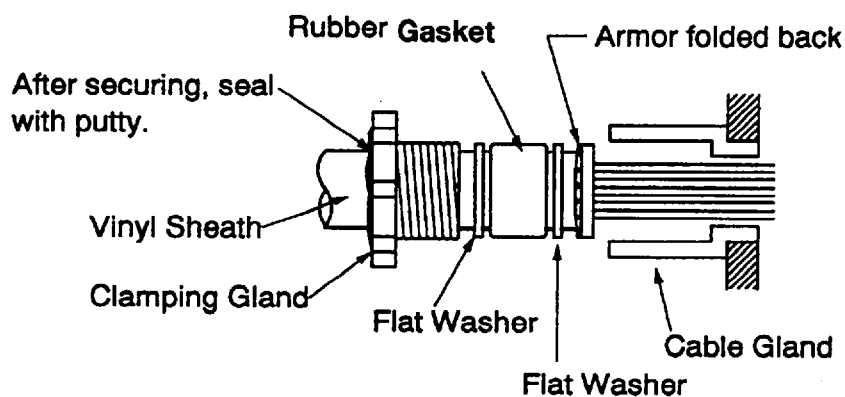


Fig. 2-2

- 4) Determine the length of the cores considering their location on STB1. Trim conductors as necessary. (STB1 is located behind RTB801.)
- 5) Ground the armor by inserting it through the washer and cable gland.

- 6) Remove the sheath of each core by 6mm. Fix crimp-on lugs to each conductor. Make sure each connection is secure both electrically and mechanically.
- 7) Secure the clamping gland to the body; then seal with putty.
- 8) Connect the conductors to RTB802, referring to the interconnection diagram on page S-1.

Final preparations inside the scanner unit

After all wiring have been completed, check for loosen screws and poor contact on crimp-on lugs. Apply grease to scanner cover fixing screws and packing; then replace the scanner cover.

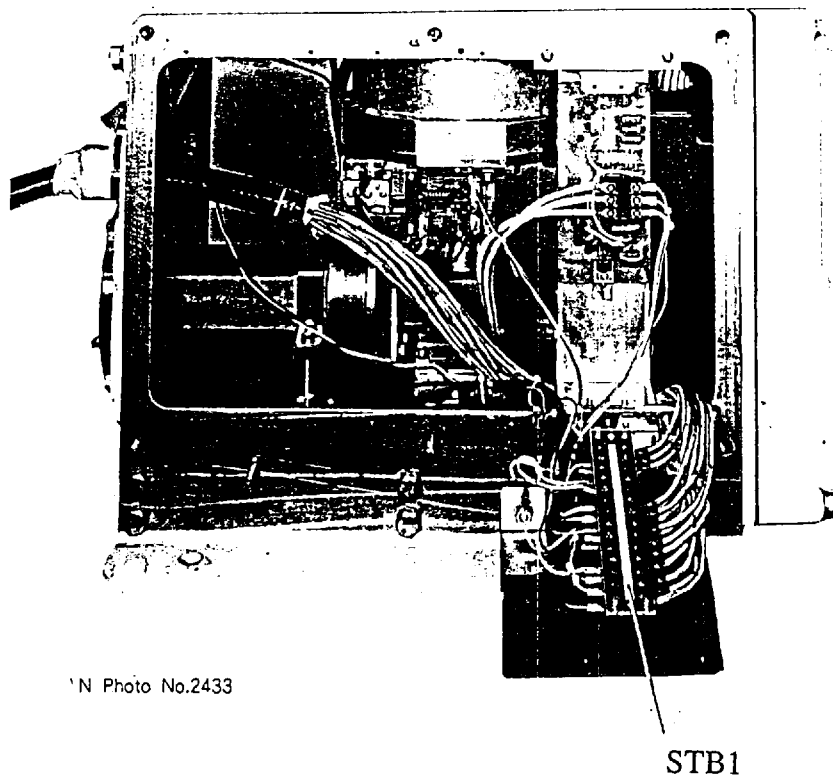


Fig. 2-3 Antenna Unit (Right-hand Side View)

2.2 Power Supply Unit (PSU-004)

Location of terminal boards

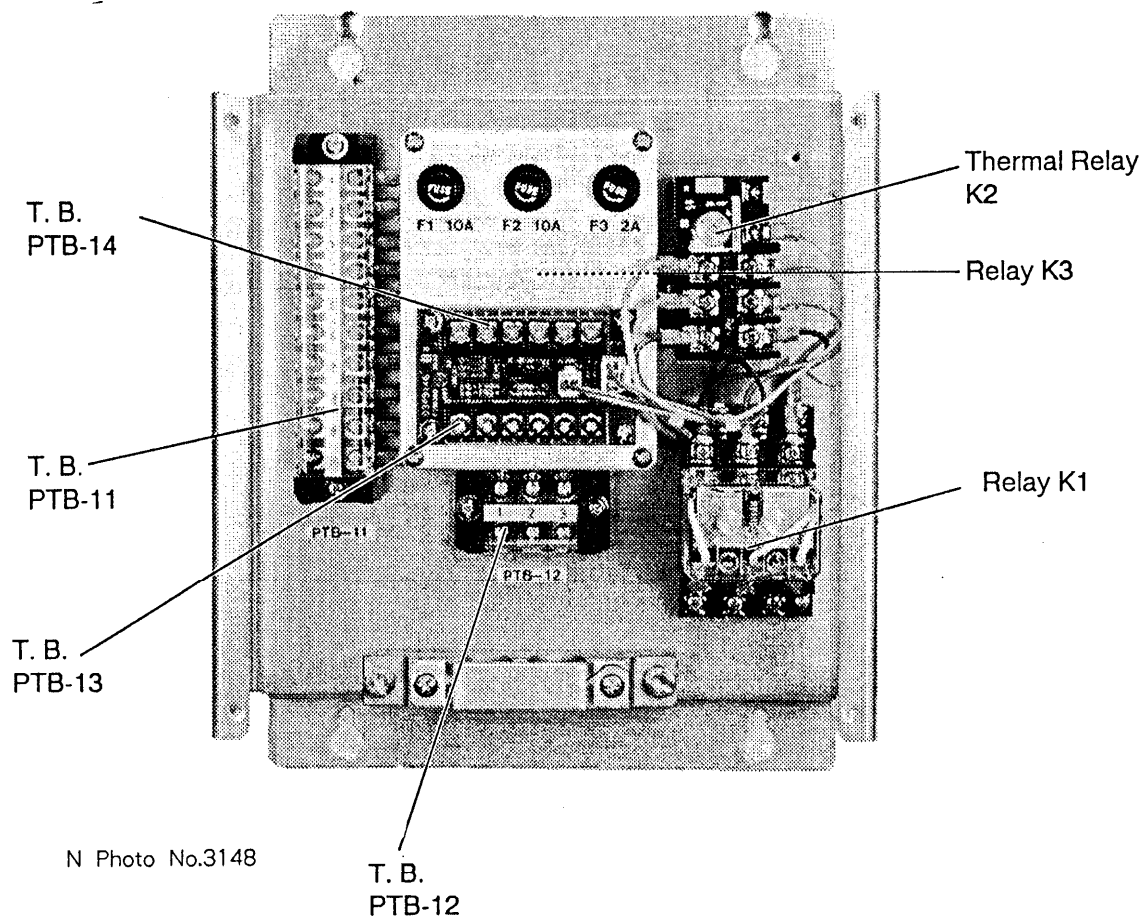


Fig. 2-4

Changing supply voltage

The table below lists the thermal relays to be used in the PSU-004. The type of the relay and its presetting differs according to ship's mains.

Ship's Mains	Scanner Unit	Thermal Relay (K2)	
		Type	Presetting
200/220VAC, 3 ϕ	RSB-0027	TR-0NH/3 1.7A	2.3A
380/440VAC, 3 ϕ	RSB-0032	TR-0NH/3 0.8A	1A

2.3 Transceiver Unit

Single cable RW-6895/5093

- 1) Remove the vinyl sheath by 1200mm.
- 2) Expose 50mm of the armor.
- 3) Expose 5mm of the inner vinyl sheath. Cover exposed part with tape,
- 4) Separate the outer layer wires with a small screwdriver.
- 5) Separate the inner layer wires as above. Mark each core for future identification.
- 6) Cut each core to a suitable length considering its location on the terminal board.
- 7) Cut the inner and outer shields to a suitable length considering the distance to the ground terminal. Fit the crimp-on lug (FV5.5-4) to each shield.
- 8) Expose the conductor of each core by 6mm. fit a crimp-on lug to each conductor.
- 9) The wires listed below are spares, bundle, and cover with vinyl tubing.

Spare Wires: white (inner layer wire), purple (outer layer wire), yellow (thick, outer layer wire), blue (thick, outer layer wire), white (thick, outer layer wire)

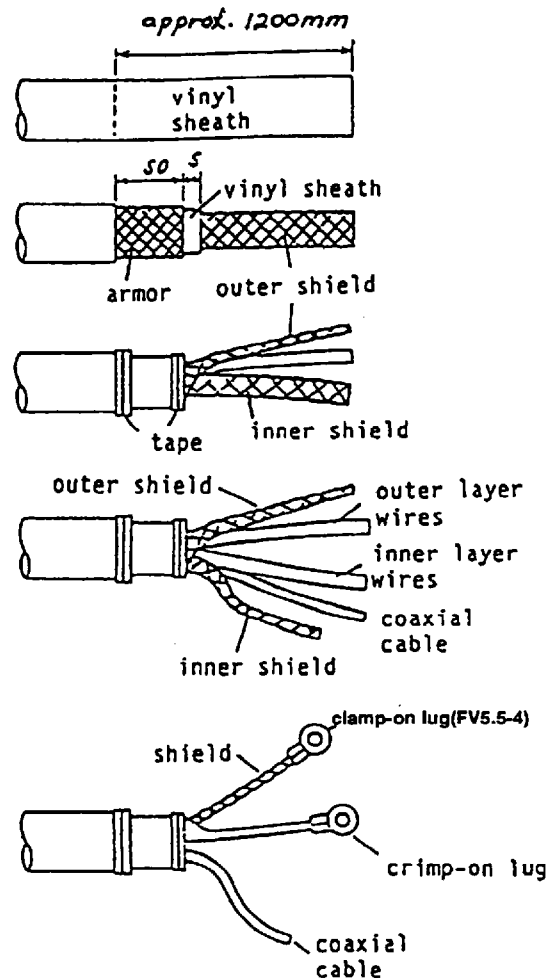


Fig. 2-5

(RW-5093)

10) Fit the BNC connector to the coaxial cable as illustrated below.

1. Remove the vinyl sheath by 10mm.
2. Slip the nut, washer, packing and gland onto the coaxial cable.
3. Comb out braid and fold back as illustrated.
4. Trim braid so that its edge just touches the outer part of the clamp.
5. Remove the dielectric by 3mm.
6. Slip male conductor in place; butt against dielectric and solder.
7. Push assembly into body as far as it will go. Slide nut into body and screw in place with wrench until tight. For this operation, hold cable and shell rigidly and rotate nut.

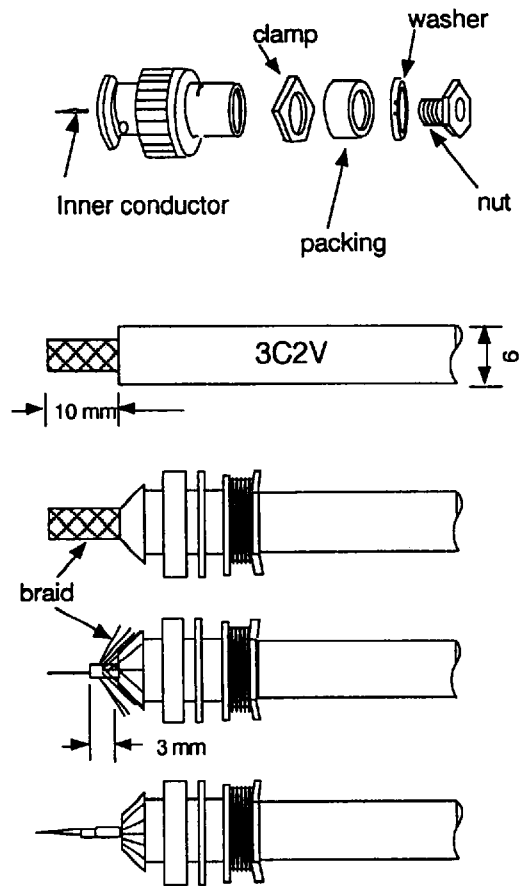


Fig. 2-6

Power cable (FR/FAR-2835SW)

For the fabrication of the power cable, refer to page 2-8. Do not forget to slip the terminal cap onto the core.

Connection (FR/FAR-2835SW, RTR-047)

- 1) Remove the cover.
- 2) Pass the signal cable through the cable entry holes. Lay the cable in the cable clamp so that the armor is directly under the clamp.
- 3) Referring to the interconnection diagram on page after, connect conductors to their proper location on Terminals RTB1 and FL801.
- 4) Install the shield to the chassis.

NOTE: You can select either of two cable enterances on "bottom" and "rear" chassis.

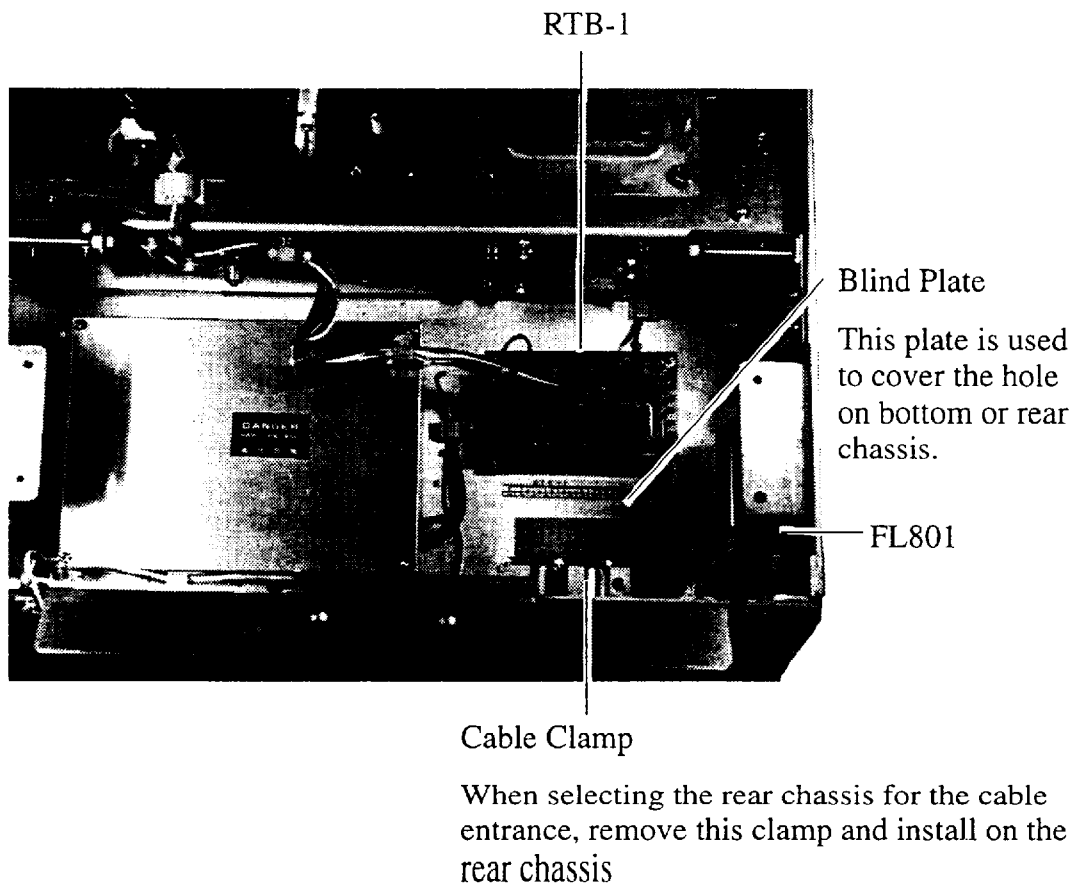


Fig. 2-7 RTR-047

Connection (FR/FAR-2865SW, RTR-018)

- 1) Remove the cover and loosen four screws fixing the meter panel to hinges down the meter panel.
- 2) Pass the signal cable through one of the two cable entry holes. Lay the cable in the cable clamp so that the armor is directly under the clamp.
- 3) Referring to the interconnection diagram on page after, connect conductors to their proper location on Terminals RTB1 and RTB2.
- 4) Connect the coaxial cable to J8 on TRT-7363 board located on back of the meter panel.
- 5) Connect the shield to the earth terminal.
- 6) Run a ground wire (shipyard supply) between the earth terminal on the transceiver unit and the ship's body.

NOTE: To prevent magnetron demagnetization, do not bring metallic objects such as screwdriver near the magnetron.

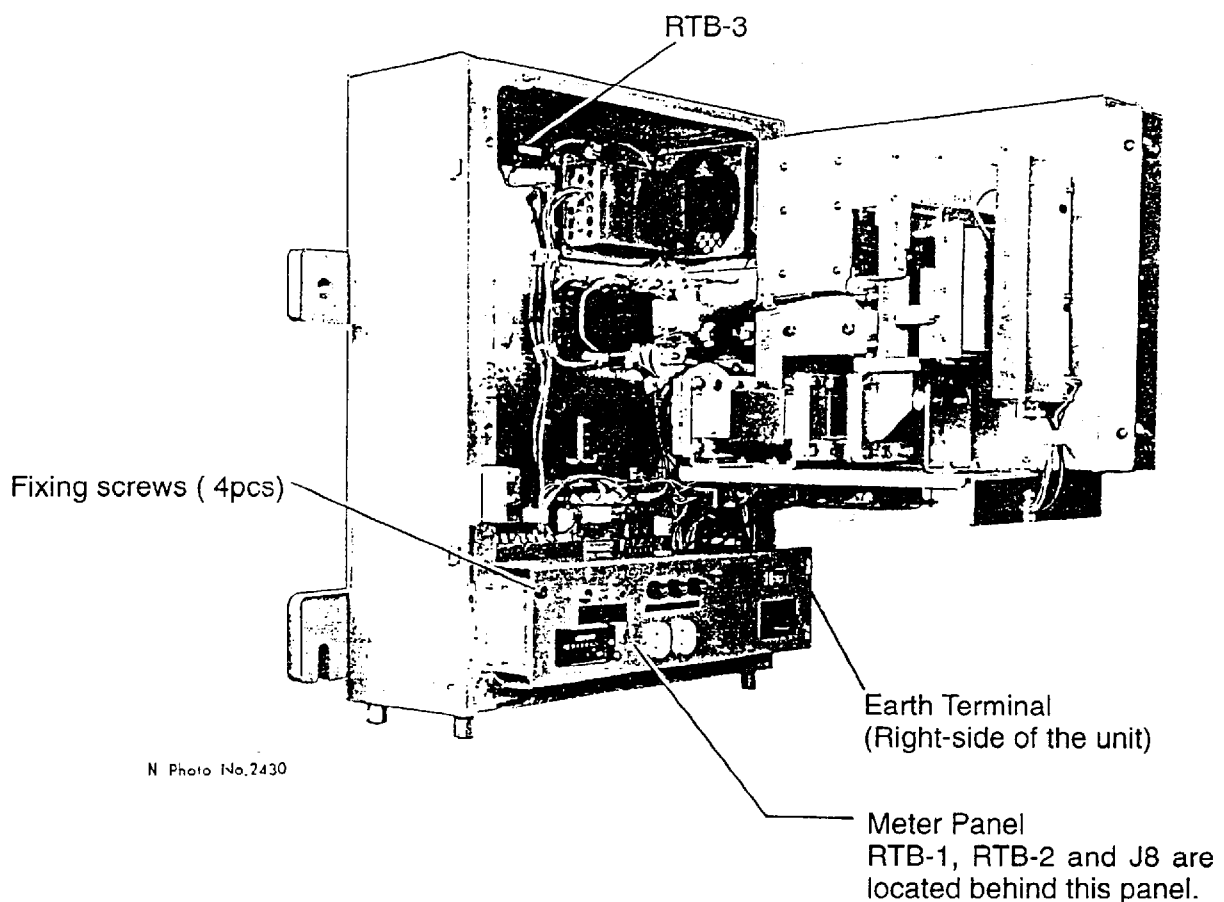


Fig. 2-8 RTR-018

Changing the Operating Voltage of the Fan Motor Transformer

The operating voltage of the fan motor in the transceiver unit (RTR-018) must be the same as that of the ship's mains. Change the tap on terminal RTB-3 according to the ship's mains; Connect #2 for 110VAC or #3 for 115VAC.

2.4 Display Unit

The following explains the connections on the display unit.

Fabricating power cable DPYCY-3.5

- 1) Remove the vinyl jacket by 150mm.
- 2) Cut off jute tape wrapped around the braided shield.
- 3) Unravel the braided shield to expose the cores by about 10mm.
- 4) Remove insulation of cores by about 10mm.
- 5) Slip the terminal cap onto the core.
- 6) Fix crimp-on lugs to the cores and braided shield.
- 7) Cover the braided shield with vinyl tape, leaving the portion which will lie inside the cable clamp untaped.

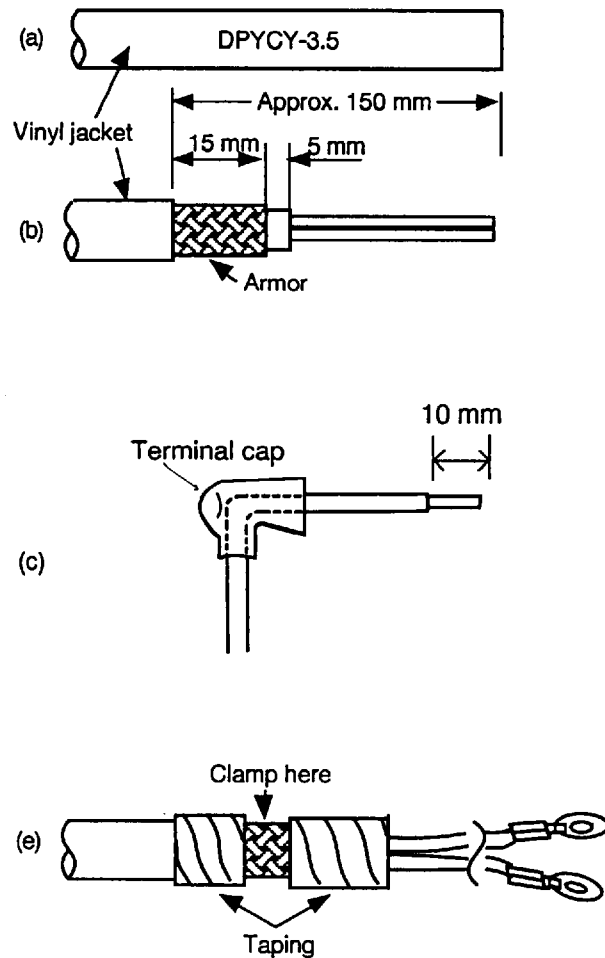


Fig. 2-9

Leading in cables to the display unit

To lead in cables easily, unfasten the cable clamp at the right side of the display unit.

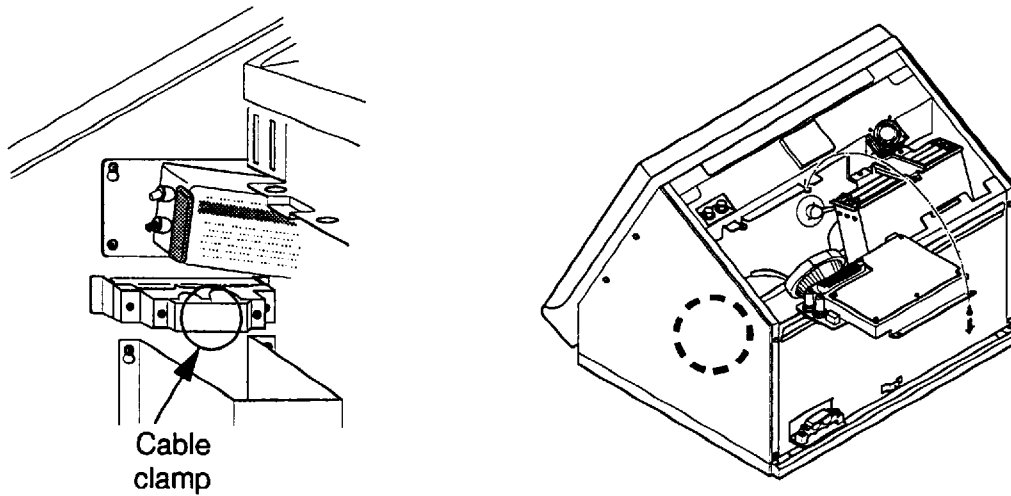


Fig. 2-10 Location of cable clamp

Tabletop

Cables can be led in through the cable gland at the rear or underside of the unit.

Pedestal

Lead in cables through the cable gland at the bottom right-hand side of the pedestal. Pass cables through the cable clamp and tighten the cable clamp. Fix cables to the pedestal frame with cable ties as shown in Figure 2-11. Finally, pass cables through the cable clamp at the right side of the display unit and then tighten the cable clamp.

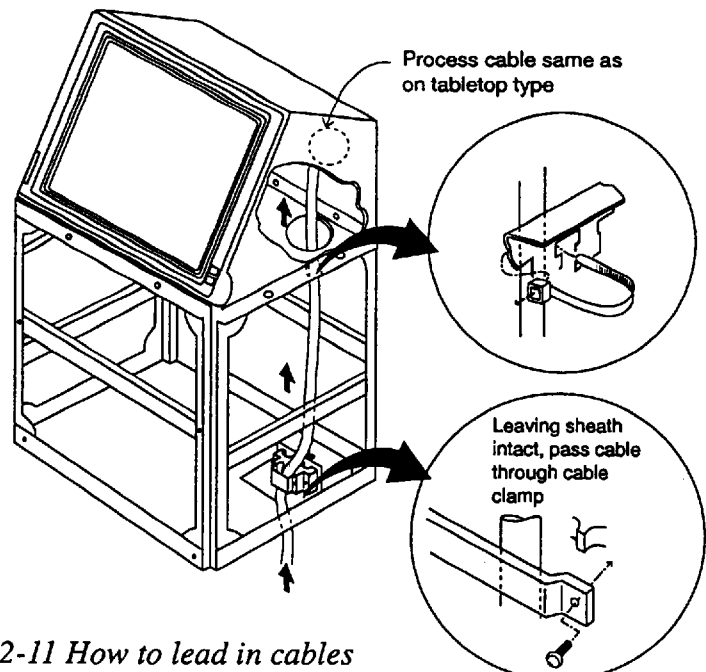


Fig. 2-11 How to lead in cables through the pedestal

Connections

Power cable

Connect the power cable to the filter at the right hand side of the display unit. Cover the filter terminals with the terminal caps (supplied) to insulate the terminals.

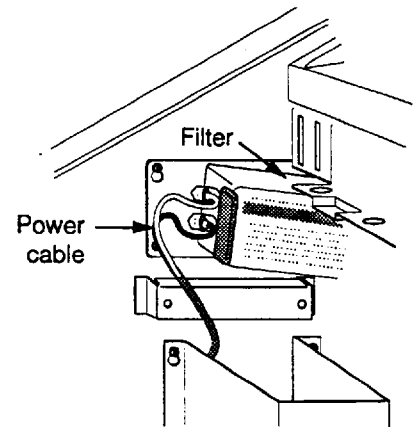


Fig. 2-12 Location of filter inside the display unit

Gyro signal

Solder the 5 pin and 3 pin VH connectors (supplied) to the gyrocompass cable. Plug in the connectors on the GYRO PROCESSOR Board. For further details, see page 4-2.

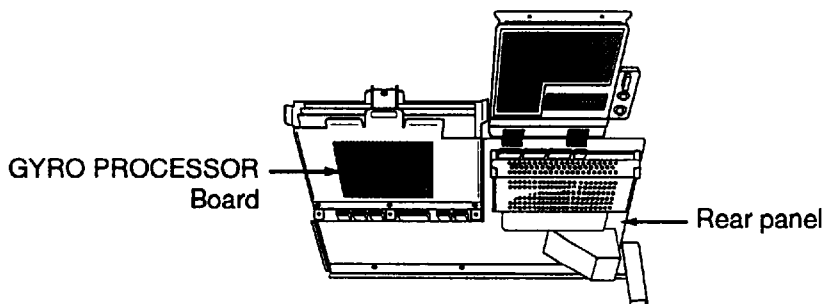
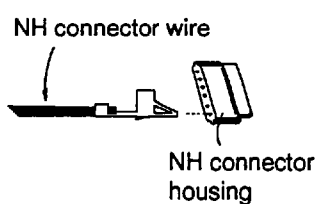
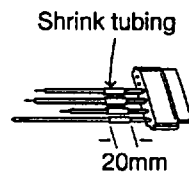


Fig. 2-13 Location of GYRO PROCESSOR Board

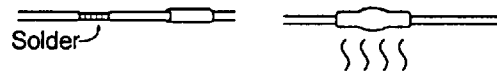
HOW TO ATTACH NH CONNECTOR TO SIGNAL CABLE



① Insert NH connector wire into NH connector housing.



② Cut shrink tubing in 20 mm lengths and slip onto each wire.



③ Connect connector to signal cable.

④ Heat shrink tubing with soldering iron.

Grounding

The display unit must be grounded at the point circled shown in Fig. 2-14.

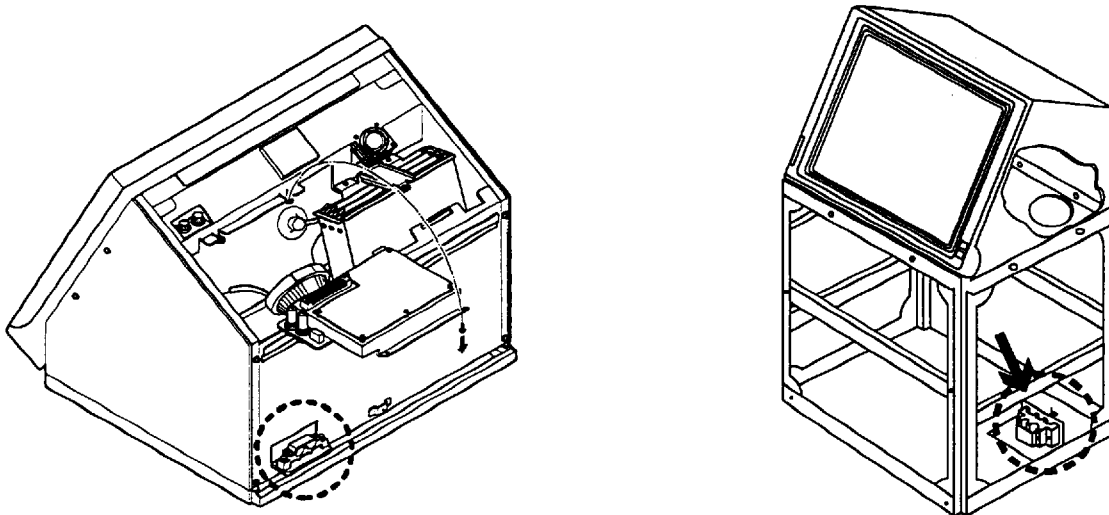
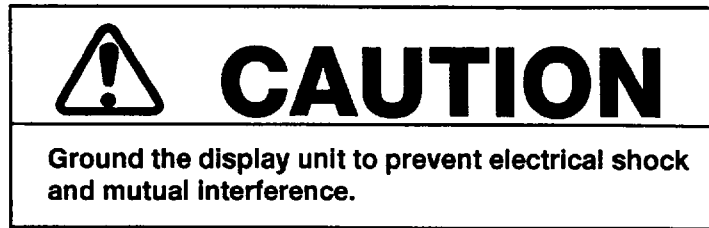


Fig. 2-14 Grounding the display unit

Radar buoy

Solder the radar buoy signal line to the "BUOY" connector on the VDA Board. Connect the trigger line to the corresponding connector on the INT Board.

Signal input/output circuit (INT Board INT-9170)

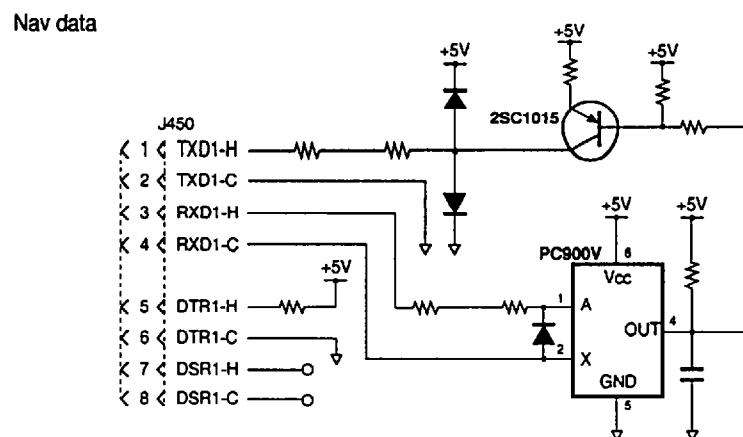


Fig. 2-15 INT Board circuit

For other input/output circuits, see the circuit diagram of the INT Board at the back of this manual.

Table 2-1 Input and output signals on the INT Board

Signal name	Name on pcb	Connector no.	Connector type	Applicable equipment	Remarks
Input Signal					
Gyro signal		J4* J5*	VH, 5 pin VH, 3 pin		*: On pcb A64P1106 (option)
Speed log signal	LOG	J448	NH, 3 pin		200 pulses/nm, etc.
Current indicator signal (tide)	NAV COURSE	J459	NH, 4 pin		Not used
Current indicator signal (speed)	NAV SPEED	J460	NH, 3 pin		Not used
Radar buoy signal	RADAR BUOY	J445	NH, 4 pin		
Remote display signal	EXT-RADAR or RJ-7	J458	NH, 8 pin		
Rudder angle signal	ROT RUDDER	J464	NH, 7 pin		
Output Signal					
External ARPA signal	EXT-ARPA	J444	NH, 8 pin	FA-2805	heading, bearing, Tx trigger
Slave display signal	SLAVE	J442 J443	NH, 8 pin	CD-140, CD-141, GD-500, FMD-800, FMD-8000, FR-2800 series	heading, bearing, video, Tx trigger
Buzzer signal	EXT-BUZ	J451	NH, 3 pin	OP03-21-3	buzzer drive signal
Buzzer signal (AC)	EXT-BUZ (AC)	J452	NH, 2 pin	Speaker w/amp	speaker signal
Monitor signal		J449	NH, 10 pin		VER synchronous, HOR synchronous, video (NTSC)
RJ-8	RJ-8	J456	NH, 4 pin		
PM-30	PM-30	J105	VH, 2pin		
Input/Output Signal					
INS data	INS. DATA	J455	NH, 5 pin		
RJ-7	RJ-7	J457	NH, 15 pin		
		J458	NH, 8 pin		
Nav data	NAV DATA	J450	NH, 8 pin		
ARPA data	ARPA DATA	J454	NH, 5 pin		

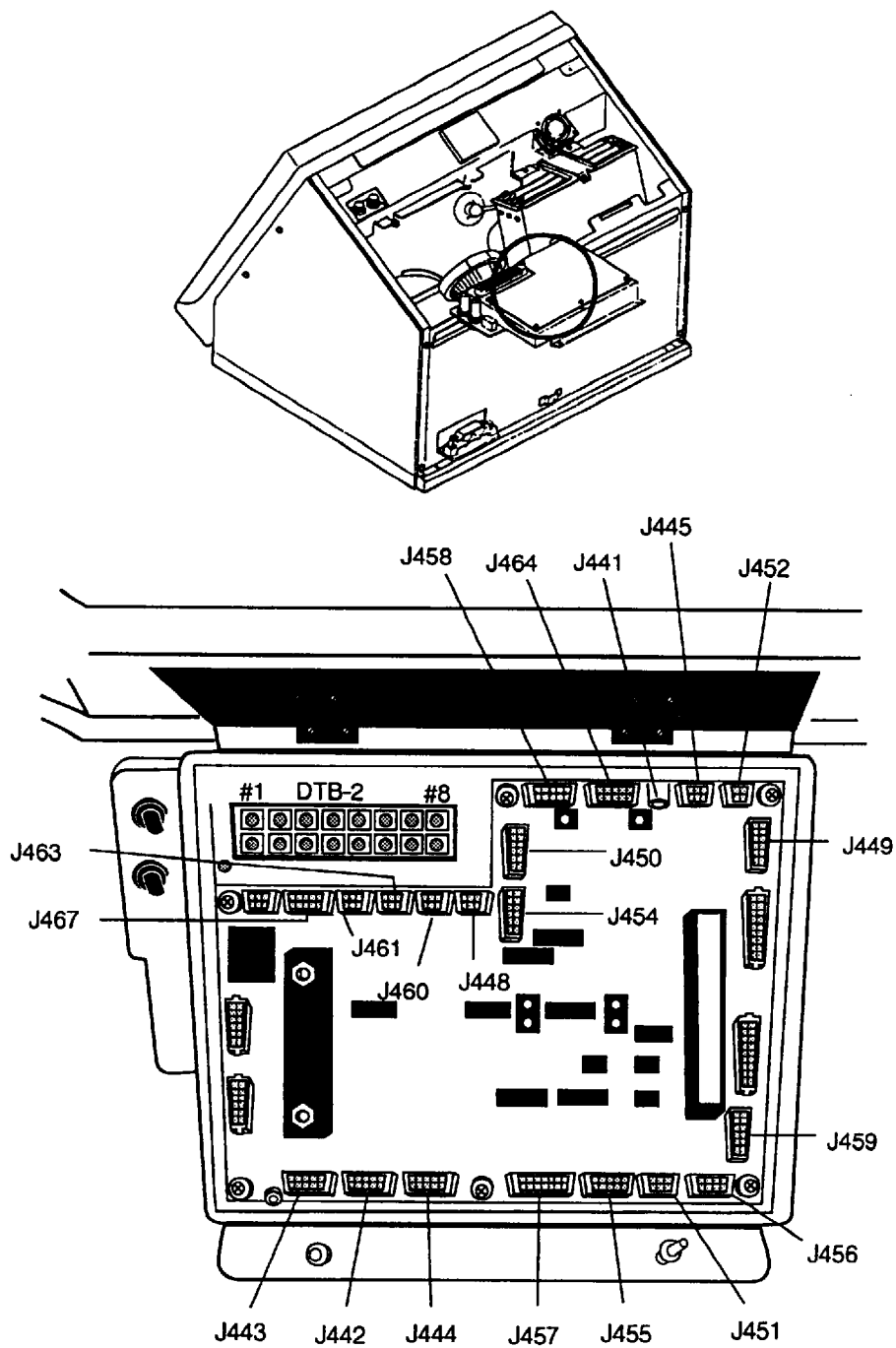


Fig. 2-16 Location of connectors on the INT Board

Grounding cables

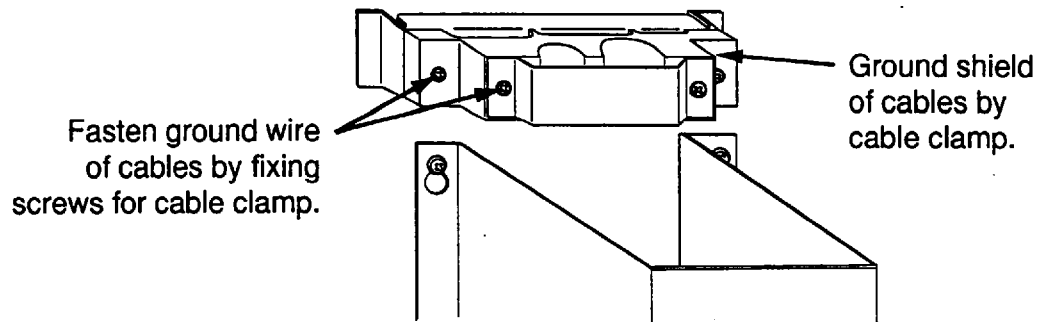


Fig. 2-17 Cable clamp

Covering unused cable slots in the cable clamp

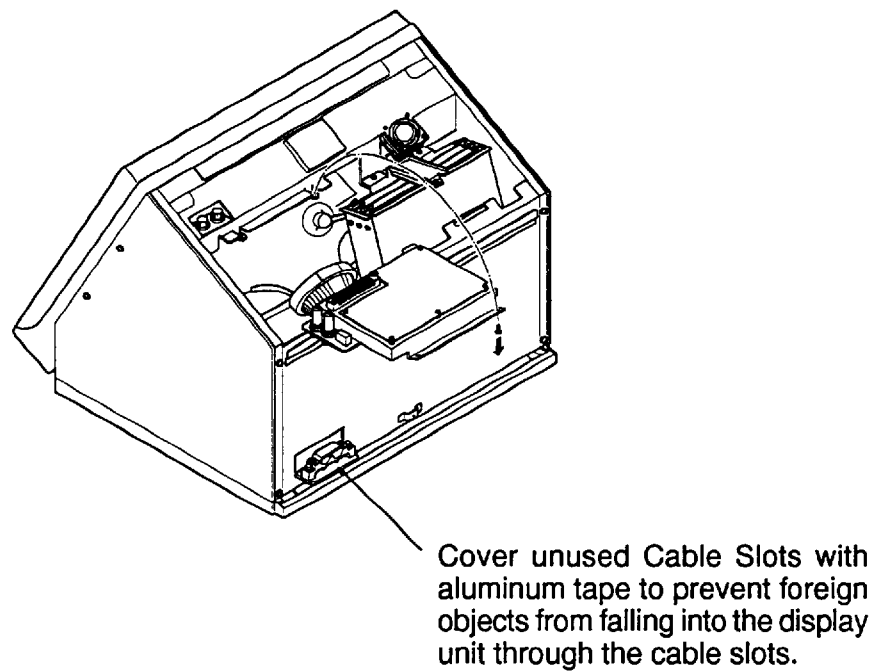
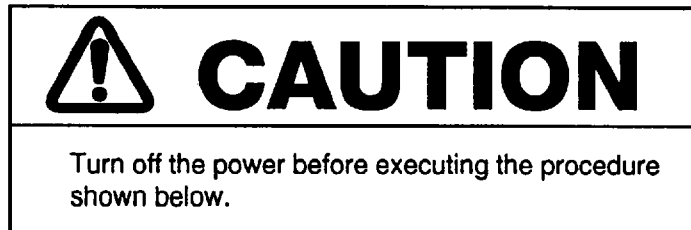


Fig. 2-18

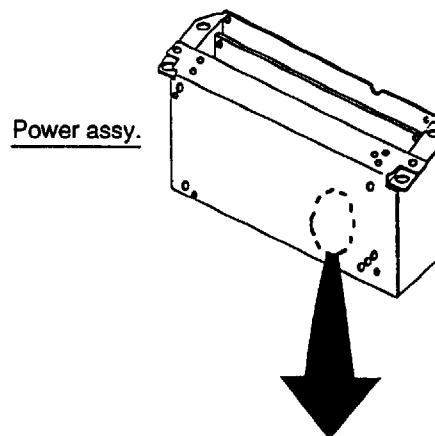
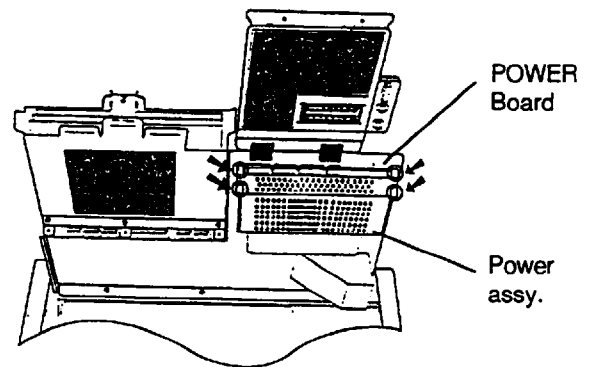
Changing power Specification

This radar can be powered by 100V AC or 220V AC, and is set at the factory for connection to a 100V power supply. To power the unit by 220V AC, remove jumper JP13 on the POWER Board as shown in the procedure below.

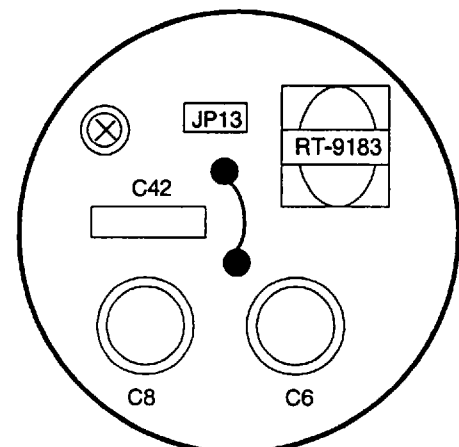


Procedure

- 1) Turn off the power.
- 2) Unfasten the four screws circled in the illustration at right.
- 3) Remove the power assembly.
- 4) Remove the power assembly cover.
- 5) For 220V power supply, remove jumper wire JP13 on the POWER Board.
- 6) Mount the power assembly.



Power	Jumper wire JP13
100 VAC	Short
220 VAC	Remove

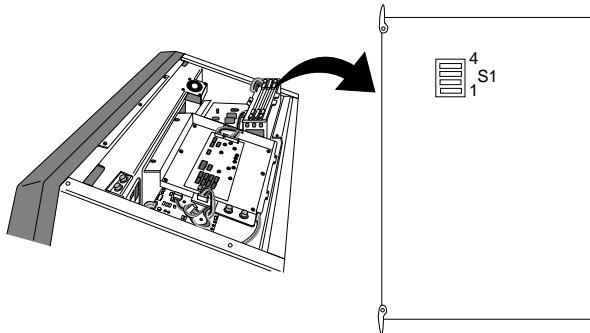


3. INITIALIZATION AND ADJUSTMENT

3.1 Preparation for Initialization and Adjustment

Accessing the menus

The menus for initialization and adjustment of this radar are locked to prevent adjustment by the user. To access them;



- 1) Turn off the power.
- 2) Turn on the #1 segment of DIP switch S1 on the SPU Board for IBS data I/O setting.
- 3) Turn on the #4 segment of DIP Switch S1 on the SPU Board.

Figure 3-1 Display unit (top view, cover removed) and SPU Board

If your radar has the program no.15 and after, you can access the INITIAL SETTING 1 menu by pressing the [RADAR MENU] key five times while pressing and holding down the [HM-OFF] key.

Menu operation

- 1) Press the [RADAR MENU] key.
- 2) Press appropriate numeric key to select menu desired.
- 3) Press numeric key to select item.
- 4) Press same numeric key pressed in step 3 to select option.
- 5) Press [ENTER] to register selection.

Menu description and menu tree

See pages 3-6 and 3-11, respectively.

Restoring default settings

- 1) Press [RADAR MENU][0][0][2][0][0][0][0] to select FACTORY DEFAULT on the INITIAL SETTING 4 menu.
- 2) Press the [ENTER] key.
- 3) Wait for 10 seconds.

- 4) Turn power off, and on again.
- 5) Press [RADAR MENU][0][0][2][0][0][0][2] to select MODEL on the INITIAL SETTING 4 menu.
- 6) Press the [2] key several times to select OTHER S-BAND.
- 7) Press the [ENTER] key.

3.2 Heading Alignment

Antenna unit mounted error (heading reed switch timing error) can be compensated at the display unit.

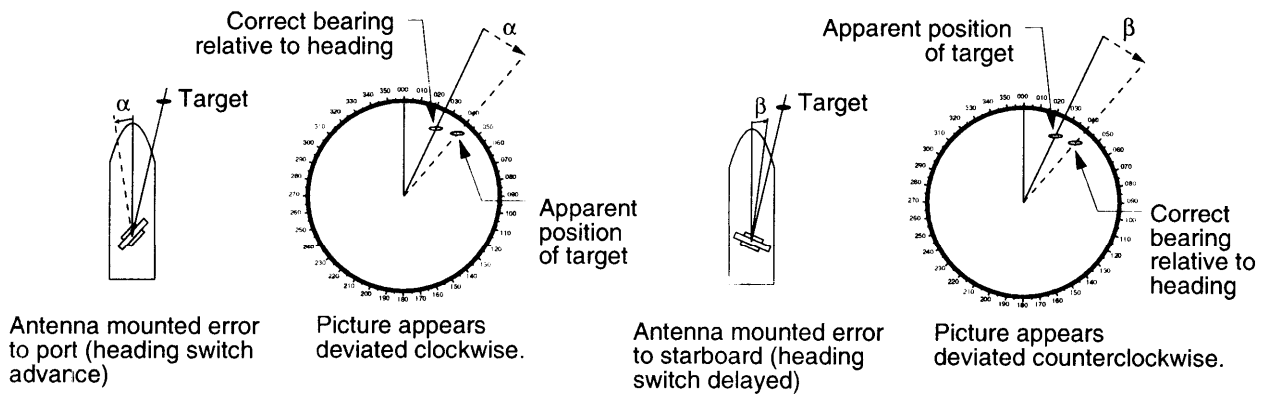


Figure 3-2 Heading alignment error

Procedure

- 1) Turn on the power. Press [RADAR MENU] [0] [0] [2] [2] to select HD ALIGN on the INITIAL SETTING 1 menu.
- 2) Select a target echo (by gyrocompass, for example) at a range between 0.125 and 0.25nm, preferably near the heading mark.
- 3) Operate the EBL control to bisect the target echo. (The value shown on the display is antenna position in relation to ship's bow.)
- 4) Press [ENTER] to finish.

3.3 Adjusting Sweep Timing

Sweep timing differs with respect to the length of the signal cable between the antenna unit and the display unit. Adjust sweep timing at installation to prevent the following symptoms:

- The echo of a "straight" target (for example, pier), on the 0.25nm range, will appear on the display as being pulled inward or pushed outward. See Figure 3-3.
- The range of target echoes will also be incorrectly shown.

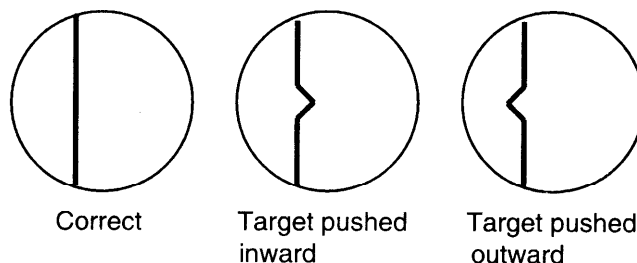


Figure 3-3 Examples of correct and incorrect sweep timings

Procedure

- 1) Turn on the power. Press [RADAR MENU] [0] [0] [2] [3] to select TIMING ADJ on the INITIAL SETTING 1 menu.
- 2) Transmit on the 0.25nm range.
- 3) Adjust radar picture controls to display picture properly.
- 4) Select a target echo which should be displayed straightly.
- 5) Adjust the VRM control to straighten the target echo.
- 6) Press the [ENTER] key.

3.4 Adjusting Video Signal Level

When the signal cable is very long, the video amplifier input level decreases, shrinking target echoes. To prevent this, confirm (and adjust if necessary) video amplifier input level.

Procedure

- 1) Connect an oscilloscope to TP3 on the INT Board (INT-9170).
- 2) Transmit on the 12nm range. Take trigger at TP10 on the same board.
- 3) Adjust VR1 on the INT Board so the value of TP3 is 4Vpp. (For secondary display, adjust VR2 for same level.)

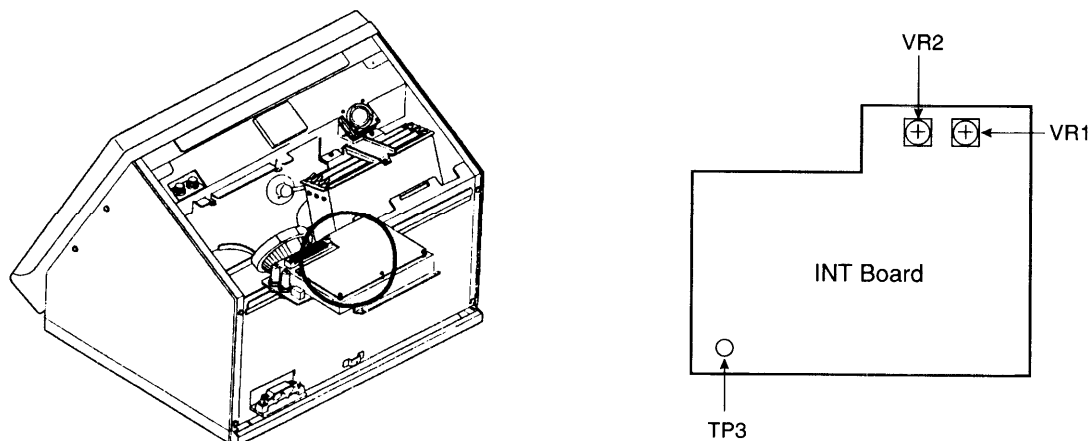


Figure 3-4 Location of INT Board

3.5 Suppressing Main Bang

If main bang appears at the screen center, suppress it as follows.

Procedure

- 1) Turn on the power. Transmit on a long range and then wait ten minutes.
- 2) Adjust [GAIN] control to show a slight amount of noise on the display.
- 3) Select the 0.25nm range. Adjust the [A/C SEA] control to suppress sea clutter.
- 4) Open the tuning compartment on the control unit.
- 5) Set VR901(MBS-L) at two o'clock and then slowly turn VR902 (MBS-T) clockwise to suppress main bang.
- 6) If main bang still exists, turn VR901 clockwise slightly, and then slowly turn VR902 clockwise. **Note that excessive main bang erases targets in close range.**

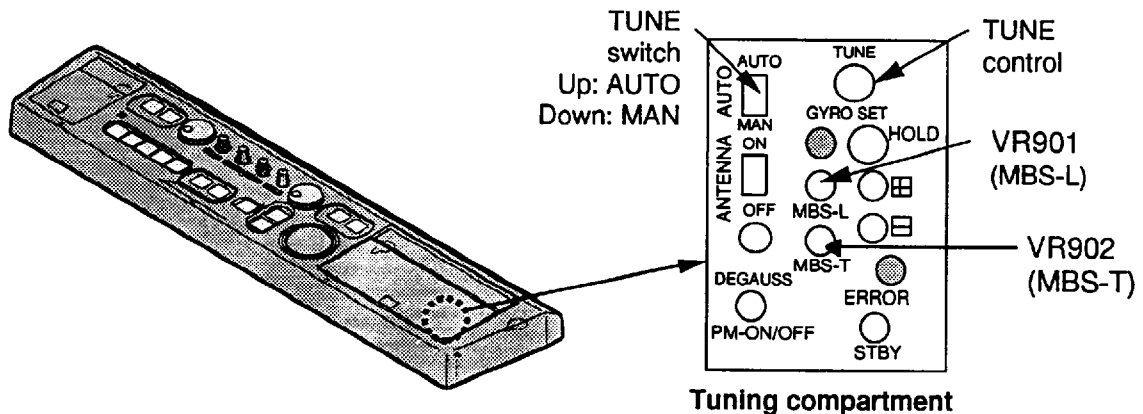


Fig. 3-5 Control unit, location of tuning compartment

3.6 Confirming Tuning

The radar receiver can be tuned both automatically and manually. Confirm that the radar can be tuned both automatically and manually.

Procedure

- 1) Turn on the power. Set the TUNE switch in the top right hand panel to MANU.
- 2) Transmit on the 48nm range.
- 3) Adjust sensitivity and picture brilliance. Turn the [A/C SEA] and [A/C RAIN] controls fully counterclockwise (off).
- 4) While observing the picture, turn the [TUNE] control in the tuning compartment slowly counterclockwise (clockwise) more than twice to get best (worst) tuning point.

- 5) Turn the [TUNE] control slowly clockwise (counterclockwise) to display the longest tuning bar.
- 6) Set the TUNE switch to AUTO and wait about 10 seconds (about four rotations of the antenna).
- 7) Confirm that the radar found best tuning point. Peak tuning is obtained when about 80% of the tuning indicator lights.

3.7 Confirming Magnetron Heater Voltage

Magnetron heater voltage is adjusted at the factory. However, confirm that it is within the prescribed rating.

Model	FR-2835SW (30kW)	FR-2865SW (60kW)
Rating	0.25 mile 9.1-9.3 VDC	7.0-7.6 VDC
	48 mile 7.5-8.5 VDC	4.7-5.3 VDC
Check Point	VR801 Trigger Board(RFC-9008)	R812 (0.25 nm) R811 (48 nm)

FR-2835SW (RTR-047)

1. Set the item 5 "SCANNER STOPPED" on the INITIAL SETTING menu to "TX" so that the radar can transmit with the scanner rotation suspended.
2. Set the SCAN switch on the top right-hand panel to "Off".
3. Remove the TX fuse (F801) on the transceiver unit.
4. Set a multimeter to 10 VDC range and connect it between #4 (+) and #6 (-) of connector on P.C.B. 03P9189.
5. With the radar set to 0.25 nm range, adjust sliding contact R801 for multimeter reading of 8.2-8.4 VDC.
6. With the radar set to a range greater than 48 mile, confirm the multimeter reading of 6.5-7.5 VDC.

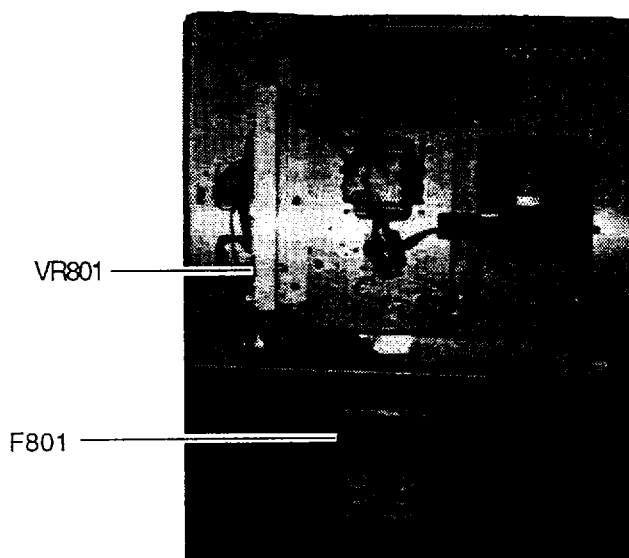


Fig. 3-6 Transceiver Unit, RTR-047

FR-2865SW (RTR-018)

1. Turn off the radar, remove transmission fuse F801 from the transceiver unit, then ready the radar for "transmitting." Also, leave transceiver unit door switch S802 pulled out.
2. Connect a multimeter, set to VDC range, between #4 (+) and #6 (-) of pulse transformer T801.
3. With the radar set to the 0.25 mile range, adjust sliding contact of R811 for a multimeter reading of 7.0 -7.6 VDC.
4. With the radar set to the 48 mile range, adjust sliding contact of R811 for a multimeter reading of 4.7-5.3 VDC.
5. Replace the transmission fuse, transmit the radar and check that magnetron current, shown on the check meter inside the display unit, is normal (6-10) on the 48 mile range.

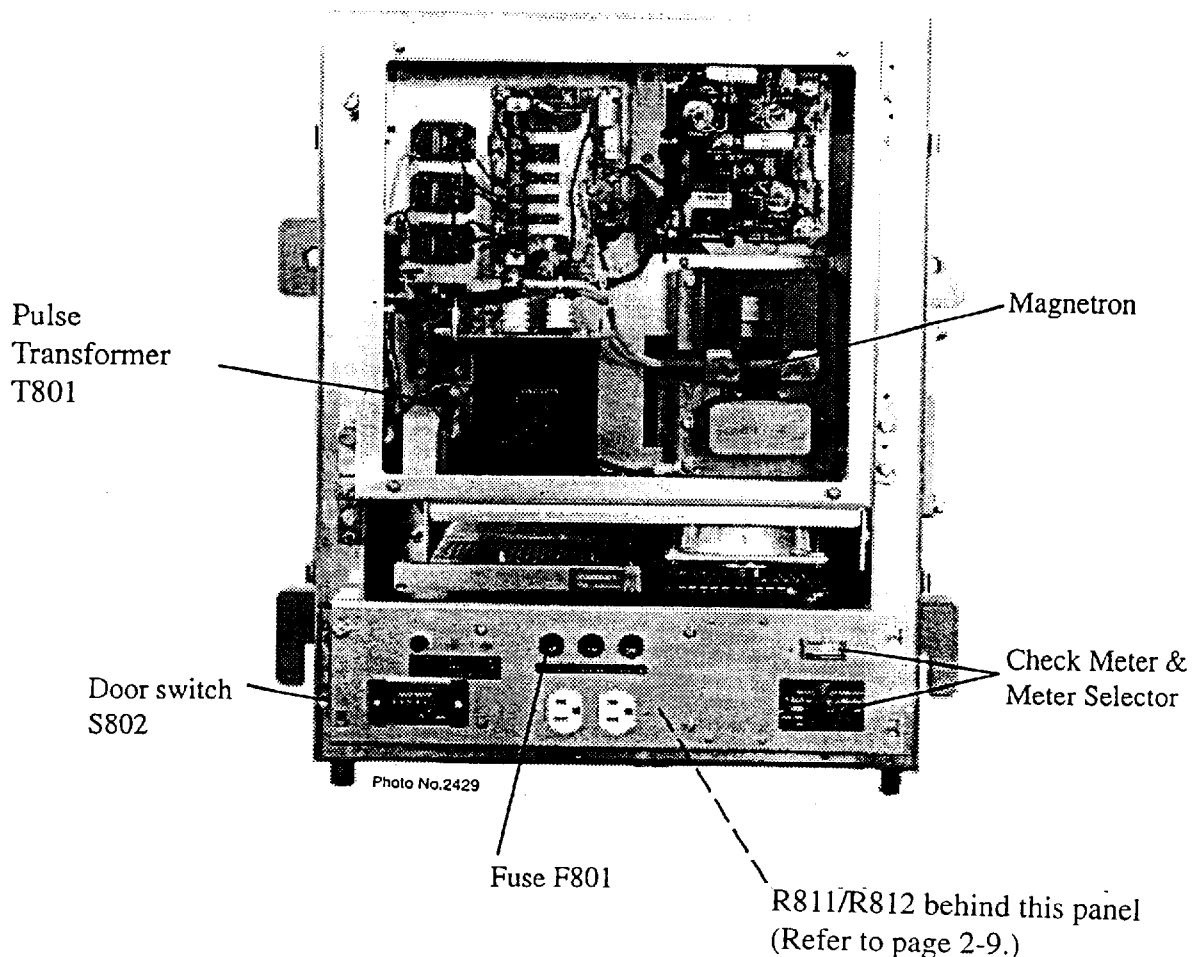


Fig. 3-7 Transceiver Unit, RTR-018

3.8 Initial Setting Menus

The INITIAL SETTING menus (four menus) setup the radar according to expected usage, authorities specification, ship's characteristics, operator's preference, etc. Set items on each menu accordingly.

INITIAL SETTING 1 menu

HD ALIGN: Compensates for heading error in bow direction.

TIMING ADJ: Adjusts sweep timing, which varies according to signal cable length.

ANT HEIGHT: Enter height of antenna above water.

LOG PULSE: Enter speed log's pulse rate.

OWN SHIP INFORMATION: Enter ship's characteristics; length, width, radar position, nav antenna position, turn rate, and speed rate. Those data will be used for the anchor watch alarm, docking, etc.

ON TIME, TX TIME: Shows number of hours the radar has been turned on and transmitted, respectively. Value can be change to monitor magnetron usage, etc.

INITIAL SETTING 2 menu

KEY BEEP: Turns key response beep on or off.

SCANNER STOPPED: Set to ST-BY in normal use. TX enables transmission state without antenna rotation.

VIDEO SIGNAL: Set to ANLG (analog) for normal use. Set for DGTL to adjust QV (Quantized Video).

ALARM LEVEL: Sets echo strength which triggers guard alarm. "7" is strongest echo; "4" is medium strength echo.

DISPLAY: Select radar display function; main or sub (slave).

SECTOR BLKG: Sets area (up to 2) where no radar pulses will be transmitted. For example, set the area where an interfering object at the rear of the antenna would produce a dead sector (area where no echoes appear) on the display. To enter an area, select ON and enter relative bearing range of the area.

INITIAL SETTING 3 menu

TRAIL RESTART: Selects whether to restart or discontinue echo trailing when changing the range. ON restarts trailing on newly selected range; OFF discontinues trailing.

ECHO AVG W/O GYRO: Echo averaging can be turned on without gyrocompass connection.

GYRO SCALE: Bearing scale may be shown in degrees or compass points.

CTR ECHO STRETCH: Turn on to enlarge echoes in the range up to the first range ring.

VIDEO CONTRAST: For factory use. Do not change setting.

MAXIMUM RANGE: For factory use. Do not change setting.

ECHO FULL COLOR: Echoes may be displayed in single or multi-color.

INDEX LINES: Selects the number of index lines to display; 2 or 6.

INITIAL SETTING 4 menu

MODEL: Select radar model. Pulsewidth, pulse repetition rate and STC curve change according to selection.

RJ-7 and RJ-8: Selects which Interswitch unit to use.

ANT A: Select model of antenna A.

ANT B: Select model of antenna B.

CABLE L: Set for "500."

FACTORY DEFAULT: Restores all menus' default settings.

After entering initial settings

Turn off the #4 segment of DIP Switch S1 on the SPU Board to disable the menus for initialization and adjustment.

3.9 Setting the Function Keys

This radar has four function keys which automatically set up the radar according to the conditions ascribed to them. Confer with ship owner and radar operator to determine suitable program for each key.

Assign task to each function key;

Function key #1: picture setup

Function key #2 and #3: picture setup or specific operation

Function keys #4: specific or watch function

The table below and menu on the next page show the programs available.

Table 3-1 Operation setup conditions

Picture setup	Function
RIVER	River navigation
BUOY	Detecting navigation buoys, small vessels and other small surface objects
SHIP	Detecting vessels
SHORT	Short range detection using a range of 3 nm or less on calm seas.
LONG	Long range detection using a range of 6 nm or larger
CRUISING	Cruising using a range of 1.5 nm or larger
HARBOR	Short range navigation in a harbor using range of 1.5 nm or less
COAST	Coastal navigation using range of 12 nm or less
OCEAN	Transoceanic voyage using range of 12 nm or larger
ROUGH SEA	Optimum setting for rough weather or heavy rain

[FUNCTION KEY 1]		
1	[SYSTEM SETTING 1]	
2	FUNCTION	FUNC1/RIVER/BUOY/ SHIP/SHORT/LONG/ CRUISING/HARBOR/ COAST/OCEAN/ ROUGH SEA (FLOAT/BIRD) *1
3	INT REJECT	OFF/1/2/3
4	ECHO STRETCH	OFF/1/2
5	ECHO AVERAGE	OFF/1/2/3
6	A/C AUTO	OFF/ON
7	[FUNC1 PULSE WD]	(see menu below)
8	NOISE REJ	OFF/ON

[FUNCTION KEY 2] *2		
1	[SYSTEM SETTING 1]	
2	FUNC KEY2	PICTURE/OPERATION HU/HU TB/CU/NU/ TM/TRAIL/CU, TM RESET/OFF CENTER/ ECHO STRETCH1/ ECHO STRETCH2/ PLS WD1/PLS WD2/ ECHO AVG1/ECHO AVG2/ ECHO AVG3/ECHO COLOR/TRAIL BRILL/ PANEL BRILL/CHAR BRILL/NOISE REJ
3	OPERATION	

[FUNC1 PULSE WD] *3			
1	[FUNCTION KEY 1]		
2	0.5	NM	S1/S2
3	0.75	NM	S1/S2
4	1.5	NM	S1/S2/M1
5	3	NM	S2/M1/M2
6	6	NM	M1/M2/L
7	12-24	NM	M2/L

[FUNCTION KEY 4]		
1	[SYSTEM SETTING 1]	
2	FUNC KEY4	OPERATION/WATCH ALARM
3	WATCH ALARM INTERVAL	6/10/12/15/20 MIN

Notes

*1: Available on "R" specification radar.

*2: Same menu appears for function key #3.

*3: Same menu appears for function keys #1, #2 & #3.

Shaded items are set at the factory; do not change their settings. See note on next page.

Figure 3-8 Function key menus

Procedure for setting function keys

Function key #1

- 1) Press [RADAR MENU].
- 2) Press [0].
- 3) Press [3] to select FUNCTION KEY 1.
- 4) Press [2] to select picture setup condition desired.
- 5) Press [8]. (See the note on the next page.)

Function key #2 & #3

- 1) Press [RADAR MENU].
- 2) Press [0].
- 3) Press [4] to select FUNCTION KEY 2.
- 4) Press [2] to select PICTURE or OPERATION.

- 5) Press [3] to select picture setup condition (or specific operation) desired.
- 6) Press [9]. (See the note below.)

Function key #4

- 1) Press [RADAR MENU].
- 2) Press [0].
- 3) Press [5] (FUNCTION KEY 3) or [6] (FUNCTION KEY 4).
- 4) Press [2] to select OPERATION or WATCH ALARM.
- 5) Press [3] to select picture setup condition (or watch alarm interval).
- 6) Press [9]. (See the note which follows.)

Note: Each picture setup condition is programmed with optimal settings for interference rejection, echo stretch, echo averaging, automatic clutter removal, pulsewidth, and noise rejection. Therefore, the settings for those items on the function key menus should not be changed; any adjustment may adversely affect the target detection ability of the radar. If change is absolutely necessary, consult with nearest FURUNO representative or dealer.

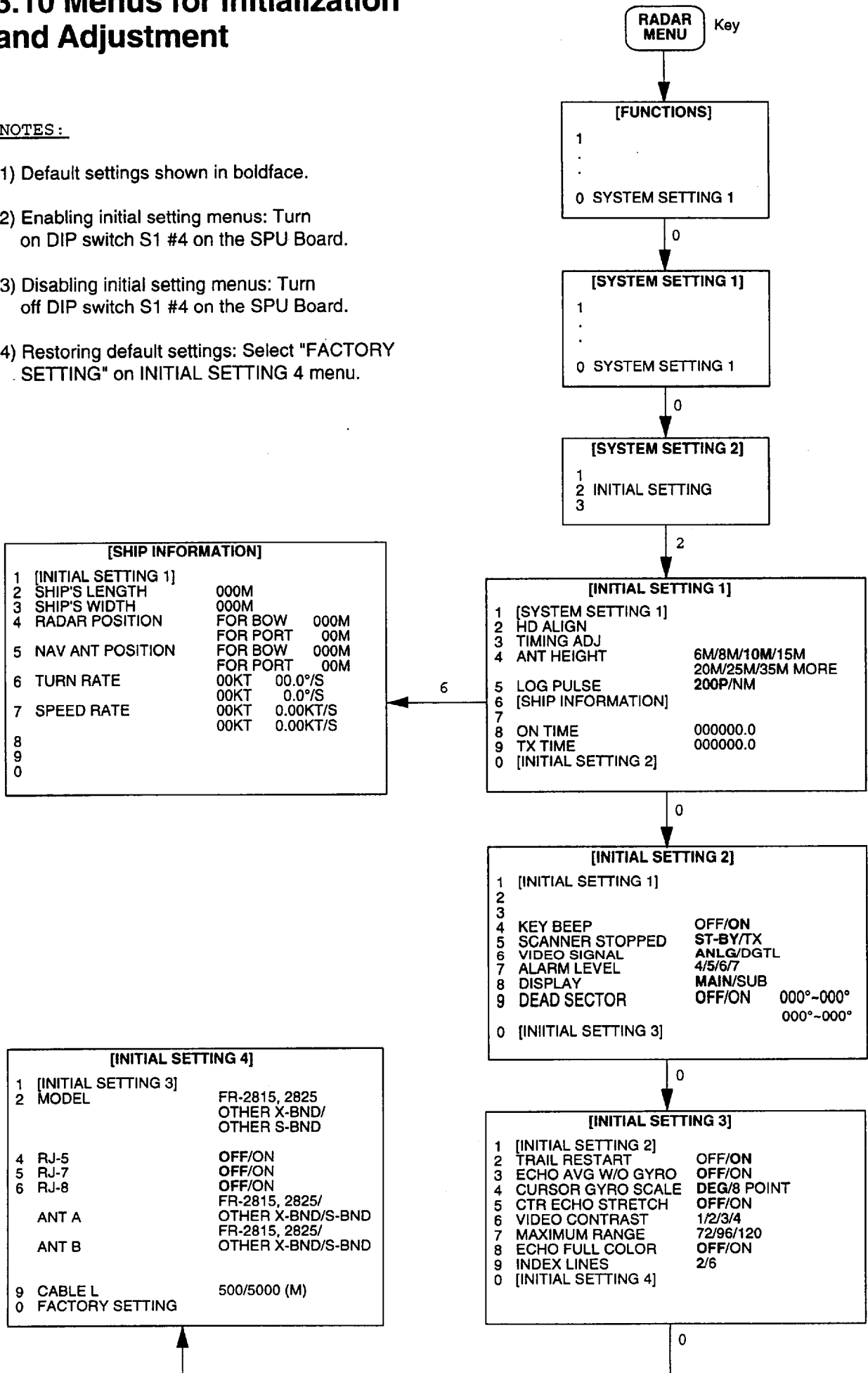
Attach label to function keys

After setting the function keys, attach appropriate label (supplied) to them.

3.10 Menus for Initialization and Adjustment

NOTES :

- 1) Default settings shown in boldface.
- 2) Enabling initial setting menus: Turn on DIP switch S1 #4 on the SPU Board.
- 3) Disabling initial setting menus: Turn off DIP switch S1 #4 on the SPU Board.
- 4) Restoring default settings: Select "FACTORY SETTING" on INITIAL SETTING 4 menu.



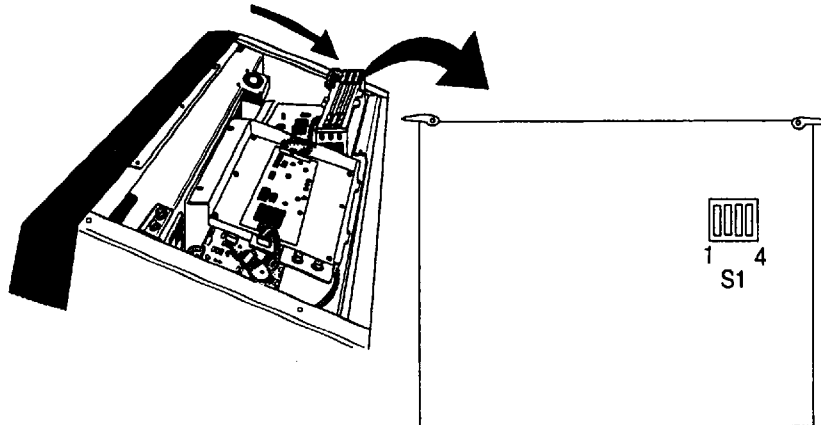
3.11 Adjusting the ARP Board

Procedure

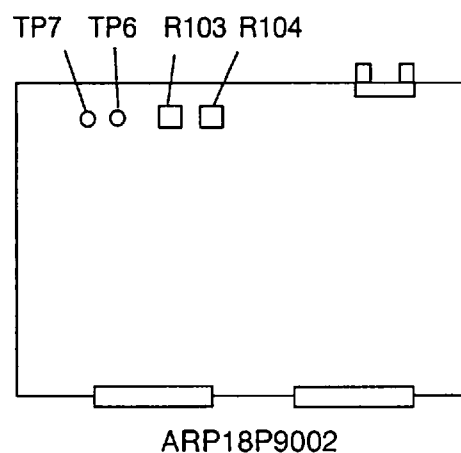
- 1) Take out the SPU Board SPU-9111 from the pcb compartment in the display unit.
- 2) Turn on #4 of DIP Switch S1.
- 3) Set the SPU Board in pcb compartment.
- 4) Set the radar as follows and transmit on 6nm range.

A/C SEA control: fully CCW
A/C RAIN control: fully CCW
GAIN controll: fully CCW

From the rear, SPU, ARP
and RP(option) Boards.



- 5) Connect a digital multimeter, set to DCV range, to the following points on the ARP Board.
+: TP7 (VS+)
- : TP6 (VS-)
- 6) Adjust potentiometer R104 ("OFFSET") on the ARP Board so that the multimeter reads +0.09 to 0.13V.



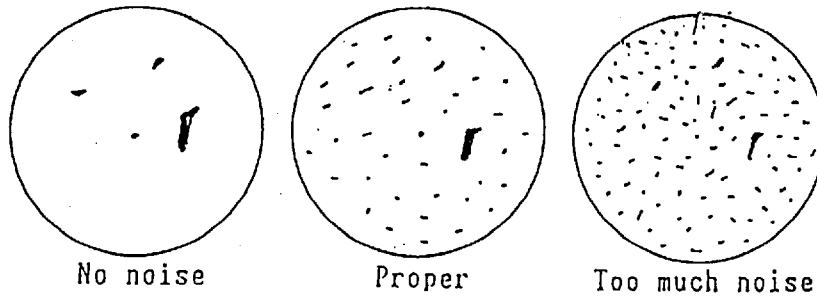
7) Set the controls and switches as follows.

- A/C SEA control: fully CCW (same as step 4)
- A/C RAIN control: fully CCW (same as step 4)
- GAIN control: fully CW
- INT REJECT key: OFF
- RANGE: 24 nm
- Echo Stretch (in menu): OFF

8) Press the RADAR MENU key followed by 0, 0, 2, 0 and 6 to select "DGTL".

9) Press the ENTER key.

10) Adjust potentiometer R103 ("LEVEL") on the ARP Board so that random noise faintly appears.

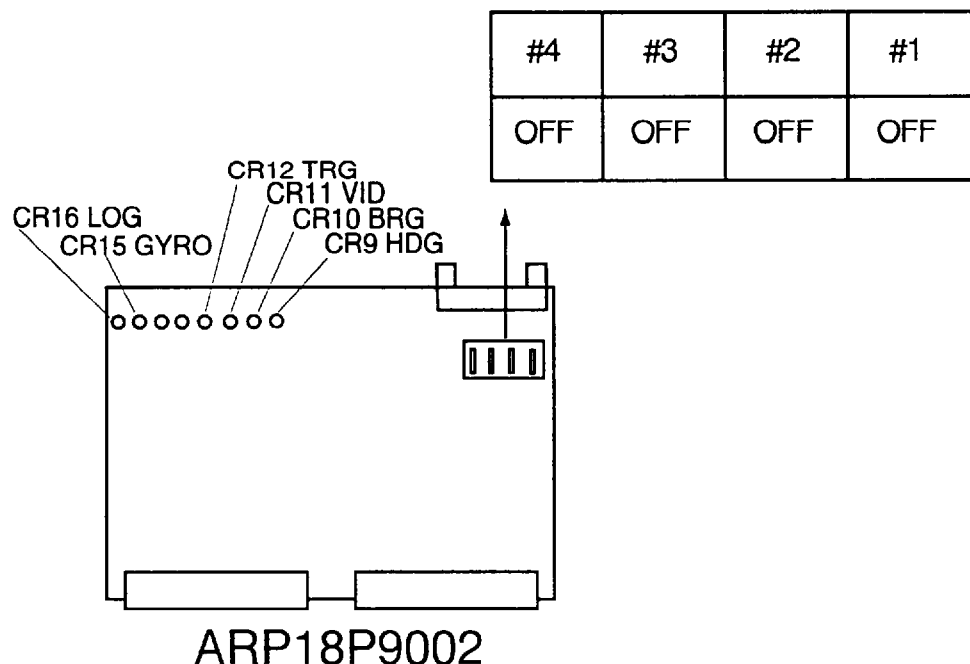


11) Repeat step 6 to select "ANLG", and press the ENTER key.

12) Turn off #4 of DIP switch S1.

Confirming proper operationw

Connect speed log and gyro to radar. Transmit the radar. Confirm that all red LEDs (CR9, 10, 11, 12, 15 and 16) are off, provided that the ship's speed is not zero. If any signal is not applied, the corresponding LED lights.



3.12 Installation Check List

Tick box to indicate completion.

- Hoist rings removed?
- Rubber mat placed between antenna unit and mounting platform?
- Waterproofing gasket on antenna unit oriented correctly?
- Heading aligned?
- Sweep timing adjusted?
- Main bang suppressed?
- Tuning checked?
- Magnetron heater voltage checked?
- Antenna height entered?
- Log pulse selected?
- GYRO CONVERTER Board set up?
- DIP Switch S1 #4 turned off?
- Function keys set and function key labels attached?
- Unused cable slots in cable clamp covered with aluminum tape?

4. INSTALLATION OF GYRO CONVERTER GC-8 (option)

The Gyro Converter GC-8 converts analog gyrocompass reading into digital coded bearing data for display on the radar display.

This section explains how to install the GC-8 (mainly consisting of the GYRO CONVERTER Board) and set it up according to the type of gyrocompass connected.

4.1 General Procedure for Installing and Setting up the GYRO CONVERTER Board

- 1) Turn off the power.
- 2) Remove the top cover.
- 3) Connect the GYRO CONVERTER Board to the MOTHER Board (cables supplied with GC-8) as follows:

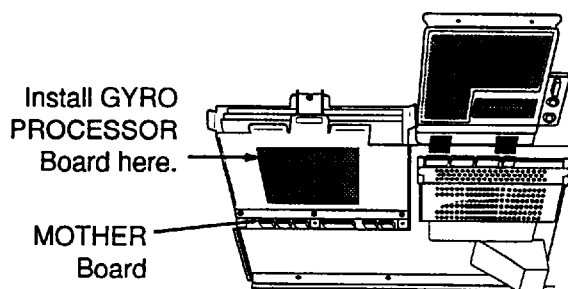
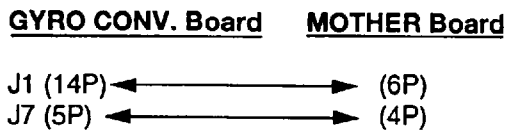


Fig. 4-1 Display unit, top view

Table 4-1 Contents of GC-8 installation kit

Name	Type	Code No.	Qty
GYRO CONVERTER Board	64P1106	004-412-200	1
Spacer	SQ-10	000-801-678	4
Washerhead Screw	M3 x 8	008-456-404	4
PH-XH Connector	03-1761 (14P-6P)	008-456-130	1
NH-XH Connector	03-1762 (5P-5P)	008-456-140	1
Label	64-014-2021-1	100-132-701	1
VH Connector Assy.	03-1763 (5P)	008-456-150	1
VH Connector Assy.	03-1764 (3P)	008-456-160	1
Spare Fuses	FGMB 2A 250V	000-122-000	4

- 4) Confirm gyrocompass specifications and set up the DIP switches and jumper wires on the GYRO CONVERTER Board according to gyrocompass connected;
 - Confirming gyrocompass specifications: see next page
 - Setting jumper wires and DIP switches by gyrocompass specifications: page 4-4
 - Setting jumper wires and DIP switches by make and model of gyrocompass: page 4-6
 - Location of jumper wires and DIP switches: page 4-7
- 5) Solder the gyrocompass cable to the VH connector assemblies (supplied).
- 6) Connect the VH connectors to the GYRO CONVERTER Board as shown in the table below.

Connector		Gyrocompass	
		Step type	Synchro type
J4	#1	S1	S1
	#2	S2	S2
	#3	S3	S3
	#4		
	#5	F. G.	F. G.
J5	#1	—	R2
	#2	COM	R1
	#3	F. G.	F. G.

- 7) Attach instruction label (supplied) to the rear side of the top cover.
- 8) Close the panel.
- 9) Turn on and off the power to reset the CPU.

4.2 Connection of External Power Supply

Connect an external power supply when the repeater signal is step-by-step type and the step voltage is below 20V or output voltage is less than 5W.

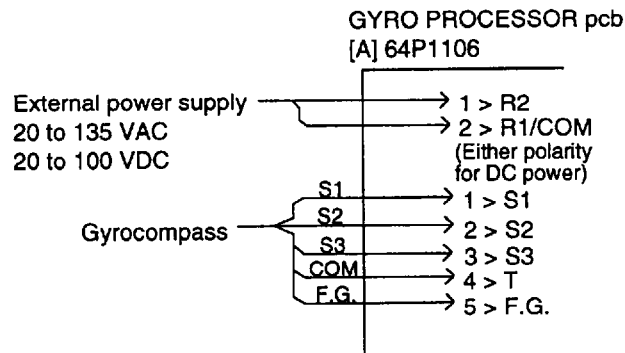


Fig. 4-2 Connection of external power supply to GYRO GYRO CONVERTER Board

4.3 Confirming Gyrocompass Specifications

Follow the flow chart in the figure below to confirm gyrocompass specifications.

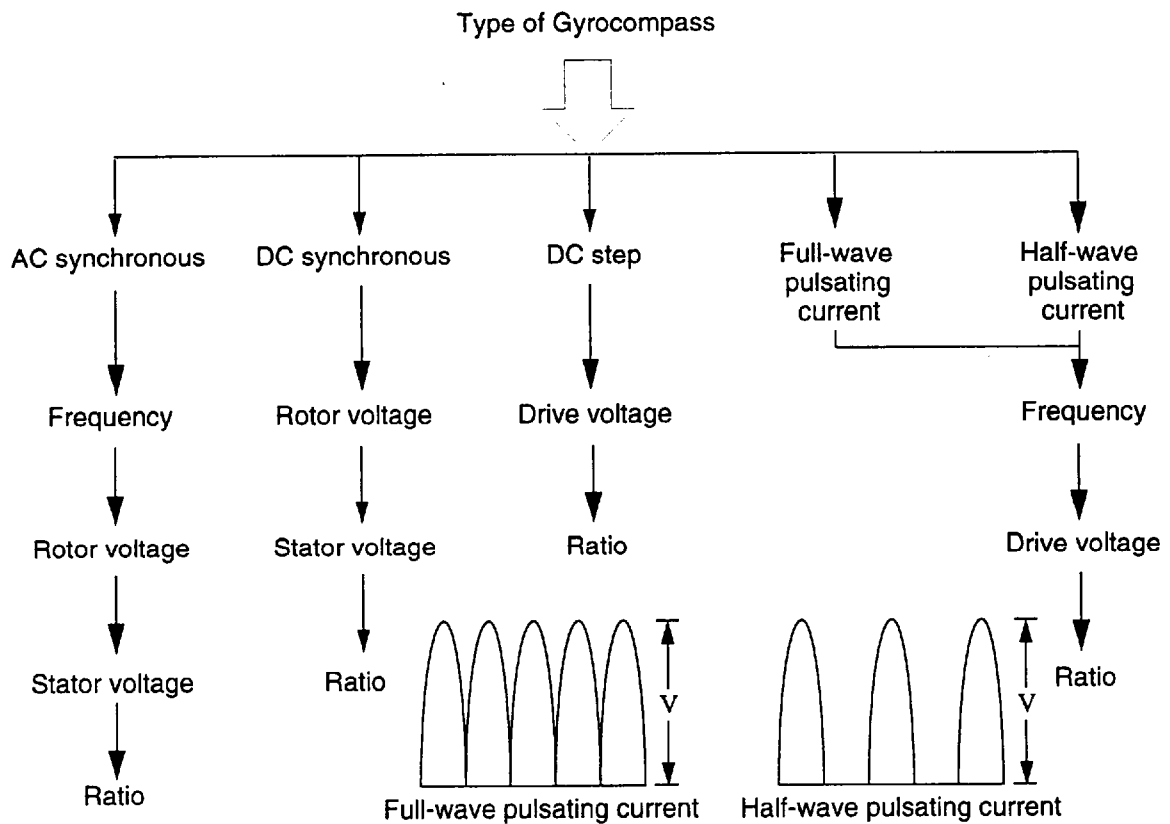


Fig. 4-3 Confirming gyrocompass specifications

4.4 Changing Settings on the GYRO CONVERTER Board

Default setting

In the default setting all DIP switches are off and all jumpers wires are set to "#1." (Note that jumper wire JP1's setting is #1, #2, and #3.) In those settings the gyrocompass having the following specifications can be directly connected; modification of the GYRO CONVERTER Board is not necessary.

AC synchronous signal: 50/60Hz
 Rotor voltage: 60V to 135V AC
 Stator voltage: 60V to 135V AC
 Gear ratio: 360x
 Supply voltage: 30V to 135V AC

If the specifications of the gyrocompass differ from those mentioned above, change jumper wire and DIP switches settings on the GYRO CONVERTER Board. Settings may be changed according to gyrocompass specifications or make and model of gyrocompass (see page 4-6). For the location of DIP switches and jumper wires, see page 4-7.

Setting method 1: by gyrocompass specifications

1) Gyrocompass type

Gyrocompass type	SW 1-4	SW 1-5	SW 1-6	JP1
AC synchronous	OFF	OFF	OFF	#1, #2, #3
DC synchronous	OFF	OFF	OFF	#2, #3, #4
DC step	ON	OFF	OFF	#4, #5, #6
Full-wave pulsating current	OFF	ON	OFF	#4, #5, #6
Half-wave pulsating current	ON	ON	OFF	#4, #5, #6

2) Frequency

Frequency	SW 1-7	SW 1-8	Remarks
50/60Hz	OFF	OFF	AC synchronous pulsating current
400Hz	ON	OFF	AC synchronous pulsating current
500Hz	OFF	ON	AC synchronous pulsating current
DC	ON	ON	DC synchronous DC step

3) Rotor voltage (between R1 & R2)

Rotor voltage	SW 2-1	JP3
20V to 45V AC	OFF	#2
30V to 70V AC	OFF	#2
40V to 90V AC	ON	#1
60V to 135V AC	OFF	#1

4) Stator voltage (between S1 and S2)

Stator voltage	SW 2-2	SW 2-3	JP3
20V to 45V AC, or 20V to 60V DC	ON	OFF	#2
20V to 45V AC, or 20V to 60V DC	OFF	OFF	#2
40V to 90V AC	ON	OFF	#1
60V to 135V AC	OFF	OFF	#1

5) Ratio

Ratio	SW1-1	SW 1-2	SW1-3
360x	OFF	OFF	OFF
180x	ON	OFF	OFF
90X	OFF	ON	OFF
36X	OFF	ON	OFF

6) Supply voltage

Supply voltage	JP4	JP5
20V to 45V AC, or 20V to 60V DC	#2	#2
30V to 135V AC, or 40V to 100V DC	#1	#1

7) AD-10 format data Tx interval

Select data transmitting interval for ports 1 to 6 by jumper wires JP6 and JP7.

Note: The Tx interval is available in 25 msec or 200 msec. 25 msec is for radar; 200 msec is for all other equipment.

8) NMEA-0183 Tx interval

Tx interval	SW2-4
2 seconds	ON
1 second	OFF

Setting method 2: by make and model of gyrocompass

Table 4-2 Setting GYRO CONVERTER Board by make and model of gyrocompass

Maker	Models	Specification	SW 1-1	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8	SW 2-1	SW 2-2	SW 2-3	JP1	JP2	JP3	JP4	JP5
FURUNO	GY-700	DC step 100V 180x 5-wire, open collector	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1
Anschutz	Standard 2,3	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 22V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	#1, #2,#3	#2	#2	#1	#1
	Standard 4,6	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 90V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#2	#1	#1	#1
	Standard 20	DC step 35V 180x COM(-), 3-wire(+)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2
Yokogawa Navtec (Plaith type)	C-1/1A/2/3 A-55, B-55	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 22V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	#1, #2,#3	#2	#2	#1	#1
	CMZ-250X/ 300X/500	DC synchronous 360x	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	-	ON	OFF	Remove	#2	-	*	*
		DC step 35V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2
	CMZ-100/200/ 300 C-1Jr,D-1Z/1/3 IPS-2/3	AC synchronous 50/60Hz Rotor voltage: 100V Stator voltage: 90V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1
CMZ-50 Note	step 35V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	Remove	#2	-	*	*	
Plaith	NAVGAT II/III	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 68V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#2	#2	#1	#1
Tokimec (Sperry type)	ES-1/2/11 GLT-101/102/ 103/106K/107	AC synchronous 50/60Hz Rotor voltage: 100/110V Stator voltage: 90V 36x	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
	ES-11A/110 TG-200 PR222R/2000 PR237L/H GM 21	AC synchronous 50/60Hz Rotor voltage: 100/110V Stator voltage: 22V 90x	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
	MK-14 MOD-1/2/T NK-EN,NK-EI	DC step 70V 180x COM(-), 3-wire(+)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1
	SR-130/140	DC step 70V 180x 5-wire, open collector	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1
	TG-100/5000 PR-357/130/ 140, ES-17 GLT-201/202 /203	DC step 70V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1
	TG-6000	DC step 24V 180x	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2
	GM-11	AC synchronous 50/60Hz Rotor voltage: 100V Stator voltage: 90V 90x	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
	SR-120,ES-16 MK-10/20/30	DC step 35V 180x	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2
Kawasaki	GX-81	AC synchronous 50/60Hz Rotor voltage: 100/110V Stator voltage: 90V 90x	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
Armabrown	MK-10,MKL-1 SERIES1351, MOD-4	DC step 50V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1
Robertson	SKR-80	DC step 35V 180x COM(-), 3-wire(+)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2

After changing settings

Turn on and off the power to reset the CPU.

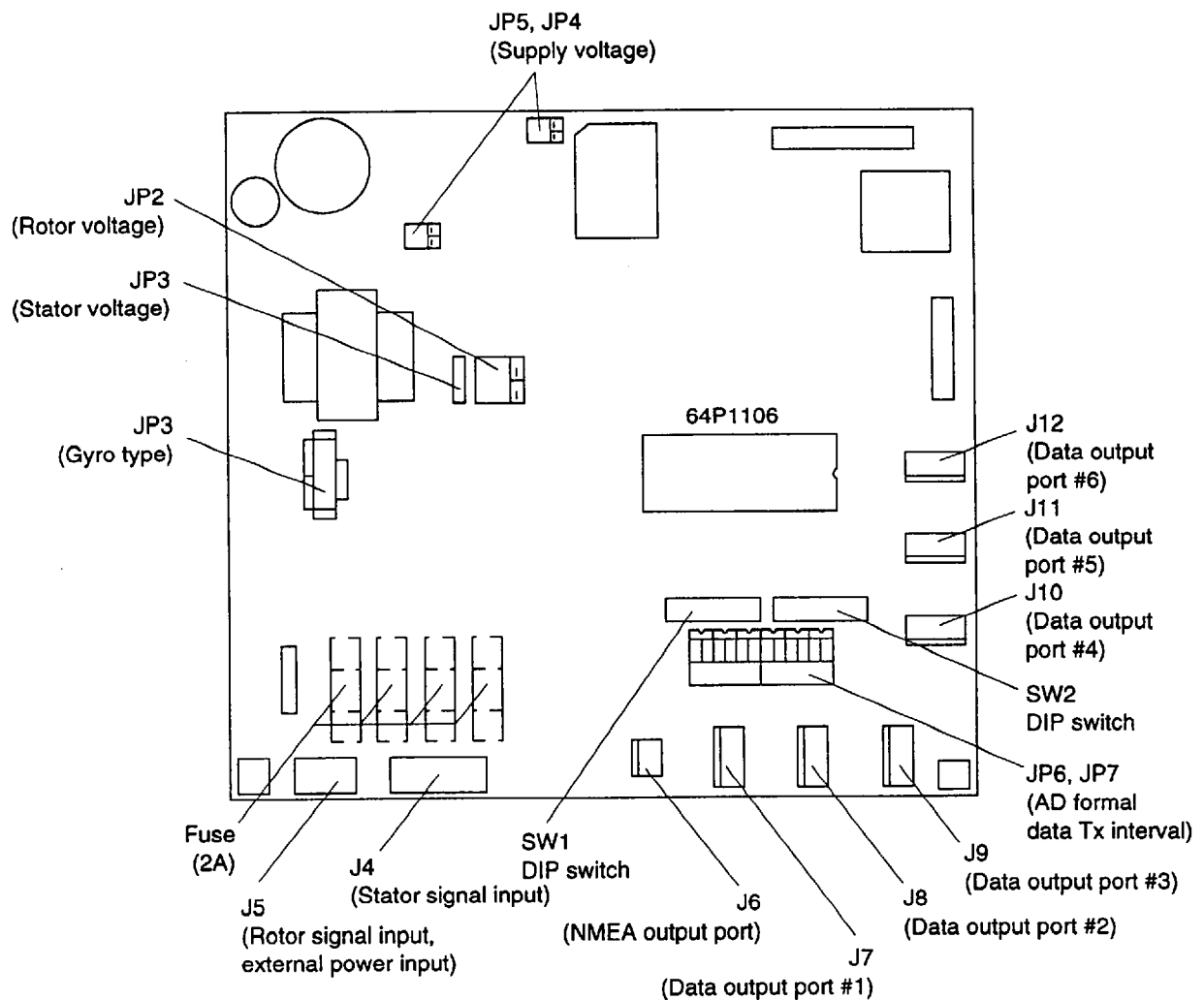


Fig. 4-5 Location of DIP switches and jumper wires on the GYRO CONVERTER Board

4.5 Setting the Bearing on the Radar Display

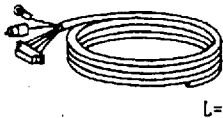
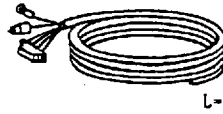
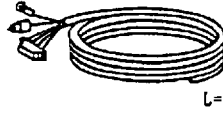
Confirm that the gyrocompass is giving reliable readings. Then, set bearing on the radar display as shown in the procedure below.

- 1) Open the tuning compartment on the control panel. Press the HOLD switch to disengage the computing circuit from the gyrocompass. The "HOLD" LED lights.
- 2) Press [+] or [-] switch to duplicate the gyrocompass reading at the top of the radar display. (Each press of those switches changes the readout by 0.1 degrees. A switch may be pressed and held down more than two seconds to change the readout by one degree.)
- 3) Press the HOLD switch when the gyrocompass reading on the radar matches the gyrocompass reading. The "HOLD" LED goes off.

Note: In some cases, the gyrocompass rotation may be the opposite of the displayed bearing, in spite of correct connections. In this case try exchanging two connections among S1, S2 and S3 on the GYRO SWITCH Board.

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TYPE	

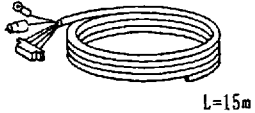
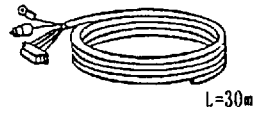
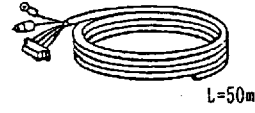
工事材料表 INSTALLATION MATERIALS		FR/FAR-2825W/2835SW L-3" - RADAR (信号ケーブル SIGNAL CABLE)			
番号 No.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	信号ケーブル組品 SIGNAL CABLE ASSEMBLY	 L=15m	S03-63-15 (RW-6895 *15M*) CODE NO. 008-465-230	1	選択 TO BE SELECTED
2	信号ケーブル組品 SIGNAL CABLE ASSEMBLY	 L=30m	S03-63-30 (RW-6895 *30M*) CODE NO. 008-465-240	1	
3	信号ケーブル組品 SIGNAL CABLE ASSEMBLY	 L=50m	S03-63-50 (RW-6895 *50M*) CODE NO. 008-465-250	1	
			CODE NO.		
			CODE NO.		
			CODE NO.		
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(略図の寸法は参考値です。)

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DWG. NO. C3411-M01-A

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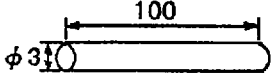
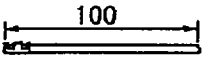

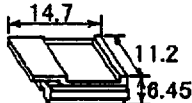
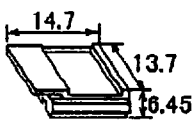
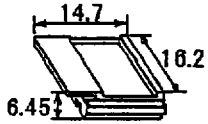
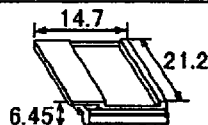
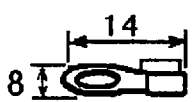
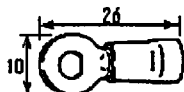
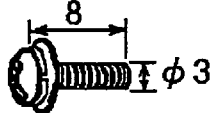
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TYPE	

工事材料表 INSTALLATION MATERIALS		FR-2855W/2865SW レーダー FAR-2855W/2865SW RADAR			
番号 No.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	信号ケーブル組品 SIGNAL CABLE ASSY.	 L=15m	S03-57-15 RW-5093 *15M* CODE NO. 008-461-810	1	選択 TO BE SELECTED
2	信号ケーブル組品 SIGNAL CABLE ASSY.	 L=30m	S03-57-30 RW-5093 *30M* CODE NO. 008-461-820	1	
3	信号ケーブル組品 SIGNAL CABLE ASSY.	 L=50m	S03-57-50 RW-5093 *50M* CODE NO. 008-461-830	1	
			CODE NO.		
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図番 (1/1)
DWG. NO. C3406-M02-A

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工事材料表 INSTALLATION MATERIALS		FR/FAR-2815/2825 2835S/2855/2855W FA-2805		船用レーダー MARINE RADAR		CODE NO.	008-461-760	03EU-X-9403 -2
						TYPE	CP03-14602	1/2
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS			
1	スミチューブ F(Z) HEAT-SHRINK TUBE		3X0.25 70 *0.10M* CODE NO. 000-105-874	2	外部機器接続用 FOR EXTERNAL EQUIPMENT			
2	NHコネクタ センサースタ NH CONNECTOR ASSY.		AWG24 *0.1M* CODE NO. 000-132-342	20	外部機器接続用 FOR EXTERNAL EQUIPMENT			
3	NHコネクタハウジング NH CONNECTOR HOUSING		H2P-SHF-AA CODE NO. 000-505-595	1	警報音信号 (AC) EXT-BUZZER (AC)			
4	NHコネクタハウジング NH CONNECTOR HOUSING		H3P-SHF-AA CODE NO. 000-505-596	2	ジャイロ信号用 GYRO DATA LOG スピード信号用 SPEED LOG			
5	NHコネクタハウジング NH CONNECTOR HOUSING		H4P-SHF-AA CODE NO. 000-505-597	3	RJ-8 用 レーダファイ用 潮流計信号用			
6	NHコネクタハウジング NH CONNECTOR HOUSING		H5P-SHF-AA CODE NO. 000-505-598	2	ジャイロ信号用 GYRO DATA LOG インスタート用 INS DATA			
7	NHコネクタハウジング NH CONNECTOR HOUSING		H7P-SHF-AA CODE NO. 000-505-600	1	舵角信号用 FOR PORT RUDDER			
8	特殊ラグ LUG		7ヶ14 ス CODE NO. 000-536-100	2				
9	圧着端子 CRIMP-ON LUG		FV5.5-4 CODE NO. 000-538-123	2				
10	ワッシャーヘッドネジ B WASHER HEAD SCREW		M3X8 C2700 MBN12 CODE NO. 000-881-404	2				

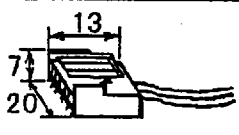
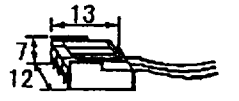
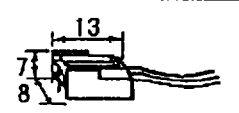
C3418-M03-D

FURUNO ELECTRIC CO., LTD

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-461-760	03EU-X-9403 -2 2/2
TYPE	CP03-14602	

工事材料表 INSTALLATION MATERIALS		FR/FAR-2815/2825 2835S/2855/2855W FA-2805		船用レーダー MARINE RADAR	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
11	VHコネクタ組品 NH CONNECTOR ASSY.		03-1737(5P)	1	シャイロコンバータ FOR GYRO CONVERTER
			CODE NO. 008-454-380		
12	VHコネクタ組品 NH CONNECTOR ASSY.		03-1738(3P)	1	シャイロコンバータ FOR GYRO CONVERTER
			CODE NO. 008-454-390		
13	VHコネクタ組品 NH CONNECTOR ASSY.		03-1778(2P)	1	パフォーマンスモニター PM-30/50用 FOR PERFORMANCE MONITOR
			CODE NO. 008-460-050 *		

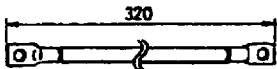
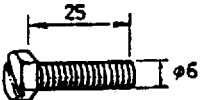
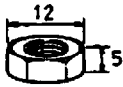


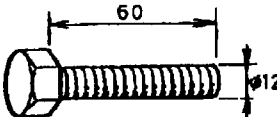
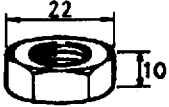
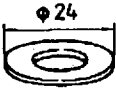


C3418-M04-C

FURUNO ELECTRIC CO., LTD

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-452-900	03EP-X-9416-3
TYPE	CP03-13943	

工事材料表 INSTALLATION MATERIALS		FR/FAR-2835SW/65SW 船舶用レーダー FR-2130SW/2160SW MARINE RADAR (空中線部用 FOR SCANNER 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	アース線 GROUNDING WIRE		RW-4747 (IV-8 *0.32M*) CODE NO. 000-566-000	1	
2	六角ボルト1種 HEX. BOLT		M6X25 SUS304 CODE NO. 000-862-180	1	
3	六角ナット 1種 HEX. NUT		M6 SUS304 CODE NO. 000-863-109	1	
4	ミカキ平座金 FLAT WASHER		M6 SUS304 CODE NO. 000-864-129	3	
5	ハネ座金 SPRING WASHER		M6 SUS304 CODE NO. 000-864-260	1	
6	六角ボルト 1種 HEX. BOLT		M12X60 SUS304 全スレッド FULL THREADED CODE NO. 000-862-191	4	
7	六角ナット 1種 HEX. NUT		M12 SUS304 CODE NO. 000-863-112	4	
8	ミカキ平座金 FLAT WASHER		M12 SUS304 CODE NO. 000-864-132	4	
9	ハネ座金 SPRING WASHER		M12 SUS304 CODE NO. 000-864-263	4	
10	圧着端子 CRIMP-ON LUG		FV1.25-4 赤 RED CODE NO. 000-538-114	12	

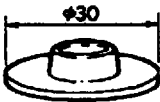
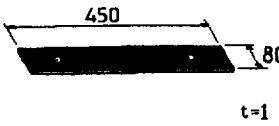
(略図の寸法は、参考値です。)

 図番 (1/2)
 DWG. NO. C3388-M01-D

FURUNO ELECTRIC CO., LTD

FURUNO

CODE NO.	008-452-900	03EP-X-9417-4
TYPE	CP03-13943	

工事材料表 INSTALLATION MATERIALS		FR/FAR-2835SW/65SW 船舶用L-波 FR-2130SW/2160SW MARINE RADAR (空中線部用 FOR SCANNER UNIT)			
番号 No.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
11	シールワッシャー SEAL WASHER		03-001-3002-0 CODE NO. 300-130-020	4	
12	防蝕ゴム CORROSION-PROOF RUBBER MAT		03-029-0301-1 CR CODE NO. 100-091-111	2	
			CODE NO.		
			CODE NO.		
			CODE NO.		
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			CODE NO.		

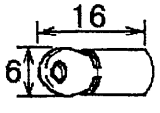
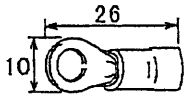
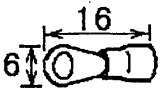
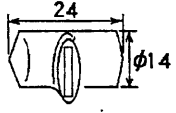
(略図の寸法は、参考値です。)

図番 (2/2)
DWG. NO. C3388-M02-E

FURUNO ELECTRIC CO., LTD

FURUNO

CODE NO.	008-465-220	03EU-X-9416 -3
TYPE	CP03-15801	1/1

工事材料表 INSTALLATION MATERIALS		FR/FAR-2825W/2835W 船用レーダー FR-2125W FR-2135SW/-MSA RADAR			
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	圧着端子 CRIMP-ON LUG		FV1.25-3 7カ	16	
			CODE NO. 000-538-113		
2	圧着端子 CRIMP-ON LUG		FV5.5-4	4	
			CODE NO. 000-538-123		
3	圧着端子 CRIMP-ON LUG		FVD1.25-3	1	
			CODE NO. 000-116-634		
4	端子板カバー PANEL BOARD COVER		ZM-47A	2	
			CODE NO. 000-532-491		

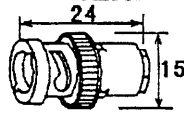

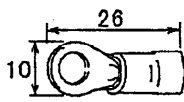
 DWG NO.
 C3411-M02- D

FURUNO ELECTRIC CO., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-461-850	03EU-X-9410-4 1/1
TYPE	CP03-14802	

工事材料表 INSTALLATION MATERIALS		船舶用レーダ - MARINE RADAR			
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 CONNECTOR		BNC-P-3	1	
			CODE NO.		
2	圧着端子 CRIMP-ON LUG		FV1.25-M3 7カ	16	
			CODE NO.		
3	圧着端子 CRIMP-ON LUG		FV5.5-4	4	
			CODE NO.		

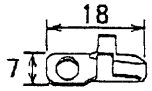

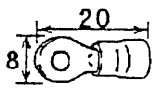
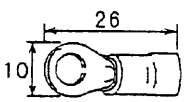
DWG NO.
C3406-M01- C

FURUNO ELECTRIC CO., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-452-540	03EP-X-9405 -4 1/1
TYPE	CP03-13907	

工事材料表 INSTALLATION MATERIALS		FR/FAR-2125W FR-2135S/-B FR-2135SW/-MSA FR-2155/-B/2165DS FR/FAR-2825W FR/FAR-2835S/SW FR/FAR-2855/W FR/FAR-2865SW		船舶用レーダー MARINE RADAR	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	特殊ワ LUG		7ヶ付4 ス	2	
			CODE NO.		
2	圧着端子 CRIMP-ON LUG		FV1.25-M3 7ヶ	16	
			CODE NO.		
3	圧着端子 CRIMP-ON LUG		FV1.25-4	11	
			CODE NO.		
4	圧着端子 CRIMP-ON LUG		FV5.5-4	19	
			CODE NO.		

DWG NO.

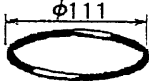
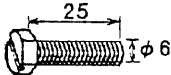
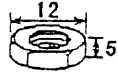


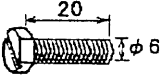
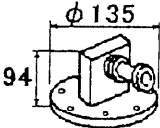
C3387-M01- E

FURUNO ELECTRIC CO., LTD

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-198-600	03BF-X-9417 -6 1/1
TYPE	PA-5600	

工事材料表 INSTALLATION MATERIALS		FR-2135SW FR-2135SW-MSA FR-2835SW FAR-2135SW FR-2865SW FAR-2165SW		船舶用レーダー MARINE RADAR 変換機 PA-5600 COUPLER		
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS		数量 Q'TY	用途/備考 REMARKS
1	リング O-RING		ARP568-345 A305		1	
			CODE NO.	000-851-891		
2	六角ねじスリ割付 HEX. BOLT (SLOTTED HEAD)		M6X25 SUS304		6	
			CODE NO.	000-862-133		
3	六角ナット 1種 HEX. NUT		M6 SUS304		6	
			CODE NO.	000-863-109		
4	平座金 FLAT WASHER		M6 SUS304		22	
			CODE NO.	000-864-129		
5	バネ座金 SPRING WASHER		M6 SUS304		6	
			CODE NO.	000-864-260		
6	六角ねじスリ割付 HEX. BOLT (SLOTTED HEAD)		M6X20 SUS304		16	
			CODE NO.	000-881-922		
7	変換器組品 COUPLER		03-012-5600-1		2	
			CODE NO.	301-256-001		

DWG NO.

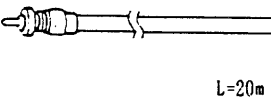
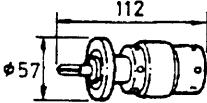
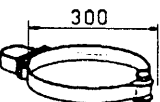
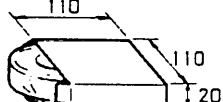
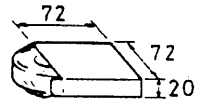
C3006-M05-C

FURUNO ELECTRIC CO., LTD

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-198-500	03EP-X-9421
TYPE	CX-20DF-20A	

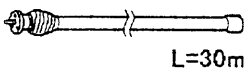
工事材料表 INSTALLATION MATERIALS		レーダー同軸ケーブル工事用 FOR RADAR COAX. CABLE INSTALLATION			
番号 No.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	RFケーブルCN付 RFCABLE WITH CONNECTOR		CX20DFCBL-20A *20M* 03S5661-2 CODE NO. 000-564-751	1	
2	ケーブル用コネクタ CABLE CONNECTOR		20D-20DWFP-A 13-3-5417-1 CODE NO. 000-564-753	1	
3	ケーブル用バンド CABLE BAND		H78-004-A 13-3-5416-1 CODE NO. 000-564-756	20	
4	スミテフ°B VULCANIZING TAPE		0.5X19X10000 クロ BLK CODE NO. 000-835-214	1	
5	スミテフ°C VULCANIZING TAPE		0.2X19X10000 クロ BLK CODE NO. 000-835-216	1	
			CODE NO.		
			CODE NO.		
			CODE NO.		
			CODE NO.		
			CODE NO.		

FR-2130SW/2160SW
FR/FAR-2835SW/2865SW

(略図の寸法は、参考値です。)

図番 (1/1)
DWG. NO. C3414-M04-A

FURUNO

		CODE NO.			03EP-X-9422 -1
		TYPE			1/1
工事材料表 INSTALLATION MATERIALS		FR-2135SW FR-2135SW-MSA FR-2835SW FAR-2835SW FR-2865SW FAR-2865SW	船舶用レーダー MARINE RADAR 同軸ケーブル工事用 FOR RADAR COAX. CABLE INSTALLATION		
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	ケーブル組品 CABLE ASSY.	 <p>L=30m</p>	LHPX-20D-ASSY (30M) CODE NO. 000-142-292	1	

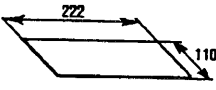
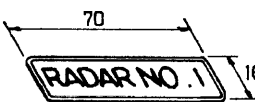
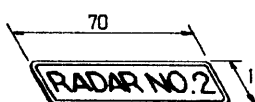
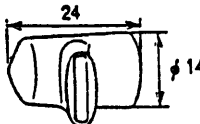
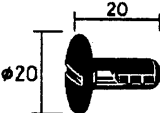
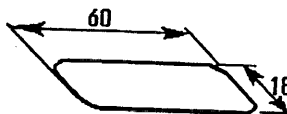
DWG NO. C3414-M03- B

FURUNO ELECTRIC CO., LTD

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-459-790	03EU-X-9502-4
TYPE	FP03-05701	

付 属 品 表 ACCESSORIES		FR/FAR-2815/2825/2835S /2855/2855W 船用レダ- /2865SW/2825W/2835SW MARINE RADAR FA-2805			
番号 No.	名 称 N A M E	略 図 OUTLINE	型 名 / 規 格 DESCRIPTIONS	数 量 Q'TY	用 途 / 備 考 REMARKS
1	キーシート(E) KEY LABEL(E)		03-133-1802-1	1	
			CODE NO. 100-233-420		
2	システム銘板NO.1 NAME PLATE NO.1		03-009-0343-0	2	
			CODE NO. 300-903-430		
3	システム銘板NO.2 NAME PLATE NO.2		03-009-0344-0	2	
			CODE NO. 300-903-440		
4	端子板カバー PANEL BOARD COVER		ZM-47A	2	
			CODE NO. 000-532-491		
5	ホールプラグ HOLE PLUG		NO. 4567	4	
			CODE NO. 000-800-729		
6	RPフライントフィルム RP BRIND FILM		03-133-1636-0	1	
			CODE NO. 100-244-490		
			CODE NO.		
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			CODE NO.		

英文 / 操作パネル一体型
ENGLISH / PANEL FITTED

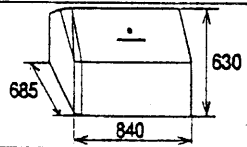
(略図の寸法は、参考値です。)

図 番 (1/1)
DWG. NO. C3418-F02-F

FURUNO

CODE NO.	000-807-203	03EU-X-9504-2
TYPE	03-133-1811-0	

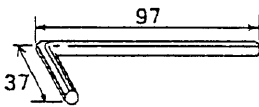
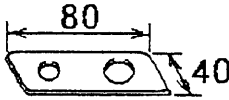
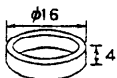
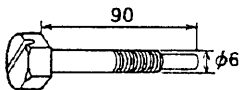
付 属 品 表 ACCESSORIES	FR/FAR-2815/2825/2835S /2855/2855W /2865SW/2825W/2835SW FA-2805	船用レダ- MARINE RADAR
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番号 No	名 称 N A M E	略 図 O U T L I N E	型 名 / 規 格 D E S C R I P T I O N S	数 量 Q ' T Y	用 途 / 備 考 R E M A R K S
1	ダストカバー DUST COVER		03-133-1811 CODE NO. 000-807-203	1	
			CODE NO.		
			CODE NO.		
			CODE NO.		
			CODE NO.		
			CODE NO.		
			CODE NO.		
			CODE NO.		
			CODE NO.		

(略図の寸法は参考値です。)

図 番 (1/1)
DWG. NO. C3418-F04-E

FURUNO

付属品表 ACCESSORIES		FR-2135S/2135SW FR-2135S-B FR/FAR-2835S FR/FAR-2835SW FR/FAR-2865SW FR-2135SW-MSA		船舶用レーダー MARINE RADAR	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	六角レンチ HEX. WRENCH		対辺6 CODE NO. 000-830-134	1	
2	つり上げ金具 LIFTING FIXTURE		03-015-3233-0 CODE NO. 100-090-720	2	
3	取付用カラー COLLAR FOR LIFTING FIXTURE		03-015-3234-0 CODE NO. 100-090-730	2	
4	ボルト BOLT		03-029-0403-0 CODE NO. 100-091-140	1	

DWG NO.

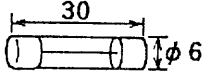
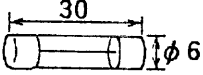
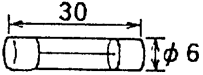
C3407-F01- F

FURUNO ELECTRIC CO., LTD

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

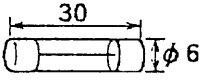
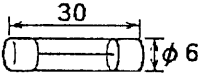
CODE NO.	008-464-880	03EU-X-9302 -2
TYPE	SP03-11701	BOX NO. P

SHIP NO.		SPARE PARTS LIST FOR		U S E			SETS PER VESSEL
		FR/FAR-2800シリーズ FR-2100シリーズ		レダ- RADAR			送受信部予備品 SPARE PARTS FOR TRANSCEIVER UNIT
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.
				WORKING		SPARE	
				PER SET	PER VES		
1	ヒューズ FUZE		FGBO 0.5A AC125V	2		2	000-549-060
2	ヒューズ FUZE		FGBO-A 5A AC125V	1		2	000-549-064
3	ヒューズ FUZE		FGBO-A 2A AC125V	*		2	*25/30KW用1個 50/60KW用2個 000-549-062
MFR'S NAME		FURUNO ELECTRIC CO., LTD		DWG NO.		C3412-P01- D	1/1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-452-700	03EP-X-9301 -3
TYPE	SP03-10320	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR		U S E			SETS PER VESSEL
	FR-2155/2155-B 船舶用レーダー FR-2125W/2165DS FR-2135S/2135SW FR-2135S-B/2825W FR-2855/2855W MARINE RADAR FR-2865SW FR-2835S/2835SW		電源制御部用 FOR POWER CONTROL UNIT			
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY		REMARKS/CODE NO.
				WORKING	SPARE	
PER SET	PER VES					
1	ヒューズ FUSE		FGBO-A 2A AC125V	1	2	000-549-062
2	ヒューズ FUSE		FGBO 10A AC125V	2	4	000-549-065
MFR'S NAME	FURUNO ELECTRIC CO., LTD		DWG NO.	C3387-P01-D		1/1

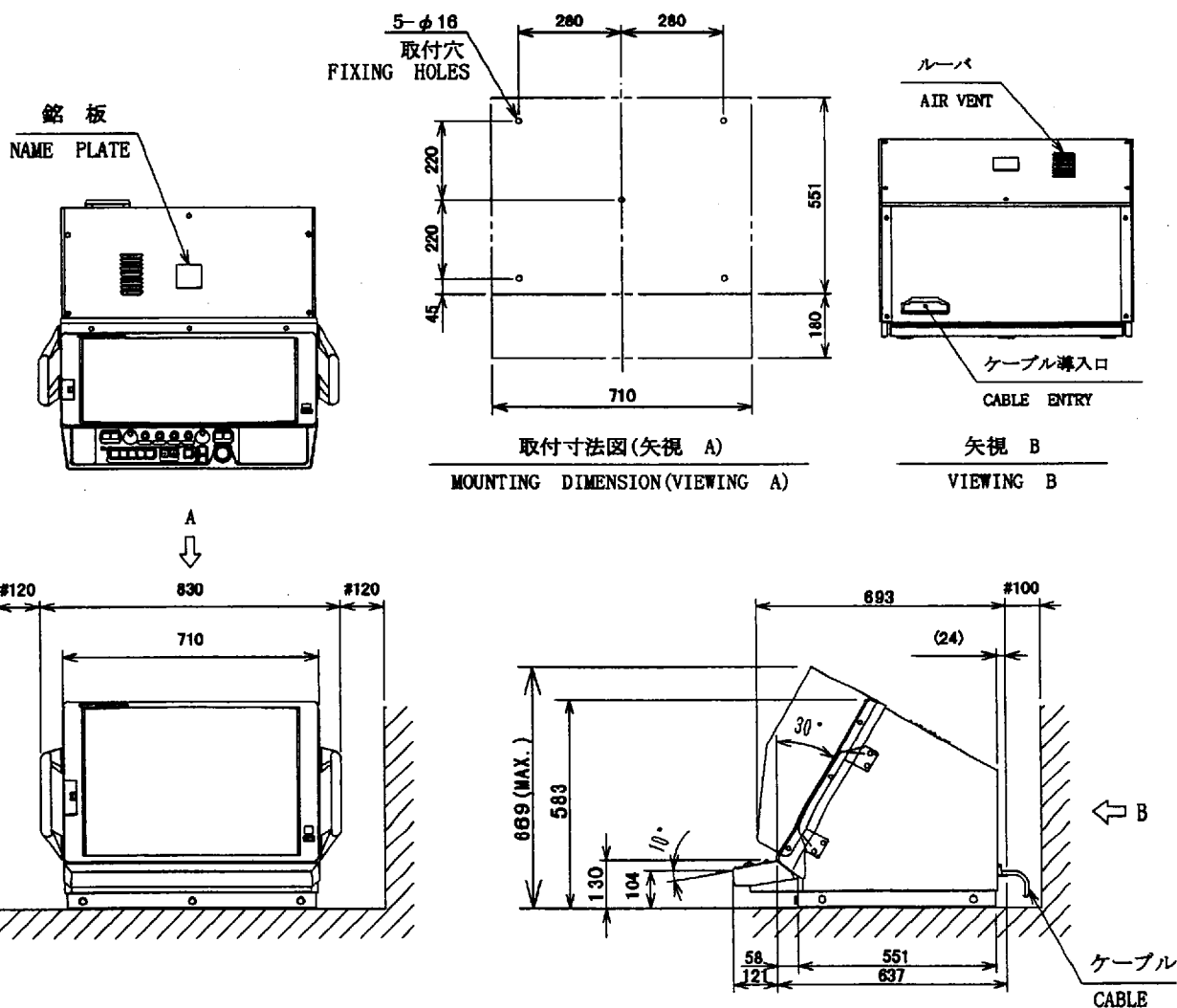
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

- 注 記 1) 装備ケーブルはサービス時、指示部を前方に十分引き出せるよう余裕を持たせること。
 2) 取付用ネジはM10ボルト又は コーチボルト呼び径9を使用のこと。
 3) #印寸法は最小サービス空間寸法とする。

- NOTE 1) SUFFICIENT EXTRA CABLINGS SHOULD BE ALLOWED AT THE BACK OF THE UNIT SO THAT THE UNIT CAN BE DRAWN OUT WITH THE CABLES CONNECTED FOR MAINTENANCE.
 2) USE M10 BOLTS OR $\phi 9$ COACH SCREWS FOR FIXING THE UNIT.
 3) #:RECOMMENDED SERVICING CLEARANCE.

範囲 DIMENSION	公差 TOL.
$L \leq 50$	$\pm 1 \text{ mm}$
$50 < L \leq 100$	$\pm 2 \text{ mm}$
$100 < L \leq 500$	$\pm 3 \text{ mm}$
$500 < L \leq 1000$	$\pm 4 \text{ mm}$
$1000 < L \leq 2000$	$\pm 5 \text{ mm}$
$2000 < L \leq 4000$	$\pm 7 \text{ mm}$
$4000 < L \leq 8000$	$\pm 10 \text{ mm}$
$8000 < L$	$\pm 15 \text{ mm}$

表 1
TABLE 1



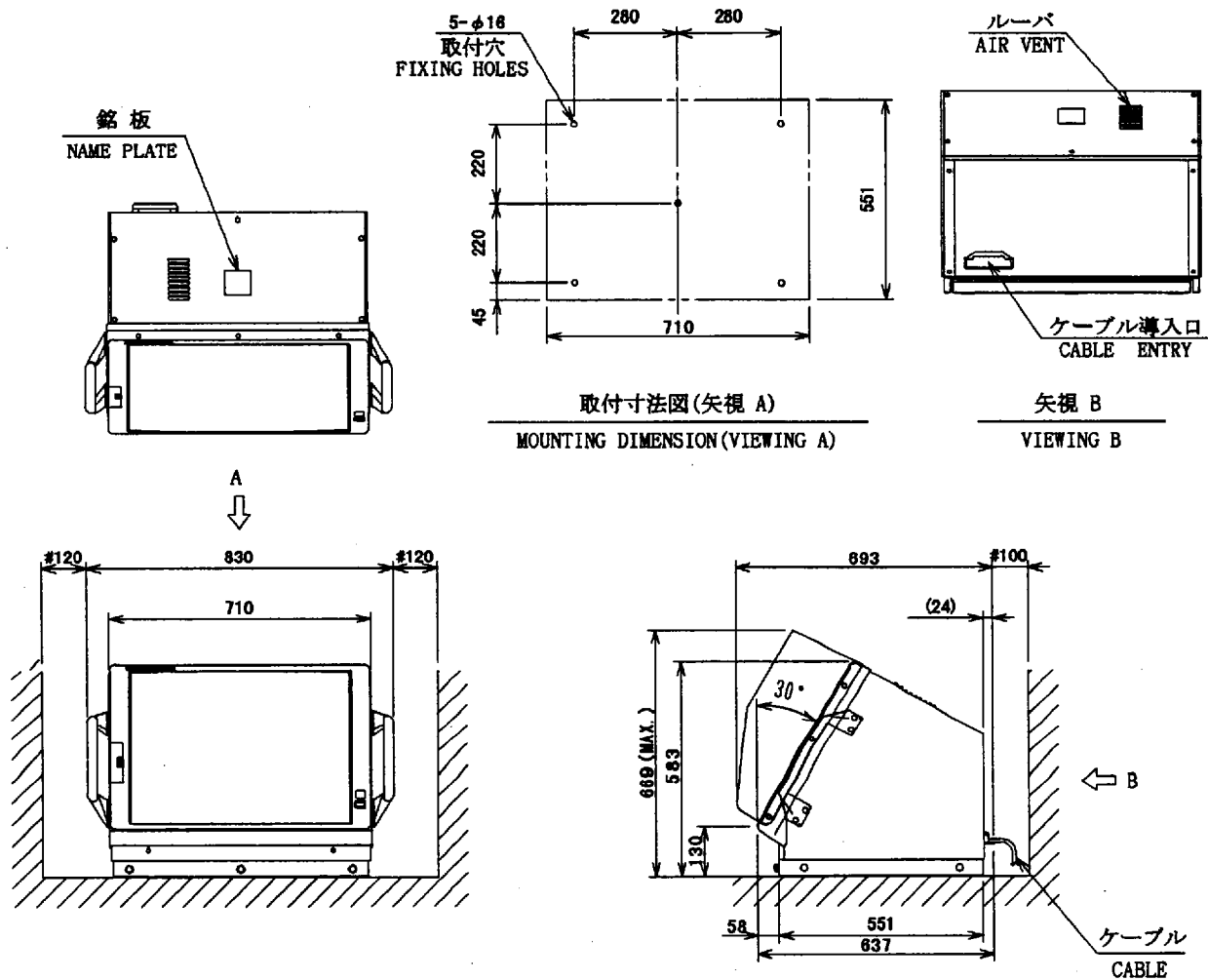
DRAWN Oct. 7 '97 T. YAMASAKI		TITLE RDP-115
CHECKED Oct. 7 '97 K. Kusunoki		名 稱 指示器 (卓上型)
APPROVED Oct. 7 '97 K. Kusunoki	FR/FAR-2805 SER.	外 寸 図
SCALE 1/20	MASS 85 kg	NAME DIAPLAY UNIT (TABLETOP)
DWG. No. C3418-G02-C	03-133-1000-G2	OUTLINE DRAWING

- 注 記 1) 装備ケーブルはサービス時、指示部を前方に十分引き出せるよう余裕を持たせること。
 2) 取付用ネジはM10ボルト又は コーチボルト呼び径9を使用のこと。
 3) #印寸法は最小サービス空間寸法とする。

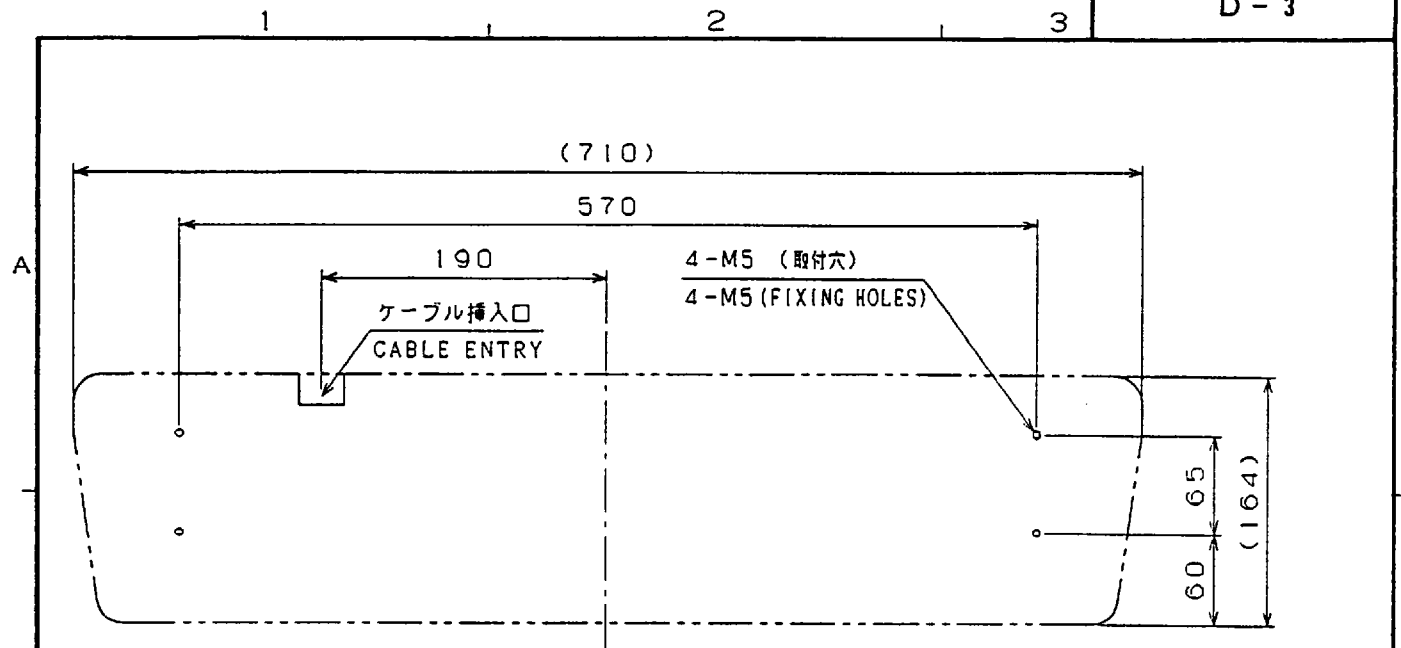
- NOTE 1) SUFFICIENT EXTRA CABLINGS SHOULD BE ALLOWED AT THE BACK OF THE UNIT SO THAT THE UNIT CAN BE DRAWN OUT WITH THE CABLES CONNECTED FOR MAINTENANCE.
 2) USE M10 BOLTS OR $\phi 9$ COACH SCREWS FOR FIXING THE UNIT.
 3) #:RECOMMENDED SERVICING CLEARANCE.

範囲 DIMENSION	公差 TOL.
$L \leq 50$	$\pm 1 \text{ mm}$
$50 < L \leq 100$	$\pm 2 \text{ mm}$
$100 < L \leq 500$	$\pm 3 \text{ mm}$
$500 < L \leq 1000$	$\pm 4 \text{ mm}$
$1000 < L \leq 2000$	$\pm 5 \text{ mm}$
$2000 < L \leq 4000$	$\pm 7 \text{ mm}$
$4000 < L \leq 8000$	$\pm 10 \text{ mm}$
$8000 < L$	$\pm 15 \text{ mm}$

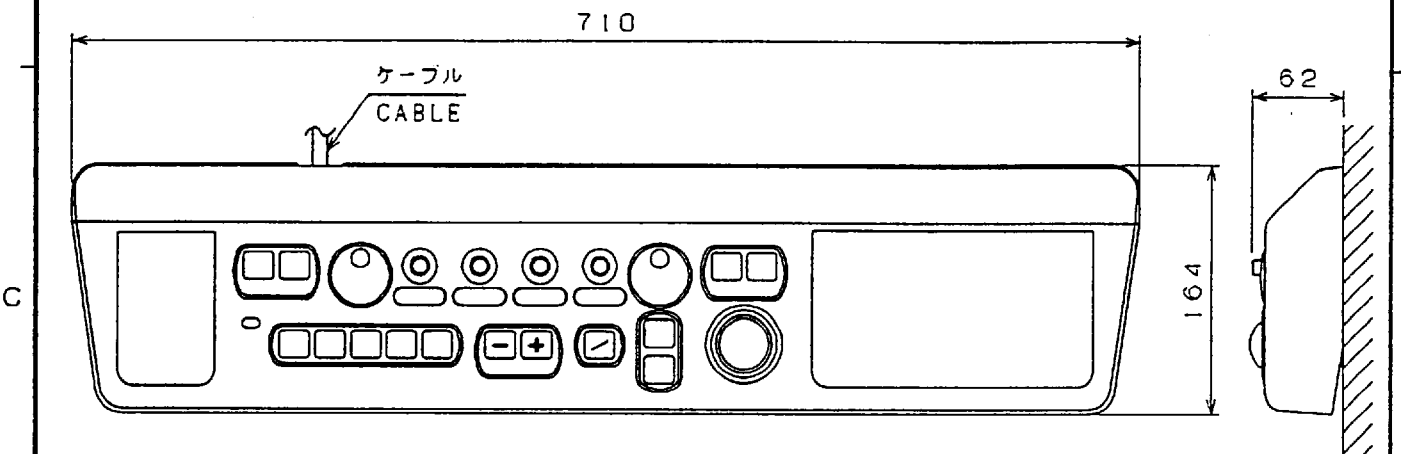
表 1
TABLE 1



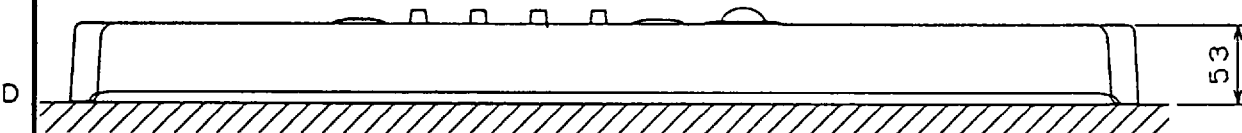
DRAW Oct. 7 '97 T. YAMASAKI		TITLE RDP-115
CHECKED Oct. 7 '97 K. Kusunoki		名 稱 指示器 (卓上・パネル分離型)
APPROVED Oct. 7 '97 K. Kusunoki	FRFAR-2805 SER.	外 寸 図
SCALE 1/20	MASS 82 kg	NAME DIAPLAY UNIT (TABLETOP W/O KEYBOARD)
DWG. No. C3418-G01- C	03-133-1100-G2	OUTLINE DRAWING



取付寸法図 (矢視 A)
 FLAT MOUNTING DIMENSION (VIEWING A)



A
 ↓



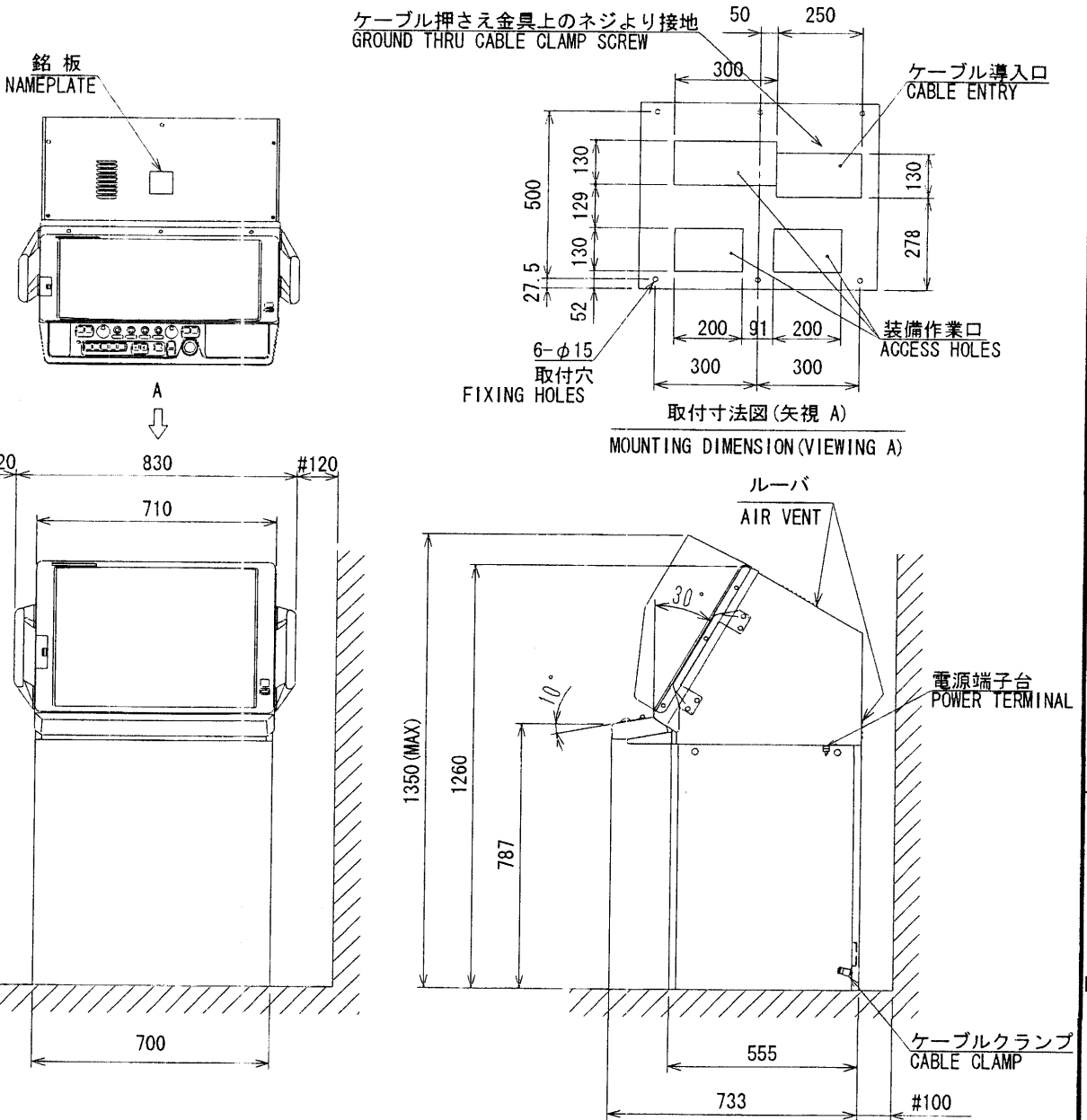
DRAWN July 6, 1995 Morimoto				TYPE RDP-115	
CHECKED July 6, '95 T. Anai				名称 操作部外寸図	
APPROVED July 6, '95 K. Okamoto		FR2805SER FAR2805SE FA2805		NAME CONTROL UNIT	
SCALE 1/5	MASS 3 kg	APPLICABLE TO: (MODEL)	BLOCK NO.	DWG NO. C3418-G04- A	03-133-1600- G0

- 注 記 1) 装備ケーブルはサービス時、指示部を前方に十分引き出せるよう余裕を持たせること。
 2) 取付用ネジはM10ボルト又は コーチボルト呼び径9を使用のこと。
 3) #印寸法は最小サービス空間寸法とする。

- NOTE 1) SUFFICIENT EXTRA CABLINGS SHOULD BE ALLOWED AT THE BACK OF THE UNIT SO THAT THE UNIT CAN BE DRAWN OUT WITH THE CABLES CONNECTED FOR MAINTENANCE.
 2) USE M10 BOLTS OR $\phi 9$ COACH SCREWS FOR FIXING THE UNIT.
 3) #: RECOMMENDED SERVICE CLEARANCE.

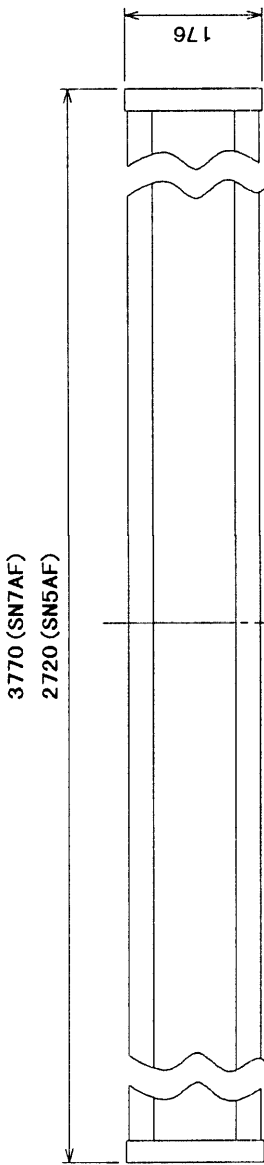
寸法範囲 (mm) DIMENSION	公差 (mm) TOLERANCE
$0 < L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 3
$500 < L \leq 1000$	± 4
$1000 < L \leq 2000$	± 5

表 1
TABLE 1



DRAWN July 27 '00 T. Yamazaki	TITLE RDP-115
CHECKED July 27 '00 Y. Kimura	名称 指示器 (コンソール型)
APPROVED July 29 '00 T. Kimura	FR/FAR-2805 SERIES 外寸図
SCALE 1/20 MASS 120 kg ±10%	NAME DIAPLAY UNIT (CONSOLE)
DWG. No. C3418-G03-H	03-133-1200-G1 OUTLINE DRAWING

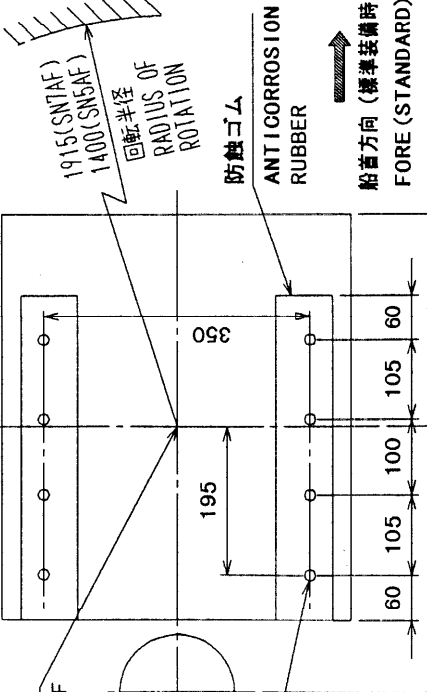
3770 (SN7AF)
2720 (SN5AF)



船板
NAME PLATE
電線貫通金物 A30b
CABLE GLAND
アース端子
GND TERMINAL
スキャナー安全スイッチ
SERVICE SWITCH

*300 (MIN.) *300 (MIN.) *410 *460 *300 (MIN.)

回転中心
CENTER OF ROTATION
φ150 穴
同軸ケーブル貫通用
FOR COAX CABLE PASS
8-φ15 取付穴
FIXING HOLES
取付寸法
MOUNTING DIMENSIONS



463

4

3

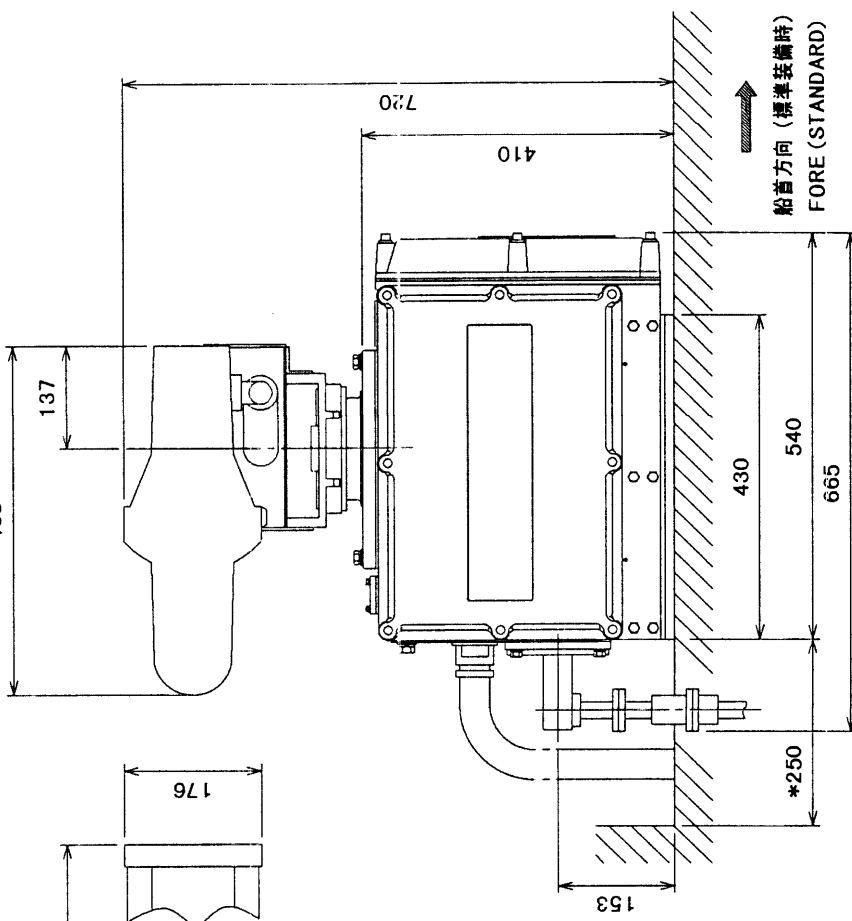
2

A

B

C

D - 5



注記 NOTE: 1) *印寸法は推奨サービスマンを示す
*MARK SHOWS RECOMMENDED SERVICING CLEARANCE.
2) 指定外の寸法公差は表 1 による
TABLE 1 SHOWS TOLERANCE OF DIMENSIONS.
3) 鉄板プレートホーム (取付板) の板厚は15mm以上とする。
MOUNTING PLATE SHOULD BE 15mm THICK OR MORE.

範囲 DIMENSIONS	公差 TOL.
L ≤ 50	± 1 mm
50 < L ≤ 100	± 2 mm
100 < L ≤ 500	± 3 mm
500 < L ≤ 1000	± 4 mm
1000 < L ≤ 2000	± 5 mm
2000 < L ≤ 4000	± 7 mm
4000 < L ≤ 8000	± 10 mm
8000 < L	± 15 mm

アンテナ ANTENNA	SN7AF	SN5AF
質量 MASS	130kg	120kg

表 1
TABLE 1

DRAWN	Feb. 13 '92	Y. HIRASAKI	TITLE	RSB-0027 / RSB-0032
CHECKED	Feb. 13 '92	K. KAWASAKI	名称	空中線部
APPROVED	Feb. 16 '92	T. KAWASAKI	外寸図	
SCALE	1/10	MASS	NAME	SCANNER UNIT
DWG. No.	C3312-601-B			OUTLINE DRAWING

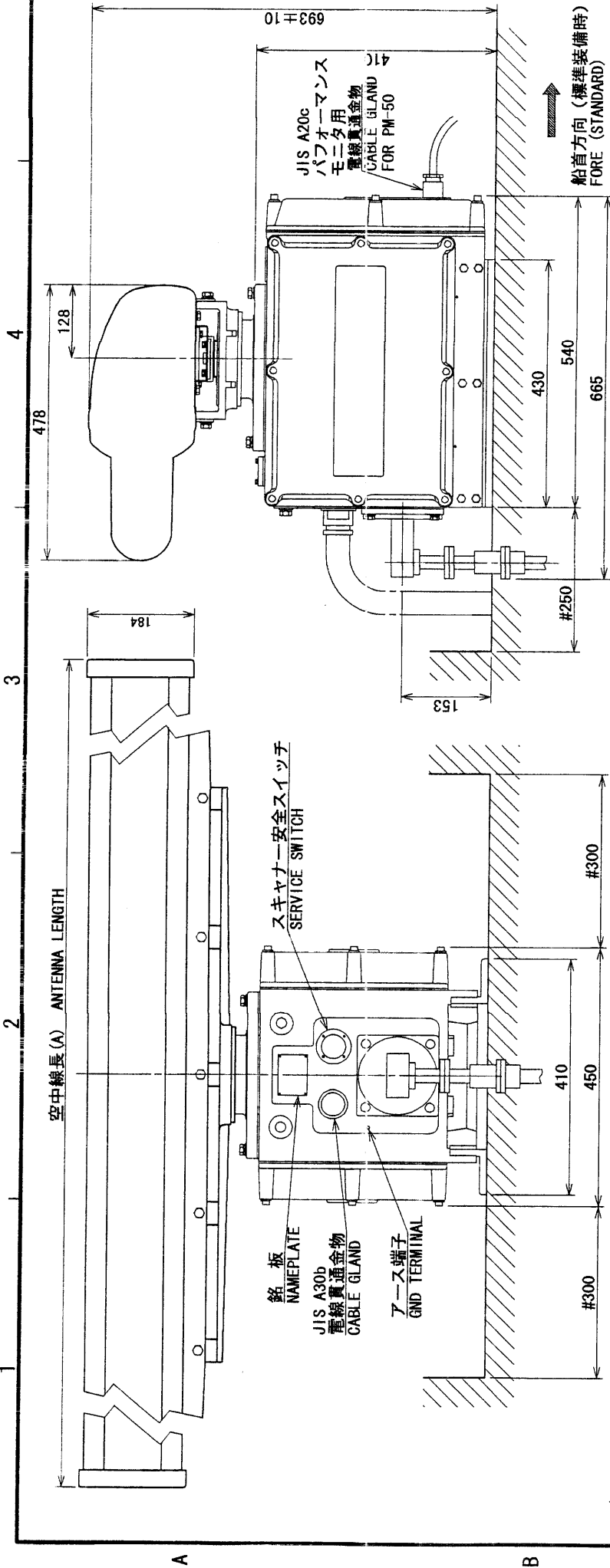


表 1 TABLE 1

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3
500 < L ≤ 1000	±4
1000 < L ≤ 2000	±5
2000 < L ≤ 4000	±7

表 2 TABLE 2

種類 ※ ANT TYPE	SN36AF	SN30AF
空中線長 (A) ANT LENGTH (mm)	3765 ± 10	3090 ± 10
回転安全空間 (B) ANT CLEARANCE (mm)	3860	3200
質量 (kg) MASS	128 ± 10%	122 ± 10%

※レーダー型式により異なる。各仕様参照。
REFER TO SPECS. AS RADAR TYPE.

DRAWN: 藤野 隆夫 (Furuno)

CHECKED: 藤野 隆夫 (Furuno)

APPROVED: 藤野 隆夫 (Furuno)

SCALE: 1/10

DWG. No. C3470-601-B

TITLE: RSB-0027/0032

名称: 空中線部

NAME: SCANNER UNIT

OUTLINE DRAWING

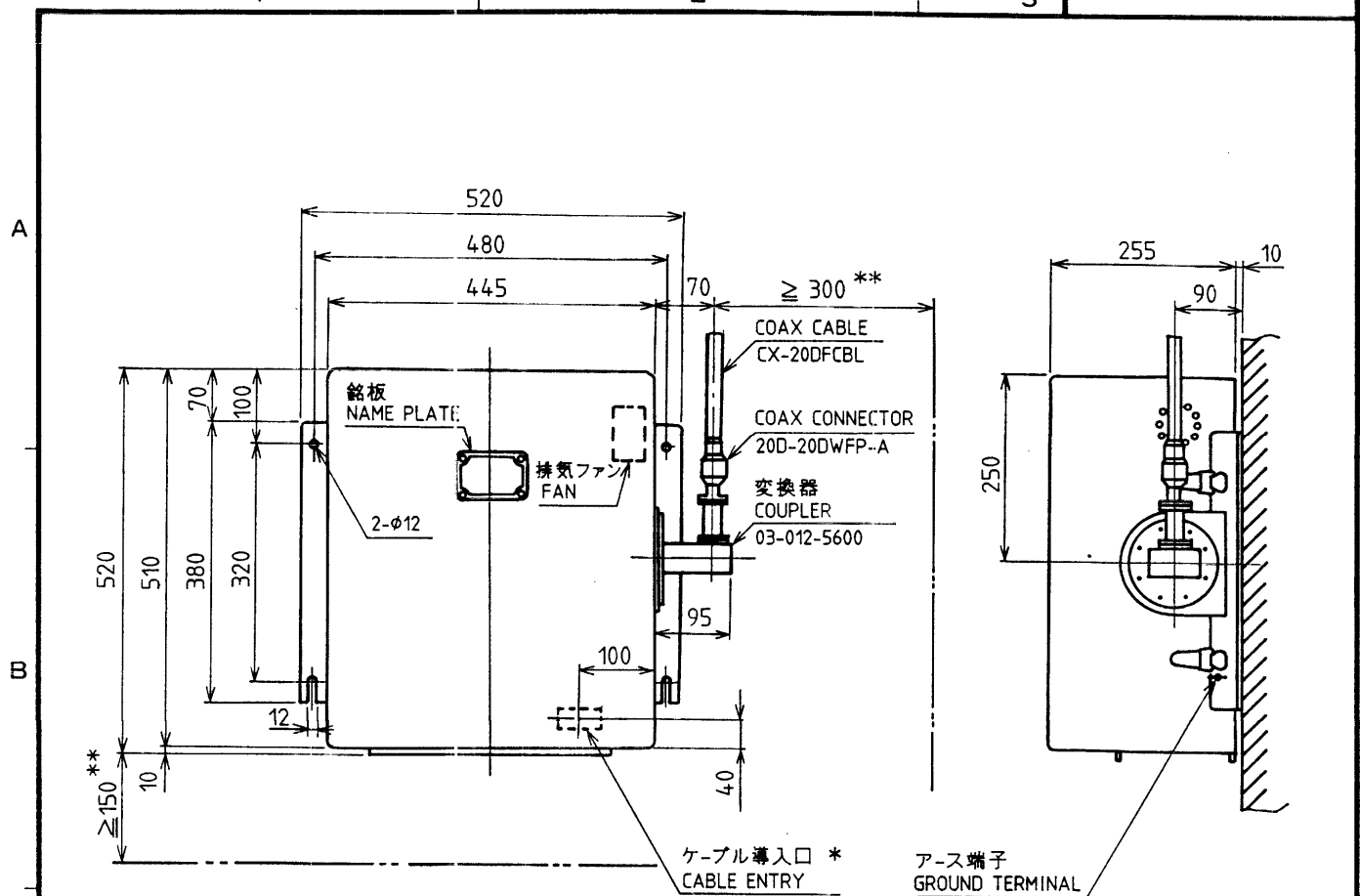
FR/FAR-2B35SW

FR-2135SW

03-145-410G-2

NOTE

- 1) # : 推奨する最小サービスペース。
- 2) 取付用ネジはM12ボルトを使用のこと。
- 3) 指定外の寸法公差は、表1による。

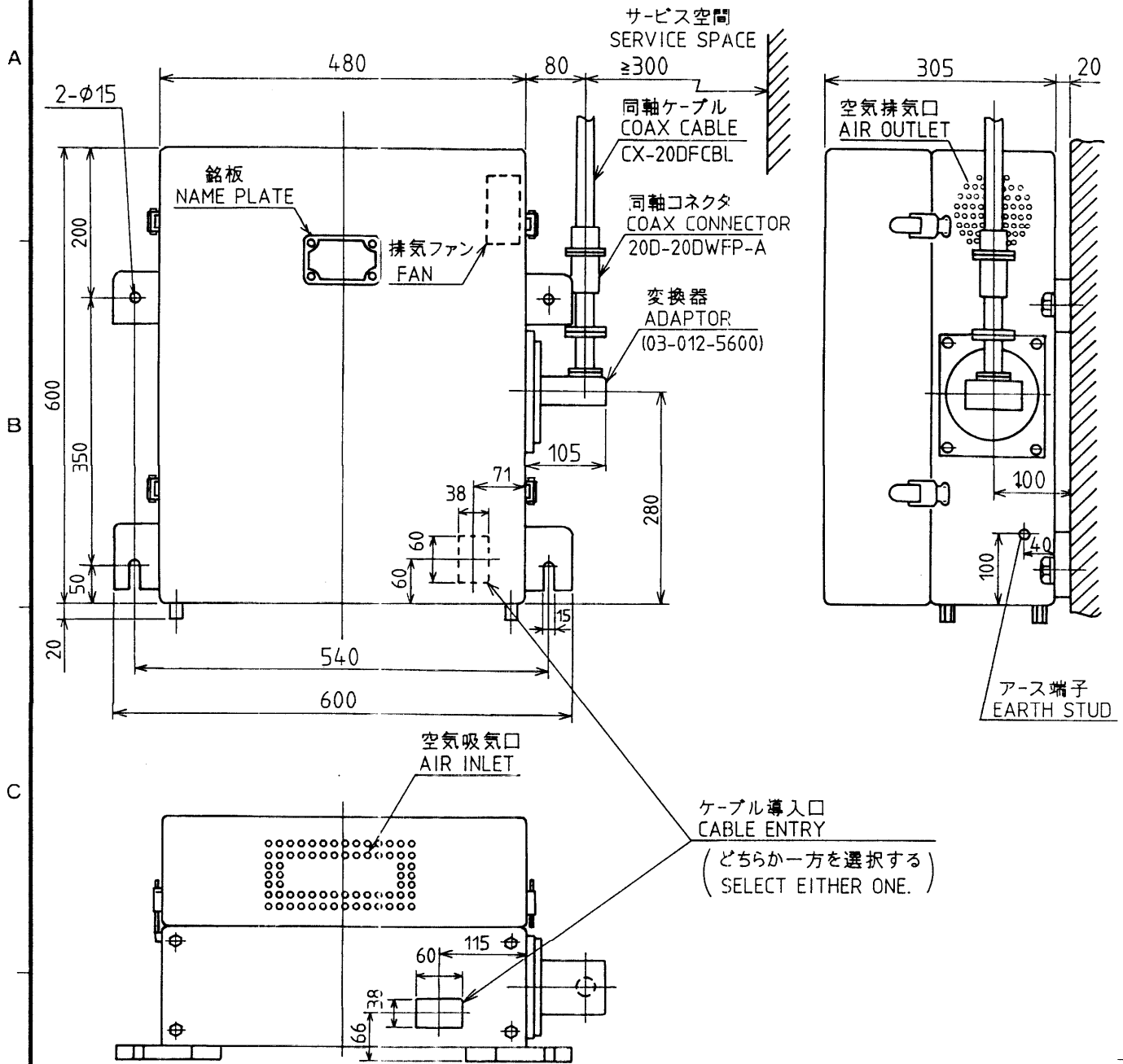


* : ケーブル導入口はどちらか一方を使用し、使用しない方は盲蓋でふさぐ。
 USE EITHER ONE OF TWO CABLE ENTRIES. COVER THE UNUSED CABLE ENTRY WITH BLIND PLATE.

** : 推奨サービス空間 (右側および下側)
 RECOMMENDED SERVICE CLEARANCE.

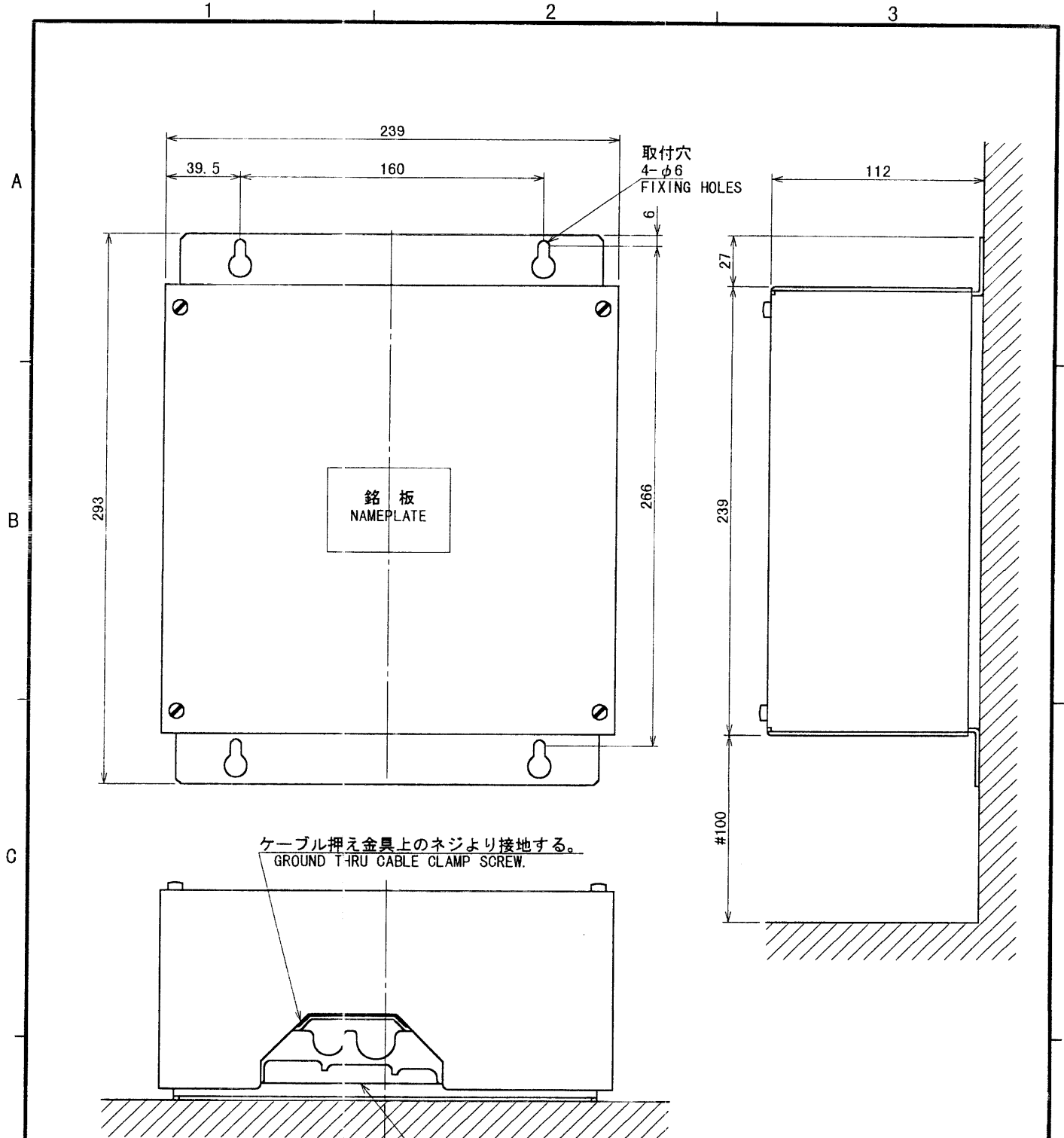
FR/FAR-2832S
 FR-2032S

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	JUL. 3 '90 T. NAKANO	三角法 THIRD ANGLE PROJECTION	名称 TITLE	RTR-025/047	レダ-送受信部外寸図 RADAR TRANSCIVER UNIT
検図 CHECKED	JUL. 3 '90 N. SAITO	尺度 SCALE	1/10	図番 DWG.NO.	
製図 DRAWN	July. 3 '90 I. AMANO	重量 WEIGHT	26 kg	C3377-G02-B	



FR/FAR-2862S
FR-2060S

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	三角法 THIRD ANGLE PROJECTION	名称 TITLE	レ-ダ-送受信部外寸図 RTR-018 RADAR TRANSCIEVER UNIT		
検 CHECKED	尺 SCALE	1 / 8			
製 DRAWN	重 WEIGHT	44 kg	図 DWG.NO.	C3312-015-C	



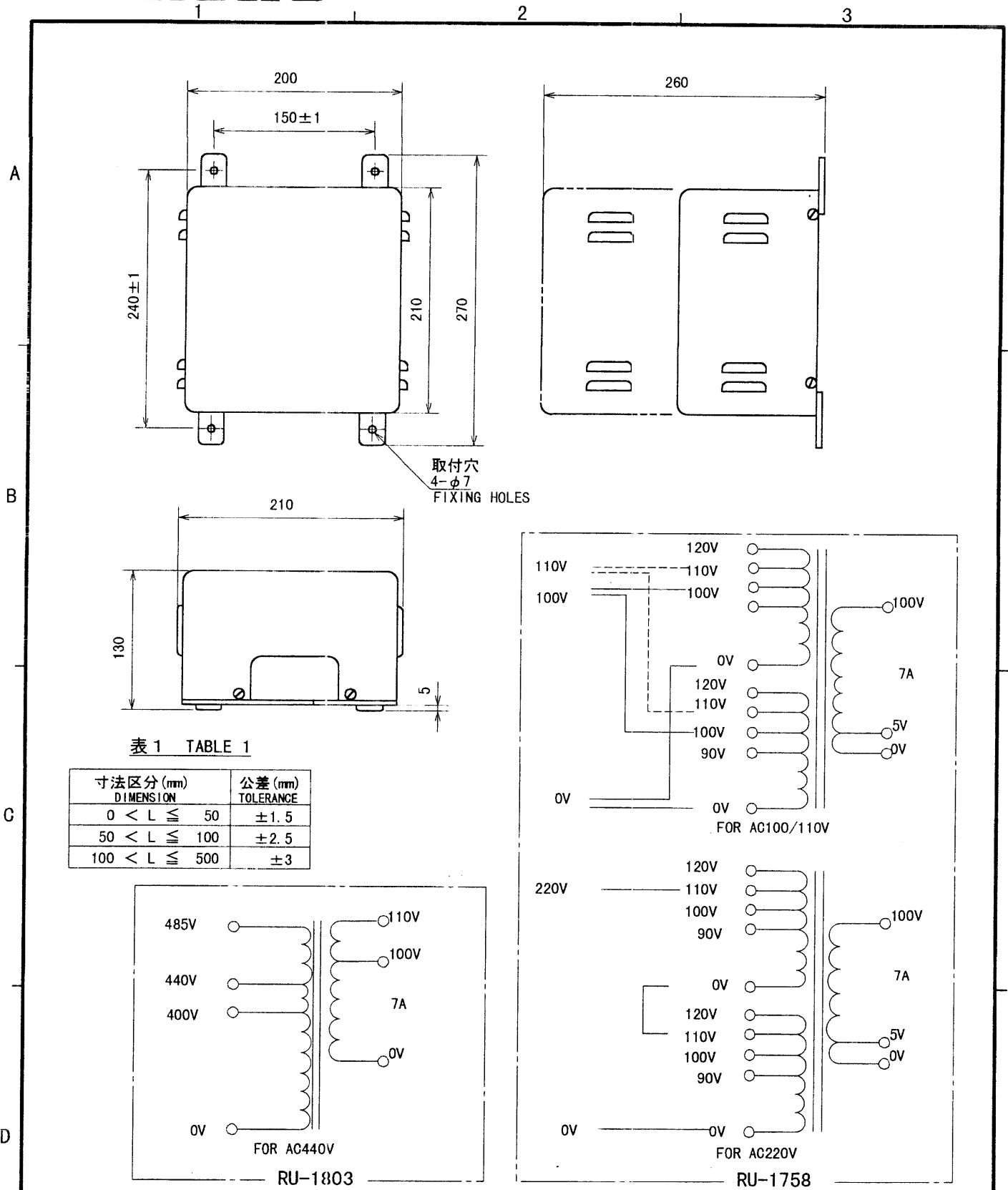
- 注記
- 1) 指定なき寸法公差は表 1 による。
 - 2) #: 推奨する最小サービス空間寸法。
 - 3) 取付ネジはトラスタッピンネジ呼び径 5 × 20 を使用のこと。

- NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
 2. #: RECOMMENDED SERVICE CLEARANCE.
 3. USE TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

表 1 TABLE 1

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3

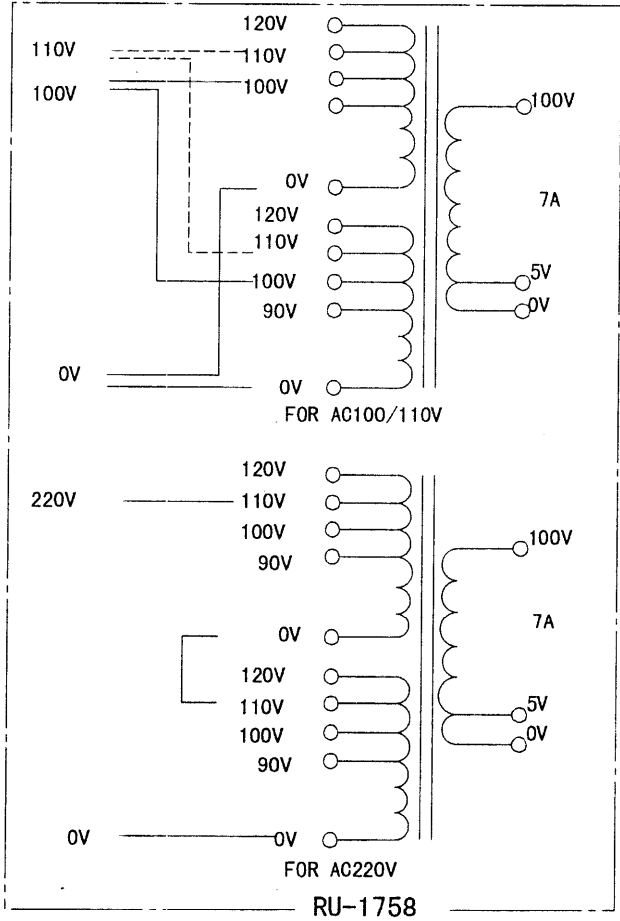
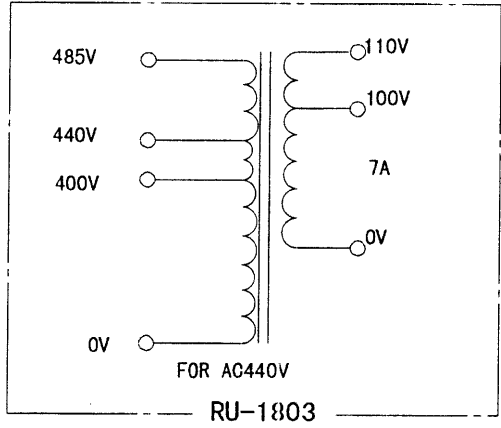
DRAWN June 27 '00 T. YAMASAKI	TITLE PSU-004
CHECKED June 27 '00 Y. Kuni	名称 電源制御部
APPROVED June 27 '00 Y. Kuni	外寸図
SCALE 1/4	NAME POWER SUPPLY UNIT
MASS ±10% 2.3 kg	
DWG. No. C3385-G02-D	OUTLINE DRAWING



取付穴
4-φ7
FIXING HOLES

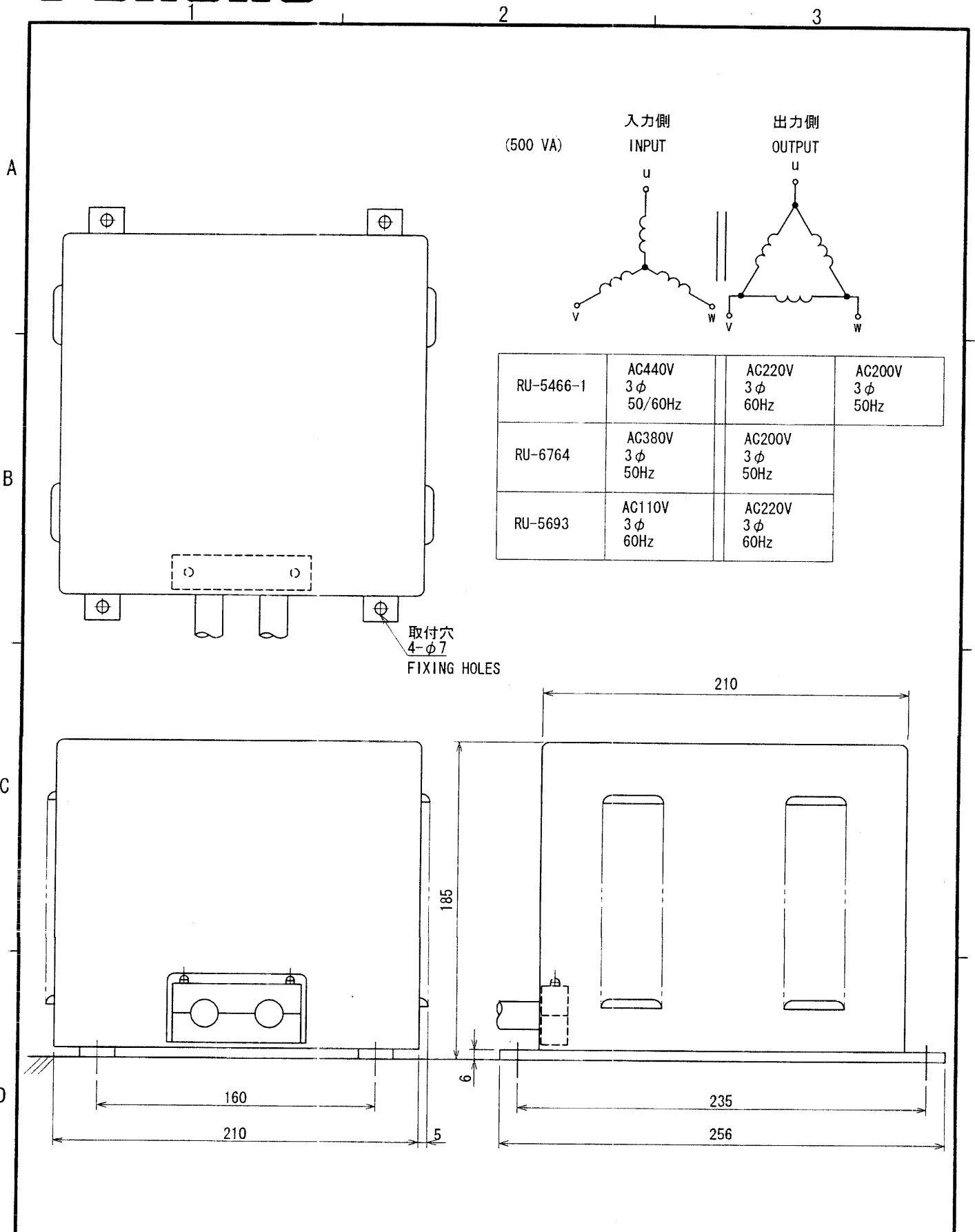
表 1 TABLE 1

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3



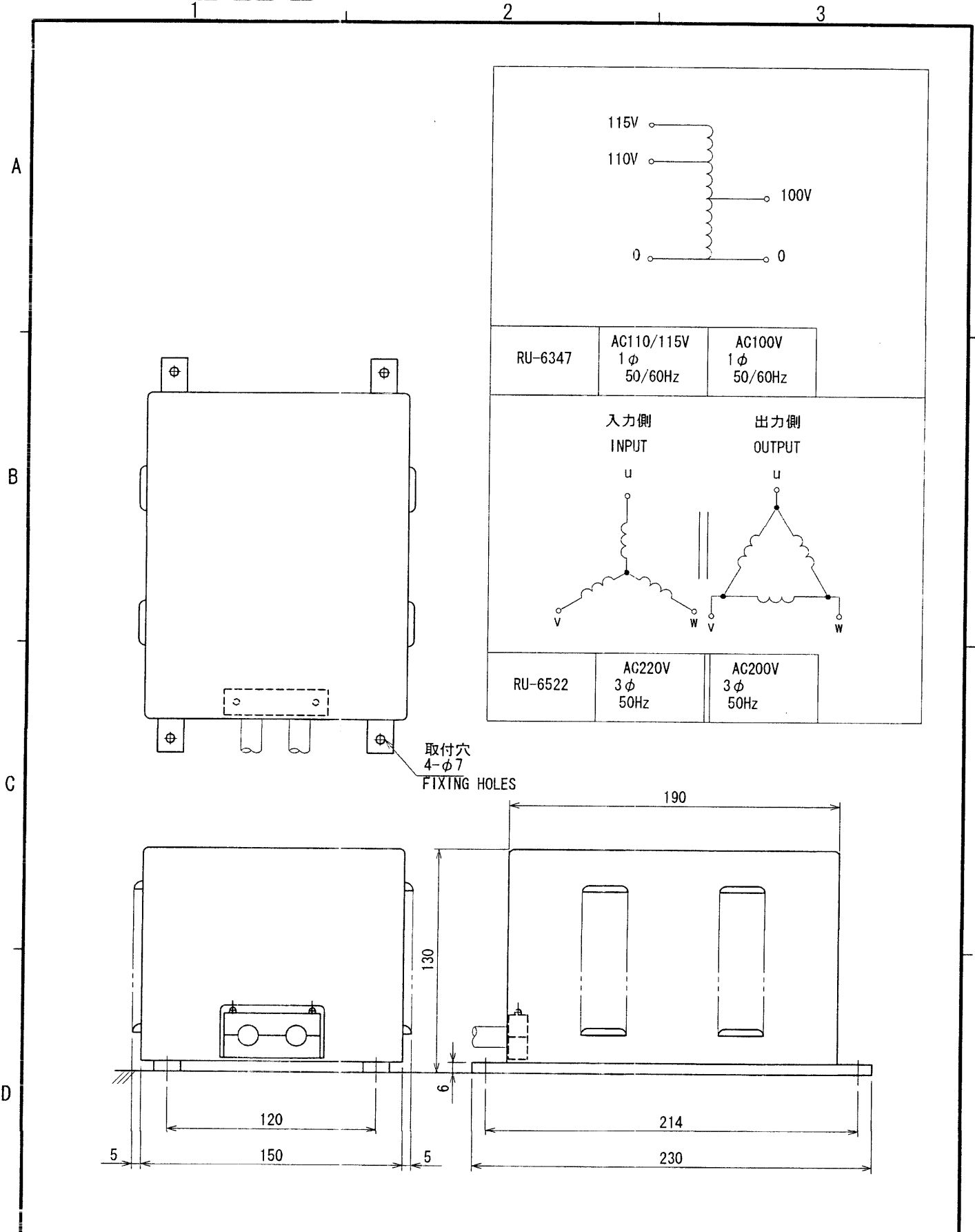
注記
1) 指定なき寸法公差は表 1 による。
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN June 28 '00 T. YAMASAKI	TITLE RU-1758/1803
CHECKED June 28 '00 Y. Kim	名称 トランスユニット
APPROVED June 28 '00 Y. Kim	外寸図
SCALE 1/5	NAME TRANSFORMER UNIT
MASS ±10% 12 kg	OUTLINE DRAWING
DWG. No. C3003-001- E	



RU-5466-1	AC440V 3φ 50/60Hz	AC220V 3φ 60Hz	AC200V 3φ 50Hz
RU-6764	AC380V 3φ 50Hz	AC200V 3φ 50Hz	
RU-5693	AC110V 3φ 60Hz	AC220V 3φ 60Hz	

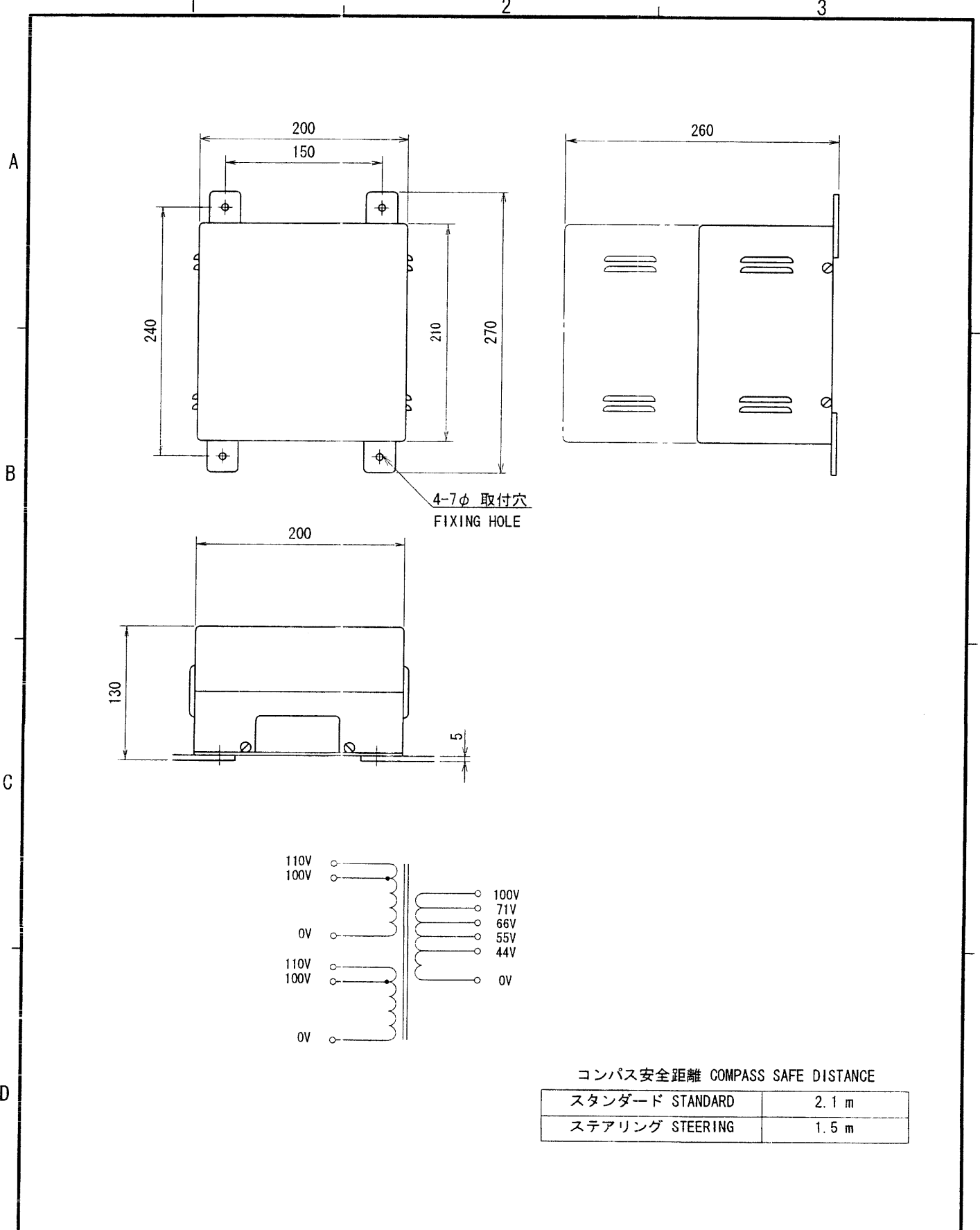
DRAWN Aug 16 '00 T. YAMASAKI	TITLE RU-5466-1, RU-6764/5693
CHECKED Aug 17 '00 Y. K.	名称 トランスユニット
APPROVED Aug 17 '00 Y. K.	外寸図
SCALE 1/3	NAME TRANSFORMER UNIT
MASS ±10% 12 kg	OUTLINE DRAWING
DWG. No. C3003-006- F	



取付穴
4-φ7
FIXING HOLES

RU-6347	AC110/115V 1φ 50/60Hz	AC100V 1φ 50/60Hz
RU-6522	AC220V 3φ 50Hz	AC200V 3φ 50Hz

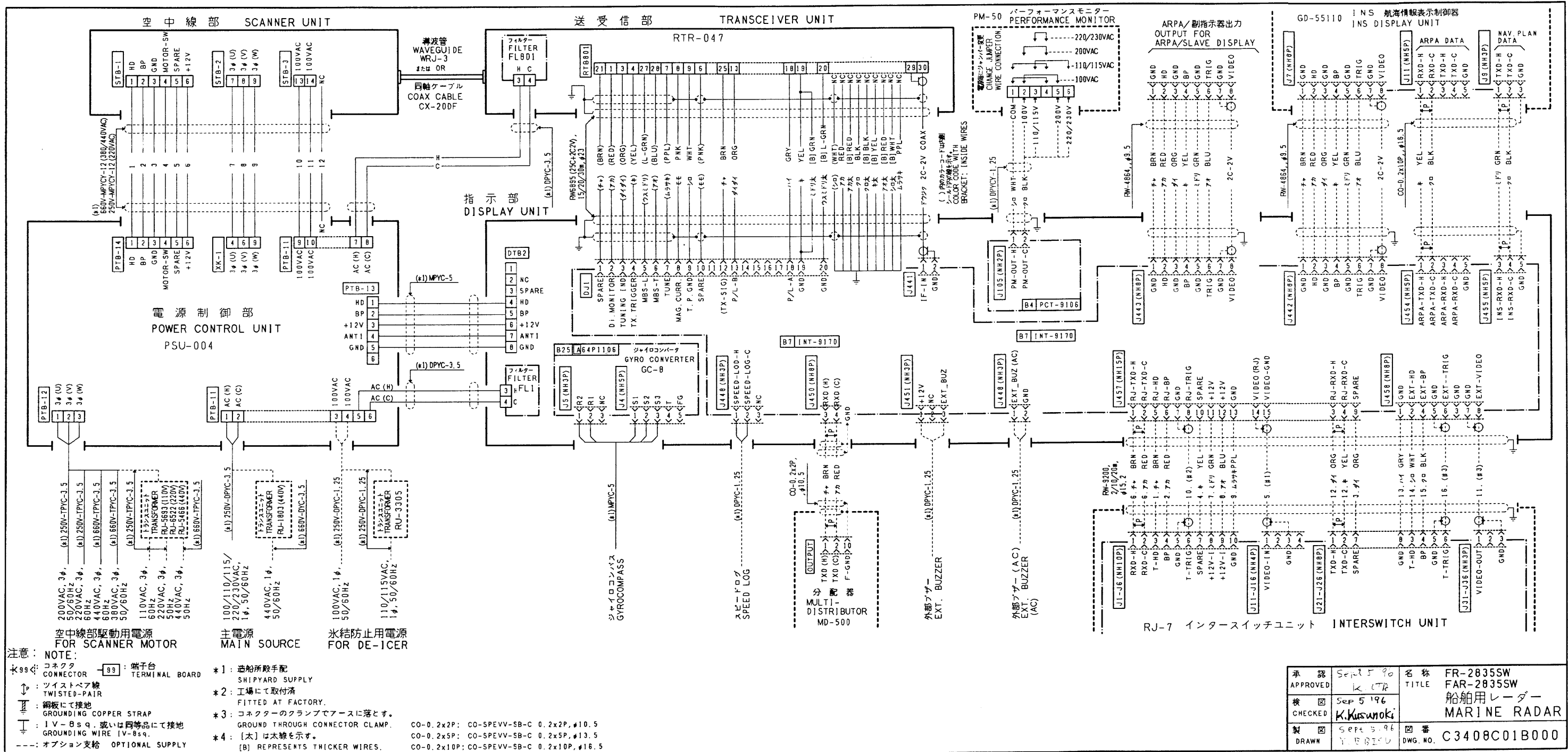
DRAWN Aug 16 '02 T. YAMASAKI CHECKED Aug 17 '02 Y. K. APPROVED Aug 17 '02 Y. K. SCALE 1/3 MASS ±10% 12 kg DWG. No. C3003-007- C	TITLE RU-6347/6522 名称 トランスユニット 外寸図 NAME TRANSFORMER UNIT OUTLINE DRAWING
---	--



コンパス安全距離 COMPASS SAFE DISTANCE

スタンダード STANDARD	2.1 m
ステアリング STEERING	1.5 m

DRAWN <i>Aug 16 '00 T. Yamazaki</i>	TITLE RU-3305
CHECKED <i>Aug 17 '00 Y. Kuni</i>	名称 トランスユニット
APPROVED <i>Aug 17 '00 Y. Kuni</i>	外寸図
SCALE 1/5 MASS ±10% 12.2 kg	NAME TRANSFORMER UNIT
DWG. No. C3003-004-D	OUTLINE DRAWING

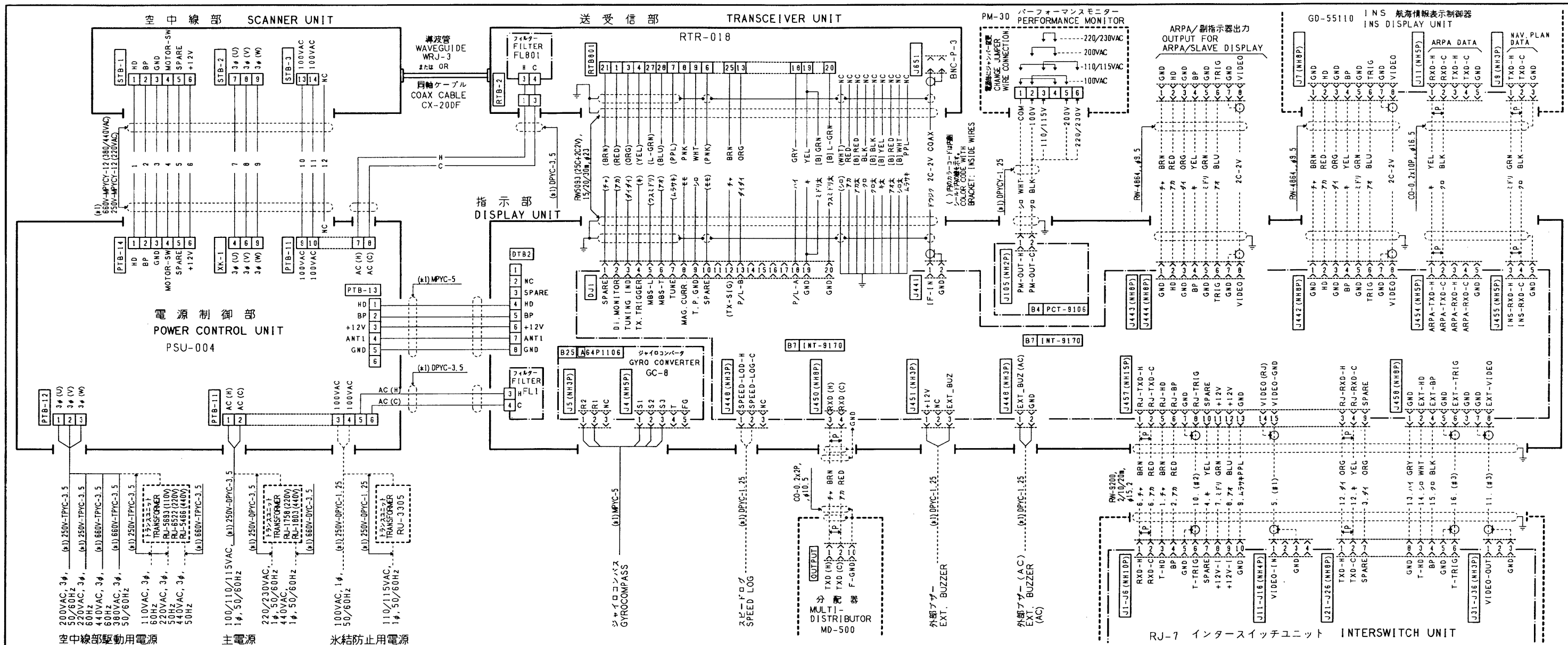


注意: NOTE:
 * 99: コネクタ CONNCTOR [99]: 端子台 TERMINAL BOARD
 ↳ ツイストペア線 TWISTED-PAIR
 ≡ 銅板にて接地 GROUNDING COPPER STRAP
 ⊥ 1V-8sq. 或いは同等品にて接地 GROUNDING WIRE 1V-8sq.
 --- オプション支給 OPTIONAL SUPPLY

- * 1: 造船所取手配 SHIPYARD SUPPLY
- * 2: 工場にて取付済 FITTED AT FACTORY.
- * 3: コネクタのクランプでアースに落とす。 GROUND THROUGH CONNECTOR CLAMP.
- * 4: [太] は太線を示す。 [B] REPRESENTS THICKER WIRES.

CO-0.2x2P: CO-SPEVV-SB-C 0.2x2P, #10.5
 CO-0.2x5P: CO-SPEVV-SB-C 0.2x5P, #13.5
 CO-0.2x10P: CO-SPEVV-SB-C 0.2x10P, #16.5

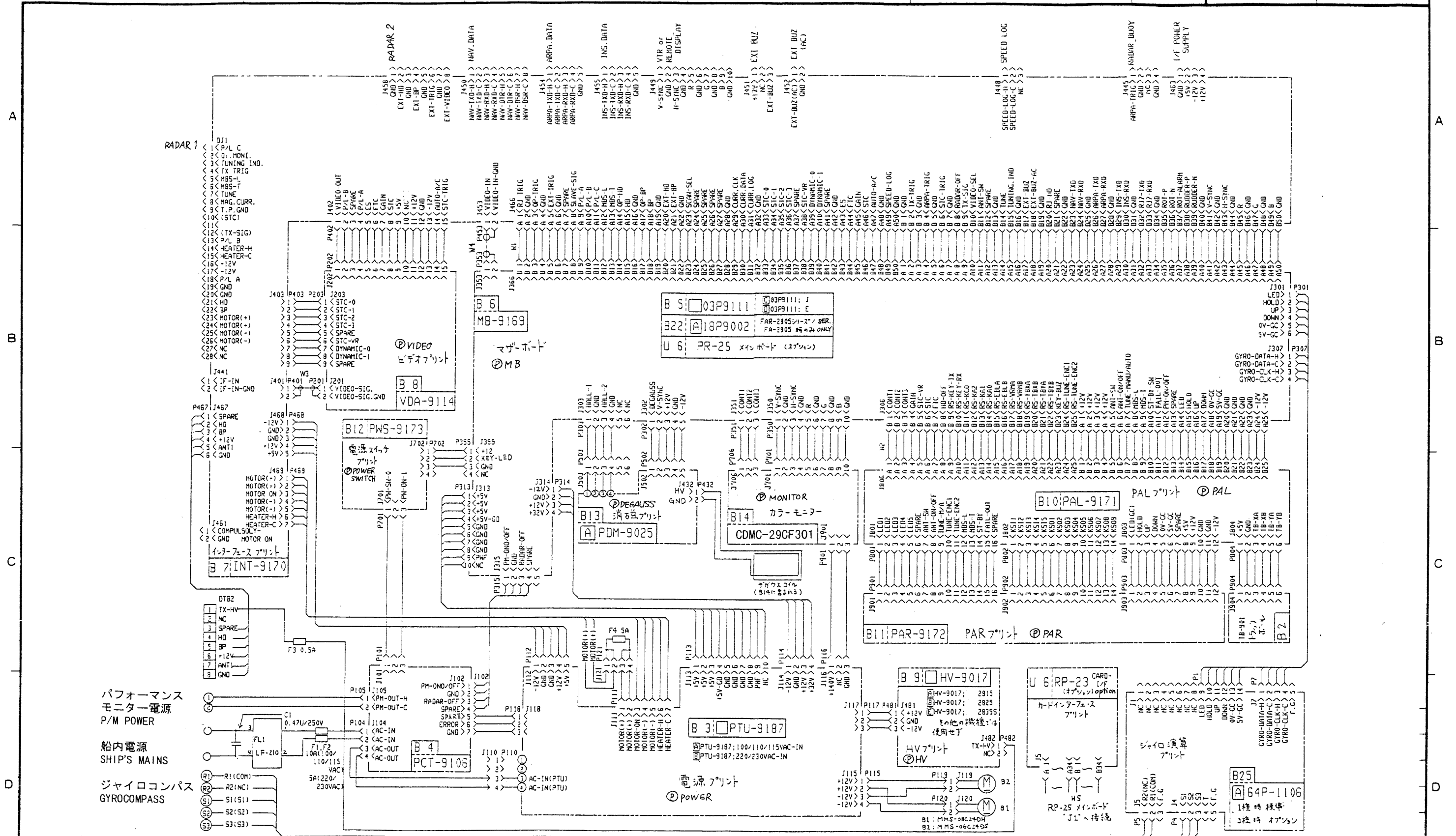
承認 APPROVED	Sept 5 '90 K. (TR)	名称 TITLE	FR-2835SW FAR-2835SW
検図 CHECKED	Sept 5 1996 K. Kusunoki	船舶用レーダー MARINE RADAR	
製図 DRAWN	Sept 5 '96 Y. B. IZU	図番 DWG. NO.	C3408C01B000



注意: NOTE:
 コネクタ CONNCTOR [93] 端子台 TERMINAL BOARD
 ツイストペア線 TWISTED-PAIR
 銅板にて接地 GROUNDING COPPER STRAP
 1V-8sq. 或いは同等品にて接地 GROUNDING WIRE 1V-8sq.
 オプション支給 OPTIONAL SUPPLY

- *1: 造船所取手配 SHIPYARD SUPPLY
 - *2: 工場にて取付済 FITTED AT FACTORY.
 - *3: コネクターのクランプでアースに落とす。 GROUND THROUGH CONNECTOR CLAMP.
 - *4: [太] は太線を示す。 [B] REPRESENTS THICKER WIRES.
- CO-0.2x2P: CO-SPEVV-58-C 0.2x2P, #10.5
 CO-0.2x5P: CO-SPEVV-58-C 0.2x5P, #13.5
 CO-0.2x10P: CO-SPEVV-58-C 0.2x10P, #16.5

承認 APPROVED	Sep 25 '97	名称 TITLE	FR-2865SW FAR-2865SW
検図 CHECKED	Sep 25 '97	船名	船舶用レーダー MARINE RADAR
製図 DRAWN	Sepe. 25 '97	図番 DWG. NO.	C3409C01C000



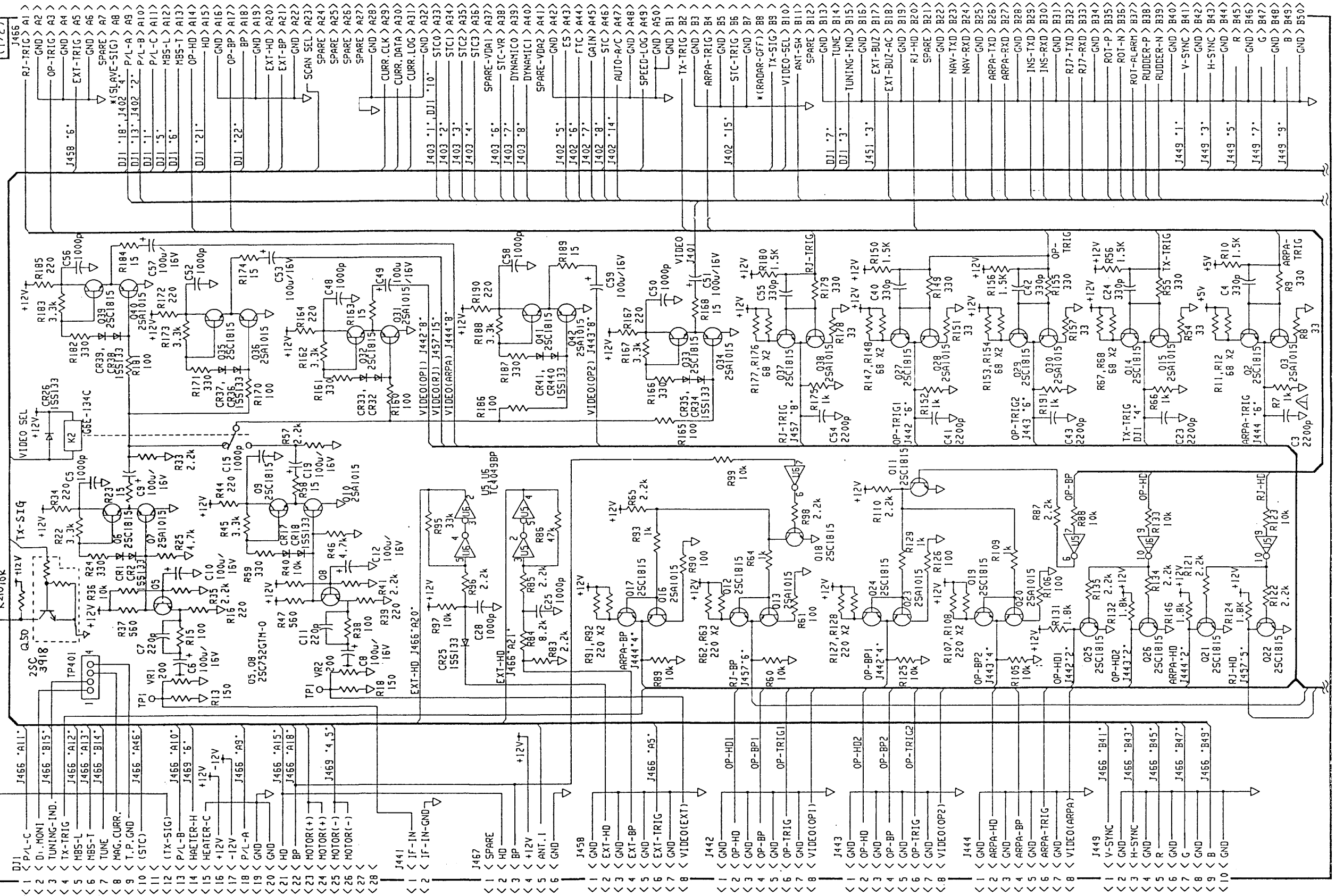
パフォーマンス
モニター電源
P/M POWER

船内電源
SHIP'S MAINS

ジャイロコンパス
GYROCOMPASS

DRAWN Dec 1 '98 T. Yamazaki		TYPE RDP-115/A
CHECKED Dec 1 '98 K. Kusunoki		名称 指示部総合
APPROVED Dec 1 '98 K. Kusunoki	SERIES FR-28X5 FAR-28X5	回路図
SCALE /	APPLICABLE TO; (MODEL)	BLOCK NO.
DWG NO. C3404-K01-C	kg	NAME DISPLAY UNIT
	03-131-6002-2	SCHEMATIC DIAGRAM

B7 INT9170
(1/2)



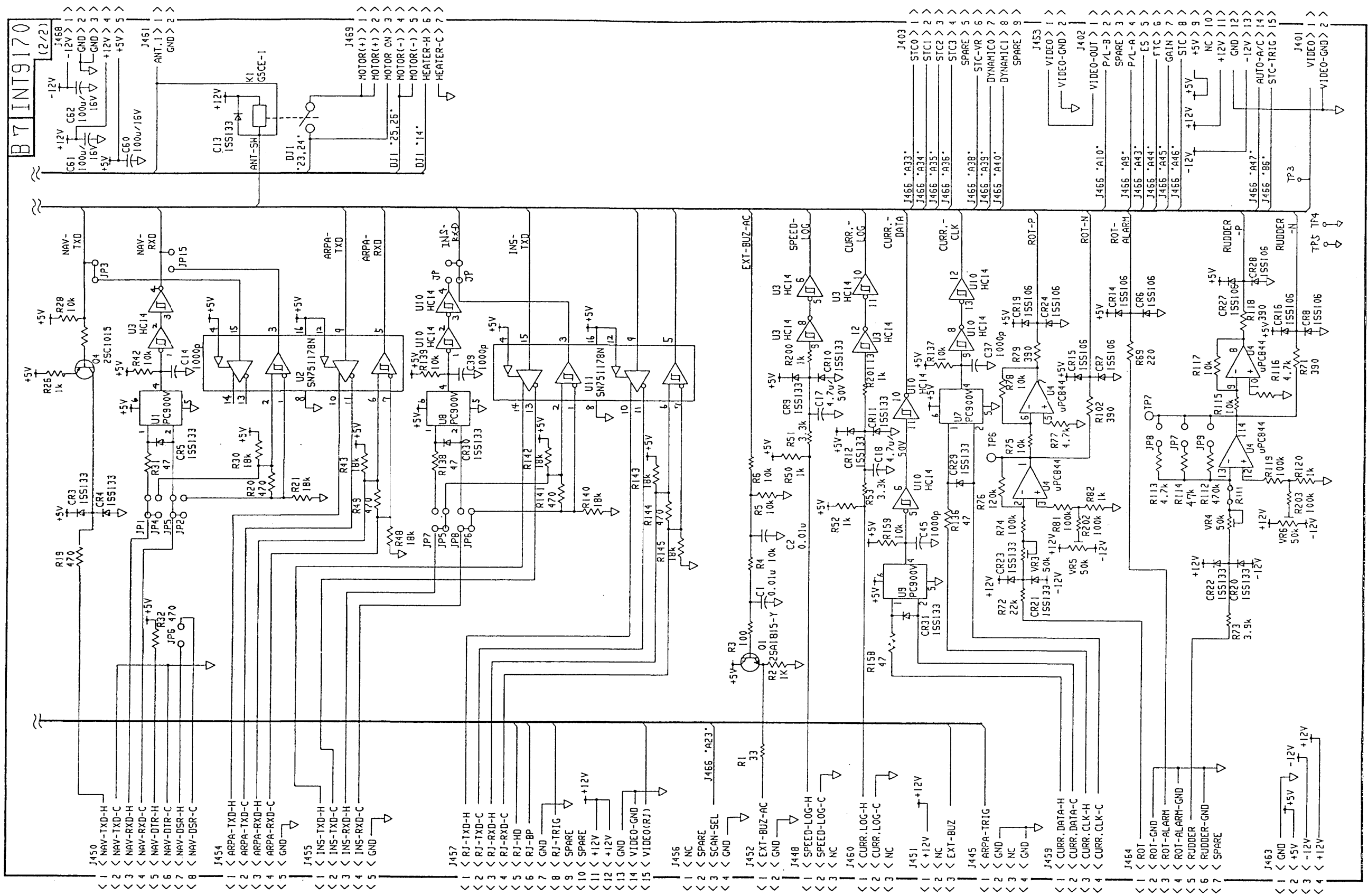
- < 1 < P/L-C J466 'A11'
- < 2 < DI-HONI J466 'B15'
- < 3 < TX-TRIG J466 'A12'
- < 4 < HBS-L J466 'A13'
- < 5 < HBS-T J466 'B14'
- < 6 < MAG. CURR. J466 'A46'
- < 7 < T.P. GND
- < 8 < (STC)
- < 9 < (TX-SIG)
- < 10 < P/L-B J466 'A10'
- < 11 < HEATER-H J469 '6'
- < 12 < HEATER-C J466 'A9'
- < 13 < +12V
- < 14 < -12V
- < 15 < P/L-A
- < 16 < GND
- < 17 < GND
- < 18 < GND
- < 19 < GND
- < 20 < GND
- < 21 < BP
- < 22 < MOTOR(+) J466 'A15'
- < 23 < MOTOR(+) J466 'A18'
- < 24 < MOTOR(-) J469 '4.5'
- < 25 < MOTOR(-)
- < 26 < MOTOR(-)
- < 27 < MOTOR(-)
- < 28 < MOTOR(-)

- < 1 < IF-IN
- < 2 < IF-IN-GND
- < 3 < SPARE
- < 4 < HD
- < 5 < +12V
- < 6 < ANT. 1
- < 7 < GND
- < 8 < VIDEO(OP1)
- < 9 < GND
- < 10 < EXT-HD
- < 11 < GND
- < 12 < GND
- < 13 < GND
- < 14 < GND
- < 15 < GND
- < 16 < GND
- < 17 < GND
- < 18 < GND
- < 19 < GND
- < 20 < GND
- < 21 < GND
- < 22 < GND
- < 23 < GND
- < 24 < GND
- < 25 < GND
- < 26 < GND
- < 27 < GND
- < 28 < GND

- < 1 < GND
- < 2 < OP-HD
- < 3 < OP-BP
- < 4 < OP-TRIG
- < 5 < GND
- < 6 < OP-TRIG
- < 7 < GND
- < 8 < VIDEO(OP1)
- < 9 < GND
- < 10 < OP-HD
- < 11 < GND
- < 12 < GND
- < 13 < GND
- < 14 < GND
- < 15 < GND
- < 16 < GND
- < 17 < GND
- < 18 < GND
- < 19 < GND
- < 20 < GND
- < 21 < GND
- < 22 < GND
- < 23 < GND
- < 24 < GND
- < 25 < GND
- < 26 < GND
- < 27 < GND
- < 28 < GND

- < 1 < V-SYNC J466 'B41'
- < 2 < GND
- < 3 < H-SYNC J466 'B43'
- < 4 < GND
- < 5 < R J466 'B45'
- < 6 < GND
- < 7 < G
- < 8 < GND
- < 9 < B
- < 10 < GND

DRAWN July 18, 1995 Morimoto CHECKED July 18, '95 Maki APPROVED July 18, '95 Okamoto SCALE MASS	TYPE INT9170 名称 INT基板 (1/2) NAME INT BOARD (1/2) DWG NO. C3418-K01-A 03-131-6004-1	FR2805SER FAR2805SE FA2805 1B 7 BLOCK NO.	APPLICABLE TO: (MODEL) MASS kg
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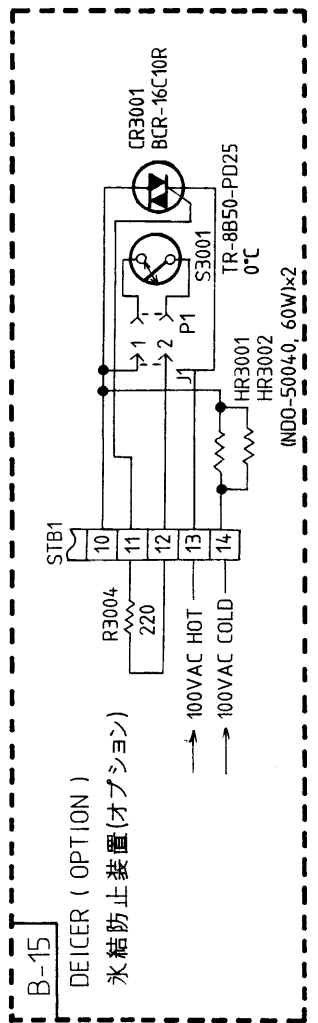
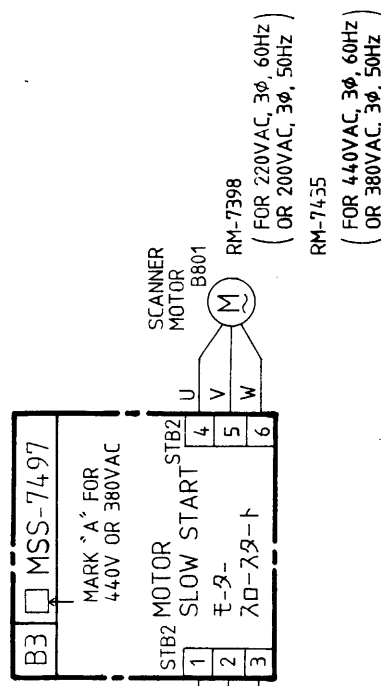
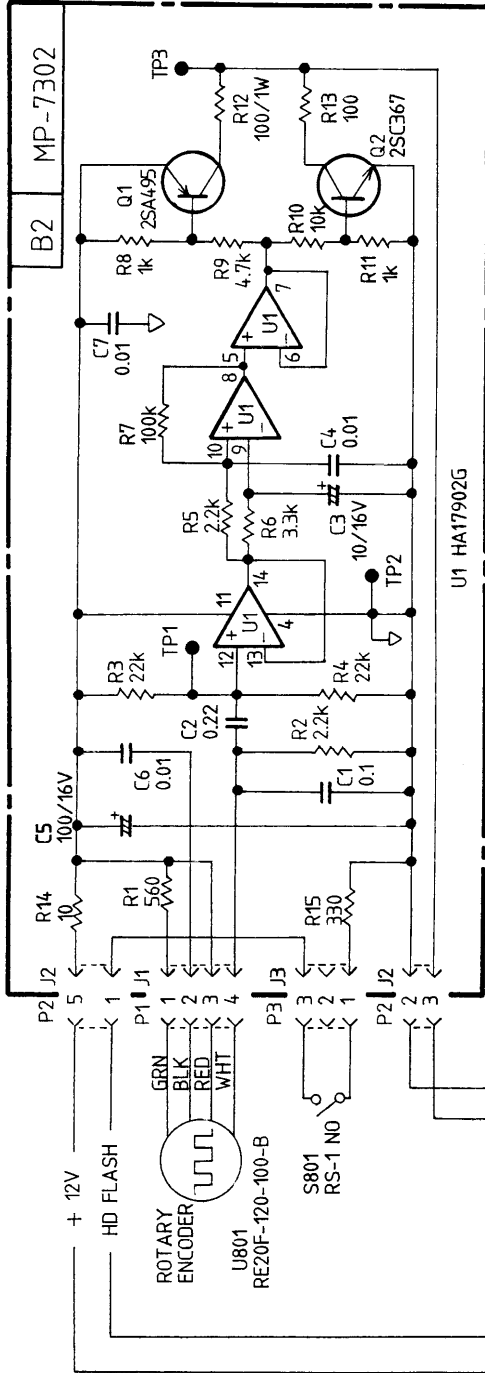


B7 INT9170 (2/2)

- < 1 < NAV-TXD-H
- < 2 < NAV-TXD-C
- < 3 < NAV-RXD-H
- < 4 < NAV-RXD-C
- < 5 < NAV-DTR-H
- < 6 < NAV-DTR-C
- < 7 < NAV-DSR-H
- < 8 < NAV-DSR-C
- < 1 < ARPA-TXD-H
- < 2 < ARPA-TXD-C
- < 3 < ARPA-RXD-H
- < 4 < ARPA-RXD-C
- < 5 < GND
- < 1 < INS-TXD-H
- < 2 < INS-TXD-C
- < 3 < INS-RXD-H
- < 4 < INS-RXD-C
- < 5 < GND
- < 1 < RJ-TXD-H
- < 2 < RJ-TXD-C
- < 3 < RJ-RXD-H
- < 4 < RJ-RXD-C
- < 5 < RJ-HD
- < 6 < RJ-BP
- < 7 < GND
- < 8 < RJ-TRIG
- < 9 < SPARE
- < 10 < SPARE
- < 11 < +12V
- < 12 < +12V
- < 13 < GND
- < 14 < VIDEO-GND
- < 15 < VIDEO(RJ)
- < 1 < NC
- < 2 < SPARE
- < 3 < SCAN-SEL
- < 4 < GND
- < 1 < EXT-BUZ-AC
- < 2 < GND
- < 1 < SPEED-LOG-H
- < 2 < SPEED-LOG-C
- < 3 < NC
- < 1 < CURR.LOG-H
- < 2 < CURR.LOG-C
- < 3 < NC
- < 1 < +12V
- < 2 < NC
- < 3 < EXT-BUZ
- < 1 < ARPA-TRIG
- < 2 < GND
- < 3 < GND
- < 4 < GND
- < 1 < CURR.DATA-H
- < 2 < CURR.DATA-C
- < 3 < CURR.CLK-H
- < 4 < CURR.CLK-C
- < 1 < ROT-GND
- < 2 < ROT-ALARM
- < 3 < ROT-ALARM-GND
- < 4 < RUDDER
- < 5 < RUDDER-GND
- < 6 < SPARE
- < 1 < GND
- < 2 < +5V
- < 3 < -12V
- < 4 < +12V

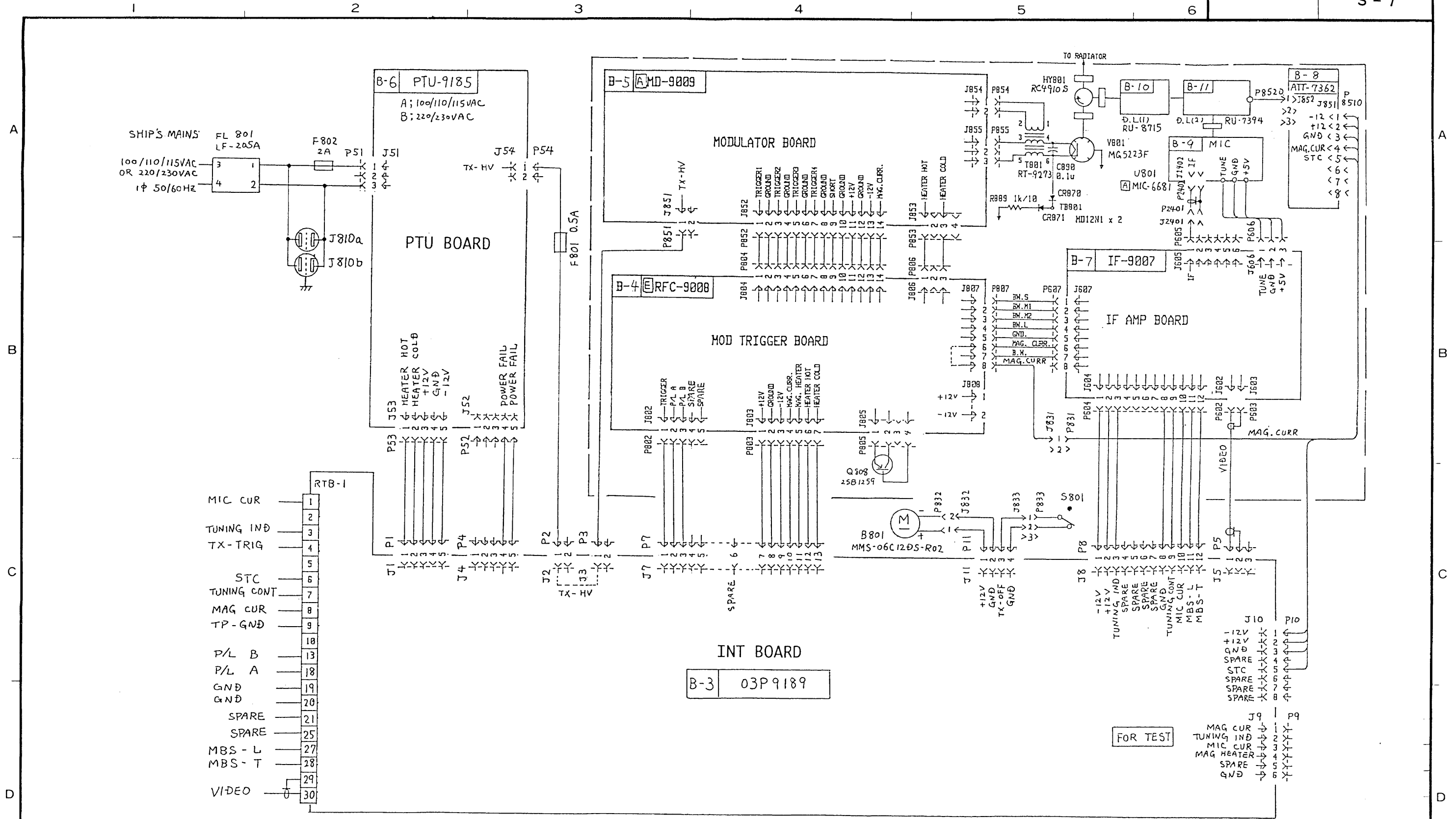
DRAW July 18, 1995 Morimoto		TYPE INT9170
CHECKED July 18, '95 Maki	FR2805SER FAR2805SE	名称 INT基板 (2/2)
APPROVED July 18 '95 Okamoto	FA2805	NAME INT BOARD (2/2)
SCALE	MASS kg	APPLICABLE TO: (MODEL)
		BLOCK NO. 1B 7
		DWG NO. C3418-K02-A 03-131-6004-1

A
B
C
D

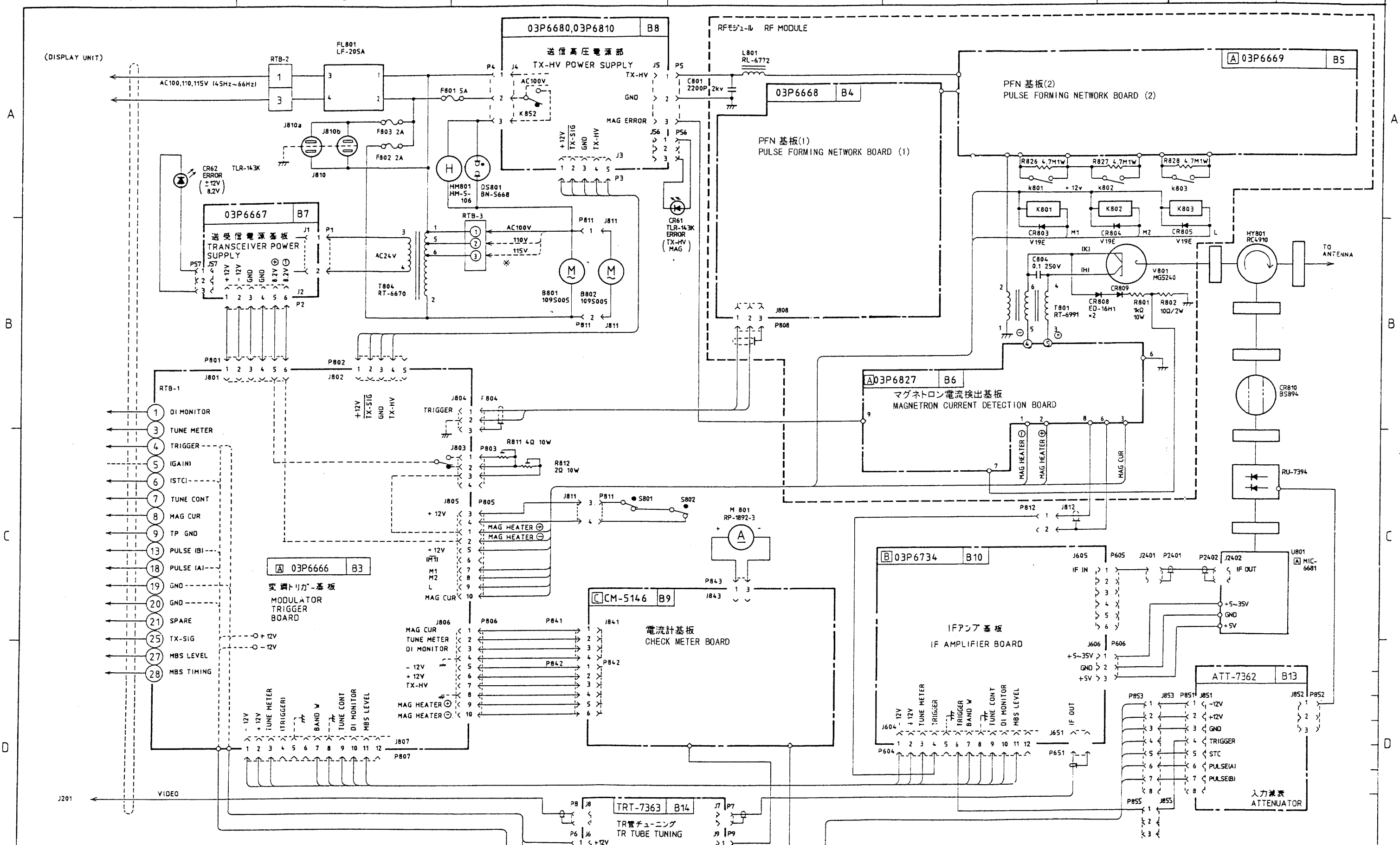


NOTE :
 特記なき抵抗の単位は全てΩ, 1/4W 又コンデンサはμF.
 ALL RESISTANCE IN OHMS, 1/4W AND CAPACITANCE
 IN MICROFARADS UNLESS NOTED OTHERWISE.

DRAWN APR 24 '96 E. KISHIMA CHECKED Apr 24 '96 T. SAITO APPROVED APR 24 '96 K. OTA SCALE / MASS kg DWG NO. C3312-014-D	FAR2865SW FAR2865SW FAR2835SW FAR2835SW FAR2835S FAR2835S	TYPE RSB-0027/0032 名称 レーダ空中線総合 回路図 回路図 NAME RADAR SCANNER UNIT SCHEMATIC DIAGRAM
APPLICABLE TO: (MODEL) BLOCK NO.	NAME	



DRAWN	FL. Maki	TYPE	RTR-047
CHECKED	Oct 14 '95 K Okamoto	名称	
APPROVED	Oct 19 '95 K Okamoto	回路図	
SCALE	MASS kg	APPLICABLE TO: (MODEL)	BLOCK NO. NAME
DWG NO.	C3408-K01- A	03-130-6009- 0	SCHMATIC DIAGRAM



NOTE 1. * 入力電源により100V,110V,115Vのいずれかのタップを使用。
 CHANGE TAP CONNECTION WITH SHIP'S MAINS VOLTAGE.

2. 特記なき抵抗の単位は全て0.1/4W又コンデンサはuF。
 ALL RESISTANCE IN OHMS, 1/4W AND CAPACITANCE IN MICROFARADS
 UNLESS NOTED OTHERWISE.

DRAWN 11/99 T.YAMASAKI	TYPE RTR-018
CHECKED 11/99 K.Kusunoki	名称 送受信部
APPROVED 11/99 K.Kusunoki	回路図
SCALE MASS KR	APPLICABLE TO: FR-2060S FR-2863SW
DWG NO. C3409-K01-C	BLOCK NO. 31-874-0503-
	NAME TRANSCIVER UNIT
	SCHEMATIC DIAGRAM

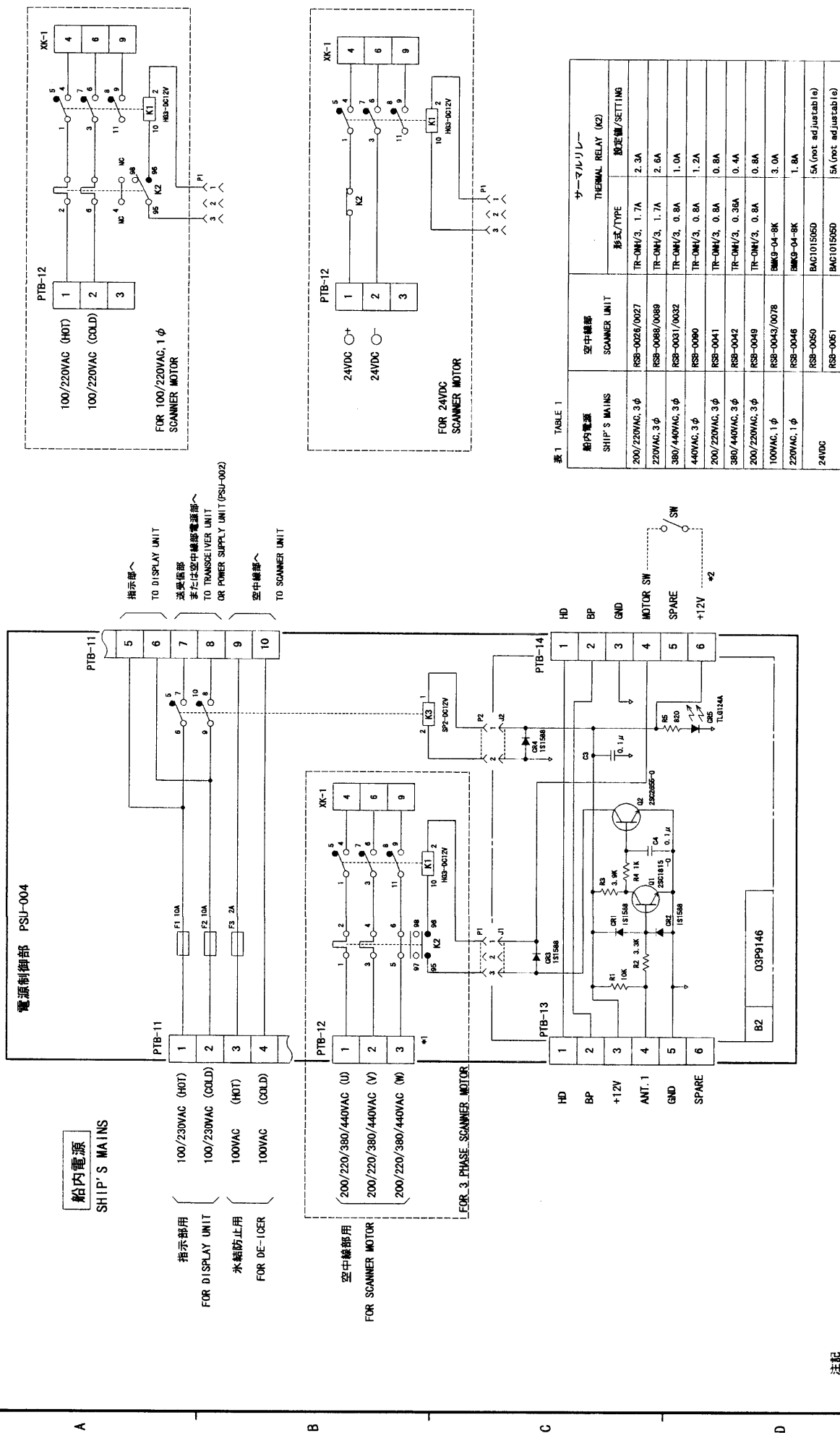


表 1 TABLE 1

船内電源 SHIP'S MAINS	空中線部 SCANNER UNIT	サーマルリレー THERMAL RELAY (K2)
	形式/TYPE	設定値/SETTING
200/220VAC, 3φ	RSB-0026/0027	TR-0M1/3, 1.7A 2.3A
220VAC, 3φ	RSB-0088/0089	TR-0M1/3, 1.7A 2.6A
380/440VAC, 3φ	RSB-0031/0032	TR-0M1/3, 0.8A 1.0A
440VAC, 3φ	RSB-0090	TR-0M1/3, 0.8A 1.2A
200/220VAC, 3φ	RSB-0041	TR-0M1/3, 0.8A 0.8A
380/440VAC, 3φ	RSB-0042	TR-0M1/3, 0.36A 0.4A
200/220VAC, 3φ	RSB-0049	TR-0M1/3, 0.8A 0.8A
100VAC, 1φ	RSB-0043/0078	BMK9-04-8K 3.0A
220VAC, 1φ	RSB-0046	BMK9-04-8K 1.8A
24VDC	RSB-0050	BAC1015050 5A (not adjustable)
	RSB-0051	BAC1015050 5A (not adjustable)

注記
 * 1) 設定値は表 1 を参照。
 * 2) FR-21600S のときは PTB-14 の #4 と #6 を現場で短絡すること

NOTE
 * 1. REFER TO TABLE 1 FOR THERMAL RELAY SETTINGS.
 * 2. FOR FR-21600S, PUT A JUMPER BETWEEN #4 AND #6 OF PTB-14 AT INSTALLATION.

DRAWN Jun. 20 '01 T. YAMASAKI
 CHECKED 山崎 隆夫 T. YAMASAKI
 APPROVED 山崎 隆夫 T. YAMASAKI
 SCALE 1/2000 MASS KE
 DWG No. C3385-K01-F

TITLE PSU-004
 名称 電源制御部
 回路図
 NAME POWER SUPPLY UNIT
 SCHEMATIC DIAGRAM

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