

FURUNO

OPERATOR'S MANUAL

RADAR ALARM UNIT

MODEL RA-24 / 24A



FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

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SPECIFICATIONS OF RA-24/24A RADAR ALARM UNIT
(RA-24: Separate Type, RA-24A: Built-in Type)

This equipment is a compact collision warning system. Connected with any type of FURUNO radar, the radar alarm unit produces audio and optical alarms when any targets, ships, markers, or land mass which are detected on the radar screen fall into a guard zone. RA-24A is the built-in unit type for FR-1012/1022 radars.

- Guard Zone:
Range:--- 0.5 n.m. to 24 n.m. continuously set.
Sector -- 10-degree sector to 360-degree full circle.
(360 degrees only for radars using servo synchronization system)
- Gyrocompass Stabilization:
When the radar display is incorporated with the north-up feature, the guard sector can be gyrocompass stabilized to a specific direction or target.
(Application: FR-1000/1200 series)
- Alarm Devices:
Optical --- Red Lamp (LED)
Audio --- Incorporated Buzzer and external Trumpet Speaker.
- Ambient Temperature:
-20°C to +55°C
- Power Supply:
Supplied from the radar display. (+12V, -12V & +5V)
- Coating Color:
Cabinet ----- 2.5GY-5/1.5 Newtone No.5
Front Panel -- 2.5PB-2.5/7 (RA-24), N1.0 (RA-24A)

Radar alarm unit RA-24/24A is not authorized as an anti-collision system. It should be noted that small targets such as drifting timbers and small wooden boats are sometime masked by sea or rain clutters and not detected. They should be watched by eyes as usual and excessive reliance must not be put on the alarm unit. Range closer than 0.5 miles is not guarded because this area is subject to plenty of sea clutters and gives erroneous information to the operator.

COMPLETE SET

No.	Name		Weight	Q'ty	Remarks
1	Radar Alarm Unit	RA-24 RA-24A	2.0 kg	1	with mounting bracket built-in unit type
2	Trumpet Speaker	CA-150	1.2 kg	1	5W, with 5m cable and plug
3	Installation Materials			1 set	

INSTALLATION MATERIALS

No.	Name	Type	Kit A	Kit B	Kit C	Kit D	Kit E
1	Twist Cable (A) *1	CO-DS-IREVV-SX 10P	1.5m				1.5m
	Twist Cable (B) *2	x 0.18sq (TA-SC)		1.5m			
2	Interface pcb	INT-4314	1				1
3	Interconnection Cable (A) *1		1				1
4	Interconnection Cable (B) *1		1				1
5	Spacer	LRO-1013	3				3
6	Spacer	HSA-3025	3				3
7	Washerhead Screw	M3 x 6	6				6
8	Panhead Screw	M3 x 20	3				3
9	Spring Washer	For M3	3				3
10	14C Cable	*3		30cm			
		*2			30cm		
11	Rectifier pcb	RU-4206		1			
12	Spacer	HSA-3020		4			
13	Washerhead Screw	M3 x 8		8			
14	Power Transformer	HS-2405			1		
15	Washerhead Screw	M3 x 12			2		
16	Nuts	M3			2		
17	Cable Clamp	03-004-1134					1

Kit A --- (FR-700/1000/1200 Series, CD-140, FCR-1400 Series, FR-1222/1223/1222X/1262S, FR-1622/1623/1622X/1662S)*4
 Kit B --- (FR-160/240/240MARK-II/320, FRS-24/36/48/60/80, FRM-60/64/64W/100/100W)
 Kit C --- (FRJ-100/100W/101/101W, FRL-100, FRI-85)
 Kit D --- (FR-360)
 Kit E --- (Model 1600/2400, FR-240MK-III, 360MK-II)

- *1: NH plugs at both ends.
- *2: NH and ML plugs at each end.
- *3: ML plug at one end.
- *4: For FR-1012/1022 radars provided with RA-24A, all items are previously fitted in the radar display.

CHAPTER 1. OPERATING INSTRUCTION

1-1. Function of Front Panel Controls and Switches (Ref. Fig.1-4)

FUNCTION switch

OFF: Function off. (Power alive)

MARKER: Guard zone appears on the screen as shown in Fig.1-1. Set the guard zone with RANGE and SECTOR controls.

RUN: Normal position. Guard zone disappears but alarm function remains. When operating RANGE or SECTOR control, check the guard zone at MARKER position.

TEST: While the sweep is running over guard zone, an audio is heard for test purpose.

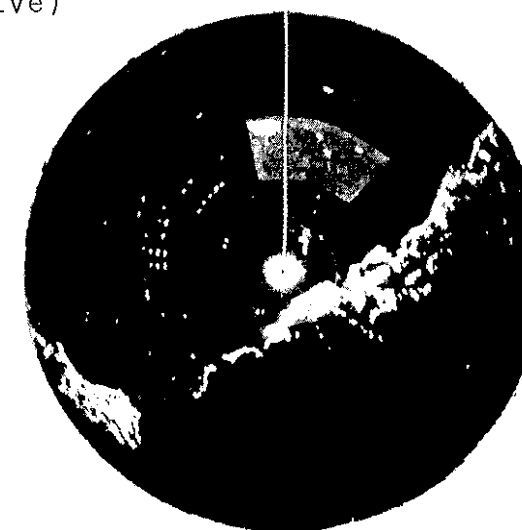


Fig.1-1 Guard Zone Marker

RANGE control

Two controls set a guard zone (range and width) between 0.5 and 24 miles. Outer knob sets the range of inner edge of guard zone, and inner knob sets the width of guard zone.

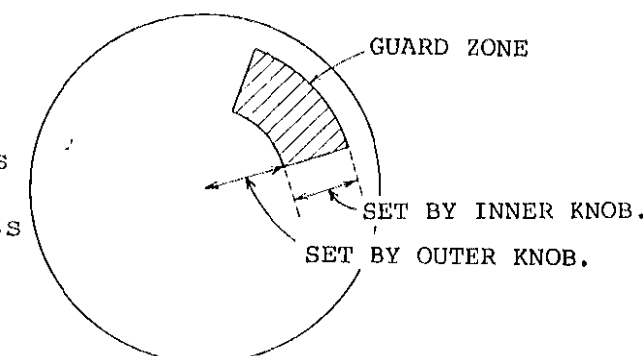


Fig.1-2 Range Setting

SECTOR control

Two controls adjust the direction and width of guard sector. Outer knob set the direction and inner knob sets the width as shown in Fig.1-3.

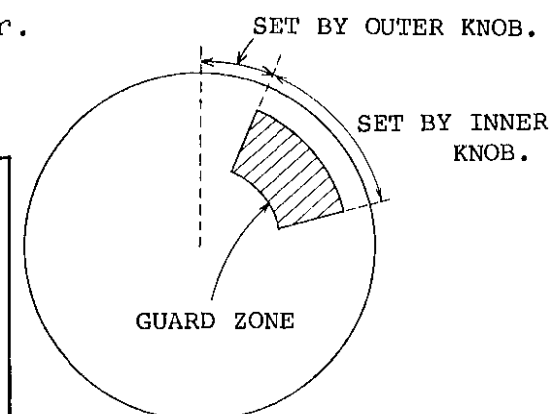


Fig.1-3 Sector Setting

Note: Operation of the SECTOR controls is disabled when the radar alarm unit is connected to the radar display using servo synchronization system for bearing transmission between scanner and display, e.g. FRJ-100/W, FRL-100 FRI-85 radars. (360° full circle zone appears.)

EXT.SP.VOL control (BUZZER ON-OFF switch)

Volume control for external trumpet speaker. Push-pull for buzzer OFF-ON. The volume of the buzzer warning sound is preset in cabinet.

DISPLAY MODE switch (TRU.B - REL.B)

REL.B (Relative Bearing): The direction of guard zone is set by the SECTOR controls relative to heading.

TRU.B (True Bearing): The direction of guard zone is stabilized by gyrocompass relative to north. The bearing mode switch of the radar display should be set to "North-up" mode.

Note: The "TRU.B." mode is available when the radar display unit is connected to the North-up Unit shown below, and also the North-up Unit is operated in the true bearing mode.

North-up Unit: RG-2/2A & RG-12

ALARM lamp

The lamp flickers upon warning signal.

1-2. Operating Procedure

- 1) Operate radar in normal condition.
- 2) Turn the FUNCTION switch to "MARKER" position. A guard zone will appear on radar screen as shown in Fig.1-1.
- 3) Set the guard zone with the RANGE and SECTOR controls. See Fig.1-2 and Fig.1-3.
- 4) Turn the FUNCTION switch to "TEST" position. An audio is heard and ALARM lamp lights up while the sweep is running over the guard zone.
- 5) Adjust the EXT.SP. VOL control for appropriate volume of the sound. As necessary, pull it to operate the ALARM BUZZER.
- 6) Set the FUNCTION switch to "RUN" position. Guard zone disappears but alarm function remains.
- 7) When operating the RANGE or SECTOR controls, check the guard zone with the FUNCTION switch in "MARKER" position.

NOTE: The radar alarm unit operation is dependent on the radar function; therefore, the radar should be adjusted to the most favorable condition by STC and GAIN controls of radar display unit.

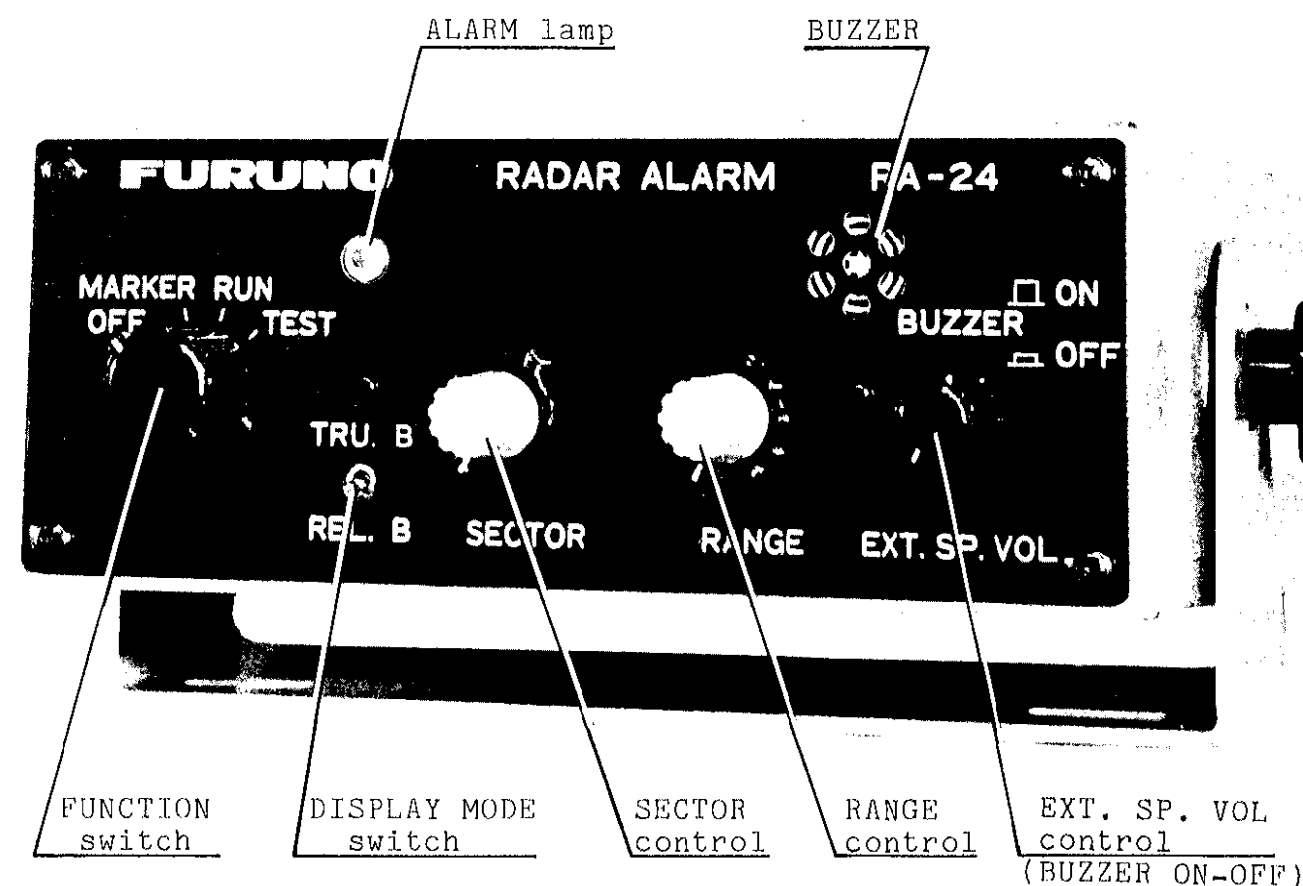


Fig.1-4 Front Panel Controls and Switches

Note: The above picture shows RA-24 (Separate Unit Type). There is no difference in arrangement of front panel controls between RA-24 and RA-24A (Built-in Type).

1-2. Operating Procedure

- 1) Operate radar in normal condition.
- 2) Turn the FUNCTION switch to "MARKER" position. A guard zone will appear on radar screen as shown in Fig.1-2.
- 3) Set the guard zone with the RANGE and SECTOR controls. See Fig.1-3 and Fig.1-4.
- 4) Turn the FUNCTION switch to "TEST" position. An audio is heard and ALARM lamp lights up while the sweep is running over the guard zone.
- 5) Adjust the EXT.SP. VOL control for appropriate volume of the sound. As necessary, pull it to operate the ALARM BUZZER.
- 6) Set the FUNCTION switch to "RUN" position. Guard zone disappears but alarm function remains.
- 7) When operating the RANGE or SECTOR controls, check the guard zone with the FUNCTION switch in "MARKER" position.

NOTE: The radar alarm unit operation is dependent on the radar function; therefore, the radar should be adjusted to the most favorable condition by STC and GAIN controls of radar display unit.

INSTALLATION INSTRUCTIONS OF RA-24 RADAR ALARM

1. Mounting

The radar alarm unit is designed for flexible installation; it can be table-top or overhead mounted with its mounting bracket. Refer to the radar alarm outline drawing.

2. Connections at Radar Side

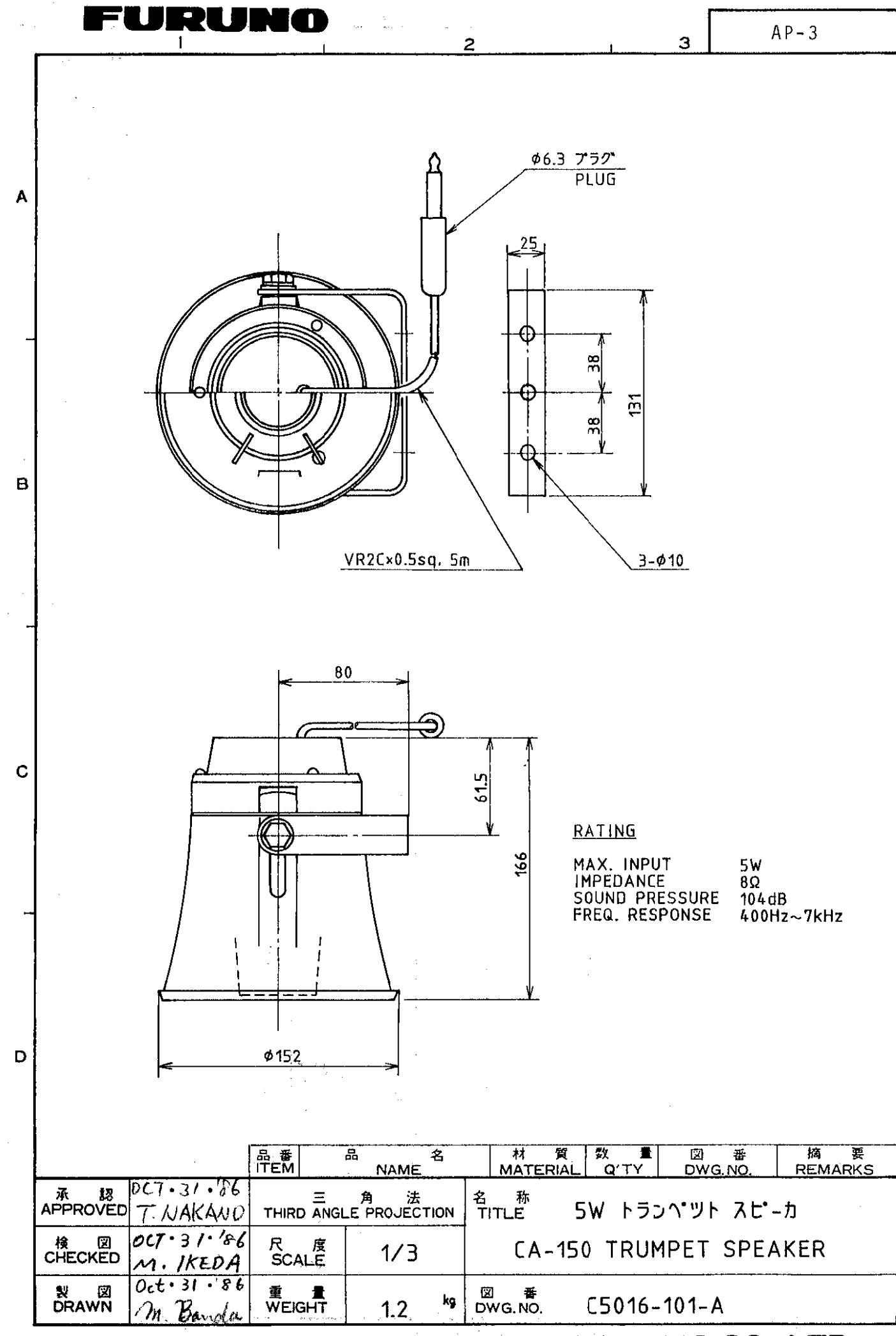
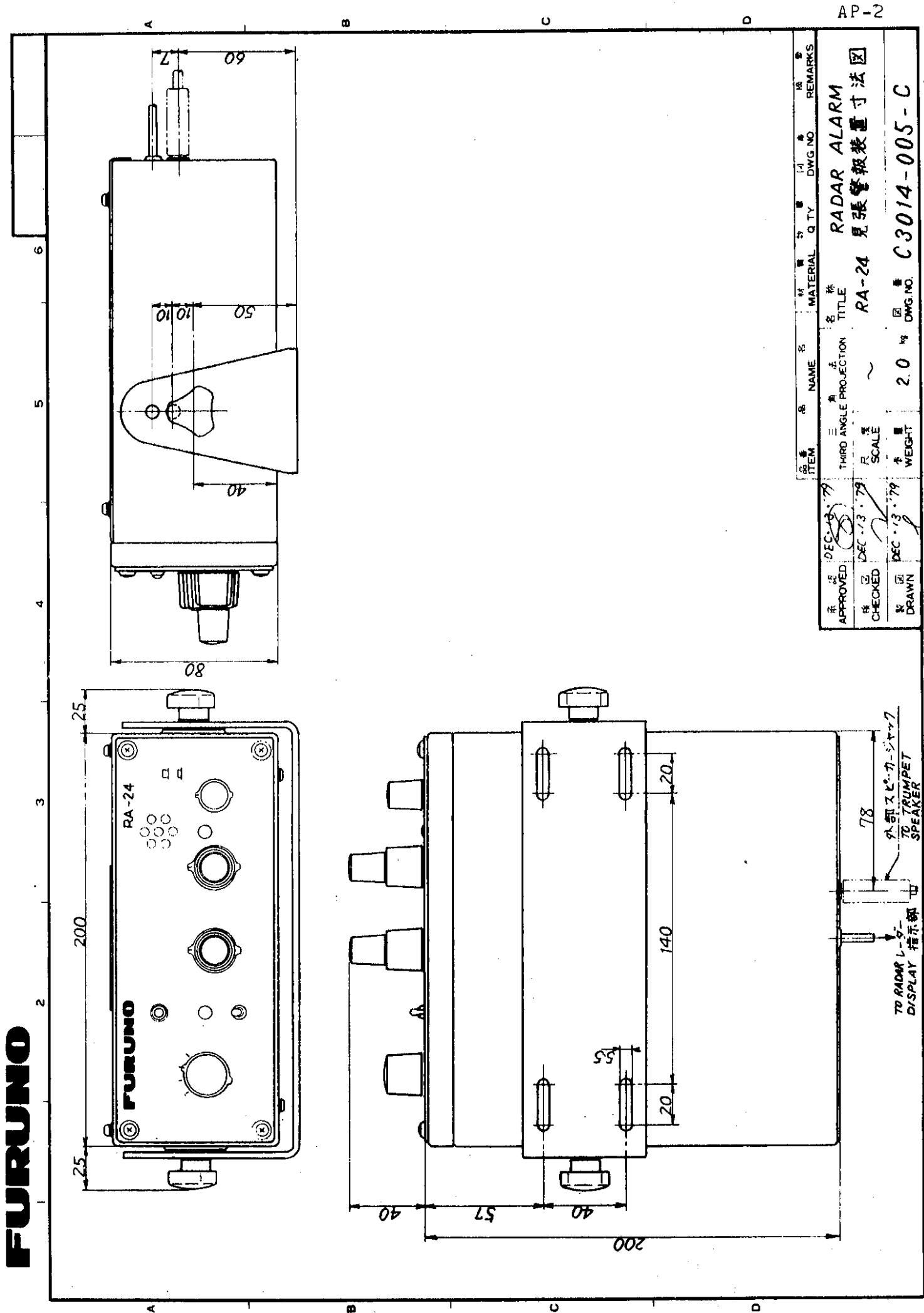
At radar side, connect the cables following the procedure below. Note that the connection is different with radar model.

Connections to FR-700/1000/1200 Series Radars

Parts required and connection are different as mentioned below depending on whether the radar contains an interference rejector p.c. board IR-3695 or not.

- Parts required -

No.	Name	Descriptions	Q'ty		
			Supplied	With Interference Rejector pcb	Without Interference Rejector pcb
1	Twist cable (A) (w/plugs at both ends, 1.5m)	CO-DS-IREVV-SX 10P×0.18sq (TA-SC)	1	1	1
2	Interface pcb	INT-4314 or RU-4179	1	1	1
3	Interconnection Cable (A), (B)		1 each	1 each	
4	Spacer	LRO-1013	3		3
5	Spacer	HSA-3025	3	3	
6	Washerhead Screw	M3×6 C2700W MBNiII	6		6
7	Panhead Screw and Washer	M3×20 C2700W MBNiII	3 each	3 each	



Connection to Radar with Interference Rejector pcb

Refer to the drawings "Interconnection at radar side" on page AP-5 or AP-5' and "Interconnection Diagram" on page AP-8. Note that connection is different with type of interface board; RU-4179 or INT-4314.

- Procedure -

(1) Removal of Display Main pcb and Interference Rejector pcb.

- 1) Take off the RANGE switch knob ① and rubber seal ②.
- 2) Disconnect the plugs connected to the display main pcb ③ and interference rejector pcb ④.
- 3) Unscrew two M4x6 fixing screws ⑤ and seven M3x6 fixing screws ⑥, then detach the display main pcb ③.
- 4) Unscrew three M3x6 fixing screws ⑦, then detach the interference rejector pcb ④.
- 5) Fix three spacers (LRO-1013) ⑧ with M3x20 fixing screws (supplied) instead of M3x6 fixing screws.

(2) Fixing of Display Main pcb

- 1) Fix the display main pcb ③ on the chassis with the fixing screws ⑤ and ⑥ removed in step (1)-3).
- 2) Connect the plugs disconnected in step (1)-2).
- 2) Fix the RANGE switch knob ① together with the rubber seal ②.

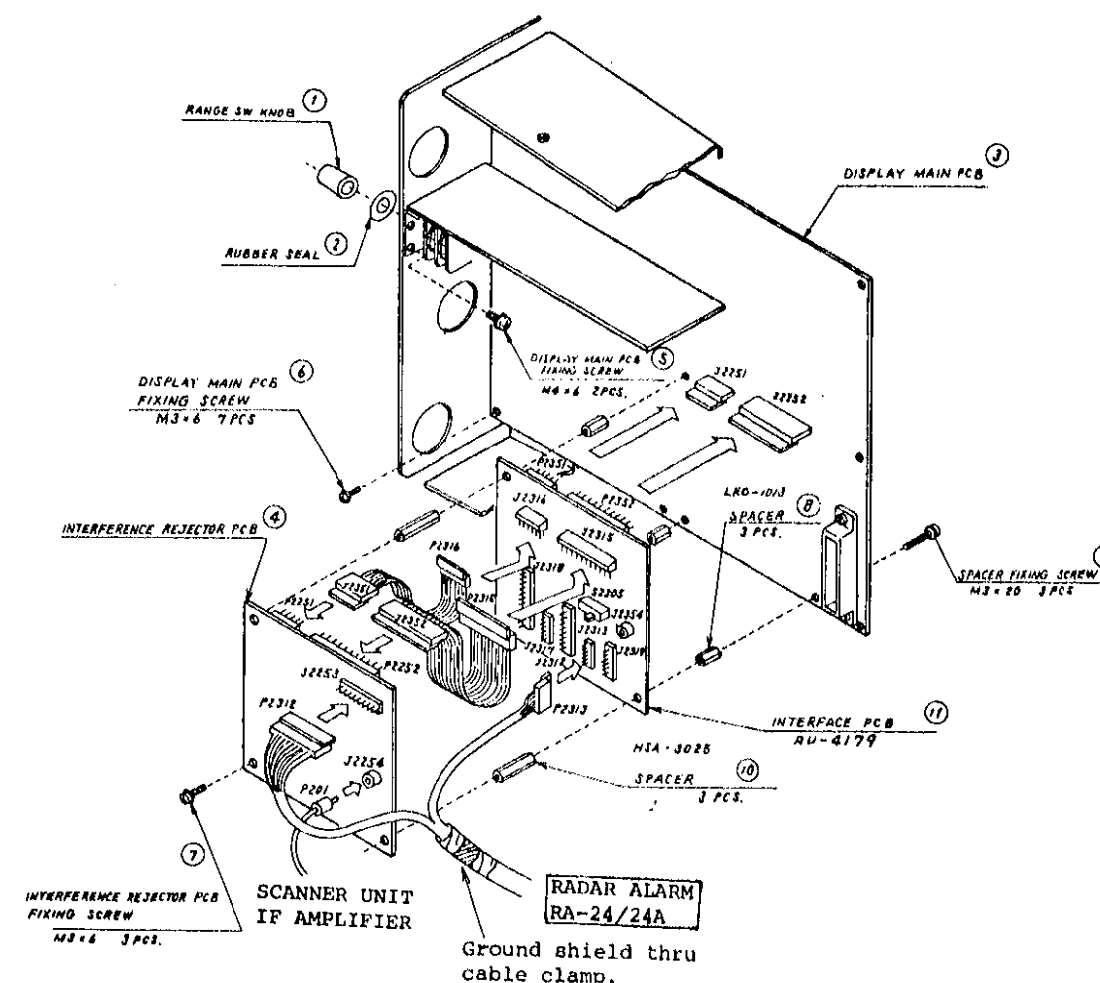
(3) Fixing of Interface pcb

- 1) Mount the interface pcb on the spacers ⑧ fitted in step (1)-5) by using three spacers (HSA-3025) ⑩ supplied.

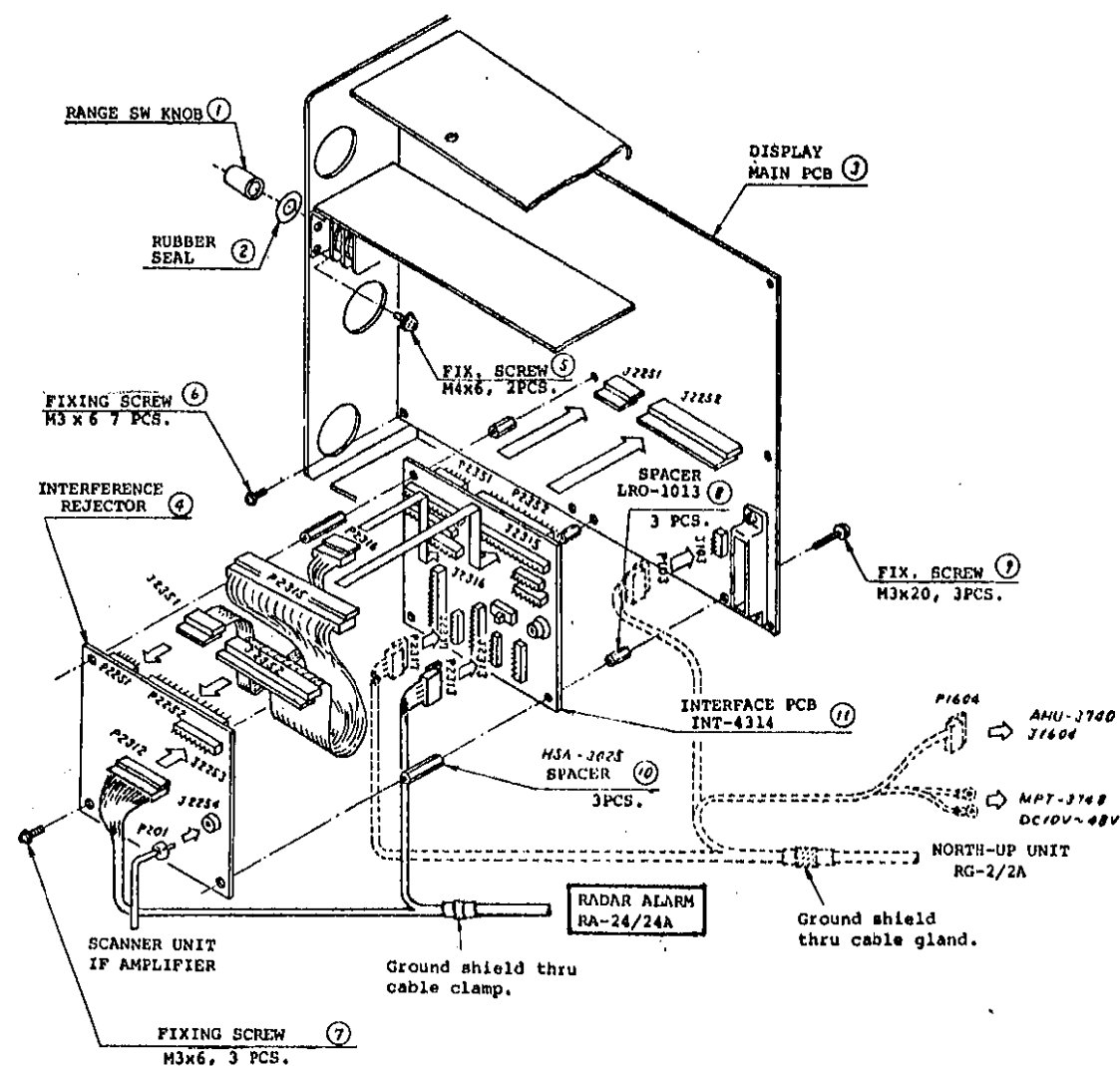
(4) Cable Connection and Fixing of Interference Rejector pcb

The twist cable (A) is supplied with two connector plugs (P2312/P2313) fitted at radar side.

- 1) Connect plug P2313 (smaller than P2312) of the twist cable (A) to jack J2313 on the interface pcb ⑩.
- 2) Connect plugs P2315 and P2316 of two kinds of interconnection cable (A)/(B) to jacks J2315 and J2316 on the interface pcb ⑩ respectively. Likewise connect plugs J2352 and J2351 of interconnection cables to jacks P2352 and P2351 on the interference rejector pcb ④ respectively.
- 3) Mount the interference rejector pcb ④ on the spacers (HSA-3025) ⑩ with three M3x6 fixing screws ⑦ removed in step (1)-4).
- 4) Connect plug P2312 (bigger than P2313) of the twist cable (A) to jack J2253 on the interference rejector pcb ④.
- 5) Connect plug P201 of the video signal cable to jack J2254 on the interference rejector pcb ④.



Radar Alarm Interconnection at Radar side with interface board **RU-4179** (Interference rejector board installed)



Radar Alarm Interconnection at Radar side
with interface board **INT-4314**
(Interference rejector board installed)

Connection to Radar without Interference Rejector pcb

Refer to the drawings "Interconnection at radar side" on page AP-7 or AP-7' and "Interconnection Diagram" on page AP-8.
Note that connection is different with type of interface board; RU-4179 or INT-4314.

- Procedure -

(1) Removal of Display Main pcb

- 1) Take off the RANGE switch knob (1) and rubber seal (2).
- 2) Disconnect the plugs connected to the display main pcb (3).
- 3) Unscrew two M4x6 fixing screws (4) and seven M3x6 fixing screws (5), then detach the display main pcb (3).
- 4) Fix three spacers (LRO-1013) (6) (supplied) on the display main pcb (3) with three M3x6 fixing screws (7) supplied.

(2) Fixing of Display Main pcb

- 1) Fix the display main pcb (3) on the chassis with the fixing screws (4) and (5) removed in step (1)-3). Connect the plugs disconnected in step (1)-2).
- 2) Fix the RANGE switch knob (1), together with the rubber seal (2).

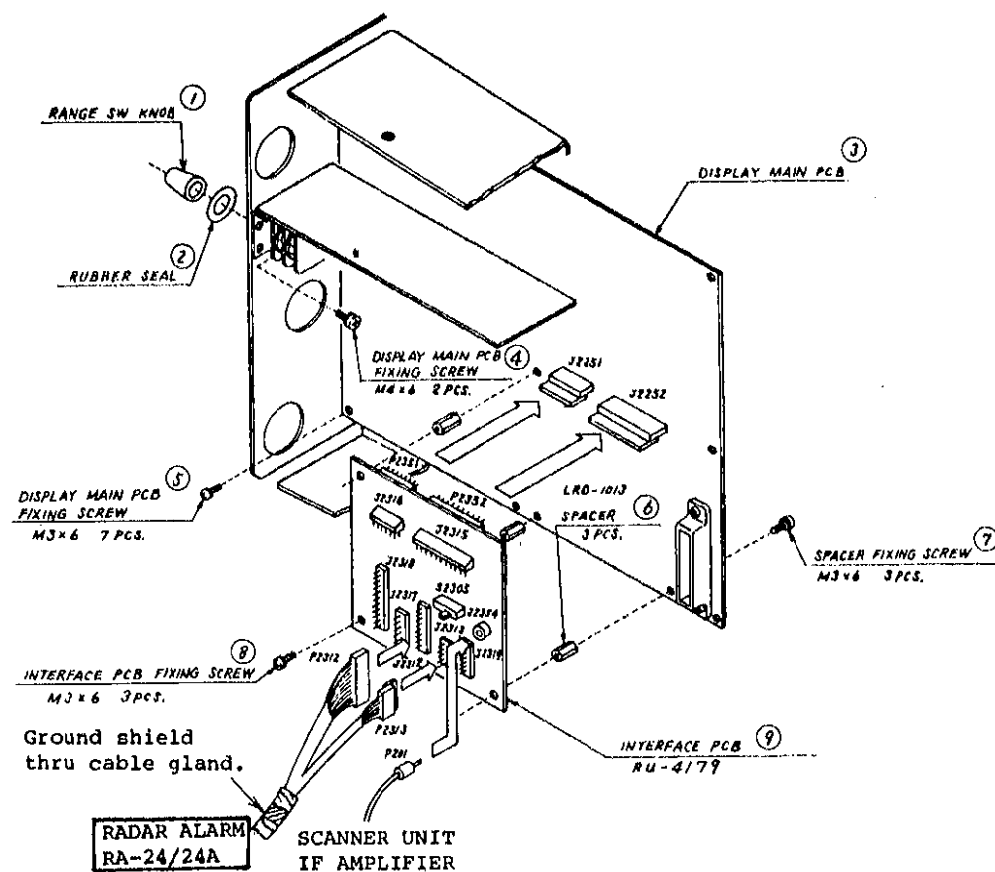
(3) Fixing of Interface pcb

- 1) Mount the interface pcb (9) on the spacers (6) fitted in step (1)-4) with three M3x6 fixing screws (8) supplied.

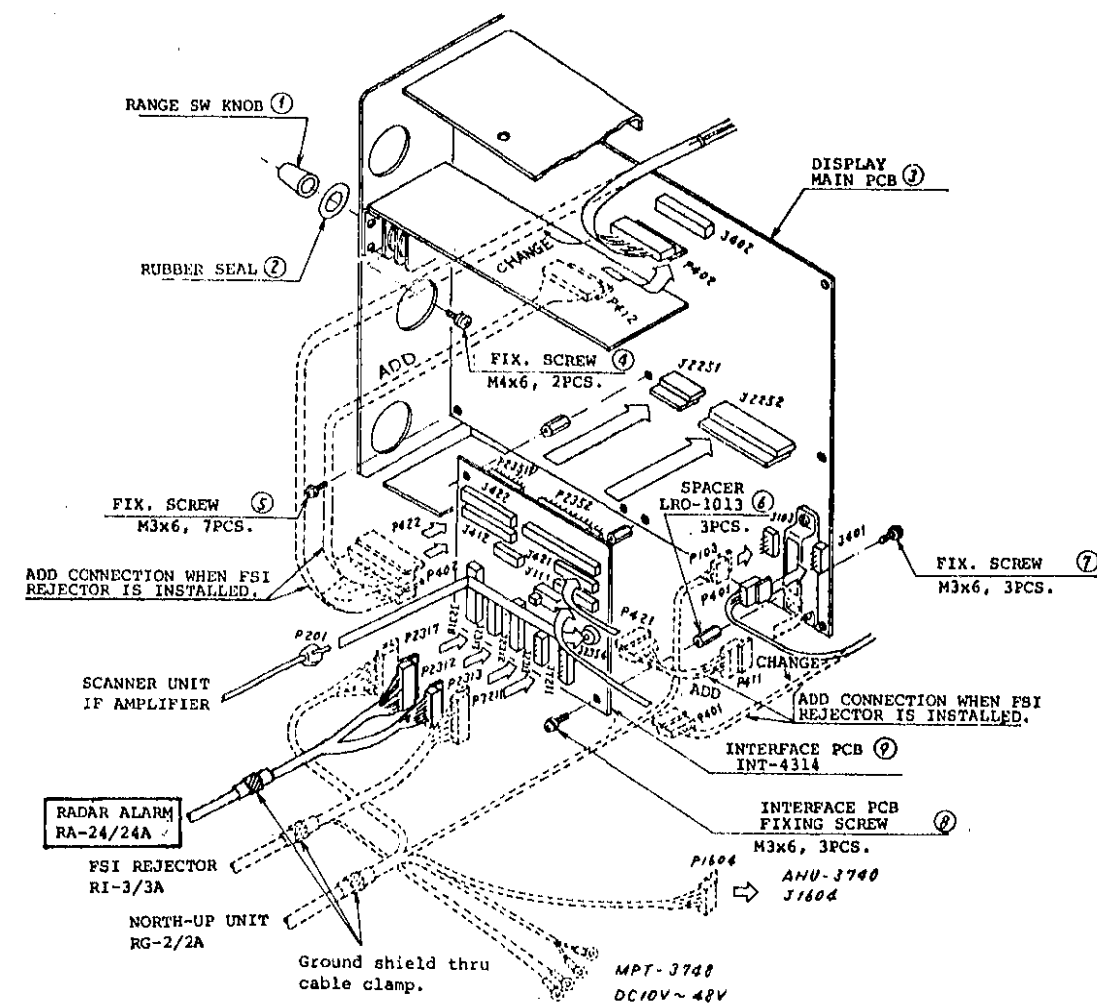
(4) Cable Connection

The twist cable (A) is supplied with two connector plugs (P2312/P2313) fitted at radar side.

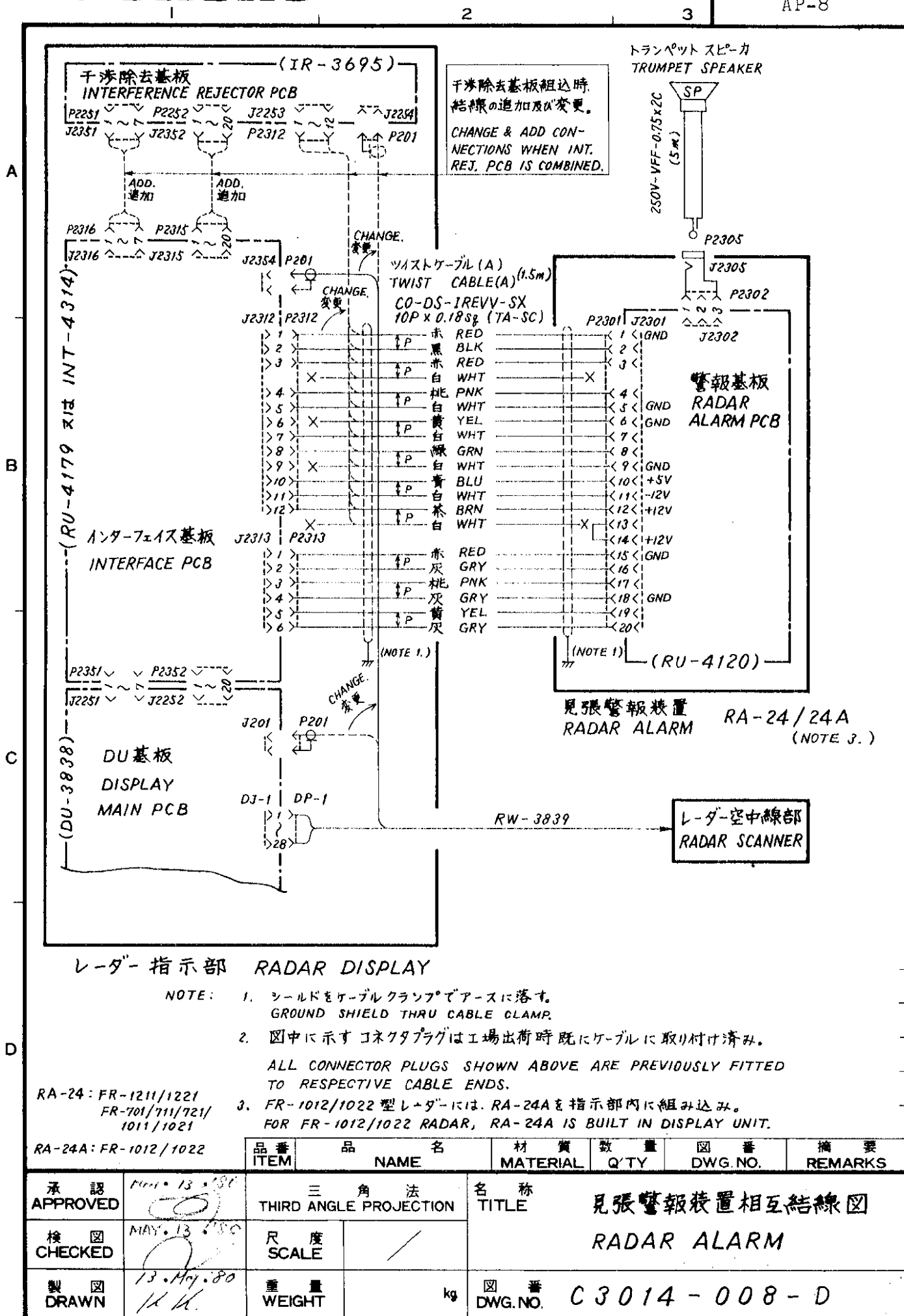
- 1) Connect plugs P2312 and P2313 (P2312 is bigger than P2313) of the twist cable (A) to jacks J2312 and J2313 on the interface pcb (9) respectively.
- 2) Connect plug P201 of video signal cable to jack J2354 on the interface pcb (9).



Radar Alarm Interconnection at Radar side
with interface board **RU-4179**
(Interference Rejector board not installed)



Radar Alarm Interconnection at Radar side
with interface board **INT-4314**
(Interference Rejector not installed)



Connection to

Group (1): FR-160/240/240MII/320, FRS-24/36/48/60/80,
FRM-60/64/64W/100/100W Radars

Group (2): FRL-100, FRJ-100/100W/101/101W, FRI-85 Radars

Group (3): FR-360

Refer to "Interconnection Diagrams" for respective radar models.

- Parts required -

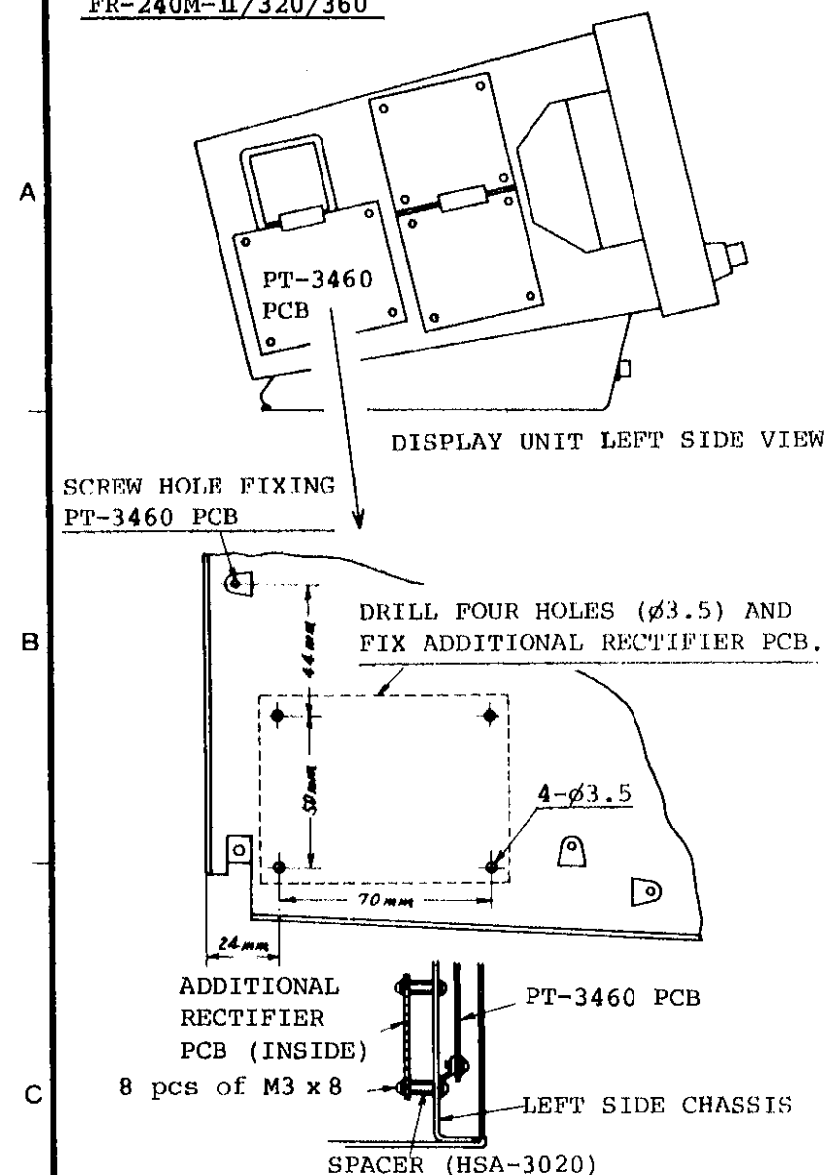
No.	Name	Descriptions	Q'ty		
			Kit B	Kit C	Kit D
1	Twist Cable (B)	CO-DS-IREVV-SX 10P x 0.18sq (TA-SC) with plugs at both ends	1.5m		
2	14C Cable	with plug at one end.	1.5m		
		with plugs at both ends.			
3	Rectifier pcb	RU-4206	1		
4	Spacer	HSA-3020	4		
8	Washerhead Screw	M3x8 C2700W MBNiII	8		
9	Power Transformer	HS-2405		1	
10	Washerhead Screw, Nut	M3x12 C2700W MBNiII		2 each	

NOTE Kit B: For radars in group (1)
Kit C: For radars in group (2)
Kit D: For radars in group (3)

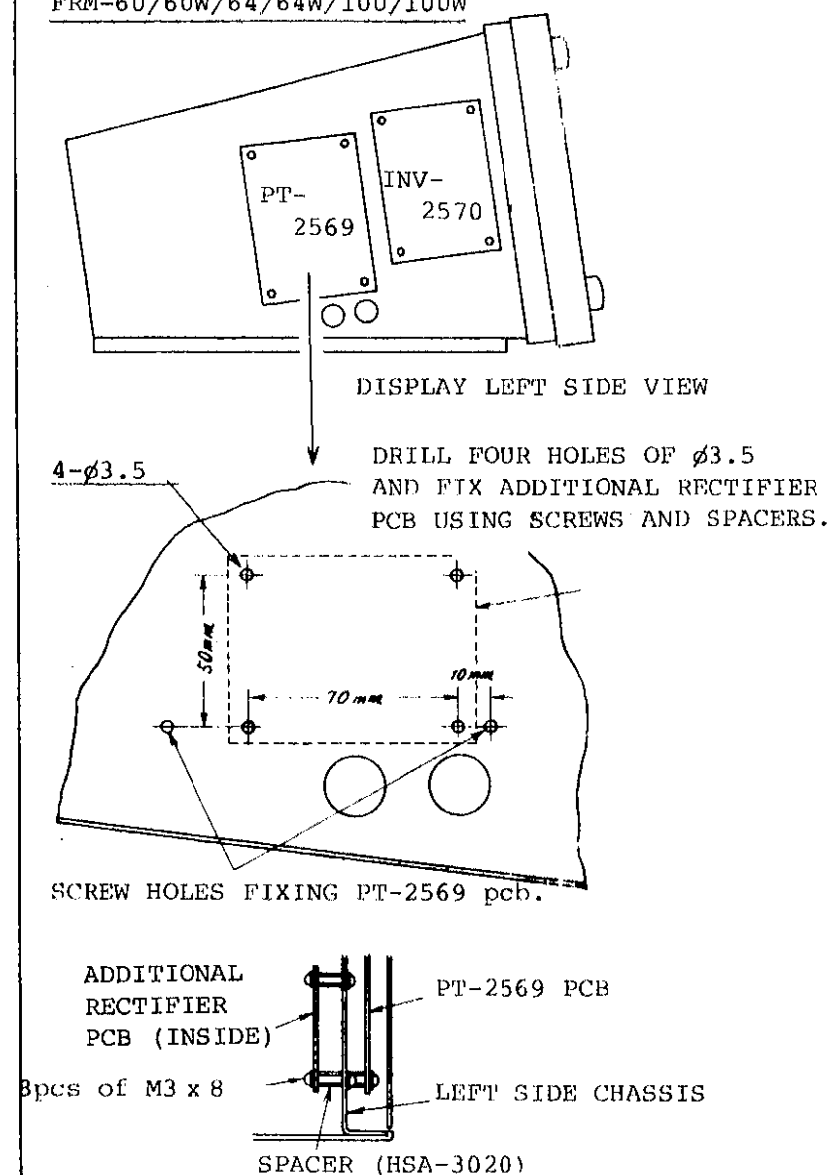
- Procedure -

- (1) Fix the rectifier pcb RU-4206 with four spacers HSA-3020 and four M3x8 fixing screws supplied. For radars in group (2), fix the power transformer (HS-2405) as well. Refer to "Rectifier board mounting drawing" on page AP-10.
- (2) Connect one end of the 14C cable (15P plug fitted at the other end) to the display main pcb, rectifier pcb, trigger generator pcb or power transformer, referring to "Interconnection diagram".
- (3) Lead one end (15P plug fitted) of the twist cable (B) into the radar display unit, and mate 15P plug of the twist cable (B) with 15P plug of 14C cable.

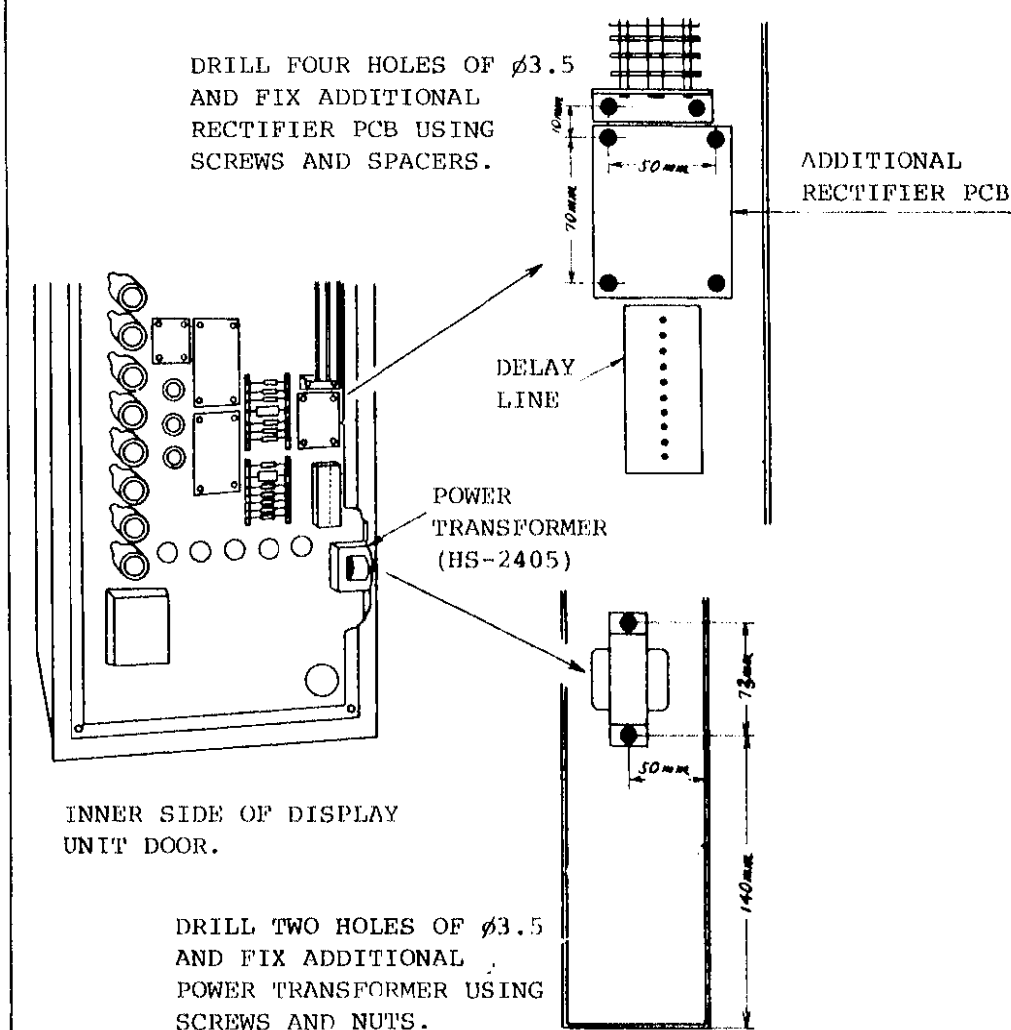
FR-240M-II/320/360



FRM-60/60W/64/64W/100/100W



FRL-100, FRJ-100/100W/101/101W/FRI-85

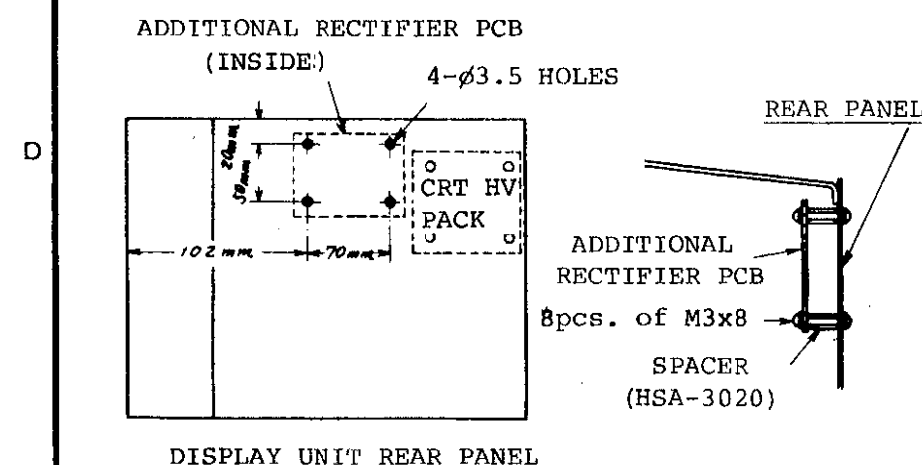


NOTE

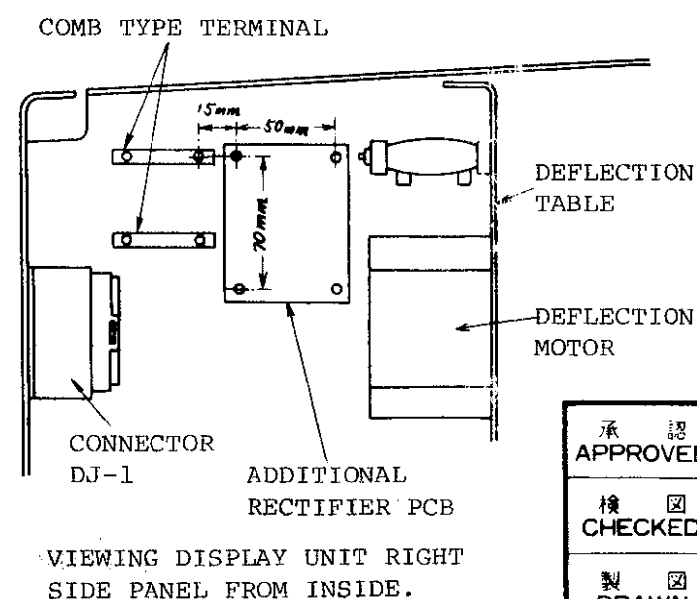
THIS DRAWING IS FOR FRL-100 AND FRJ SERIES, AND APPLICABLE TO FRI-85.

FR-160/240

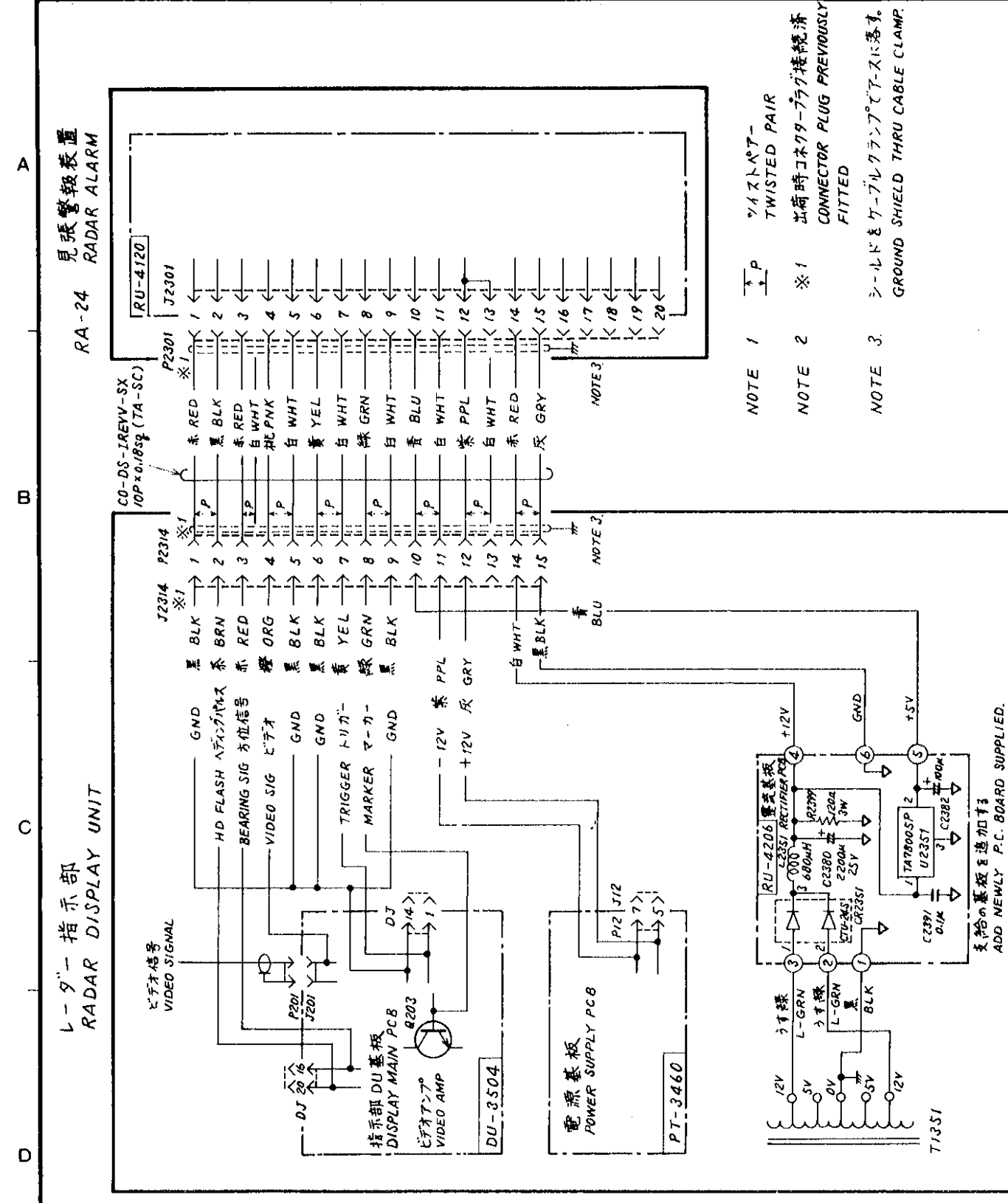
DRILL FOUR HOLES OF $\phi 3.5$ AS SHOWN BELOW. THEN, FIX ADDITIONAL RECTIFIER PCB USING SCREWS AND SPACERS.

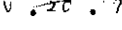
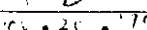


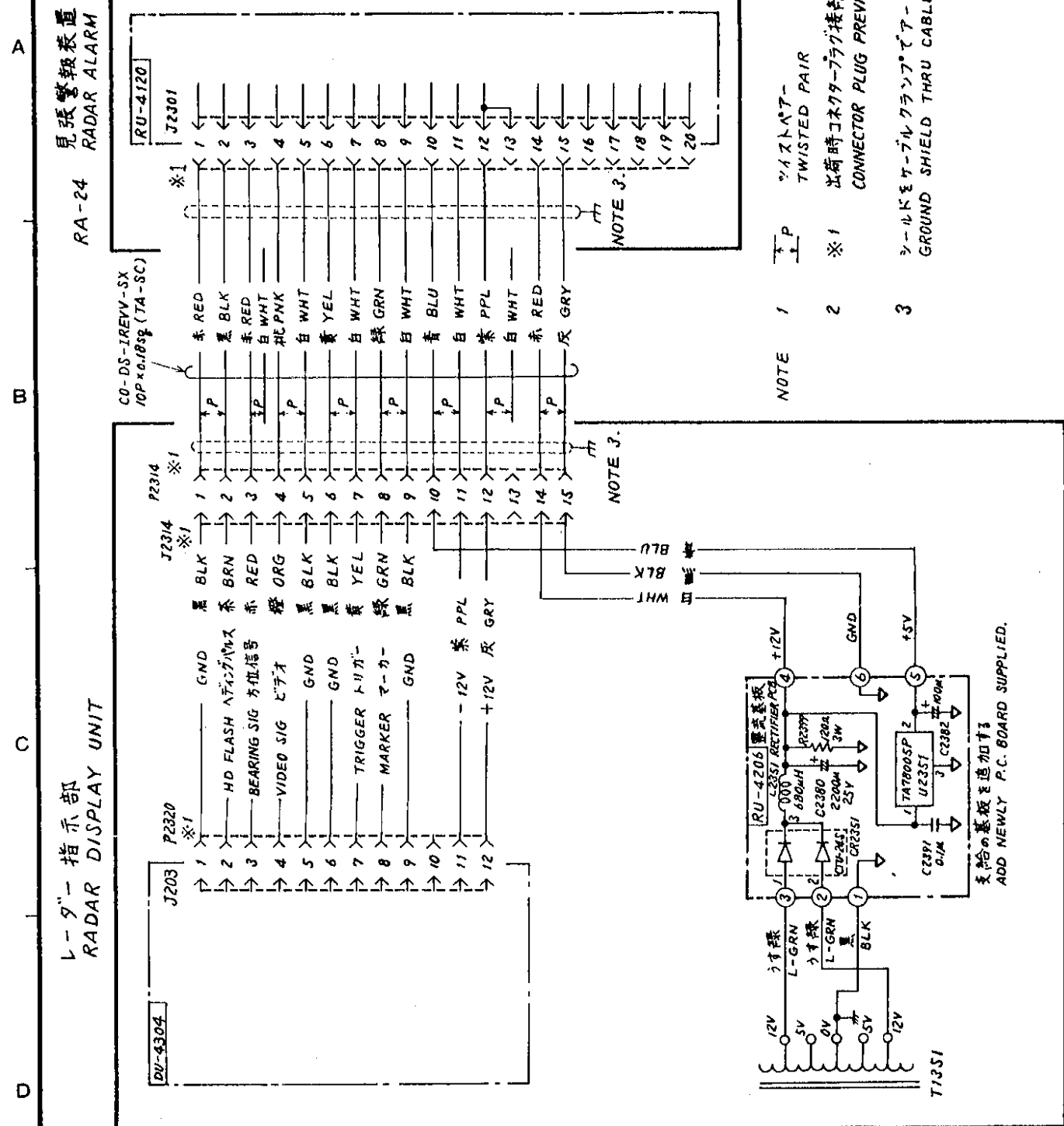
FRS-24/48/36/36A/36E/60/80



品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. NO.	摘要 REMARKS
承認 APPROVED	三角法 THIRD ANGLE PROJECTION	名称 TITLE	MOUNTING METHOD OF - ADDITIONAL RECTIFIER PCB AND POWER TRANSFORMER		
検図 CHECKED	尺度 SCALE	RA-24			
製図 DRAWN	重量 WEIGHT	kg	図番 DWG. NO.		

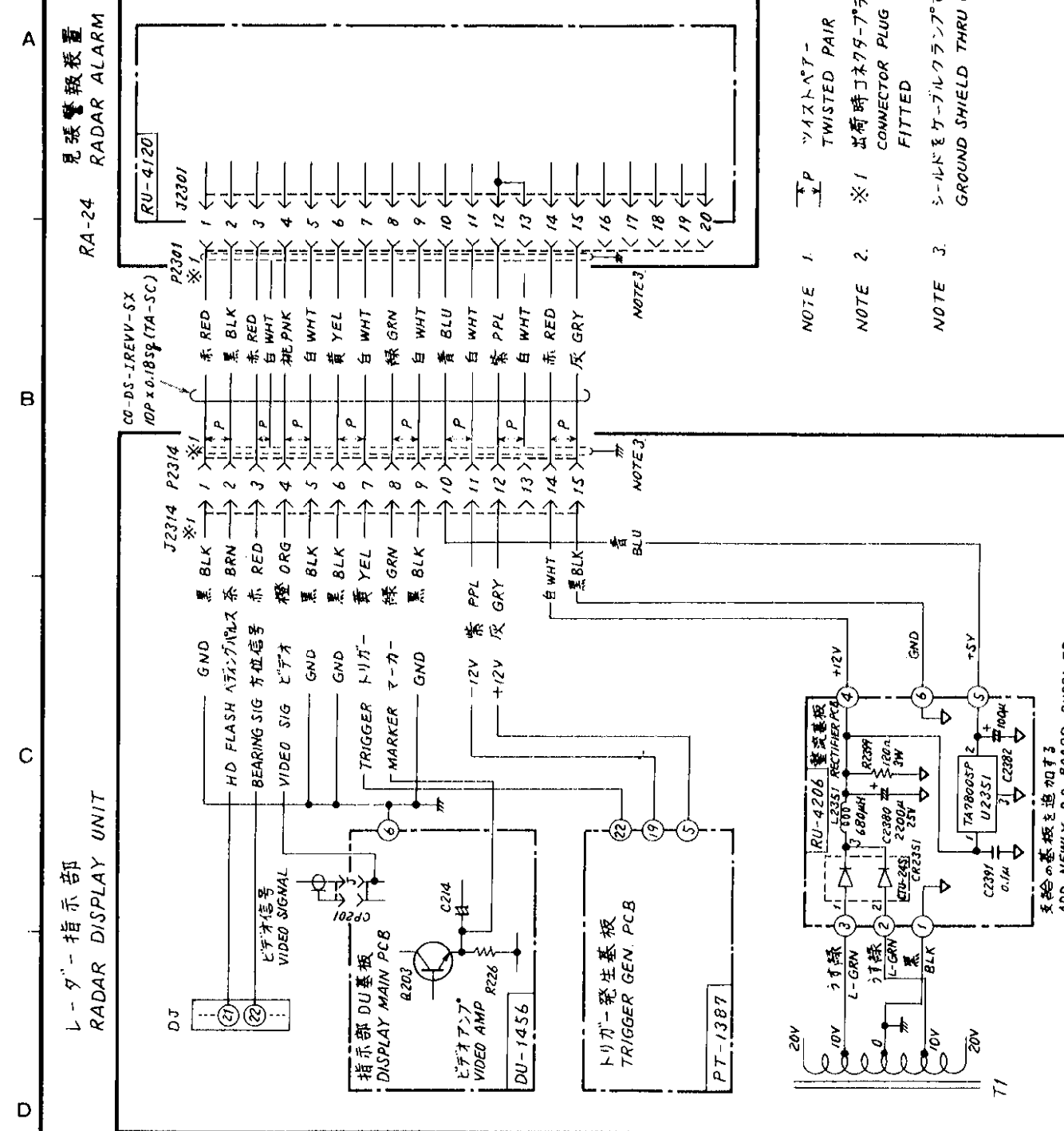


APPLICATION		品番 ITEM	品名 NAME	材質 MATERIAL	數量 Q'TY	圖番 DWG. NO.	摘要 REMARKS
承認 APPROVED	NOV. 22 '79 	三角法 THIRD ANGLE PROJECTION		名稱 TITLE RA-24 見張警報裝置相互結線圖 RADAR ALARM			
檢圖 CHECKED	NOV. 20 '79 	尺度 SCALE					
製圖 DRAWN	NOV. 20 '79 	重量 WEIGHT	kg				
				圖番 DWG. NO.	C3014-002-B		



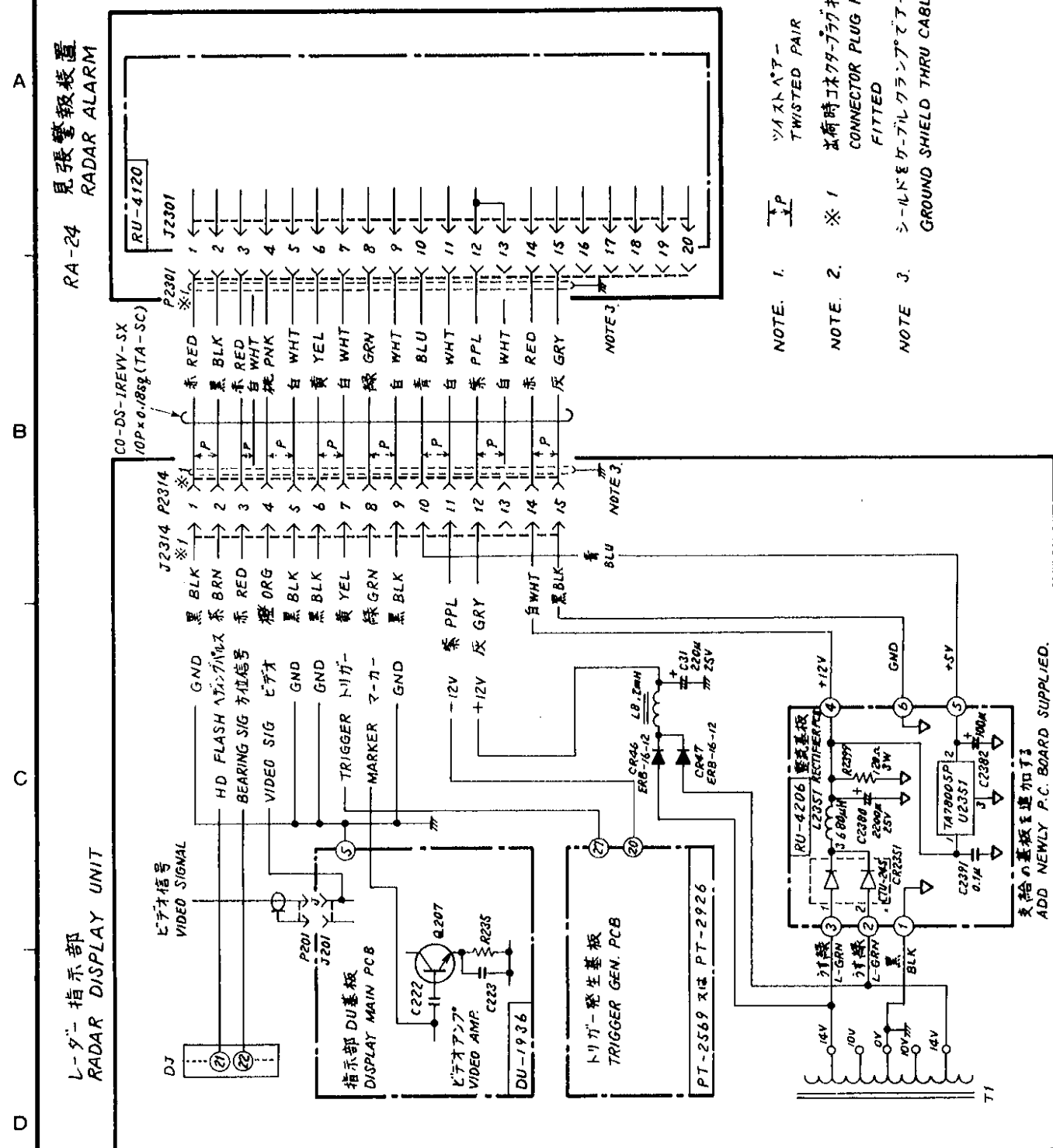
該当機種 FRA-360
APPLICATION

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	NOV. 22. '79	三角法 THIRD ANGLE PROJECTION	名称 TITLE	RA-24	見張警報装置相互結線図 RADAR ALARM
検図 CHECKED	NOV. 20. '79	尺度 SCALE			
製図 DRAWN	NOV. 20. '79 TOMITA	重量 WEIGHT	kg	図番 DWG.NO.	C3014-010-A



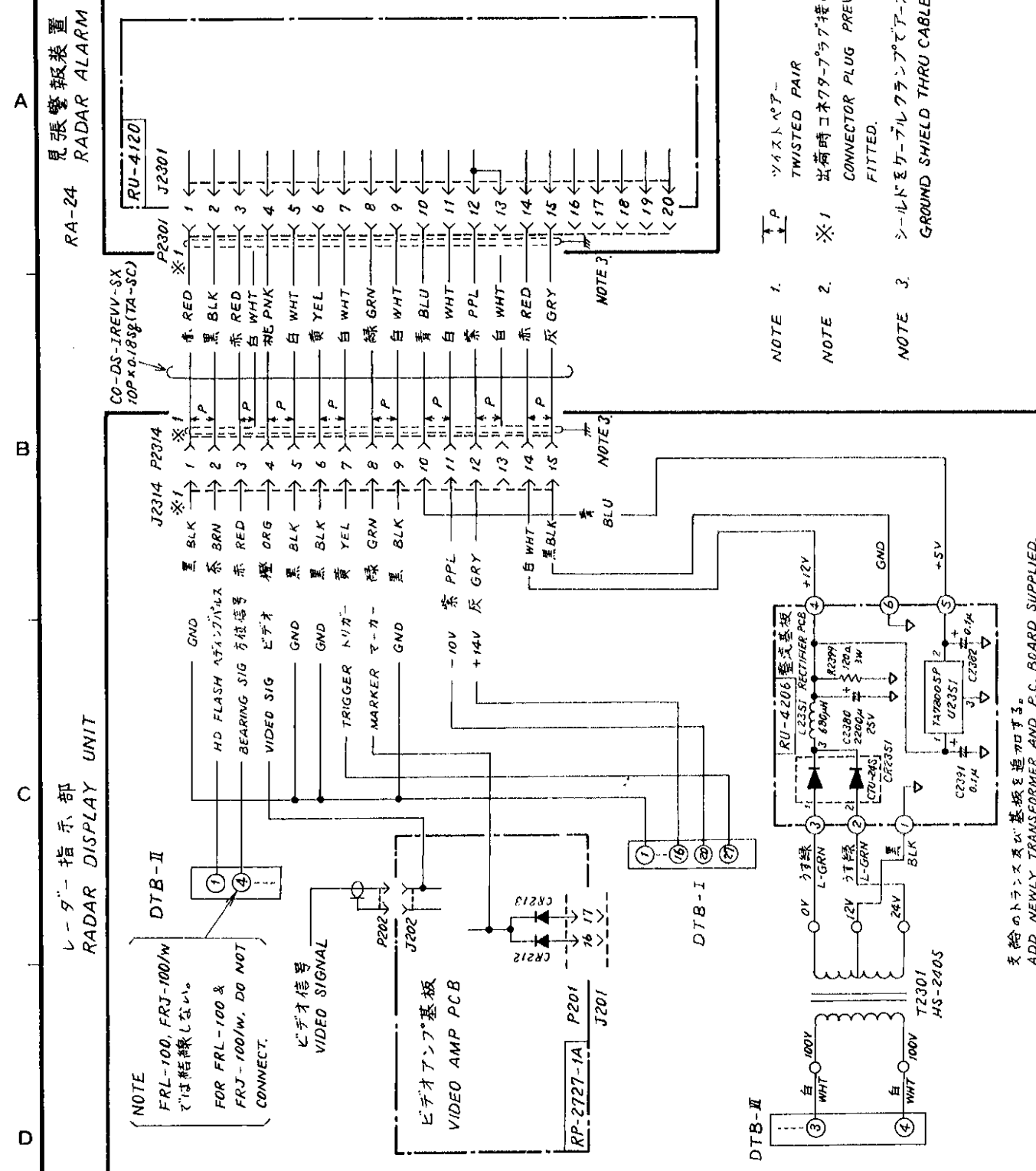
該当機種 FRA-10MII FRS-24/36/36E/48/36A
APPLICATION

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	NOV. 22. '79	三角法 THIRD ANGLE PROJECTION	名称 TITLE	RA-24	見張警報装置相互結線図 RADAR ALARM
検図 CHECKED	NOV. 20. '79	尺度 SCALE			
製図 DRAWN	NOV. 20. '79 TOMITA	重量 WEIGHT	kg	図番 DWG.NO.	C3014-003-B



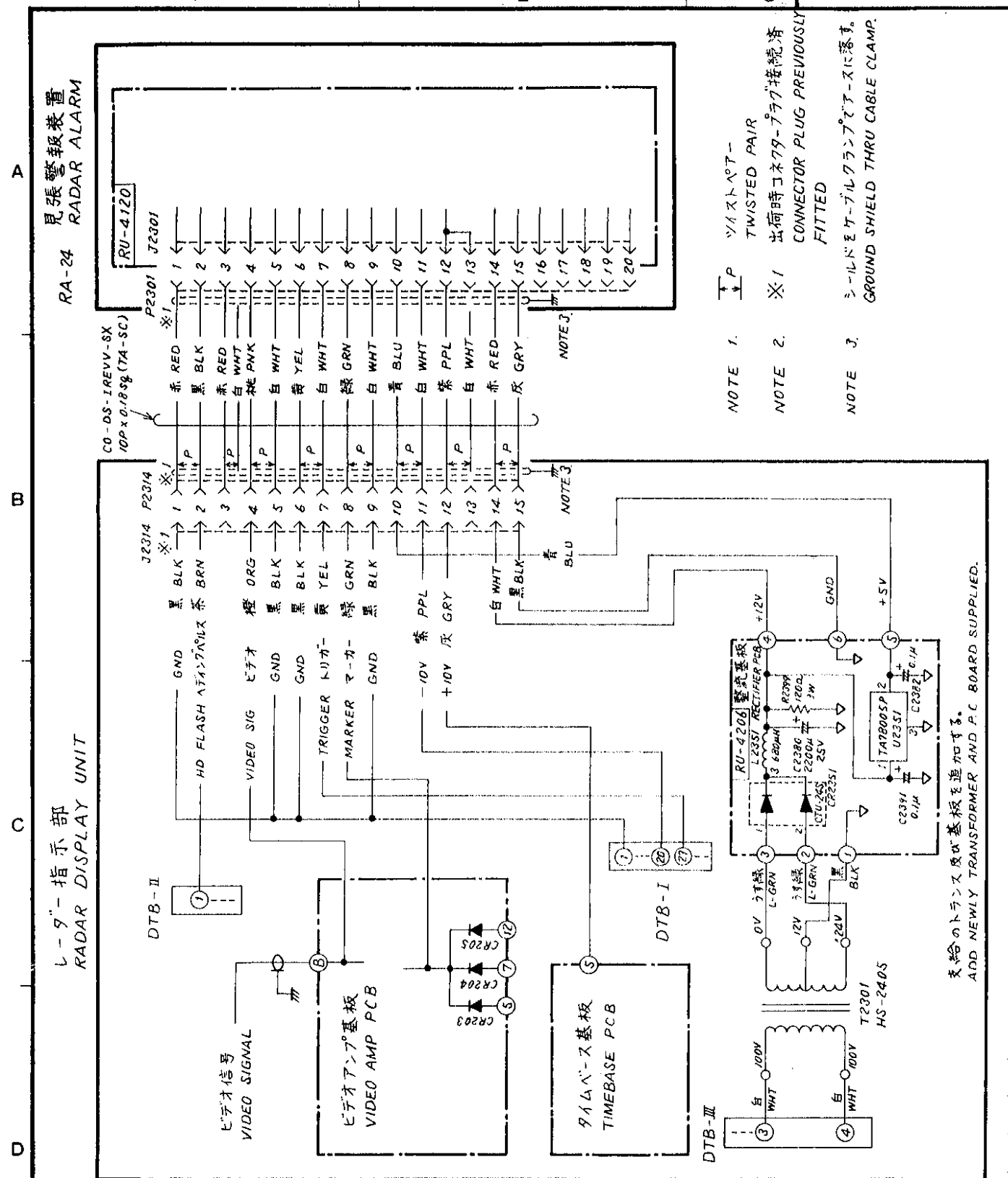
該當機種 APPLICATION FRM-60/60W/64/64W/100/100W, FRS-60/80

品番 ITEM		品名 NAME		材質 MATERIAL	數量 Q'TY	圖番 DWG.NO.	摘要 REMARKS
承認 APPROVED	NOV. 22. '79 	三角法 THIRD ANGLE PROJECTION		名稱 TITLE		見張警報裝置相互結線圖 RADAR ALARM	
檢 CHECKED	NOV. 20. '79 	尺 SCALE		RA-24			
製 DRAWN	NOV. 20. '79 	重 WEIGHT	kg	圖番 DWG.NO.		C3014-004-B	



該当機種 APPLICATION FRL-100, FRJ-100/100W, FRJ-101/101W

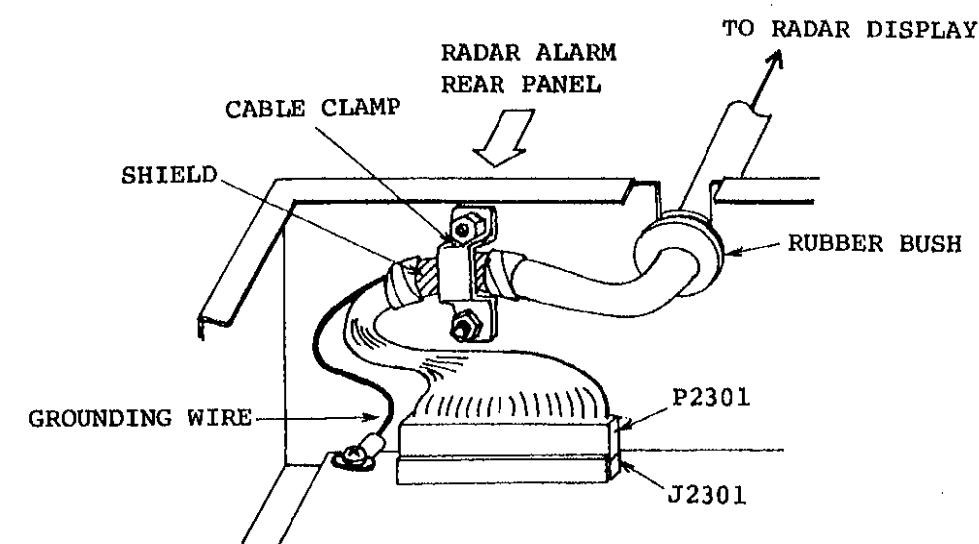
APPLICATION		品番 ITEM	品名 NAME	材質 MATERIAL	數量 Q'TY	圖番 DWG.NO.	摘要 REMARKS
承認 APPROVED	APR. 7. 80	三角法 THIRD ANGLE PROJECTION		名稱 TITLE 見張警報裝置相互結線図 RA-24 RADAR ALARM			
檢図 CHECKED	APR. 7. 80	尺度 SCALE	/				
製図 DRAWN	MAY 4. 80	重量 WEIGHT	kg	圖番 DWG.NO. C3014-013-A			



3. Connections at Radar Alarm Side

At radar alarm side, connect the cable as below.

- (1) Open the upper lid of the radar alarm unit after removing four fixing screws.
- (2) Connect plug P2301 of the twist cable to jack J2301 on the radar alarm p.c. board RU-4120.
- (3) Fix the cable on the chassis by clamping exposed aluminum shield with the cable clamp as shown below.



4. Adjustment at Installation

Carry out the following adjustments after wiring. Adjusting items are different with radar models combined. Items marked "○" on the list opposite should be adjusted at installation.

For models 1600, 2400, FR-240MKIII and FR-360MKII, turn the coil L2301 fully ccw and then cw slowly so that the maximum range of guard band will be approximately 24 miles.

Group A: FR-700/1000/1200 series, MODEL 1600, MODEL 2400
FR-240MK-III, FR-360MK-II

B: FR-160/240/240II/320, FRA-10MII, FRS-24/36/36E/48/36A, FR-360

C: FRS-60/80, FRM-60/W/64/W/100/W, FRJ-101/W

D: FRJ-100/W, FRL-100, FRK-100/W, FRI-85

該当機種 FRI-85

APPLICATION

承認 APPROVED	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
検図 CHECKED		三角法 THIRD ANGLE PROJECTION				名称 TITLE RA-24 見張警報装置相互結線図 RADAR ALARM
製図 DRAWN		尺度 SCALE				重量 WEIGHT
						kg
					図番 DWG.NO.	C3014-012-A

List of Adjusting Items

Items \ Models	Group A	Group B	Group C	Group D
(1) S2301 setting	○	○	○	○
(2) S2302 setting	○	○	○	-
(3) S2305 setting	○	-	-	-
(4) R2335 removal	-	-	○	-
(5) Jumper wire cutting	-	-	-	○
(6) VR2302 adj.	△	○	○	○
(7) VR2303 adj.	△	○	○	-
(8) VR2304 adj.	△	○	○	-

Note 1. ○ : Adjust at installation.

- : No adjustment

△ : Previously adjusted at factory

2.) : Adjust in the order shown by "arrow".

(1) S2301 setting

The slide switch S2301 selects the polarity of the radar trigger to operate the radar alarm.

Set the switch as below with radar model.

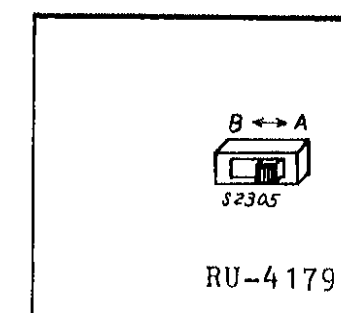
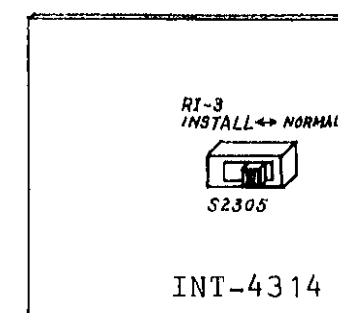
Radar models	S2301 setting	Polarity of trigger
FR-700/1000/1200 series	Left	Negative going
Model 1600/2400 FR-240MKIII/360MKII	Left	Positive going
Other Furuno radars	Right	Positive going

(2) S2302 setting

Slide switch S2302 is intended to adjust the timing of bearing and heading pulses. Set the switch to either position where the green lamp (LED) CR2315 is lighted.

(3) S2305 setting

Normally, set slide switch S2305 on the interface pcb (INT-4314 or RU4179) to position "NORMAL" or "A" (right). See below. When the FSI Rejector RI-3/3A is installed, use interface pcb INT-4314 instead of RU-4179 and set the slide switch to position "RI-3 INSTALL" (left).



(4) R2335 removal

(5) Jumper wire cutting

Follow the list of adjusting items on page AP-18 and RADAR ALARM INSIDE VIEW on page AP-20.

(6) VR2302

The potentiometer VR2302 presets the brilliance of the guard zone on the radar screen.

Adjust VR2302 for appropriate brightness of the guard zone with the radar picture brilliance set correctly. Too high a setting will cause the fixed range rings to be distorted.

(7) VR2303

The potentiometer VR2302 presets the direction of the guard zone.

With the DISPLAY MODE switch set to "REL.B." position, place the outer knob of the SECTOR control at mid-travel. Adjust VR2303 so that the starting edge of the guard zone is placed in aft (180 deg) position. Then confirm that the starting edge is placed in fore (0 deg) position with the control turned fully clockwise.

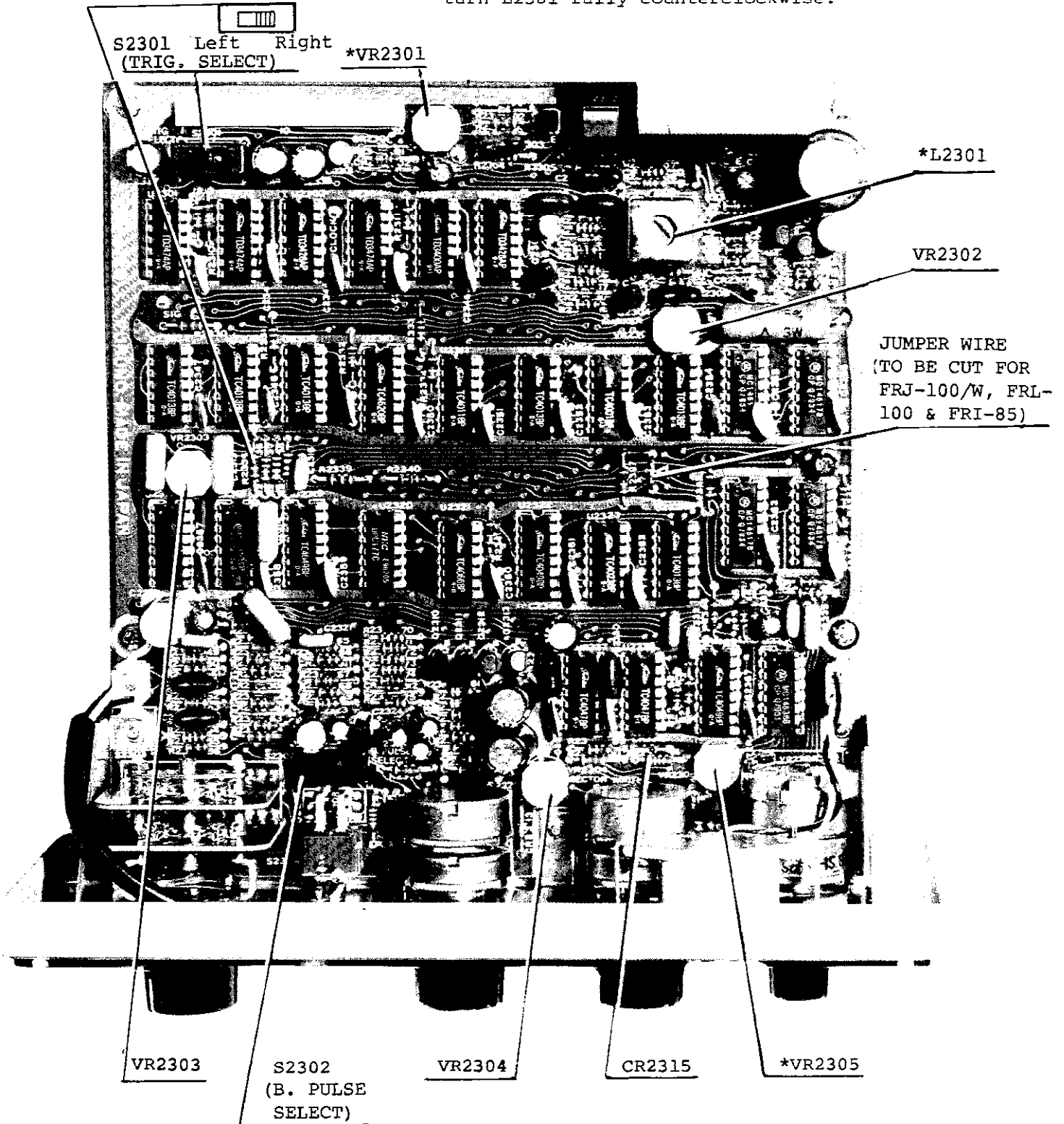
(8) VR2304

The potentiometer VR2304 presets the minimum sector width of the guard zone.

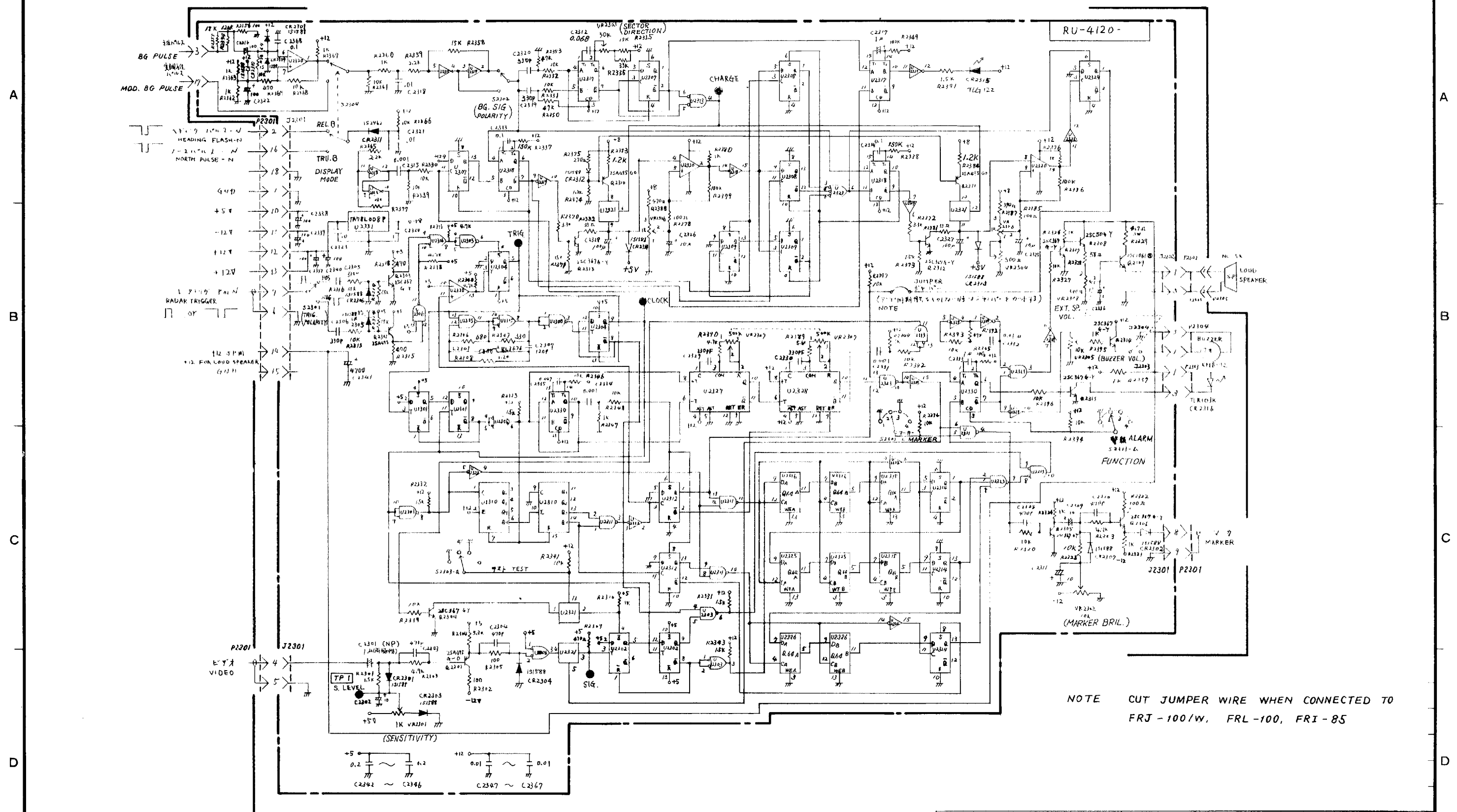
Adjust VR2304 so that the minimum sector width becomes 10 degrees with the inner knob of the SECTOR control turned fully anticlockwise.

R2335
(TO BE REMOVED
FOR FRS-60/80,
FRM-60/60W/100/
100W & FRJ-101/W)

Note: The potentiometers and coil marked "*" normally require no adjustment at installation. For adjustment, refer to Service Manual.
For MODEL 1600/2400, FR-240MK-III and FR-360MK-II, turn L2301 fully counterclockwise.

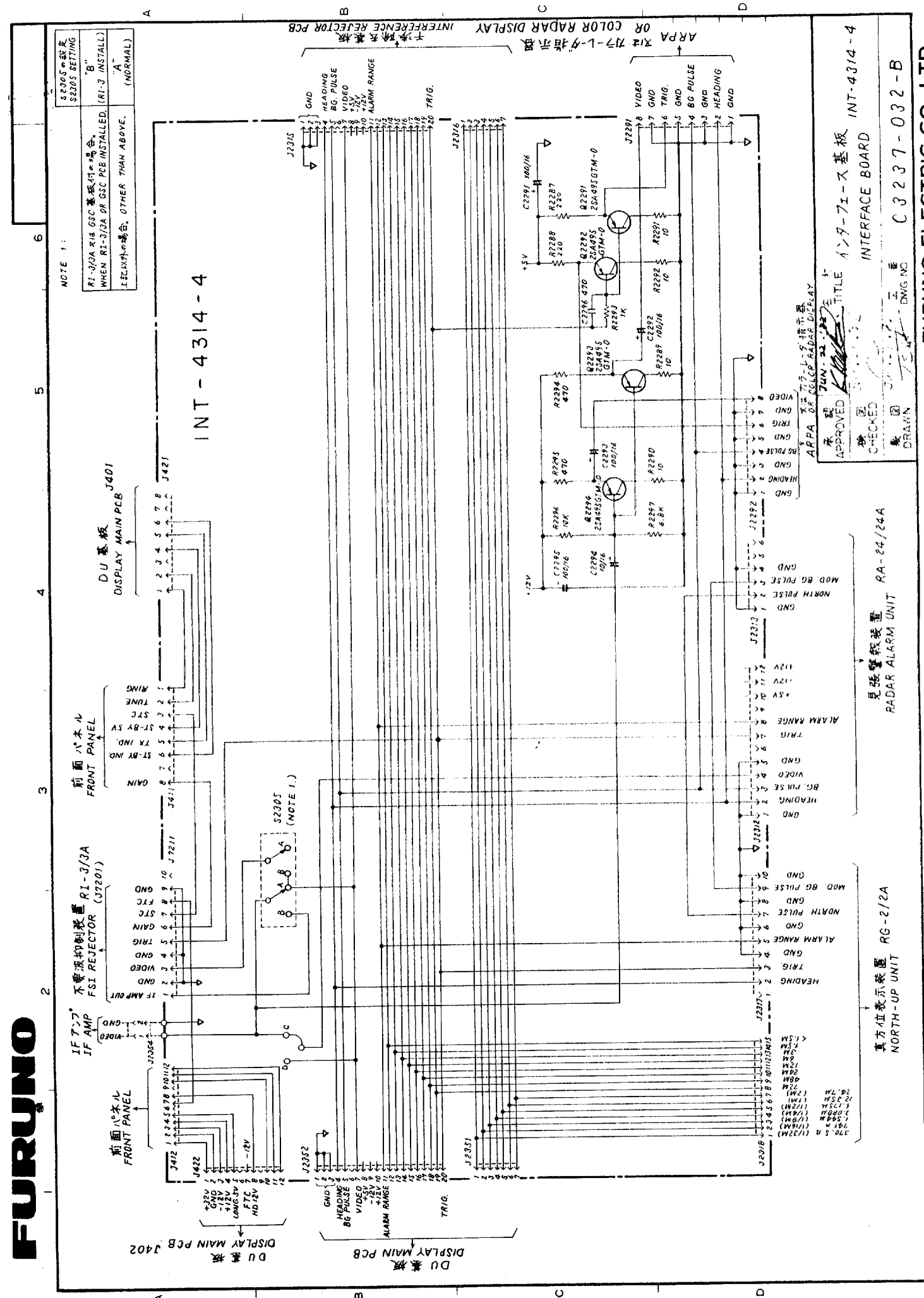


RADAR ALARM INSIDE VIEW



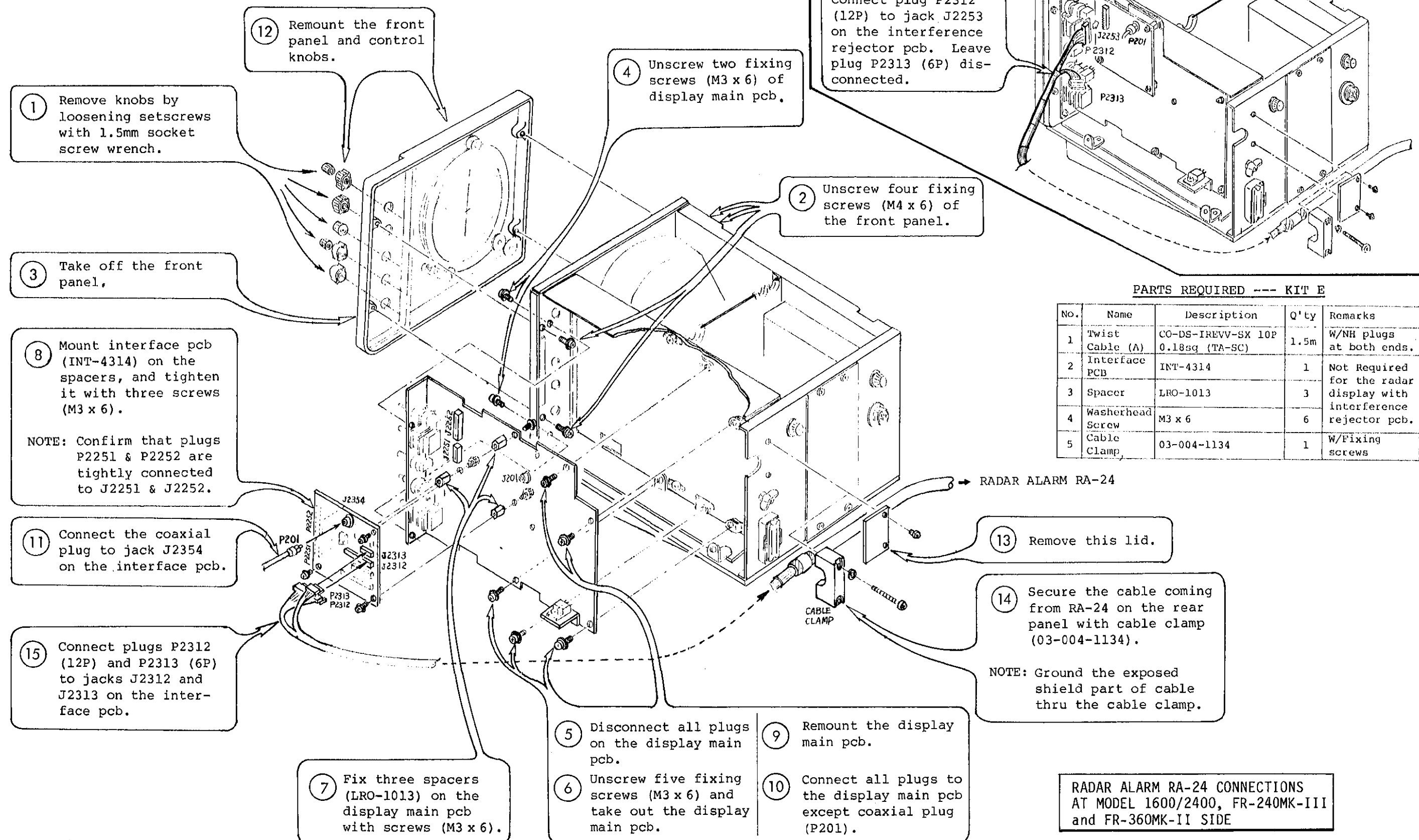
NOTE CUT JUMPER WIRE WHEN CONNECTED TO
FRJ-100/W, FRL-100, FRI-85

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	見張警報装置回路図 RA-24	図番 DWG.NO.	C3014-006-B
検図 CHECKED	尺度 SCALE	重量 WEIGHT	kg		
製図 DRAWN					



Connections to Radar
Display without
Interference Rejector

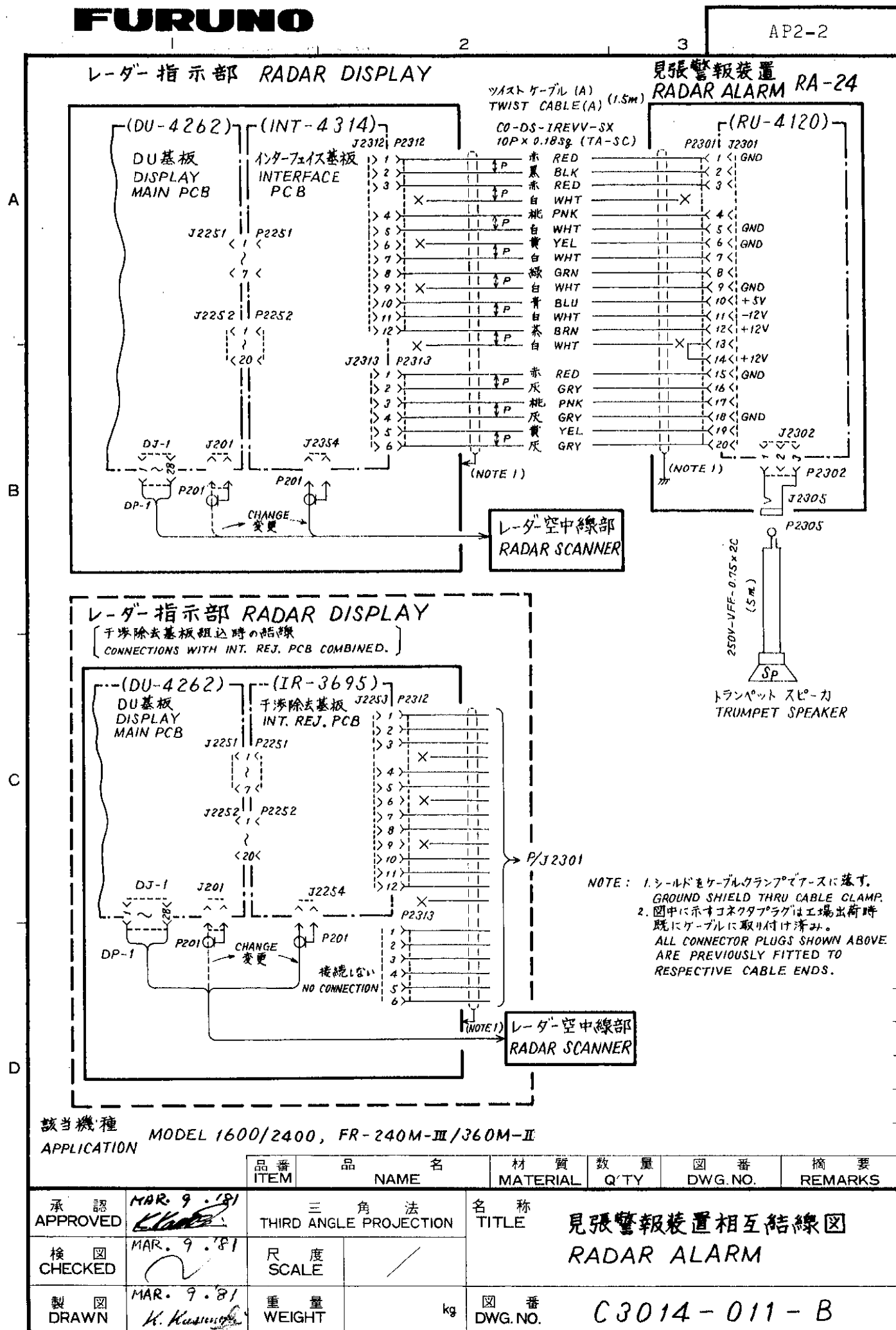
Connections to Radar
Display with
Interference Rejector
NOTE: Interface pcb
not required.



PARTS REQUIRED --- KIT E

No.	Name	Description	Q'ty	Remarks
1	Twist Cable (A)	CO-DS-IREVV-SX 10P 0.18sq (TA-SC)	1.5m	W/NH plugs at both ends.
2	Interface PCB	INT-4314	1	Not Required for the radar display with interference rejector pcb.
3	Spacer	LRO-1013	3	
4	Washerhead Screw	M3 x 6	6	
5	Cable Clamp	03-004-1134	1	W/Fixing screws

RADAR ALARM RA-24 CONNECTIONS
AT MODEL 1600/2400, FR-240MK-III
and FR-360MK-II SIDE

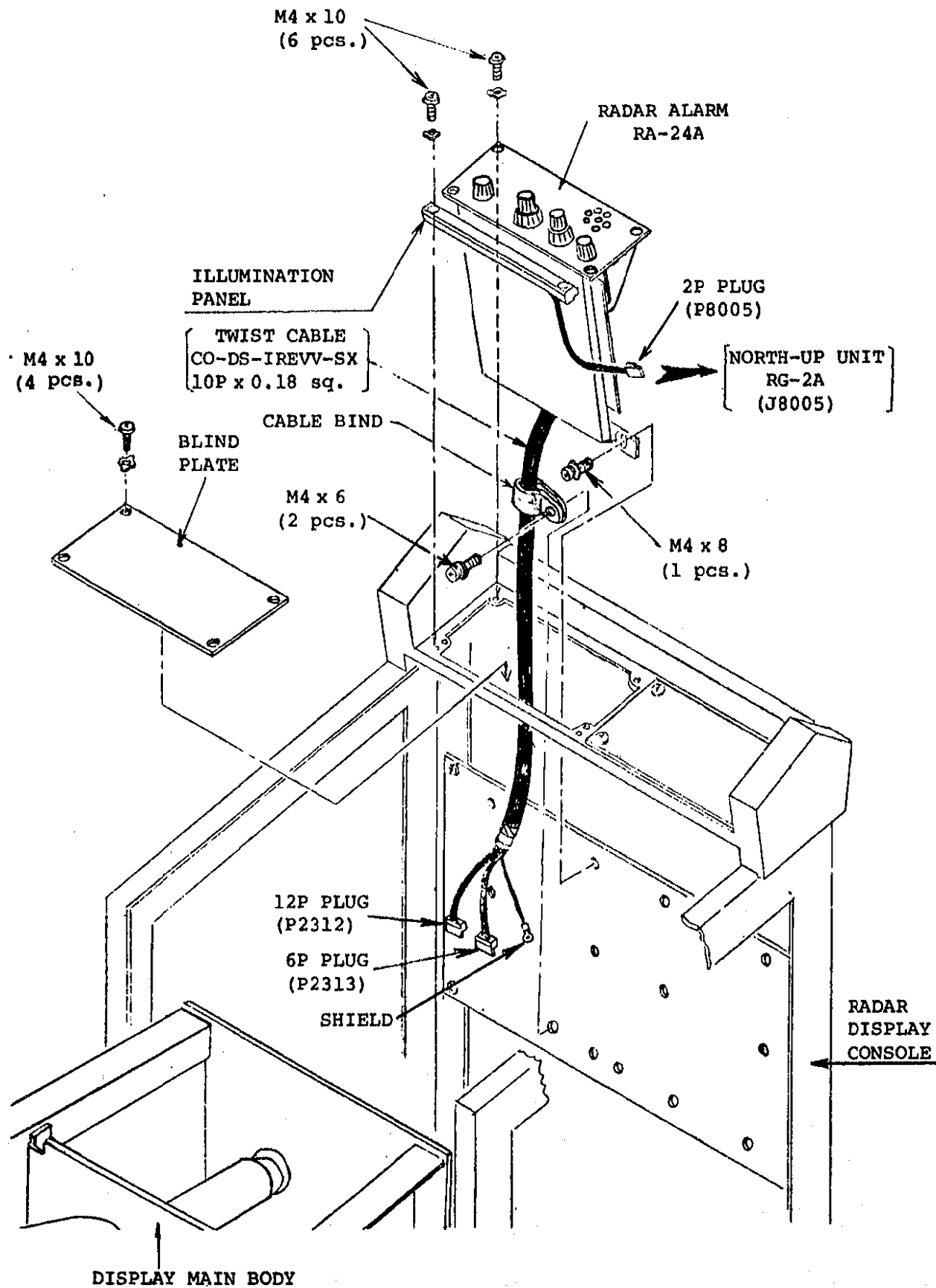


INSTALLATION INSTRUCTIONS OF RA-24A (BUILT-IN TYPE)

RA-24A is a built-in type radar alarm unit for FR-1012/1022 radars, and electrically equivalent to RA-24 (separate type) and different only in configuration from that. This appendix describes how to mount RA-24A in the radar display console and how to connect it to the radar display and external trumpet speaker in the field.

Mounting and Connecting Method

- 1) Prior to mounting the radar alarm unit, connect twist cable CO-DS-IREVV-SX 10P x 0.18sq. (TASC) to the unit as mentioned on page AP-17 of installation instructions of RA-24.
- 2) Take off the display front cover and swing down the display main body referring to operator's manual OM-E3243 for FR-1012 and OM-E3244 for FR-1022. (Chapter 1, Section 1-3.)
- 3) See the drawing on the next page. Take off the blind plate by loosening four screws M4 x 10.
- 4) Mount the radar alarm unit with cable in the console as shown in the drawing.
- 5) Mount the illumination panel with cable. If North-up unit RG-2A is previously mounted in the console, connect 2P plug P8005 of the illumination panel to jack J8005 of RG-2A. See operator's manual OM-E3017, page AP2-2, Fig.2 for RG-2/ RG-2A.
- 6) Secure the radar alarm unit and the illumination panel to the console chassis with six screws M4 x 10.
- 7) Fasten the cable to the console chassis with the cable bind.
- 8) Feed the cable of the external trumpet speaker in the display console, and connect it to the jack located on the bottom of the radar alarm unit.
- 9) Connect the other end of the cable to the display main body referring to "Connection to FR-701/711/721/1011/1021 Radars in Installation Instructions of RA-24" on page AP-1 thru AP-8.
- 10) Swing up the radar display main body and close the display front cover.



RA-24A RADAR ALARM MOUNTING

HOW TO COMBINE WITH CD-140/FCR SERIES RADARS

1. Necessary Parts

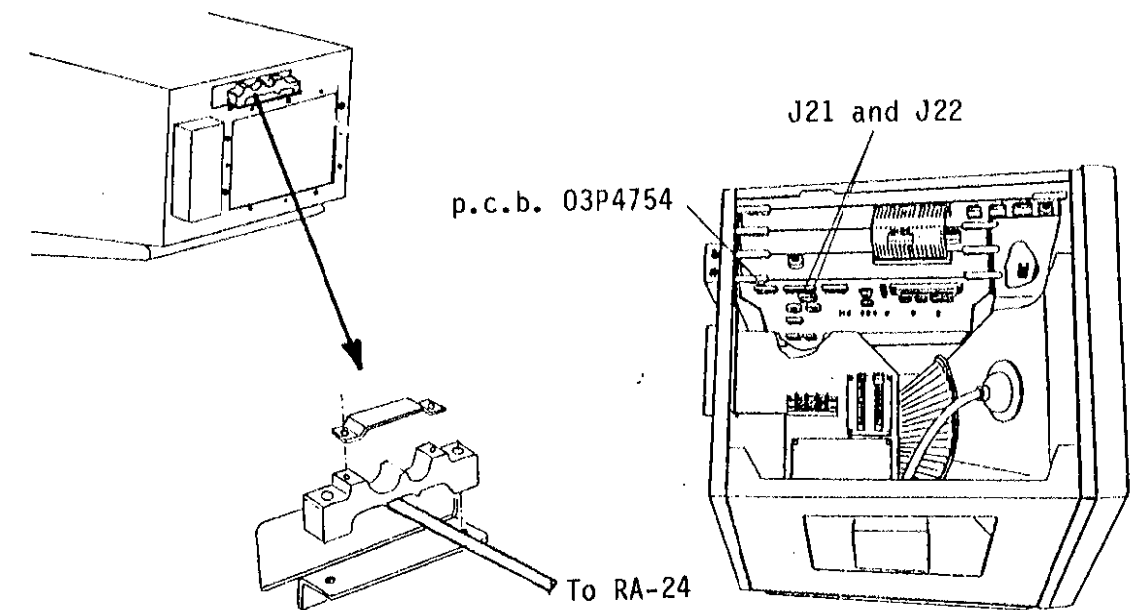
Use installation material Kit "A".

2. Modification and Connections

1) Connect a carbone resistor, 10k ohms, 1/4W to R2346(10k) in parallel on p.c.b. RU-4120 inside RA-24.

2) Make connection between CD-140 and RA-24, referring to next page.

Do not connect the trumpet speaker for CD-140, production around Nov. '82 and before.



3. Adjustment/Pre-setting of RA-24 after Installation

- 1) S2301 Left-hand (See page AP-20.)
- 2) S2302 Set Display Mode sw to "REL.B" on the front panel, and set S2302 at the side where CR2315 comes on.
- 3) VR2301 Adjust for $2.2 \pm 0.2V$ at TP1.
- 4) VR2302 Fully cw
- 5) CR2303 & VR2304 Refer to page AP-19.

Refer to page AP-20 for parts location.

A

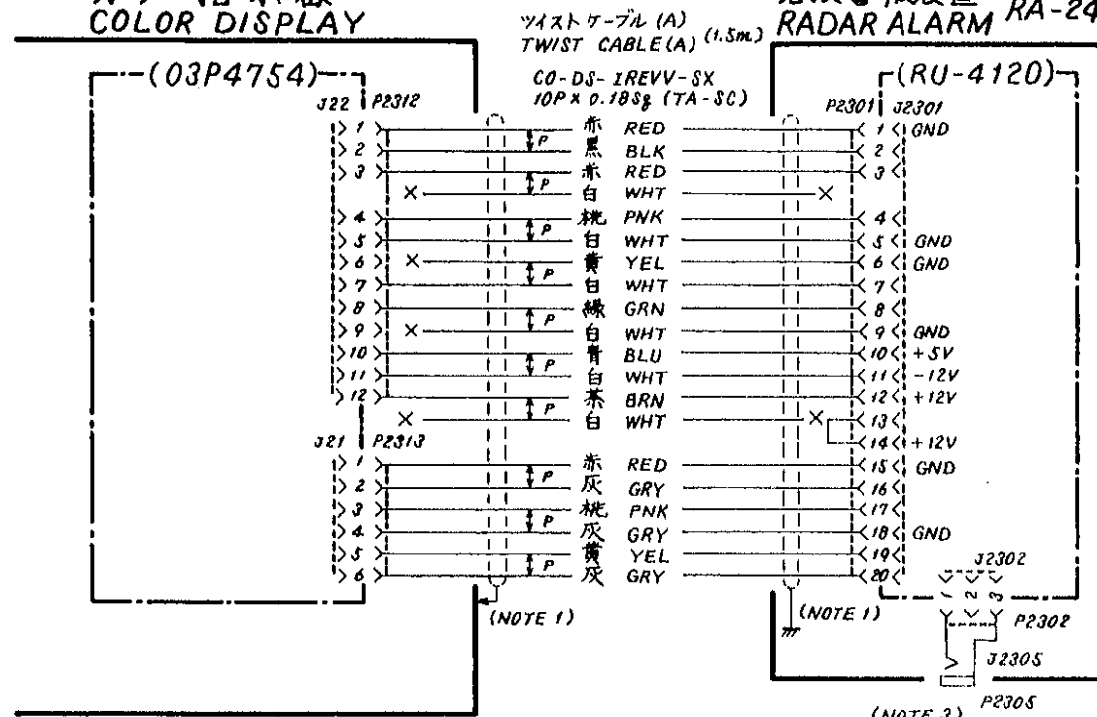
B

C

D

カラー指示器
COLOR DISPLAY

見張警報装置
RADAR ALARM RA-24



NOTE: 1. シールドケーブルクランプでアースに接す。
GROUND SHIELD THRU CABLE CLAMP.

2. 図中に示すコネクタプラグは工場出荷時
既にケーブルに取り付け済み。
ALL CONNECTOR PLUGS SHOWN ABOVE
ARE FACTORY-WIRED TO
RESPECTIVE CABLE ENDS.

3. スピーカーは接続しないこと。
DO NOT CONNECT SPEAKER.

(但し 1982年11月頃生産以前の CD-140)

該当機種: CD-140, FCR-1400 SERIES

承認 APPROVED	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
SEP-18-82 K	三角法 THIRD ANGLE PROJECTION	名称 TITLE				
検査 CHECKED	SEP-18-82	尺度 SCALE				
製図 DRAWN	SEP-18-82	重量 WEIGHT	kg		図番 DWG.NO.	
					C3014-014-A	

FURUNO ELECTRIC CO., LTD.

HOW TO COMBINE WITH FR-1222/1223/1222X/1252X/1262S/
FR-1622/1623/1622X/1652X/1662S

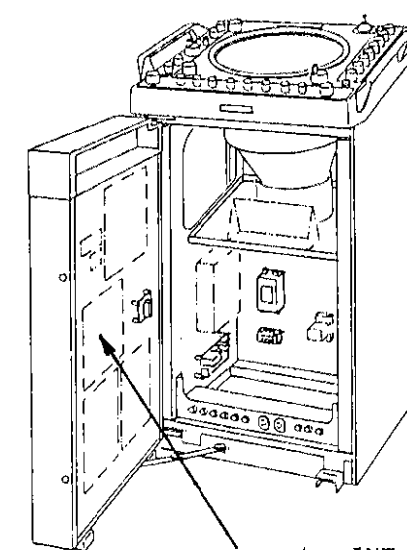
1. Connection

Make connection between the above radar and RA-24, using the supplied twisted cable. Refer to connection diagram of next page.

2. Adjustment/Pre-setting of RA-24 after Installation

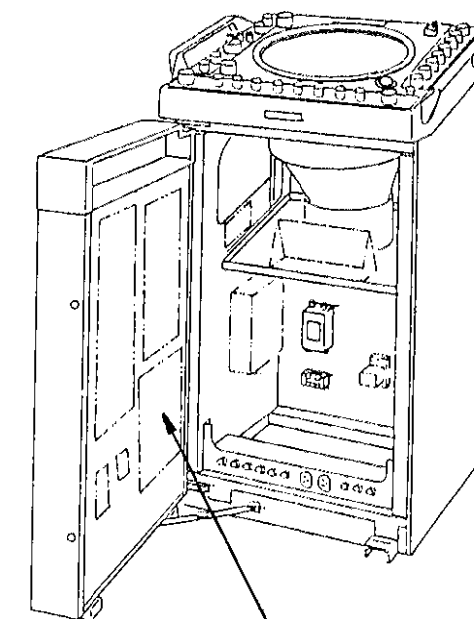
- 1) S2301..... Left-hand (See page AP-20.)
- 2) S2302..... Set Display Mode sw to "REL.B" on the front panel,
and set S2302 at the side where CR2315 comes on.
- 3) VR2301..... Adjust for 2.2±0.2V at TP1.
- 4) VR2302..... Fully cw
- 5) VR2303 & VR2304..... Refer to page AP-19.

Refer to page AP-20 for parts location.



p.c.b. INT-5143

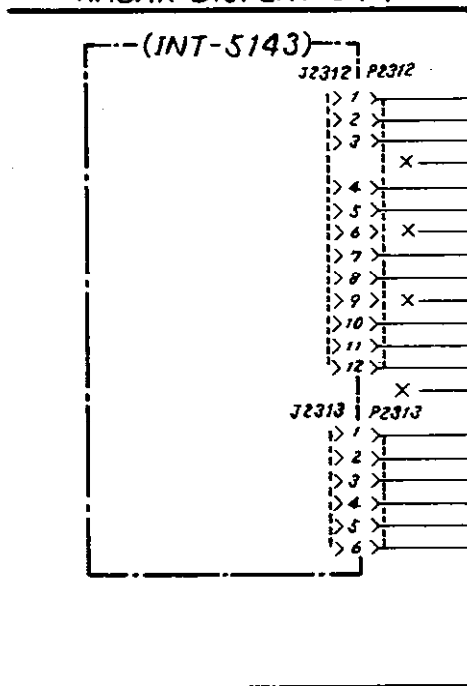
FR-1222/1223/1222X/1252X/1262S



p.c.b. INT-5143

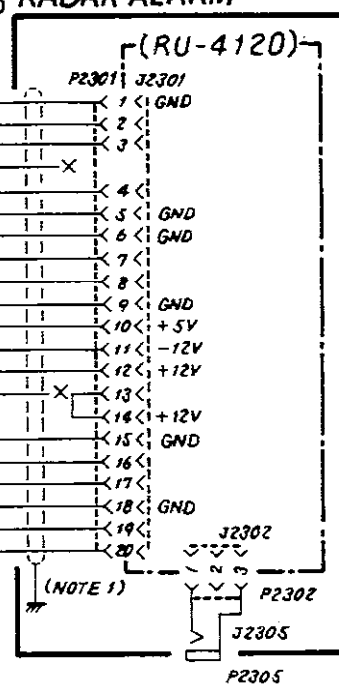
FR-1622/1623/1622X/1652X/1662S

レーダー指示部 RADAR DISPLAY UNIT



ツイストケ-ブル (A)
TWIST CABLE (A) (1.5mm)
CO-DS-IREVV-SX
10P X 0.18S (TA-3C)

見張警報装置 RA-24



NOTE: 1. シールドモ-ケーブルクランプでア-スに繋す。
GROUND SHIELD THRU CABLE CLAMP.

2. 図中に示すコネクタプラグは工場出荷時既にケーブルに取り付け済み。
ALL CONNECTOR PLUGS SHOWN ABOVE ARE FACTORY-WIRED TO RESPECTIVE CABLE ENDS.

該機種種: FR-1222/1223/1222X/1262S/1622/1623/1622X/1662S

APPLICATION

品番
ITEM

品名
NAME

材質
MATERIAL

数量
Q'TY

図番
DWG.NO.

摘要
REMARKS

承認
APPROVED

SEP. 18. 82

三角法
THIRD ANGLE PROJECTION

名称
TITLE

RA-24

見張警報装置相互結線図

検図
CHECKED

SEP. 18. 82

尺度
SCALE

RADAR ALARM

製図
DRAWN

SEP. 16. 82

重量
WEIGHT

kg

図番
DWG.NO.

C3014-015-A