

FURUNO

OPERATOR'S MANUAL

RADAR INTERSWITCH UNIT

MODEL **RJ-8**

CONTENTS

OVERVIEW ······	P 1
OPERATION ······	P 3
INSTALLATION ······	P 3
ADJUSTMENT ······	P 4



FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

©FURUNO ELECTRIC CO., LTD.

9-52, Ashihara-cho,
Nishinomiya, Japan 662

Telephone: 0798-65-2111
Telefax: 0798-65-4200

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(TATA)

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RJ-8

-Your Local Agent/Dealer

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SAFETY INSTRUCTIONS

Safety Instructions for the Installer

WARNING



Do not work inside the equipment unless totally familiar with electrical circuits.

Hazardous voltage which can cause electrical shock, burn or serious injury exists inside the equipment.

CAUTION

Use the correct cable (supplied with the equipment.)

Use of wrong cables can cause fire or equipment.

Use the correct fuse.

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

Safety Instructions for the Operator

WARNING



Do not open the equipment.

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

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

CAUTION

Use the proper fuse.

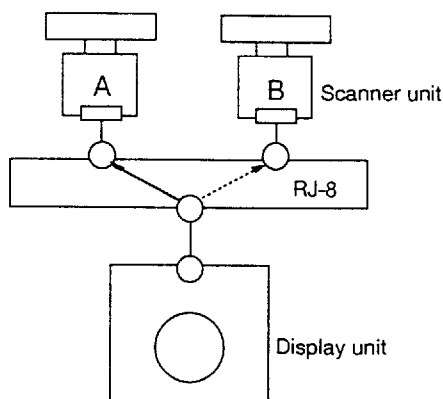
Use of a wrong fuse can result in fire or permanent equipment damage.

OVERVIEW

The Radar Interswitch Unit RJ-8 enables connection of two scanner units to a radar display unit. The RJ-8's compact size allows installation on small bridges, permitting small boats to have a spare scanner units.

The RJ-8 can accept the following combinations of scanner unit;

- (1) X-band and S-band
- (2) Scanner units installed fore and aft
- (3) Scanner units with different specifications such as output power, beamwidth, etc.



Radar to be connected: FR-2100 series

Maximum cable length: 15m
(between RJ-8 and display)

Environmental Conditions:

Ambient temperature: -15°C to 55°C

Humidity: 93% at 40°C

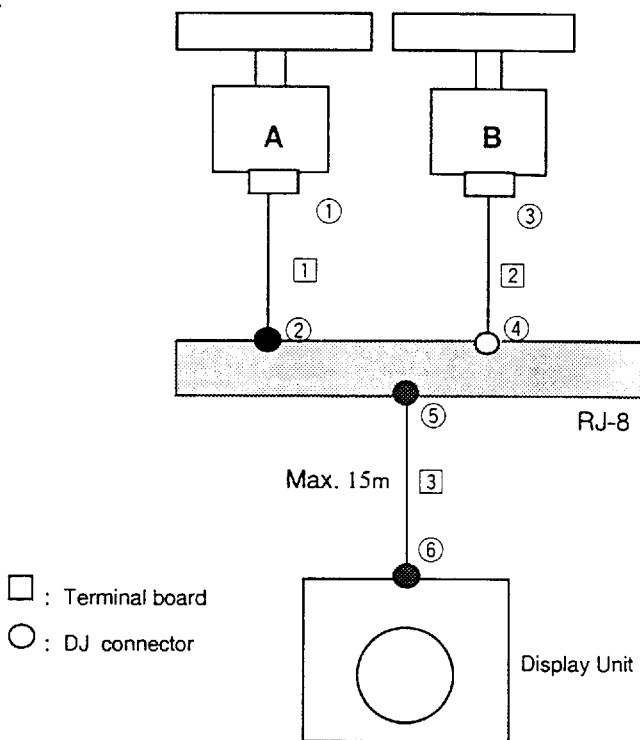
How to order installation materials

For example, connecting RJ-8 and Scanner Unit B to the radar system (Scanner Unit A) requires the following installation materials.

- (1) Cable ① and Connectors ①②:
Supplied as installation materials for the Scanner Unit A.
- (2) Cable ② and Connectors ③④:
Supplied with the Scanner Unit B or optionally.

- (3) Cable ③ :
A section of cable ① or ②, or 15m optional cable with a factory-wired connector.

- (4) Connectors ⑤⑥ :
Supplied as installation material for the RJ-8.



Complete set

Name	Type	Code no.
Interswitch	RJ-8	000-085-875
Spare parts (0.5A fuse)	SP03-11000	000-085-876
Installation materials	CP03-14100	000-085-817

* Installation materials CP03-14100 consist of CP03-14110 (for display unit) and CP03-14120 (for RJ-8).

□ INSTALLATION MATERIALS

FURUKAWA		CODE NO	008-454-110	03ER-X-9401
		TYPE	CP03-14110	
工 事 材 料 表 INSTALLATION MATERIALS		RJ-8	レ ー ダ ー 切 換 器 RADAR INTERSWITCH	
品 名	品 名	規 格	数 量	備 考
品 名	品 名	規 格	数 量	備 考
品 名	品 名	規 格	数 量	備 考
1 NH CONNECTOR ASSY.	NH3222 *E77*1*	AWG24 *0.1M* NH3222127	5	
2 NH CONNECTOR ASSY.	NH3222 *E77*1*	AWG20 *0.1M* NH3222127	10	
3 CONNECTOR	コネクタ	57D-M328PR-D8	1	
4 NH CONNECTOR HOUSING	NH3222127 *コネクタ*	H4P-SHF-AA	1	
5 VH CONNECTOR HOUSING	VH3222127 *コネクタ*	VHR-3N	2	
6 CONNECTOR	コネクタ	CN-7042 7*52* 20 BLK	1	
7 CRIMP-ON LUG	圧着端子	FV1.25-M3 7h RED	9	

図 番 (1/1)
DWG. NO. C3094-M01-A

FURUNO ELECTRIC CO., LTD

FURUKAWA		CODE NO	008-454-120	03ER-X-9402
		TYPE	CP03-14120	
工 事 材 料 表 INSTALLATION MATERIALS		RJ-8	レ ー ダ ー 切 換 器 RADAR INTERSWITCH	
品 名	品 名	規 格	数 量	備 考
品 名	品 名	規 格	数 量	備 考
品 名	品 名	規 格	数 量	備 考
1 NH CONNECTOR ASSY.	NH3222 *E77*1*	AWG24 *0.1M* NH3222127	5	
2 NH CONNECTOR ASSY.	NH3222 *E77*1*	AWG20 *0.1M* NH3222127	10	
3 CONNECTOR	コネクタ	57D-M328PR-D8	1	
4 CONNECTOR HOUSING	コネクタ	4 pin	1	
5 VH CONNECTOR HOUSING	VH3222127 *コネクタ*	VHR-3N	1	
6 VH CONNECTOR HOUSING	VH3222127 *コネクタ*	VHR-4N	1	
7 CONNECTOR	コネクタ	CN-7042 7*52* 20 BLK	1	
8 CRIMP-ON LUG	圧着端子	FV1.25-M3 7h RED	7	
9 CRIMP-ON LUG	圧着端子	FV5.5-4 * YEL	2	

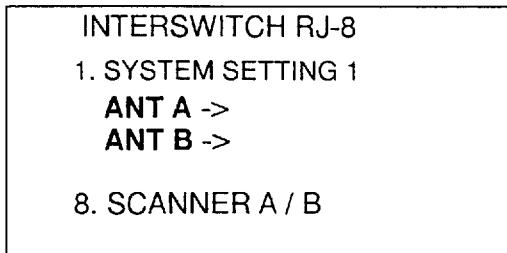
図 番 (1/1)
DWG. NO. C3094-M02-A

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OPERATION

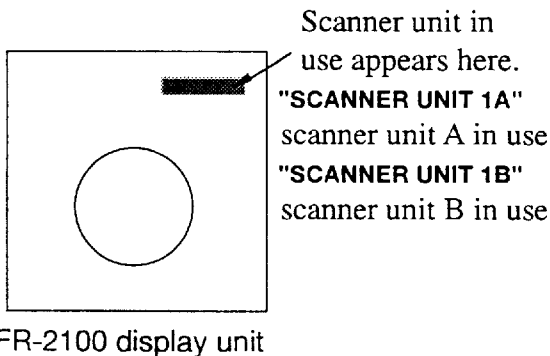
A scanner unit can be selected through the radar menu as shown below.

- 1) Press the **RADAR MENU**, **0** and **7** to open the [INTERSWITCH RJ-8] menu.



- 2) Press the **8** to select the scanner A or B.
- 3) Press the **ENTER**.

Allow about 3 minutes for radar warm-up.



- 4) Press the **RADAR MENU** to close the menu.

INSTALLATION

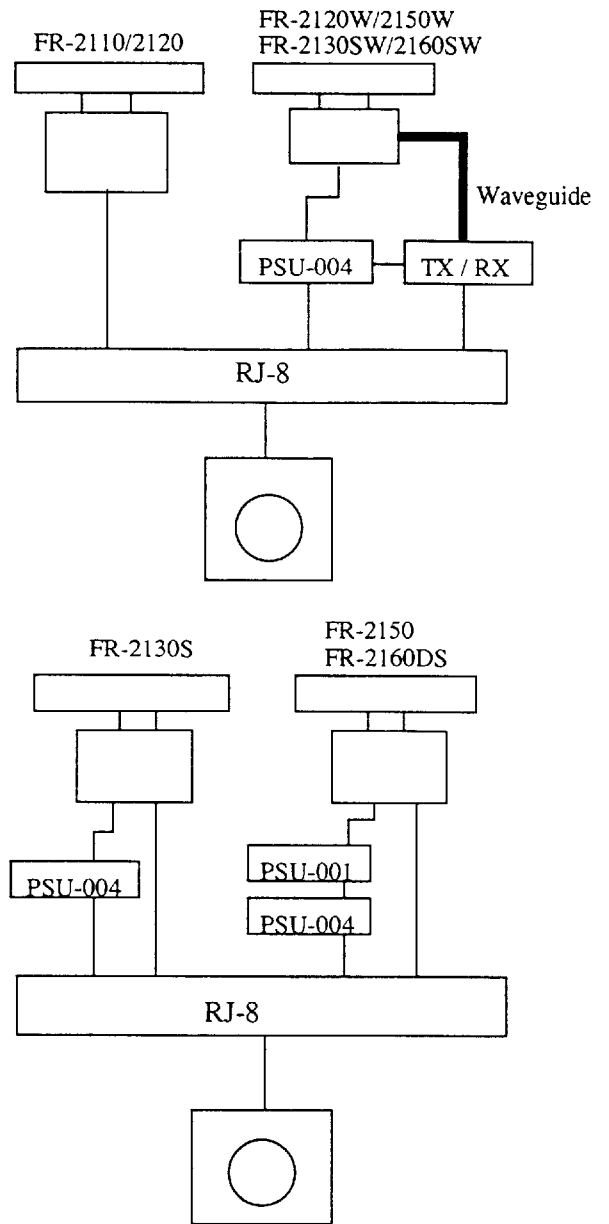
Mounting

The console type display unit of the FR-2100 series radar can accommodate the RJ-8 (or RJ-7) by four M5 threaded holes in the rear panel.

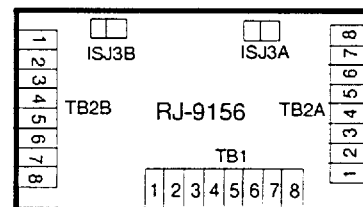
For the tabletop type display unit, the RJ-8 may be installed at any convenient location, considering lengths of interconnection cables.

Connection

Refer to the interconnection diagram at the back of this manual.



The terminal boards on the RJ-9156 is numbered as below.



Location of Terminal Board on the RJ-9145 board

ADJUSTMENT

Selection of scanner unit specifications

- 1) Set the radar to "ST-BY".
- 2) Press the **RADAR MENU, 0, 0, 2, 0, 0** and **0** to open the [INITIAL SETTING 5] menu.

[INITIAL SETTING 5]	
1	[INITIAL SETTING 4]
6	RJ-8 OFF / ON
	ANT A FR-2110/2120/ OTHER X-BAND/S-BND
	ANT B FR-2110/2120/ OTHER X-BAND/S-BND
9	CABLE L. 500/5000 (M)
0	FACTORY SETTING

- 3) Press the **6** to turn "ON" the RJ-8.
- 4) Press the **ENTER**.
- 5) Press the **6** several times to select the specification for Scanner Unit A.

Selection	Specification
FR-2110, 2120	X-Band 10kW, TR up X-Band 25kW, TR up
Other X-Band	
FR-2120W	X-Band 25kW, TR down
FR-2150	X-Band 50kW, TR up
FR-2150W	X-Band 50kW, TR down
S-Band	
FR-2130S	S-Band 30kW, TR up
FR-2130SW	S-Band 30kW, TR down
FR-2160SW	S-Band 60kW, TR down
FR-2160DS	S-Band 60kW, TR up

- 6) Press the **ENTER**.
- 7) Press the **6** several times to select the specification for Scanner Unit B.
(Same operation as step 5.)
- 8) Press the **ENTER**.
- 9) Press the **RADAR MENU** to close the menu.
- 10) Turn off the radar to save the setting to the memory.

Initial setting of Scanner Unit A

- 1) Press the **RADAR MENU, 0** and **7** to display the [INTERSWITCH RJ-8] menu.

[INTERSWITCH RJ-8]	
1.	SYSTEM SETTING 1
	ANT A ->
	ANT B ->
8.	SCANNER A / B

- 2) Press the **8** to select "Scanner Unit A".
- 3) Press the **ENTER**.

Setting antenna height

- 4) Press the **RADAR MENU, 0** and **2** to open the [INTERSWITCH RJ-8] menu .
- 5) Enter antenna height of Scanner Unit A.
- 6) Press the **ENTER**.

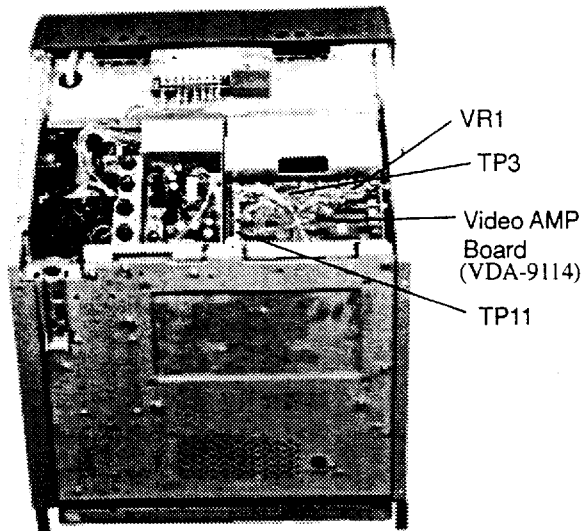
Video amplifier level adjustment

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) Transmit the radar on the 12 mile range.
- 2) Measure video amplifier input level on the VIDEO AMP Board (VDA-9114) in the display unit as directed in the table which follows.

Check point	TP3 on VDA-9114 (take trigger at TP11)
Rating	4.2 Vpp (strong signal)
Measureing condition	Turn off A/C SEA, A/C RAIN, and INTERFERENCE REJECTION
Adjustment pot	VR1 (LEVEL)



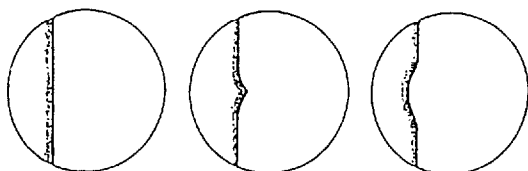
N Photo No.3127

Display unit, top view, cover removed

Sweep timing adjustment

Sweep timing differs with respect to the length of the signal cable between the scanner 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 0.25 mile range will appear on the display as being pulled inward or pushed outward.
- The range of target echoes will also be incorrectly shown.



(1) Correct (2) Target pulled inward. (3) Target pushed outward.

Example of correct and incorrect sweep timings

Procedure

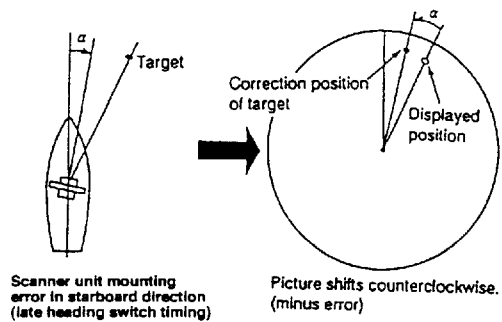
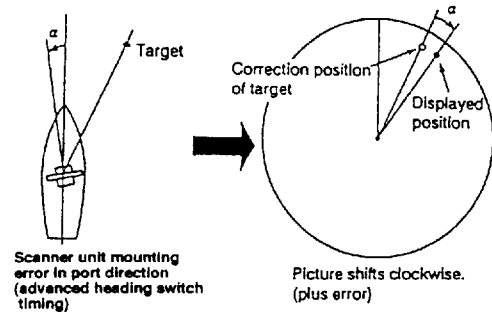
- 1) Open the INITIAL SETTING 1 menu and select "3. TIMING ADJ".
- 2) Transmit on the 0.25 mile range.
- 3) Adjust radar controls to display picture properly.
- 4) Select an echo which should be displayed straightly. Adjust the VRM rotary control to straighten target echo.

NOTE : The readout which changes with VRM rotary control operation is unrelated to this adjustment. Please disregard it.

5) Press the **ENTER**.

Heading adjustment

Scanner unit mounting error (heading reed switch timing error) can be compensated at the display unit.



Procedure

- 1) Open the INITIAL SETTING 1 menu and select "2. HD ALIGN".
- 2) Operate the EBL rotary control to shift target echo to correct position.
- 3) Press the **ENTER**.

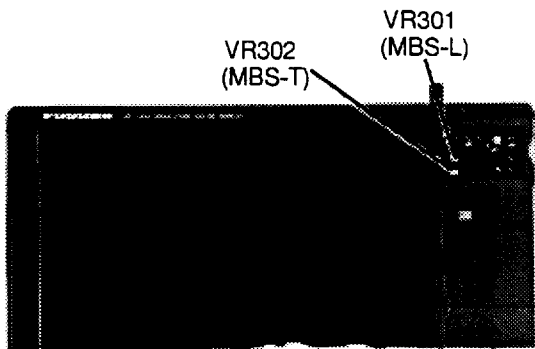
Main bang suppression

If main bang appears at the screen center, suppress it as follows, to prevent erasure of targets in close range.

Procedure

- 1) Transmit the radar on a long range and then wait ten minutes. Then, adjust sensitivity to show a slight amount of noise on the display.
- 2) Select the 0.25 mile range. Adjust the **A/C SEA** control to suppress sea clutter.
- 3) Open the top right-hand panel on the display unit. Turn VR301 (MBS-L) fully counterclockwise and VR302 (MBS-T) fully clockwise. See the next page.

- 4) Slowly turn VR301 until main bang is just visible.
- 5) Slowly turn VR302 so that main bang just disappears.
- 6) Adjust VR301 and VR302 so that target echoes about 30 meters apart are clearly displayed.



N Photo No.3124

FR-2100 Series Display Unit

Initial Setting of Scanner Unit B

- 1) Press the **RADAR MENU, 0** and **7** to display the [INTERSWITCH RJ-8] menu .
- 2) Press the **8** to select the "SCANNER UNIT B".
- 3) Press the **ENTER**.

Setting antenna height

- 4) Press the **RADAR MENU, 0** and **2** to open the [INITIAL SETTING 1] menu.
- 5) Input antenna height of Scanner Unit B.
- 6) Press the **ENTER**.

Video amplifier level adjustment

Same as Scanner Unit A.

Check point	TP3 on VDA-9114 (take trigger at TP11)
Rating	4.2 Vpp (strong signal)
Adjustment pot	VR3 on RJ-9156 inside of RJ-8

Sweep timing adjustment

Same as Scanner Unit A

Heading adjustment

Same as Scanner Unit A.

Main bang Suppression

Procedure

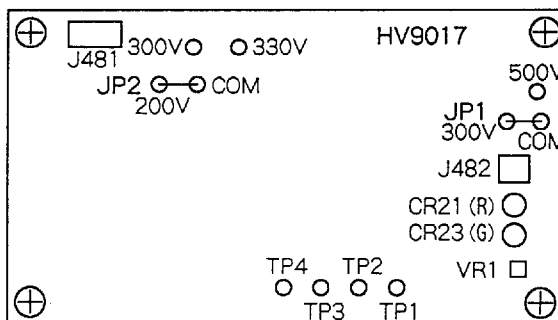
- 1) Transmit the radar on a long range and then wait ten minutes. Then, adjust sensitivity so a slight amount of noise appears on the display.
- 2) Select the 0.25 mile range. adjust the **A/C SEA** control to suppress sea clutter.
- 3) On P. C. Board RJ-9156 in the RJ-8, turn VR1 (MBS-L) fully counterclockwise VR2(MBS-T) fully clockwise.
- 4) Slowly turn VR1 until main bang is just visible.
- 5) Slowly turn VR2 so that main bang just disappears.
- 6) Adjust VR1 and VR2 so that target echoes about 30 meters apart are clearly displayed.

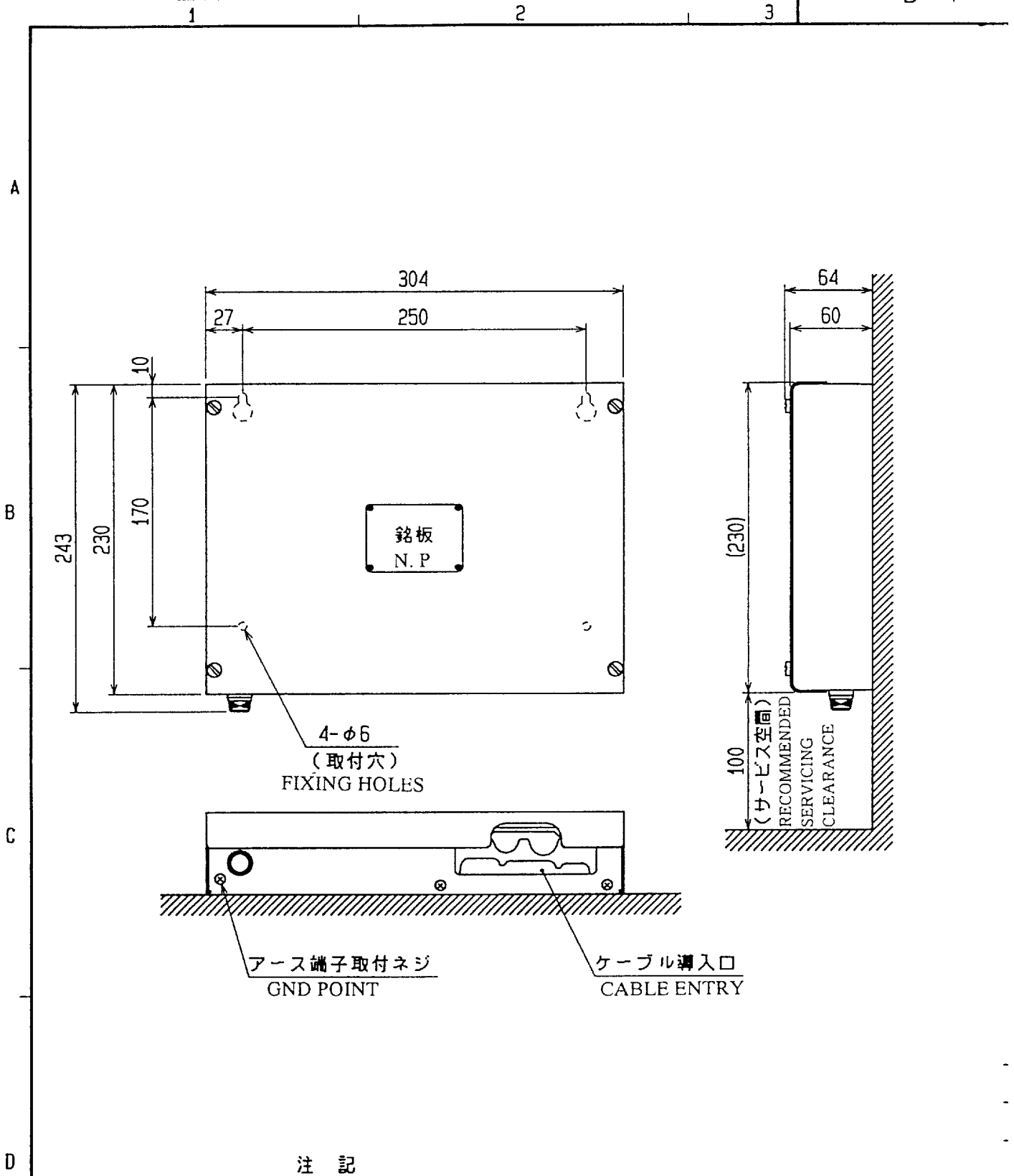
Changing Jumper on HV Board

When using the scanner unit of the following models as scanner "B", change the jumper wire on the HV-9017 Board as below.

FR/FAR-2815	HV-9017	A
FR/FAR-2825	HV-9017	B
FR/FAR-2835S	HV-9017	E

Board	JP-1	JP-2	Model
HV-9017 A	300V	330V	FR/FAR-2815 (10kW TR-Up)
HV-9017 B	500V	330V	FR/FAR-2825 (25kW TR-Up)
HV-9017 E	500V	300V	FR/FAR-2835S (30kW TR-Up)





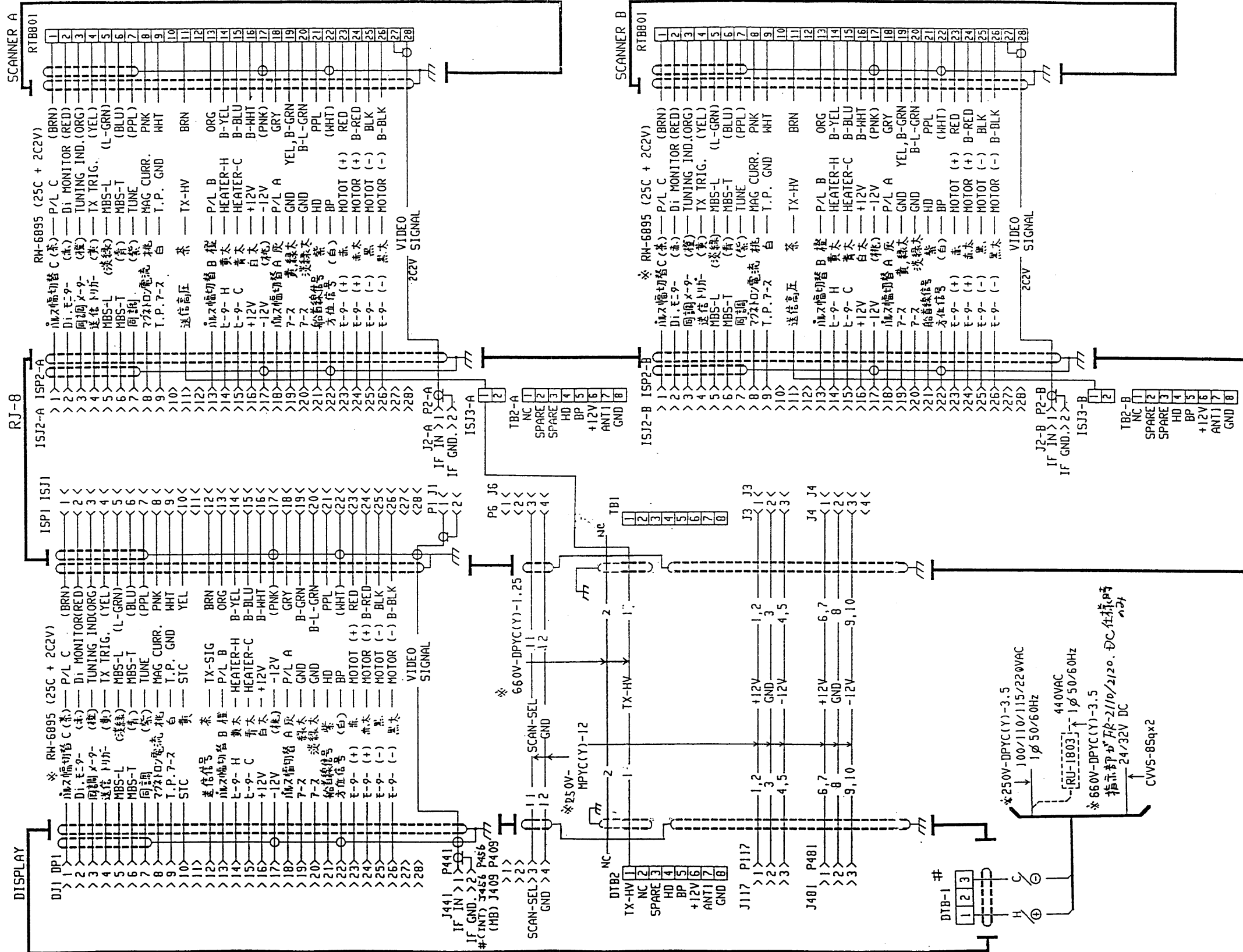
注 記

取付ネジはトラスタップピンネジ呼び径5X20を使用のこと

NOTE: Use φ5x20 tapping screws to fix the unit.

REMARKS			TYPE	
			RJ-8	
			名称 インタースイッチ	
DRAWN K.M	APPROVED <i>Feb. 10 '95</i> IKEDA	RJ-8	NAME INTERSWITCH	
SCALE 1/4	MASS 2 kg	APPLICABLE TO: (MODEL)	BLOCK NO.	DWG NO. C3094-G01- A

空中線部 A 空中線部 B
 SCANNER A SCANNER B
 FR-2110/2120 (FR-2110/2120)
 FR/FAR (FR/FAR)
 -2815/2825 -2815/2825



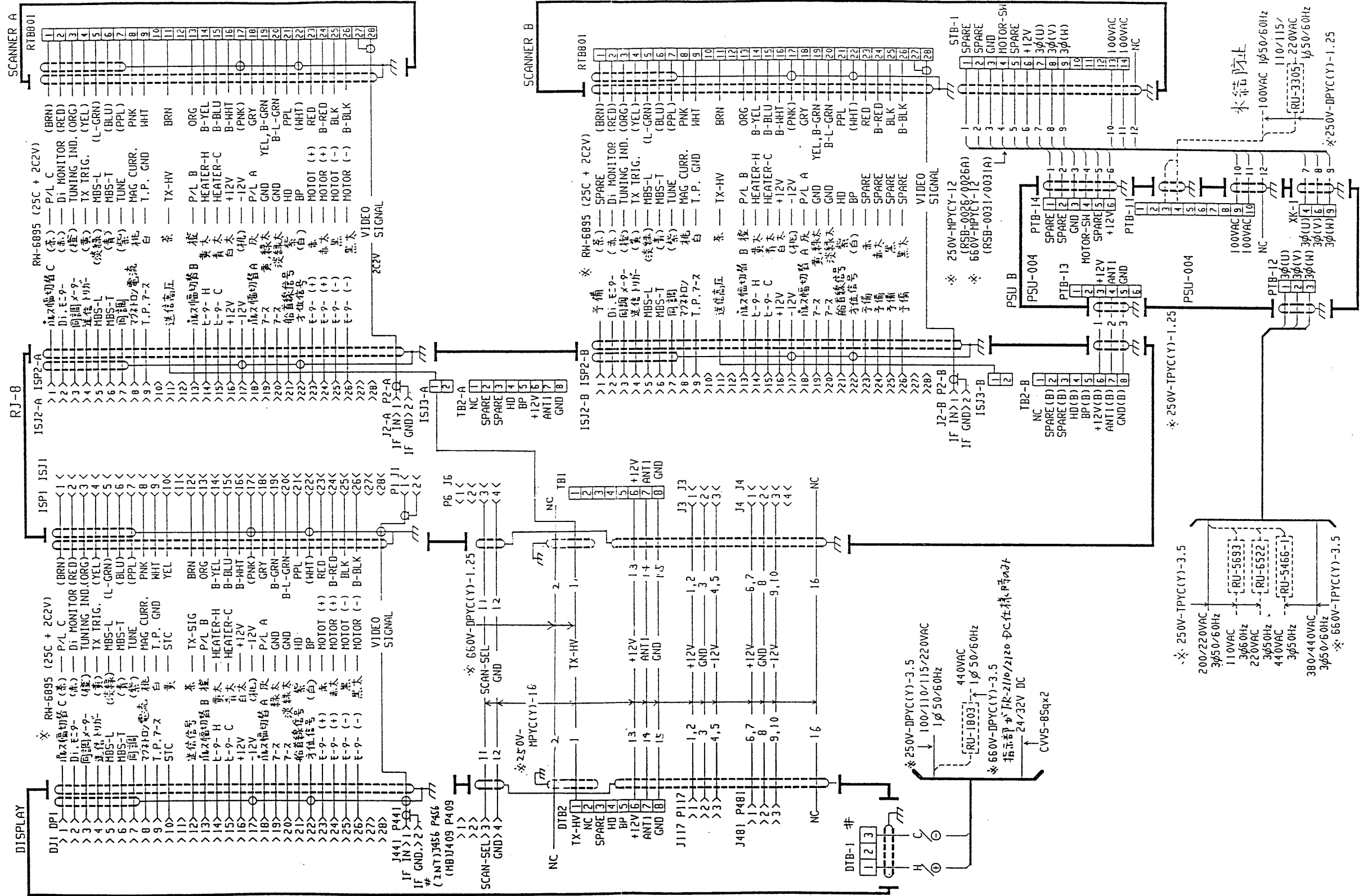
- NOTE) 1. WIRE COLOR CODE(): INSIDE WIRE
 B-: BIG WIRE, L-: LIGHT COLOR.
 2. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT END.
 3. ※ SHIPYARD SUPPLY.
 4. # on 2100 series CONNECT TO DTB-1 (DISPLAY)
 2805 series CONNECT TO FL-1 (DISPLAY)

- 注) 1. カラーコードで () は 内側シールド内の線を表す。
 2. シールドは、面ユニット側で完全にマースすること。
 3. ※ 造船所支給。
 4. # 指示部 DTB-1に接続

DRAWN MAY 7 '96 E. KISHIMA	SCANNER A FR2815	TYPE RJ-8
CHECKED MAY 7 '96 T. SAITO	SCANNER B FR2825	名称
APPROVED MAY 8 '96 K. OTA		相互結線図
SCALE MASS kg	APPLICABLE TO: (MODEL)	BLOCK NO. NAME
DWG NO. C3094-C01-A		INTERCONNECTION DIAGRAM

空中線部 A SCANNER A
FR-2110/2120 (FR-2130S)
FR/FAR
-2815/2825 (FR/FAR-2835S)

空中線部 B SCANNER B

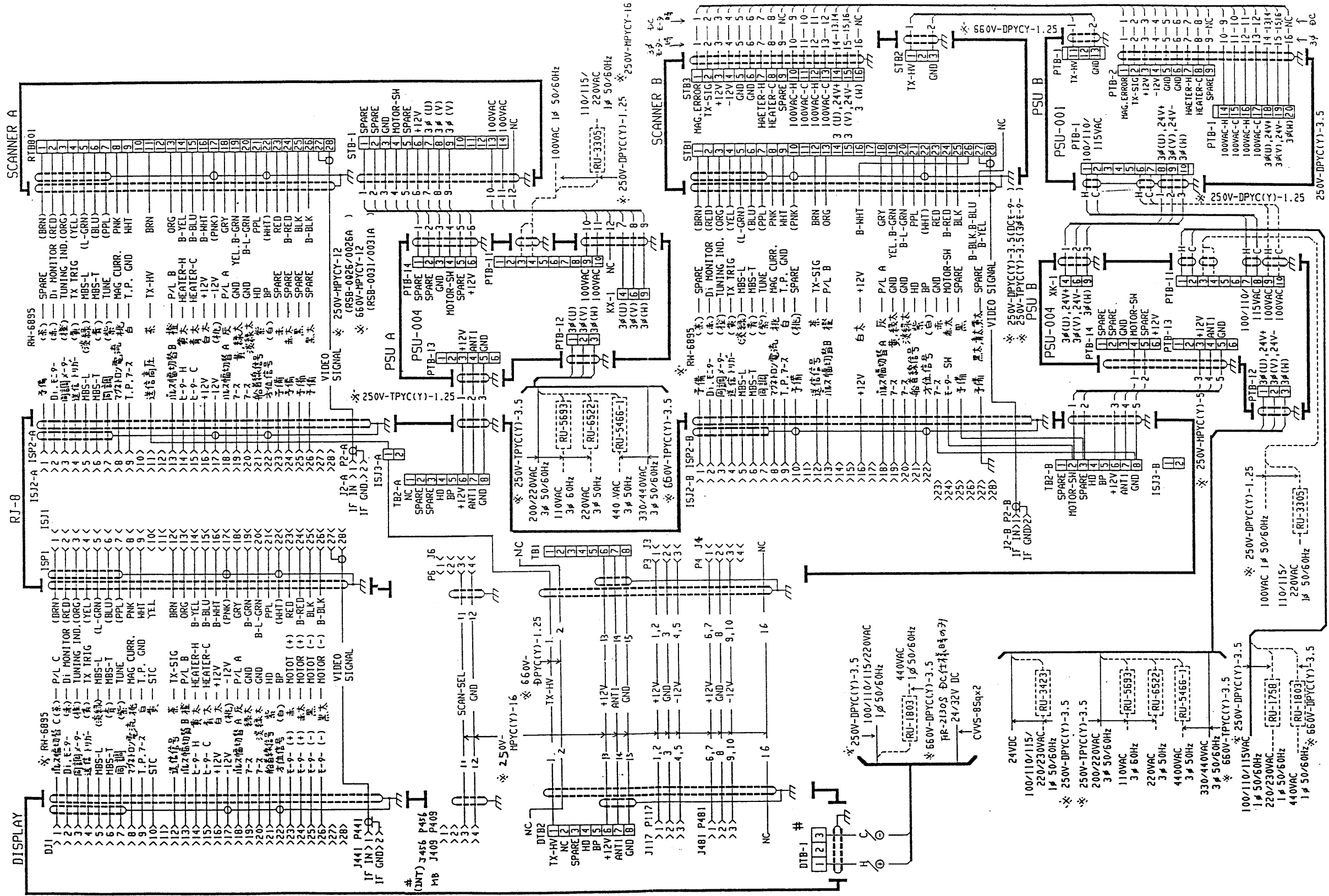


- NOTE) 1. WIRE COLOR CODE(): INSIDE WIRE
B-: BIG WIRE. L-: LIGHT COLOR.
2. SHIELD SHOULD BE EFFECTIVELY GROUNDING AT BOTH UNIT END.
3. * SHIPYARD SUPPLY.
4. # on 2100 series CONNECT TO DTB-1 (DISPLAY)
2805 series CONNECT TO FL-1 (DISPLAY)

- 注) 1. カラーコードで () は 内側シールド内の線を表す。
2. シールドは、画ユニット側で完全にマースすること。
3. * 造船所支給。
4. # 指示部 DTB-1 に接続

DRAWN MAY 7 '96 E. KISHIMOTO	SCANNER A	TYPE
CHECKED MAY 7 '96 T. SAITO	FR2815	RJ-8
APPROVED MAY 8 '96 K. OHTA	SCANNER B	名称
SCALE MASS	FR2835S	相互結線図
DWG NO. C3094-C02-A	FR2130S	NAME
	APPLICABLE TO: (MODEL)	BLOCK NO.
		INTERCONNECTION DIAGRAM

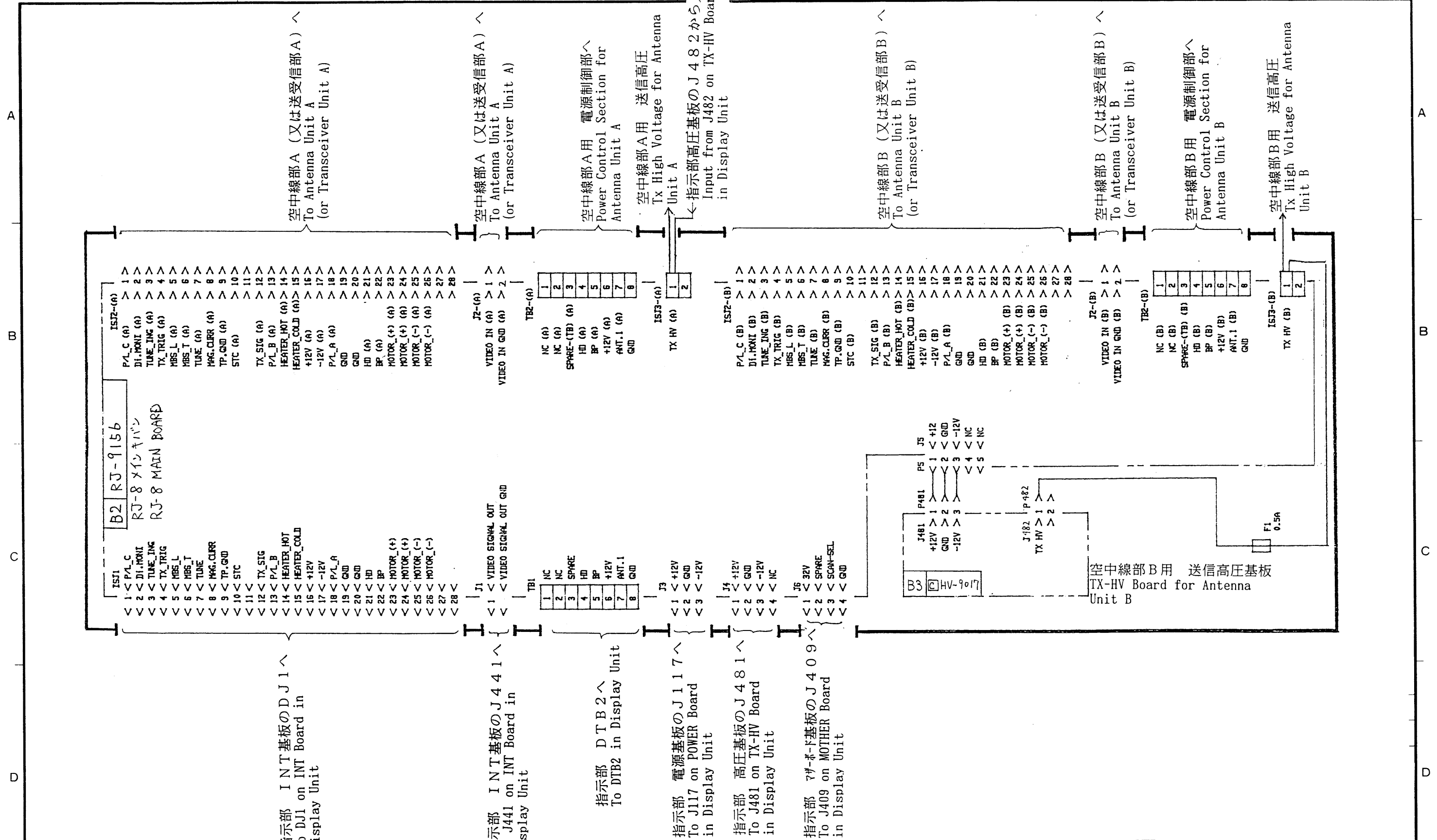
空中線部 A 空中線部 B
 SCANNER A SCANNER B
 FR-2130S — FR-2150
 FR/FAR-2835S — FR/FAR-2855



NOTE) 1. WIRE COLOR CODE(): INSIDE WIRE
 B-: BIG WIRE, L-: LIGHT COLOR.
 2. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT END.
 3. * SHIPYARD SUPPLY.
 4. & on 2100 series CONNECT TO DTB-1 (DISPLAY)
 2805 series CONNECT TO FL-1 (DISPLAY)

注) 1. カラーコードで () は内側シールド内の線を表す。
 2. シールドは、両ユニット側で完全にアースすること。
 3. * 造船所支給。
 4. & 指示部 DTB-1 に接続

DRAWN MAY 7 '96 E. KISHIMA CHECKED MAY 7 '96 T. SAITO APPROVED MAY 8 '96 K. OTA SCALE MASS kg DWG NO. C3094-C04- A	SCANNER A FR2835S SCANNER B FR2130S FR2855 FR2150 APPLICABLE TO: (MODEL)	TYPE RJ-8 名称 相互結線図 BLOCK NO. NAME
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指示部 INT基板のDJ1へ
To DJ1 on INT Board in
Display Unit

指示部 INT基板のJ441へ
To J441 on INT Board in
Display Unit

指示部 DTB2へ
To DTB2 in Display Unit

指示部 電源基板のJ117へ
To J117 on POWER Board
in Display Unit

指示部 高圧基板のJ481へ
To J481 on TX-HV Board
in Display Unit

指示部 マザーボード基板のJ409へ
To J409 on MOTHER Board
in Display Unit

空中線部B用 送信高圧基板
TX-HV Board for Antenna
Unit B

DRAWN MAY 7 '96 E. KISHIMOTO	TYPE RJ-8
CHECKED MAY 7 '96 T. SAITO	名称 RJ-8 総合回路図
APPROVED MAY 8 '96 K. OTA	回路図
SCALE / MASS kg	NAME RJ-8 GENERAL
DWG NO. C3094-K02-A	APPLICABLE TO: (MODEL)
	BLOCK NO.
	SCHMATIC DIAGRAM