FURUNO

OPERATOR'S MANUAL

SCANBEAM SOUNDER

MODEL FCV – 10

(Display Unit)

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NISHINOMIYA, JAPAN

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⚠ SAFETY INSTRUCTIONS

"**DANGER**", "**WARNING**" and "**CAUTION**" notices appear throughout this manual. It is the responsibility of the operator and 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 apotentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.

⚠ SAFETY INFORMATION FOR THE OPERATOR

⚠ WARNING

Do not open the cover of the equipment.

This equipment uses high voltage electricity which can shock, burn, or cause death. Only qualified personnel should work inside the equipment.

Do not dissasemble or modify the equipment.

Fire, electrical shock or serious injury can result.

Immediately turn off the power at the ship's mains switchboard if water or foreign object falls into the equipment or the equipment is emitting smoke or fire.

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

⚠ CAUTION

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

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

Do not place heater near the equipment.

Heat can melt the power cord, which can result in fire or electrical shock.

Do not operate the unit with wet hands.

Electrical shock can result.

Use the correct fuse.

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

(Continued on next page)

NOTICE

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

Use of the equipment as a chair or a shelf, for example, can cause equipment damage.

Immediately turn off the power whenever you feel the equipment is abnormal.

Continued use can cause equipment damage.

The useable temperature range is 0°C to 50°C.

Use out of the range can cause equipment damage.

Keep magnets and magnetic fields (speaker, transformer, etc.) away from the equipment.

Magnets and magnetic fields can cause equipment malfunction.

Do not place objects near the equipment.

Objects near the equipment can cause overheating.

Handle the equipment carefully.

Rough handling can cause corrosion.

Do not use chemical cleaners to clean the equipment.

Chemical cleaners can remove paint and markings.

⚠ SAFETY INFORMATION FOR THE INSTALLER

⚠ WARNING

Only qualified personnel should work inside the equipment.

This equipment uses high voltage electricity which can shock, burn, or cause death.

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

Serious injury or death can result if the power is not turned off, or is applied while the equipment is being installed.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Ungrounded equipment can give off or receive electromagnetic 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 equipment.

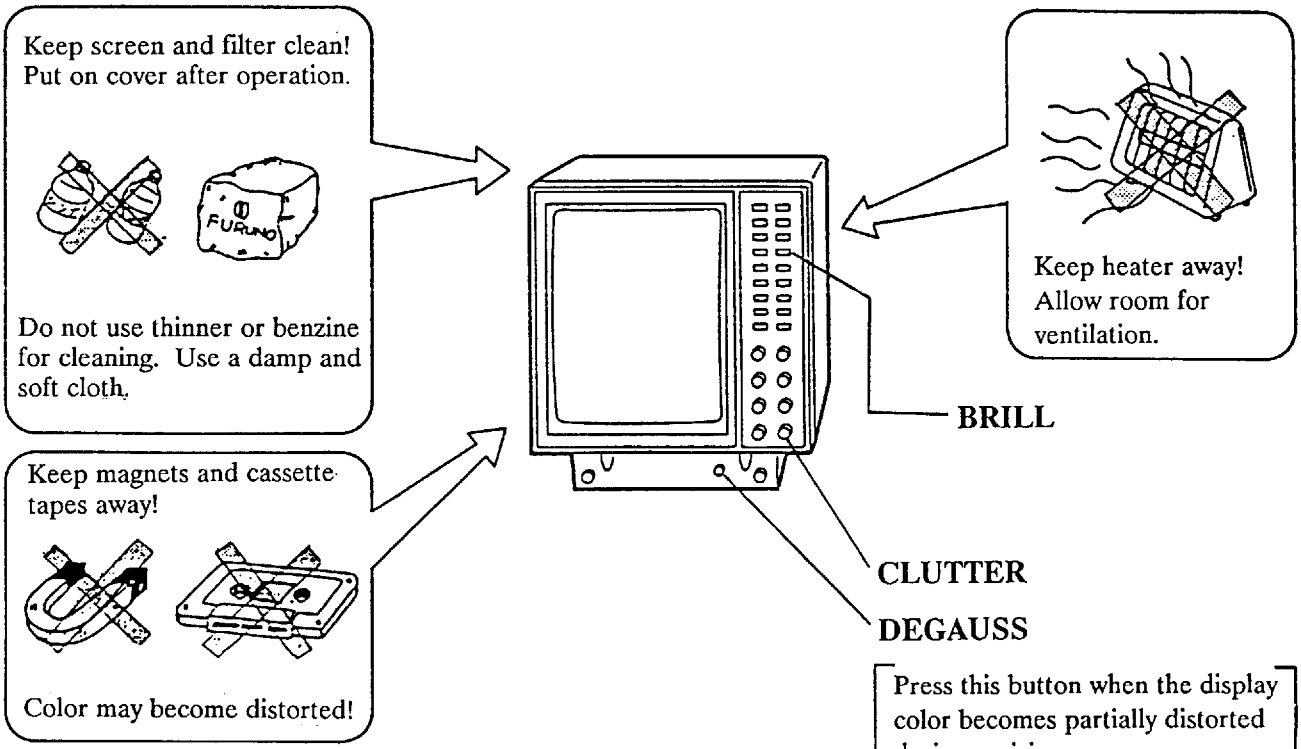
NOTICE

The mounting location must satisfy the following conditions:

- Away from rain and water splash
- Out of direct sunlight
- Away from air conditioner vents
- Away from magnets and magnetic fields
- Moderate and stable in temperature and humidity

HANDLING PRECAUTIONS

- **Moderate screen brightness to extend the life of the CRT.**
- **Do not remove the display cover. High voltage exists inside the unit.**
- **Do not use too high a setting of the CLUTTER control, or small and weak fish echoes may be missed.**
- **Observing the following points will help to keep your FCV-10 in top condition for many years.**



Keep screen and filter clean! Put on cover after operation.

Do not use thinner or benzine for cleaning. Use a damp and soft cloth.

Keep magnets and cassette tapes away!

Color may become distorted!

Keep heater away! Allow room for ventilation.

[Press this button when the display color becomes partially distorted during cruising.]

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1. A WORD TO FURUNO FCV-10 OWNERS:

Congratulation on your choice of the **FURUNO FCV-10** Scanbeam Sounder! For over 40 years Furuno Electric Company has enjoyed an enviable reputation for quality and reliability throughout the world. This dedication to excellence is furthered by our extensive global network of agents and dealers.

The **FURUNO FCV-10** is designed and constructed to give the user many years of trouble-free operation. However, to obtain optimum performance from this unit, you should carefully read and follow the recommended procedures for installation, operation and maintenance. No machine can perform to the utmost of its ability unless it is installed and maintained properly.

Thank you for considering and purchasing Furuno equipment.

FEATURES

- 16-color presentation (including background) shows detailed information on fish density and the nature of the bottom, on a 14" diagonal medium resolution CRT. Selectable background color lessens eye-fatigue in both daytime and nighttime operations.

- In addition to a real-time color display, the **FE-1280** paper recorder is optionally available for extended recording of underwater searching for later reference.

- The high power and narrow beam transducer of 24 kHz, 10 kW, 10 degrees (port-starboard) x 9.5 degrees (fore-aft) has a maximum detection range up to 6000 m deep.

- The transducer transmits and receives three sounding beams towards ship's port and starboard as well as downward. Searching area is thus three times that of a single beam detection. In the automatic scanning mode, the transmitting beam is scanned between the selected transmit angles in port and starboard. This feature is useful for observing fish behavior and seabed nature.

- To stabilize a sounding beam against ship's rolling, a clinometer unit is provided standard. This ensures stable picture presentation of fishes and seabed echoes even under severe weather conditions.

- The split screens simultaneously display detected echoes from an external net recorder or echo sounders as well as own transceiver-detected echoes if these units are connected to the display unit.

- Display of ship's position and water temperature. (External navigation equipment and water temperature indicator required)

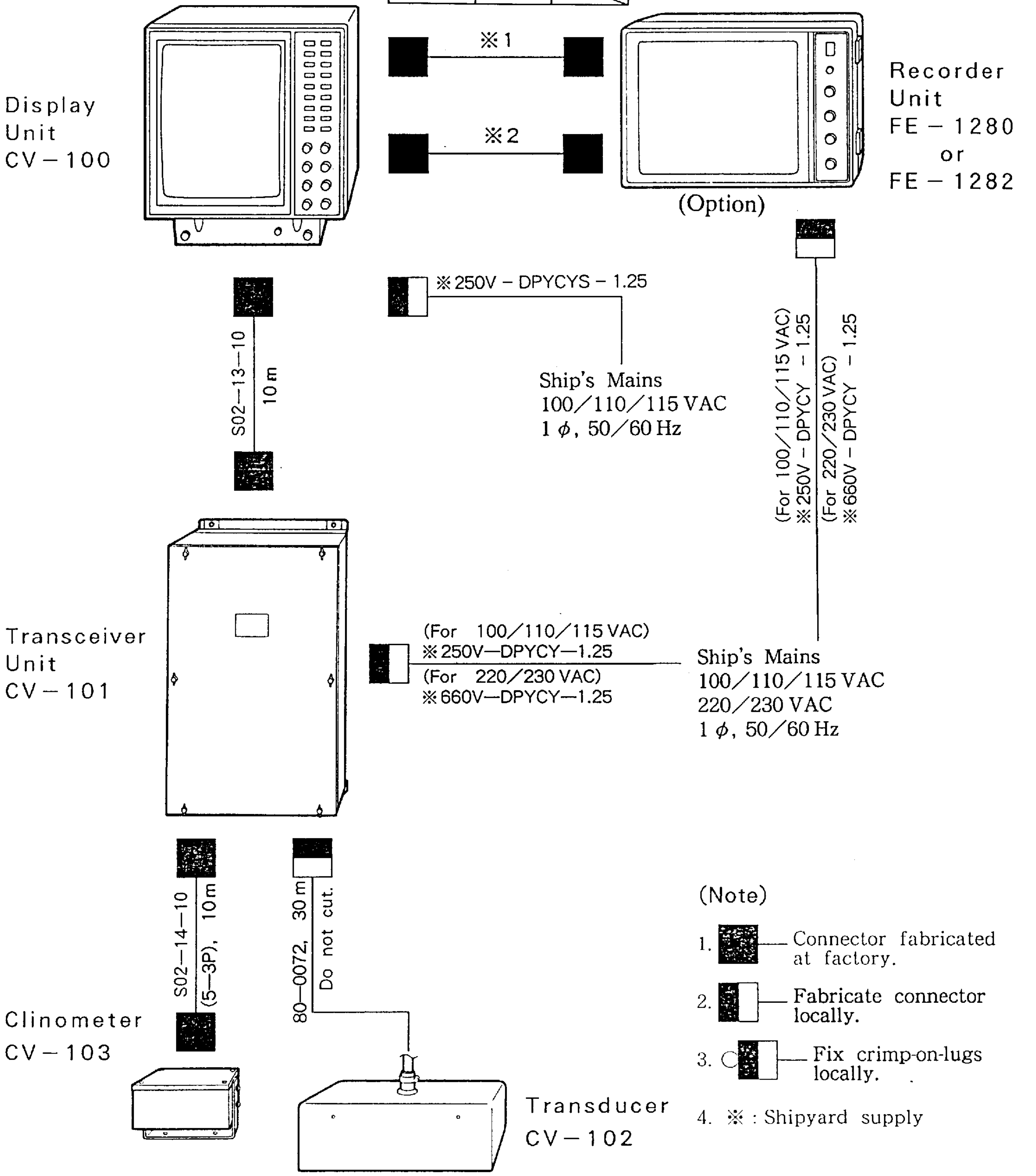
- The A-scope presentation provides detailed presentation of echoes every transmission of ultrasonic pulse by the transceiver unit. This feature is especially useful for trawling where detailed presentation of bottom fish is important.

- Bottom locked expansion and pelagic expansion displays give you highly detailed presentations of echoes.

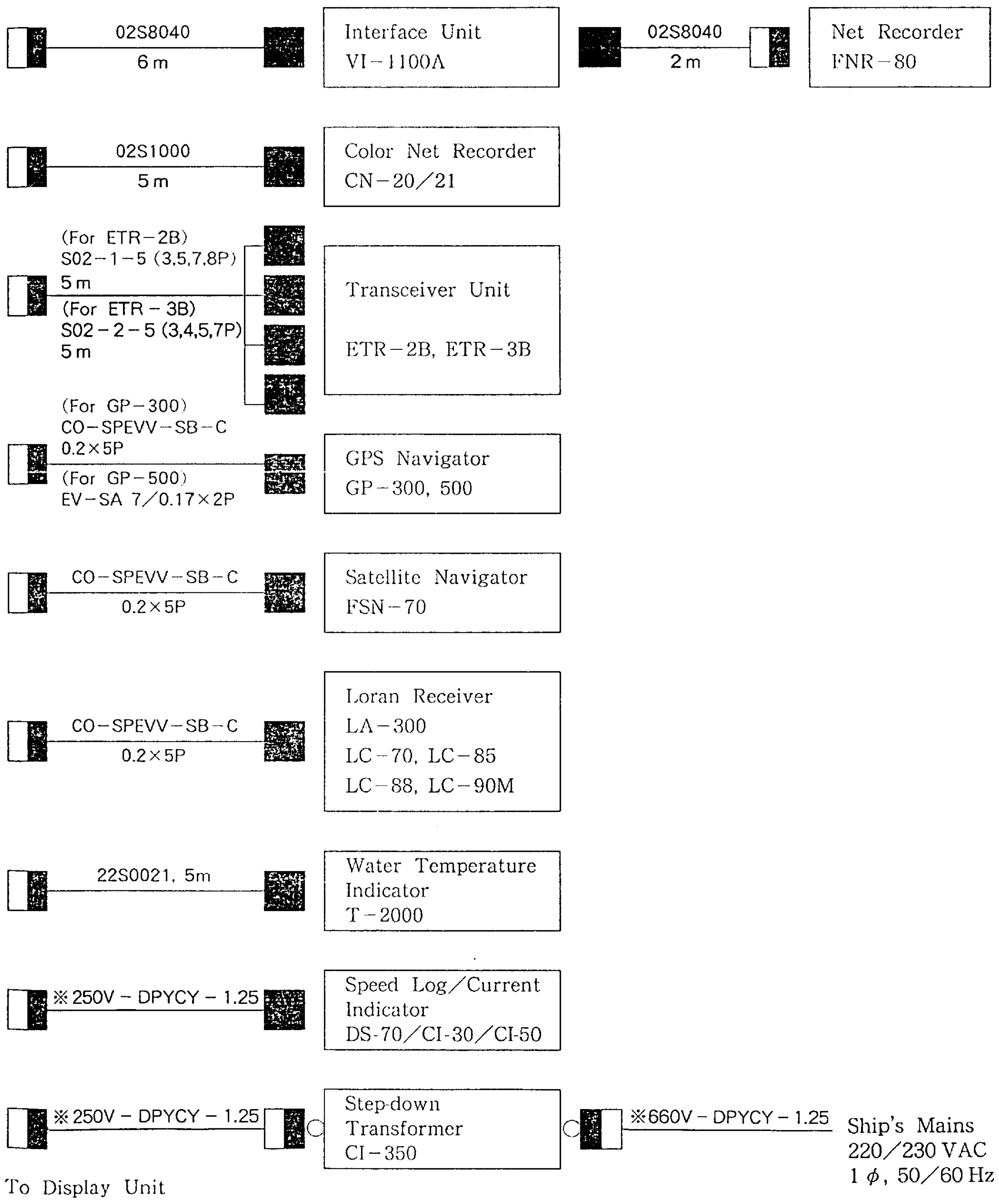
2. SYSTEM CONFIGURATION

Interconnection Cable

	※1	※2
FE-1280	S02-16-5	S02-17-5
FE-1282	S02-19-5	


Display Unit CV－100
※1
※2
Recorder Unit FE－1280 or FE－1282
(Option)
※250V - DPYCYS - 1.25
Ship's Mains 100／110／115 VAC 1 φ, 50／60 Hz
S02－13－10 10 m
(For 100／110／115 VAC) ※250V - DPYCY - 1.25
(For 220／230 VAC) ※660V - DPYCY - 1.25
Transceiver Unit CV－101
(For 100／110／115 VAC)
※250V—DPYCY—1.25
(For 220／230 VAC)
※660V—DPYCY—1.25
Ship's Mains 100／110／115 VAC 220／230 VAC 1 φ, 50／60 Hz
S02－14－10 (5－3P), 10m
80－0072, 30 m Do not cut.
Clinometer CV－103
Transducer CV－102
(Note)
1. Connector fabricated at factory.
2. Fabricate connector locally.
3. Fix crimp-on-lugs locally.
4. ※ : Shipyard supply

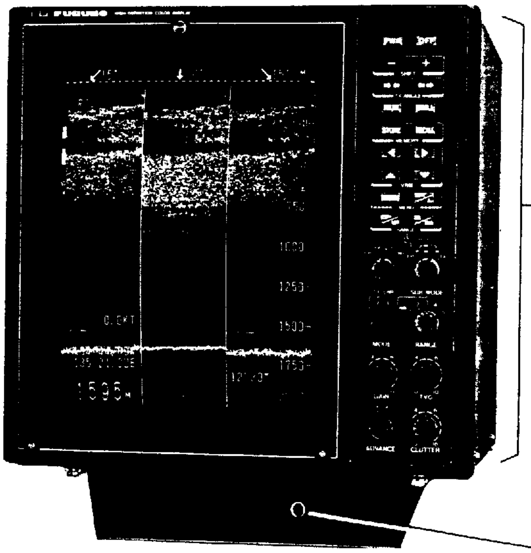
《 Interfaced to 》


02S8040 6 m
Interface Unit VI－1100A
02S8040 2 m
Net Recorder FNR－80
02S1000 5 m
Color Net Recorder CN－20／21
(For ETR－2B) S02－1－5 (3,5,7,8P) 5 m
(For ETR - 3B) S02－2－5 (3,4,5,7P) 5 m
Transceiver Unit ETR－2B, ETR－3B
(For GP－300) CO－SPEVV－SB－C 0.2×5P
(For GP－500) EV－SA 7／0.17×2P
GPS Navigator GP－300, 500
CO－SPEVV－SB－C 0.2×5P
Satellite Navigator FSN－70
CO－SPEVV－SB－C 0.2×5P
Loran Receiver LA－300 LC－70, LC－85 LC－88, LC－90M
22S0021, 5m
Water Temperature Indicator T－2000
※250V - DPYCY - 1.25
Speed Log／Current Indicator DS-70／CI-30／CI-50
※250V - DPYCY - 1.25
Step-down Transformer CI－350
※660V - DPYCY - 1.25
Ship's Mains 220／230 VAC 1 φ, 50／60 Hz
To Display Unit

3. OPERATING CONTROLS AND KEYS

The **FCV-10** Scanbeam Sounder has a color display unit and a paper recorder unit **FE-1280** (option) as output devices. Each unit has individual operating controls and keys. This manual explains the color display unit. For the **FE-1280** paper recorder, refer to the operator's manual for the **FE-1280** Scanbeam Sounder recorder unit which is separately published.

Take a look at the display unit. The front part of the display unit is separated into two sections: controls and keys on the right-hand side and the CRT on the left-hand side. Operation is simple and straight forward. If you press a key or operate a control the associated reaction is seen on the screen almost immediately.



CONTROL PANEL

A brief description of the function of each key and control appears on the next page.

DEGAUSS Button

Press this button when the display color becomes partially distorted by unwanted access of magnetic field or change of terrestrial magnetism during sailing.

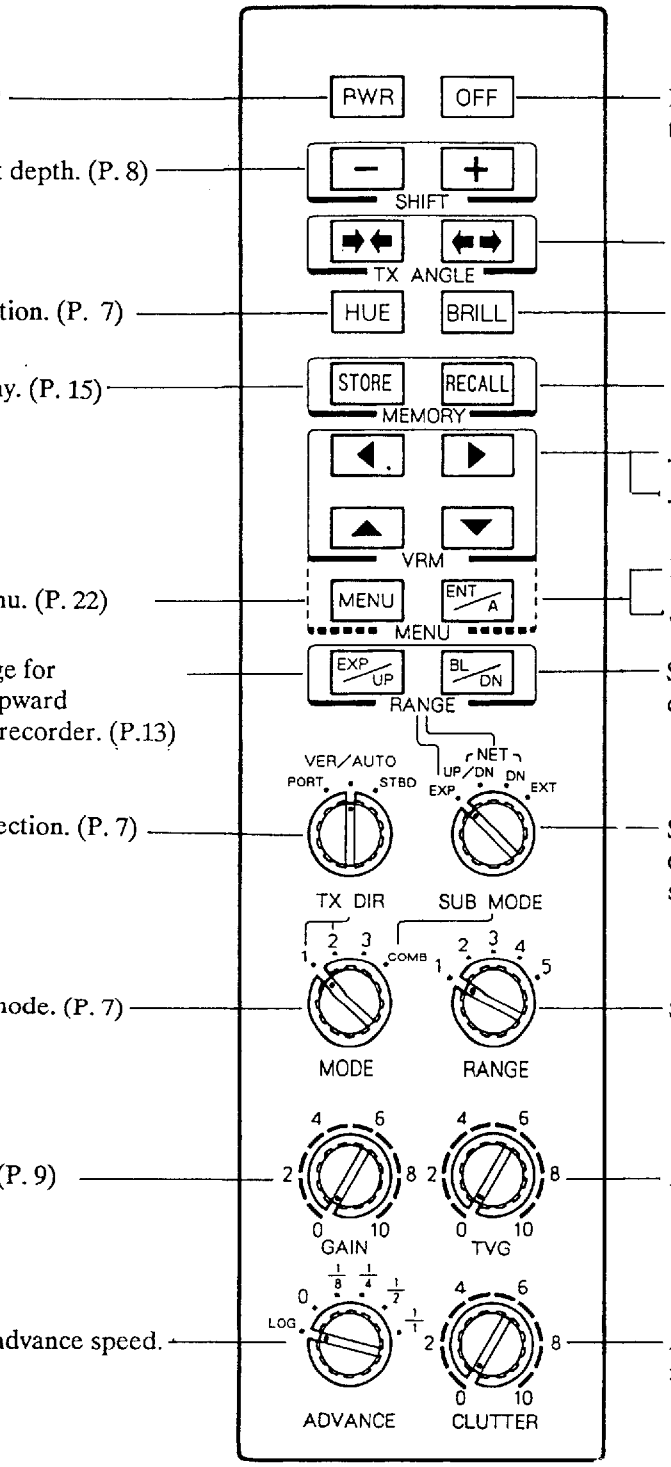
F Photo No.1922 PC

BEFORE TURNING ON THE POWER

This system can utilize external signals coming from navigation equipment, net recorder, echo sounder, etc. Ensure that all these machines operate properly before turning on this system.

4. DESCRIPTION OF CONTROL PANEL

This chapter provides rough description of operating controls and keys on the control panel. Numbers in brackets denote reference pages. As the operator becomes familiar with operation, you can easily operate this system referring to this page and the display selection guide table on page 17.


PWR
OFF
−
+
SHIFT
TX ANGLE
HUE
BRILL
STORE
RECALL
MEMORY
VRM
MENU
ENT
A
MENU
EXP
UP
BL
DN
RANGE
VER/AUTO
PORT
STBD
NET
UP/DN
DN
EXP
EXT
TX DIR
SUB MODE
1 2 3
COMB
1 2 3 4 5
MODE
RANGE
0 2 4 6 8 10
GAIN
0 2 4 6 8 10
TVG
LOG
0
1/8 1/4 1/2
1/1
2
ADVANCE
0 2 4 6 8 10
CLUTTER

Turns on the power. (P. 7)

Press it and PWR simultaneously to turn off the power. (P. 7)

Sets display start depth. (P. 8)

Sets transmit angle. (P. 12)

Sets color gradation. (P. 7)

Adjusts brilliance. (P. 7)

Stores the display. (P. 15)

Recalls display. (P. 15)

.Shifts VRM (Ver. and Hor.). (P. 14)

.Selects menu item. (P. 22)

Displays A-scope presentation. (P. 16)

Displays the menu. (P. 22)

Sets menu item(P. 22)

Sets display range for expansion and upward sounding by net recorder. (P.13)

Sets bottom-lock range or downward sounding range. (P. 13)

Selects TX DIRection. (P. 7)

Selects submode; own transceiver, external net recorder or echo sounder. (P. 13)

Selects display mode. (P. 7)

Selects display range. (P. 8)

Adjusts GAIN. (P. 9)

Adjusts TVG level to eliminate surface noises. (P. 10)

Selects display advance speed. (P. 8)

Adjusts **CLUTTER** level to reject noise (blue in color). (P. 10)

5. DISPLAY MODES

The FCV-10 provides eight display modes to meet the requirements of fishing methods and conditions.

Variety of Displays

Below are the eight display modes. All display modes appear on the quick display selection table on page 17 which shows you how to select a display mode by the display **MODE** selector, **TX DIR** selector and **SUB-MODE** selector.

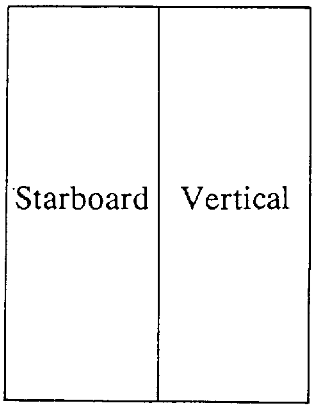
VERtical display	presents echoes by sounding vertically like conventional color video sounders. This unit transmits ultrasonic sounds in three directions of port, vertical, and starboard.
PORT display	presents echoes sounded towards port.
STBD (Starboard) display	presents echoes sounded towards starboard.
AUTO scan display	presents echoes sounded towards between port and starboard.
EXTernal echo sounder display	presents echoes sounded by external echosounders connected to the display unit. Selection of the display is done on the DISPLAY menu screen. For further details, see page 26.
NET UP/DN and DN displays	presents echoes by upward and downward soundings of the connected net recorder.

Example of Display Selection

1) Select the desired display by referring to the quick display selection table on page 17. For example, select the display of vertical and starboard soundings for observation of underwater situation in two directions.

2) Since this is a 2-display screen, set the **MODE** selector to the **2** position.

3) The TX direction is starboard, so select **STBD** with the **TX DIR** selector.



Ex. Two display mode

6. OPERATION

The **FCV-10** is simple to operate. Most major functions can be set with a single key stroke or selector setting. When you become familiar with the unit, you can operate it referring to the separate operation guide sheet.

Turning Power On/Off

PWR key

Press the **PWR** key to turn on the power. The unit will commence transmission and display echoes on the CRT screen in a few seconds.

PWR, OFF keys

Press the **PWR** and **OFF** keys simultaneously to turn off the unit.

Adjusting Brilliance

BRILLiance key

The **BRILL** key adjusts the picture brilliance in four steps; **1, 2, 3, 4** and the value selected appears in large letters for two seconds. To extend the life of the CRT use moderate brilliance.

Selecting Combination of Display Colors

HUE key

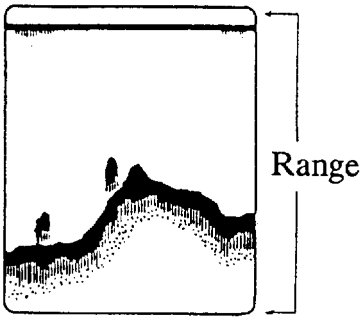
The **HUE** key changes the arrangement of display colors. Every pressing changes it in eight steps to match surrounding lightness.

Selecting Display RANGE

RANGE selector

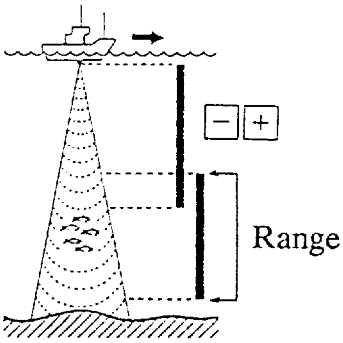
The **RANGE** selector sets the basic RANGE from the five ranges tabulated below. Theses ranges are the factory-set values. You can customize the BASIC range depending on your requirement. See page 27 for DEPTH RANGE menu.

Position	1	2	3	4	5
Range	100 m	200 m	500 m	1000 m	1500 m



Shifting Range

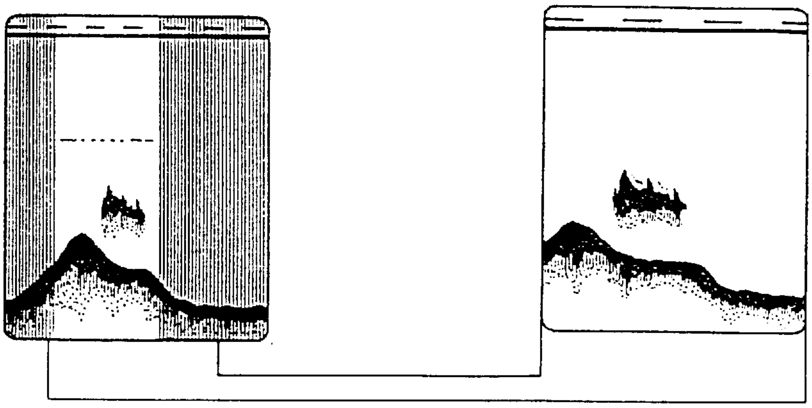
Shift + - keys The **SHIFT** + - keys set the start depth of the display. Note that continuous pressing of the keys accelerates the rate of change. (End depth: Max. 6000 m)



Display Advance Speed Selection

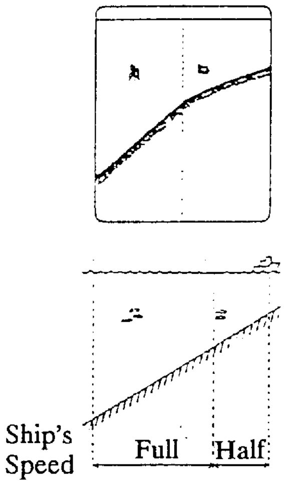
ADVANCE selector The **ADVANCE** selector sets the display advance speed from **1/1**, **1/2**, **1/4** or **1/8**.

At the fastest speed (**1/1**) echoes are horizontally expanded. The slowest speed (**1/8**) provides longer observation period. The **0** position stops picture advancement to observe echoes closely, or take a photograph of the display.

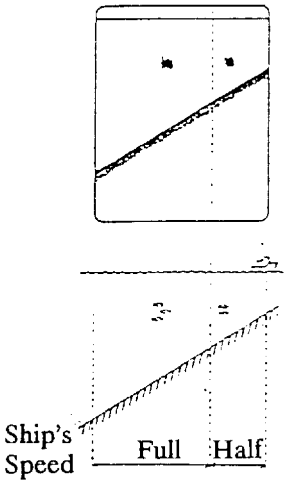


The **LOG** position, operative when a log pulse is available from a speed log, a current indicator, or navigation equipment, sets the display advance speed according to ship's speed.

In this position, the display advance rate changes automatically in proportion to ship's speed. The illustration below shows that the horizontal scale of the display is not influenced by the change of ship's speed, permitting judgement of fish school size and abundance.



Other Positions

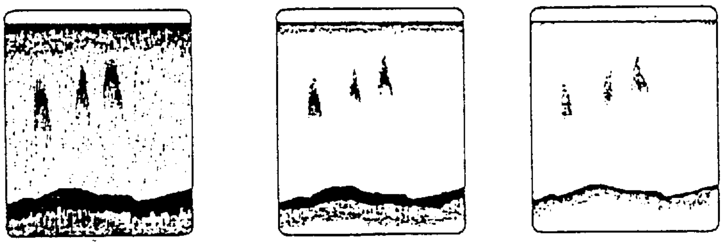


LOG Position

Adjusting GAIN

GAIN control

The **GAIN** control adjusts the sensitivity of the receiver. Set it to the point just below where weak noise disappears from the screen. Detected echoes are painted in reddish to bluish colors according to their intensity. The seabed and large fish schools are drawn in reddish color, and the seabed tail and small fish echoes in bluish color. Normal setting is between **3** and **5**. Note that the color of echoes will change when the **HUE** key is pressed.



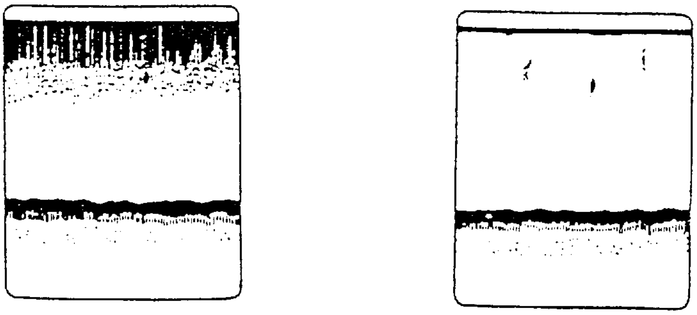
Too high Proper Too low

Adjusting TVG

TVG control

The **TVG** control compensates for propagation attenuation of the ultrasonic pulses. It equalizes echo presentation in color level so that the fish schools of the same size appear in the same density in both shallow and deep waters. In addition, it also helps to eliminate surface noise, which may mask shallow targets.

For normal operation, set the **TVG** control between **3** and **5**. Too excessive setting of the TVG may eliminate the desired echoes. If the TVG curve is not suitable for your fishing, you can change it using the RECEIVER menu. See page 25.

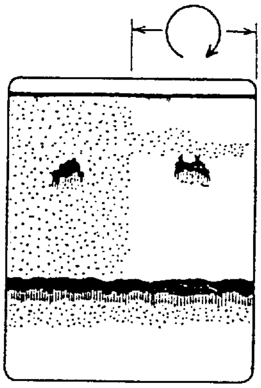


Improper Proper

Removing Clutter

CLUTTER control

Turn the **CLUTTER** control clockwise if blue dots (noise caused by contaminated water) appear on the whole screen. Additionally adjust it whenever the **TVG** is adjusted. Normally set it between **0** and **2**. Note that some forms of noises cannot be eliminated.



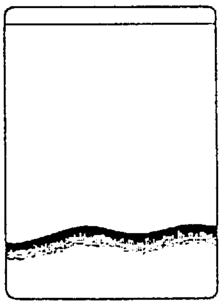
Selecting Display Mode

As noted earlier the FCV-10 has a wide variety of display modes. This section shows you how to select display modes. Also refer to the quick display selection table on page 17.

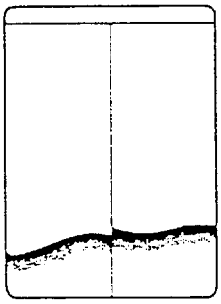
Note: The display unit is shipped with the screen split vertically. If you prefer horizontally divided screen, select it on the DISPLAY menu. See page 26.

MODE selector

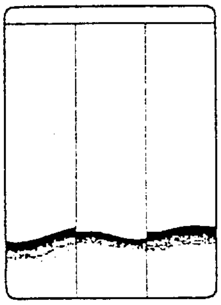
The **MODE** selector selects the display mode as shown below.



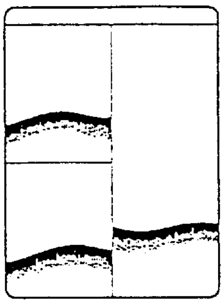
" 1 "



" 2 "



" 3 "



"COMB"

MODE 1

One-screen display of echoes detected by the sounding beam in the direction of **VER**tical, **PORT**, or **STBD** (starboard), selected by the **TX DIR** selector.

MODE 2

The right screen displays echoes detected by the vertical sounding beam, and the left, echoes detected by the sounding beam selected by the **TX DIR** selector.

MODE 3

The three-display picture shows echoes detected by the port, vertical and starboard soundings on the left, center and right screens, respectively.

MODE **COMB**ination

The combination display mode gives you vertical sounding plus **EXP**ansion, **NET UP/DN** (net recorder upward and downward) and **NET DN** (downward) displays, which you can select by the **SUB MODE** selector.

Selecting Sub-Mode Display

EXPansion mode

This position presents a expansion display on whole or half of the screen as selected on the RANG menu. See page 27.

NET UP/DN (Net recorder upward and downward sounding mode)

This position plots echoes on the left screen which are detected by upward and downward soundings of the connected net recorder.

NET DN (Net recorder downward sounding mode)

This position plots echoes on the left screen which are detected by downward sounding of the connected net recorder.

EXTernal echo sounder mode

This position plots echoes detected by external echo sounders connected to the display unit.

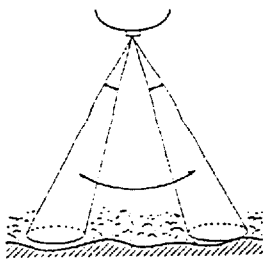
Selecting Transmit Direction

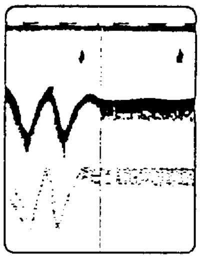
TX DIR selector

The **TX DIR** selector chooses the sounding direction among vertical, port, starboard, and auto scan soundings. This selection is necessary when the **MODE** selector is set to **1** or **2** (one- or two- screen display).

AUTO SCAN Mode

In this mode, the sounding beam is automatically scanned between the selected directions in port and starboard. This mode is useful for observing the distribution of fish in a wide area. The figure below illustrates the concept of the **AUTO SCAN** mode.



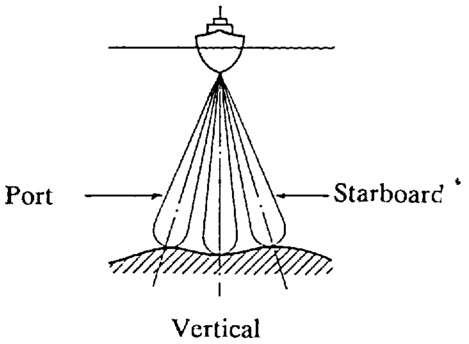


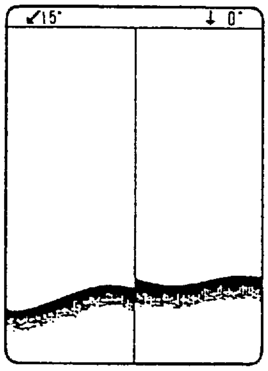
Selecting Transmit Angle

TX ANGLE key

The FCV-10 uses three sounding beams: port, starboard and vertical. The **TX ANGLE** keys set transmit directions of port and/or starboard sounding beams in one degree steps up to 16 degrees relative to the vertical. The transsmit directions are shown by arrows and angles at the top of the display.

Note: When ROLL CALIB is set to OFF on the TRANSMITTER menu, maximum TX angle is 32 degrees instead of 16 degrees. See page 24.





Ex. Two Display Mode

Selecting Range for Expansion and Bottom-locked Display

MODE and SUB MODE selectors

Set the **MODE** selector to the **COMB** position and the **SUB MODE** selector to the **EXP** position to display a zoom or bottom-locked expansion display. The expansion display range may be adjusted by the **EXP/UP** and **BL/DN RANGE** keys. The display range appears on the expansion display for two seconds. Note that the depth range scale is calibrated automatically.

The bottom-locked display function operates only when the bottom is detected at certain level. Note that the bottom cannot be detected in the water with air bubbles and if the bottom is steep or muddy.

Pelagic Expansion Display

EXP/UP key

The **EXP/UP** key sets the range for marker zoom (M/Z) and bottom zoom (B/Z) displays. The start depth of the display may be set by the **VRM** up and down keys.

Position	1	2	3	4	5
Expansion Range	5 m	10 m	20 m	40 m	80 m

BL/DN key

The **BL/DN** key sets the expansion range of the bottom-locked display.

BL/DN key The **BL/DN** key sets the expansion range of the bottom-locked display.

Position	1	2	3	4	5
Bottom-lock Range	5 m	10 m	20 m	40 m	80 m

Selecting Net Recorder Display Range

MODE and SUB MODE selectors Set the **MODE** selector to the **COMB** position and the **SUB MODE** selector to **NET UP/DN** or **DN** position to get the net recorder display (on the left display screen). To adjust the display range, use the **EXP/UP** and **BL/DN RANGE** keys. The display range appears on the expansion display for two seconds.

Net Recorder Upward Sounding Display Range

EXP/UP key The **EXP/UP** key selects the upward range of the net recorder.

Position	1	2	3	4	5	6	7	8
Net Recorder Upward Range	10 m	20 m	120 m	180 m	280 m	400 m	500 m	600 m

Net Recorder Downward Sounding Display Range

BL/DN key The **BL/DN** key sets the downward range of the net recorder.

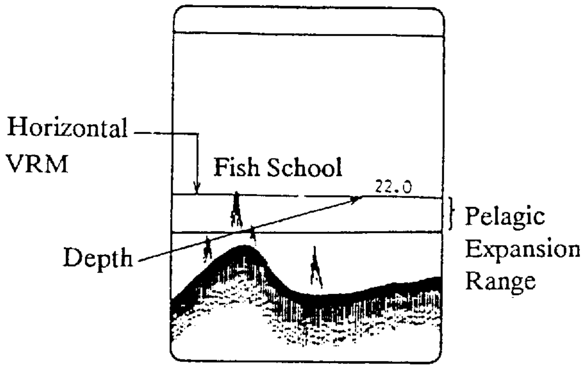
Position	1	2	3	4	5	6	7	8
Net Recorder Downward Range	5 m	10 m	20 m	40 m	60 m	120 m	180m	400 m

Using the Vertical and Horizontal VRMs

VRM keys This unit provides two types of **VRMs** (Variable Range Marker): one vertical and one horizontal VRMs. The VRMs function to measure the depth or range to a fish school, by moving the horizontal or vertical VRM with right/left and up/down arrow keys.

Measuring Depth to a Fish School

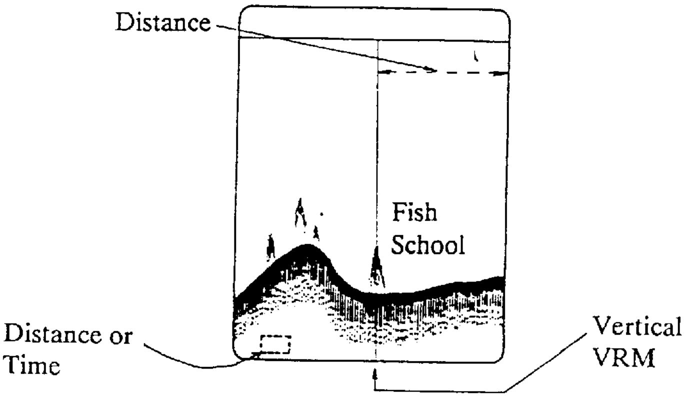
VRM UP/DOWN keys Move the horizontal **VRM** marker onto a fish school with the up/down arrow keys. The depth to the fish school is digitally shown above the marker.


Horizontal VRM
Fish School
22.0
Pelagic Expansion Range
Depth

Measuring Horizontal Distance to a Fish School

RIGHT and LEFT arrow keys

Move the vertical **VRM** marker onto a fish school with the right/left arrow keys. The horizontal distance to the fish school is digitally shown at the lower left-hand corner of the display.


Distance
Fish School
Distance or Time
Vertical VRM

Note: To display distance ship's speed data should be entered from the connected speed log or navigational equipment. If unavailable, elapsed time after passing over the point of the vertical VRM marker is displayed instead.

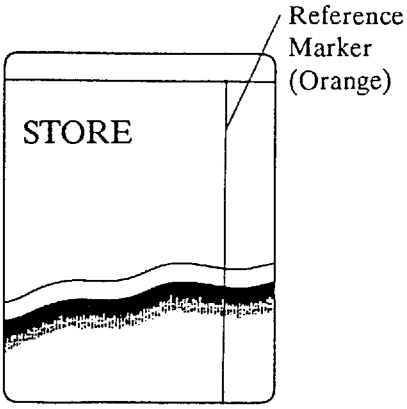
Storing/Recalling Picture

This equipment is capable of storing the current display in its memory for later reference and study.

Storing the Display

STORE key

Press the **STORE** key to store the current display in the memory. **STORE** appears on the screen during the storing process. At the same time, an orange color vertical line appears on the screen and advances with the display to mark the position where the **STORE** key was pressed.



Recalling the Stored Display

RECALL key

Press the **RECALL** keyn to recall the stored display. To restore normal operation, press the **RECALL** key.

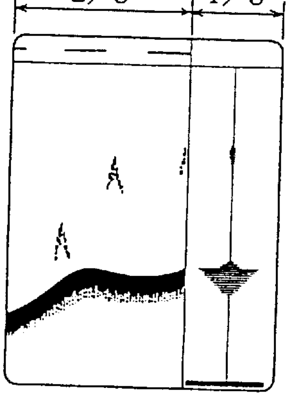
Note 1: The display stored in the memory is erased each time the STORE key is pressed or the power is turned off.
2: The color of the marker line may change when the HUE key is pressed to change the display color.

A-Scope Presentation

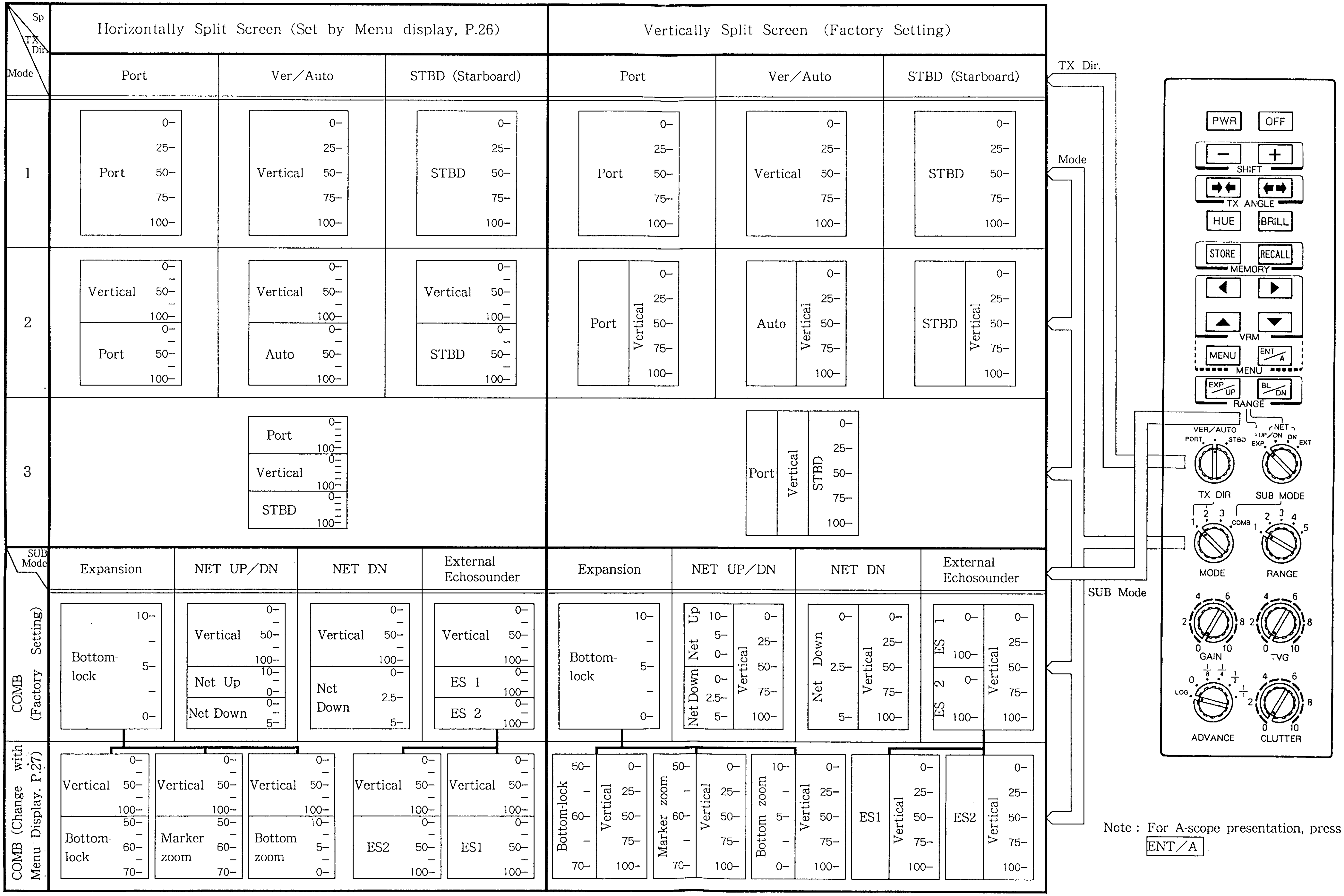
ENT/A key

The A-scope presentation provides for detailed presentation of fish echoes. Press the **ENT/A** key to enable the A-scope presentation. Since fish echoes are displayed with varying amplitudes and colors according to echo strength, the discrimination of bottom fish and their density become easier.

To return to the previous mode, press the **ENT/A** key again.



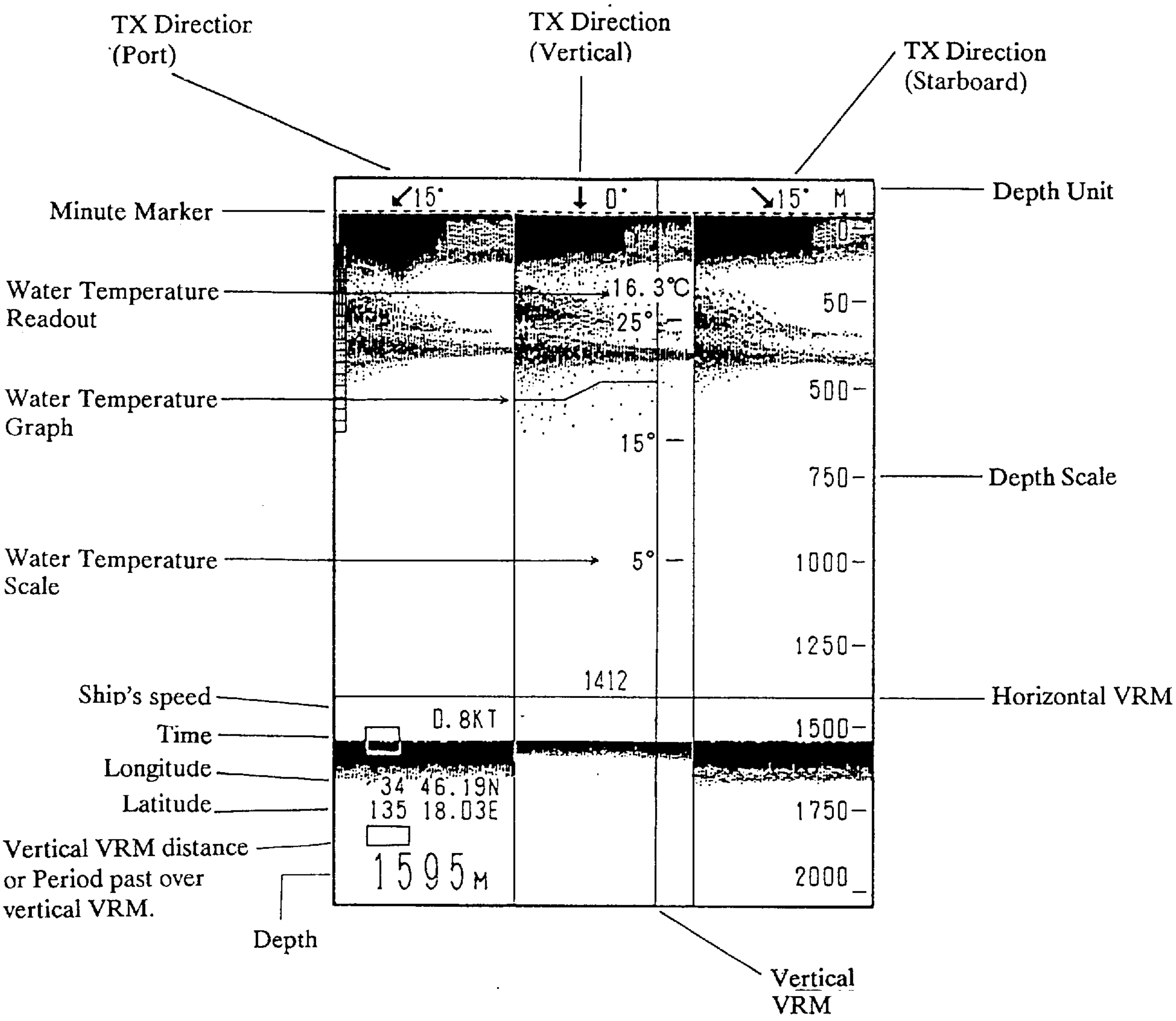
③ Quick Display Selection Table(MODE , TX DIR , SUB MODE Selectors)


Sp
TX Dir
Mode
Horizontally Split Screen (Set by Menu display, P.26)
Vertically Split Screen (Factory Setting)
Port
Ver／Auto
STBD (Starboard)
1
2
3
Port
Vertical
STBD
Auto
0– 25– 50– 75– 100–
SUB Mode
Expansion
NET UP／DN
NET DN
External Echosounder
COMB (Factory Setting)
COMB (Change with Menu Display, P.27)
Bottom-lock
Net Up
Net Down
ES 1
ES 2
Marker zoom
Bottom zoom
10– 5– 0–
2.5–
50– 60– 70–
TX Dir.
Mode
SUB Mode
PWR
OFF
SHIFT
TX ANGLE
HUE
BRILL
STORE
RECALL
MEMORY
VRM
MENU
ENT/A
EXP/UP
BL/DN
RANGE
VER/AUTO
PORT
STBD
NET
UP/DN
DN
EXP
EXT
TX DIR
SUB MODE
COMB
MODE
RANGE
GAIN
TVG
LOG
ADVANCE
CLUTTER

Note : For A-scope presentation, press ENT／A

7. INTERPRETING THE DISPLAY

Example of Display (3- Display Mode)


TX Direction (Port)
TX Direction (Vertical)
TX Direction (Starboard)
Minute Marker
Depth Unit
Water Temperature Readout
Water Temperature Graph
Water Temperature Scale
Depth Scale
Horizontal VRM
Ship's speed
Time
Longitude
Latitude
Vertical VRM distance or Period past over vertical VRM.
Depth
Vertical VRM
15°
0°
15° M
16.3℃
25°
15°
5°
50
500
750
1000
1250
1412
1500
1750
2000
0.8KT
34°46.19N
135 18.03E
1595M

The above illustration shows the location of every marker and indication which appear on the display. Explanation is given for items not previously mentioned.

Minute Marker	Shows one minute by a 30-second mark and 30-second space.
Time, Ship's Speed	Appears when navigation equipment or speed log is connected to the display unit.
Ship's position	Indicated in latitude and longitude, if navigation equipment is connected.
Depth	Measured by the vertical sounding beam.

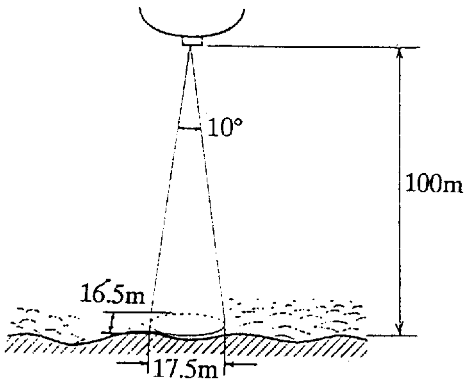
Water Temperature Scale	Appears when a water temperature indicator is connected to the display unit. Changes automatically according to the temperature among -5 to 15 °C, 5 to 25 °C, 15 to 35 °C.
Water Temperature Readout	Indicates water temperature.
Water Temperature Graph	Plots change of water temperature with a continuous line.

Scanning Area of Sounding Beams

The **FCV-10** scanbeam sounder is provided with the scanning function of sounding beams in port and starboard directions. In this section, the detecting area by scanning sounding beams is explained..

One sounding beam

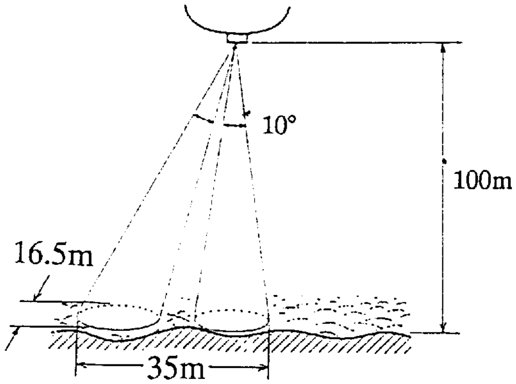
When the MODE selector is set to "1", the sounding beam is directed vertically. The beam is 10 degrees (port-starboard) by 9.5 degrees (fore-aft) wide, covering an area of 17.5 m by 16.5 m at 100 m depth.



Two sounding beams

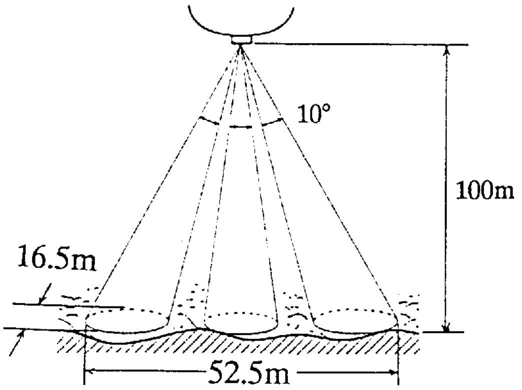
With the **MODE** selector set to 2 and the **TX DIR** selector to **PORT**, another sounding beam is added in the port direction. In the example at the top of the next page, it directs towards port 10 degrees. By this addition, the sounding beam is widened to 20 degrees by 9.5 degrees and its detecting area is 35 m by 16.5 m at 100 m depth. Compared to sounding by a single beam with similar beamwidth, this has an advantage of better resolution of fish school location because fish schools detected by respective sounding beams are displayed on the respective screens. It may be utilized to observe how fish school and shoal are distributed or shaped and also how bottom condition changes.

Note : Since echoes from a flat seabed become weaker when they are of the slanted sounding beams, be careful not to judge its hardness simply from display colors.



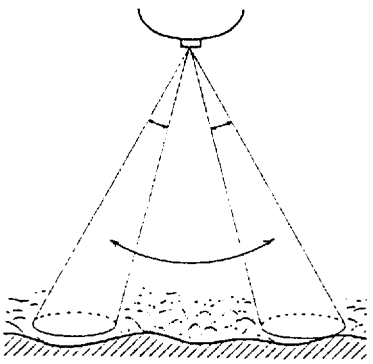
Three Sounding Beams

When the **MODE** selector is set to the **3** position, another beam of 10 degrees wide is added to the previous mode. Then the total beam width is 30 degrees x 9.5 degrees, and effective for general searching.



AUTO scanned beam

When the **MODE** selector is set to the **2** position and the **TX DIR** selector **VER/AUTO**, the sounding beam scans in steps of 1 degree or 2 degrees between port and starboard like a single beam searchlight sonar. This mode is useful for examining the nature of a of shoal and distribution of fish. Note that it takes about 9.6 seconds for 1 degree-step scanning with the **RANGE** set to **100 m** to scan from port 16 degrees to starboard 16 degrees. Also the scanning speed becomes slower as the **RANGE** is increased.



Note: The scanning step can be set for 1 or 2 degrees with the DEPTH RANGE menu. See page 27.

Using Three Direction Combination Display

When the **MODE** selector is set to the **3** position, the vertical, port and starboard displays appear on the entire screen irrespective of the **TX DIR** selector setting. The two features of this mode are explained referring to Example 2 below.

Distribution of Fish

The port and vertical displays detect fish but the port display does not. This means you should steer your ship in the port direction.

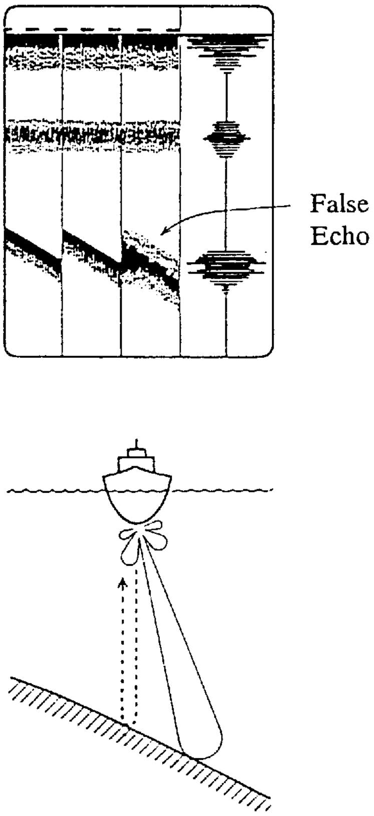
Shape of Bottom

The starboard display draw the longer tail for the bottom than the port display, indicating a hard bottom. The vertical display shows the bottom with the shortest tail, because it is detected with the narrower sounding area by the vertical sounding beam in comparison with by the slant port and starboard sounding beams. Also the port and starboard displays can show the inclination of the bottom by reading each depth.

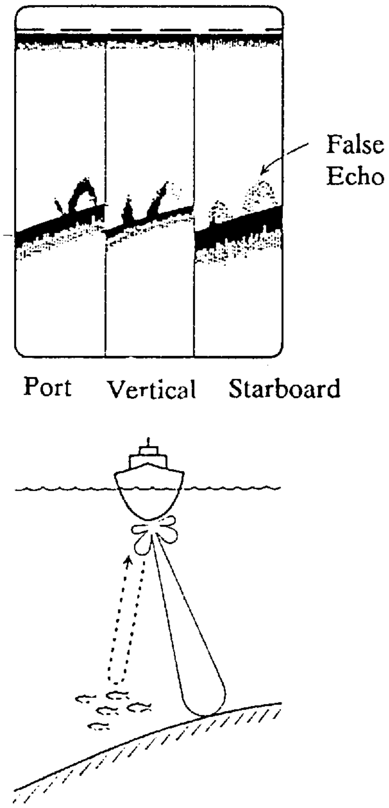
False Echo by Sidelobe of Sounding Beam

The ultrasonic beam comprises the main lobe and other sidelobe components. Most of the ultrasonic energy is contained in a main lobe; but some energy is transmitted in unwanted direction as sidelobes. If the sidelobe can detect the bottom and fish with a sufficient echo level, false echo by a sidelobe is displayed like Example 2.

Example 1



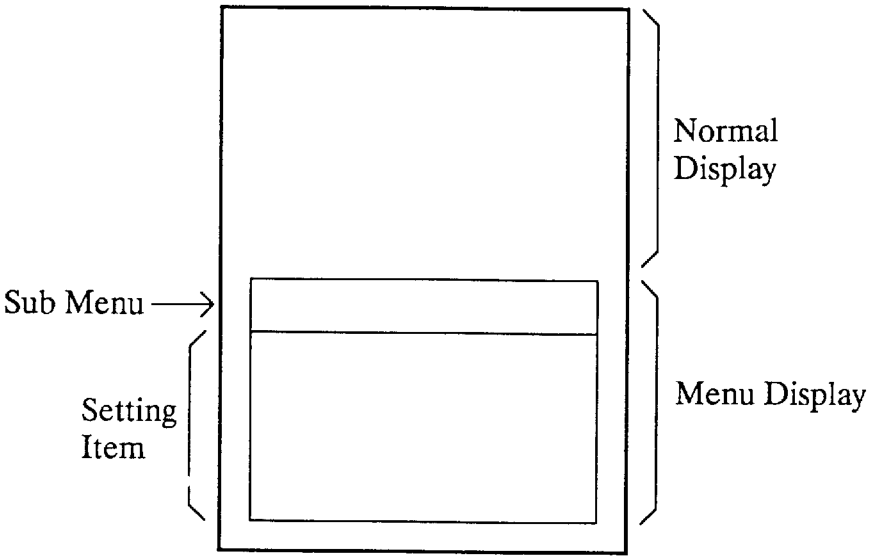
Example 2



8. CHANGE OF OPERATING MODE BY MENU

Basic Operation

The **MENU**s of the FCV-10 let you change the operating mode from the factory settings to meet your demand, fishing ground condition, method, etc. There are four menus: **INIT**ial, **TX**, **RX** , **DISP**lay and **RANG**e.



Procedure

1) Press the **MENU** key. The **INIT**ial menu appears on the lower half of the screen.

2) Press the up and down arrow keys to move the longer cursor to the **MENU SELECT** position.

3) Select a submenu by moving the shorter cursor to the desired submenu (**INIT, TX, RX, RANG**) with the right and left arrow keys.

4) Press the **ENT/A** key. The selected submenu is highlighted and items of the submenu appear below the **MENU SELECT** row.

5) Move the shorter cursor to the item to be changed, by pressing the up, down, right and left arrow keys. Details of the items are given on the following pages.

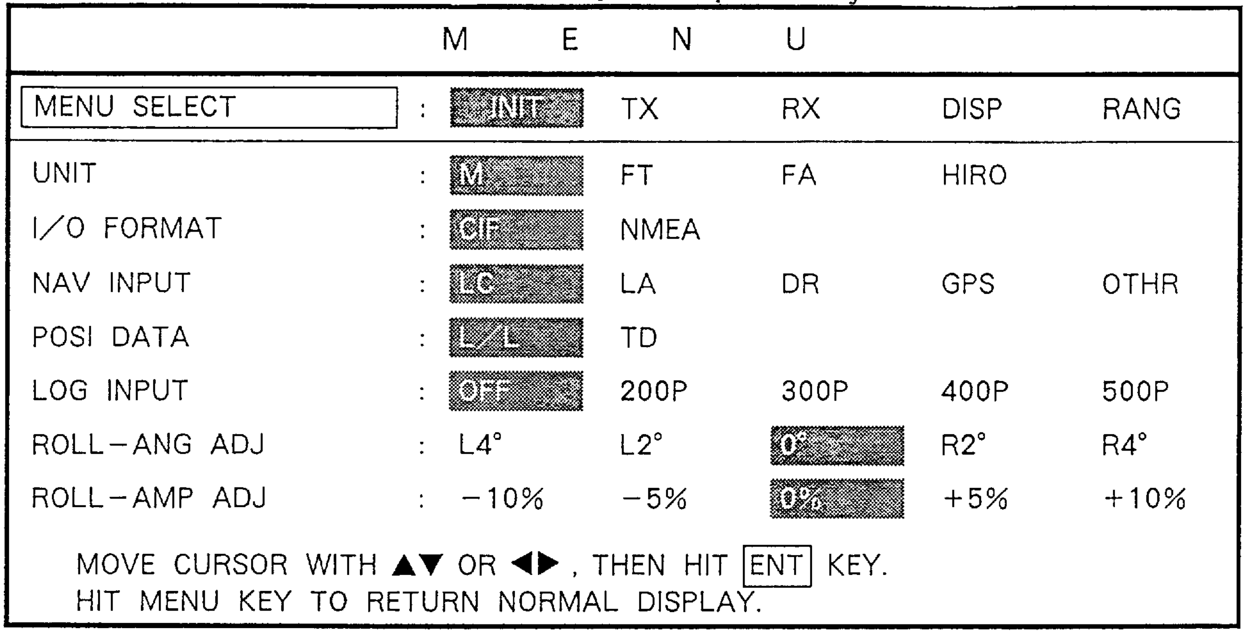
6) Press the **ENT/A** key to register selection.

7) To change other items, repeat the steps 5 and 6.

8) After making selection, press the **MENU** key. Control is returned to the previous display.

INITIAL Menu

The INITIAL menu contains items which are set during installation, and thus does not require frequent readjustment.



MENU

MENU SELECT	:	INIT	TX	RX	DISP	RANG
UNIT	:	M	FT	FA	HIRO	
I/O FORMAT	:	CIF	NMEA			
NAV INPUT	:	LC	LA	DR	GPS	OTHR
POSI DATA	:	L/L	TD			
LOG INPUT	:	OFF	200P	300P	400P	500P
ROLL-ANG ADJ	:	L4°	L2°	0°	R2°	R4°
ROLL-AMP ADJ	:	−10%	−5%	0%	+5%	+10%

MOVE CURSOR WITH ▲▼ OR ◀▶ , THEN HIT ENT KEY.
HIT MENU KEY TO RETURN NORMAL DISPLAY.

UNIT

Unit of depth measurement: **M** (meter), **FT** (Feet), **FA** (Fathom), **HIRO** (Japanese Fathom)

I/O FORMAT

selects the format {**FURUNO CIF** or **NMEA** (NMEA0183)} of the communication data fed from or sent out to external devices such as navigation equipment.

NAV INPUT

selects the device to feed position data: **LC** (Loran C navigator), **LA** (Loran A navigator), **DR** (Dead reckoning position made by a gyrocompass and a speed log), **GPS** navigator and **OTHR** (other navigation equipment).

POSI DATA

selects the ship's position data measurement system: **L/L** (Latitude/Longitude), **TD** (Time difference measured by a Loran navigator).

LOG INPUT

selects the speed data source; **OFF** (No entry of pulsed speed data), **200**Pulses/n.m., **300P**, **400P**, **500P**.

Note 1: The log mark is plotted on the optional recorder unit FE-1280 only.
2: When the **OFF** *position is selected, a digital speed data in* **CIF** *or* **NMEA** *format is fed from navigation equipment.*

ROLL-ANG ADJ

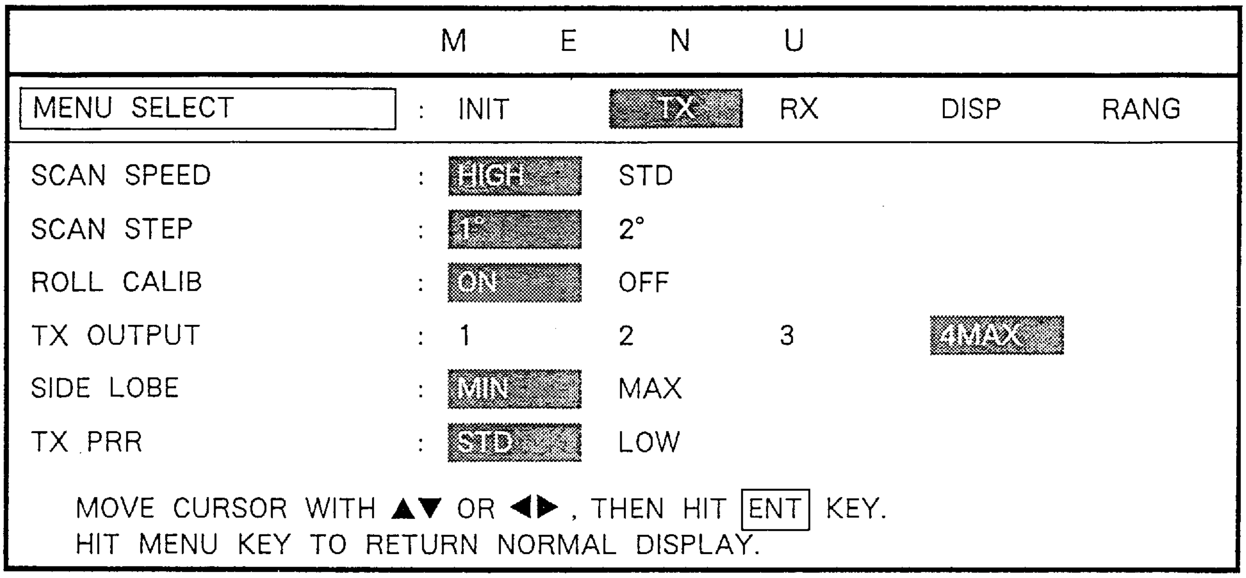
compensates for mounting inclination of the transducer in port and starboard directions.

ROLL-AMP ADJ

compensates for siting deviation of the clinometer from its best mounting location. Refer to page 48.

TRANSMITTER Menu

Normally these items may not be changed after installation. If you would sail a different fishing ground or catch a different species of fish, these items may be changed by the operator.

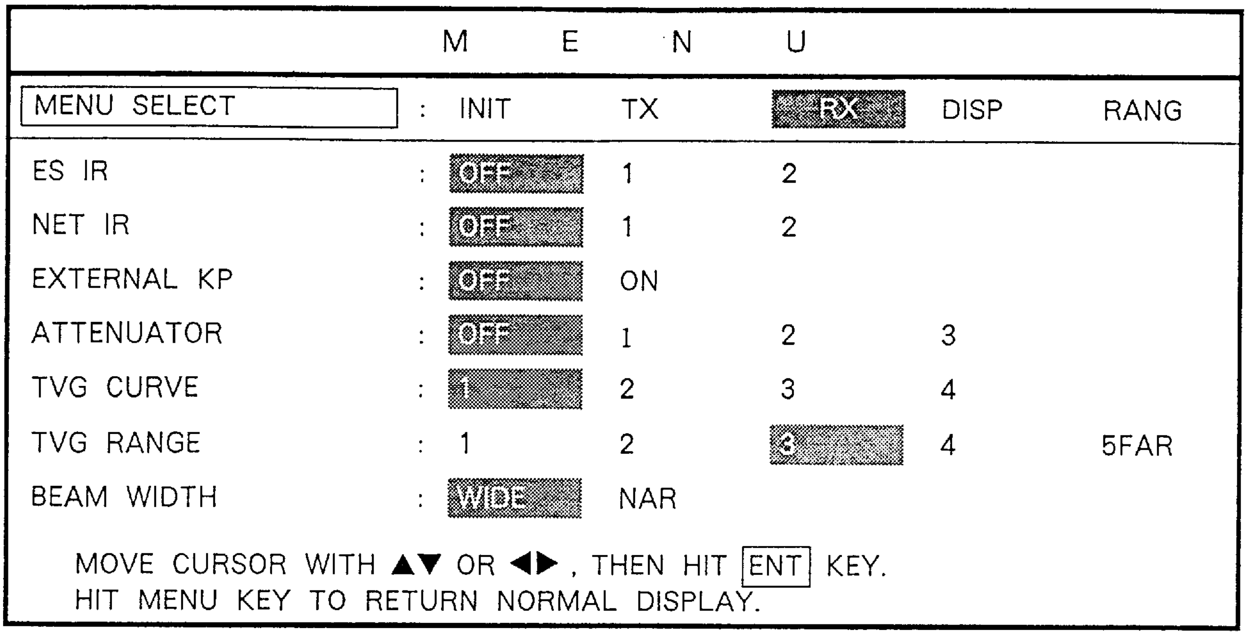


```
                          M     E     N     U
MENU SELECT          :  INIT    TX    RX       DISP      RANG
SCAN SPEED           :  HIGH    STD
SCAN STEP            :  1°      2°
ROLL CALIB           :  ON      OFF
TX OUTPUT            :  1       2     3        4MAX
SIDE LOBE            :  MIN     MAX
TX PRR               :  STD     LOW
   MOVE CURSOR WITH ▲▼ OR ◀▶ , THEN HIT ENT KEY.
   HIT MENU KEY TO RETURN NORMAL DISPLAY.
```

SCAN SPEED	**HIGH** (Alternates vertical and simultaneous port/starboard soundings), **STD** (Vertical to port to starboard to vertical successive sounding).
SCAN STEP	selects the scanning step for the sounding beam in the auto scanning mode: **1** degree or **2** degrees.
ROLL CALIB	enables and disables compensation for ship's rolling by the clinometer. If set to **ON**, the adjustable range of the TX angle changes from 36 degrees to 16 degrees for both port and starboard.
TX OUTPUT	selects transmitter output power emitted from the transducer. The 4 position is for the maximum output. In shallow waters, select the lower power (**1, 2 or 3**) to avoid unwanted surface noises.
SIDELOBE	selects the level of the sidelobe of the transmitting signal. The **MAX** position is proper for discrimination of ground quality.
TX PRR	selects the number of transmitting pulses per minutes. The **STD** position is for the standard setting. If the second reflection appears on the screen, however, select the **LOW** position to eliminate it.

RECEIVER Menu

These items may be changed in accordance with fishing ground and fishing method, etc. Set them for distinct echo presentation.



MENU

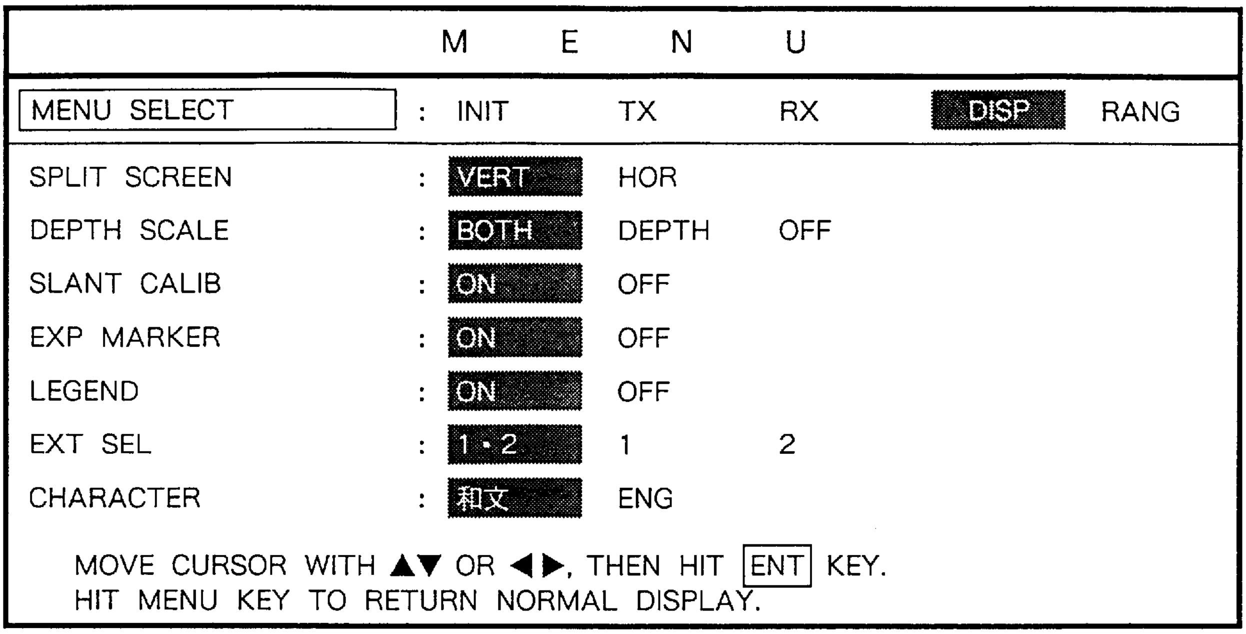
MENU SELECT	:	INIT	TX	[✓ RX]	DISP	RANG
ES IR	:	[✓ OFF]	1	2		
NET IR	:	[✓ OFF]	1	2		
EXTERNAL KP	:	[✓ OFF]	ON			
ATTENUATOR	:	[✓ OFF]	1	2	3	
TVG CURVE	:	[✓ 1]	2	3	4	
TVG RANGE	:	1	2	[✓ 3]	4	5FAR
BEAM WIDTH	:	[✓ WIDE]	NAR			

MOVE CURSOR WITH ▲▼ OR ◀▶ , THEN HIT ENT KEY.
HIT MENU KEY TO RETURN NORMAL DISPLAY.

ES IR	sets the degree of interference rejection from other echo sounders and sonar. The **2**-position may reject weak echoes as well as unwanted ones.
NET IR	rejects unwanted noise appearing on the net recorder display.
EXTERNAL KP	synchronizes transmission with another echo sounder installed onboard to prevent mutual interference. *Note: To use this functiopn, the keying pulse from another echo sounder should be applied to the FCV-10.*
ATTENUATOR	If the intensity of seabed and fish echoes is too high with the **GAIN** control set to the minimum position, increase this value to decrease receiver sensitivity.
TVG CURVE	presets the **TVG** curve. The higher the setting the greater the **TVG** effect. Change the position according to your fishing ground and method: **1** for 20log R curve suitable for seabed and large fish school detection, **2** for 20log 2R, **3** for 30log R, **4** for 40log R suitable for a single fish and small fish school detection.
TVG RANGE	sets both the **TVG** start depth (from 1 to 5 meters), and **TVG** effective range. Note that the **TVG** effective range is determined by combination of **TVG CURVE** and **TVG RANGE** settings. If , for example, the **TVG RANGE** is set to 3, the effective ranges are; 700 m for 20log R, 350 m for 20 log 2R, 75 m for 30log R and 30 m for 40 log R.
BEAMWIDTH	10 degrees for **WIDE**, 6 degrees for **NAR**row.

DISPLAY Menu

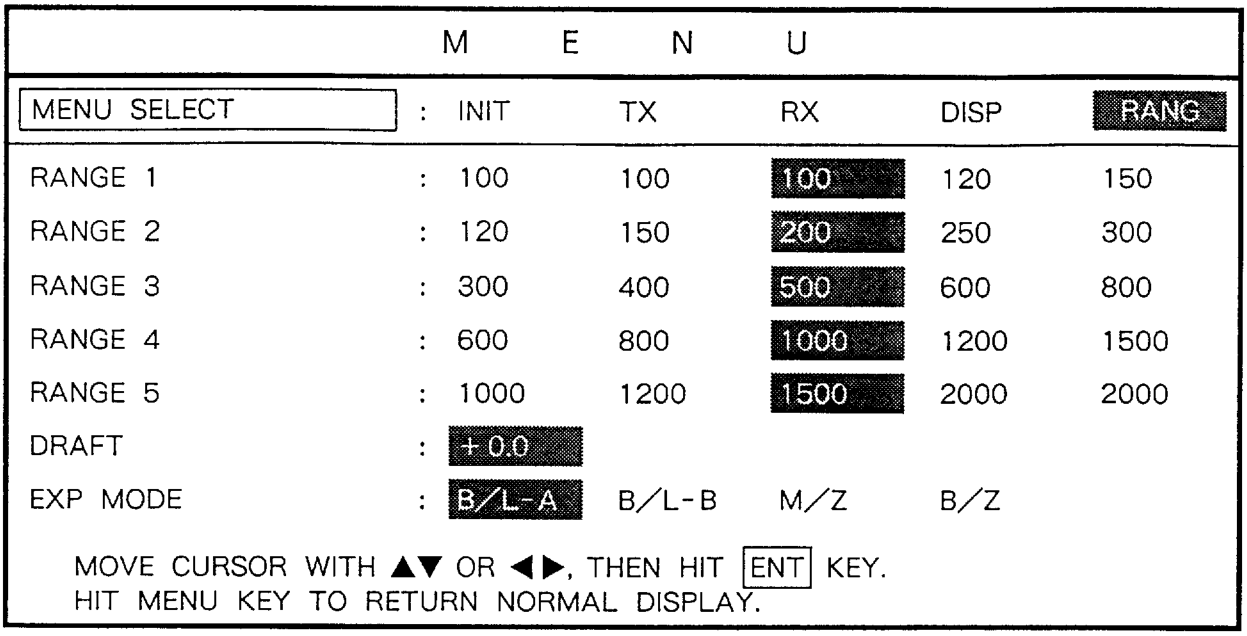
These items may be changed locally on your requirements.



```
                              M     E     N     U

 MENU SELECT          :  INIT      TX       RX       DISP      RANG

 SPLIT SCREEN         :  VERT      HOR
 DEPTH SCALE          :  BOTH      DEPTH    OFF
 SLANT CALIB          :  ON        OFF
 EXP MARKER           :  ON        OFF
 LEGEND               :  ON        OFF
 EXT SEL              :  1・2      1        2
 CHARACTER            :  和文      ENG

    MOVE CURSOR WITH ▲▼ OR ◀▶, THEN HIT ENT KEY.
    HIT MENU KEY TO RETURN NORMAL DISPLAY.
```

SPLIT SCREEN	**VERT**ically or **HOR**izontally divided.
DEPTH SCALE	**BOTH** (Temperature and depth scale displayed), **DEPTH** (Depth scale displayed), **OFF** (No scale displayed)
SLANT CALIB	**ON** (Slant ranges to a seabed measured by port and starboard soundings are converted into true sea depth.), **OFF** (Slant ranges are displayed. These are greater than a true depth because of longer sounding paths of ultrasonic pulse.)
EXP MARKER	**ON** (The pelagic and bottom-locked expansion ranges are shown with marker lines on the vertical display.), **OFF** (No expansion range marker)
LEGEND	turns **ON** and **OFF** digital display of ship's speed, ship's position in latitude/longitude, date, and time data fed from external devices if connected.
EXT SEL	selects either or both external echo sounders, if connected, which are monitored on the left screen: **1** (#1 echo sounder), **2** (#2 echo sounder), **1.2** (#1 and 2 echo sounders).
CHARACTER	selects display language: Japanese or **ENG**lish.

RANGE Menu



M E N U

MENU SELECT	INIT	TX	RX	DISP	RANG
RANGE 1	100	100	100	120	150
RANGE 2	120	150	200	250	300
RANGE 3	300	400	500	600	800
RANGE 4	600	800	1000	1200	1500
RANGE 5	1000	1200	1500	2000	2000
DRAFT	+0.0				
EXP MODE	B/L-A	B/L-B	M/Z	B/Z	

MOVE CURSOR WITH ▲▼ OR ◀▶, THEN HIT ENT KEY.
HIT MENU KEY TO RETURN NORMAL DISPLAY.

RANGE 1 to 5	These items let you customize depth ranges.
DRAFT	Set ship's draft (depth of transducer from sea surface). Setting range is 50.0 to -6.0. Normally set it in positive polarity. When unit of depth readout is changed, re-enter it.
EXP MODE	Set type of expansion picture which is displayed when **SUB MODE** switch is set to "EXP".

B/L-A:	Bottom-lock expansion picture on whole screen.
B/L-B:	Normal and bottom-lock expansion picture combination display.
M/Z:	Normal and marker zoom picture combination display.
B/Z:	Normal and bottom zoom picture combination display.

Fine Tuning Hue

As noted on page 7, you can adjust display hue with the **HUE** key. If you would like to fine tune the hue, follow the procedure below.

Procedure

1) Press the **PWR** and **OFF** keys together to turn off the unit.

2) Press the **HUE** and **PWR** keys to enable the **HUE CHANGE** mode.

3) Press the **MENU** key. The **HUE CHANGE** menu appears.

4) Select the desired brilliance by pressing the **BRILL** key.

5) Select the color to be changed; **0** to **F** by pressing the up and down arrow keys.
(**0**: background color, **F**: reddish brown)

6) Move the cursor to the primary color R (red), G (green) or B (blue) by pressing the right and left arrow keys.

Note: The display color develops with the three primary colors of red, green and blue.

7) Observing the color bar, change the value on the cursor, press the up and down arrow keys while pressing the **ENT/A** key. If the desired color cannot be obtained by a single primary color setting, do the same on other primary colors.

8) To set other color levels, repeat the steps **4**) to **7**) .

9) To set other brilliances, repeat the steps **3**) to **8**).

10) After setting the hue to your liking, press the **PWR** and **OFF** keys together to turn off the unit.

Recovering Factory-set Hue

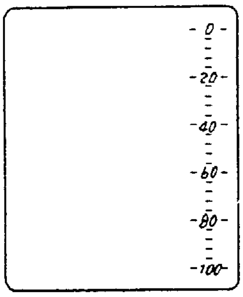
If the above cannot bear satisfactory results unfortunately, the factory-set hue can be recovered by pressing the **PWR** and **BRILL** keys together.

9. IF SOMETHING SHOULD GO WRONG WITH YOUR UNIT

If you cannot get the unit to operate properly, do the Operation Check below to determine if there is equipment fault. If there is a problem, execute the System Diagnosis (P. 30), and report the results when requesting service.

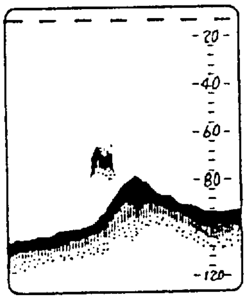
OPERATION CHECK

No Echo Presentation, But Scale Shows.



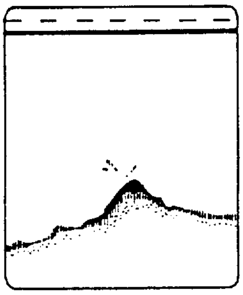
- Is the **ADVANCE** (display advance speed) control set to **0** (stop)? Normal setting is **1/1**.
- Is the **ADVANCE** control set to **LOG**?
  This position requires ship speed signal input which is fed from a speed log or navigation equipment. Also check that they are working properly.

No Zero Line



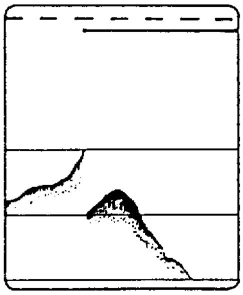
- Is the range shift reading **0**?
  If the range is shifted several meters or more, the zero line is not displayed. Press the - shift key to move the zero line to 0 meters.

Low Sensitivity



- Is the **GAIN** control set too low?
- Is the **CLUTTER** control set too high?
- Turn the **GAIN** control clockwise or the **CLUTTER** control counterclockwise to increase the receiver sensitivity.

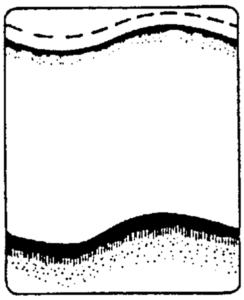
No Water Depth Readout/Bottom Lock Inoperative



- Is the seabed echo present within the normal display range?
- Is the seabed return strong enough; i.e., red or reddish brown?
- Water depth may not be indicated in the following cases:

1) Seabed return is too weak.
2) Seabed return is interrupted by air foam or a large fish school.
3) Seabed echo is not painted red or reddish brown.

Display Color Distorted



- Is a magnetic field generator (heavy duty transformer, rectifier, etc.) nearby?
- Picture may become distorted if a machine including a heavy duty transformer is located near the unit.
- Display color may become distorted when echoes are greatly different in intensity.

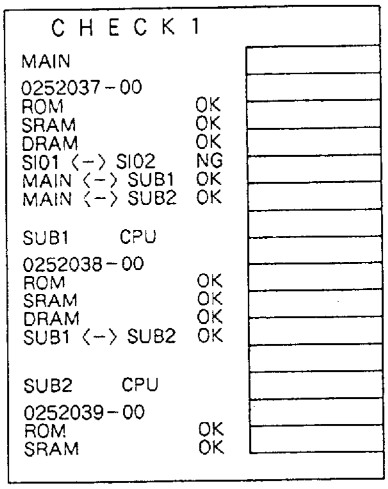
SYSTEM DIAGNOSIS (SELF-CHECK)

Your unit provides self-check facilities to check it for proper operation.

Memory ICs (Check 1)

1) Turn off the unit by pressing the **PWR** and **OFF** keys simultaneously.

2) Turn on the unit by pressing the - and **PWR** keys simultaneously. The results of the memory ICs check appear shortly thereafter. Below is an example of check results.



```
  CHECK 1
MAIN
0252037-00
ROM                OK
SRAM               OK
DRAM               OK
SI01 <-> SI02      NG
MAIN <-> SUB1      OK
MAIN <-> SUB2      OK

SUB1      CPU
0252038-00
ROM                OK
SRAM               OK
DRAM               OK
SUB1 <-> SUB2      OK

SUB2      CPU
0252039-00
ROM                OK
SRAM               OK
```

Note: SI01 < - > SI02 are for factory use only. Therefore the indication NG *(No Good) is normal.*

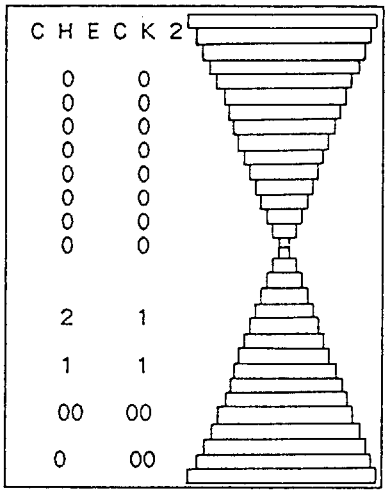
3) To terminate the system diagnosis check, turn off the unit by pressing the **PWR** and **OFF** keys simultaneously. Then press the **PWR** key to begin the normal operation again.

Checking Controls and Keys on the Front Panel (Check 2)

1) Turn off the unit by pressing the **PWR** and **OFF** keys simultaneously.

2) Press the **PWR** and **ENT/A** keys simultaneously. The display should look something like the figure below.

3) Operate each control and key one by one. The corresponding number on the screen changes if the control or key is functioning properly.



4) To terminate Check 2, press the **PWR** and **OFF** keys simultaneously. Then press the **PWR** key to begin the normal operation again.

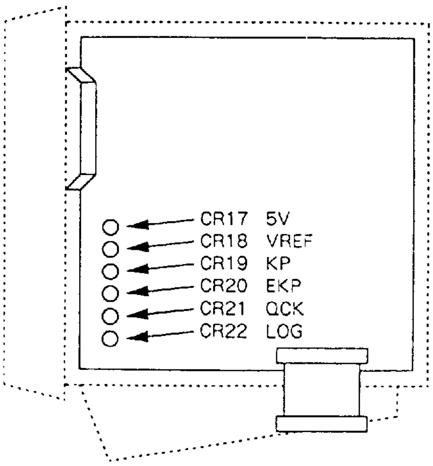
Checking With the LED Displays

There are several LEDs inside the unit. The status of LEDs give the service technician some hints to bring replacement parts. Therefore it is preferable you open the cover and check the status of LEDs before calling service.

DANGER

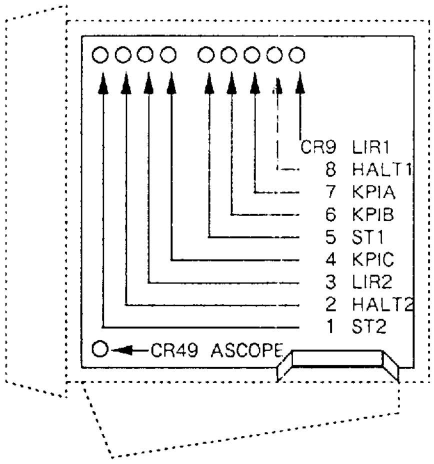
HIGH VOLTAGE exists inside the display unit. Precautions must always be exercised when reaching inside the equipment for checking LED status.

LEDs on MAIN PCB(02P6084)


CR17 5V
CR18 VREF
CR19 KP
CR20 EKP
CR21 QCK
CR22 LOG

Symbol	Signal	LED Status	Remarks
CR17	5V	Lighting	5V supply for logic ckt.
CR18	VREF	Lighting	Reference voltage +5V for A/D conversion of operating control signals
CR19	KP	Blinking	Every transmission
CR20	EKP	Not lit or Blinking	Keying pulse from external transceivers.
CR21	QCK	Lighting faintly	When HIGH scan speed is selected.
CR22	LOG	Blinking	When ship speed signal is input.

LEDs on SUB PCB(02P6085)


CR9 LIR1
8 HALT1
7 KPIA
6 KPIB
5 ST1
4 KPIC
3 LIR2
2 HALT2
1 ST2
CR49 ASCOPE

Symbol	Signal	LED Status	Remarks
CR1	ST2	Lighting faintly	Checks CPU on SUB2 board.
CR2	HALT2	Lighting darkly	Checks CPU on SUB2 board.
CR3	LIR2	Blinking	Checks CPU on SUB2 board.
CR4	KPIC	Blinking	By KP. Checks echo acquisition port C.
CR5	ST1	Lighting faintly	Checks CPU on SUB1 board.
CR6	KPIB	Blinking	By KP. Checks echo acquisition port B. (Note)
CR7	KPIA	Blinking	By KP. Checks echo acquisition port A .(Note)
CR8	HALT1	Lighting darkly	Checks CPU on SUB1 board.
CR9	LIR1	Lighting faintly	Checks CPU on SUB1 board.
CR49	ASCOPE	Blinking	By KP. Checks A-scope ckt.

Note: LEDs CR6 and CR7 may not light in some display modes.

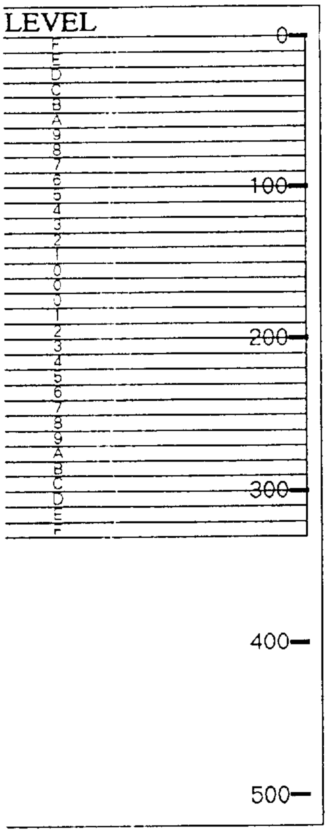
Checking With Demo Display

This mode operates the display unit without transceiver unit connection. Thus this mode is useful for judging whether the display unit is operating properly.

Procedure

1) Turn on the unit by pressing the **RECALL** and **PWR** keys. The demo display shown below appears. (**F**: Reddish brown, **0**: Background color)

2) The unit checks following key and control functions:
   - **RANGE** control and **SHIFT** key
   - **MODE** switch
   - **ADVANCE** control
   - **CLUTTER** control
   - **STORE** and **RECALL** keys
   - **TX DIR** control (See note 1)
   - **MENU** key
   - A-scope display with the **ENT/A** key
   - **HUE** and **BRILL** keys



Note 1: When the SLANT CALIB is set to ON on the menu display, the width of echoes on port, starboard and auto scan displays is reduced with the formula below.

Width (slant display) = Width (vertical display) x cos(TX angle)

2: The above display is given when the CLUTTER *control is set to 0.*

3: The color bars do not appear when the **SCAN SPEED** *is set to* **HIGH** *on the TRANSMITTER menu.*

4: The **GAIN** *and* **TVG** *controls do not function during this check.*

5: The **UP/DN**, **DN** *and* **EXT** *positions of the* **SUB MODE** *switch can be checked when a net recorder or external transceiver is connected.*

10. SPECIFICATIONS

Display Unit CV-100

1. Display Tube	14" diagonal medium resolution CRT
2. Echo Color	8 or 16 colors depending on echo intensity. (Combination of colors can be selected by the HUE key.)
3. Basic Display Range	100, 200, 500, 1000, 1500 m (Reprogramable by MENU.)
4. Display Start Depth	0 to 6000 m minus basic display range
5. Sounding Direction	Slant port, slant starboard, vertical, auto scanning (slant port and slant starboard)
6. Presentation Mode	1) Vertical sounding 2) Slant port sounding 3) Slant starboard sounding 4) Autoscan sounding 5) Bottom-locked expansion 6) Pelagic expansion 7) A-scope presentation 8) Monitoring external net recorder (Upward and/or downward sounding 9) Monitoring external transceivers (ETR-2B/3B) sounding signal
7. Expansion Range	5, 10, 20, 40, 80 m for both pelagic expansion and bottom-locked expansions
8. Variable Range Markers (VRM)	1) Vertical VRM (Time or distance* from VRM to present position) 2) Horizontal VRM (Depth from zero line to VRM)

Note: Speed log input required to measure the distance from the vertical VRM to the present ship's position.

9. Display Memory Capacity	One full screen
10. Brilliance Control	Adjustable in four steps
11. Digital Display	Ship's position in latitude and logitude, Water temperature (digital readout and graph), Ship's speed*

* *Navigation equipment, water temperature indicator and speed log required.*

12. Power Supply	100/110/115 Vac, 2 A, 50/60 Hz, 1 ø, 220/230 Vac, 1 A, 50/60 Hz, 1 ø (Optional step-down transformer CI-350 required)
13. Dimensions and Weight	372 (W) x 432 (H) x 465 (D) mm, 21 kg

Transceiver Unit CV-101

1. Frequency	24 kHz
2. Output Power	10 kWrms
3. Pulselength	1 to 20 msec (variable according to display range)
4. Number of Transmission	200 ppm or less (variable according to display range)
5. Slant Sounding Direction	Can be set in 1 degree or 2 degrees step from 0 degrees (vertical) to 16 degrees or 36 degrees.
6. TVG Curve	20logR, 20log2R, 30logR, 40logR (selected on the menu display)
7. Detection Capability	6000 m for seabed, 1400 m for fish in a satisfactory condition
8. Power Supply	100/110/115 Vac, 2 A, 50/60 Hz, 1 ø or 220/230 Vac, 1 A, 50/60 Hz, 1 ø (Change of transformer tap connection is required.)
9. Dimensions and Weight	374 (W) x 194 (H) x 592 (D) mm, 25 kg

Transducer CV-102

1. Beamwidth	10 degrees (port-starboard) x 9.5 degrees (fore-aft) at -3dB point
2. Dimensions and Weight	467 x 467 x 167 (H) mm, 65 kg

Clinometer CV-103

1. Detection Direction	Ship's rolling of port 20 degrees to starboard 20 degrees
2. Dimensions and Weight	168 (W) x 108 (H) x 150 (D) mm, 2 kg

COMPLET SET

No.	Description	Type	Qty	Code Number	Remarks
1	Display Unit	CV-100-E	1	000-014-552 000-014-591	For color 2.5GY5/1.5 For color 2.5G7/2
2	Transceiver Unit	CV106-6	1	000-014-553	100/110/115 Vac
		CV-101-7	1	000-014-554	220/230 Vac
3	Transducer	CV-102	1	000-014-557	
4	Thru-hull Pipe	TFB-1400	1	000-015-227	
5	Clinometer	CV-103	1	000-014-558	
6	Spare Parts		1 set		See table on flollowing page.
7	Installation Materials		1 set		See table on following page.
8	Accesories		1 set		See table on following page.

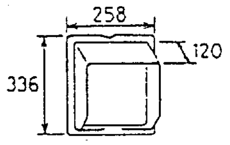
OPTION

No.	Description	Type	Code Number	Remarks
1	Recorder Unit	FE-1280	1	Vertical feed or horizontal feed
2	Paper Winder	WI-31	000-014-589	
3	Step-down Transformer	CI-350-72	000-069-848	For 220 Vac ship's mains
		CI-350-73	000-069-849	For 230 Vac ship's mains
4	Transducer Tank	T-674	000-015-989	

Accessories

No.	Description	Type	Qty	Sketch	Code Number	Remarks
1	Hood	10-044-0032-0	1	1	000-109-250	
2	Filter Assembly	FP02-02620	1	2	002-007-290	
3	Vinyl Cover	10-044-0031-1	1	3	000-801-859	

1



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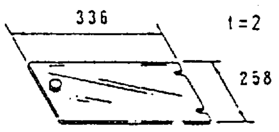

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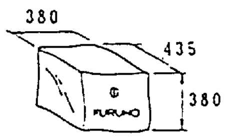
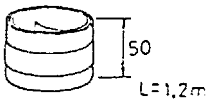


Installation Materials

No.	Description	Type	Qty	Sketch	Code Number	Remarks
1	Copper Strap	WEA-1004-0	1	1	500-310-040	For display unit
2	Connector	NCS-252-P	1	2	000-506-501	For display unit
3	Connector	SRCN6A13-3P	1	3	000-508-660	
4	Connector	SRCN6A16-10P	1	4	000-508-663	
5	Connector	SRCN6A25-24P	1	5	000-508-676	
6	Insulation Tube	3.0x0.3 *50cm*	4	6	000-568-226	
7	Copper Strap	WEA-1004-0	1	1	500-310-040	For transceiver unit
8	Connector	NCS-252-P	1	7	000-506-501	
9	Signal Cable Assy.	S02-13-10 (24-25P)	1	8	002-007-270	
10	Signal Cable Assy	S02-14-10 (5-3P)	1	8	002-007-270	For clinometer unit
11	Signal Cable Assy	S02-19-10 (24P)	1		002-135-270	For FE-1282

1



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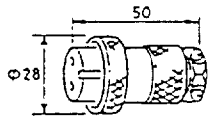

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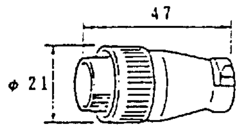

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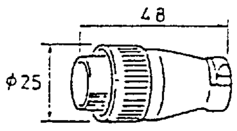
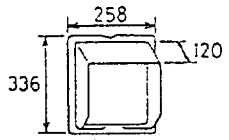


Accessories

No.	Description	Type	Qty	Sketch	Code Number	Remarks
1	Hood	10-044-0032-0	1	1	000-109-250	
2	Filter Assembly	FP02-02620	1	2	002-007-290	
3	Vinyl Cover	10-044-0031-1	1	3	000-801-859	

1



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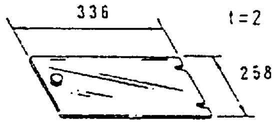

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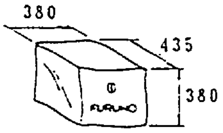
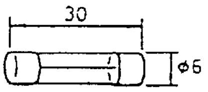


Spare Parts

No.	Description	Type	Qty	Fig.	Code Number	Remarks
1	Fuse	FGBO 7A, AC125V or JSO 7A, 125A	1	1	000-549-013	For 100/110/115 Vac ship's mains
		FGBO 5A, AC125V	1	1	000-549-022	For 220/230Vac ship's mains
2	Fuse	FGBO 3A, AC125V or JSO 3A, 125A	1	1	000-549-063	
3	Hex Wrench	Hex size 4 mm	1	2	000-830-132	
4	Spare Parts Box	For F-710	1	3	000-831-610	

1



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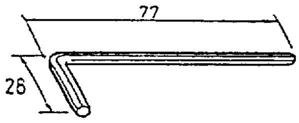

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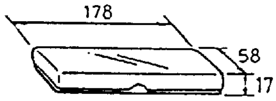


Recommended Installation of Transducer CV-102

When the transducer CV-102 is installed on a large vessel just under the bulbous bow, we recommend that it be installed as shown in Fig. 1. FURUNO standard tank T-674 is not strong enough for big slamming.

1) For locally made tank, use a steel plate whose thickness is 10 to 12 mm.

2) The diameter of the cable hole in the top plate should be between 60 and 80 mm.

3) Fix the transducer cable as shown in Fig. 1 if the distance between the transducer and the thru-hull pipe is longer than 1 m. This will prevent damage to wiring inside the transducer due to cable vibration.

Recommended installation:

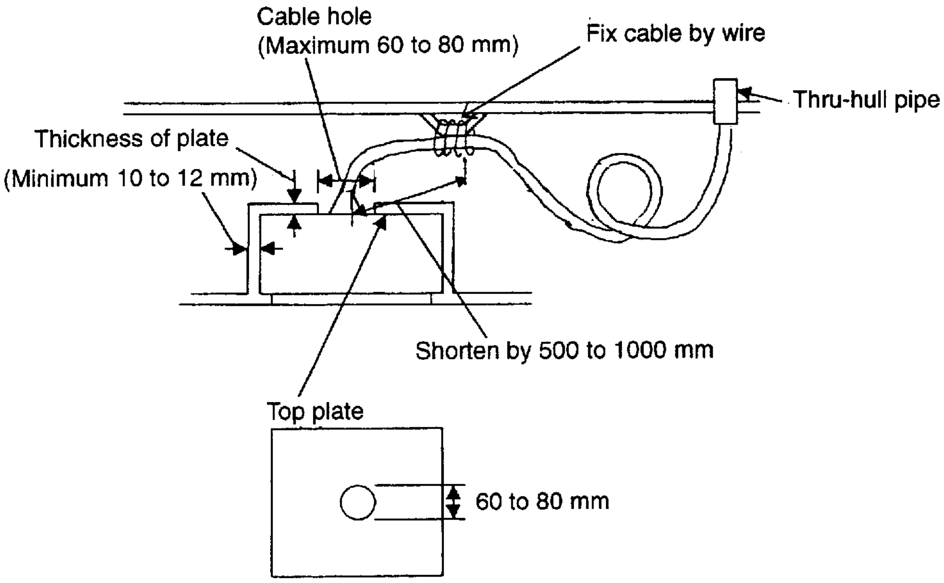

Cable hole
(Maximum 60 to 80 mm)
Fix cable by wire
Thru-hull pipe
Thickness of plate
(Minimum 10 to 12 mm)
Shorten by 500 to 1000 mm
Top plate
60 to 80 mm

Fig.1

CAUTION

Damage to the CV-102 has been reported from large trawlers where the transducers, installed just under the bulbous bow, have been struck by waves.

According to our investigation, the CV-102 was installed as shown in Fig. 2 or Fig. 3. These installations did not provide sufficient protection from large waves and thus the transducers were damaged.

Installation case 1 (Refer to Fig. 2): The cutout in the top plate was 400 mm in diameter. Because of the large cutout and large waves, the top of the CV-102 projected outward, which allowed waves to dent the transducer bottom and break wires and elements in the transducer.

Installation case 2 (Refer to Fig. 3): The transducer is only fixed by two bars instead of the top plate. This allowed the transducer to separate from the tank and break.

Bad installtion: Case 1

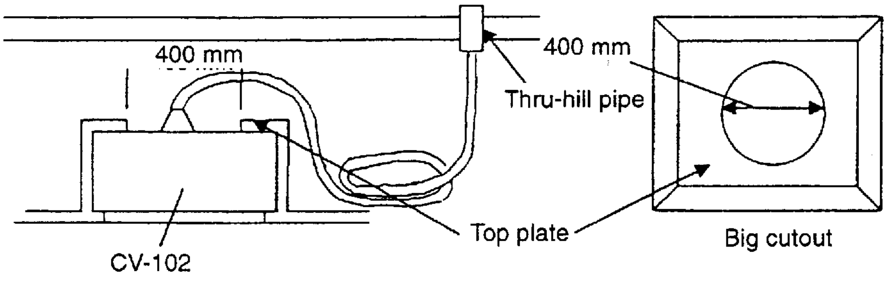

400 mm
400 mm
Thru-hill pipe
Top plate
Big cutout
CV-102

Fig. 2

Bad installation: Case 2

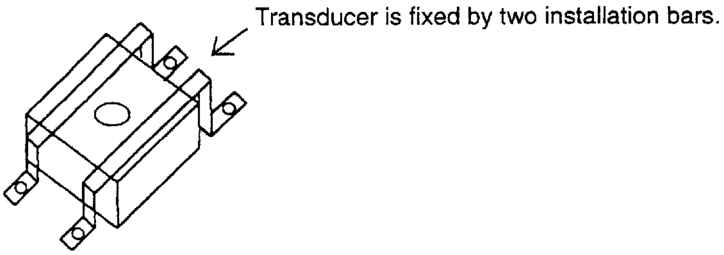
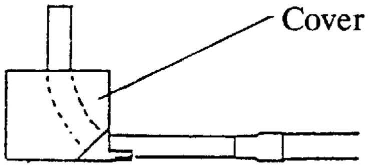

Transducer is fixed by two installation bars.

Fig. 3

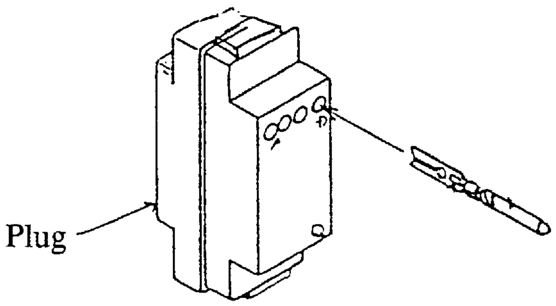
Assembling the Transducer Cable

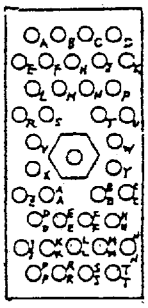
The transducer cable is 30 meters long and has necessary contact pins attached. Insert contact pins into the connector plug and assemble the connector when the unit is installed on board the ship.

1) Pass the cable through the connector housing like the figure below.



2) Insert the contact pins to the plug until they are securely pushed in. Refer to the wiring list for each lead color.



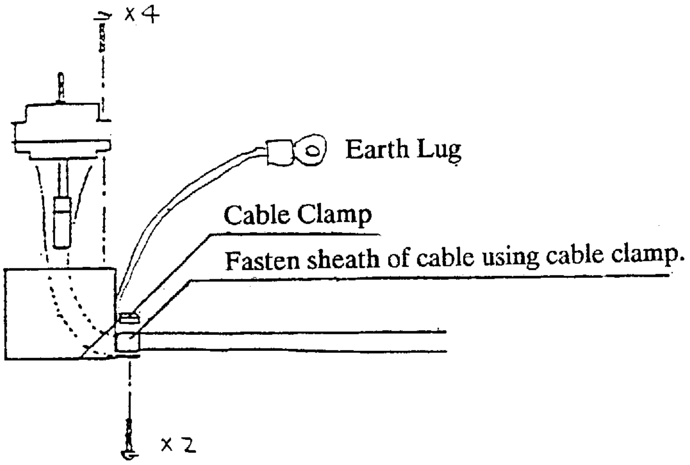


Note: Colors in parentheses denote colors of tubing which covers black color vinyl leads.

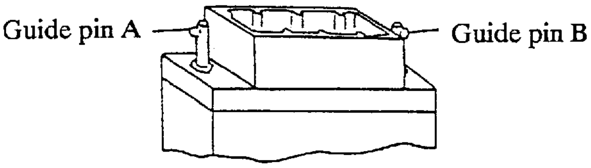
	Color		**Color**
A	White	EE	(White)
B	Red	FF	(Red)
C	Green	HH	(Green)
D	Yellow	JJ	(Yellow)
E	Brown	KK	(Brown)
F	Blue	LL	(Blue)
H	Gray	MM	(Gray)
J	Orange	NN	(White/Yellow)
K	Purple	PP	Black
L	White/Black	RR	(White/Black)
M	White/Red	SS	(White/Red)
N	White/Green	TT	(White/Green)

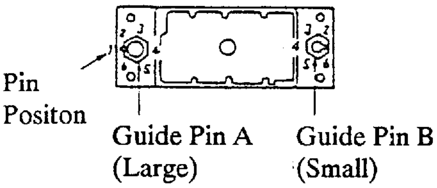
Note: Colors in parentheses denote colors of tubing which covers black color vinyl leads.

3) Fix the plug and cable clamp to the connector cover.


x4
Earth Lug
Cable Clamp
Fasten sheath of cable using cable clamp.
x2

4) Check that the guide pin is set to **1** (factory setting is also **1**).


Guide pin A
Guide pin B

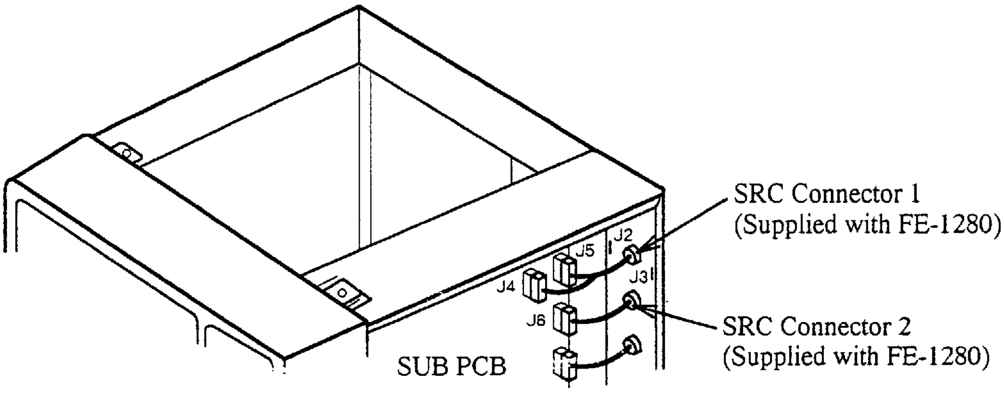

Pin
Positon
Guide Pin A
(Large)
Guide Pin B
(Small)

Modifying Unit for Connection with FE-1280

Modify the display unit as follows to connect the FE-1280 (option).

1) Remove wires which connect J2 on rear panel to SUB board. Then, make wiring between J2 on rear panel and SUB board by using "SRC Connector 1" (connectors fitted with interconnection wires) supplied as an installation material of FE-1280.

2) Make wiring between J3 on rear panel and SUB board by using "SRC Connector 2" supplied as an installation materials of FE-1280.


SRC Connector 1
(Supplied with FE-1280)
J2
J5
J3
J4
J6
SRC Connector 2
(Supplied with FE-1280)
SUB PCB

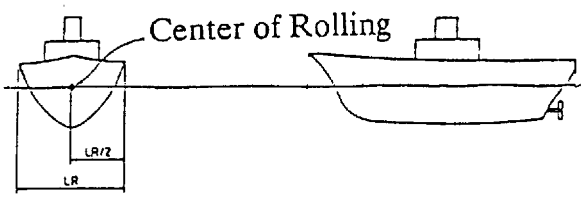
Installing Clinometer Unit

The clinometer is used to detect the inclination of the ship during rolling to stabilize the transmitting beam. Therefore it is preferable that it be located as near the ship's rolling axis as possible. The best position is summarized as below:

1) The vertical position is as close to the ship's draft level as possible.

2) The horizontal position is as close to the ship's center as possible.

Following the recommendations outlined in 1) and 2), the mounting position is shown below.



Note: The unit should be oriented forward referring to the bow mark.

Calibration of Clinometer

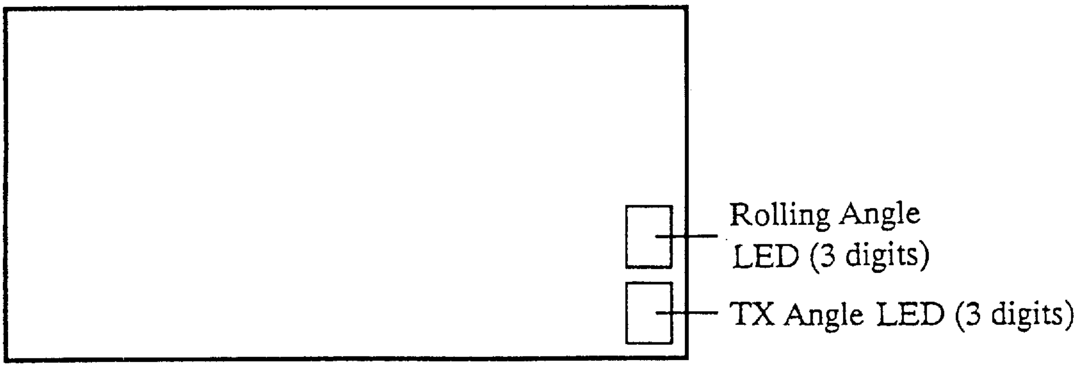
If the clinometer causes unwanted error due to its mounting position, compensate for it on the **INITIAL** menu.

1) Measure actual inclination by the ship's clinometer.

2) Press the **MENU** key to present the menu display.

3) Three digital displays shows rolling angle in three digit.

4) Select the calibration value at the **ROLL-AMP ADJUST** between -10% and + 10% so that the digital display indicates the value most closest to the actual inclination angle.



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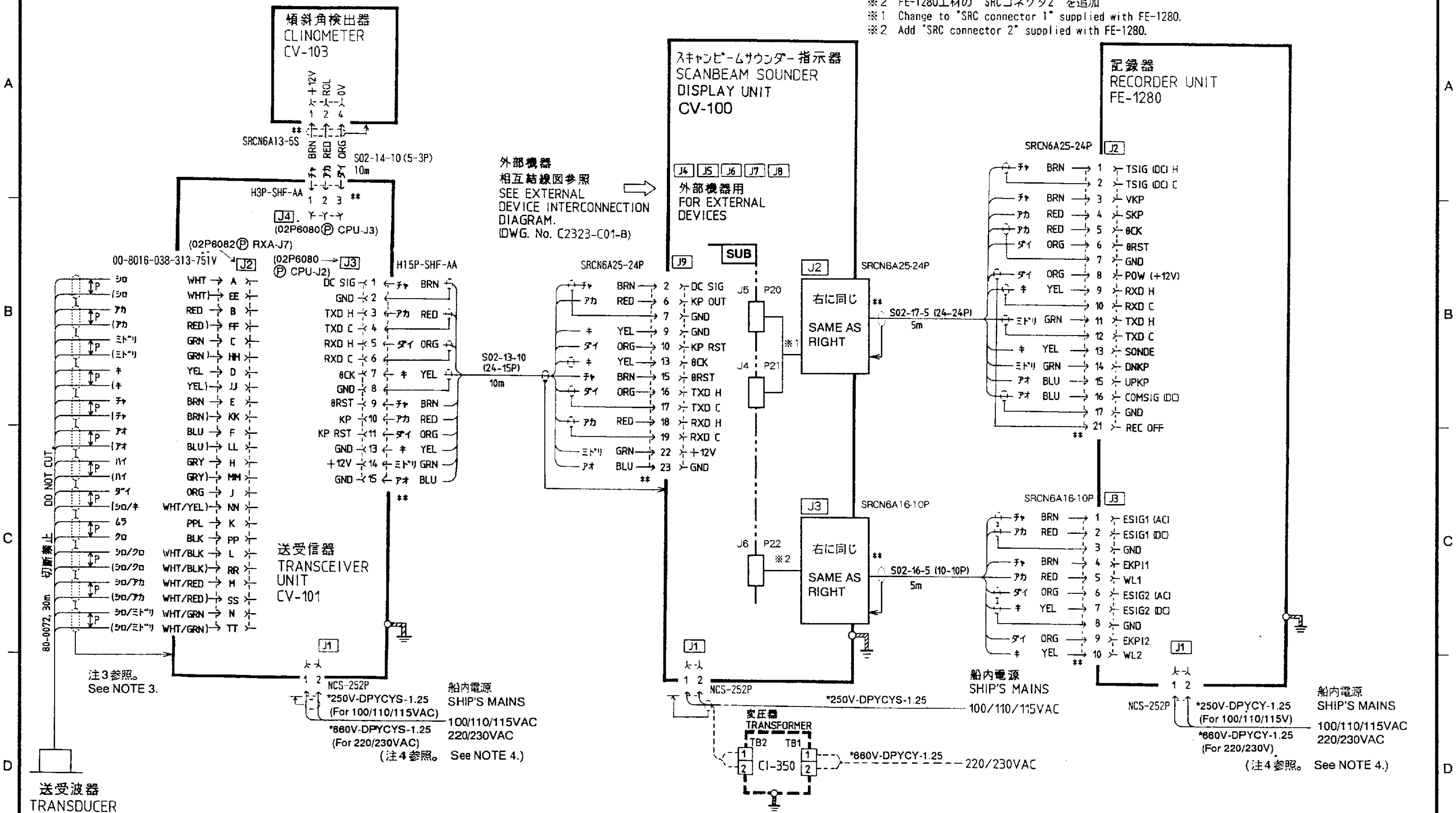
FURUNO


傾斜角検出器
CLINOMETER
CV-103
+12V ROL 0V
1 2 4
SRCN6A13-5S
BRN RED ORG
チャ アカ ダイ
S02-14-10 (5-3P)
10m
H3P-SHF-AA
1 2 3
J4
(02P6080Ⓟ CPU-J3)
(02P6082Ⓟ RXA-J7)
00-8016-038-313-751V
J2
(02P6080 Ⓟ CPU-J2)
J3
H15P-SHF-AA
DC SIG 1 チャ BRN
GND 2
TXD H 3 アカ RED
TXD C 4
RXD H 5 ダイ ORG
RXD C 6
θCK 7 キ YEL
GND 8
θRST 9 チャ BRN
KP 10 アカ RED
KP RST 11 ダイ ORG
GND 13 キ YEL
+12V 14 ミドリ GRN
GND 15 アオ BLU
WHT A
WHT) EE
RED B
RED) FF
GRN C
GRN) HH
YEL D
YEL) JJ
BRN E
BRN) KK
BLU F
BLU) LL
GRY H
GRY) MM
ORG J
WHT/YEL) NN
PPL K
BLK PP
WHT/BLK L
WHT/BLK) RR
WHT/RED M
WHT/RED) SS
WHT/GRN N
WHT/GRN) TT
シロ (シロ アカ (アカ ミドリ (ミドリ キ (キ チャ (チャ アオ (アオ ハイ (ハイ ダイ (シロ/キ ムラ クロ シロ/クロ (シロ/クロ シロ/アカ (シロ/アカ シロ/ミドリ (シロ/ミドリ
P
DO NOT CUT
切断禁止
80-0072, 30m
送受信器
TRANSCEIVER
UNIT
CV-101
J1
1 2
NCS-252P
*250V-DPYCYS-1.25
(For 100/110/115VAC)
*660V-DPYCYS-1.25
(For 220/230VAC)
船内電源
SHIP'S MAINS
100/110/115VAC
220/230VAC
(注4参照。 See NOTE 4.)
注3参照。
See NOTE 3.
送受波器
TRANSDUCER
S02-13-10
(24-15P)
10m
外部機器
相互結線図参照
SEE EXTERNAL
DEVICE INTERCONNECTION
DIAGRAM.
(DWG. No. C2323-C01-B)
スキャンビームサウンダー指示器
SCANBEAM SOUNDER
DISPLAY UNIT
CV-100
J4 J5 J6 J7 J8
外部機器用
FOR EXTERNAL
DEVICES
J9
SUB
SRCN6A25-24P
BRN 2 DC SIG
RED 6 KP OUT
7 GND
YEL 9 GND
ORG 10 KP RST
YEL 13 θCK
BRN 15 θRST
ORG 16 TXD H
17 TXD C
RED 18 RXD H
19 RXD C
GRN 22 +12V
BLU 23 GND
J5 P20
J4 P21
J6 P22
※1
※2
J2
J3
右に同じ
SAME AS RIGHT
SRCN6A25-24P
SRCN6A16-10P
S02-17-5 (24-24P)
5m
S02-16-5 (10-10P)
5m
J1
1 2
NCS-252P
*250V-DPYCYS-1.25
100/110/115VAC
変圧器
TRANSFORMER
TB2 TB1
CI-350
*660V-DPYCY-1.25
220/230VAC
船内電源
SHIP'S MAINS
記録器
RECORDER UNIT
FE-1280
J2
SRCN6A25-24P
チャ BRN 1 TSIG (DC) H
2 TSIG (DC) C
チャ BRN 3 VKP
アカ RED 4 SKP
アカ RED 5 θCK
ダイ ORG 6 θRST
7 GND
ダイ ORG 8 POW (+12V)
キ YEL 9 RXD H
10 RXD C
ミドリ GRN 11 TXD H
12 TXD C
キ YEL 13 SONDE
ミドリ GRN 14 DNKP
アオ BLU 15 UPKP
アオ BLU 16 COMSIG (DC)
17 GND
21 REC OFF
J3
SRCN6A16-10P
チャ BRN 1 ESIG1 (AC)
アカ RED 2 ESIG1 (DC)
3 GND
チャ BRN 4 EKPI1
アカ RED 5 WL1
ダイ ORG 6 ESIG2 (AC)
キ YEL 7 ESIG2 (DC)
8 GND
ダイ ORG 9 EKPI2
キ YEL 10 WL2
J1
1 2
NCS-252P
*250V-DPYCY-1.25
(For 100/110/115V)
*660V-DPYCY-1.25
(For 220/230V)
船内電源
SHIP'S MAINS
100/110/115VAC
220/230VAC
(注4参照。 See NOTE 4.)
**

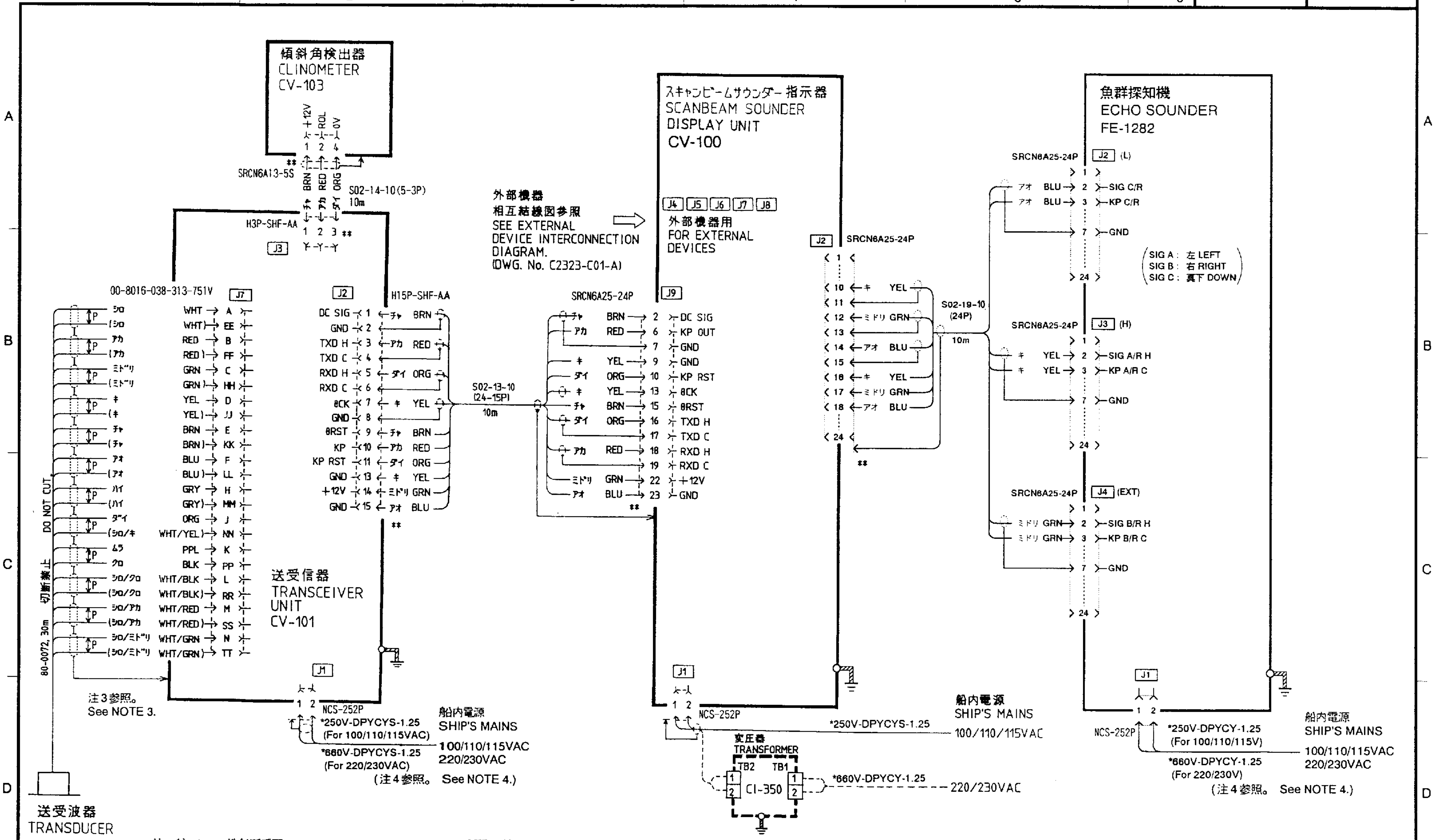
※1 FE-1280工材の "SRCコネクタ1" に交換
※2 FE-1280工材の "SRCコネクタ2" を追加
※1 Change to "SRC connector 1" supplied with FE-1280.
※2 Add "SRC connector 2" supplied with FE-1280.

注 1) ＊ ：造船所手配
2) ＊＊：工場出荷時接続済
3) 送受波器ケーブルの（ ）はリード線に被せたスミチューブの色を示す。
4) 電源電圧をAC100/110/115VまたはAC220/230Vへ変更する場合は、電源トランスのタップ変更（送受信器）、電源パックの交換（記録器）およびヒューズの交換（両ユニット）が必要です。

NOTE 1) * : Shipyard Supply
2) ** : Connector factory-wired
3) Colors in ( ) for the transducer cable are of tubes covering lead wires.
4) To change operating voltage between 100/110/115VAC and 220/230VAC, change tap connection on power transformer (transceiver unit), replace power pack (recorder unit) and replace fuses (both units).

承認 APPROVED	MAY・28・'90 T. NAKANO	名称 TITLE FCV-10 + FE-1280 相互結線図 INTERCONNECTION DIAGRAM
検図 CHECKED	APR・19・'90 M. USUDA	
製図 DRAWN	APR・19・'90 T. KODA	図番 DWG.NO C2323-C02-D

FURUNO



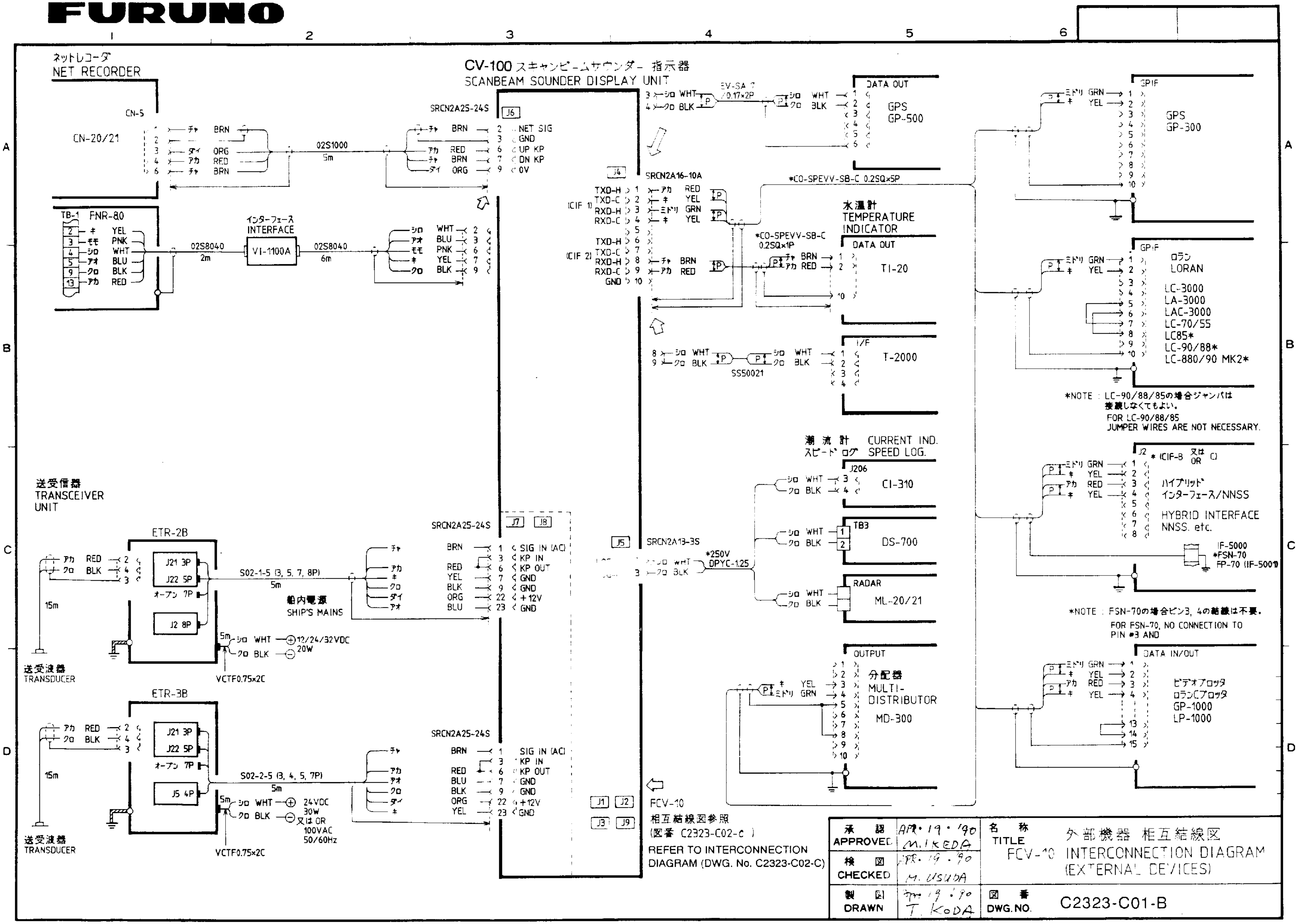
傾斜角検出器
CLINOMETER
CV-103
+12V ROL 0V
SRCN6A13-5S
BRN RED ORG
S02-14-10(5-3P)
10m
H3P-SHF-AA
J3
外部機器
相互結線図参照
SEE EXTERNAL
DEVICE INTERCONNECTION
DIAGRAM.
(DWG. No. C2323-C01-A)
スキャンビームサウンダー指示器
SCANBEAM SOUNDER
DISPLAY UNIT
CV-100
J4 J5 J6 J7 J8
外部機器用
FOR EXTERNAL
DEVICES
魚群探知機
ECHO SOUNDER
FE-1282
SRCN6A25-24P
J2 (L)
SIG C/R
KP C/R
GND
SIG A : 左 LEFT
SIG B : 右 RIGHT
SIG C : 真下 DOWN
J3 (H)
SIG A/R H
KP A/R C
J4 (EXT)
SIG B/R H
KP B/R C
S02-19-10
(24P)
10m
00-8016-038-313-751V
J7
J2
H15P-SHF-AA
DC SIG
GND
TXD H
TXD C
RXD H
RXD C
θCK
θRST
KP
KP RST
+12V
S02-13-10
(24-15P)
10m
J9
DC SIG
KP OUT
θCK
θRST
TXD H
TXD C
RXD H
RXD C
+12V
GND
DO NOT CUT
切断禁止
80-0072, 30m
送受信器
TRANSCEIVER
UNIT
CV-101
注3参照。
See NOTE 3.
J1
NCS-252P
*250V-DPYCYS-1.25
(For 100/110/115VAC)
*660V-DPYCYS-1.25
(For 220/230VAC)
船内電源
SHIP'S MAINS
100/110/115VAC
220/230VAC
(注4参照。 See NOTE 4.)
変圧器
TRANSFORMER
TB2 TB1
CI-350
*660V-DPYCY-1.25
220/230VAC
*250V-DPYCY-1.25
(For 100/110/115V)
*660V-DPYCY-1.25
(For 220/230V)
送受波器
TRANSDUCER

注 1) ＊ ：造船所手配
2) ＊＊：工場出荷時接続済
3) 送受波器ケーブルの（ ）はリード線に被せたスミチューブの色を示す。
4) 電源電圧をAC100/110/115VまたはAC220/230Vへ変更する場合は、電源トランスのタップ変更（送受信器）、電源パックの交換（魚群探知機）およびヒューズの交換（両ユニット）が必要です。

NOTE 1) ＊ : Shipyard Supply
2) ＊＊: Connector factory-wired
3) Colors in ( ) for the transducer cable are of tubes covering lead wires.
4) To change operating voltage between 100/110/115VAC and 220/230VAC, change tap connection on power transformer (transceiver unit), replace power pack (Echo Sounder) and replace fuses (both units).

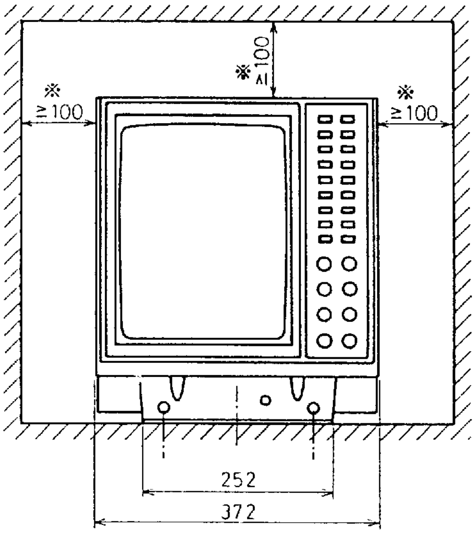
承 認 APPROVED	FEB. 19 '93 M. IKEDA	名 称 TITLE FCV-10 + FE-1282 相互結線図 INTERCONNECTION DIAGRAM
検 図 CHECKED	FEB • 19 • '93 K. OKAMOTO	
製 図 DRAWN	FEB • 19 • '93 M. USUDA	図 番 DWG.NO C2323-C03-B

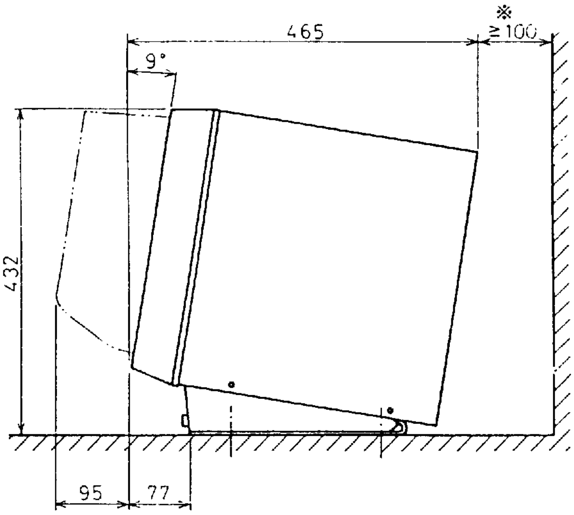
FURUNO

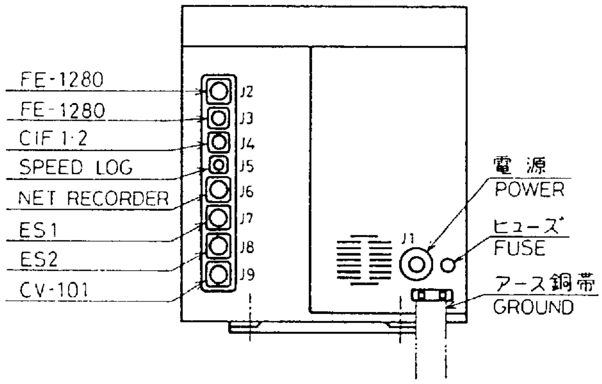


CV-100 スキャンビームサウンダー 指示器
SCANBEAM SOUNDER DISPLAY UNIT
ネットレコーダ
NET RECORDER
CN-5
CN-20/21
TB-1
FNR-80
インターフェース
INTERFACE
VI-1100A
02S1000
5m
02S8040
2m
6m
SRCN2A25-24S
J6
NET SIG
GND
UP KP
DN KP
0V
J4
SRCN2A16-10A
TXD-H
TXD-C
RXD-H
RXD-C
(CIF 1)
(CIF 2)
GND
EV-SA 7
0.17×2P
DATA OUT
GPS
GP-500
*CO-SPEVV-SB-C 0.2SQ×5P
*CO-SPEVV-SB-C
0.2SQ×1P
水温計
TEMPERATURE
INDICATOR
TI-20
I/F
T-2000
SS50021
GPIF
GPS
GP-300
ロラン
LORAN
LC-3000
LA-3000
LAC-3000
LC-70/55
LC85*
LC-90/88*
LC-880/90 MK2*
*NOTE : LC-90/88/85の場合ジャンパは
接続しなくてもよい。
FOR LC-90/88/85
JUMPER WIRES ARE NOT NECESSARY.
潮流計
スピードログ
CURRENT IND.
SPEED LOG.
J206
CI-310
TB3
DS-700
RADAR
ML-20/21
J5
SRCN2A13-3S
*250V
DPYC-1.25
J2
* (CIF-B 又は OR C)
ハイブリッド
インターフェース/NNSS
HYBRID INTERFACE
NNSS. etc.
IF-5000
*FSN-70
FP-70 (IF-500の)
*NOTE : FSN-70の場合ピン3, 4の結線は不要。
FOR FSN-70, NO CONNECTION TO
PIN #3 AND
OUTPUT
分配器
MULTI-
DISTRIBUTOR
MD-300
DATA IN/OUT
ビデオプロッタ
ロランCプロッタ
GP-1000
LP-1000
送受信器
TRANSCEIVER
UNIT
ETR-2B
ETR-3B
J21 3P
J22 5P
オープン 7P
J2 8P
J5 4P
送受波器
TRANSDUCER
15m
S02-1-5 (3, 5, 7, 8P)
S02-2-5 (3, 4, 5, 7P)
船内電源
SHIP'S MAINS
12/24/32VDC
20W
24VDC
30W
又は OR
100VAC
50/60Hz
VCTF0.75×2C
J7
J8
SIG IN (AC)
KP IN
KP OUT
+12V
J1
J2
J3
J9
WHT
BLK
BRN
RED
YEL
GRN
ORG
BLU
PNK
シロ
クロ
チャ
アカ
キ
ミドリ
ダイ
アオ
モモ
FCV-10
相互結線図参照
(図番 C2323-C02-C)
REFER TO INTERCONNECTION
DIAGRAM (DWG. No. C2323-C02-C)

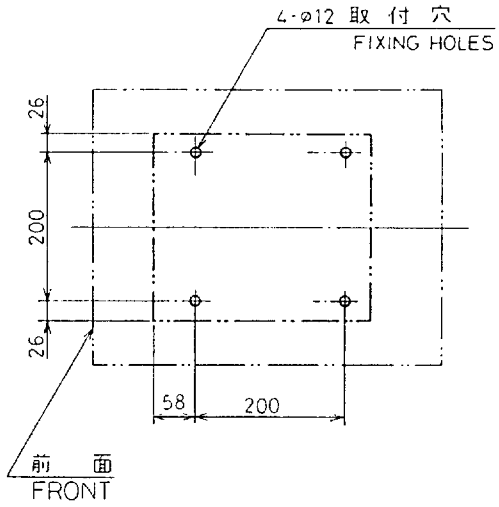
承認 APPROVED	APR. 19 '90 M. IKEDA	名称 TITLE	外部機器 相互結線図 FCV-10 INTERCONNECTION DIAGRAM (EXTERNAL DEVICES)
検図 CHECKED	APR. 19 '90 M. USUDA		
製図 DRAWN	APR. 19 '90 T. KODA	図番 DWG. NO.	C2323-C01-B


※ ≥100
※ ≥100
※ ≥100
252
372


465
※ ≥100
9°
432
95
77


FE-1280
FE-1280
CIF 1·2
SPEED LOG
NET RECORDER
ES1
ES2
CV-101
J2
J3
J4
J5
J6
J7
J8
J9
J1
電源
POWER
ヒューズ
FUSE
アース銅帯
GROUND

背面図
REAR VIEW


4-φ12 取付穴
FIXING HOLES
26
200
26
58
200
前面
FRONT

取付寸法
MOUNTING DIMENSION

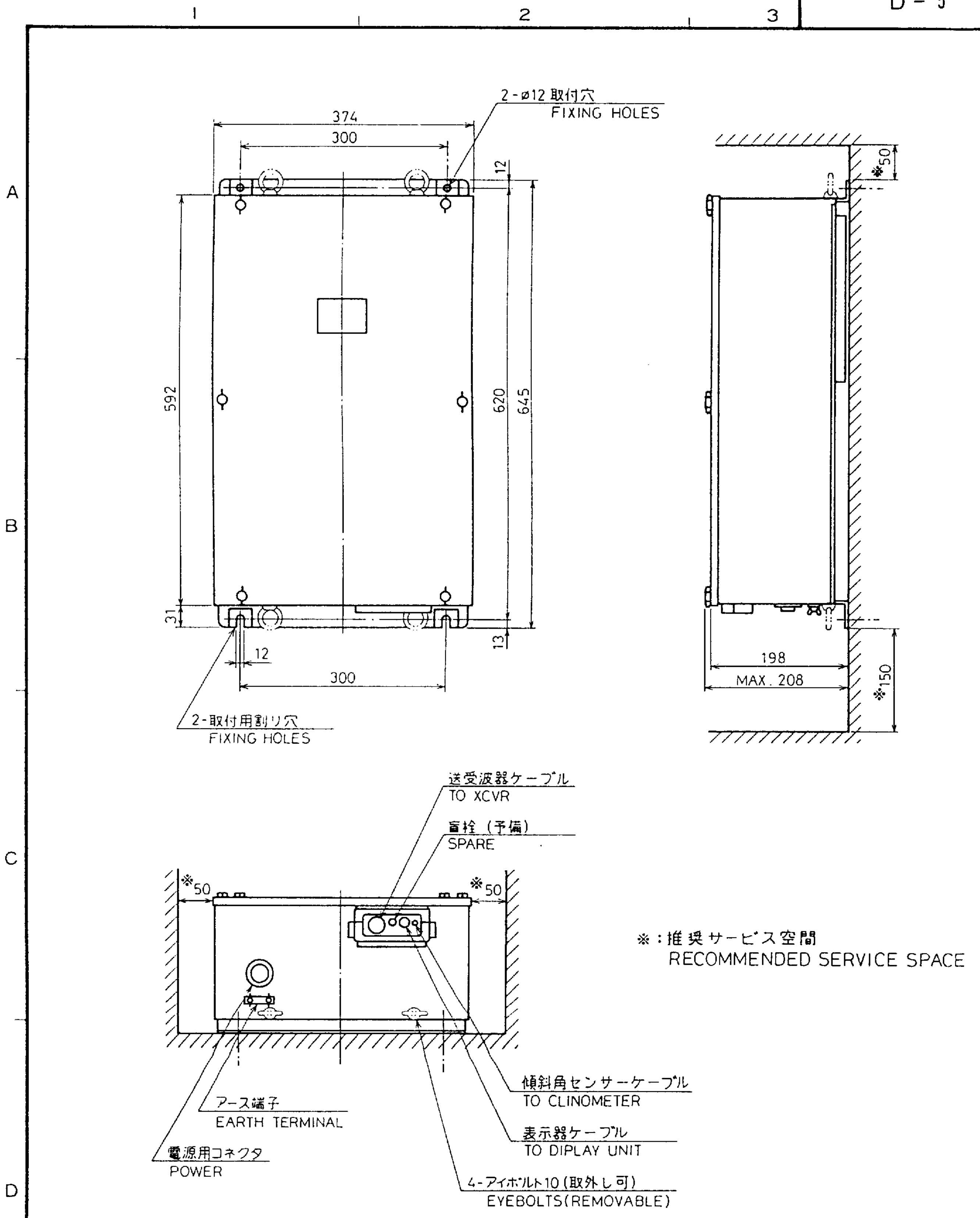
NOTE 1. 保守点検及び放熱用として ※ 印のスペースをとる事。
DIMENSIONS MARKED "※" SHOW MINIMUM MAINTENANCE AND VENTILATION SPACE.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

承認 APPROVED	JAN・29・'90 T. NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	FCV-10 指示器 DISPLAY UNIT
検図 CHECKED	JAN・29・'90 M. USUDA	尺度 SCALE	1/10		
製図 DRAWN	Jan.・29・'90 T. KODA	重量 WEIGHT	21 kg	図番 DWG. NO.	C2323-G01-A

FURUNO

D - 5



1
2
3
A
B
C
D
374
300
2-ø12 取付穴
FIXING HOLES
12
592
620
645
31
13
12
300
2-取付用割り穴
FIXING HOLES
※50
198
MAX. 208
※150
送受波器ケーブル
TO XCVR
盲栓（予備）
SPARE
※50
※50
傾斜角センサーケーブル
TO CLINOMETER
アース端子
EARTH TERMINAL
表示器ケーブル
TO DIPLAY UNIT
電源用コネクタ
POWER
4-アイボルト10（取外し可）
EYEBOLTS(REMOVABLE)

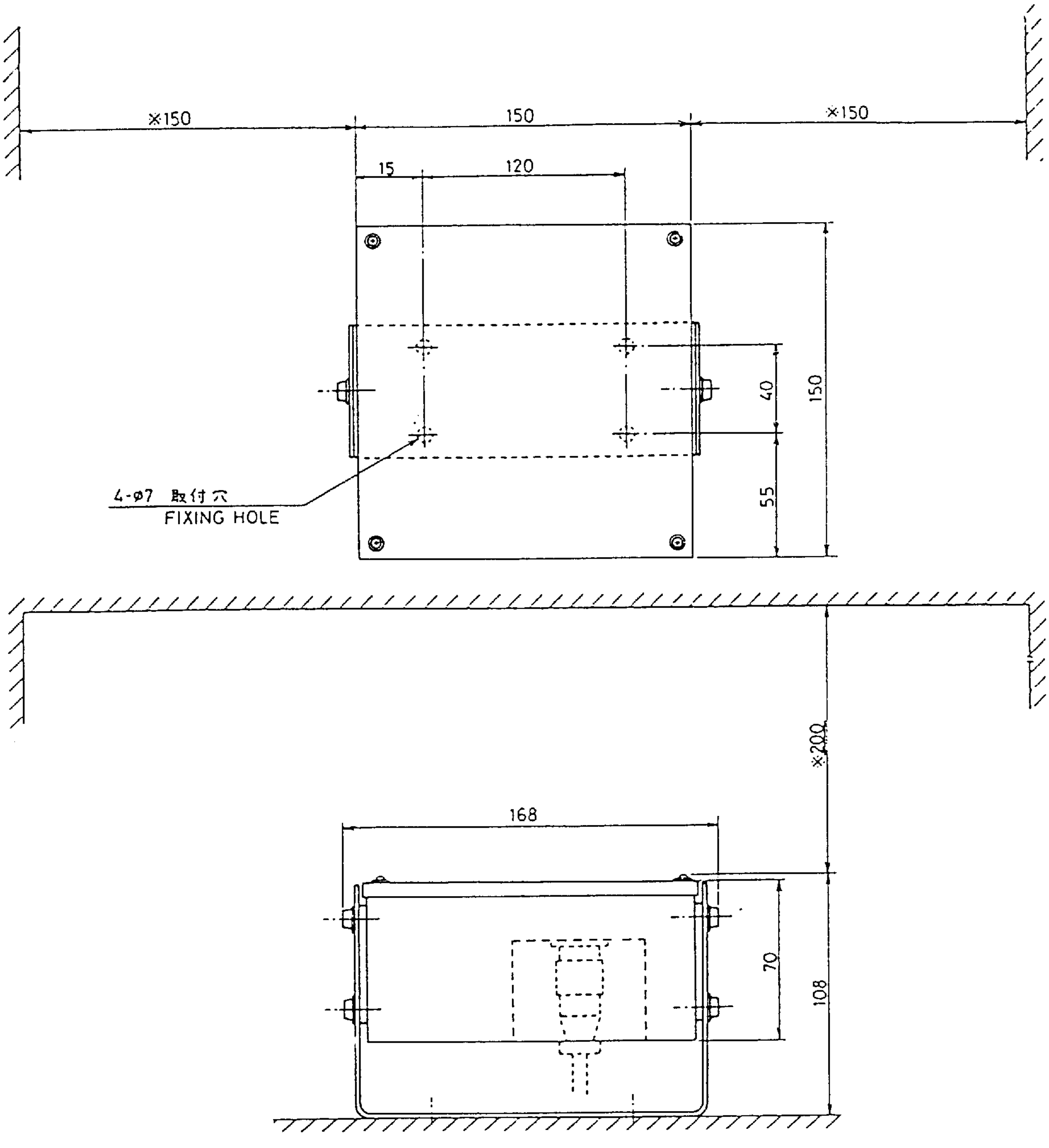
※：推奨サービス空間
RECOMMENDED SERVICE SPACE

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	JAN. 22. '90 T. NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE CV-101	送受信器 TRANSCEIVER UNIT
検図 CHECKED	JAN. 22. '90 M. USUDA	尺度 SCALE	1/8		
製図 DRAWN	Jan. 22. '90 T. KODA	重量 WEIGHT	25 kg	図番 DWG.NO.	C2323-G02-A

FURUNO

D - 6


1
2
3
A
B
C
D
※150
150
※150
15
120
40
150
55
4-φ7 取付穴
FIXING HOLE
※200
168
70
108

NOTE 1. 保守点検及び放熱用として ※印のスペースをとる事.
DIMENSIONS MARKED "※" SHOW RECOMMENDED MAINTENANCE AND VENTILATION SPACE.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG NO.	摘要 REMARKS

承認 APPROVED	JAN. 8 '86.	三角法 THIRD ANGLE PROJECTION		名称 TITLE	CV-103 傾斜角検出器 CLINOMETER
検図 CHECKED	Jan. 8 '86	尺度 SCALE	1/3		
製図 DRAWN	Oct. 29. '85	重量 WEIGHT	2 kg	図番 DWG. NO.	C1259-G01-A

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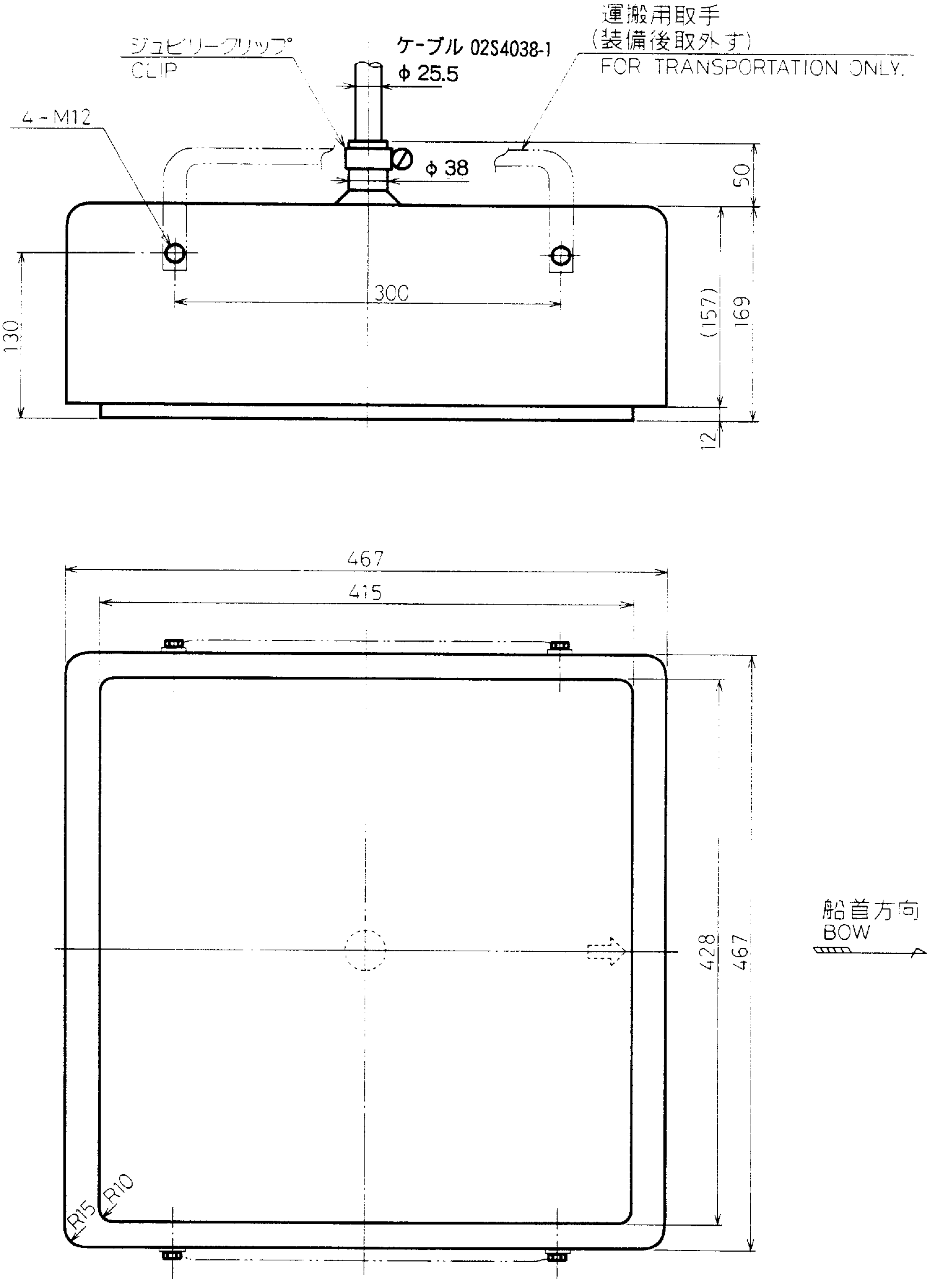
ジュビリークリップ
CLIP
ケーブル 02S4038-1
φ 25.5
運搬用取手
(装備後取外す)
FOR TRANSPORTATION ONLY.
4-M12
φ 38
50
300
130
(157)
169
12
467
415
船首方向
BOW
428
467
R15
R10

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

承認 APPROVED	JAN.22.'90 T.NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE CV-102	送受波器外観図 TRANSDUCER OUTLINE DRAWING
検図 CHECKED	JAN.22.'90 M.USUDA	尺度 SCALE	1/5		
製図 DRAWN	Jan.16.'90 T.KODA	重量 WEIGHT	65 kg	図番 DWG. NO.	C2323-G03-B

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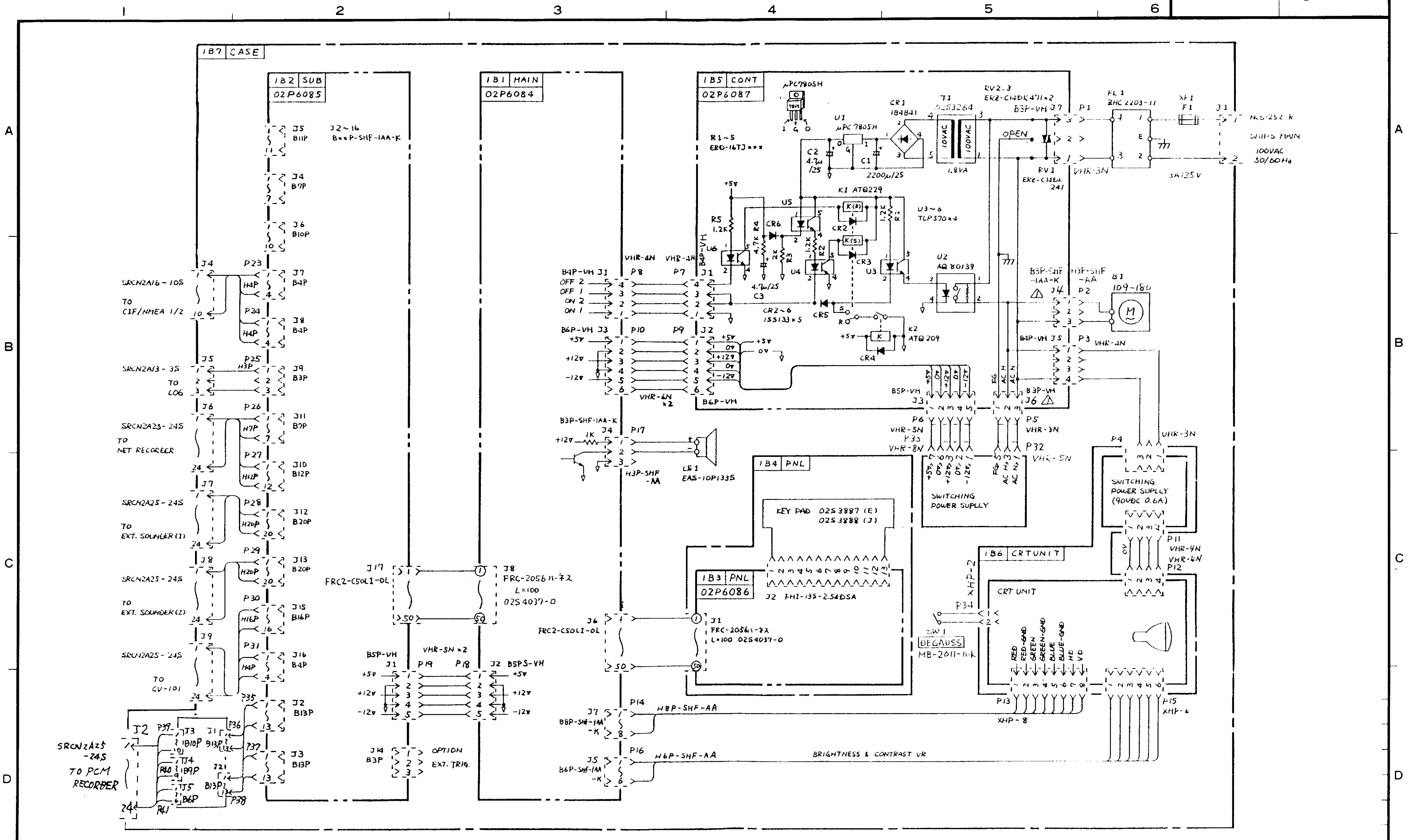
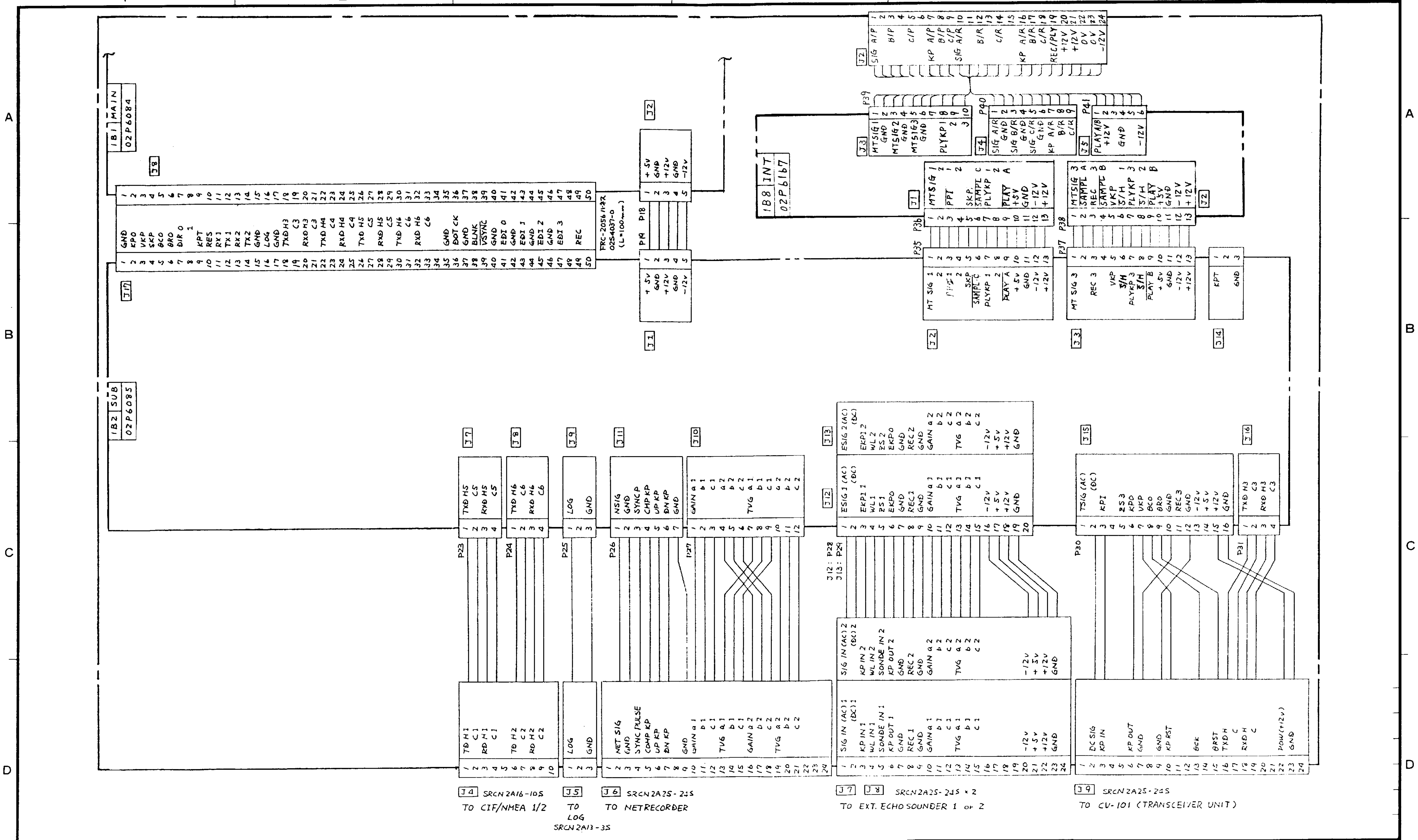

1B7 CASE
1B2 SUB 02P6085
1B1 MAIN 02P6084
1B5 CONT 02P6087
1B4 PNL
1B3 PNL 02P6086
1B6 CRT UNIT
J2~16 B□□P-SHF-1AA-K
SRCN2A16-10S TO CIF/NMEA 1/2
SRCN2A13-3S TO LOG
SRCN2A25-24S TO NET RECORDER
SRCN2A25-24S TO EXT. SOUNDER (1)
SRCN2A25-24S TO EXT. SOUNDER (2)
SRCN2A25-24S TO CV-101
SRCN2A25-24S TO PCM RECORDER
J17 FRC2-C50L1-0L
J8 FRC-2056 ハーネス L=100 02S4037-0
J6 FRC2-C50L1-0L
J1 FRC-2056ハーネス L=100 02S4037-0
J14 B3P OPTION EXT. TRIG.
VHR-5N ×2
μPC7805H
U1 μPC7805H
CR1 1B4B41
T1 02S3264
RV2, 3 ERZ-C14DK471×2
FL1 ZAC 2203-11
XF1 F1
SHIP'S MAIN 100VAC 50/60Hz
3A125V
RV1 ERZ-C14DK241
R1~5 ERD-16TJ□□□
K1 ATQ229
U3~6 TLP570×4
U2 AQ 80139
K2 ATQ 209
CR2~6 1SS133×5
B1 109-18D
LS1 EAS-10P133S
KEY PAD 02S3887 (E) 02S3888 (J)
J2 FH1-13S-2.54DSA
SWITCHING POWER SUPPLY
SWITCHING POWER SUPPLY (90VDC 0.6A)
CRT UNIT
SW1 DEGAUSS MB-2011-1-K
RED RED-GND GREEN GREEN-GND BLUE BLUE-GND HD VD
BRIGHTNESS & CONTRAST VR
H8P-SHF-AA
H6P-SHF-AA
XHP-8
XHP-6
XHP-2
VHR-3N
VHR-4N
VHR-6N ×2
B6P-VH
B5P-VH
B3P-VH
B4P-VH

承　認 APPROVED	MAY・29・'90 T. [illegible]	名　称 TITLE	CV-100　指　示　器 DISPLAY UNIT
検　図 CHECKED	May・29・'90 M. [illegible]		
製　図 DRAWN	MAY・28・'90 T. KODA	図　番 DWG. NO.	C2323-K01-B


1B1 MAIN 02P6084
1B2 SUB 02P6085
1B8 INT 02P6167
J8
J17
J1
J2
J3
J4
J5
J14
P18
P19
P35 P36
P37 P38
P39 P40 P41
FRC-2056 II-2R 0254037-0 (L=100mm)
+5V GND +12V GND -12V
MT SIG 1 PPI SKP SAMPL C PLYKP 1 PLAY A +5V GND -12V +12V
MT SIG 3 REC 3 VKP S/H PLYKP 3 PLAY B +5V GND -12V +12V
KPT GND
J7 J8 J9 J10 J11 J12 J13 J15 J16
P23 P24 P25 P26 P27 P30 P31
J12: P28 J13: P29
ESIG 1 (AC) (DC)
ESIG 2 (AC) (DC)
TSIG (AC) (DC)
SIG IN (AC) 1 (DC) 1
SIG IN (AC) 2 (DC) 2
J4 SRCN 2A16-10S TO CIF/NMEA 1/2
J5 TO LOG SRCN 2A13-3S
J6 SRCN 2A25-25S TO NETRECORDER
J7 J8 SRCN 2A25-25S × 2 TO EXT. ECHO SOUNDER 1 or 2
J9 SRCN 2A25-25S TO CV-101 (TRANSCEIVER UNIT)
1 2 3 4 5 6
A B C D

承認 APPROVED	MAY.28.'90 T. TAKADA	名称 TITLE	CV-100 コネクタ接続図 CONNECTOR CONNECTION (1/2)
検図 CHECKED	May.28.'90 M. USHIDA		
製図 DRAWN	MAY.28.'90 T. KODA	図番 DWG. NO.	C2323-K02-C

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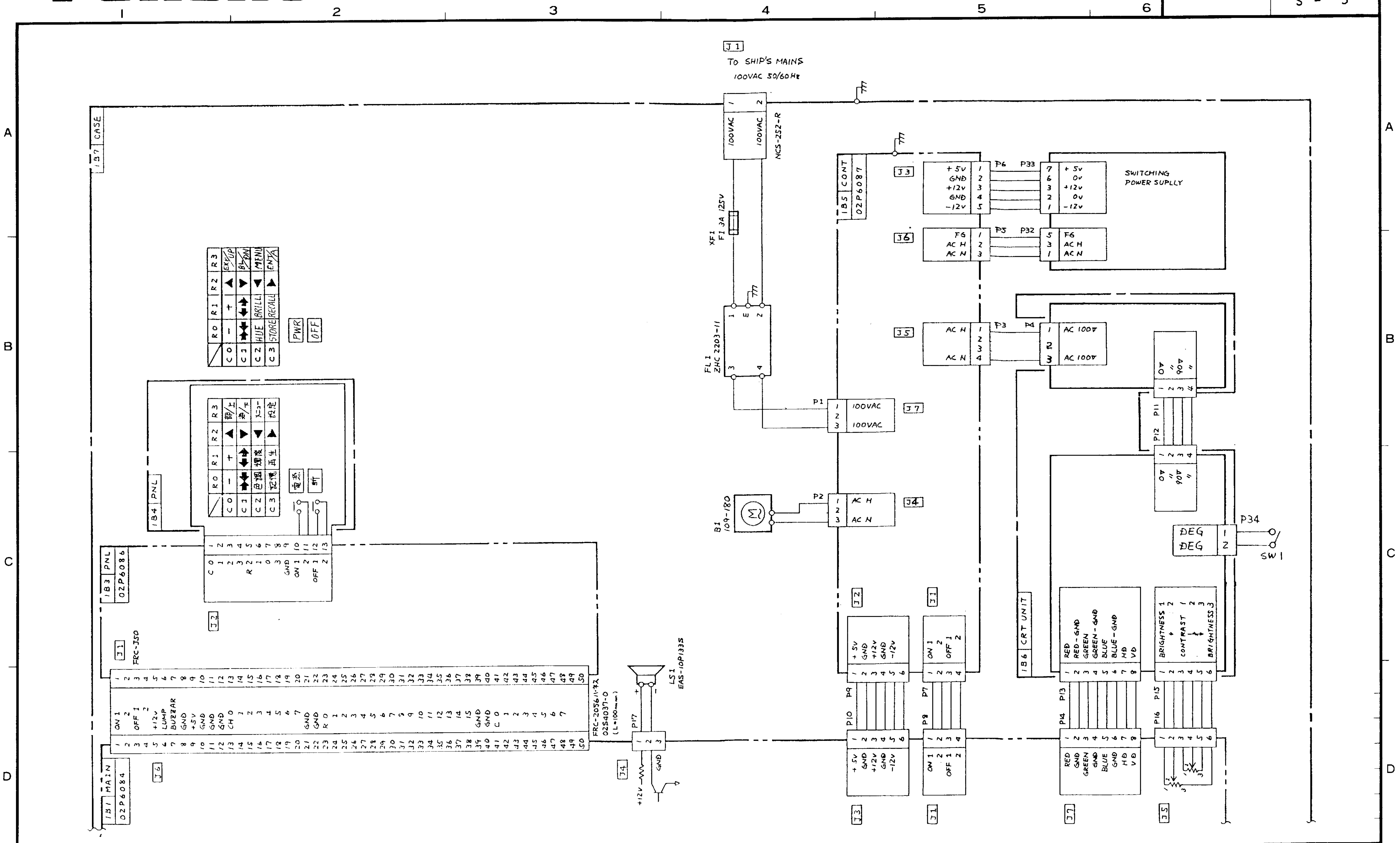
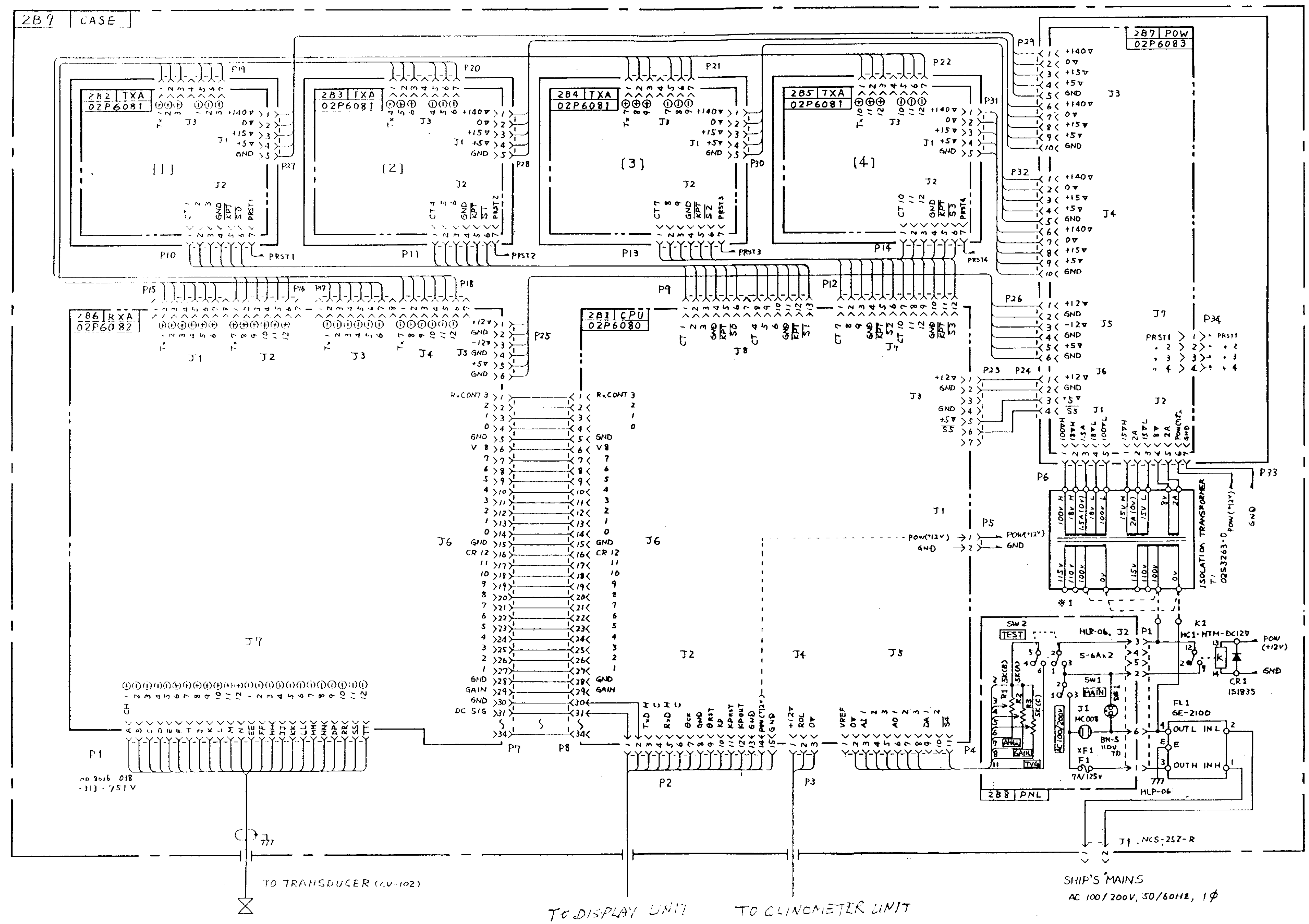
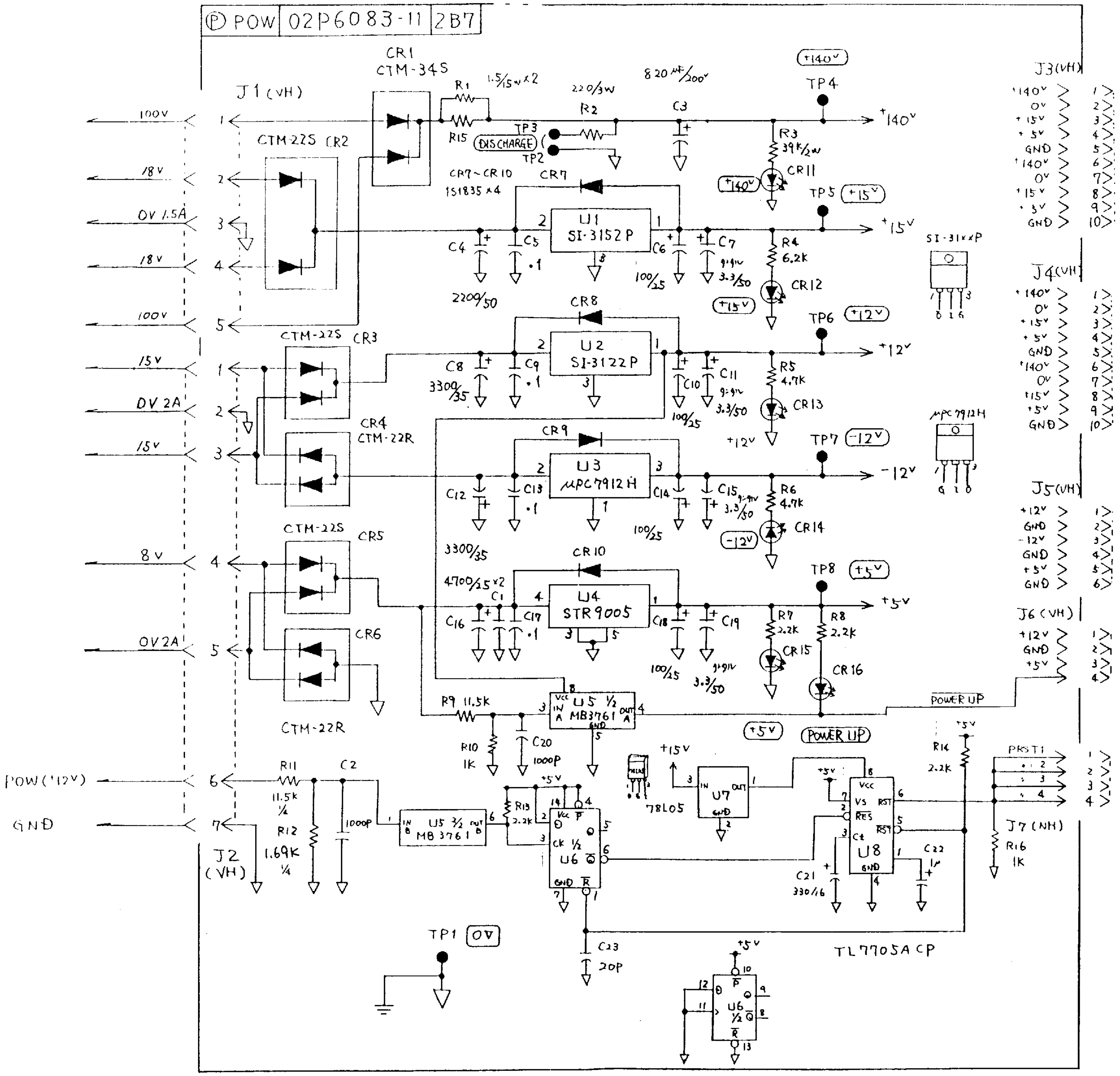

J1
TO SHIP'S MAINS
100VAC 50/60Hz
100VAC
NCS-252-R
XF1
F1 3A 125V
FL1
ZHC 2203-11
J3
J6
J5
J7
J4
+5V
GND
+12V
-12V
FG
AC H
AC N
P6
P33
P5
P32
P3
P4
P1
P2
0V
AC 100V
SWITCHING POWER SUPLLY
B1
109-180
1B7 CASE
1B5 CONT 02P6087
1B4 PNL
1B3 PNL 02P6086
1B1 MAIN 02P6084
1B6 CRT UNIT
PWR
OFF
HUE
BRILL
STORE
RECALL
MENU
ENT
FRC-350
FRC-2056-11-YX
02S4031-0
(L=100mm)
LS1
EAS-10P133S
P17
P9
P10
P7
P8
P13
P14
P15
P16
P11
P12
P34
DEG
SW1
ON 1
OFF 1
BUZZER
LUMP
RED
RED-GND
GREEN
GREEN-GND
BLUE
BLUE-GND
HD
VD
BRIGHTNESS
CONTRAST
A
B
C
D
1
2
3
4
5
6

承　認 APPROVED	MAY・28・'90 T. NAKAYO	名　称 TITLE	CV-100	コネクタ接続図 CONNECTOR CONNECTION (2/2)
検　図 CHECKED	May・28・'90 M. USUDA			
製　図 DRAWN	MAY・28・'90 T. KODA	図　番 DWG. NO.	C2323-K03-B	

FURUNO ELECTRIC CO., LTD.


2B9 CASE
2B2 TXA 02P6081
2B3 TXA 02P6081
2B4 TXA 02P6081
2B5 TXA 02P6081
[1]
[2]
[3]
[4]
2B6 RXA 02P6082
2B1 CPU 02P6080
2B7 POW 02P6083
2B8 PNL
P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16 P17 P18 P19 P20 P21 P22 P23 P24 P25 P26 P27 P28 P29 P30 P31 P32 P33 P34
J1 J2 J3 J4 J5 J6 J7 J8
+140V 0V +15V +5V GND
+12V GND -12V +5V
PRST1 PRST2 PRST3 PRST4
CT1 CT4 CT7 CT10 RPT ST
RxCONT 3
ISOLATION TRANSFORMER T1 02S3263-0
K1 MC1-HTM-DC12V
CR1 1S1835
FL1 GE-2100
SW2 TEST
HLR-06, J2
S-6A×2
SW1 MAIN
BN-S 110V TD
J1 MC008
XF1 F1 7A/125V
HLP-06
POW(+12V)
J1 NCS-252-R
SHIP'S MAINS
AC 100/200V, 50/60Hz, 1φ
TO TRANSDUCER (CV-102)
TO DISPLAY UNIT
TO CLINOMETER UNIT
#1

承認 APPROVED	MAY·28·'90 T. NAKANO	名称 TITLE	CV-101 送受信器 TRANSCEIVER UNIT
検図 CHECKED	May·28·'90 H. USUDA		
製図 DRAWN	May·28·'90 T. KODA	図番 DWG. NO.	C2323-K06-B


Ⓟ POW 02P6083-11 2B7
J1 (VH)
100V
18V
0V 1.5A
18V
100V
15V
0V 2A
15V
8V
0V 2A
POW ('12V)
GND
J2 (VH)
CR1 CTM-34S
CTM-22S CR2
CTM-22S CR3
CR4 CTM-22R
CTM-22S CR5
CR6 CTM-22R
R1 1.5/5W×2
R15
R2 220/3W
DISCHARGE
TP3
TP2
C3 820μF/200V
TP4 +140V
R3 39K/2W
CR11
CR7~CR10 1S1835×4
CR7
U1 SI-3152P
C4 2200/50
C5 .1
C6 100/25
C7 3.3/50
TP5 +15V
R4 6.2K
CR12
CR8
U2 SI-3122P
C8 3300/35
C9 .1
C10 100/25
C11 3.3/50
TP6 +12V
R5 4.7K
CR13
CR9
U3 μPC7912H
C12 3300/35
C13 .1
C14 100/25
C15 3.3/50
TP7 −12V
R6 4.7K
CR14
CR10
U4 STR9005
C1 4700/35×2
C16
C17 .1
C18 100/25
C19 3.3/50
TP8 +5V
R7 2.2K
R8 2.2K
CR15
CR16
R9 11.5K
R10 1K
C20 1000P
U5 ½ MB3761
POWER UP
R11 11.5K ¼
R12 1.69K ¼
C2 1000P
U5 ½ MB3761
R13 2.2K
U6 ½
U7 78L05
U8 TL7705ACP
R14 2.2K
C21 330/16
C22 1μ
C23 20P
R16 1K
TP1 0V
U6 ½
SI-31××P
μPC7912H
J3 (VH)
J4 (VH)
J5 (VH)
J6 (VH)
J7 (NH)
+140V
0V
+15V
+5V
GND
+12V
−12V
PRST1

承認 APPROVED	MAY.28.'90 T.NAKANO	名称 TITLE	02P6083-11	POW 基板 BOARD
検図 CHECKED	May.28.'90 M USUDA			
製図 DRAWN	MAY.28.'90 T.KODA.	図番 DWG.NO.	C2323-K12-A	

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