No. OM-E4281-0H

# FURUNO

# OPERATOR'S MANUAL

VIDEO PLOTTER CONTROL UNIT

**MODEL** GD-2000

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

860220KO(862)
PRINTED IN JAPAN

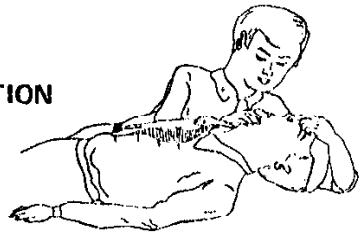
## WARNING AGAINST HIGH TENSION

The operation of this equipment involves the use of high voltage, which endangers human life. Although the design of the equipment has been made in due consideration of measures to insure the operator's safety, adequate precaution must be exercised when reaching inside the equipment for the purpose of maintenance and service. Do not change a component or inspect the equipment with the voltage applied. A residual charge may exist in some capacitors with the equipment turned off. Always short all supply lines to the chassis with an insulated screwdriver or a similar tool prior to touching the circuit.

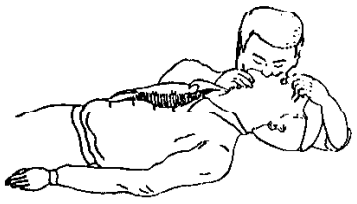
## FIRST AID IN CASE OF ELECTRIC SHOCK

When a victim struck by electricity is found, first switch off the equipment via the main switch on the equipment or the ship's distribution board. If this is not possible, protect yourself with dry insulating material (a wooden plate or rod, cloth, your belt, etc.) and pull the victim clear of electricity. If the victim is not breathing himself, apply artificial respiration according to the "Method of Artificial Respiration". Do not give up halfway. Perseverance and continual efforts are important in artificial respiration.

## METHOD OF ARTIFICIAL RESPIRATION



Lay the victim on his back. Position yourself beside the victim's head and pinch his nose by your thumb and forefinger to prevent air leakage. Insert the thumb of your other hand between the victim's teeth and lift his chin up. Then, place the arm (the one closing the victim's nose) on the victim's forehead and press the head down so that the victim's head is given a maximum backward tilt with the chin prominent and the neck bent back. Seal the victim's mouth with your mouth and blow therein about half of the deeply inhaled air every time. After exhaling, turn your head to watch for a chest contraction, whilst inhaling deeply in readiness for the next blowing. Repeat the movements faster for the first 1 to 2 minutes and 12 times per minute thereafter.

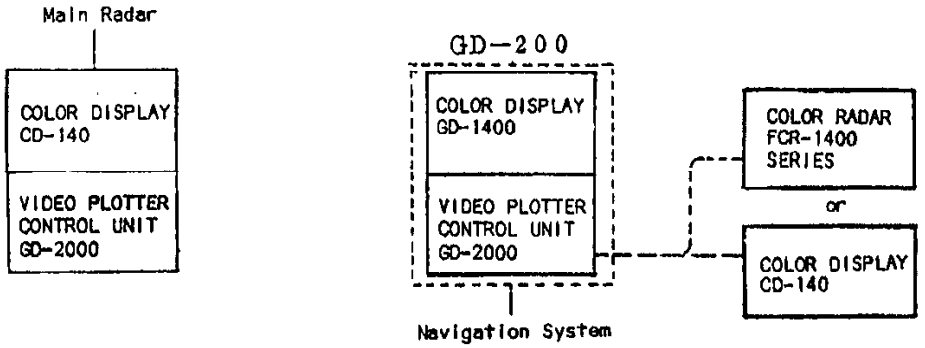


* * * * CONTENTS * * * *

GENERAL

The video plotter control unit, GD-2000 permits the following combinations with color displays CD-140 and/or GD-1400 as below.

The system is called "GD-200" when the GD-2000 is used in combination with the GD-1400.




The difference between CD-140/GD-1400 is whether or not the radar picture can be controlled on their control panels; just power switch and brilliance control are provided on GD-1400. Note combination plot and radar modes are not available on GD-200 when no radar is connected to GD-1400.

# SPECIFICATIONS OF GD-2000

| | |
|---|---|
| 1. Display: | 14" Color Display, Effective size 256 x 192 mm (10" x 7.5") |
| 2. Plotting Mode: | 1) TM Course Plot on North-up, Mercator Projection<br>2) RM Course Plot on North-up, Equidistant (Globular) projection<br>3) Combination Plot -radar picture is overlaid on the RM Course Plot<br>4) Radar Mode -main radar picture is repeated |
| 3. Map Scale: | 1/5,000 to 1/2,000,000 (Map Area). In combination plot, the map scale is automatically determined by radar range. |
| 4. Usable Ground: | 85° latitude or below |
| 5. Plot Interval: | Courseline is stored in memory at intervals of 5, 10, 30 sec, 1, 2, 5, 10, 30 or 60 min. |
| 6. Memory Capacity: | Memory Allocation<br>Memory 0 ----- for current course(500 points)<br>Memory 1, 2 -- for past courseline or memory expansion (500 points each)<br>Memory Transfer<br>Courseline data in memory 0 can be transferred to memory 1 or 2 for semi-permanent storage (backup battery built in).<br>Memory Linking<br>Current course plotting memory can be increased to 1,000 or 1,500 points by linking memory 0 - 1 or 0 -1 - 2. |
| 7. Plotting Color: | Free selection from 7 colors of red, yellow, green, light blue, blue, purple and white. Water temperature and depth readouts in 5 colors according to actual values. White in the combination mode with radar picture. Radar picture in 3 colors. |

| | |
|---|---|
| 8. Marks: | 1) Waypoint marks (circle containing numbers) at the cursor intersections, max. 10 plus destination mark from external nav equipment.<br>2) Event marks (square, diamond, large diamond and crossed diamond) at cursor intersections, any quantity within memory capacity. Triangle mark from nav equipment.<br>3) Satellite fix mark (bowtie)<br>4) Hour mark (inverted triangle)<br>5) Comment (4-digit figures) |
| 9. Approach Alarm: | Approach to a specified waypoint is alerted by a buzzer. Choice of 5 and 1 n.m.(may be preset to 1 and 0.2 n.m.) |
| 10. Navigation Equipment: | Nav input selection for Sat/Nav(DR), Omega or Loran |
| 11. Power Supply: | DC18 to 42V, 120W or<br>AC100/110/115/220V, 1 $\phi$, 50 - 60Hz, 200VA with extra rectifier |
| 12. Coating Color: | Munsell 2.5GY5/1.5 (Cabinet cover) |

## COMPLETE SET

| No. | Name | Type | Q'ty | Weight | Remarks |
|---|---|---|---|---|---|
| 1 | Video Plotter Control Unit | GD-2000 | 1 | 30kg | |
| 2 | Installation Materials | | 1 set | | |
| 3 | Standard Spare Parts | | 1 set | | |

## INSTALLATION MATERIALS

| No. | Name | Description | Code No. | Q'ty | Remarks |
|---|---|---|---|---|---|
| 1 | Cable | 14-73(10.13.13-8.12.12P) (VV-S-7/0.18(TA)x16P *1.7m* with connectors) | 004-306-140 | 1 pc. | |
| 2 | Cable | 14-74 10P GD-2000C (CO-SPEVV-SB-C 0.2sqx5P *5m* with H10P-SHF-AA) | 004-306-150 | 1 pc. | |
| 3 | Cable | GD-2000C (VCTF-1.25x2C *3.5m* with 16P2B) | 004-306-210 | 1 pc. | |
| 4 | NH connector Kit | 14-75,76 GD-2000C (H10P-SHF-AA and H13P-SHF-AA with 15cm wires) | 004-306-260 | 1 set | |
| 5 | Label *MT* | 14-011-5515 | 841-155-150 | 1 pc. | |
| 6 | Label *GD* | 14-011-5518 | 841-155-180 | 1 pc. | |
| 7 | Hex. Bolt | M8 x 20 (SUS304) | 000-862-147 | 4 pcs. | |
| 8 | Flat Washer | M8 | 000-864-130 | 4 pcs. | |
| 9 | Spring Washer | M8 | 000-864-262 | 4 pcs. | |

## STANDARD SPARE PARTS

| No. | Name | Type | Code No. | Q'ty | Remarks |
|---|---|---|---|---|---|
| 1 | Pilot Lamp | T3.8C 8V 60mA | 000-540-180 | 12 | |
| 2 | Fuse | FGBO, 7A, AC125V | 000-549-013 | 3 | |

FURUNO

CHAPTER 1. OPERATION INSTRUCTIONS

## FUNCTION OF TOUCHPADS AND SWITCHES

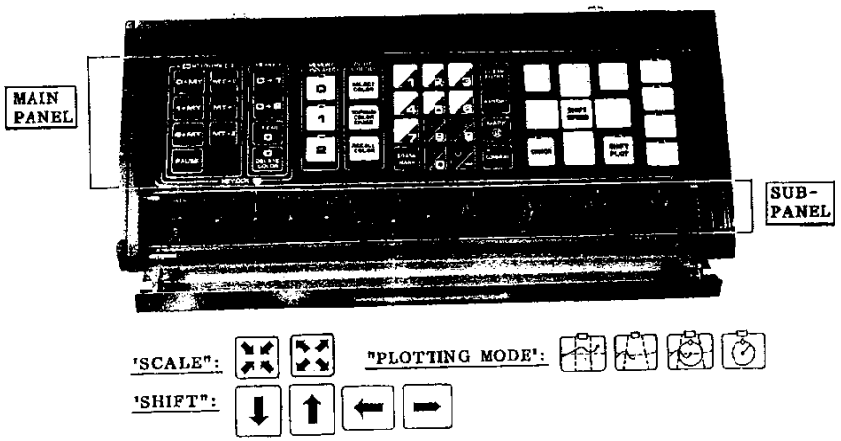



Fig.1-1 Control Panel with flip-down cover opened

**MAIN PANEL**
* * * * * * *

"PLOTTING MODE": Used to choose one of four plotting modes.

"SHIFT ARROWS": Used to move cursor lines or display.

"SCALE": Adjusts map scale between 1/5,000 and 1/2,000,000.

SHIFT SPEED: Used to make movement of cursor lines/display and adjustment of scale faster.

CURSOR: Puts variable cursor lines on screen.

SHIFT PLOT: Clears cursor lines. Shift arrow touchpads now can shift plot on screen.

CLEAR ENTRY: Clears accidental entry in "WAYPOINT", "MARK #" or "COMMENT" entry operations.

WAYPOINT: Displays range/bearing to waypoint.

MARK # : Used for entry of a waypoint.

COMMENT: Used to enter a 4-digit comment number on the screen.

NUMERIC Keys: Touchpads for the entry of numbers as needed. Also used to select the shape of event mark and to select colors.

ERASE MARK: Used to erase waypoint, event mark etc.

"PLOT COLOR": Used to select, erase or recall a part of courseline in a specific color.

"MEMORY DISPLAYED": Used to select the memory to be displayed.

"MEMORY": Used to transfer memory data from the memory block "0" to "1" or "2" and erases all memory at once. A specific color of courseline can be erased permanently with the DELETE COLOR pad.

"MT CONTROL": Only used when "Magnetic Tape" data recorder is provided.

**SUB-PANEL**
* * * * * *

KEYLOCK: Use to lock the "MT CONTROL" and "MEMORY" pads to avoid accidental operation.

MEMORY SIZE: Used to increase memory capacity from 500 points to 1,000 and 1,500 points.

POSITION OF MARKS: Used to display a table of waypoint positions in the lower right of screen.

APPROACH ALARM: Used to select the arrival alarm zone as either 5 or 1 n.m.

ALARM VOLUME: Used to adjsut audible alarm.

ILLUM: Used to vary the brightness of the main control panel.

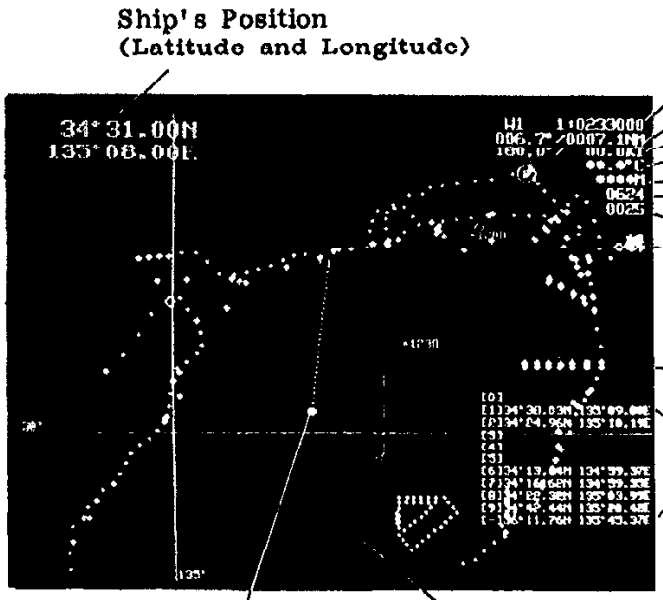
NAV INPUT: Used to select the navigation system to be connected.

SMOOTHING: Provides 9 grades for input averaging.

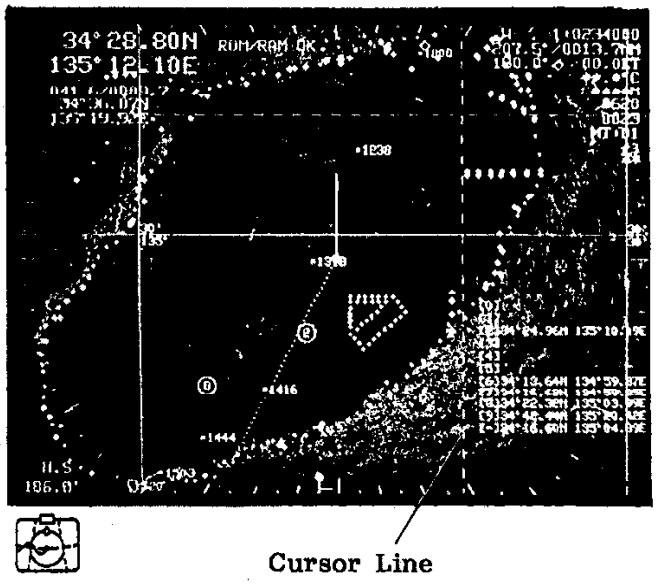
DEPTH/TEMP: Used to select water Depth or Temperature to be displayed on the courseline.

PLOT INTERVAL: Used to select a interval of 5, 10, 30 sec, 10, 30 or 60 min.

## EXAMPLES OF TYPICAL DISPLAY




Example of "TM Course Plot" Mode




**Description of Marks**

- ; Own Ship
- ⓪~⑨ ; Waypoints
- ⊖ ; Waypoint (Remote Entry)
- ◇,□,◇ ; Event Marks
- ; Time Mark
- ; Satellite Fix

Example of "Combination Plot" Mode
(Only available when radar is combined.)

## 1 STARTING THE EQUIPMENT

Make sure that the GD-2000 sub-panel under the flip-down cover has the following control positions. Other controls may be at any setting.

| Control | Position |
|---|---|
| SELF-CHECK | OFF |
| KEYLOCK | ON |
| MEMORY SIZE | 0 (Zero) |
| PLOT INTERVAL | Any position but HOLD |

1) First turn on the color display, then turn on the GD-2000. If the GD-2000 is powered up prior to the display unit, the picture may get disturbed. To restart the GD-2000, allow 5 seconds at least.

After a while, a picture will come up with the same scale, same colors and same area as those used in the previous operation. If own ship is out of the previous areas, the display will be such that own ship is positioned at the screen center even in the TM plot mode.

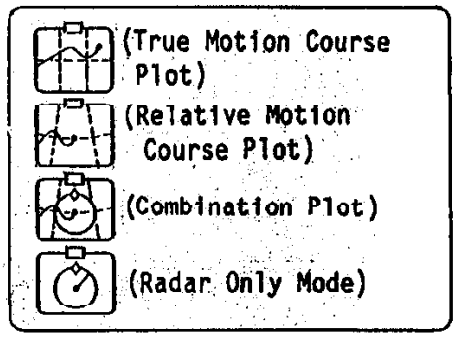
1. POWER up the Color Display
2. Then, POWER up the GD-2000.

## 2 SELECTING THE PLOTTING MODE

1) Press the desired PLOTTING MODE key.

* True Motion Course Plot
* Relative Motion Course Plot
* Combination Plot
* Radar Only Mode

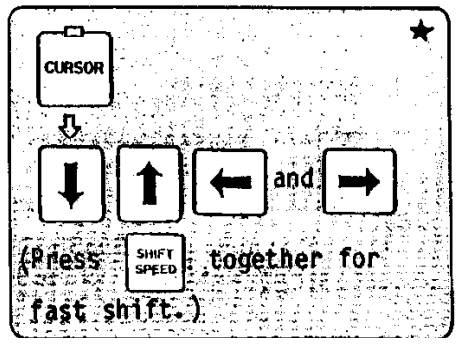
★: Only on TM Course Plot Mode




## 3 SHIFTING THE CURSOR LINES

1) Press CURSOR touchpad, and two dotted lines(cursor lines) will appear. The latitude/longitude at the cursor crossing appears on the upper left corner of the screen.

2) Cursor lines are controlled with four SHIFT pads. When SHIFT SPEED pad is pressed together with SHIFT pads, the speed of the cursor lines becomes ten times as quick as before.

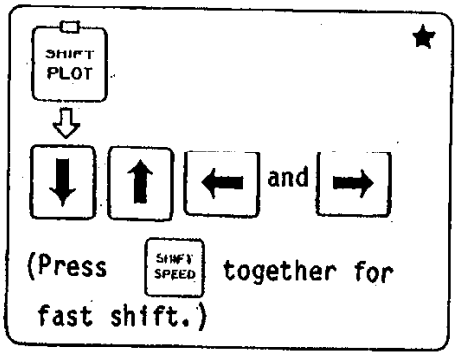


## 4 SHIFTING THE DISPLAY

1) Press SHIFT PLOT touchpad.

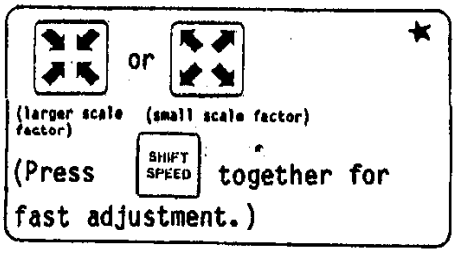
2) Displace the map area with four SHIFT touchpads in any direction.

   The shifting speed can be increased ten times by pressing SHIFT SPEED pad together.




## 5 CHANGING THE MAP SCALE

Map scale is adjustable between 1/5,000 and 1/2,000,000 with SCALE touchpads. Note that a larger scale factor in essence shrinks the picture, and a smaller scale "blows up" the picture.




## 6 ENTERING WAYPOINT MARKS

10 waypoints can be entered locally at the intersection of the two cursor lines. One other can be entered from the nav. aid connected.

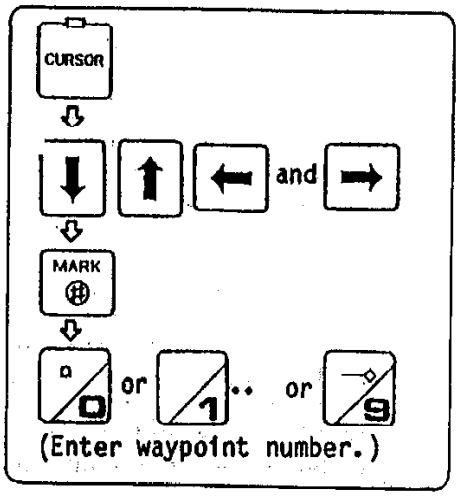
### 6-1 Local Entry (at the GD-2000)

1) Control the cursor lines so that their intersection comes to a wanted position.

2) Press the touchpads MARK. and # _ will appear at the bottom of the screen.

3) Press a desired waypoint number. The number selected will be indicated next to the # mark.

4) If the waypoint selected is engaged, "x" will follow close behind the waypoint number like #_ x. Press the numeric key the selcted waypoint number again for new data entry on the engaged waypoint.



### 6-2 Remote Entry

Waypoint ⊖ is entered from the nav aid connected.

FSN-70;-

Select a desired position as "TO" waypoint on "WAY-POINT INPUT" display

LC-70;-

Select a desired position as "TO" waypoint.

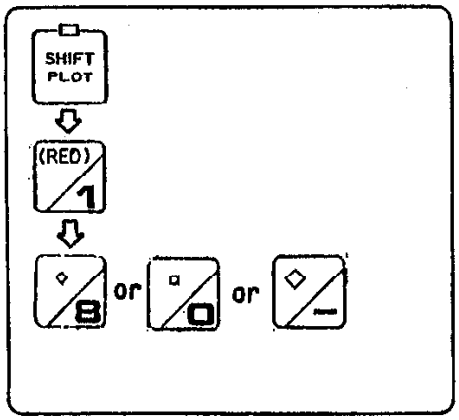
## 7 ENTERING EVENT MARKS

### 7-1 ON THE COURSELINE

To put an event mark at own ship position (to mark a net buoy, for instance), press the touchpad [SHIFT PLOT] to erase the cursor lines. Choose a color, then press a touchpad to choose the shape of the mark.

Example;

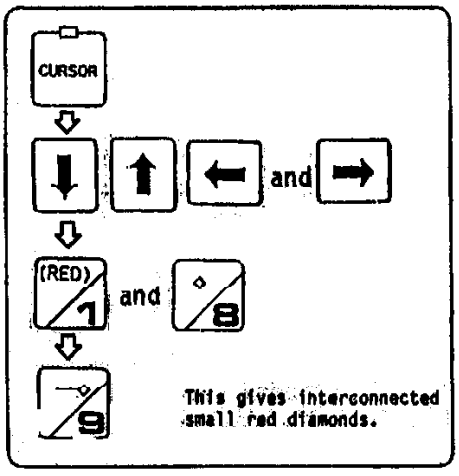
To get a red, large diamond mark, press the touchpads shift plot, [1] (RED), [◇/−].




### 7-2 CHART MAKING

To enter a square mark in red, move the cursor lines so that their intersection comes to the latitude/longitude where a mark is desired, then press touchpads [1], [8].

To interconnect between marks, first put the desired shape of mark. for example. a small diamond mark, by the touchpad [8] then press [9] at succeeding mark positions. Quantity of memory used for event marks and courseline is indicated at the upper right on the screen.



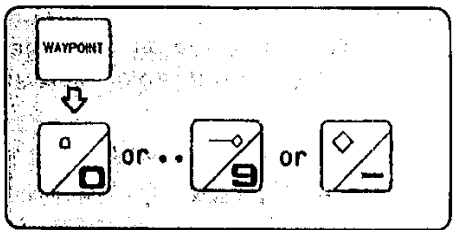

### 7-3 REMOTE ENTRY

An event mark can be entered from the nav aid connected to the GD-2000. This is a triangle mark and is entered at own ship position.

## 8 READING OUT THE WAYPOINT

Turn on the POSITION OF MARKS switch in the sub-panel, and latitude/longitude readouts of all waypoints will be displayed at lower right on the screen.

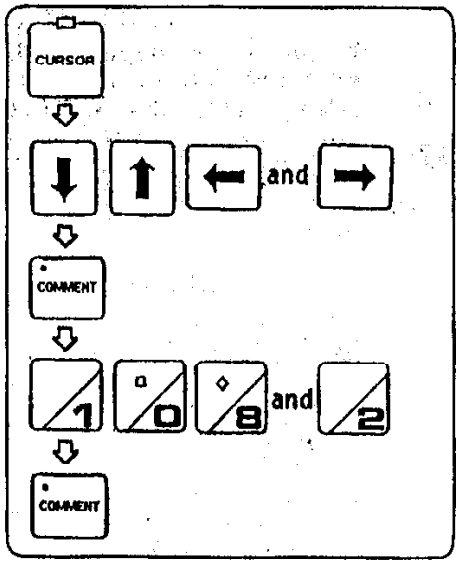
## 9 DISPLAYING THE RANGE/BEARING TO WP




The range and bearing to a desired waypoint can be displayed at the upper right of the screen. Press [WAYPOINT], and enter a desired waypoint number.

A dotted line appears connecting the selected waypoint ⓪ to ⑨ and the present position.

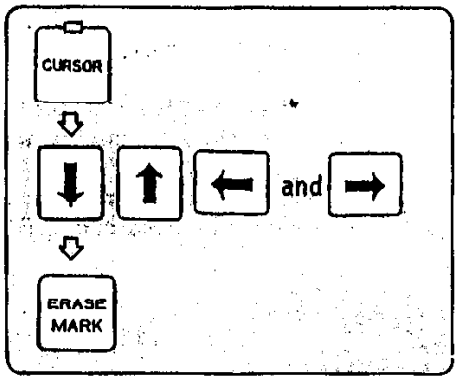
## 10 ENTERING COMMENTS




4-digit numerical comments can be entered at intersections of the cursor lines or at ship's position. To enter 1082 for instance, press touchpads [COMMENT] [1] [0] [8] [2] [COMMENT] in that order. When cursors aren't used, the comment is entered at the ship's position.

It is suggested that the operator make up his own definitions of what the numbers mean ("0032 tons of fish caught at a particular spot", for example) and note the information in his log.

## 11 ERASING WAYPOINTS, MARKS AND COMMENTS




Waypoints, event marks, satellite marks and comments in the memory block "0" are erased by placing the cursor intersection on the mark and pressing [ERASE MARK]. Hour marks are not erased.

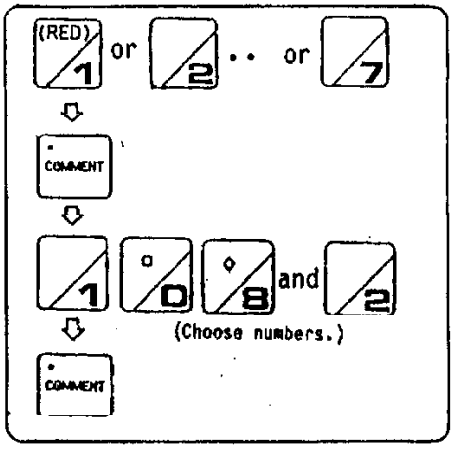
Press "CLEAR 0" for erasing all memory contents(incl. courseline) instantly.

## 12 SELECTING COLORS

There are 7 colors from which to select for courseline, event mark, waypoint marks and comments. Pressing the color pad desired is the first of the key-strokes for color selection and the abbreviation of selected color is displayed at the bottom of the screen.

### 12-4 COMMENTS

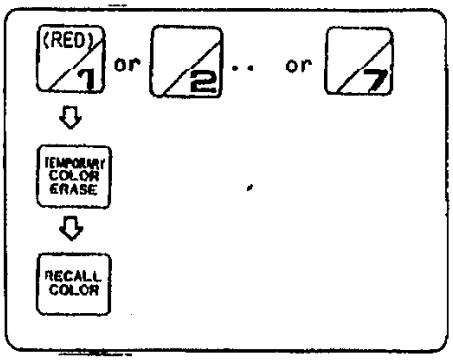
1) Select the color for the comment.
2) Press [COMMENT] touchpad.
3) Enter the comment in 4-digit.
4) Press [COMMENT] touchpad again.




## 13 ERASING COURSELINE COLOR

### 13-1 TEMPORARY COLOR ERASE

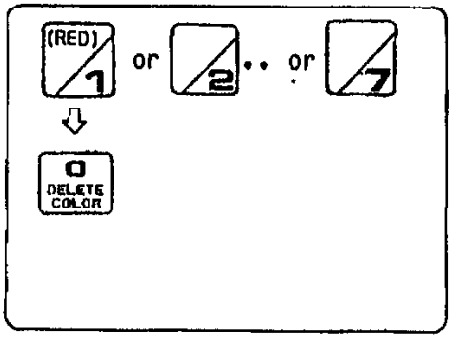
It is possible to erase a part of the courseline in a specific color. To erase the red part for instance, press touchpads [1] [TEMPORARY COLOR ERASE] in that order. To regain the color, just press [RECALL COLOR].




### 13-2 PERMANENT COLOR ERASE

To erase the red parts of the courseline, for instance, turn off KEYLOCK switch in the sub-panel, then press touchpads [1] [DELETE COLOR].

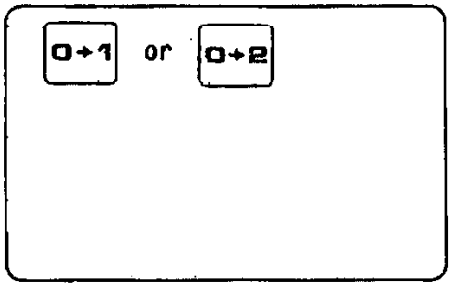
Remember to return the KEYLOCK switch back to ON! To delete more than one color permanently, repeat the same procedure.




## 14 MEMORY TRANSFER

Current plotting data (courseline and marks) in the memory block "0" may be transferred to the memory block "1" or "2" for repeated use in the future. Transfer is done as below.

1) Turn the KEYLOCK switch to OFF position in the sub-panel.
2) Press the [MEMORY] touchpad [0 → 1] to transfer the current data to memory block "1", or press [0 → 2] to transfer to memory block "2".
3) Return the KEYLOCK switch to the ON position.

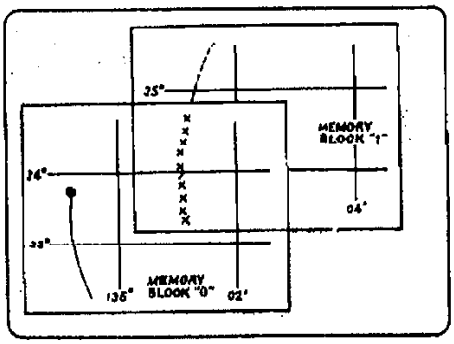


## 15 MEMORY LINKING

Memory capacity of 500 points for current plotting can be increased to 1000 or 1500 points. Memory linkage provides a prolonged period of courseline plotting with short plot intervals.

To increase the capacity to 1000 points, turn the MEMORY SIZE switch to position "0 - 1", and to increase to 1500 points, turn the switch to position "0 - 1 - 2" in the sub-panel.

See pages 2-1 through 2-3 for details about how and why Memory points are used.

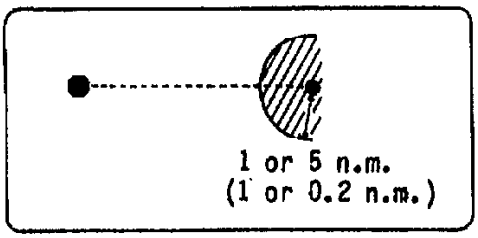



## 16 SETTING THE PLOT INTERVAL

Position data from the Sat-Nav or Loran coordinator is stored in memory block "0" of the GD-2000 at a rate set by the PLOT INTERVAL .

## 17 SETTING THE APPROACH ALARM

Approach to a selected waypoint can be alerted by an internal buzzer. The standard alarm range is 1 or 5 n.m. as selected from the sub-panel. The range can be preset to 1 or 0.2 n.m. by an internal preset control.



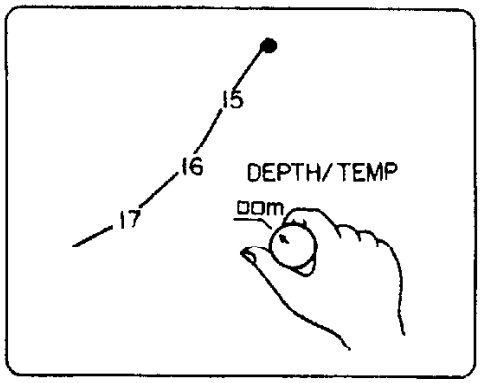

## 18 SETTING THE SMOOTHING SWITCH

Irregular courseline plotting due to signal variations may be smoothed out by the SMOOTHING switch in the sub-panel. This switch changes a weight factor on new position data and a previous fix to get an averaged value. For instance, position 3 provides a weight factor of 7/10 on the new data and 3/10 on a previous data. When a higher position is selected, slower position updating results.

Use the SMOOTHING switch between "OFF" and "5" normally.

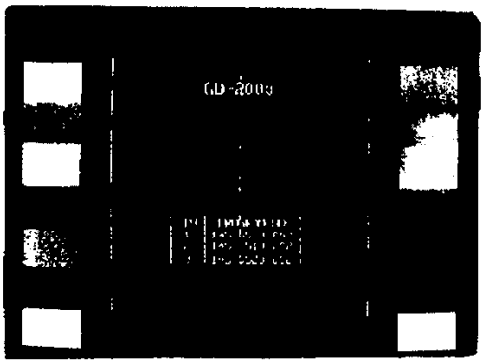
## 19 DISPLAYING THE WATER DEPTH/ TEMPERATURE

When water depth and/or temperature data are available through the satnav or other interface, these are displayed to the top right on the screen or along the courseline. The DEPTH/TEMPERATURE control in the sub-panel permits selection of two digits of a readout on the courseline.




## 20 SELF-CHECK

When the SELF CHECK switch in the sub-panel is turned on, the computer performs diagnosis on major circuit blocks. Three lamps above the switch flicker a few seconds, then remain lit with the image at right.



CAUTION

Do not turn off the power switch after the test pattern is switched off and before display returns to normal image. Otherwise, all memory contents will be destroyed.

If the self-check sequence detects a failure of some part of the system, the lamp does not come on in respect to the defective board as below.

| Lamps | Defective Board to be expected |
|---|---|
| Lamp 1; | CPU 1, CRAM, and/or IF |
| Lamp 2; | CPU 2, and/or CRAM |
| Lamp 3; | CPU 3, GDC, IF, or VRAM |

## 21 MEMORY CLEARANCE

When initially turning on the GD-2000 after installation or after repair work (incl. board removal and backup battery replacement), take the following procedure to clear all the memory contents.

1) Make sure that the POWER and SELF-CHECK switches are off.

2) Turn on the SELF-CHECK switch.

3) Turn on the POWER switch and wait for more than 30 seconds.

4) Turn off the POWER switch.

5) Turn off the SELF-CHECK switch and wait for more than 5 seconds.

6) Turn on the POWER switch, then perform normal operation.

# CHAPTER 2. FURTHER DESCRIPTION FOR OPERATION AND FUNCTION

## 2-1. Plotting Mode

Details of four plotting modes are as below.

1) True Motion Course Plot:

Own ship moves on the North-up Mercator Projection according to its speed and heading as introduced from a selected nav aid. When own ship reaches the edge of the screen, it automatically jumps back to the center with grids redrawn.

2) Relative Motion Course Plot:

Own ship is fixed at screen center. Lat/long grids move on the North-up Equidistant(Globular) projection.

3) Combination Plot:

Radar picture is overlaid on the RM Course Plot. The plotting area and map scale are automatically determined by the radar range setting. In this case, own ship course line and event/waypoint marks will be indicated in monochrome.

4) Radar Mode:

The screen displays only the radar picture.

## 2-2. Plot Interval and Storage Time

The GD-2000 has a memory block that is capable of storing position data sent from the Sat Nav or Loran coordinator up to 500 points. This memory block is named memory block "0" and stores ship's position in latitude and longitude at a sampling rate set on the PLOT INTERVAL switch. The stored position data is used to display past courseline on the map.

In Fig.2-1, the map (1) represents a courseline which is provided by plotting position data sent from the combined equipment is the normal plotting of the courseline. However, if a touchpad(Plotting Mode, Shift, Scale etc.) is operated, the courseline in the map (1) is erased and a new courseline is automatically computed and redrawn with a succession of straight line segments as in the map (2). Data for the reconstraction of the plot is taken from the individual position points stored in memory. In this courseline drawing, joining points of straight lines show ship's positions which have been sampled and stored in the memory block "0". If no touchpad is operated after the map (2) is created, ship's position is plotted again and a smooth courseline is provided as from point (A) of the map (3).

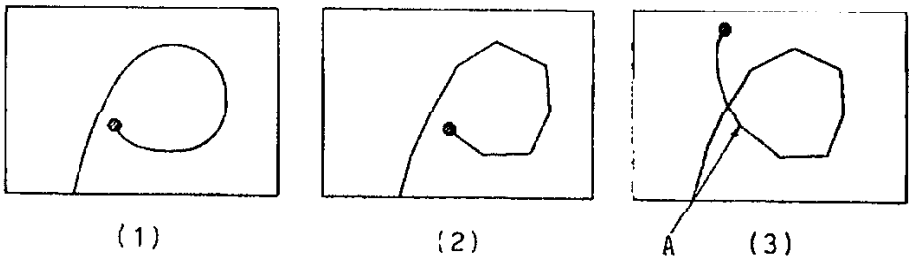



Fig.2-1

Memory capacity is 500 points. When the entry of 500 points is reached, the oldest data is pushed out of the memory so that only the latest 500 points are always stored. However, all marks are not removed from the memory. Some marks remain in memory unless removed by a manual clear operation.

| | |
|---|---|
| Marks of last in, first out | Event mark △<br>Satellite mark ⋈ |
| Marks invulnerable unless removed by clear operation | Event mark ◇<br>Event mark □<br>Event mark ◇<br>Waypoint mark ⓪~⑨ and ⊖<br>Comments |

## RELATION BETWEEN PLOT INTERVAL AND STORAGE TIME

The plot interval selectable with the PLOT INTERVAL switch is either 5 sec, 10 sec, 30sec, 1 min, 2 min, 5 min, 10 min, 30 min or 60 min. Each position data is stored in the memory for the period listed below. In other words, for instance, if the plot interval of 5 minutes is selected, the memory stores the courseline as long as 41 hours and 40 minutes.

| Plot Interval | Storage Time |
|---|---|
| 5 sec | 42 min |
| 10 sec | 1 hr 23 min |
| 30 sec | 4 hr 10 min |
| 1 min | 8 hr 20 min |
| 2 min | 16 hr 40 min |
| 5 min | 41 hr 40 min |
| 10 min | 83 hr 20 min |
| 30 min | 250 hr (10 days) |
| 60 min | 500 hr (20 days) |

Obviously there is a trade off between smoothness reconstruction of a plot and the total amount of plotting time that can be stored, since a smooth reconstruction of a plot requires position data points stored close together frequently and this uses up memory quickly. For open sea steaming a Plot Interval time of 5 minutes is usally satisfactory. For precision close-in work a 5 or 10 second Plot Interval might be necessary.

Note that the plot will stay on the screen so long as power is kept on and provided that the plot is not shifted either manually by the operator or recentered automatically, and that the cursors aren't used or the scale factor isn't changed.

Plot interval should be selected properly in consideration of ship's speed, map scale, etc. If a shorter interval is selected, a reconstructed courseline is provided with better accuracy as in Fig.2-2 (b), but storage time of the courseline is reduced.

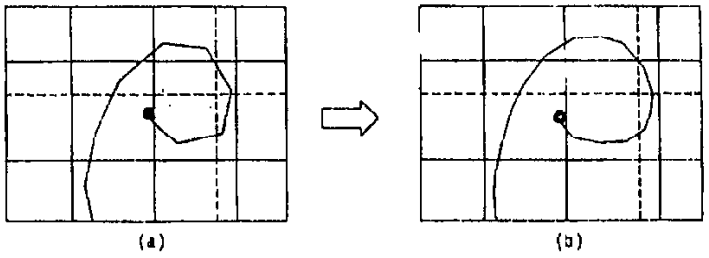



Fig.2-2

**What happens if plot interval is improper ?**

If the plot interval is set too long as compared with ship's speed and map scale being displayed, what happens is that the past courseline is erased and only the ship mark is displayed at the moment the following operation is done:

a) When a touchpad (Display Mode, Shift, Scale etc.) is operated.

b) when the GD-2000 automatically recenters the position.

To avoid this, change the map to a scale covering larger area or select a shorter plot interval so that the most recent sampled point comes in the area shown in dotted line in Fig.2-3

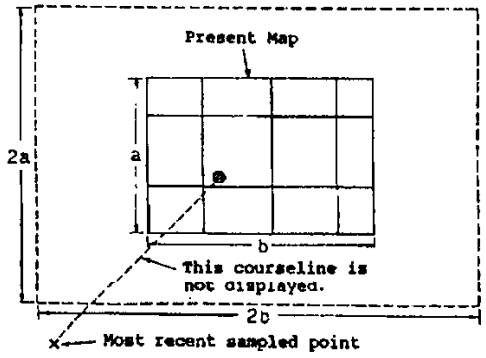



Fig.2-3

## 2-3. Memory Linking, Memory Transfer, Display Selection and Overlapped Presentation

The GD-2000 contains 3 memory blocks, each having a capacity of storing 500 positional data, to give operational flexibility. These blocks are named memory blocks "0", "1" and "2".

Of the three memory blocks, memory block "0" is for storing position data coming from the combined equipment. Memory blocks "1" and "2" are used for memory linking, overlapped presentation and replay through the MT-100 data recorder (option).

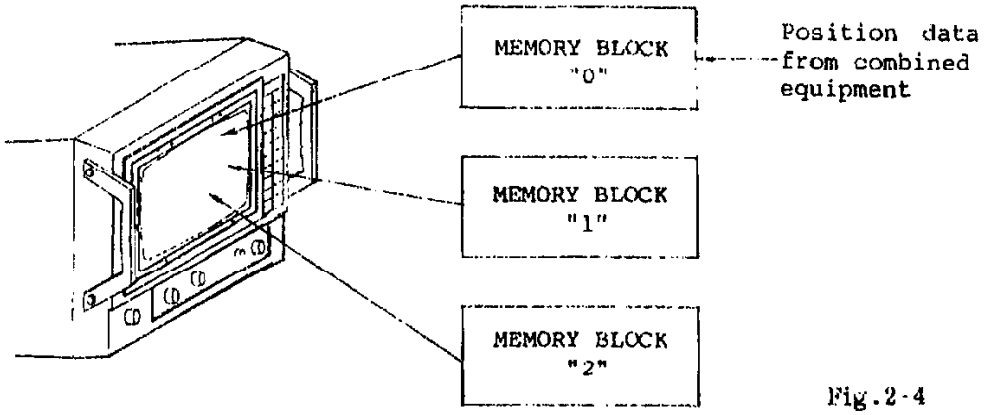



Fig.2-4

Memory Linking

The memory capacity of 500 points for storing the data from the combined equipment can be increased to 1,000 or 1,500 points. This memory linking is achieved by linking the memory blocks "0" and "1" or "0", "1" and "2" together with MEMORY SIZE switch.

The linked memory capacity is useful to plot a courseline using a short plot interval to obtain maximum resolution when the courseline is reconstructed.

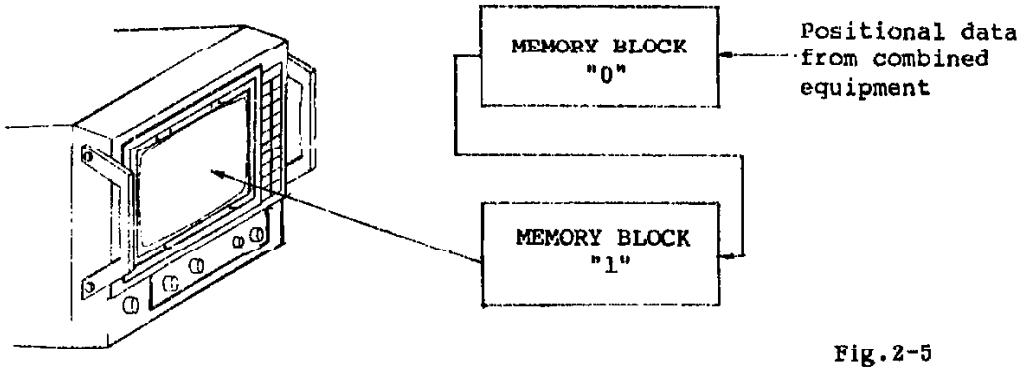



Fig.2-5

## Memory Transfer

The data in the memory block "0" are stored for the period listed on page 2-2 and each piece of data is erased one by one when the storage time is exceeded. To avoid erasure of data in memory block "0", it is possible to transfer them from memory block "0" to memory block "1" or "2" for semi-permanent storage. To do so, follow the procedure below.

1. Turn the KEYLOCK switch downward.

2. Press the MEMORY pad "0-1" or "0-2", and all data in memory block "0" including temperature data and event marks is transfered to memory block "1" (or "2").

3. Turn the KEYLOCK switch upward to prevent the erasure of the transferred data by accidental operation of MEMORY or RECORD switch by other person.

The data transferred to memory block "1" or "2" can be displayed independently or together with the data in other memory blocks. Refer to "Display Selection and Overapped Presentation" below. The courseline plotted thru memory block "1" or "2" is distinguished from that plotted thru memory "0" by shape, as shown below.

The data in the memory block "1" is retained by a keep-alive battery until new data is transferred from the memory block "0" or the memory block "1" is utilized for the memory linking. The data in memory block "2" is also retained until new data is transferred from the memory block "0".

## Display Selection and Overlapped Presentation

The three memory blocks "0", "1" and "2" can be selected for display on the screen by using one of the MEMORY DISPLAYED touchpads.

If one of the MEMORY DISPLAYED pads "0", "1" and "2" is pressed the data in the selected memory block is displayed on the screen. For example, if the MEMORY DISPLAYED pad "1" is pressed while the other pads "0" and "2" are off, only the data in memory block "1" is displayed.

In addition to above single memory block presentation the pad allows overlapped presentation of the data in 2 or 3 memory blocks. To provide the overlapped presentation, just select memory blocks by pressing the pads "1" and "2". For overlapping of memory blocks "0" and "1", press the pads "0" and "1".

In the overlapped presentation, the map area and scale is determined by the pad with smaller number. This means that if the pads "0" and "1" are on, the map area and scale is determined by the pad "0" and only when the data in the memory block "1" is included in this area, it is displayed together. Also if the pads "1" and "2" are on, the map area and scale is determined by the pad "1".

In Fig.2-6, the display "0" and "1" are each shown representing the map which is provided with the memory block "0" or "1" selected independently. Here, if the overlapped presentation of the two memory blocks is selected, the whole of the area of the display "0" is shown on the screen and only the data included in this area is overlapped from the memory block "1".

Note that the data from either Block "1" or "2" can be shown as a series of small "X"'s with a internal preset switch.

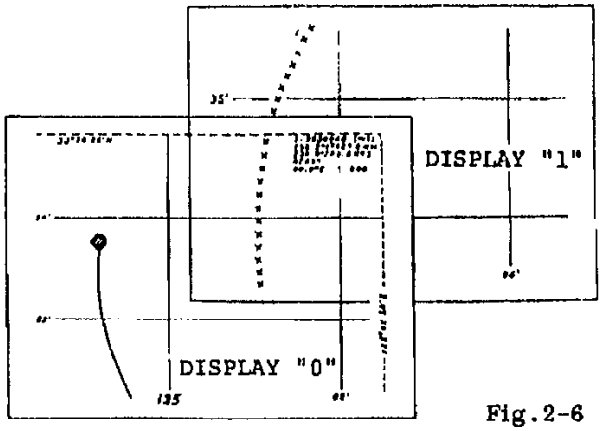



Fig.2-6

## 2-4. Remarks on Operation

Event marks reduce storage time of position data.

The position data coming from Sat-Nav or Loran coordinator is sampled at intervals selected by the PLOT INTERVAL switch and is stored in the memory block "0" up to 500 points. However, this memory capacity of 500 points is not always completely available but is reduced by the number of event marks plotted on the screen. Since the memory block "0" is also used for storing event marks, the memory capacity useable for the position data decreases with the numbers of event marks. For example, if twenty event marks are entered, memory capacity for the position data is 480. Therefore, for effective utilization of memory block "0", it is recommended that event marks are erased whenever they become unnecessary.

# CHAPTER 3. APPLICATION

## 3-1. Overlapped Presentation of Coast line and Courseline

One of the typical applications of the VIDEO PLOTTER is an overlapped presentation of a courseline and a chart which is drawn up by the operator beforehand by selecting up to 500 important points from a chart of a wanted area.

The first step is to draw up a chart on the VIDEO PLOTTER screen and the second is to display it together with the courseline. To draw up a chart, pick up as many as 500 important points (such as cape, bay, lighthouse, land contour, etc.) in latitude and longitude from a chart of a wanted area and enter them into the memory block "0" as event marks of different shapes. Then, transfer them into the memory block "1" or "2". If the data transferred to the memory block "1" or "2" is displayed together with the data in the memory block "0", the courseline and the chart as shown on page 3-3, Fig.3-1 is provided.

Usually, for storage of the chart, it is recommended that it be allocated to memory block "2". Also, shape, color and size of the marks should be properly assigned to mark different objects, such as land contour with event mark " ◊ ", lighthouse with event mark " □ ", etc.

Since the number of positions which can be used for drawing a chart is limited to 500, there is a shortcoming if the map is expanded from that utilized for chart making, the screen displays only part of the 500 points. On the contrary, if the map is contracted to display a larger area, the drawn-up chart will shrink into a part of the screen. To avoid this inconvenience, when the data recorder (option) is provided, it is recommended that charts are drawn up in various areas and scales and recorded on the cassette tape so that a wanted one can be displayed whenever necessary.

When it is desired to draw a chart by utilizing a greater number of event marks, the memory blocks "1" and "2" can be used together for storing a chart. This allows one to draw a chart of 1000 event marks of 21 kinds (3 shapes x 7 colors).

## 3-2. Application to a Bottom Trawler

In bottom trawl fishing, a good fishing area is trawled many times, repeating the same course and taking care not to damage the trawl net by a shoal and a reef.

If the best trawling course displayed on the screen is stored in the memory block "1" or "2" together with event marks showing shoals and reefs, the ship can trace exactly the same course at any time, avoiding the reefs and shoals. This can provide substantial improvement of fish catch.

In this application of the VIDEO PLOTTER, since the ship takes almost the same course many times, if all of ship's courselines are plotted on the screen, they overlap one after another and can become confusing. To avoid this, it is recommended to set preset switch 2-2* to "OFF" and the PLOT INTERVAL switch to "HOLD" so that only the ship's mark is displayed with the courseline eliminated. See Fig.3-2.

*; Refer to Apeendix 1.

## 3-3. Application to a Purse Seiner

In purse seining the VIDEO PLOTTER can be used to decide the way of net shooting, considering the starting point of the net relative position of the net and reefs, direction of ocean current, etc.

Fig.3-3 on page 3-4 illustrates that the skiff boat is released at the point of event mark □, then the ship is maneuvered by observing the courseline on the screen so as to surround the fish on an outcrop shown by event mark previously entered. The VIDEO PLOTTER is very useful for this application since it enables fishing operation even in thick foggy weather.

## 3-4. Application to Tuna Long-Line Fishing

In long line fishing, the length of the main line and its location is represented by a ship's courseline which is displayed on the screen when the long line is set into the sea. If this courseline is stored in the memory block "1" or "2" together with buoy marks entered in the form of event marks, direction of ocean current and location of current rip can be judged by its comparison with the ship's courseline which is displayed when the long line is hauled from the sea. Also if the place where the tuna is caught is marked by using a different shape of event mark after each set, the accumulation of this data helps to determine good fishing zones. See Fig.3-4.

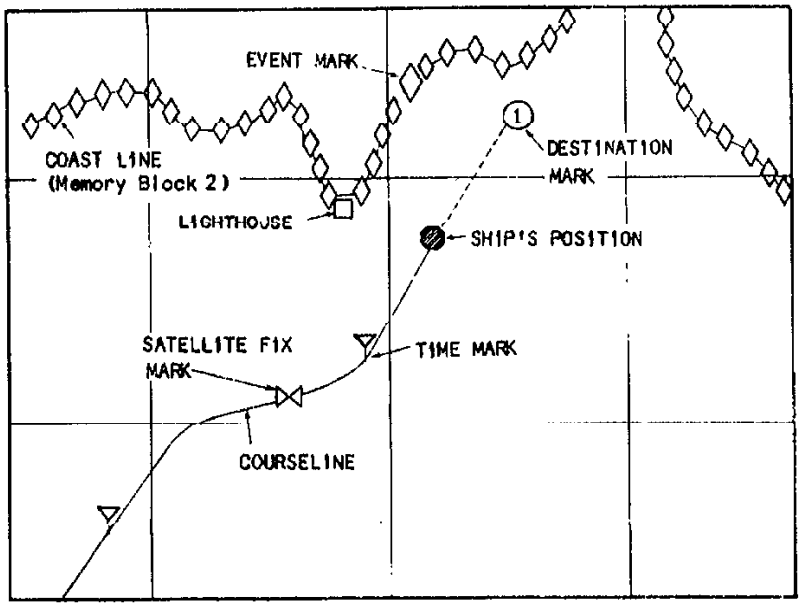
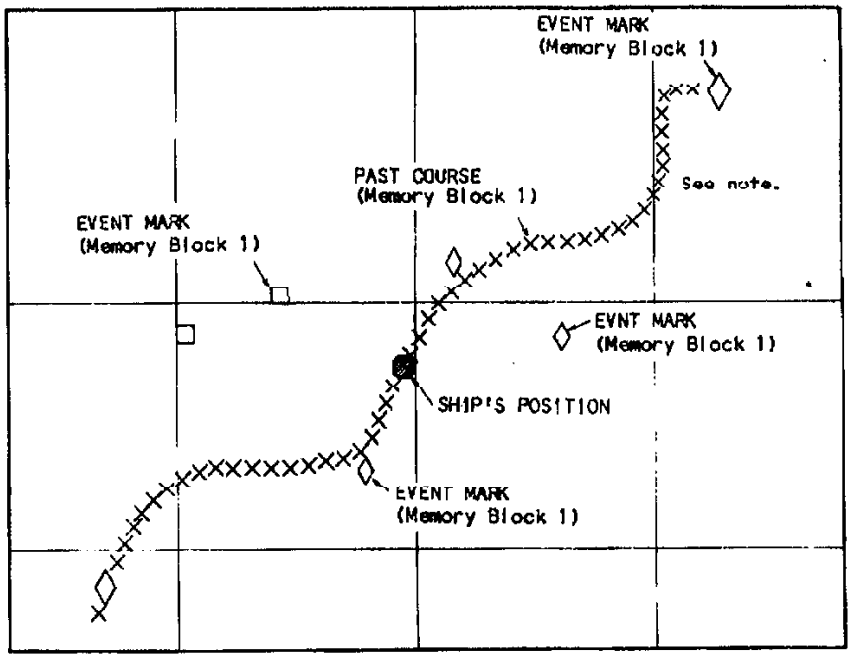



Fig.3-1 Example of Overlapped Presentation of Chart and Courseline




Note; Courseline in the memory block "1" and "2" are displayed in solid line as standard. However, the courseline can be preset internally to display with "x" marks.

Fig.3-2 Example of Display in Trawling Operation

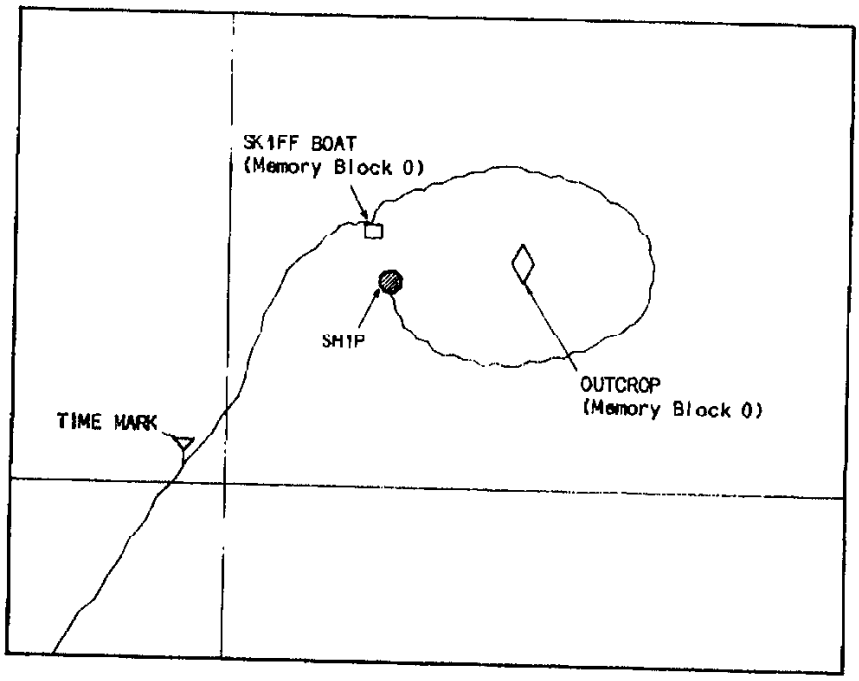



Fig.3-3 Example of Purse Seiner Operation

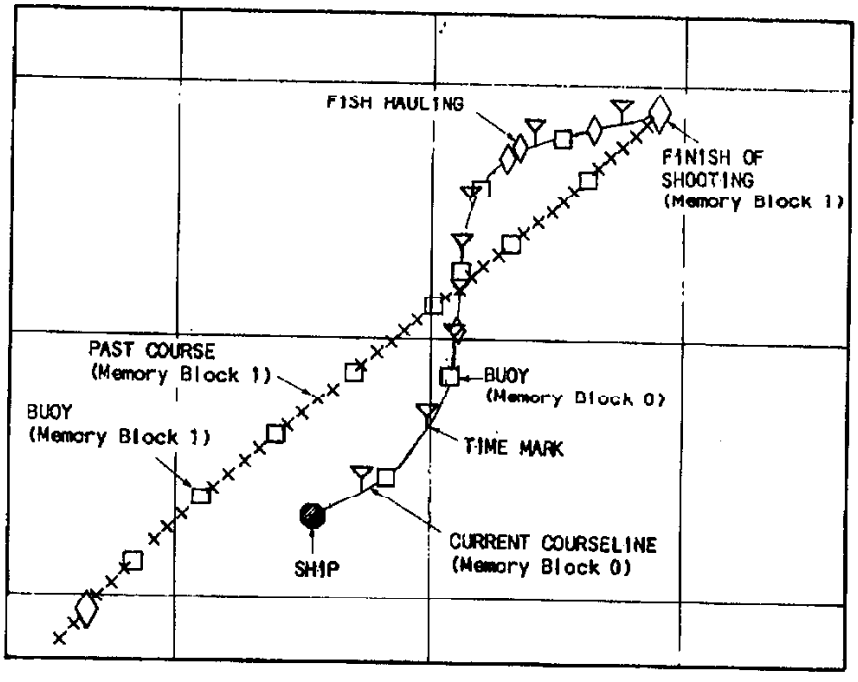



Fig.3-4 Example of Display in Tuna Long-Line Fishing

# CHAPTER 4. OPERATION WITH MT-100 MAGNETIC TAPE DATA RECORDER

Courseline and event/waypoint marks can be stored in the data recorder MT-100 for later playback. Fundamental operation of the GD-2000 for this purpose is given here and detailed operating instruction for the MT-100 is given in the separate manual.

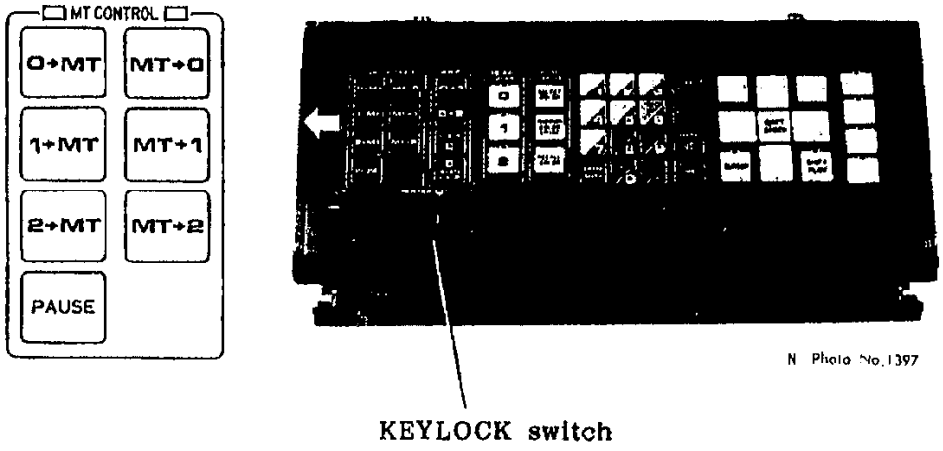



Fig.4-1 Control Panel with flip-down cover opened

## 4-1. Recording

1) Turn off the KEYLOCK switch on the GD-2000 sub-panel.

2) Press touchpad [0-MT], [1-MT], or [2-MT] depending on what memory content is to be stored into the MT-100.

   NOTE: Recording is not possible in the radar mode of the GD-2000.

3) Set the MT-100 Function switch to WRITE. Push down the start switch. Tape counter light and MT Control Lamp flicker indicating that the data is being written into the tape. When the data is transferred to the tape, the MT Control Lamp ceases flickering and the memory address is displayed on the screen and in the MT-100 tape counter. Note the address for later reference.

4) Make sure you return the KEYLOCK switch to ON unless more data is to be stored immediately.

## 4-2. Playback

Similar to recording, the playback requires the combined operation of the MT-100 and GD-2000.

1) Set the GD-2000 as follows.

   Turn off the KEYLOCK switch. Press touchpads [MT-0], [MT-1], or [MT-2] depending on to which memory block the data is to be played back into. Confirm that the Read Lamp goes on.

2) Operate the MT-100 as below.

   Set the Function switch to READ. Set the data address to be played back by using the Counter Set switch. Push down the Start switch, and the Start Lamp will begin flickering telling that the data is being transferred to the GD-2000 memory block. Tape counter light and MT Control Lamp will flicker, too.

### Playback Rate

The MT-100 stores courseline data as a series of dots at selected plotting intervals, and plays back these stored positions at the rate shown below.

| GD-2000 Plot Interval Switch | Playback Rate (Interval) |
|---|---|
| 5 sec | 0.25 sec |
| 10 sec | 0.5 sec |
| 30 sec | 1 sec |
| 1 min | 1.5 sec |
| 2 min | 2 sec |
| 5 min | 2.5 sec |
| 10 min | 3 sec |
| 30 min | 3.5 sec |
| 60 min | 4 sec |
| HOLD | STOP |

PRESETTING ON GD-2000 (INTERNAL PRESETS) --- These should be done by a qualified electronic technician.

1. Colors of own ship and cursor lines

The preset switches (1) and (2) are provided on the p.c.b. "IF" for the selection of colors of own ship and cursor line respectively. The color is identified by the numbers on the switches shown below. To gain access to the switches, open the control panel by loosening two control panel fixing bolts at both sides.

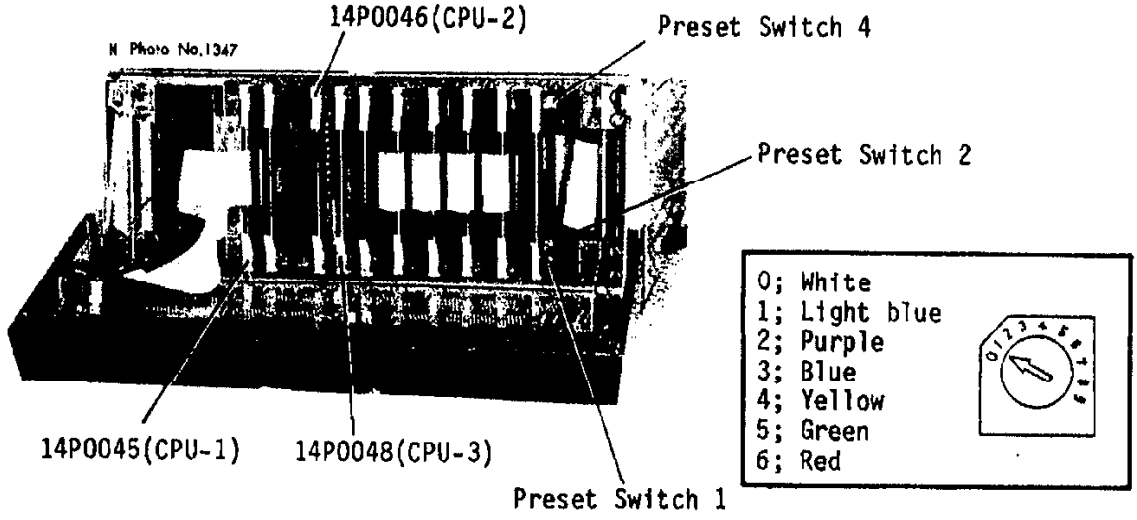



Fig.1

2. Others

The following items can be preset with respective switches inside the GD-2000 as follows. Refer to Figs. 1 and 2 for parts location.

| Items | Switch Number | Factory Setting |
|---|---|---|
| 1. Display of satellite fix | 1-1 | OFF(Yes) |
| 2. Display of no good satellite fix | 1-2 | ON (Yes) |
| 3. Display of satellite fix in navigation states other than DR | 1-3 | ON (Yes) |
| 4. Range of approach alarm, 5/1n.m. (standard) or 1/0.2n.m. | 1-4 | ON (5/1n.m.) |
| 5. Display of courseline during "HOLD" period | 2-2 | ON (Yes) |
| 6. Display of courseline in line or "x" mark on the memory (1) and (2) | 2-3 | ON (Line) |
| 7. Display of the courseline with its color erasing | 2-4 | OFF(Yes) |
| 8. Japanese Version/English Version | 2-5 | ON (English) |
| 9. Display of time mark | 3-2 | OFF(Yes) |
| 10. Factory use | 3-7 | OFF |
| 11. Performing of V-RAM check during self-check | 3-8 | OFF(No) |

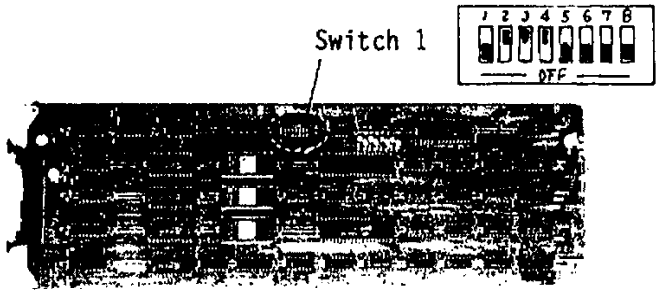



Fig.2(a) p.c.b. 14P0045(CPU-1)

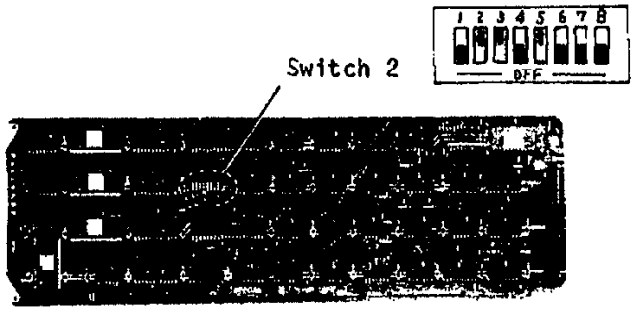
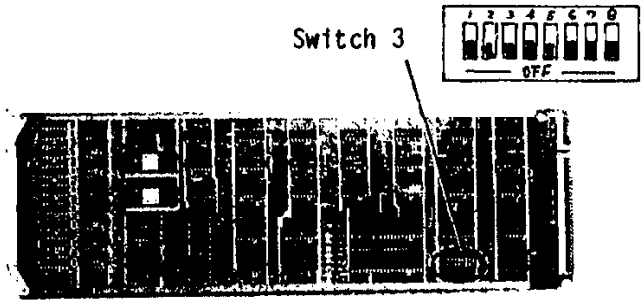



Fig.2(b) p.c.b. 14P0046(CPU-2)




N Photo No.1367

Fig.2(c) p.c.b. 14P0048(CPU-3)

## INSTALLATION OF VIDEO PLOTTER CONTROL UNIT GD-2000

The video plotter control unit, GD-2000 is supplied with the installation materials listed below.

Table 1. Installation Materials

| No. | Name | Description | Code No. | Q'ty | Remarks |
|---|---|---|---|---|---|
| 1 | Cable | 14-73(10.13.13-8.12.12P) (VV-S-7/0.18(TA)x16P *1.7m* with connectors) | 004-306-140 | 1 pc. | |
| 2 | Cable | 14-74 10P GD-2000C (CO-SPEVV-SB-C 0.2sqx5P *5m* with H10P-SHF-AA) | 004-306-150 | 1 pc. | |
| 3 | Cable | GD-2000C (VCTF-1.25x2C *3.5m* with 16P2B) | 004-306-210 | 1 pc. | |
| 4 | NH connector Kit | 14-75,76 GD-2000C (H10P-SHF-AA and H13P-SHF-AA with 15cm wires) | 004-306-260 | 1 set | |
| 5 | Label *MT* | 14-011-5515 | 841-155-150 | 1 pc. | |
| 6 | Label *GD* | 14-011-5518 | 841-155-180 | 1 pc. | |
| 7 | Hex. Bolt | M8 x 20 (SUS304) | 000-862-147 | 4 pcs. | |
| 8 | Flat Washer | M8 | 000-864-130 | 4 pcs. | |
| 9 | Spring Washer | M8 | 000-864-262 | 4 pcs. | |

The control unit can be installed for either piggyback mounting with the color display unit CD-140 or for stand-alone mounting.

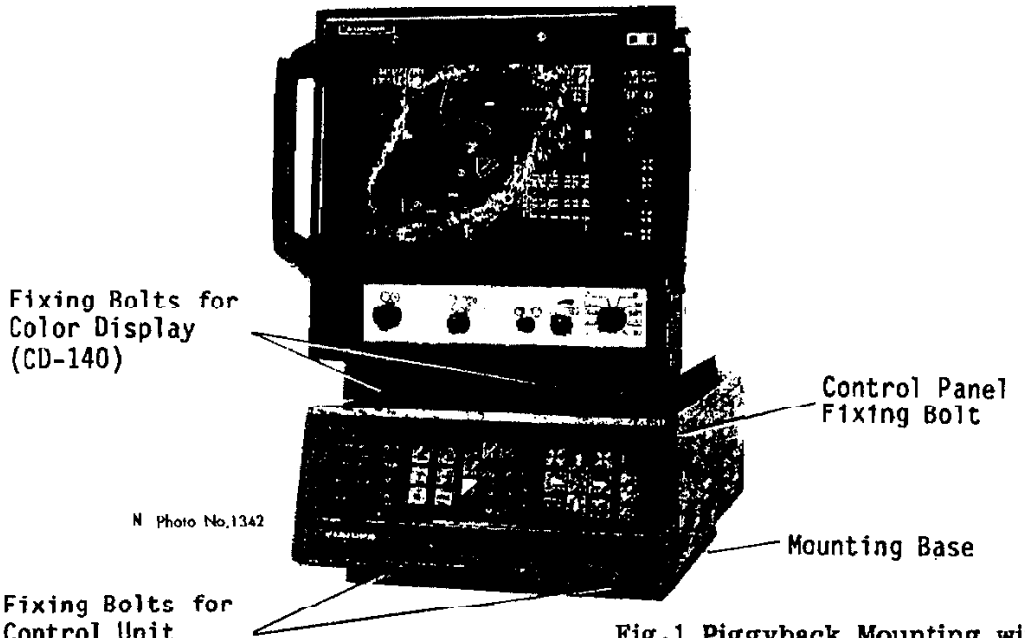



Fig.1 Piggyback Mounting with Color Display(CD-140)

1. Mounting of the Control Unit

The control unit can be mounted on a table-top, bulkhead or overhead Since the unit is supplied for table-top mounting, local modification should be made for bulkhead and overhead mounting as below. When mounting the control unit, use the mounting base attached to the bottom of the control unit at delivery. The mounting base can be removed easily from the main chassis by loosening two fixing bolts. See Fig. 1.

Choose the mounting place, taking into account the following points. Refer to the page D-1 for dimensions of the unit.

a) Allow at least 150mm of clearance for cabling behind the control unit.

b) Mount the unit so that it never gets sprayed with salt water from open ports or hatchways.

c) Do not mount it near heat sources such as heaters, stoves or exhaust pipes.

d) Reinforce the mounting place, if necessary. The unit weighs 30kg.

Fix the mounting base at the location selected with four woodscrews or bolts.

It is recommended that connections on the control unit is made prior to securing the unit to its mounting base.

Conversion from table-top to bulkhead/overhead mounting

The control unit is supplied suitable for table-top mounting. When con version to bulkhead/overhead mounting is required, follow the procedure below.

1) Open the control panel after loosening the control panel fixing bolts at both sides. See Figs.1 and 2.

2) Disconnect temporarily the muliticonnector(flat cable) on the control panel p.c.b. and separate the control panel from the main chassis together with its brackets by unscrewing eight bracket fixing screws. See Fig.3.

3) Turn the control panel and brackets upside down.

4) Loosen six screws fixing the key board and refix the key board upside down.

5) Interchange the top cover with the bottom cover, and put the mounting base on the other side (on the top) of the chassis.

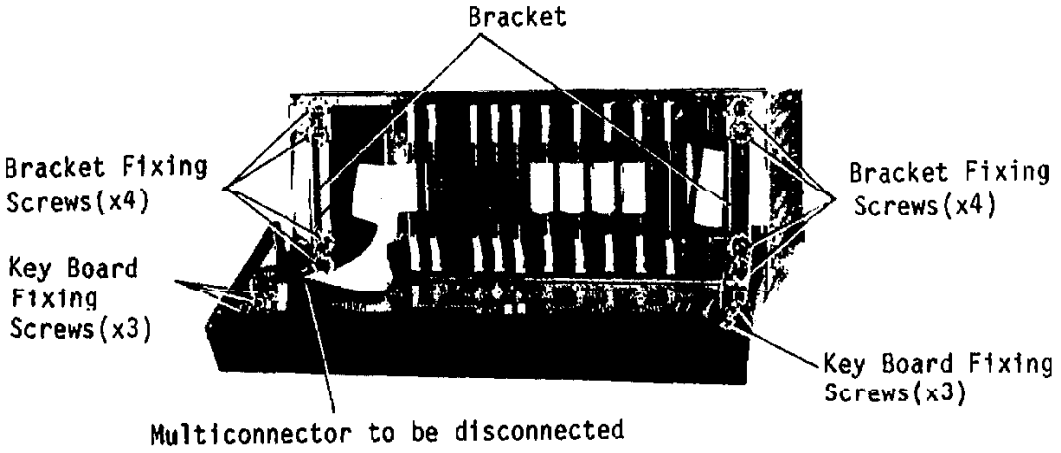



Fig.2 GD-2000 with Control Panel opened

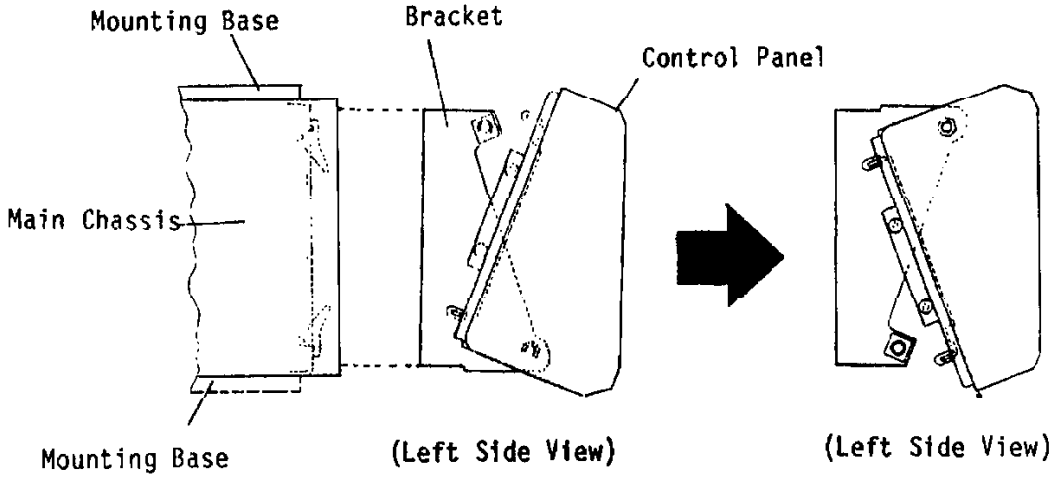



Fig.3(a) For Table-top Fig.3(b) For Bulkhead/Overhead

2. Piggyback Mounting with Color Display Unit CD-140

The display unit can be mounted on top of the control unit. Separate the mounting base attached to the bottom of the display unit by loosening two fixing bolts. Undo four screws on the top panel of the control unit where the mounting base is fixed.

GD-2000

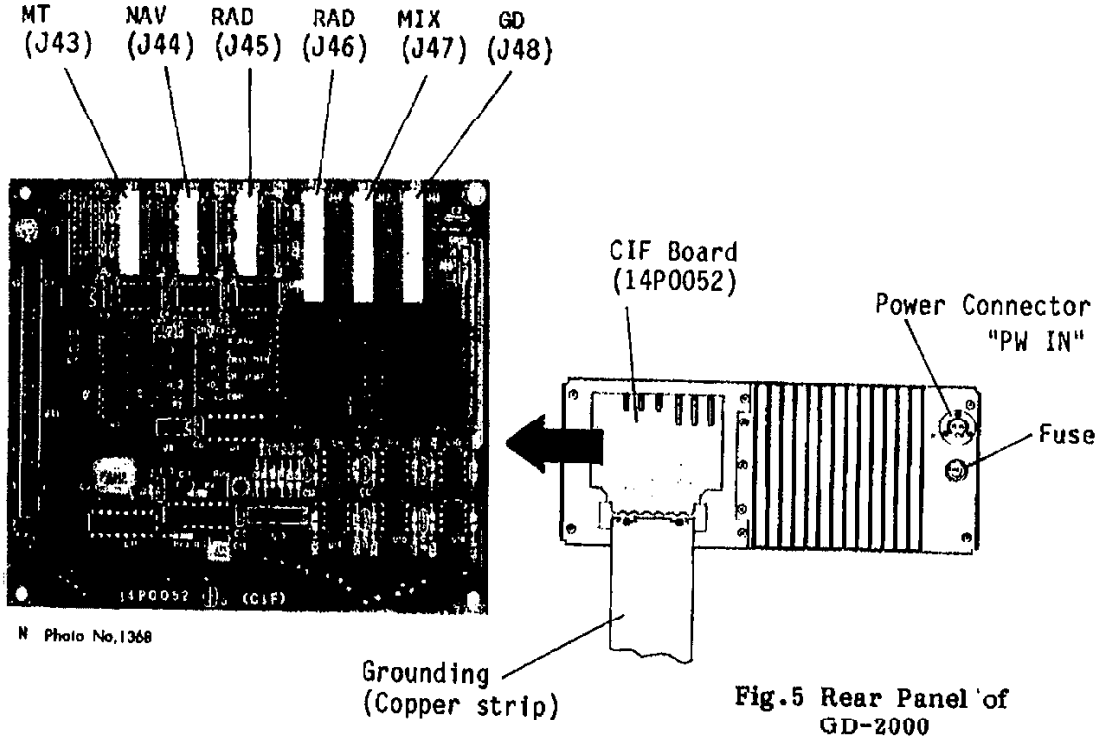



Fig.5 Rear Panel of GD-2000

2) Navigation Data to the GD-2000

Navigation data as well as position data should be supplied to the connector "NAV" on the board CIF in GD-2000. The cable is supplied with a connector plug factory-wired at GD-2000 side. For fabrication at the navigation equipment side, refer to the respective operator's manual or installation manual.

3) Power Supply for GD-2000

Ship's mains (DC18 to 42V) is supplied to the power connector "PW IN" at the rear panel. (Positive; white core, pin #1 and Negative; black core, pin #2)

4) Grounding

Grounding should be made firmly with copper strap supplied. See Fig.5.

## MODIFICATION OF COLOR DISPLAY CD-140
### FOR COMBINATION WITH GD-2000

The following modification is required only on the color display CD-140 having serial number 887-0136 and before, when combining with the GD-2000. The modification kit is supplied together with the GD-2000, production in November, 1982 and before. For the GD-2000 having the serial number 429-0105 and after, production in December, 1982 and after, the modification kit is not supplied and should be prepared separately.

### Modification Kit

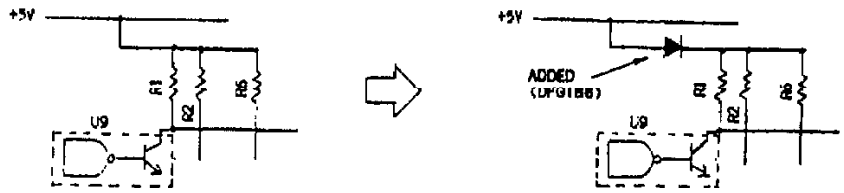
1) PROM's having program version number 04 or after, 3pcs.
2) Diode, DFG1B8 (Code No.000-136-013), 1pc.
3) Ceramic Capacitor, 470pF, 50V (Code No.000-251-703), 1pc.

1. Add the diode to isolate +5V line from that of GD-2000 on p.c.b. 03P4756 as below.

   1) Scrape 3 to 5mm of the resistant coating from copper foil at Ⓐ on the soldering side.

   2) Cut copper foil leaving a gap of 1 to 2.5mm at Ⓑ.

   3) Solder diode (Type; DFG1B8, Code No.000-136-013) between points Ⓐ and Ⓒ as shown in Figure 1. Anode side of the diode is connected to the point Ⓐ.




Before modification

After Modification

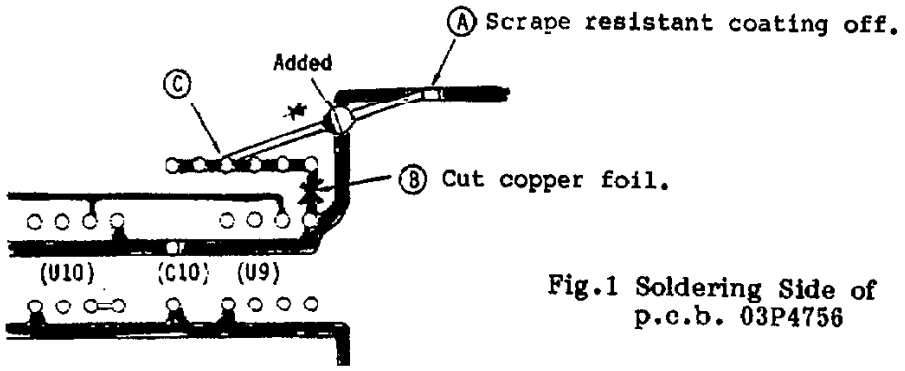



Fig.1 Soldering Side of p.c.b. 03P4756

2. Add the 470pF., 50V, ceramic capacitor between #4 and #6 of U11 on p.c.b. 03P4756 to keep the picture stable.

   Put insulating vinyl tubes on both leads before soldering. Fix the capacitor body to the board with a little adhesive.

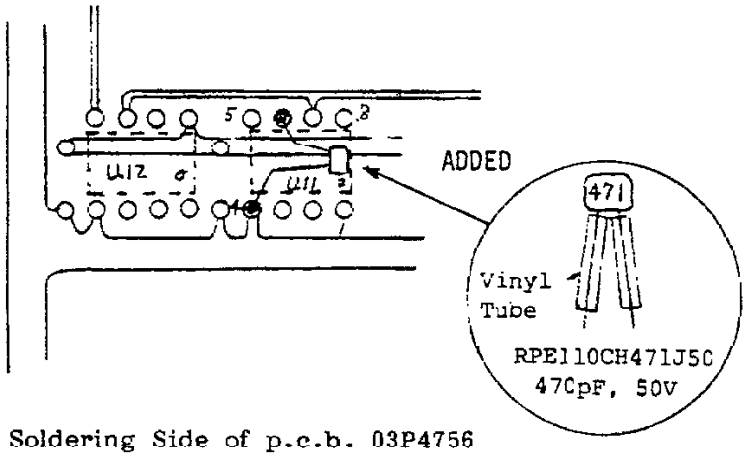



Fig.2 Soldering Side of p.c.b. 03P4756

3. Replace PROM's (U60, U61 and U75) with new ones containing program version number -04 or after on CPU board, 03P4757.

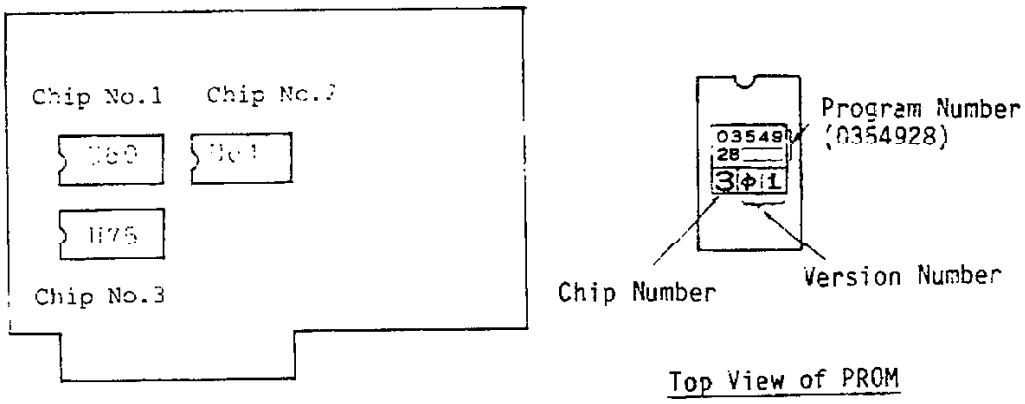
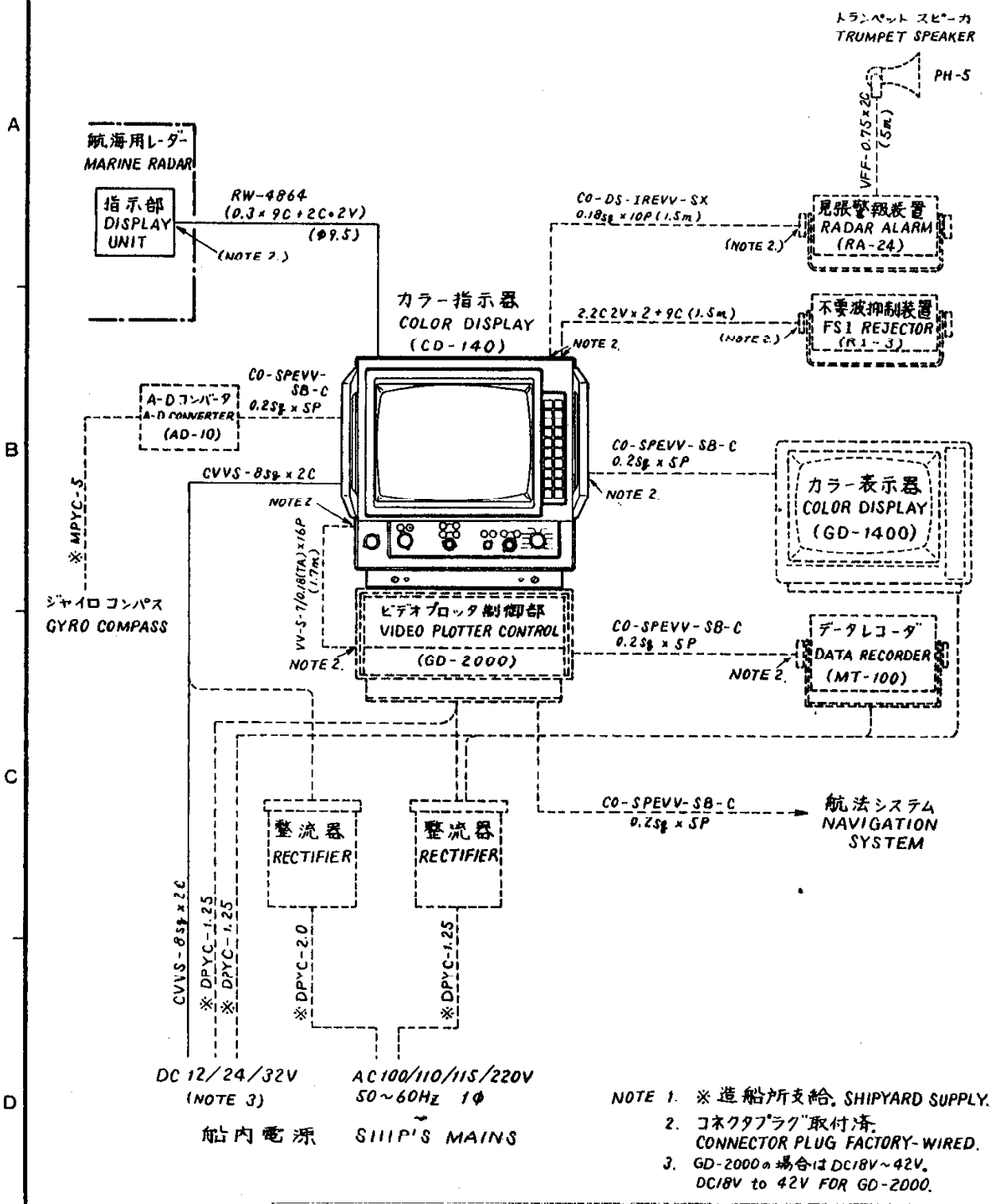



Fig.3 CPU Board(03P4757)

**FURUNO**

S-1




NOTE 1. ※造船所支給. SHIPYARD SUPPLY.
2. コネクタプラグ"取付済. CONNECTOR PLUG FACTORY-WIRED.
3. GD-2000の場合はDC18V~42V. DC18V to 42V FOR GD-2000.

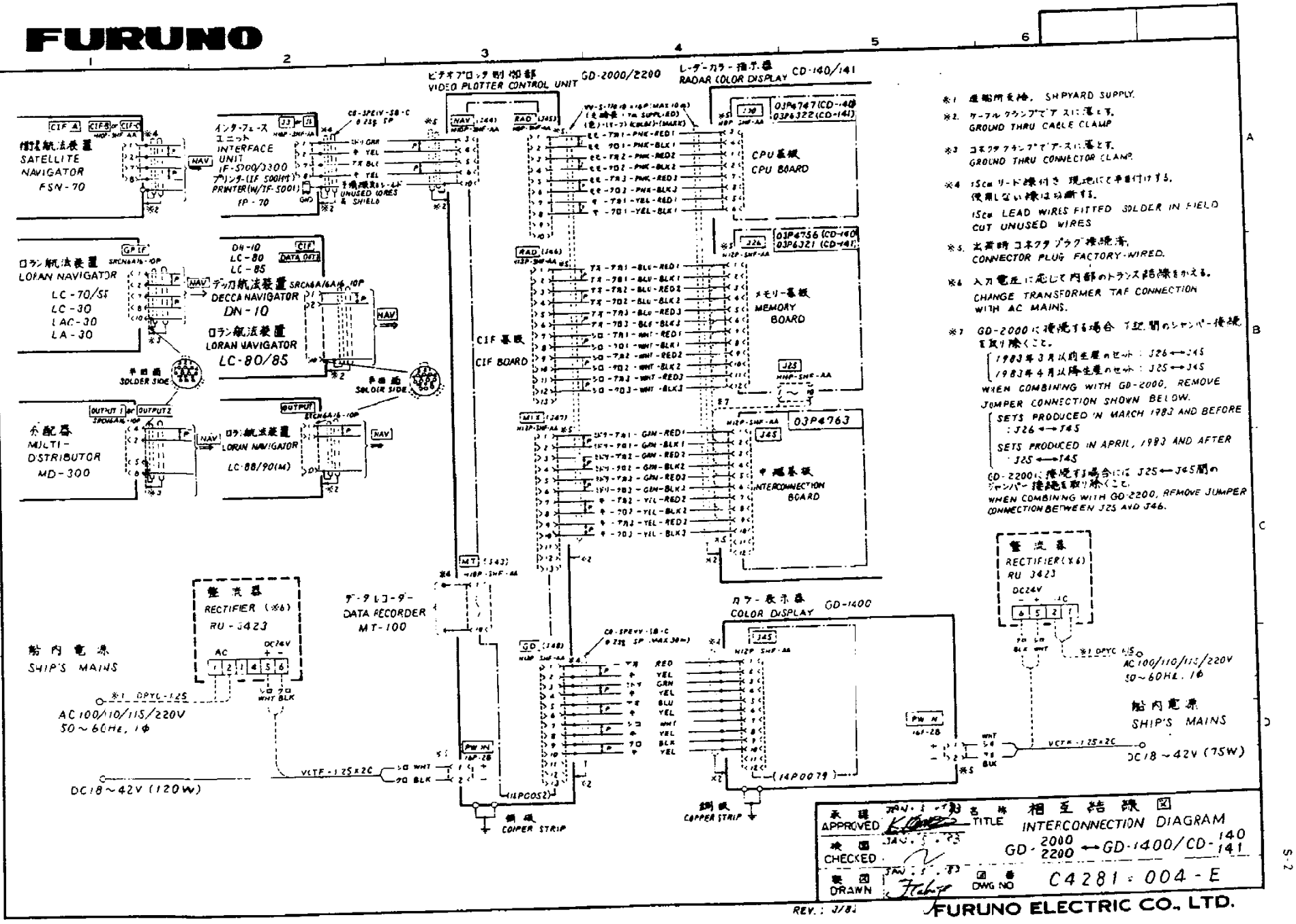
CD-140

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

| | | | |
|---|---|---|---|
| 承認 APPROVED | SEP.18.'92 | 三角法 THIRD ANGLE PROJECTION | 名称 TITLE レーダーカラー指示器相互連絡図 RADAR COLOR DISPLAY SYSTEM DIAGRAM |
| 検図 CHECKED | SEP.17.'92 | 尺度 SCALE | |
| 製図 DRAWN | Sept.9.'92 K.M | 重量 WEIGHT kg | 図番 DWG.NO. C3252-001-E |

**FURUNO ELECTRIC CO., LTD.**

FURUNO




※1 船舶所有者。 SHIPYARD SUPPLY.

※2. ケーブルクランプでアースに落とす。
GROUND THRU CABLE CLAMP

※3 コネクタクランプでアースに落とす。
GROUND THRU CONNECTOR CLAMP.

※4 15cm リード線付き 現地にて半田付けする。
使用しない線は切断する。
15cm LEAD WIRES FITTED SOLDER IN FIELD
CUT UNUSED WIRES

※5. 出荷時コネクタプラグ接続済。
CONNECTOR PLUG FACTORY-WIRED.

※6 入力電圧に応じて内部のトランス結線をかえる。
CHANGE TRANSFORMER TAP CONNECTION WITH AC MAINS.

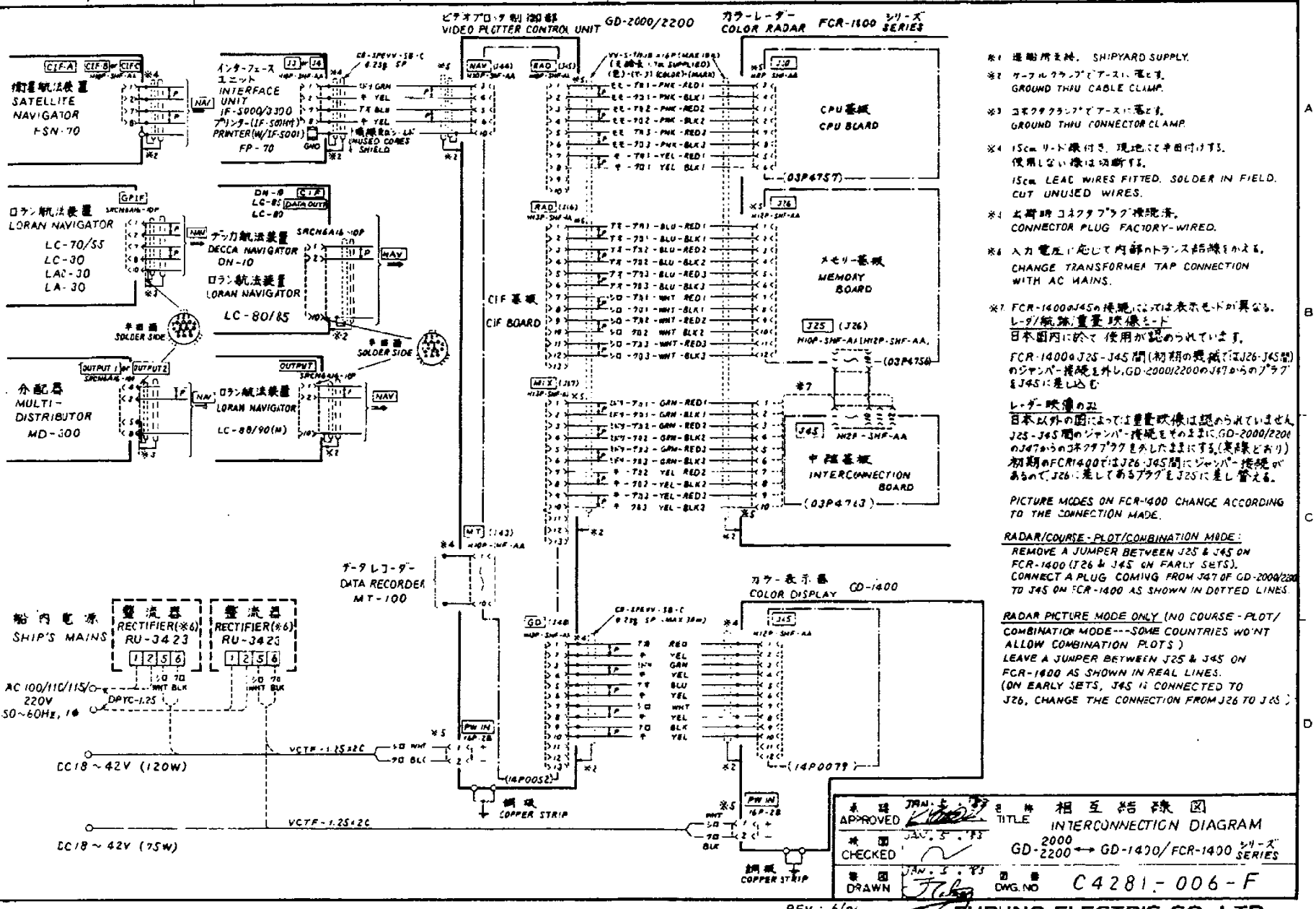
※7 GD-2000に接続する場合 下記間のジャンパー接続を取り除くこと。
1983年3月以前生産のセット : J26 ⟷ J45
1983年4月以降生産のセット : J25 ⟷ J45
WHEN COMBINING WITH GD-2000, REMOVE JUMPER CONNECTION SHOWN BELOW.
SETS PRODUCED IN MARCH 1983 AND BEFORE : J26 ⟷ J45
SETS PRODUCED IN APRIL, 1983 AND AFTER : J25 ⟷ J45
GD-2200に接続する場合には J25 ⟷ J45間のジャンパー接続を取り除くこと。
WHEN COMBINING WITH GD-2200, REMOVE JUMPER CONNECTION BETWEEN J25 AND J46.

| | | | |
|---|---|---|---|
| 承認 APPROVED | | 名称 TITLE | 相互結線図 INTERCONNECTION DIAGRAM |
| 検図 CHECKED | JAN. 5. '83 | | GD-2000/2200 ⟷ GD-1400/CD-140/141 |
| 製図 DRAWN | JAN. 5. '83 | 図番 DWG NO | C4281 : 004 - E |

REV. : J/83

FURUNO ELECTRIC CO., LTD.

FURUNO




※1 造船所支給。 SHIPYARD SUPPLY.

※2 ケーブルクランプでアースに落とす。
GROUND THRU CABLE CLAMP.

※3 コネクタクランプでアースに落とす。
GROUND THRU CONNECTOR CLAMP.

※4 15cm リード線付き。現地にて半田付けする。
使用しない線は切断する。
15cm LEAD WIRES FITTED. SOLDER IN FIELD.
CUT UNUSED WIRES.

※5 工場出荷時コネクタプラグ接続済。
CONNECTOR PLUG FACTORY-WIRED.

※6 入力電圧に応じて内部のトランス結線をかえる。
CHANGE TRANSFORMER TAP CONNECTION WITH AC MAINS.

※7 FCR-1400のJ45の接続によっては表示モードが異なる。
レーダ/航跡/重畳映像モード
日本国内において使用が認められています。
FCR-1400のJ25-J45間(初期の機械ではJ26-J45間)のジャンパー接続を外し、GD-2000/2200のJ47からのプラグをJ45に差し込む

レーダー映像のみ
日本以外の国によっては重畳映像は認められていません。
J25-J45間のジャンパー接続をそのままにGD-2000/2200のJ47からのコネクタプラグをはずしたままにする。(実線どおり)
初期のFCR1400ではJ26-J45間にジャンパー接続があるので、J26に差してあるプラグをJ25に差し替える。

PICTURE MODES ON FCR-1400 CHANGE ACCORDING TO THE CONNECTION MADE.

RADAR/COURSE-PLOT/COMBINATION MODE:
REMOVE A JUMPER BETWEEN J25 & J45 ON FCR-1400 (J26 & J45 ON EARLY SETS).
CONNECT A PLUG COMING FROM J47 OF GD-2000/2200 TO J45 ON FCR-1400 AS SHOWN IN DOTTED LINES.

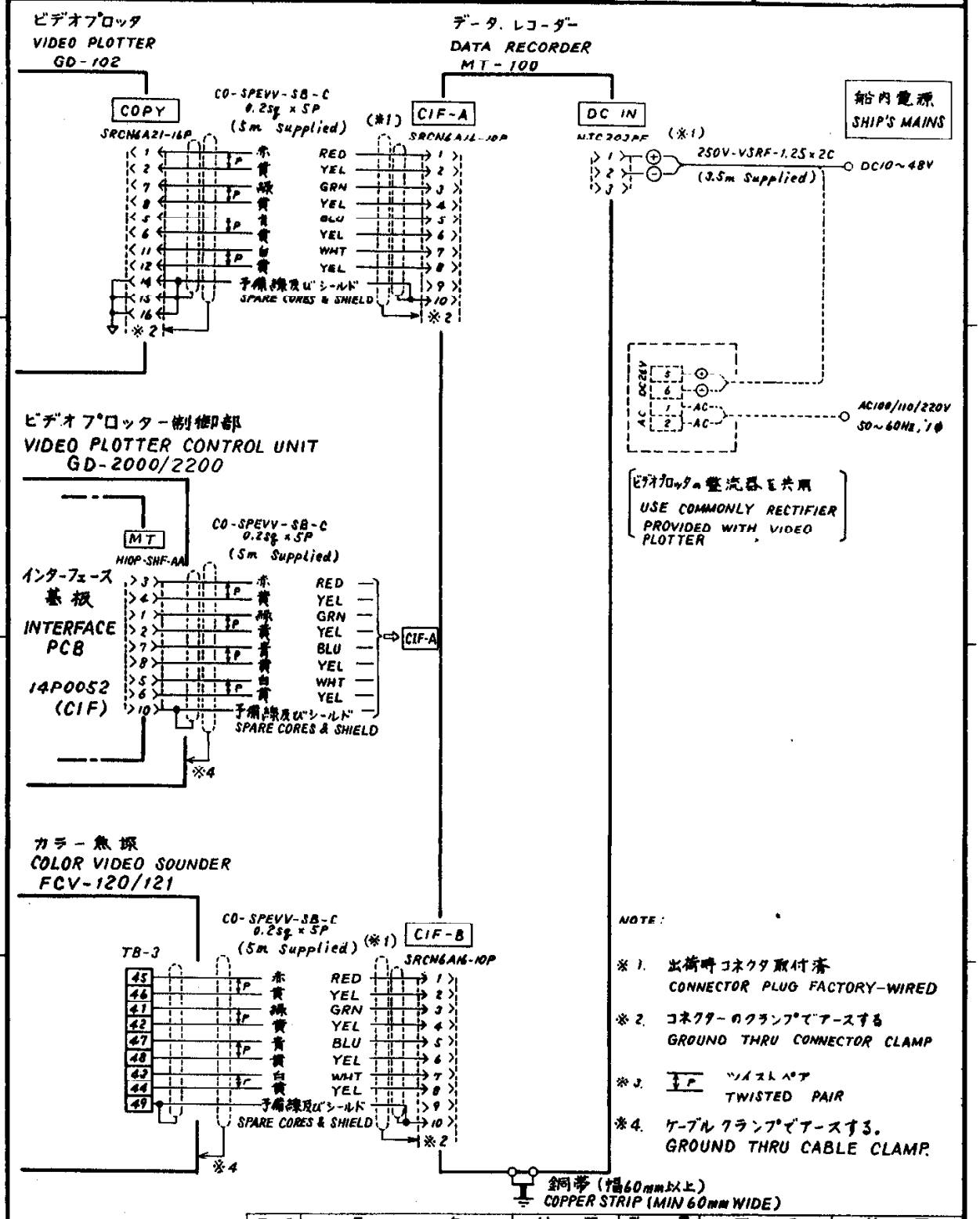
RADAR PICTURE MODE ONLY (NO COURSE-PLOT/COMBINATION MODE---SOME COUNTRIES WON'T ALLOW COMBINATION PLOTS)
LEAVE A JUMPER BETWEEN J25 & J45 ON FCR-1400 AS SHOWN IN REAL LINES.
(ON EARLY SETS, J45 IS CONNECTED TO J26, CHANGE THE CONNECTION FROM J26 TO J25)

| | | | |
|---|---|---|---|
| 承認 APPROVED | JAN. 5. '93 | 名称 TITLE | 相互結線図 INTERCONNECTION DIAGRAM |
| 検図 CHECKED | JAN. 5. '93 | | GD-2000/2200 ⟷ GD-1400/FCR-1400 シリーズ SERIES |
| 製図 DRAWN | JAN. 5. '93 | 図番 DWG. NO | C4281-006-F |

REV.: 6/84

FURUNO ELECTRIC CO., LTD.

FURUNO




NOTE:

※1. 出荷時コネクタ取付済
CONNECTOR PLUG FACTORY-WIRED

※2. コネクターのクランプでアースする
GROUND THRU CONNECTOR CLAMP

※3. ツイストペア
TWISTED PAIR

※4. ケーブルクランプでアースする。
GROUND THRU CABLE CLAMP

銅帯 (幅60mm以上)
COPPER STRIP (MIN 60mm WIDE)

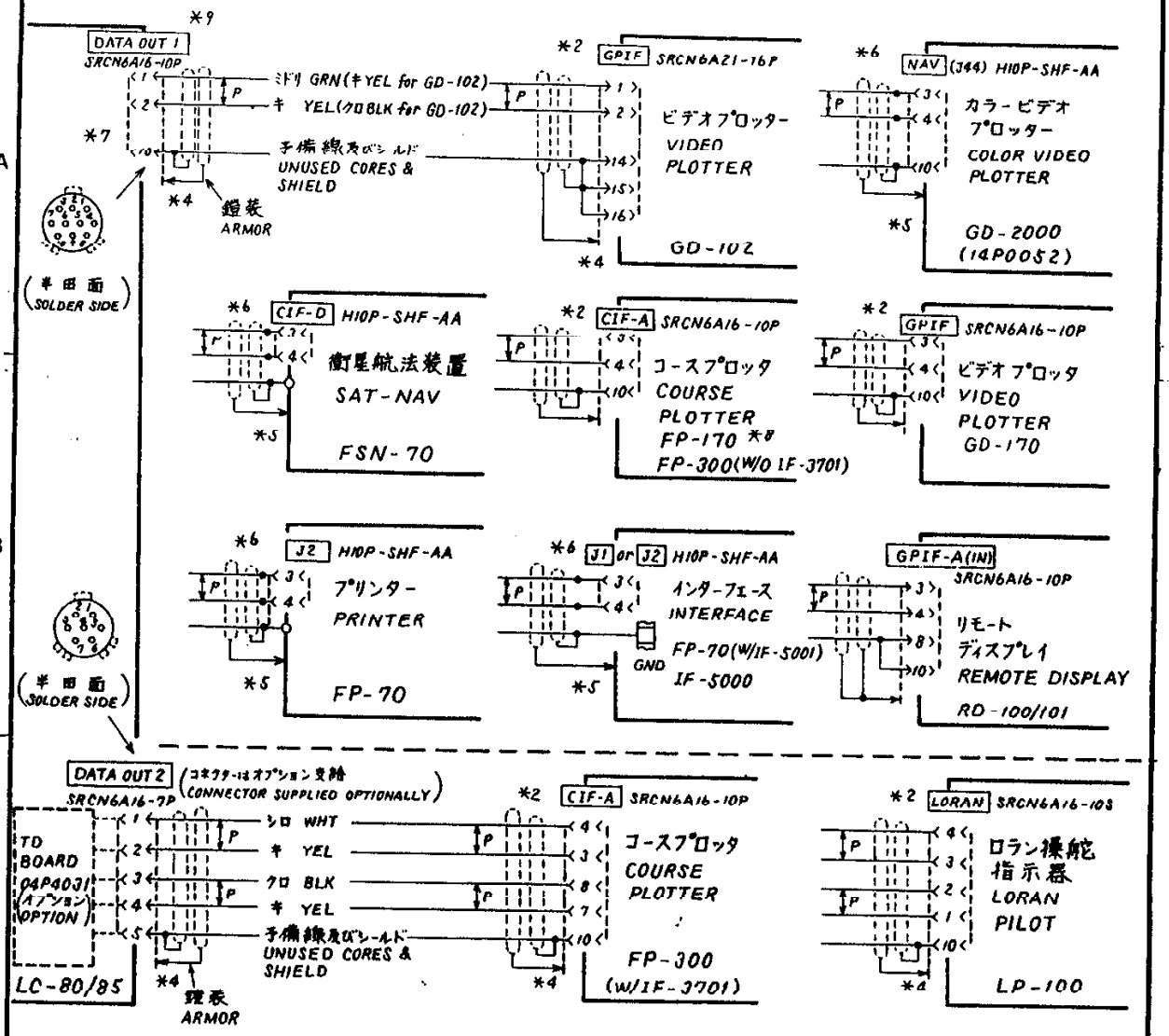
| 品番 ITEM | 品名 NAME | 材質 MATERIAL | 数量 Q'TY | 図番 DWG.NO. | 摘要 REMARKS |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 承認 APPROVED | JUL. 28 '80 | 三角法 THIRD ANGLE PROJECTION | | 名称 TITLE | データ・レコーダ相互結線図 DATA RECORDER |
| 検図 CHECKED | JULY. 28 '80 | 尺度 SCALE | / | | |
| 製図 DRAWN | July. 28 '80 | 重量 WEIGHT | kg | 図番 DWG.NO. | C4264-002-F |

FURUNO ELECTRIC CO., LTD.

**FURUNO**

S-6




注)

* 1. ケーブルはすべて CO-SPEVV-SB-C 0.2×5P を使用。
USE CABLE CO-SPEVV-SB-C 0.2×5P.

* 2. 出荷時コネクター結線済。
CONNECTOR PLUG FACTORY-WIRED.

* 3. P ツイストペアー。 TWIST PAIR.

* 4. 鎧装をコネクターのクランプでアースする。
GROUND ARMOR THRU CONNECTOR CLAMP.

* 5. ケーブルクランプでアースに落とす。
GROUND THRU CABLE CLAMP.

* 6 15cmリード線付き現地にて半田付けする。
使用しない線は切断する。
15cm LEAD WIRES FITTED. SOLDER IN FIELD.
CUT UNUSED WIRES.

* 7. ピン #3 & #4 は使用しないこと。 DO NOT USE #3 & #4.

* 8. ロラン位置線は作図されない。
LOP'S LINES NOT PLOTTED.

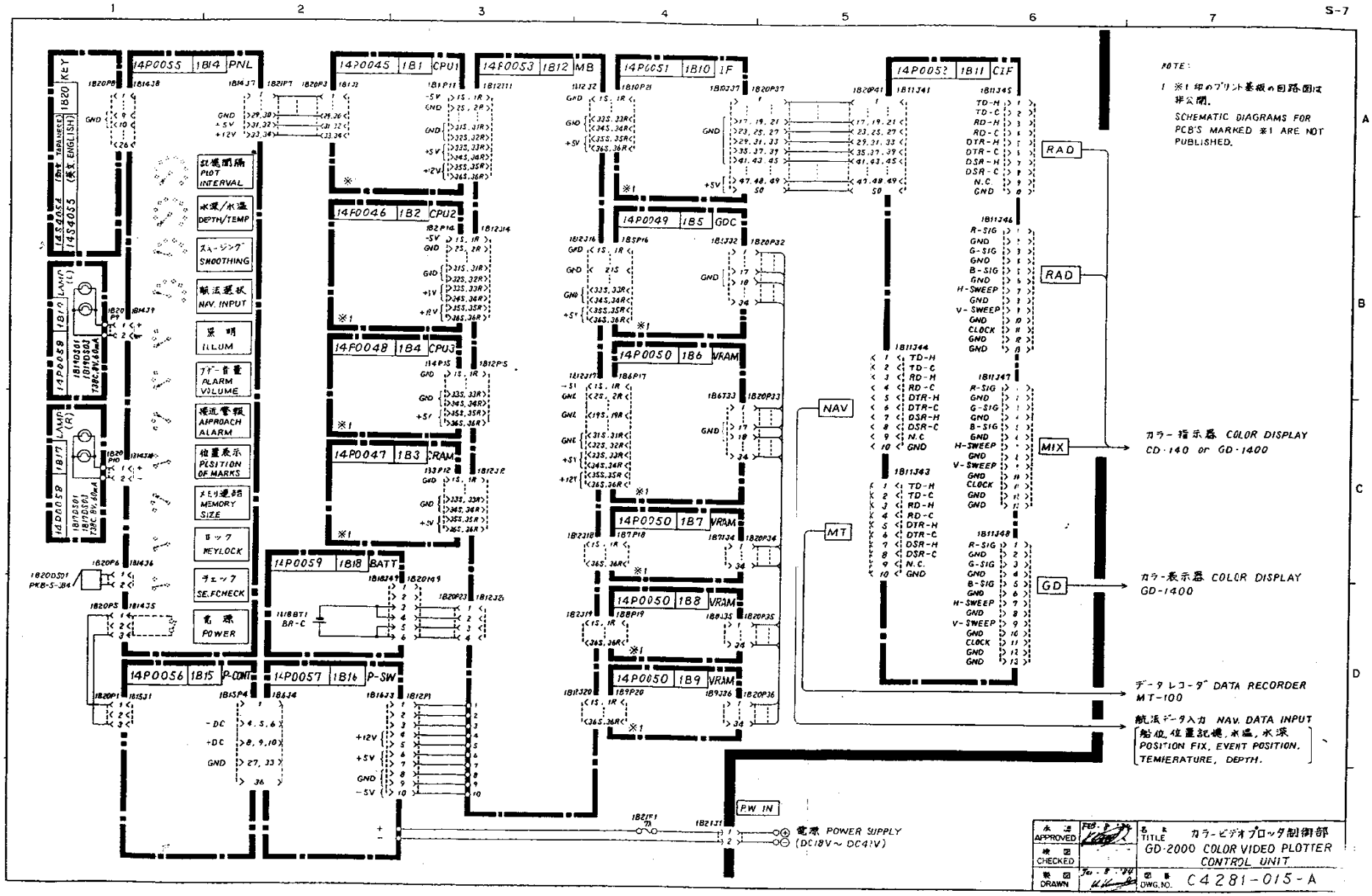
* 9. LC-80の場合、標準セットではコネクターは付かない。
CONNECTORS NOT SUPPLIED AS STANDARD SET FOR LC-80.

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

| | | | |
|---|---|---|---|
| 承認 APPROVED | FEB.22.'83 | 三角法 THIRD ANGLE PROJECTION | 名称 TITLE ロラン航法装置 付加装置結線図<br>LORAN NAVIGATOR ⟷ PERIPHERAL EQUIPMENT<br>LC-80/85 |
| 検図 CHECKED | 22-FEB-'83 | 尺度 SCALE | |
| 製図 DRAWN | 22.2.'83 | 重量 WEIGHT kg | 図番 DWG.NO. C4288-004-G |

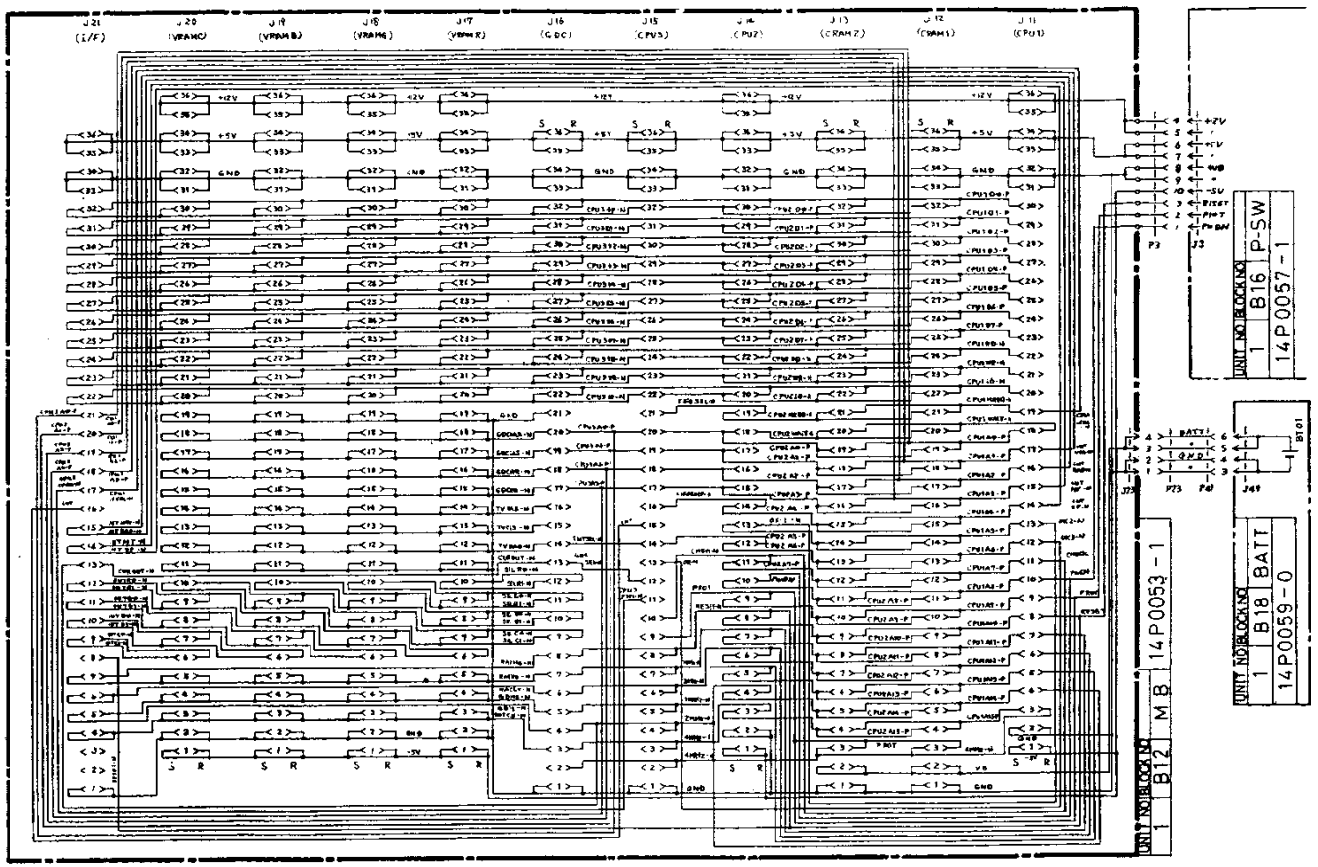
REV: 6/83, 8/83

FURUNO ELECTRIC CO., LTD.


14P0055 1B14 PNL
14P0045 1B1 CPU1
14P0053 1B12 MB
14P0051 1B10 IF
14P0052 1B11 CIF
14P0046 1B2 CPU2
14P0049 1B5 GDC
14P0048 1B4 CPU3
14P0050 1B6 VRAM
14P0047 1B3 VRAM
14P0050 1B7 VRAM
14P0059 1B18 BATT
14P0050 1B8 VRAM
14P0056 1B15 P-CONT
14P0057 1B16 P-SW
14P0050 1B9 VRAM
KEY
LAMP (L)
LAMP (R)
PLOT INTERVAL
DEPTH/TEMP
SMOOTHING
NAV. INPUT
ILLUM
ALARM VOLUME
APPROACH ALARM
POSITION OF MARKS
MEMORY SIZE
KEYLOCK
SE.FCHECK
POWER
RAD
RAD
NAV
MIX
MT
GD
カラー指示器 COLOR DISPLAY
CD-140 or GD-1400
カラー表示器 COLOR DISPLAY
GD-1400
データレコーダ DATA RECORDER
MT-100
航法データ入力 NAV. DATA INPUT
船位,位置記憶,水温,水深
POSITION FIX, EVENT POSITION,
TEMPERATURE, DEPTH.
PW IN
電源 POWER SUPPLY
(DC18V～DC41V)
NOTE:
1 ※1 印のプリント基板の回路図は非公開.
SCHEMATIC DIAGRAMS FOR PCB'S MARKED ※1 ARE NOT PUBLISHED.
APPROVED
CHECKED
DRAWN
TITLE
カラービデオプロッタ制御部
GD-2000 COLOR VIDEO PLOTTER
CONTROL UNIT
DWG.NO. C4281-015-A

FURUNO

S-8



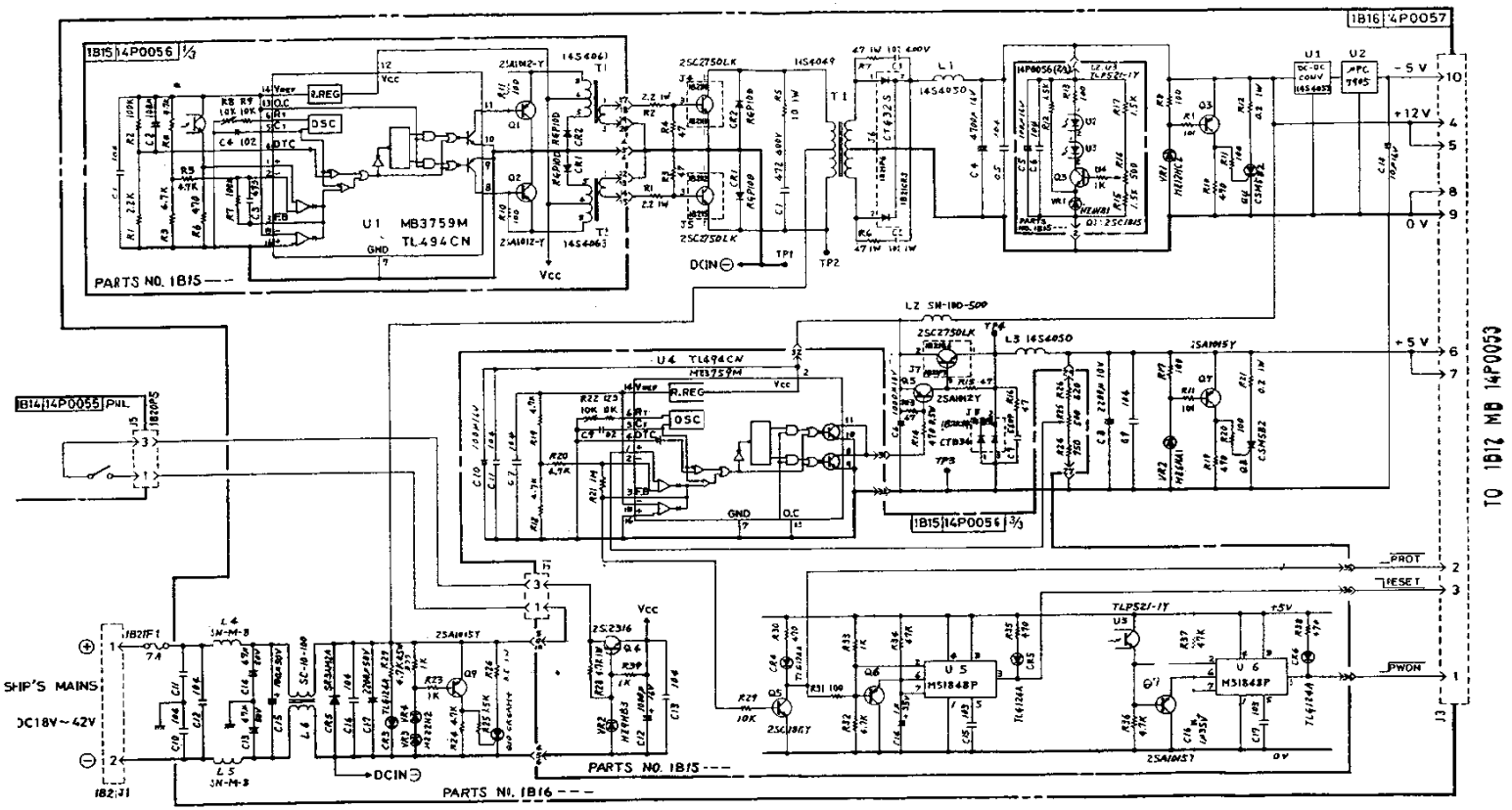

PARTS NO. 1812---

| ITEM | NAME | MATERIAL | Q'TY | DWG NO. | REMARKS |
|---|---|---|---|---|---|
| | | | | | |

| | | | |
|---|---|---|---|
| APPROVED | FEB. 8. '84 | THIRD ANGLE PROJECTION | TTLE マザー(MB)基板 MOTHER BOARD (MB) (14P0053) |
| CHECKED | FEB. 8. '84 | SCALE | |
| DRAWN | Feb. 2. '84 | WEIGHT kg | DWG. NO. C4281-011-A |

GD-2000

FURUNO ELECTRIC CO., LTD.



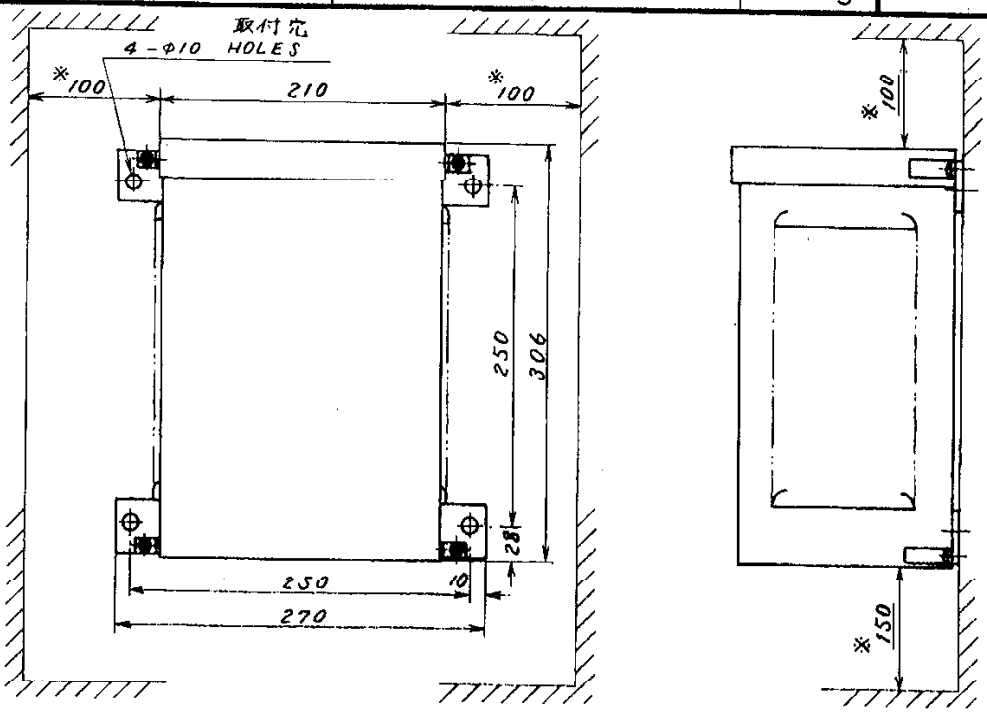

| ITEM | NAME | MATERIAL | Q'TY | DWG. NO. | REMARKS |
|---|---|---|---|---|---|
| APPROVED | | THIRD ANGLE PROJECTION | TITLE | 電源部 (P-SW/P-CONT) POWER SUPPLY (14P0056/14P0057) | |
| CHECKED | | SCALE | | | |
| DRAWN | | WEIGHT | kg | DWG. NO. C4281-014 — A | |

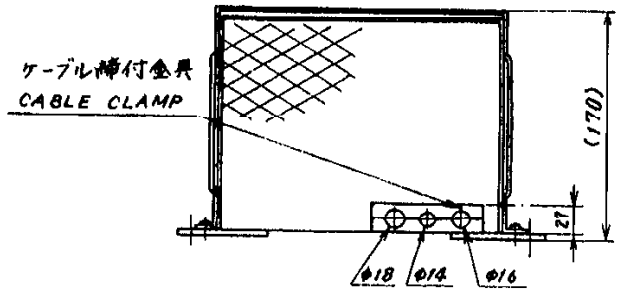
GD-2000

FURUNO ELECTRIC CO., LTD.

FURUNO

D-4

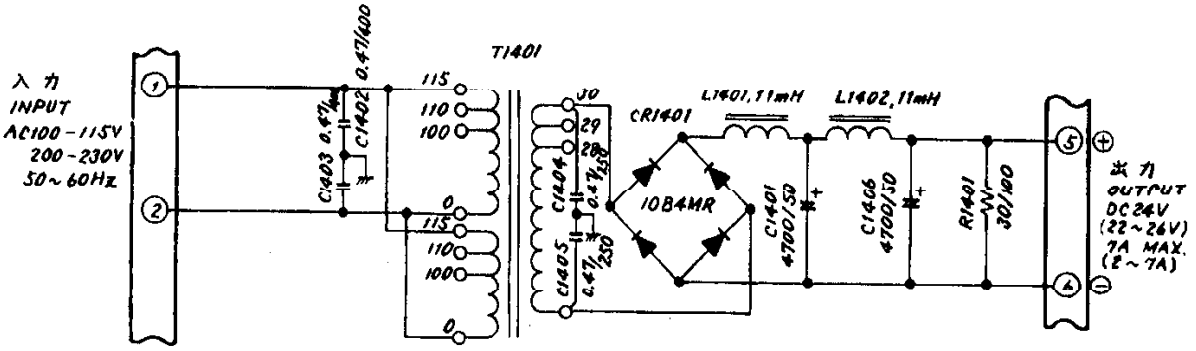



NOTE 1. ※: 推奨サービス空間。
RECOMMENDED SERVICING CLEARANCE.

2. コンパス安全距離
COMPASS SAFE DISTANCE.

| | |
|---|---|
| スタンダード STANDARD | 2.1M |
| ステアリング STEERING | 1.5M |



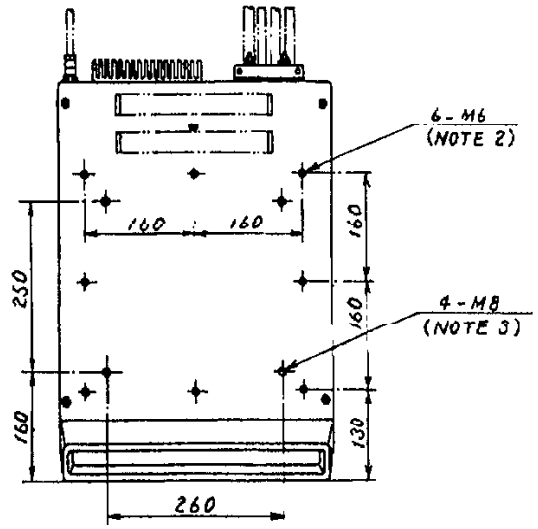

注 AC220V 入力に対しては T1401 の一次巻線を直列に接続する。

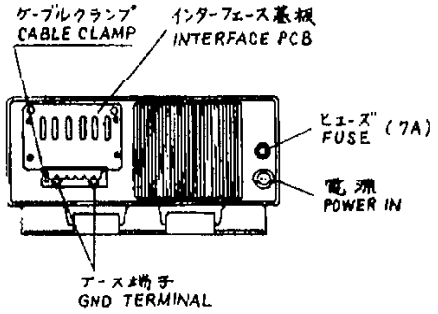
NOTE FOR 220VAC INPUT, CONNECT T1401 PRIMARY WINDINGS IN SERIES.

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

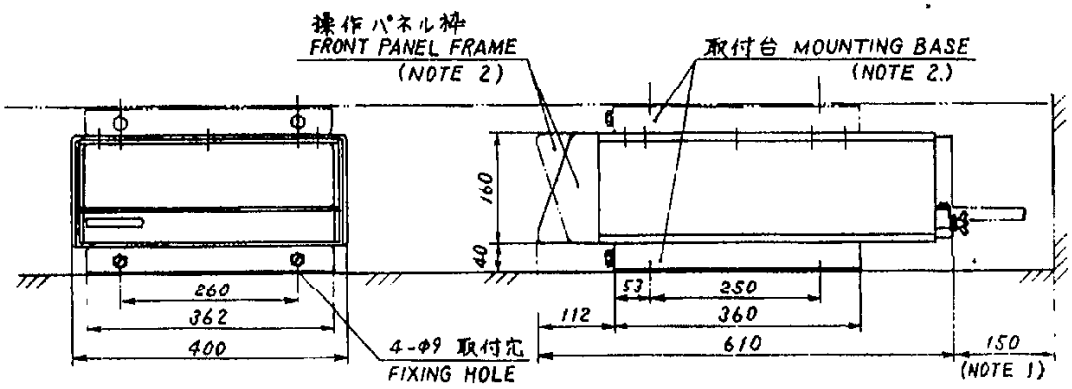
| | | | | | |
|---|---|---|---|---|---|
| 承認 APPROVED | JAN 18 '79 | 三角法 THIRD ANGLE PROJECTION | | 名称 TITLE | RU-3423 整流器 RECTIFIER UNIT |
| 検図 CHECKED | JAN. 17. '79 | 尺度 SCALE | 1/5 | | |
| 製図 DRAWN | Jan 16 79 | 重量 WEIGHT | 16.5kg | 図番 DWG. NO. | C3002-005-D |

FURUNO ELECTRIC CO., LTD.




後面図 REAR SIDE VIEW




NOTE 1. ケーブル接続用推奨スペース
RECOMMENDED CLEARANCE FOR CABLING.

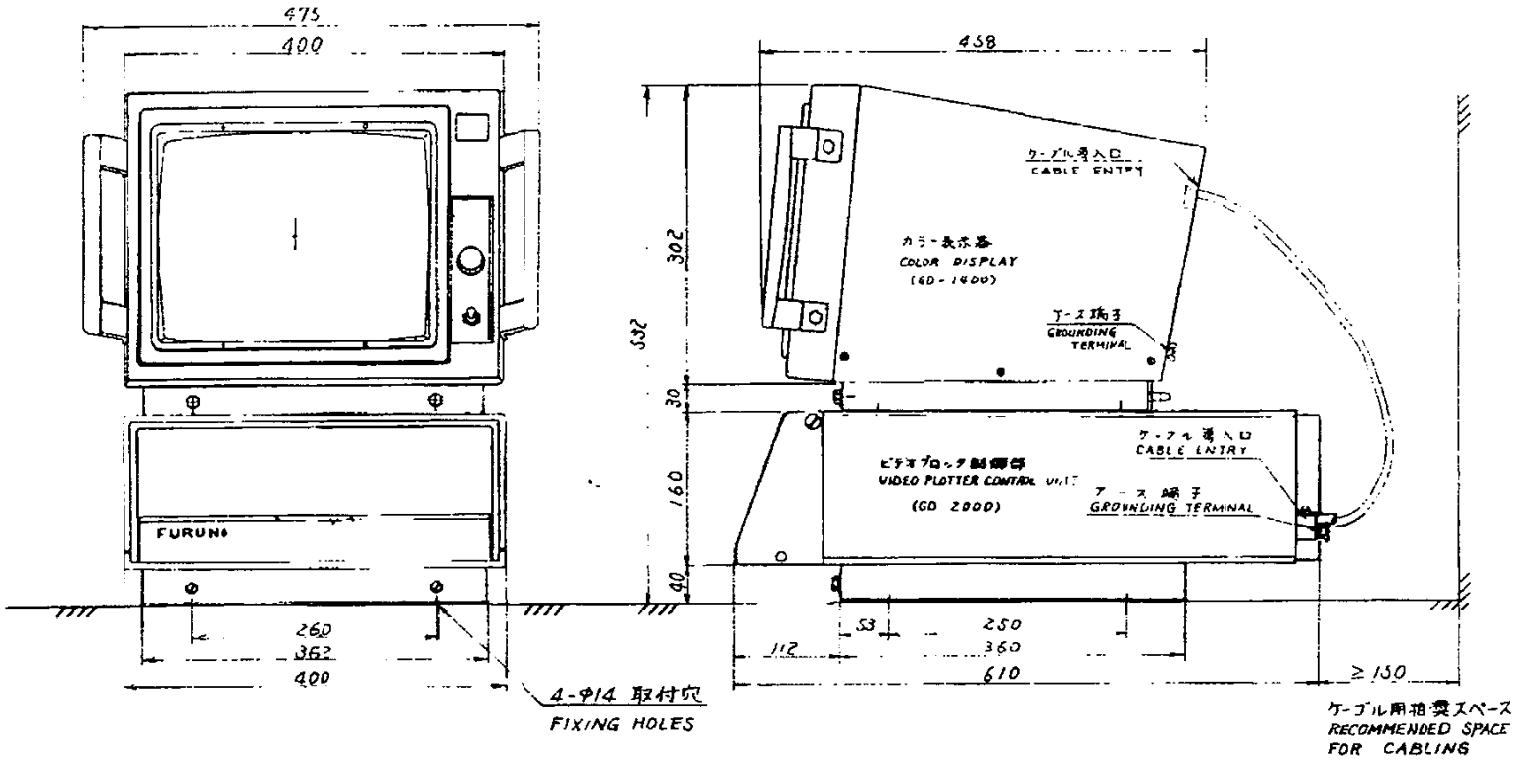
NOTE 2. 天井取付の場合, 取付台を上蓋側に取り付けるとともに、操作パネル枠を上下さかさまに取り付ける。
FOR OVERHEAD MOUNTING, PLACE MOUNTING BASE ON TOP OF UNIT, AND TURN UPSIDE-DOWN FRONT PANEL FRAME.

NOTE 3. 上蓋上の4ヶのネジ穴(M8)を利用して カラー表示器を2段重ね装備可能。
USING FOUR SCREW HOLES (M8), COLOR DISPLAY CAN BE MOUNTED ON THIS UNIT.

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

| | | | | | |
|---|---|---|---|---|---|
| 承認 APPROVED | JAN. 13 '83 K. [signature] | 三角法 THIRD ANGLE PROJECTION | | 名称 TITLE | カラービデオプロッタ制御部寸法図 |
| 検図 CHECKED | JAN. 13. '83 [signature] | 尺度 SCALE | 1/10 | GD-2000 | COLOR VIDEO PLOTTER CONTROL UNIT (セパレート装備) (SEPARATE MOUNT) |
| 製図 DRAWN | Jan. 13. '83 K. [signature] | 重量 WEIGHT | 30 kg | 図番 DWG.NO. | C4281-007-A |

FURUNO




| | | | |
|---|---|---|---|
| 承認 APPROVED | | 名称 TITLE | カラービデオプロッタ寸法図<br>COLOR VIDEO PLOTTER<br>GD-200 |
| 検図 CHECKED | | | |
| 製図 DRAWN | Nov. 12. '92<br>K.K. | 図番 DWG NO. | C4284-001-B |

FURUNO ELECTRIC CO., LTD.

D-2