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FURUNO

INSTALLATION MANUAL

INTERFACE UNIT

MODEL VI-1100A

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

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·Your Local Agent/Dealer

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⚠ SAFETY INSTRUCTIONS

"DANGER", **"WARNING"** and **"CAUTION"** notices appear throughout this manual. It is the responsibility of the installer of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.

⚠ **DANGER**	This notice indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
⚠ **WARNING**	This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ **CAUTION**	This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.

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⚠ WARNING

Hazardous voltage.
Can shock, burn or cause serious injury.

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

Turn off the power at the mains switchboard before beginning the installation.

Electrical shock or fire can result if the power is not turned off.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

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

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

Use the correct fuse.

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

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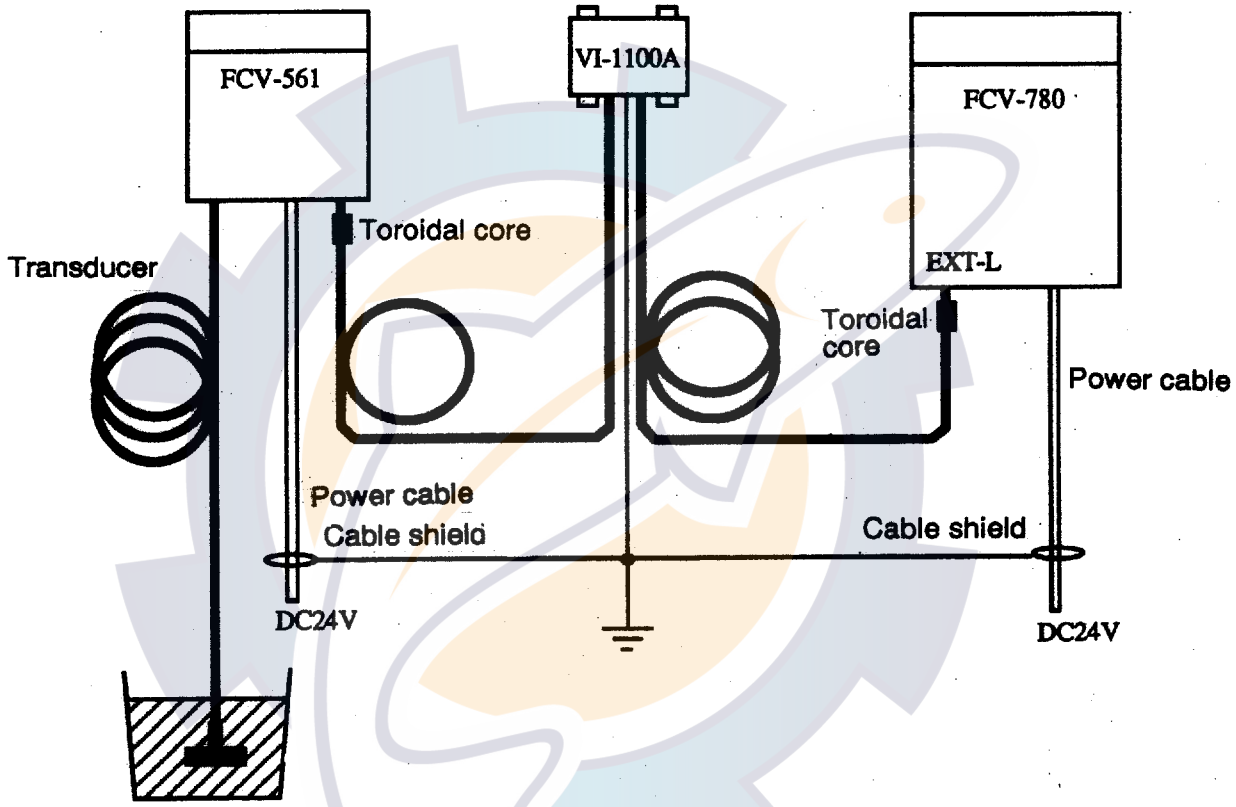
Attaching toroidal Core (To comply with EMC requirement)

Toroidal cores are supplied with the installation materials. Attach them as close as possible to the echosounder end of the interconnection cables as shown below.



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INTRODUCTION

The VI-1100A Interface Unit is basically designed to feed an echo signal from Furuno paper echo sounders to color video sounders for the purpose of monitoring an echo signal in a variety of colors.

Interfacing methods between Furuno's echo sounders (net recorder, sonar), the interface unit and the color video sounders are collected and given on pages 13 thru 36.
One piece of the VI-1100A interface unit is required for each frequency of an echo signal with the following exceptions; For the FE-606, FE-880/880T and FE-881/881Ⅱ echo sounders, an echo signal can be directly fed to the color video sounder without the use of the interface unit.
An additional switch box EX-7 (or EX-6) may be used between the interface units (transceiver units) and the color video sounder for expansion of the channel number. As to cabling method between them, refer to the installation manual for EX-7 Switch Box. (Publication No. IM-E2010-0A)

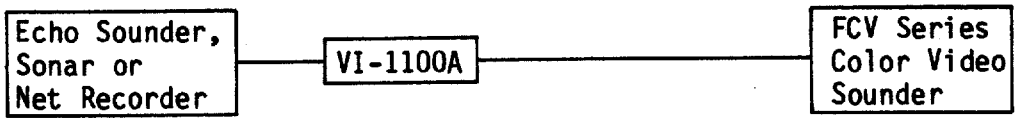
Chapter 1. INSTALLATION

The VI-1100A Interface Unit should be sited as nearby the echo sounder, sonar or net-recorder as possible (max. 2m) because a weak signal is handled. If a longer cable is used, color display and echogram are degraded in fidelity. Also, care should be taken not to bundle the interface cables with others handling RF signal, pulses or power.

Chapter 2. ECHO SOUNDER INTERFACING

The following diagrams show the system configurations with or without external echo sounder(s), EX-7 (or EX-6) Switch Box, ETR-2A/B/C/D Transceiver Unit and MT-12 Picture Recorder. Refer to the operator's manuals of the individual color video sounders to show a variety of system configulation.
This chapter describes how to hook up necessary signals in the echo sounder and how to adjust the VI-1100A interface unit because these are fixed irrespective of type of color video sounder.

EX.1



EX.2

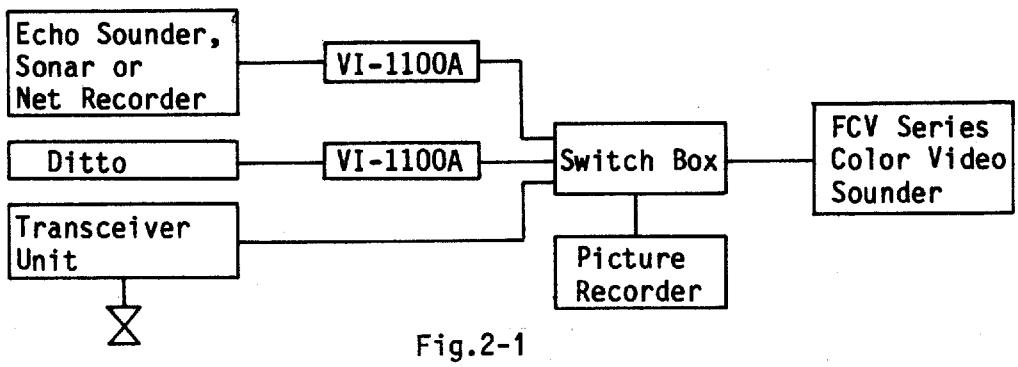


Fig.2-1

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2-1. VI-1100A Input Requirements

Fig.2-2 shows what kind of signals should be fed from the echo sounder, and Table 2-1 shows their specifications. The first step of echo sounder interfacing is to find out such signal sources in the echo sounder circuit.

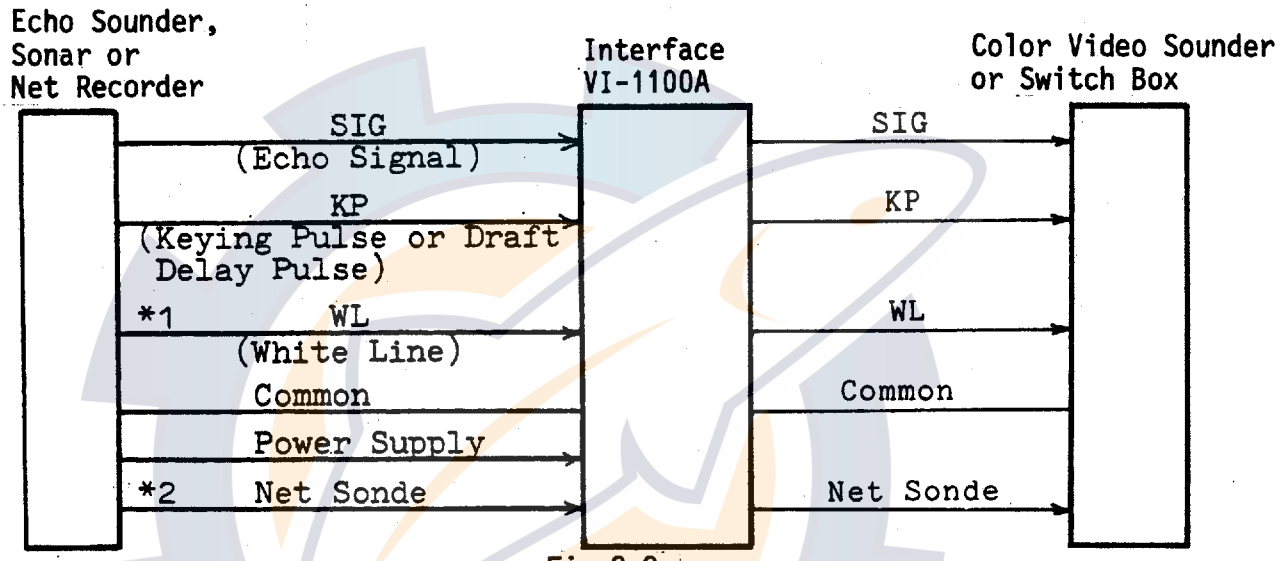

Fig.2-2

Table 2-1

Signal Name	Specifications of Input Signal	
SIG (Echo)	"AC"	IF (10 to 455KHz) Signal or Pen Output Signal of Dry Paper Recorder*3. 0.5 to 10Vpp
	"DC"	Pen Output Signal of Wet Paper Recorder*3, Scanning Sonar, Net Recorder, Telesounder, etc. 5 to 30Vpeak or 50 to 100Vpeak
KP (Keying Pulse)	Trigger Pulse or Draft Delay Pulse*4 if draft control is provided on the combined echo sounder. 3V or more, +3 to 24V, 0V, -10V or above (Positive); 3V or more, +12 to 24V, -12 to +9V (Negative)	
WL (White Line)	White Line Pulse. Specifications are same as KP.	
Power Supply	DC Voltage, +12 to +30V. Power drain is 70mA.	

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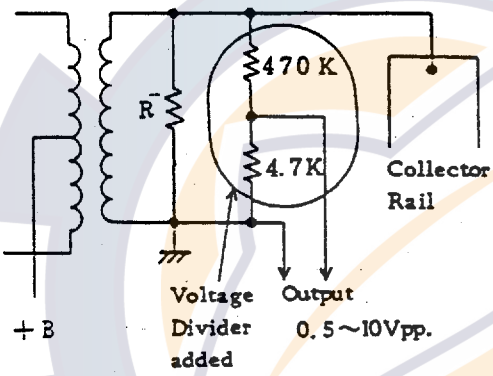
Note *1 No connection if echo signal (SIG) is not effected by the white line control.

*2 No connection if a net sonde is not coupled.

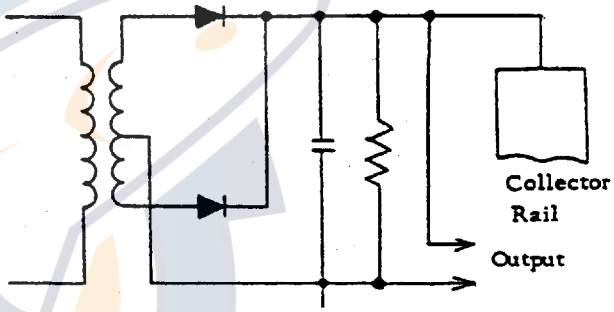
*3 It is recommended to take an echo signal at an IF younger stage of the echo sounder for higher fidelity. Pen output signal can be used with lower fidelity picture as it is somewhat saturated.

When using pen output signal of a dry paper recorder, add a voltage divider for 0.5 to 10Vpp output.



Pen Output Signal of Dry Paper Recorder ("AC" Mode)

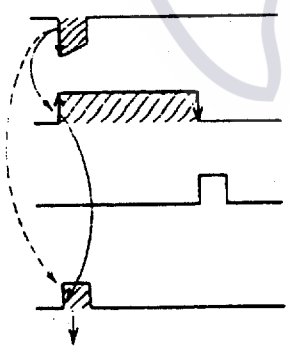
Fig.2-3



Pen Output Signal of Wet Paper Recorder ("DC" Mode)

Fig.2-4

*4 In case of [Trigger] or [Draft Delay Pulse], the draft adjustment at the echo sounder moves up or down the zero line position in the picture.



[Trigger Pulse] (Cam, Reed Switch)

[Draft Delay Pulse] (One-shot Multivibrator)
(Pulsewidth varies according to draft control.)

TX Trigger Pulse

"KP" which is generated in the interface for delivery to the color video sounder

Fig.2-5

In case of [TX Trigger], the draft adjustment at the echo sounder does not affect the zero line position in the picture.

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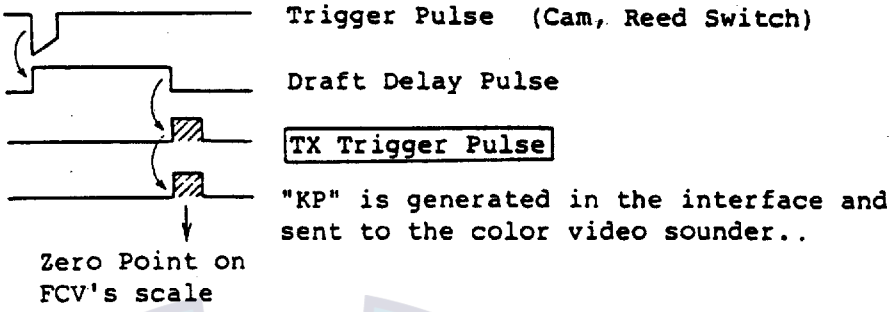

Fig.2-6

How to hook up a net sonde signal

To plot the net depth mark both on the Color Video Sounder and the external echo sounder;

Add a diode (U06C, F114B or equivalent) in the echo sounder and bypass the net depth signal to the Color Video Sounder as shown below.

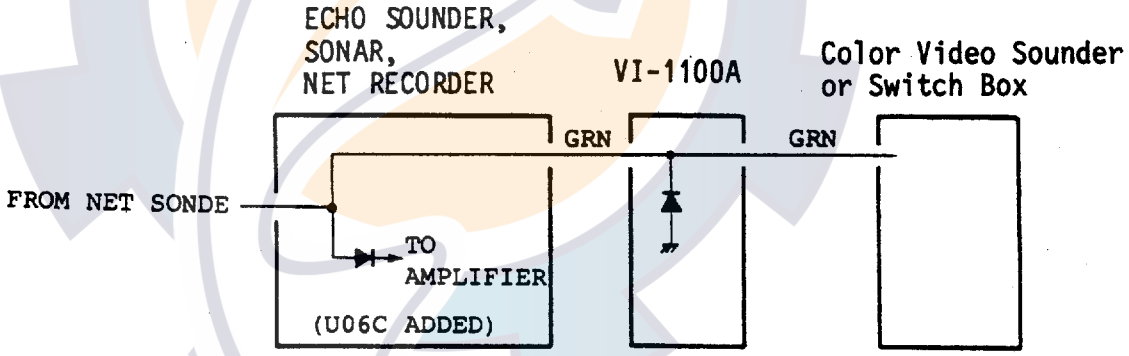

Fig.2-7

Characteristics of U06C and F114B Table 2-2

Type	U06C	F114B
FURUNO Code	000135901	000132716
Application	Rectifier	Rectifier
Construction	Si. D.	Si. D.
Absolute Maximum Ratings (25°C)		
Max. DC Reverse Voltage	200V	200V
Max. Average DC Output Current	2A	800mA
Max. Forward Transit Current	80A	40A

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2-2. Adjustment of Interface Unit

Parts to be adjusted on the circuit board are shown below.

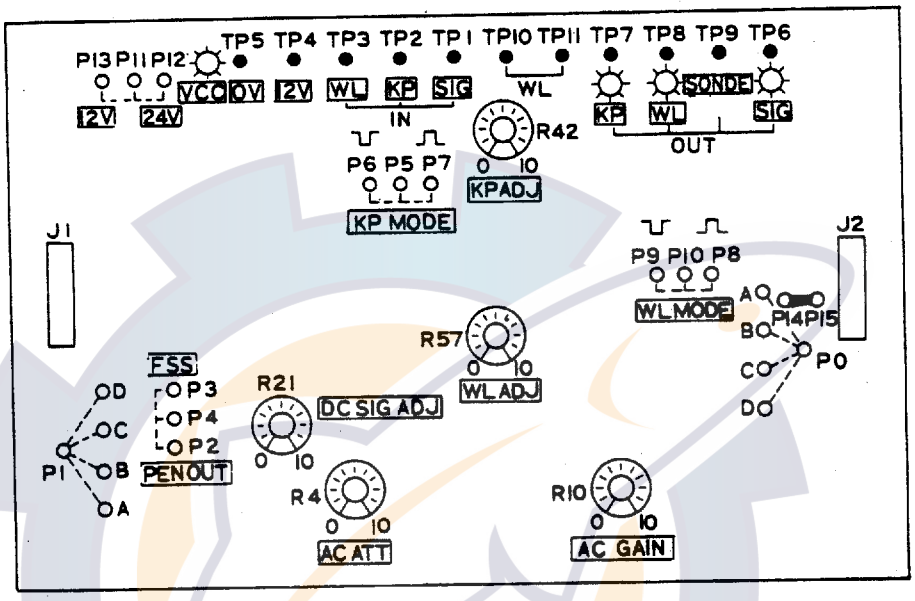

Fig.2-8

(1) According to the signals selected in the previous paragraph, connect jumper leads as below.

Table 2-3

SIGNAL			Jumper connection		
SIG	AC	10 to 455kHz	P0-A	P1-A	
	DC	50 to 100Vpeak	P0-B	P1-B	P4-P2
		5 to 30Vpeak	P0-B	P1-B	P4-P3
KP	Positive		P5-P7		
	Negative		P5-P6		
WL	Positive		P10-P8	} ONLY WHEN "WL" IS FED	
	Negative		P10-P9		
Power	+15V to +30V		P11-P12		
	+12V to +14V		P11-P13		

NOTE P14-P15: Usually cut off the jumper wire.
(See NOTE 3 on page 8.)

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(2) Adjustment

Place the Color Video Sounder and the combined echo sounder under the following condition.

Color Video Sounder

GAIN Control : "5"
THRESHOLD Control: "0"

Combined Echo Sounder

GAIN control : mid-point
RANGE switch : minimum range with which bottom echo tail is appreciable.

Keying Pulse, KP

① Turn KP ADJ between CW and CCW limits and read the range where KP OUT blinks.

② Set KP ADJ at the mid point of the range.

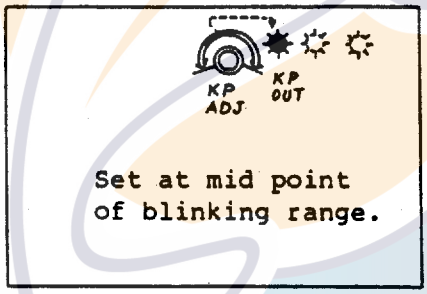

Fig.2-9

White Line, WL (only when WL signal is fed.)

① Effect WHITE LINE of the combined echo sounder.

② Turn WL ADJ between CW and CCW limits and read the range where WL OUT blinks.

③ Set WL ADJ at the mid point of the range.

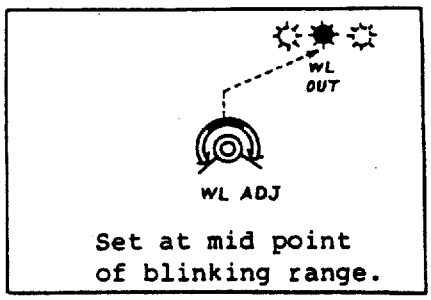

Fig.2-10

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Echo Signal, SIG

AC mode signal

① Turn off WHITE LINE of the combined echo sounder if provided.

② Fix AC GAIN at the CCW limit.

③ Gradually turn AC ATT clockwise until SIG OUT begins to blink.

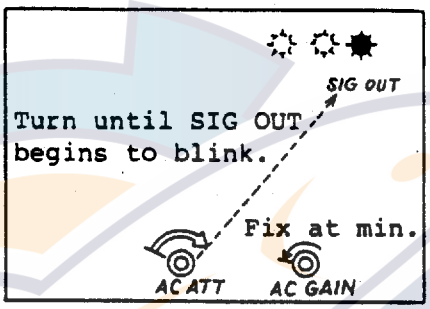


Fig.2-11

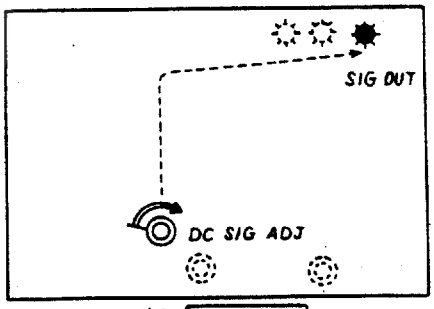
Note If SIG OUT does not blink with AC ATT turned fully CW, slowly turn AC GAIN clockwise until SIG OUT begins to blink with AC ATT fixed at the CW limit.

DC mode signal

① Turn off WHITE LINE of the combined echo sounder if provided.

② Gradually turn DC SIG ADJ clockwise until SIG OUT begins to blink.

③ Further turn DC SIG ADJ clockwise by one graduation of the potentiometer.



Turn until SIG OUT
begins to blink, and
further turn by one
graduation only.

Fig.2-12

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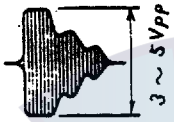
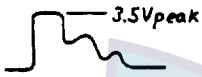
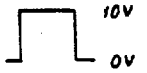
NOTE 1. The Interface unit is so designed that the following output levels may be obtained when the above-mentioned adjustments are correctly done.

Table 2-4

ECHO SIGNAL	S I G	KEYING PULSE	WHITE LINE
'AC'	'DC'	KP	WL
 (TP6)	 (TP6)	(TP7)	 (TP8)

2. If the picture scrolling is abnormal (entirely no, random, intermittent, etc.), check if fair KP waveform presents on TP7.

3. If the screen is fully or partially painted in reddish brown color, check WL waveform on TP8. Note that HIGH level on this pin causes reddish brown color on the screen.

   As a rare case, there is such an echo sounder that produces a white line signal not only at the seabed return but also during full period of the draft delay in order to inhibit recording above the zero line. If such a white line signal is fed to the color video sounder, it will completely fill the draft space with reddish brown color. When this case is encountered, gate the white line signal by (1) feeding the negative output of the draft delay one-shot to the interface unit as KP and (2) connecting a jumper wire between P14 and P15.

2-3. Fine Adjustment of Echo Level

The echo level should be finally adjusted so that the sensitivity of the Color Video Sounder may be a little higher than that of the combined echo sounder.

① Place the Color Video Sounder and the combined echo sounder under the following condition.

Color Video Sounder

GAIN control : "5"
THRESHOLD control: "0"

Combined Echo Sounder

GAIN control : mid point
RANGE switch : minimum range with which bottom echo tail is appreciable.

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② Read out the depth "D" at the end of the bottom echo tail from the range scale of the combined echo sounder.

③ Check if:

- the bottom echo tail by the Color Video Sounder is painted deeper than that by the combined echo sounder.
- the bottom echo tail is LIGHT BLUE or GREEN at the depth "D".

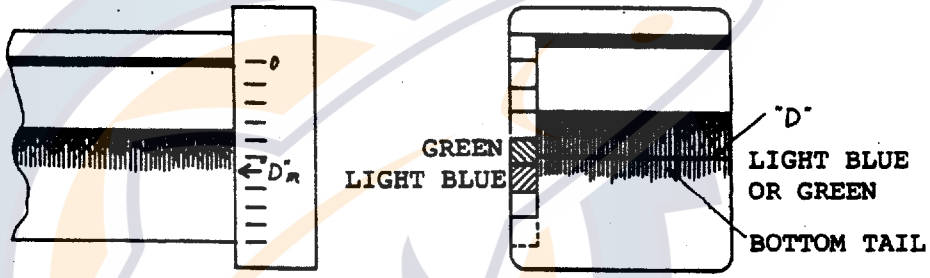


Fig.2-13

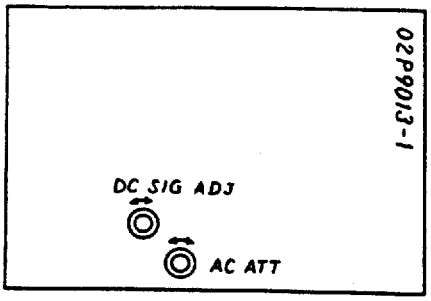
④ If the above condition is not obtained, adjust the Interface Unit again.

AC Mode Signal

Fine-adjust [AC ATT] so that the bottom tail at the depth "D" may be LIGHT BLUE or GREEN. (If [AC ATT] is already turned fully clockwise, adjust [AC GAIN] instead.)

DC Mode Signal

Fine-adjust [DC SIG ADJ] so that the bottom echo tail at the depth "D" may be LIGHT BLUE or GREEN.



INTERFACE PCB

Fig.2-14

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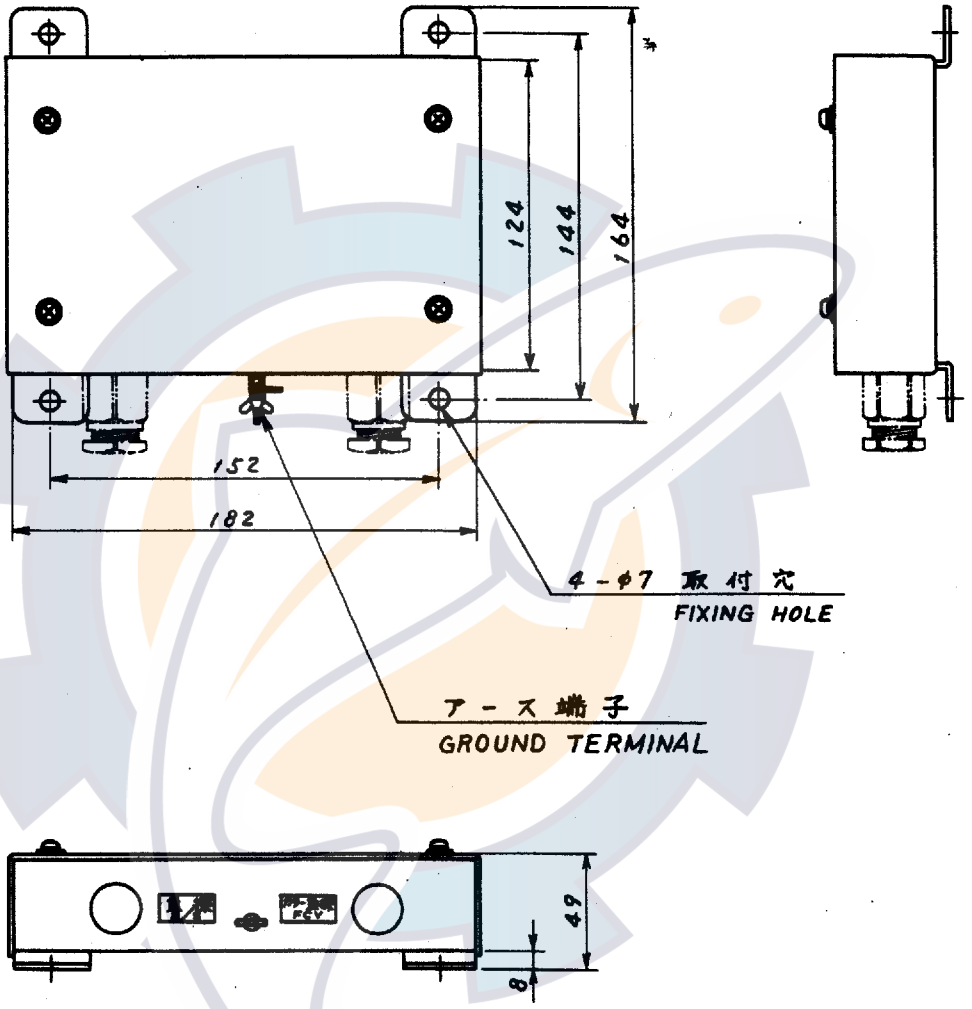

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED		三角法 THIRD ANGLE PROJECTION		名称 TITLE	インターフェース外観図
検図 CHECKED		尺度 SCALE	1/3	VI-1100A	INTERFACE UNIT
製図 DRAWN		重量 WEIGHT	2 kg	図番 DWG.NO.	C2261-026-B

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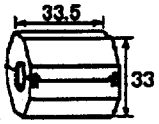
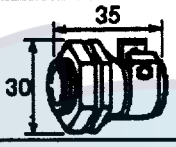
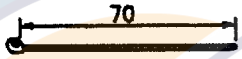
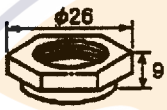
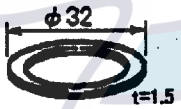
CODE NO.		02BL-X-9401 -2
TYPE		1/1

工事材料表
INSTALLATION MATERIALS

VI-1100A 魚探インターフェース
E/S INTERFACE UNIT

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	コア(EMI) CORE(EMI)		ESD-SR-25 CODE NO. 000-123-303	2	
2	コードロック CORD LOCK		NC-1 CODE NO. 000-516-650	1	
3	コンペックス PLASTIC BAND		CV-70 CODE NO. 000-570-324	5	
4	インターフェースケーブル(3)組品 I/F CABLE ASSY.(3)		VI-1100A-C 02S8040 (6M-NH8P) CODE NO. 002-182-340	1	
5	インターフェースケーブル(4)組品 I/F CABLE ASSY.(4)		VI-1100A-C 02S8040(2M-NH10P) CODE NO. 002-182-360	1	
6	締付ナット NUT		02-009-0801-0 CODE NO. 200-908-010	1	
7	ワッシャ WASHER		02-009-0802-0 CODE NO. 200-908-020	1	

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

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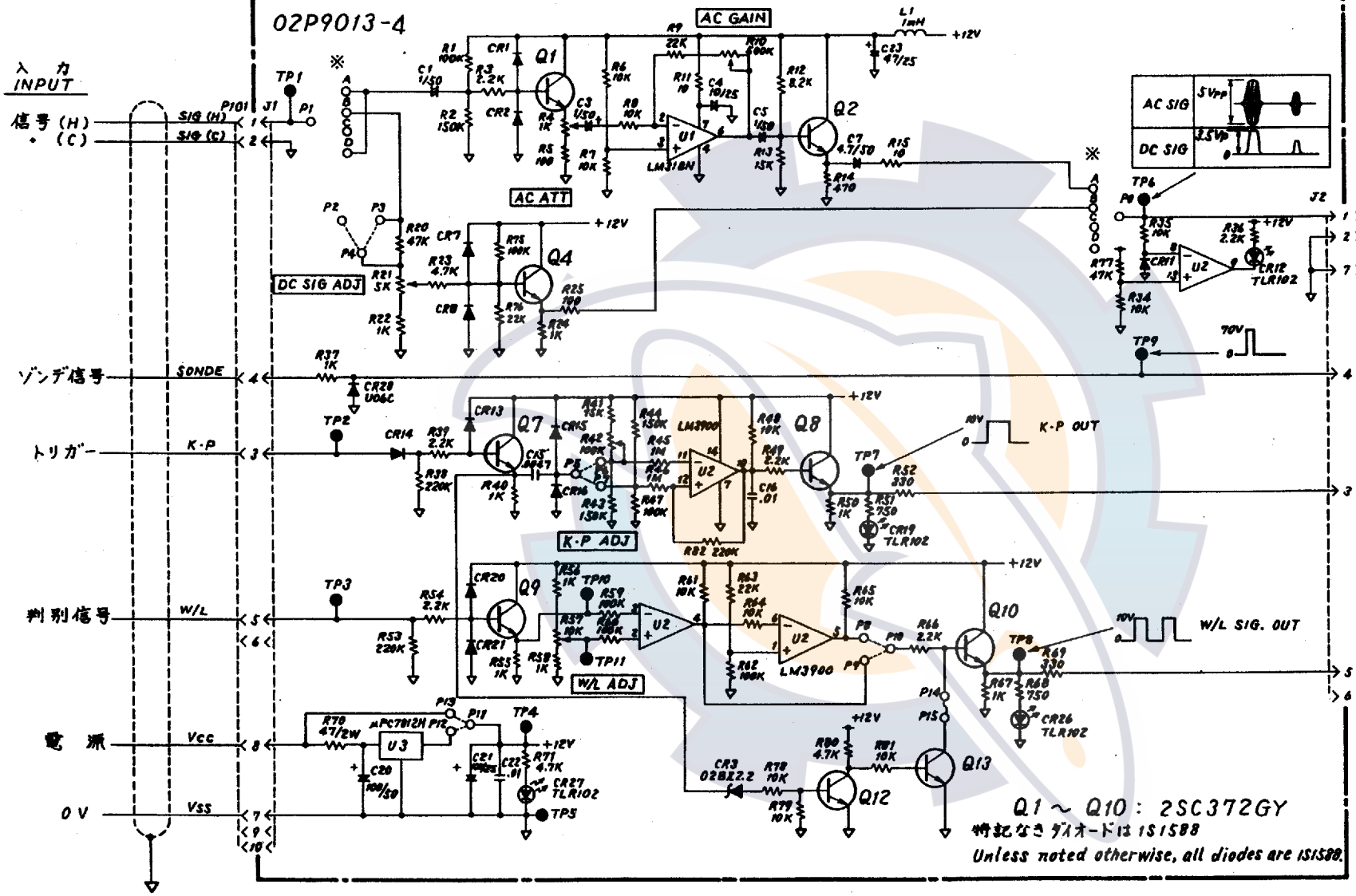
02P9013-4



※

A	AC SIG	10 ～ 455 kHz
B	DC SIG	湿式ペン出力, スキャニングソーナー, テレサウンダー, ネットレコーダー Moist Stylus out, Scanning Sonar, Telesounder, Net-recorder
C	使用しない	Not Applied
D	使用しない	Not Applied

承認 APPROVED		三角法 THIRD ANGLE PROJECTION	名称 TITLE	VI-1100A インターフェース INTERFACE	
検図 CHECKED		尺度 SCALE			
製図 DRAWN		重量 WEIGHT	kg	図番 DWG.NO.	C2266-029-A

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

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1. NECESSARY PARTS

Table 1

Name	Type	Q'ty	Note
Interface Unit	VI-1100A	1	With 02S8040 cables (2m/6m) (factory-terminated with connectors at interface ends.)
Cord Lock	NC-1	1	Supplied as installation materials.
Lead Binder	CV-70	5	Supplied as installation materials.
Grounding Lead	(Black Vinyl)	20cm	(Procure locally.)
Diode	F114B or U06C	1	for Net Sonde (Procure locally.)
Lug Board	2P	1	for Net Sonde (Procure locally.)
Carbon Resistor	100Ω, 1/4W	1	(Procure locally.)

2. CABLING

(1) Install the interface unit as near by the echo sounder as possible.

(2) Insert the cord lock into the spare hole on the bottom of the recorder as shown in Fig. 5.

(3) Pass the 2m cable through the cord lock, and fabricate the cable end as shown right.

(4) Solder the core leads to signal hook-up points inside the equipment. (Fig. 5)

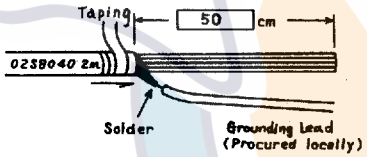


Fig. 1

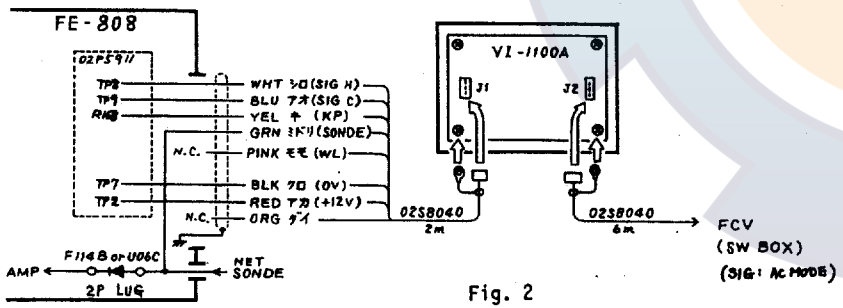
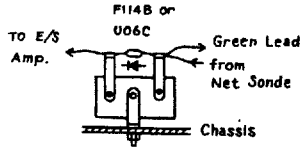


Fig. 2



If a net sonde is combined; mount the 2P lug board at a suitable place in the echo sounder, solder the diode (F114B or U06C) to it and make wiring as shown left.

(5) Modify the PCB 02P9013 as shown in Fig. 6.

3. JUMPER CONNECTION

Confirm that all jumper leads inside the interface unit are connected in position as shown below. (Pot positions show typical settings.)

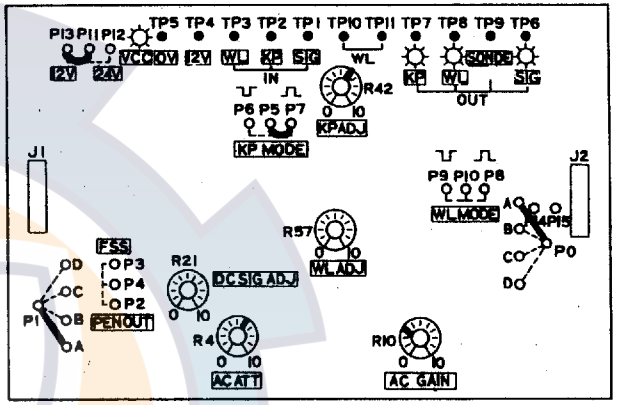


Fig. 3

4. INTERFACE ADJUSTMENT

Conditions FCV---------- GAIN "5", CLUTTER "0"
Echo Sounder--- RANGE: Minimum range where bottom echo tail is appreciable.
GAIN : Mid range, TVG: Minimum

(1) Keying Pulse "KP"

Turn KP ADJ (R42) to position "5", and confirm that KP (CR19) blinks.

(2) Echo Signal "SIG" (Turn off SHADOW LINE of the echo sounder for this item.)

With AC GAIN (R10) fixed at ccw limit, slowly turn AC ATT (R4) clockwise until SIG (CR12) begins to blink.

(If SIG does not blink, slowly turn AC GAIN clockwise until it begins to blink while AC ATT is fixed at cw limit.)

承認 APPROVED		名称 TITLE	INTERFACING FE-808 TO COLOR VIDEO SOUNDER
検図 CHECKED	Dec.13.'84		
製図 DRAWN	Dec.13.'84 T.Ogawa	図番 DWG.NO.	E2018-009-A (1/2)

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FE-808

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Table 2 Typical Signal Levels

	SIG	KP
INPUT	3 Vp-p	5 V / 0 V
	TP1	TP2
OUTPUT	5 Vp-p	10 V / 0 V
	TP6	TP7

(3) Fine Adjustment of SIG Level

Read the depth "D" at the tip of bottom echo tail on the recording. Fine adjust AC ATT so that its depth is painted in LIGHT BLUE or GREEN on the screen. (If AC ATT is already turned fully clockwise, adjust AC GAIN instead.)

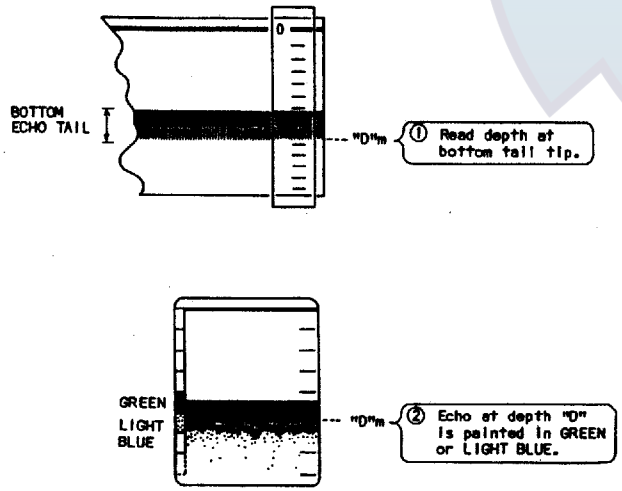

Fig. 4

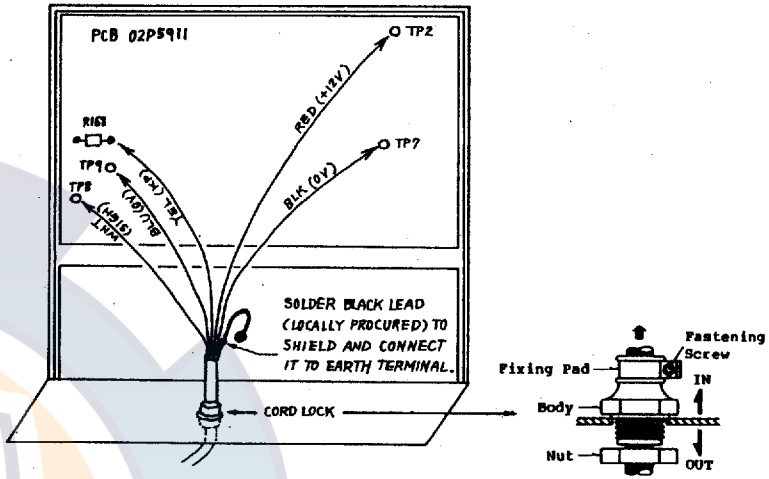

Fig. 5 FE-808 Recorder

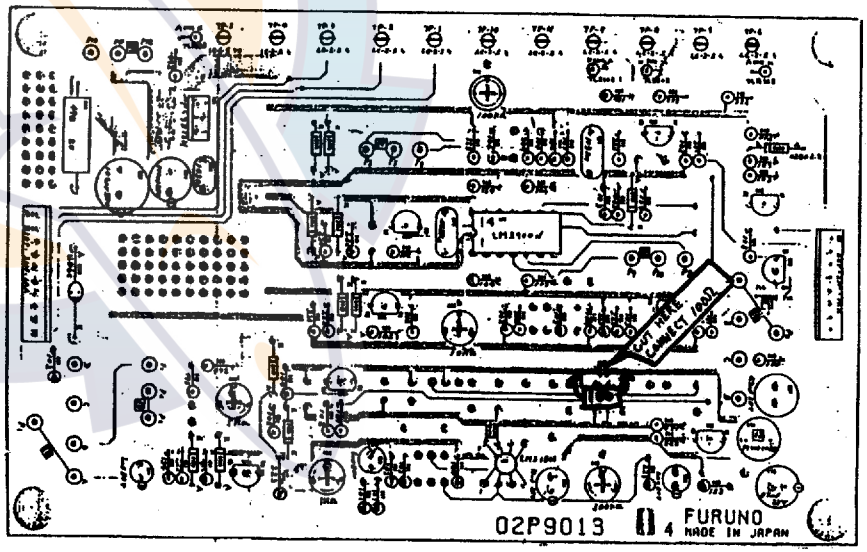

Fig. 6 PCB 02P9013

図番 DWG. NO.	E2018-010-A	(2/2)

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