FURUNO

OPERATOR'S MANUAL

VHF RADIOTELEPHONE

MODEL FM-7000

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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 those 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.

SAFETY INFORMATION FOR THE OPERATOR

WARNING

Do not open the cover of the equipment.

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

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.

Ungrounded equipment can give off or receive electro-magnetic 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.

ITEM		KEYSTROKE
CH16 DISTRESS CALL		[CH16]
AUTO REVERT WATCH ON CURRENT CH. WITH THE HANDSET ON THE REST.		Hang the handset in the handset rest. (Ch16 is automatically selected.) [SHIFT] [1 INTL] etc.
CHANNEL SELECTION		(Channel Number) [ENT] (or rotate channel selector)
CH MODE (INTL/USA/WX) SELECTION		[SHIFT] [1 INTL] etc.
MEMORY OPERATION	RECALL	[RCL] (Memory Number) [ENT]
	STORE	[SHIFT] [RCL STO] (Memory Number) [ENT] (Channel Mode: INTL/USA) [ENT] (Channel Number) [ENT]
	DELETE	[SHIFT] [RCL STO] (Memory Number) [ENT] [0] [ENT]
DUAL WATCH	desired CH and CH16	(Desired Channel Number) [ENT] [SHIFT] [CH16 DW]
	desired CH and guard CH (In U.S. waters)	[SHIFT] + [CH16 DW] .... (U.S. coast guard channel should be stored in MEMO 0)
SCANNING (Multiple Watch)	START	[SHIFT] [5 SCAN]
	STOP	Press the PTT switch or any key.
	SETTING SCAN PARAM-ETERS	[SHIFT] + [5 SCAN] ➡ [HI/LOW] ➡ (1~9) [ENT] (1~9): Dual watch quantity [HI/LOW]: Select HOLD or LOCK mode

OPTIONAL FUNCTIONS

These functions require optional devices.
Check here if the function is available

HAILER		[SHIFT] [8 HAILER]	
DSC(class-C) INDIVIDUAL CALL		[SHIFT] [HI/LOW ID] (Receiving station's ID) [ENT] [SHIFT] [9 CALL]	
INTERCOM		[SHIFT] [7 INTCOM] (2~5) [ENT]	
BEEP	Continuous beep 2-tone alarm for 5 sec 5 long beeps	When DSC distress call is received. While sending a DSC distress call. (Beep sounds from handset speaker.) When individual call is received.	

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CHANNEL 16 DISTRESS CALL

Whenever the radio is in operation, keep watch on channel 16 for distress or calling message.

IF MAYDAY IS HEARD

Distress communications have absolute priority. If you hear MAYDAY, immediately stop any transmission. Note the details of the message in the radio log. Be prepared to offer assistance or relay the distress message.

TO MAKE A MAYDAY CALL

1. Switch to channel 16.
2. Pick up the handset, press its PTT switch and then send the distress message.

   Speak **SLOWLY**, **CLEARLY** and **CALMLY**.

① Say : "MAYDAY_MAYDAY_MAYDAY."
② Say : "This is ___,___,___." (your boat's name)
③ TELL WHERE YOU ARE. (What nav. aids or landmarks are near.)
④ STATE THE NATURE OF YOUR DISTRESS (fire, collision, etc.).
⑤ TELL WHAT ASSISTANCE IS REQUIRED.
⑥ BRIEFLY DESCRIBE YOUR BOAT. __(type),__(length), __(material), __(color), __(registration no.), _____(anything else you think will help rescuers to find you.)
⑦ Say : "I will be listening on channel 16. ___(your boat's name) OVER."

3. Release the PTT switch and listen:coast operator should answer. Follow his directions afterwards. If some other channel is specified, select it with the **CHANNEL** control.
   IF NO ONE REPLIES, REPEAT THE CALL AGAIN.

DSC CLASS A DISTRESS CALLING

DSC terminal connection allows DSC class A distress call.

DSC TERMINAL WITH FREQUENCY REMOTE CONTROL (ex. FURUNO DSC-5/DSC-5V)

1. Confirm that the FM-7000 and the DSC terminal are on.
2. Press **DISTRESS** switch on the DSC terminal.
   FM-7000 transmits the distress alert on CH 70.
   When the distress acknowledge signal(DIST ACK) is received, the DSC terminal displays DIST ACK.
3. Communicate with a receiving station.

DSC TERMINAL WITHOUT FREQUENCY REMOTE CONTROL

1. Confirm that the FM-7000 and the DSC terminal are on.
2. On the FM-7000, press [SHIFT] key followed by [CH70 0] key.
3. Press **DISTRESS** switch on the DSC terminal.
   FM-7000 transmits the distress alert on CH70.
   When the distress acknowledge signal(DIST ACK) is received, the DSC terminal displays DIST ACK and the channel to be used to communicate the distress message.
4. On the FM-7000, select the channel appointed by the receiving station.
5. Communicate with the receiving station.

INTRODUCTION

The FM-7000 is a highly advanced, full duplex, fully synthesized 25W VHF transceiver, designed to satisfy the stringent requirements of marine communications. A built-in duplexer ensures quality two-way communications using a single antenna.

The FM-7000-S incorporates all the features of the FM-7000 less the duplexer, for users who only require semi-duplex communication.

Features

◆ Pre-programmed with all international marine channels. Where permitted, USA channels, weather channels and private channels are also programmed.

◆ Up to 20 user-programmed channels.

◆ Single action selection of channel 16.

◆ Automatic selection of channel 16 when the handset is hung up.

◆ Economical 12VDC operation. For AC operation, rectifier PR-101 is required. For 24VDC operation, DC-DC converter PC-208 is required.
AC/DC power supply unit is under development.

◆ Option;

- Distress reception and distress calling from DSC terminal
- 5-tone selective calling reception
- Remote control by remote station(type: FURUNO RB-700)
- Intercom between main unit and remote station

SPECIFICATIONS

GENERAL

Frequency Range	TX : 155.000 to 161.475MHz
	RX : 155.000 to 163.275MHz
Channel Program	INTL Channel: 55
	USA Channel: 55
	WX Channel: 10
	PRIV Channel: 20
	(authorization required)
	Full duplex not available on private channels other than internatinal VHF channels 01-28 and 40-88.
Oscillator	PLL synthesizer
Frequency Deviation	$\pm 10 \times 10^{-6}$ max.
Communication System	Full duplex, Semi-duplex(Private
	channel) & Simplex
	(Semi-duplex & Simplex:FM-7000-S)
Class of Emission	F3E, F2B, F2C, F2D
Antenna Impedance	50 Ω
Dimensions and Weight	250(W) × 99(H) × 248(D)mm
	4.0kg
Environment	Temperature: − 20℃ to 55℃
	Relative Humidity:93% at +40℃
Power Supply	12VDC +30% − 10%
Current Drain	Transmit: 6.0A max.
	Receive: 0.52A max.
	Stand-by: 0.37A max.
	100/110/220VAC, 1 ϕ , 50/60Hz
	(Rectifier PR-101 required.)
	24VDC(DC-DC Converter PC-208
	required.)
Color	Panel: Munsell N3.0
	Chassis: Munsell 2.5GY 5/1.5

TRANSMITTER

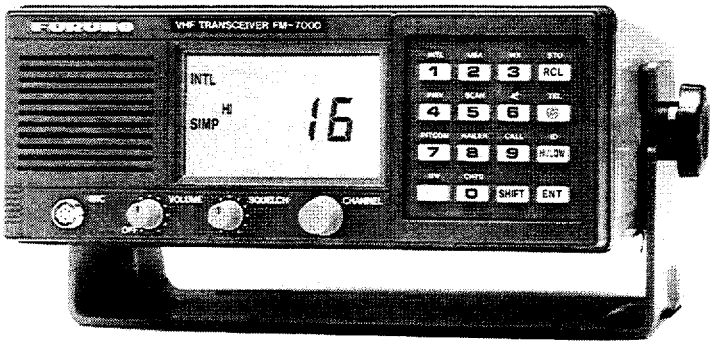
RF Output Power	25W(HI), 1W(LOW)
Modulation AF Response	Within +1/ − 3 of 6dB/oct de-emphasis characteristics at 300 to 3000Hz
Frequency Deviation	± 5kHz max.
Spurious Emission	Less than 0.25 μ W
Modulation System	Reactance Type
Hum and Noise	20dB min.

RECEIVER

Receiving System	Double Superheterodyne
Intermediate Frequency	First IF: 16.9MHz Second IF: 455kHz
Sensitivity	2 μ V min. (at 20dB)
Signal Selectivity	12kHz min. (at 6dB) 25kHz max. (at 70dB)
Spurious Response Rejection	80dB max.
Blocking	10mV min.
Squelch Sensitivity	1 μ V max.
Audio Output	Internal Speaker: 1W min.(8 Ω) External Speaker: 4W min.(4 Ω) Handset: 1mW (200 Ω)

MISCELLANEOUS

Functions	Dual watch Scan function DSC class C operation(option) Remote control(option) 5-tone selcall(option) Loudhailer(option)


VHF TRANSCEIVER FM-7000
INTL
HI
SIMP
16
RCL
SHIFT
ENT

1

OPERATION

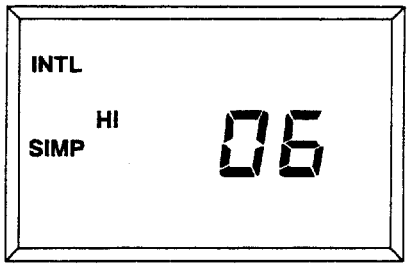
1. BASIC RULES

Status at Start Up

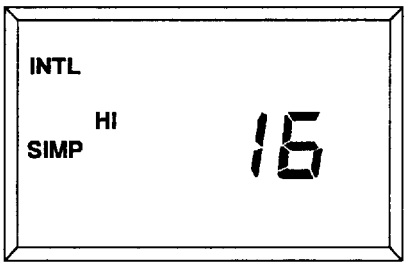
Each time you turn the FM-7000 on it begins operation with the previous settings (memorized by a super capacitor) of the following controls:

1) Channel Mode INTL/USA/WX/PRIV
2) Channel Number
3) Output Power HI/LOW
4) Speaker ON/OFF
5) Dimmer

NOTE: If the time elapsed between power applications is greater than 24 hours, channel 16 (international distress channel) is automatically selected.



(Operation begins with previous setting.)



(When 24 hours elapses between power on, INTL CH16 is selected.)

Key Operation Rules

- When entering a line of data, press each key within five seconds of the previous one. Otherwise, the FM-7000 will return control to the previous display screen.
- The [SHIFT] key alternates selection of primary and secondary functions. When the secondary function mode is in use, a sharp sign (#) appears on the LCD.

Automatic Selection of Channel 16

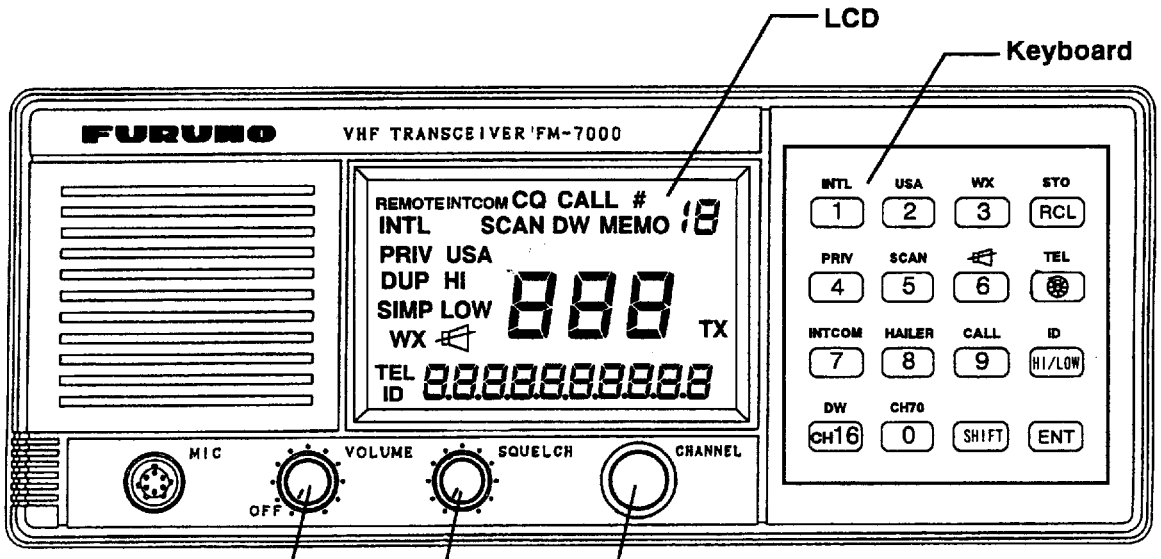
Channel 16 is automatically selected when the handset is hung.

Audible Alarm/ Key Operation

Operation	Convention	
Valid key operation	1 short beep	Pi
Invalid key operation	3 short beeps	PiPiPi
Receiving a distress call	continuous beeps	Pi—
Sending DSC distress call	short beeps in 5-sec. period	Pi–Pi–Pi–···
DSC distress call	audible alarm sounds *1	Pi–Po–Pi–Po–···
Receiving	5 long beeps	Pi–Pi–Pi–Pi–Pi–

*1: Alarm sounds through the handset speaker. (Internal speaker is off.)

2. CONTROLS AND INDICATIONS



CHANNEL Control
Selects channel number or memory number.

SQUELCH Control
Mutes the receiver when no signal is present on selected channel.

VOLUME (Power On/Off) Control
Turns power on or off and adjusts volume.

Keyboard

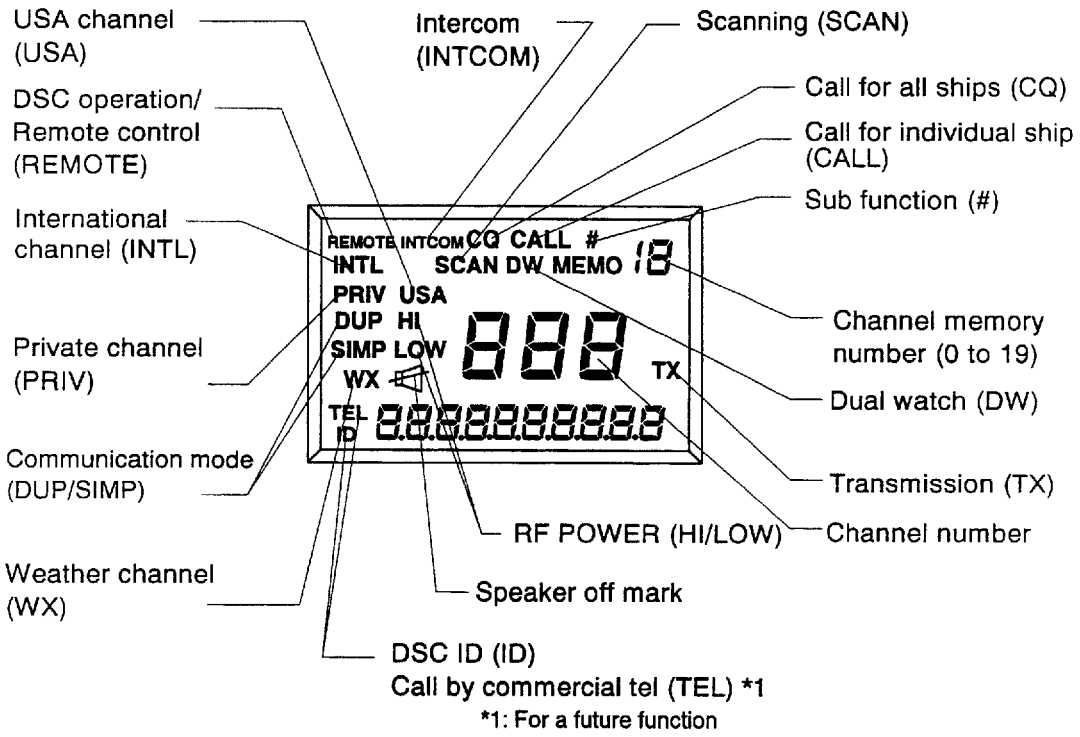
Most operations are carried out through the 16-key keyboard. Most keys have both a primary and a secondary function, the secondary function denoted above a key. (Note that some secondary functions require the connection of optional equipment.)

Functions of each key

Key	Secondary Function Primary Function	Optional secondary Func. Optional Primary Func.
INTL 1	Selects international mode.	–
	Enters 1.	–
USA 2	Selects USA mode.	–
	Enters 2.	–
WX 3	Selects weather mode.	–
	Enters 3.	–
PRIV 4	Selects private mode.	–
	Enters 4.	–
SCAN 5	Starts scanning.	–
	Enters 5.	–
6	Turns the speaker on or off.	–
	Enters 6.	–
INTCOM 7	–	Activates intercom (interphone).
	Enters 7.	–
HAILER 8	–	Activates a loud hailer.
	Enters 8.	–
CALL 9	–	Makes DSC routine call.
	Enters 9.	–
CH70 0	Selects channel 70.	–
	Enters 0.	–
DW CH16	Starts dual watching.	–
	Selects channel 16.	–
STO RCL	Registers memory channel.	–
	Recalls memory channel.	–
TEL	–	Enters telephone number.
	Adjusts backlighting for LCD and keyboard.	–
ID HI/LOW	–	Enters ID number.
	Selects output power; HI: 25W, LOW: 1W	–
ENT	Comfirms key operation.	–
SHIFT	Selects sub function mode.	–

Display Indications

The LCD displays various marks and indications which show operational status. The figure below shows the location and meaning of each mark and indication.



3. BASIC OPERATION

Turning the Power ON and OFF/Adjusting Volume

The **VOLUME** control turns the power on and off and adjusts the volume of the speaker. To turn the power on, turn the control clockwise until you hear a click. Further clockwise rotation adjusts the volume of the speaker. To turn the power off, turn the control fully counterclockwise until you hear the click.

Adjusting Squelch

The **SQUELCH** control adjusts the squelch threshold level. Adjust it so white noise heard in the loudspeaker just fades out. When there is no signal, turn it fully counterclockwise to silence the receiver.

Transmitting/Selecting RF Output Power

Press the PTT switch to talk and release it to listen for the response.

Each press of the ID HI/LOW key selects HI or LOW output power .

The transmitter power is automatically set for low on the following channels.

International : CH15/17, USA : CH13/17/67

To operate US channel 13 or 67 in high power, keep the ID HI/LOW key pressed while talking into the handset.

Turning the Speaker ON and OFF

The 6 key turns the speaker on and off. To turn the speaker on or off, press the SHIFT key followed by the 6 key. The speaker symbol appears on the LCD when the speaker is off.

Adjusting Dimmer

The TEL key adjusts the backlighting for both the LCD and keyboard in four steps: bright, normal, dim and off. Each time you press the key the backlighting changes in the above sequence.

4. SELECTING CHANNEL MODE

Channel Mode	Key Operation	Indication
International Channel	SHIFT → INTL 1	INTL
USA Channel	SHIFT → USA 2	USA
Weather Channel	SHIFT → WX 3 (Previous weather channel is selected.)	WX
Private Channel	SHIFT → PRIV 4 (Previous private channel is selected.)	PRIV
Memory Channel	STO RCL (Previous memory channel is selected.)	MEMO

Private Channel Operation

Private channels are available only where permitted.

5. SELECTING CHANNELS

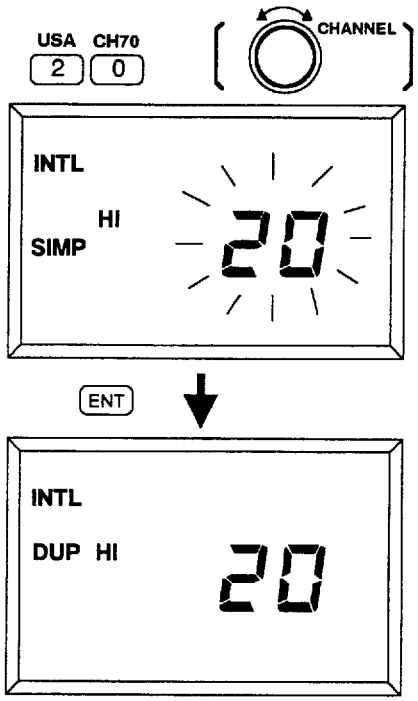
You may enter channels through the keyboard or by operating the **CHANNEL** control. Entry of an invalid channel causes the FM-7000 to reject the channel and revert to previous channel.

Procedure

(ex) Select channel 20.

〔1〕 Press the [USA 2] key followed by the [CH70 0] key. (Channel number blinks.)

〔2〕 Press the [ENT] key to select channel 20.



Tip

- Press the [ENT] **within 5 seconds** after entering channel number. Otherwise, the unit restores the previous display.
- To recall L, F or P channels:
  - ◇ Every pressing of the [PRIV 4] key changes the display in the sequence of L⇨ F⇨ P⇨ L⇨ •••.

  or

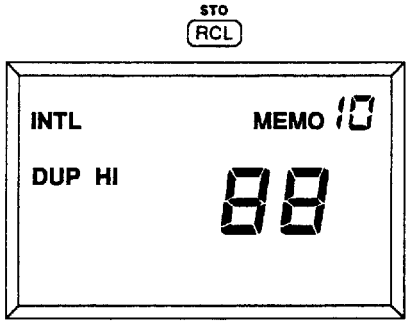
  - ◇ Press the [PRIV 4] key and then rotate the **CHANNEL** control.

6. RECALLING MEMORY CHANNELS

The FM-7000 provides a memory bank for storing up to 20 channels, including private channels.

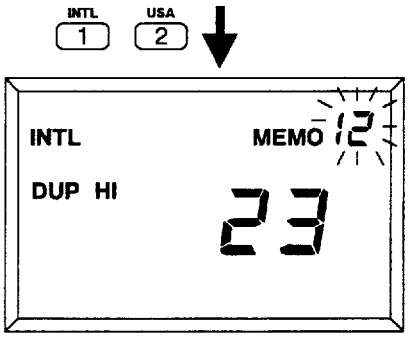
Procedure

〔1〕 Press the STO RCL key to recall a memory channel.
The previous memory channel appears.
Select a memory channel by rotating the **CHANNEL** control or pressing the numeral keys.
When rotating the control, blank channels are skipped.

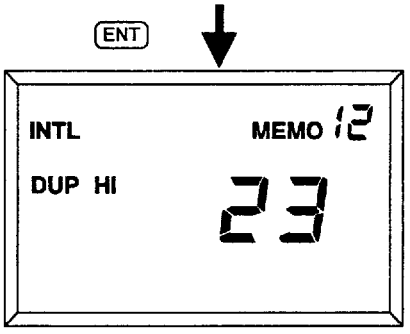


(ex) Select memory channel 12.

〔2〕 Press the INTL 1 key followed by the USA 2 key.
(Memory channel blinks.)

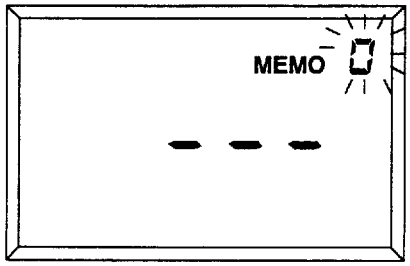


〔3〕 Press the ENT key to select memory channel 12.



Tip

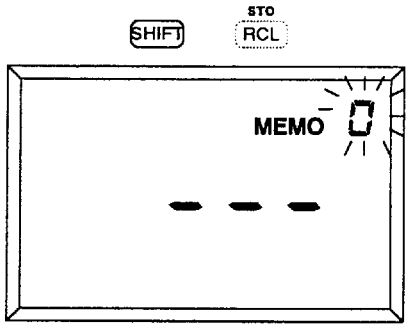
- Invalid channels generate three beeps and then the previous channel appears.
- In the case of no memory channels;
  The display shown right appears.
  (Memory channel number "**0**" blinks.)



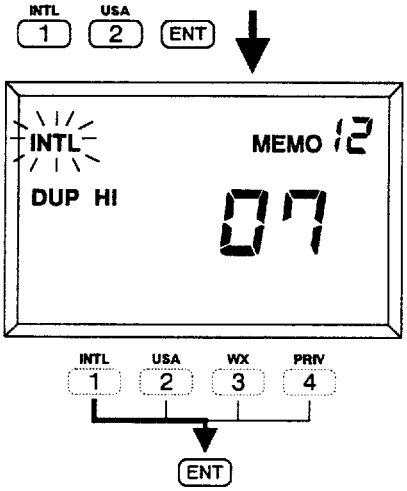
7. STORING CHANNELS

Procedure

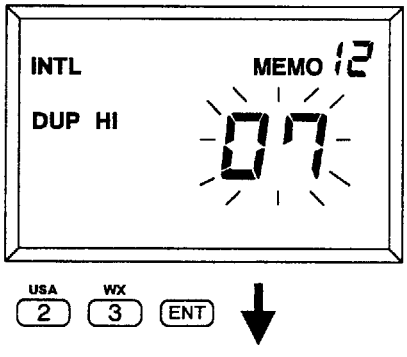
〔1〕 Press the SHIFT key followed by the STO RCL key.
The previous memory channel appears.
When there are no channels stored in the memory, the display shown right appears.



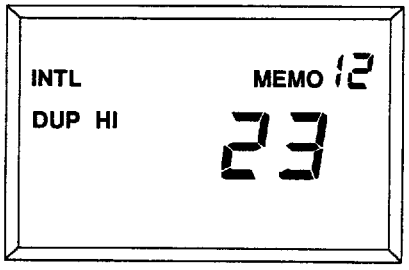
〔2〕 Enter channel number [**0 to 19**] by pressing the numeral keys.
(ex) Select memory number 12.
Press the INTL 1 USA 2 followed by the ENT key.
Channel mode indication **INTL** blinks.



〔3〕 Press desired channel mode key followed by the ENT key.
(ex) Set the channel mode for INTL.
Press the INTL 1 key followed by the ENT key.
Channel number blinks.



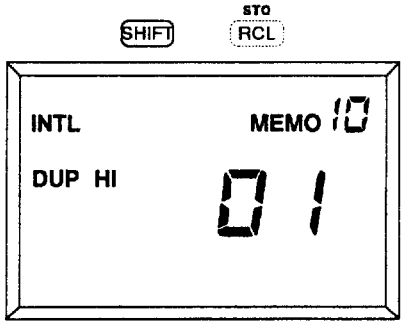
〔4〕 Enter channel number, then press the ENT key.
(ex) Select channel number CH23.
Press the USA 2 WX 3 key followed by the ENT key.



8. DELETING MEMORY CHANNELS

Procedure

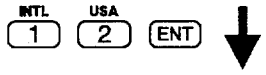
〔1〕 Press the SHIFT key followed by the STO RCL key. The previous memory channel appears.

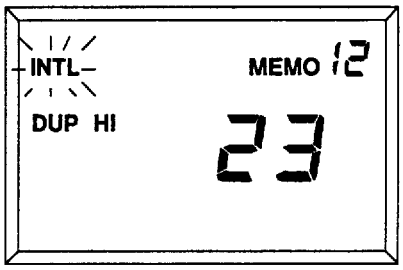


〔2〕 Enter the memory channel you want to delete, then press the ENT key.

(ex) Delete memory channel 12.

Press the INTL 1 USA 2 key followed by the ENT key, or select CH12 by rotating the **CHANNEL** control, then press the ENT key. The indication **INTL** blinks.

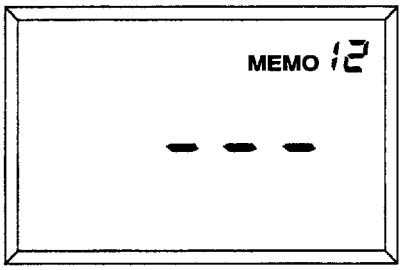




〔3〕 Press the CH70 0 key followed by the ENT key.

Channel 12 is deleted;

" — — — " appears on the display.



9. DUAL WATCH – CH16 and another channel

The dual watch function allows you to keep watch on channel 16 and another channel.

For example, another channel is CH20;

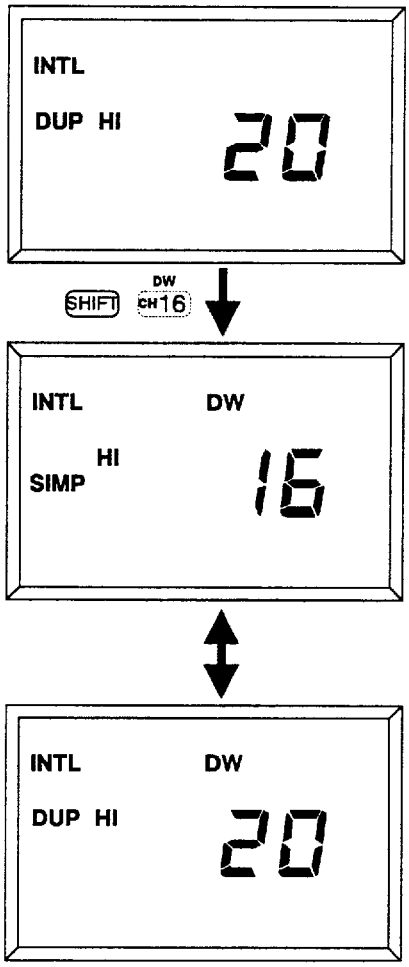
Channel Indication	CH20 ➡ CH16 ➡ CH20 ➡ CH16 ➡ CH20 ➡ •••					
Receiving Time (sec.)	1	0.15	1	0.15	1	•••••

Procedure

〔1〕 Select the channel you want to watch along with CH16 by operating the **CHANNEL** control.

〔2〕 Press the SHIFT key followed by the DW CH16 key.
The indication **DW** appears on the display.
The distress channel and channel selected are watched at intervals of 0.15 second and 1 second, respectively.
Further, the LCD alternately displays CH16 and the channel selected.

〔3〕 To escape from the dual watch mode, hit any key or press the PTT switch on the handset.



Tip

- **When a signal is present on CH16;**
  ① The receiver locks on CH16 and ignores the other channel.
  ② Five seconds after the signal on CH16 has gone, the receiver reverts to dual watching again.

- **When a signal is present on the channel being watched;**
  Keep dual watching before escaping from this mode.

10. DUAL WATCH – guard channnel and another channel

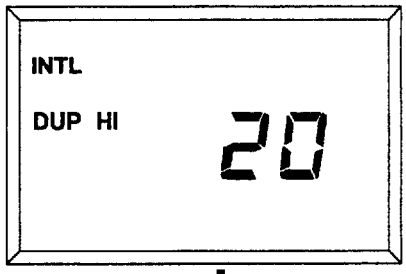
The dual watch function allows you to keep watch on coast guard channel stored in the memory and another channel. **You should store a coast guard channel in the memory number "0" for this function.**

For example, coast guard channel is CH13 in the memory and another channel is CH20;

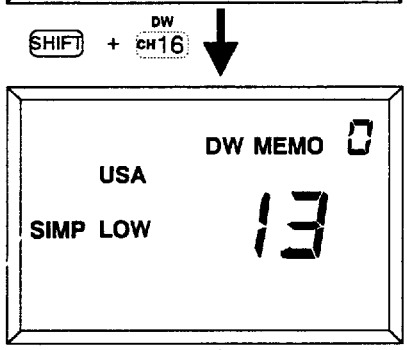
Channel Indication	CH20 ➡ CH13 ➡ CH20 ➡ CH13 ➡ CH20 ➡ •••					
Receiving Time (sec.)	1	0.15	1	0.15	1	•••••

Procedure

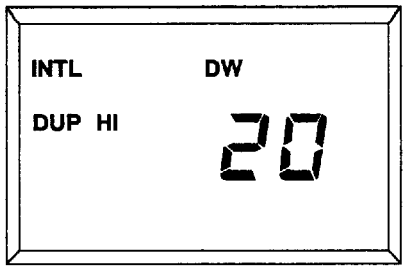
〔1〕 Select the channel you want to watch along with coast guard channel stored in the memory.



〔2〕 While pressing and holding down the SHIFT key, press the DW CH16 key.
The indication **DW** appears on the display.
The coast guard channel in the **MEMO 0** and channel selected are watched at intervals of 0.15 second and 1 second, respectively.
Further, the LCD alternately displays CH13(MEMO 0) and the channel selected.



〔3〕 To escape from the dual watch mode, hit any key or press the PTT switch on the handset.



Tip

- **When a signal is present on coast guard channel in the memory number "0";**
  ① The receiver locks on coast guard cahnnel and ignores the other channel.
  ② Five seconds after the signal on coast guard channel has gone, the receiver reverts to dual watching again.

- **When a signal is present on the channel being watched;**
  Keep dual watching before escaping from this mode.

11. SCANNING

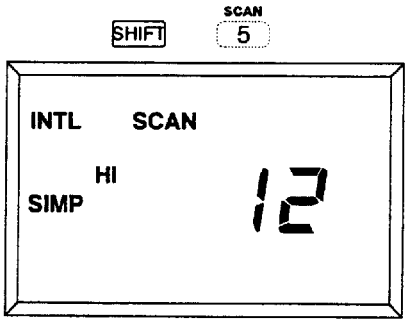
The receiver scans a channel mode (USA, WX, etc.) in ascending channel order, stopping when a signal above a certain level is received.

The receiver employs multiple watch; 1-cycle mode and endless mode. One of two modes is available by presetting the jumper wire inside the transceiver.
Note that the factory setting is endless mode.

Mode	Function
Multiple Watch [1-cycle mode]	The receiver scans in the selected mode and CH16 is always watched between channels. It terminates scanning when all channels are watched. (ex) Scan starts on CH12 in INTL mode. start end 12 → 16 → ··· → 16 → 88 → 16 → 01 → 16 → ··· → 16 → 11
Multiple Watch [Endless mode]	The receiver continuously scans in the selected mode and CH16 is always watched between channels. (ex) Scan starts on CH12 in INTL mode. → 12 → 16 → 13 → ··· → 28 → 16 → 60 → ··· → 16 → 88 → ← 16 ← 11 ← ··· ← 16 ← 02 ← 16 ←

Procedure

〔1〕 Press the SHIFT key followed by the SCAN 5 key.
The receiver starts scanning.



〔2〕 To escape from the scan mode, hit any key or press the PTT switch on the handset.

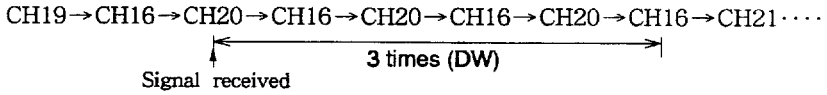
Scan Stop Mode

The receiver offers two modes to stop scanning when it finds a signal, hold or lock.

● HOLD Mode

When the receiver finds a signal on a channel other than CH16, it stops scanning and starts dual watching between CH16 and that channel. After dual watching for * times, it reverts to multiple watch.

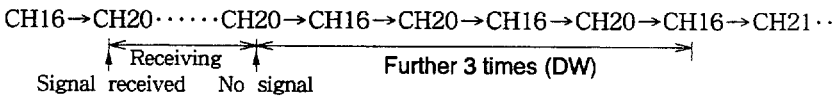
(ex) Set the DW quantity for 3 times.



● LOCK Mode

When the receiver finds a signal on a channel other than CH16, it stops scanning and starts dual watching. After the signal has gone, the receiver keeps dual watching for * times.

(ex) Set the DW quantity for 3 times.



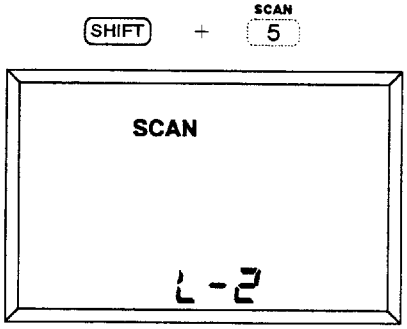
When a signal is present on CH16;

When the receiver finds a signal on CH16, it receives the signal until it has gone.
Further it keeps watching on CH16 for five seconds.
After that, the receiver reverts to multiple watch.

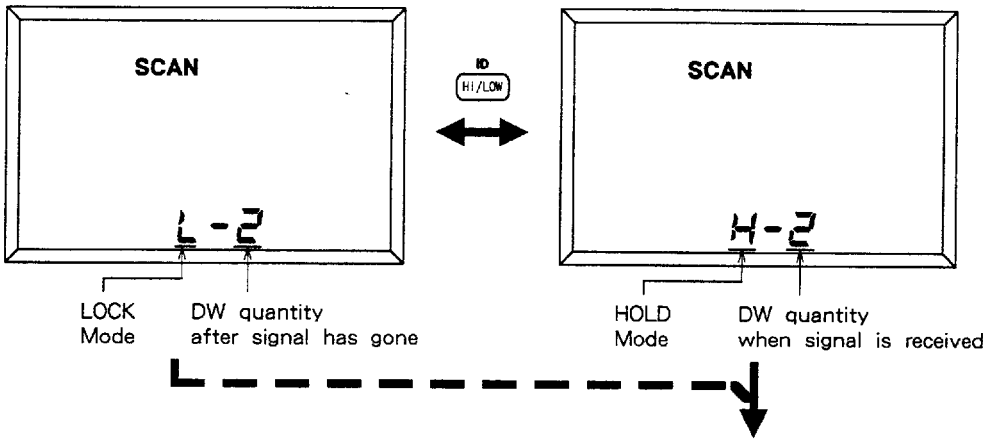
Hold or Lock mode can be selected and the scan parameter "*" can be changed from 1 to 9.
The following shows the procedure.

Procedure

〔1〕 While pressing and holding down the SHIFT key, press the SCAN 5 key.



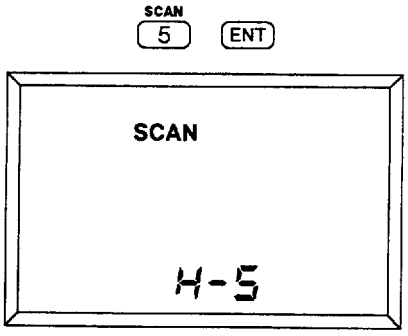
〔2〕 Each press of the ID HI/LOW key alternates display of the HOLD and LOCK mode screens.



〔3〕 Enter the DW quantity [1 to 9] followed by pressing the ENT key.

(**ex**) Set the DW quantity for 5 times.

Press the SCAN 5 key followed by the ENT key.



MEMO

2

DSC OPERATION

1. GENERAL

DSC is an acronym meaning Digital Selective Calling. Digital Selective Calling is a digital distress calling system in the MF, HF and VHF frequency bands used by ships for transmitting distress alerts and by coast stations for transmitting the associated acknowledgements.

For distress and safety operation, simplex frequency is used. The VHF DSC frequency is 156.525MHz (channel 70). **Channel 70 is designated exclusively for DSC calling. DSC calling can be done over other channels, however voice communication over channel 70 is prohibited.**

DSC CALL

DSC calls are divided roughly in two categories: distress and safety, and routine calls (calls to port authorities, etc.).

A DSC call contains the numerical address of the station to which the call is transmitted, the self-identification of the transmitting station and a message which contains several fields of information indicating the purpose of the call.

The receipt of a DSC call by a receiving station is accompanied by a suitable display of the address, the self-identification of the transmitting station and the content of the DSC message, together with audible and visual alarms.

For DSC operation, the optional SUB-CPU board and connector assembly are required.

2. DSC ROUTINE CALL

The FM-7000 can transmit DSC routine call.

When the DSC-5 or DSC-5V is connected, however, the DSC operation on the FM-7000 is disabed.

Procedure

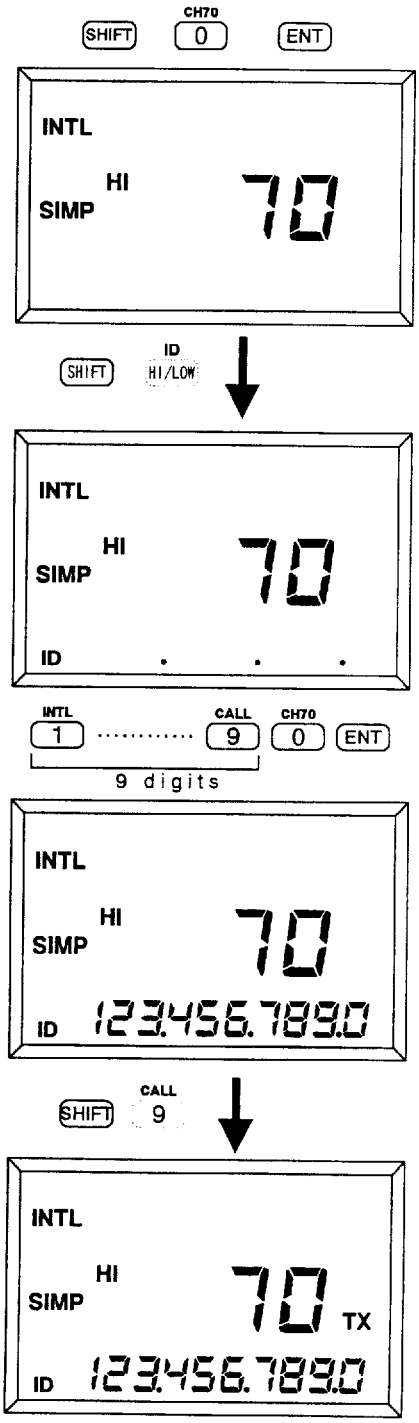
〔1〕 Select a channel.

〔2〕 Press the SHIFT key followed by the ID HI/LOW key.
ID appears.

〔3〕 Enter receiving station's ID followed by the ENT key.
(ex) Receiving station's ID is 123456789.
Press the INTL 1 USA 2 WX 3 PRIV 4 SCAN 5 6 INTCOM 7 HAILER 8 CALL 9 key followed by the CH70 0 ENT key.

CH70 0 : **Enter "0" after ID to make 10 digits.**
See next page.

〔4〕 Press the SHIFT key followed by the CALL 9 key.
Digital selective calling signal is transmitted.
TX appears.



Tip

- Enter 10 digits when setting an ID number, because the FM-7000 is designed to accept **10 digits**.

  ◇ Ship's ID is 9 digits, so enter "0" after ID.
  (123.456.789.0)

  ◇ Group ID is 8 digits, so enter "0" both before and after group ID.
  (012.345.678.0)

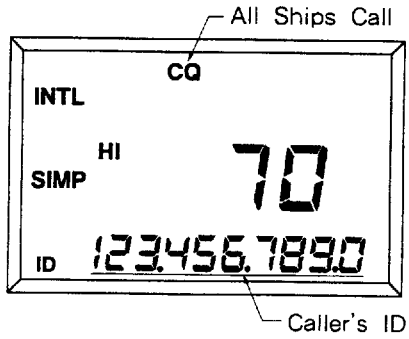
  ◇ Coast ID is 7 digits, so enter two zeroes "00" before ID and one zero "0" after coast ID.
  (001.234.567.0)

3. RECEIVING A DSC CALL

The FM-7000 can receive a DSC call by selecting a DSC channel.

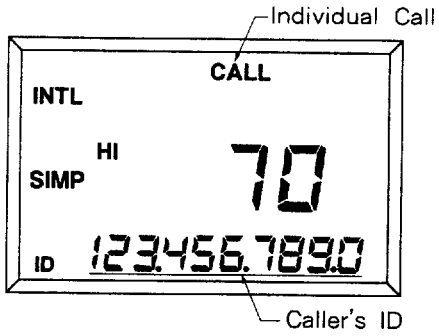
All Ships Call

When a DSC call is received, five beeps sound and caller's **ID** and **CQ** indication appear.



Individual Ship Call

When a DSC call is received, five beeps sound and caller's **ID** and **CALL** indication appear.



Distress Call

When a DSC distress call is received, the unit beeps continuously and caller's **ID** and **CALL** indication appear.

3

OPERATION OF OPTIONAL EQUIPMENT

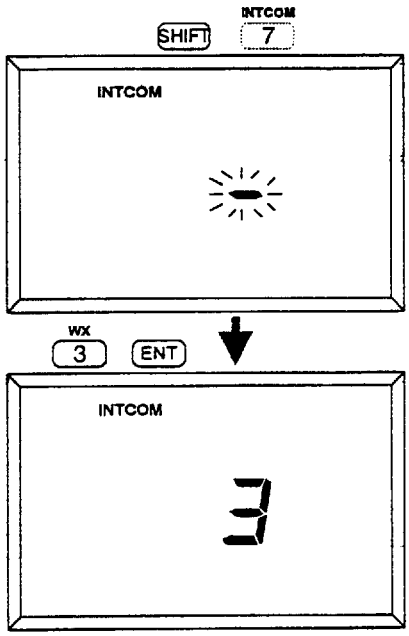
1. INTERCOM

The optional intercom provides intercommunication between the FM-7000 and a remote station.

Procedure

〔1〕 Release the handset from the hanger.

〔2〕 Press the SHIFT key followed by the INTCOM 7 key.
The minus mark "–" blinks.



〔3〕 Enter the number of the remote station [2 to 5] and press the ENT key.
(ex) The number of the remote station is 3.
Press the WX 3 ENT key.

〔4〕 Press the PTT switch to talk and release it to listen for the response.

〔5〕 After completing the communication, hang up the handset.

Tip

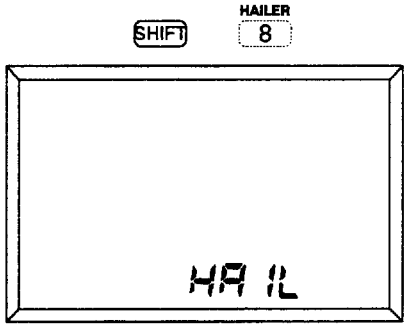
- The handset at the remote station must be hung to enable communication.
- Any number [0 to 9] may be pressed to call up the remote station when single station is connected.
- Up to 4 remote stations can be connected through Distributor DB-500. The number of the remote station is designated by the connector number on the Distributor

2. LOUDHAILER

The loudhailer outputs the audio output of the handset to a loudhailer speaker (mounted on the deck, etc.).

Procedure

〔1〕 Press the SHIFT key followed by the HAILER 8 key.
HAIL indication appears on the LCD.



〔2〕 Press the PTT switch to talk.

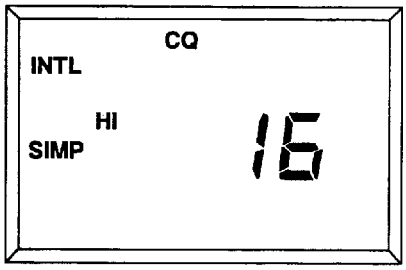
〔3〕 To escape from the loudhailer mode, press any key.

3. RECEIVING 5-TONE SELCALL

The FM-7000 can receive 5-tone selective calling signal from coast station. (Optional SUB-CPU board and AF Decoder board required.)

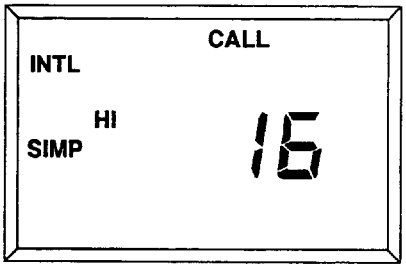
All Ships Call

When a call is received, five beeps sound and **CQ** indication appears.



Individual Ship Call

When a call is received, five beeps sound and **CALL** indication appears.



To extinguish the display, press the PTT switch or any key.

Tip

- Further information, if any, appears at the bottom of the LCD.

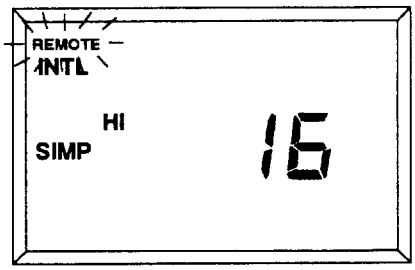
4. REJECTING THE CONTROL BY THE REMOTE STATION

The FM-7000 installed in the wheelhouse can reject the control by the remote station RB-700.

Procedure

〔1〕 Press the SHIFT key, and then hang up the handset on the hanger.(on hook)
REMOTE indication blinks.
While blinking, the control by the remote station is rejected.

SHIFT ⇨ [ON HOOK]

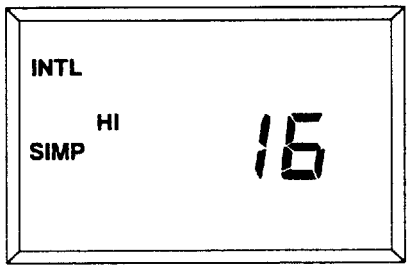


[FM-7000 rejects the control by RB-700]

〔2〕 To cancel this mode, press the SHIFT key and then hang up the handset on the hanger.
REMOTE indication disappears.

To cancel this mode

SHIFT ⇨ [ON HOOK]



Tip

- **REMOTE** indication **on the RB-700** and FM-7000 blinks when this function is available.

MEMO

4

MAINTENANCE

1. REGULAR CHECK

The FM-7000 is designed and constructed to give the user many years of trouble-free performance. However, no machine can perform to the utmost of its ability without regular maintenance. For better performance:

- Have a licensed radiotelephone technician check the transceiver and antenna before initial operation and once annually to ensure compliance with pertinent regulations.

- A quarterly routine maintenance program should be established and should include at least the following:

Item	Check Point
Connectors & Cables	Check all connectors (antenna, power, handset, ground, etc.), cables and wires for proper seating, foreign material and corrosion. Wipe of any foreign material with a clean cloth. Replace worn parts. Carefully inspect the coaxial cable connected between the antenna and the transceiver for external damage.
Transceiver	Accumulated dust or dirt on the exterior surface and keyboard can be removed with a clean, soft cloth. For stubborn dirt, use mild soap and water. Clean LCD with lens tissue or soft non-abrasive cloth to prevent scratching. **Do not use chemical solvents to clean the transceiver. They may harm plastic, paint and markings.**
Antenna	Inspect the antenna insulators for corrosion. Check condition of soldered connections. Remove salt deposits with fresh water.
Power Supply	The FM-7000 operates from 12VDC +30%, -10% power. Confirm that the power supply is operating within this rating. Check battery terminals and ship's mains switchboard and terminals for proper seating and corrosion.
Fuses	Fuse holders are subject to corrosion which increases circuit resistance. Fuses should be removed from their holders, inspected, and cleaned of any accumulation of dirt or corrosion.

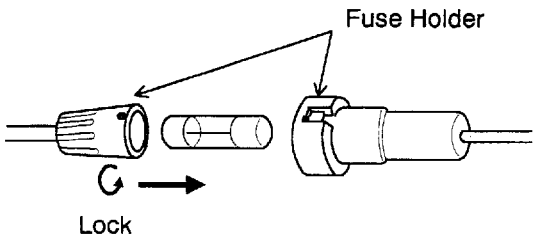
2. FUSE REPLACEMENT

To protect the unit from reverse polarity and equipment fault, two 10A fuses are provided in snap-in holders on the power cable. If a fuse blows, find the cause of the problem before replacing it. **Never use a fuse rated more than 10A since it may cause more serious damage to the equipment.**

⚠ CAUTION

Use the correct fuse.

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



3. TROUBLESHOOTING

The cause of most VHF operating problems is the antenna/antenna feeder or power supply, so those are the first places to check if there is trouble. If normal operation cannot be restored, do not attempt to check inside the unit; there are no user serviceable parts inside. Improper handling may permanently damage the transceiver.

Symptom	Possible Cause	Remedy
Cannot turn on power.	1. Power is off at mains switchboard. 2. Power lead is loose or pulled out. 3. Mains battery is discharged. 4. Fuse has blown.	1. Turn mains switch on. 2. Check plug and battery connections. 3. Check battery electrolyte level and charging system. 4. Check mains voltage and polarity. If normal, replace fuse (10A).
LCD looks normal but no audio output.	1. EE appears on LCD. 2. Speaker is off. 3. SQUELCH setting is too high. 4. VOLUME setting is too low. 5. External speaker connection has loosened.	1. See section on error messages. 2. Press [SHIFT] [6] key. 3.,4. To confirm audio output, turn SQUELCH fully CCW and turn VOLUME slowly CW. 5. Check connection.
Noise but no or poor signal reception.	1. Loosened ANT connector. 2. Dismasted antenna. 3. Damaged antenna cable. 4. Obstruction (mountain, crane, etc.) within path of radio wave. 5. Transmitter is too far away or transmitting in low power.	1. Check ANT connector. 2.,3. Replace antenna. 4.,5. Line-of-sight is a characteristic of VHF communications.
TX appears but no or low output power.	1. Refer to items 1 thru 4 above. 2. Power setting is LOW. 3. The channel is to be operated in low power. 4. TX blinks. 5. HI blinks.	2. Set power to HIGH. 3. INTL CH15, 17 and USA CH13, 17, 67 are low power channels. 4.,5. See section on error messages.
TX mark does not appear when PTT switch is pressed.	1. Attempting transmission over a channel assigned for reception only; CH15(USA), WX0 thru WX9, etc. 2. Transceiver is in dual watch or scanning mode. 3. Check handset for damage. 4. Beeps emitted when transmitting.	1. Refer to channel list. 2. Change mode. 3. Replace handset if necessary. 4. See section on error messages.
Cannot use private channel.	Private channels have not been programmed.	Authorization required to use private channels.
Scan and DW modes do not function.	SQUELCH setting too low.	Adjust SQUELCH control so noise just fades out.
Channel 16 called without operator intervention	Channel 16 is selected whenever the handset is hung up.	

4. ERROR MESSAGES

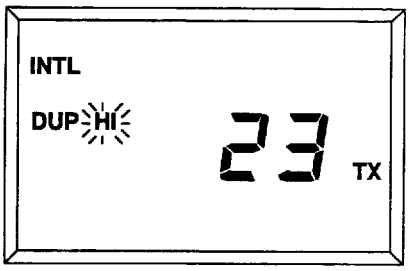
■ HI indication blinks.

Symptom:

RF power is set for 6W.

Cause:

Final stage transistor protection circuit turned on. Discontinue transmission until unit cools down.



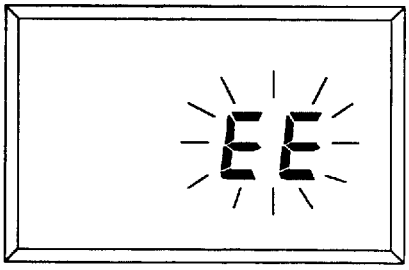
■ EE indication appears.

Symptom:

Cannot transmit, no audio output.

Cause:

PLL is unlocked. Wait several seconds and then retry. If normal operation cannot be restored the frequency control section may be defective.



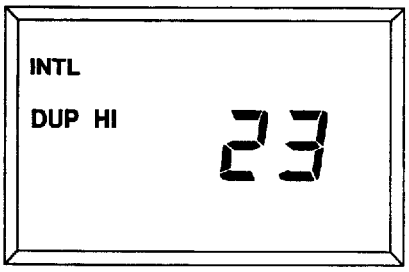
■ Three beeps emitted when PTT switch is pressed. (TX does not appear).

Symptom:

No RF power.

Cause:

Transceiver section may be defective.



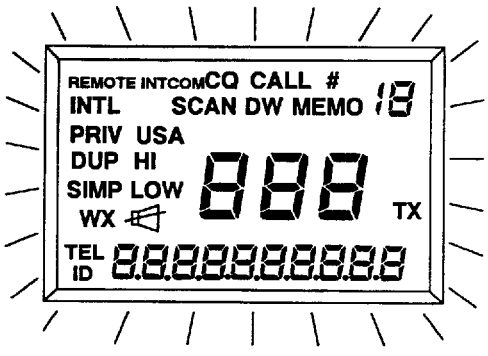
■ All LCD characters blink.

Symptom:

Operator's command is not accepted.

Cause:

Defective E^2PROM.

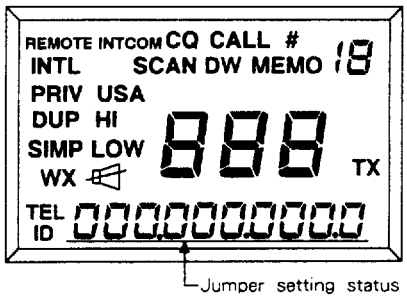


5. SELF-TEST

〔1〕 While pressing and holding down the [ENT] key, turn the power on.

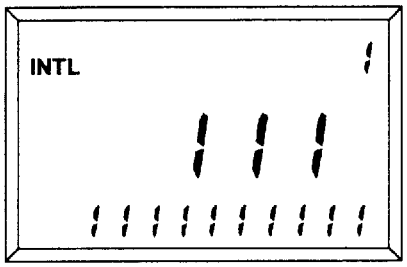
E²PROM Check

Jumper setting status on PANEL board appears at the bottom of the LCD.



Keyboard/Switch Check

- Press all numeral keys one by one. The display shows numeral and the sub function of the key. The display at right shows the appearance of the LCD when the [INTL 1] key is pressed.



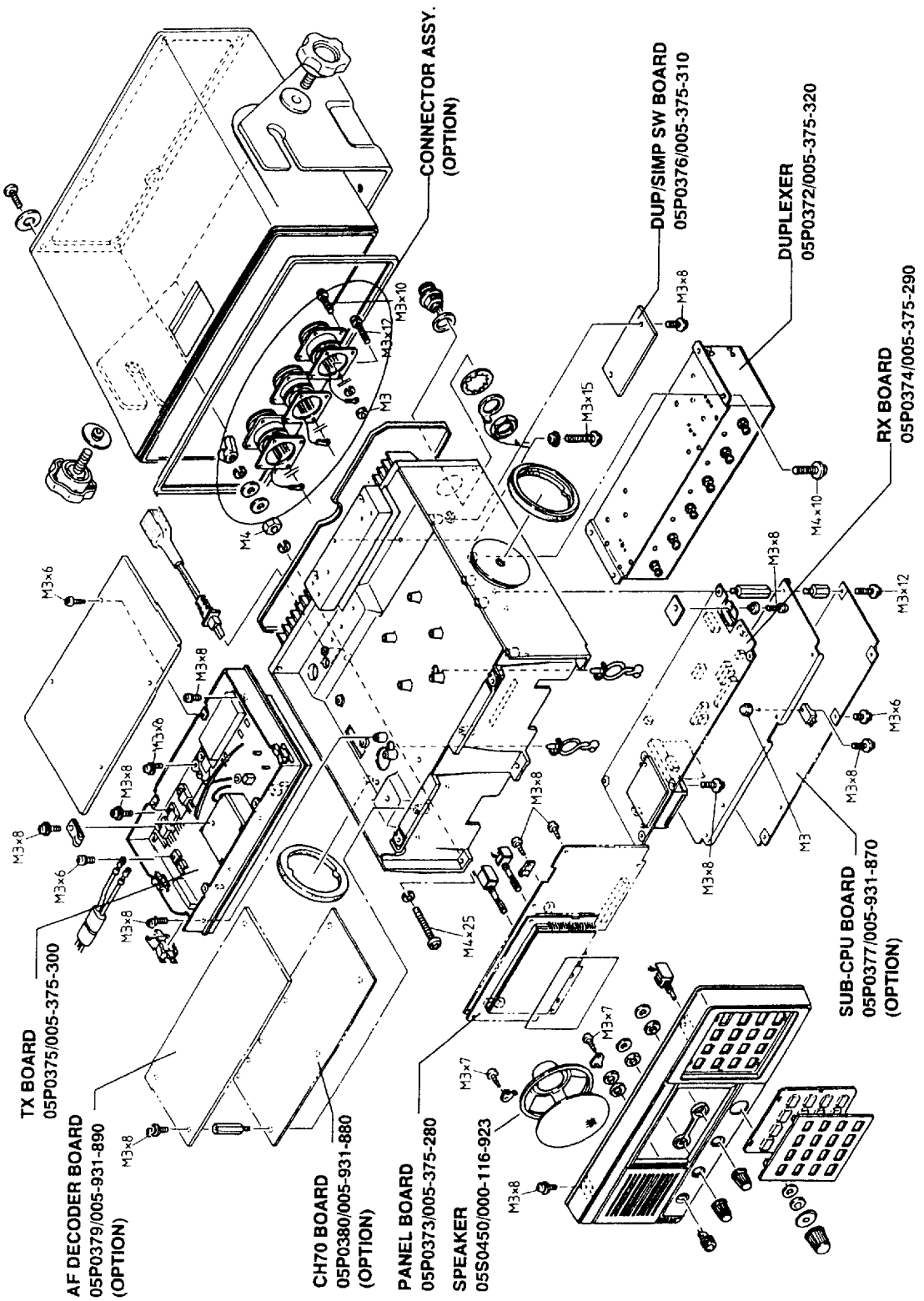
Key	Indication	Key	Indication	Key	Indication	Key	Indication
INTL 1	1, INTL	USA 2	2, USA	WX 3	3, WX	STO RCL	MEMO1, .
PRIV 4	4, PRIV	SCAN 5	5, SCAN	6	6,	TEL	TEL (*1)
INTCOM 7	7, INTCOM	HAILER 8	8	CALL 9	9	ID HI/LOW	HI, LOW, ID
DW CH16	SIMP, DW	CH70 0	0	SHIFT		ENT	CQ, #

(*1) Press the [TEL] key several times and confirm that the brightness changes in the sequence of dim, medium, bright and off.

- Press the PTT switch. The display shows **TX** and **DUP** indications.
- Release the handset from the handset rest and hang up again. The display shows **REMOTE** and **CALL** indications.

〔2〕 Turn off the power to escape from the self check.

6. EXPLODED VIEW (PARTS LIST)



MEMO

5

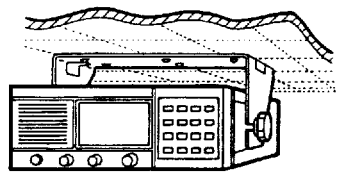
INSTALLATION

1. TRANSCEIVER UNIT

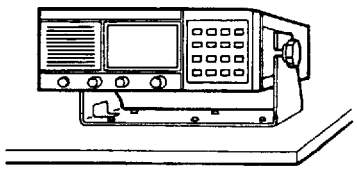
Mounting Location

Determine the mounting location for the transceiver unit considering the size of the vessel, operator convenience, proximity to the power source and the grounding point. Keep these and the following points in mind when selecting a mounting location.

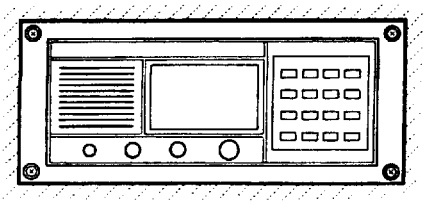
- Locate the unit in a place free of water spray and water splashes.
- Keep the unit out of direct sunlight because of heat that can build up inside the unit.
- Secure sufficient space on all sides of the unit to permit circulation of air and easy access to fuses and connectors.
- Leave a little slack in cables to allow a sevice technician to move the radio from its usual location with the cables connected. This lets him make tuning and other adjustments on a "live" set.
- Select a well ventilated area.
- Ensure the mounting location is strong enough to support the weight of the unit (4kg) under the condition of continued vibration normally encountered aboard the vessel. If necessary, reinforce the mounting area using a doubling plate or lining block.



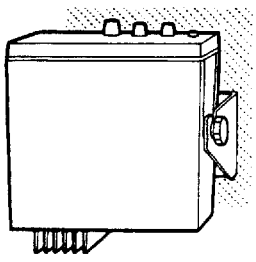
CEILING MOUNT



TABLETOP MOUNT



FLUSH MOUNT



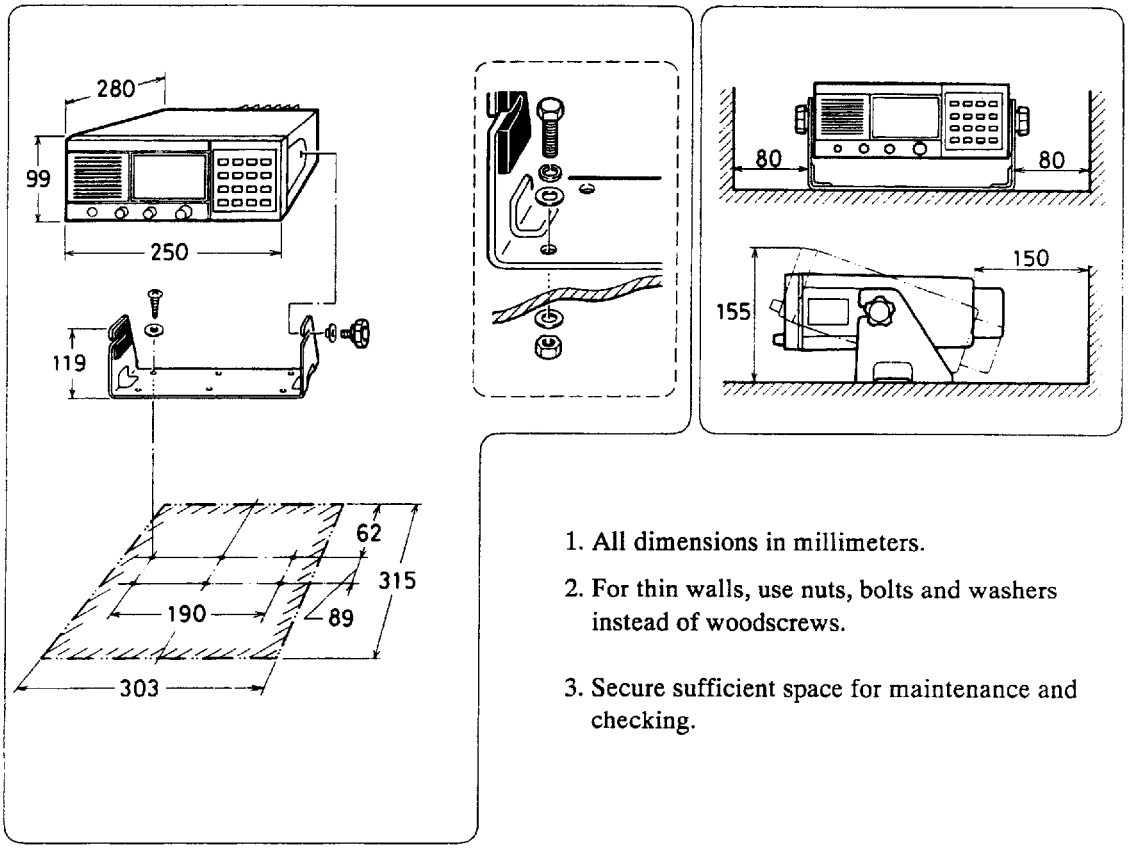
BULKHEAD MOUNT

Compass Safe Distance

Observe the compass safe distances.

UNIT	Standard compass	Steering compass
Transceiver	0.8m	0.6m
DC-DC Converter PC-208	0.5m	0.4m
Rectifier PR-101	0.8m	0.6m

Bulkhead/Ceiling/Tabletop Mounting



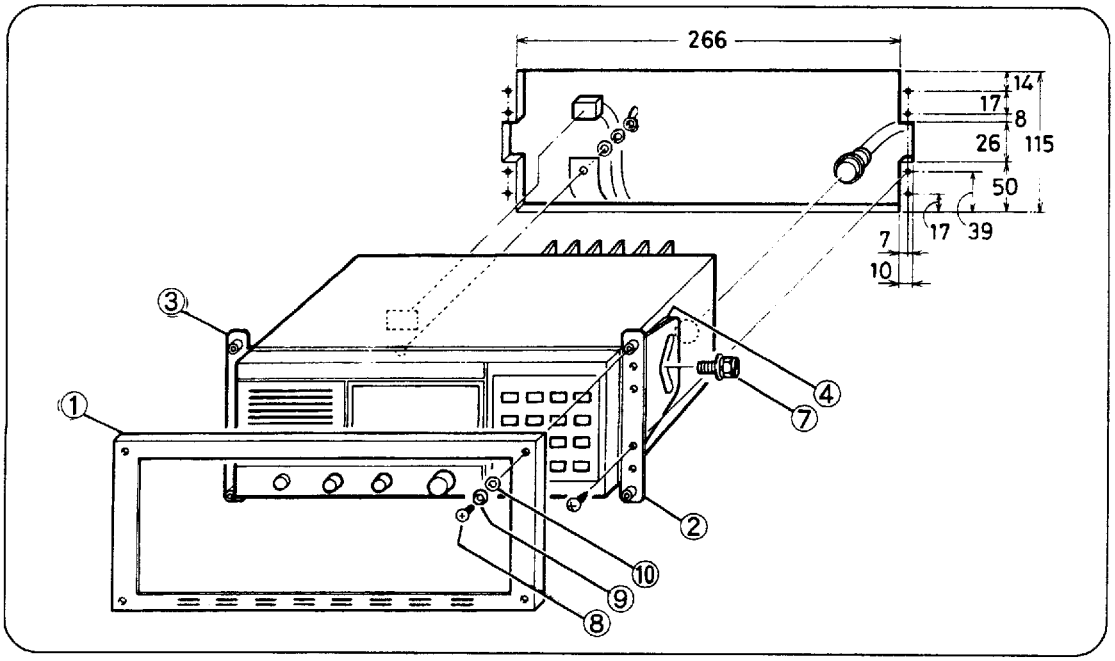
1. All dimensions in millimeters.
2. For thin walls, use nuts, bolts and washers instead of woodscrews.
3. Secure sufficient space for maintenance and checking.

Flush Mounting

Flush mounting requires the optional flush mounting kit. As noted earlier, ensure the mounting area is strong enough to support the weight of the unit (4kg). If necessary, reinforce the mounting area.

The table below shows the contents of the flush mounting kit. Note that the kit does not provide the screws for fixing the flush mount panel. Note also that the hex head screws ⑤ and ⑥ are not used with the FM-7000.

No.	Name	Type	Code No.	Qty	Remarks
①	Flush Mount Panel		100-105-470	1	
②	Mounting Bracket (R)		100-105-480	1	
③	Mounting Bracket (L)		100-105-490	1	
④	Flush Mount Liner		100-105-500	2	
⑤	Hex Head Screw	M8x16	000-882-160	2	Not used
⑥	Hex Head Screw	M8x20	000-802-248	2	Not used
⑦	Hex Head Screw	M8x25	000-882-161	2	
⑧	Phillips Head Screw	M3x8	000-861-495	4	
⑨	Rosette Washer	M3	000-864-900	4	
⑩	Nylon Washer	2.8x7x0.5	000-800-728	4	



2. ANTENNA

Any good quality antenna, complying with the following requirements, can be used. A high-gain antenna is preferable.

- **Frequency Range:** 155 to 164 MHz
- **Impedance:** 50 ohms
- **Polarization:** Vertical
- **Handling Power:** 30 W min.
- **Quality:** Able to withstand marine environment

Mount the antenna high atop the mast free from nearby antennas, masts, etc. The higher the antenna is mounted above the horizon, the further the communications range.

3. HANDSET HANGER

The handset hanger can be connected at either the front or rear of the unit. To connect the handset at the rear of the unit, a connector and connector assembly are required. The mounting location should provide easy access to front panel controls while operating the handset. Also, the length of the handset cable is 50 cm, so locate the hanger within 50 cm of the transceiver unit. (Longer cables are available optionally.)

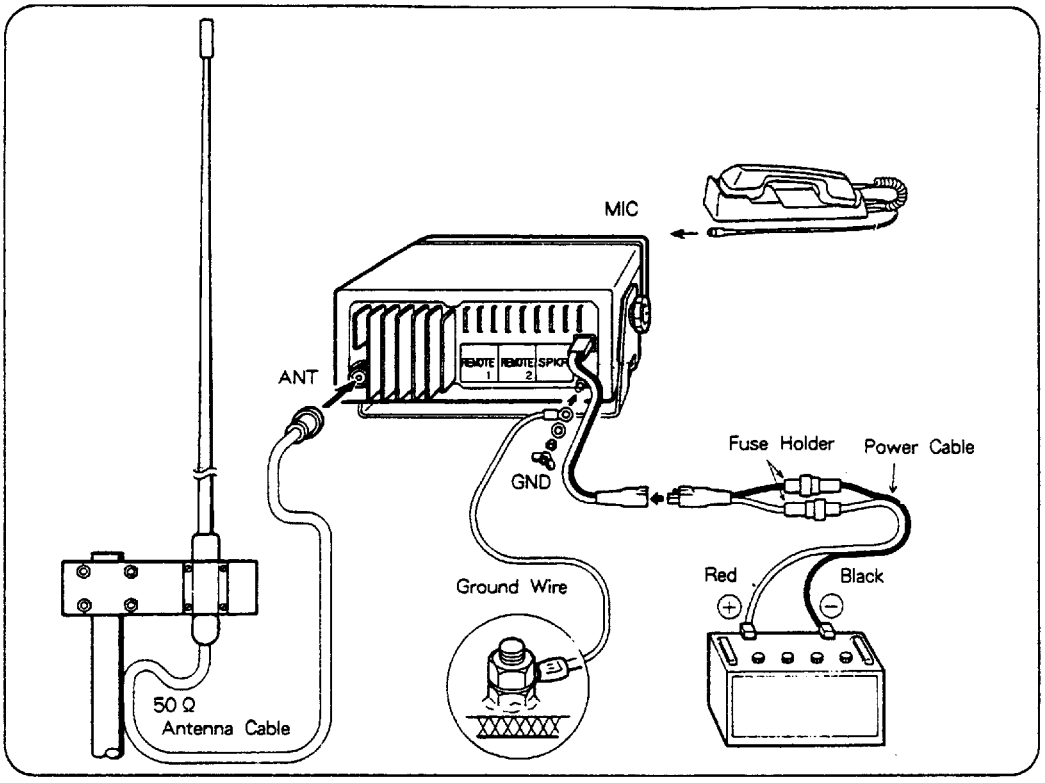
No	Name	Type	Code No	Remarks
1	Connector assy.	05S0650	000-118-348	SPKR connector
2	Cable	05S0626	000-118-349	Cable length: 1m
			000-118-350	Cable length: 5m

4. EXTERNAL POWER SUPPLY

The FM-7000 operates from any 12VDC power supply. For operation from 24 VDC or AC mains, DC-DC Converter PC-208 or Rectifier PR-101 is required, respectively. The units can be mounted almost anywhere, provided the area is clean and dry. For connections, refer to the interconnection diagram.

5. CONNECTIONS

The illustration below shows how to connect cables to the transceiver unit.



Optional Connector

To output the signals shown below, fix the optional Connector Assy. (05S0650 Code No. 000-118-348) at SPKR connector on the rear chassis of the transceiver unit.

Pin No.	Signal	Purpose
1	HAIL – H	Connection of HAILER speaker. (4 Ω / 5w)
2	HAIL – C	
3	EXT SP – H	Connection of external speaker. (4 Ω / 4W)
4	EXT SP – C	
5	CH 70 – H	Connection of DSC terminal.
6	CH 70 – C	Optional "SUB-CPU Board" is required.
7	AUX – H	Connection of alarm buzzer for selcall.
8	AUX – C	Optional "SUB-CPU Board" is required.
9	0V	
10	MUTE	Muting the receiver.
11	ON HOOK	
12	PTT	
13	HANDSET SP	Connection of handset hanger or mic receptacle box RBD-VHF-B for wing handset.
14	MIC – H	
15	MIC – C	
16	F GND	

Power Connection

A three meter power cable with two snap-in fuse holders is provided. Connect the wire ends to a battery, distribution box or said unit; the red lead to the positive(+) terminal and the black lead to the negative (-) terminal. Be sure to leave some slack in the cable to permit access to the fuse holders.

If it is necessary to extend the power cable, use a heavy wire depending on the extension distance. Refer to the table below.

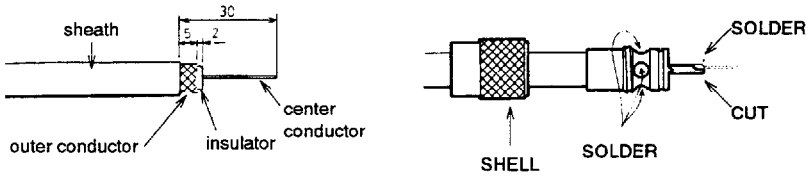
Length(m)	US Gauge (AWG)	British Gauge
5	14	16
10	10	12
20	8	10

Lighter wire will mar the performance of the transceiver, or even cause fire in the worse case. Do not twist-wrap the joints but solder or use a screw terminal when splicing the extension cable. Ensure all connections are tight, clean and well insulated.

Antenna Connection

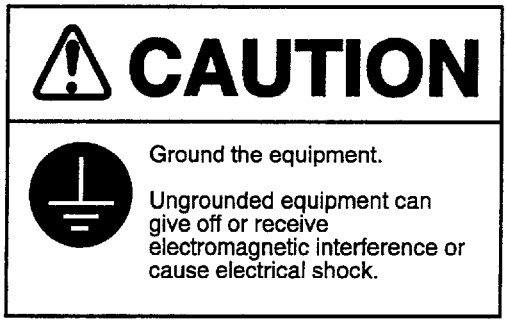
The connection between the antenna and the transceiver unit can be any 50 ohm coaxial cable heavier than 5D-2V(RG-212/U or equivalent). To extend the cable longer than 20m, use heavier coaxial cable; for example, 8D-2V or RG-213/U, to minimize power loss and signal attenuation through the cable. Be sure to leave some slack in the cable for future service and maintenance.

After laying the coaxial cable, solder the "M" type plug onto the cable end. Refer to the illustration below.



Ground Connection

For safety purposes and to minimize mutual interference, ground the transceiver cabinet to ship's grounding bus, or to the hull on a metallic hull boat.



6. OPTIONAL BOARDS

Refer to "Optional Boards Installation Instructions"(TI-E5517-1*).

7. CONNECTION OF EXTERNAL UNITS

Refer to page S-1/Interconnection Diagram(C5517-C01).

6

COMPLETE SET

FURUNO

構成表 COMPLETE SET	FM-7000 国際VHF無線電話装置 MARINE VHF RADIOTELEPHONE			
番号 No.	名称 NAME	型式 TYPE	重量 WEIGHT (Kg)	数量 Q'TY	備考 REMARKS
1	本体 MAIN UNIT	FM-7000	4.0	1	
2	150MHZ アンテナ VHF MARINE ANTENNA	FAB-151D	0.85	* 式 1 SET	
2	150MHZ アンテナ VHF MARINE ANNTENNA	150M-W2VN	0.7	* 式 1 SET	ケーブル5D-2V 10M付き WITH 10M CABLE OF 5D-2V
3	工事材料 INSTALLATION MATERIALS			式 1 SET	
4	付属品 ACCESSORIES			式 1 SET	
5	予備品 SPARE PARTS			式 1 SET	
6	DC-DC コンバータ DC-DC CONVERTER	PC-208	1.3	*	DC24V電源用 FOR 24VDC MAINS
7	整流器 RECTIFIER	PR-101	6	*	AC110/220V電源用 FOR 110/220VAC MAINS
8	AC/DC切換電源 AC/DC POWER SUPPLY			*	
9	マイクレセプタクルボックス MIC RECEPTACLE BOX	RBD-VHF-B	0.6	*	ウィング用 FOR WING

＊：オプション支給品。
OPTIONAL SUPPLY.

FURUNO ELECTRIC CO., LTD.

FURUNO

構成表 COMPLETE SET		FM-7000 国際VHF無線電話装置 MARINE VHF RADIOTELEPHONE			
番号 No.	名称 NAME	型式 TYPE	重量 WEIGHT (Kg)	数量 Q'TY	備考 REMARKS
10	ﾊﾝﾄﾞｾｯﾄ HANDSET	**HSC701K-BX21**		*	ｳｨﾝｸﾞ用 FOR WING
11	ﾊﾝﾄﾞｾｯﾄﾊﾝｶﾞ HANDSET HANGER	AP-102		*	ｳｨﾝｸﾞ用 FOR WING
12	ﾘﾓｰﾄｽﾃｰｼｮﾝ REMOTE STATION	RB-700	2.5	*	
13	ﾃﾞｨｽﾄﾘﾋﾞｭｰﾀ DISTRIBUTOR	DB-500	3.5	*	

＊：オプション支給品。
OPTIONAL SUPPLY.

FURUNO

CODE No.		05BN-X-9401
TYPE	CP05-03400	

工事材料表 INSTALLATION MATERIALS	FM-7000	国際VHF 無線電話装置 MARINE VHF TRANSCEIVER

番号 No.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ケーブル組品 CABLE ASSY.		05S0388 CODE No. 000-111-061	1	
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		

図番 DWG. No. C5517-M01-A	1/1
検図 CHECKED	

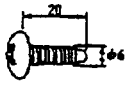
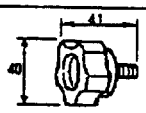
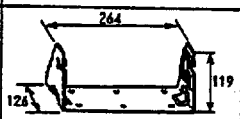
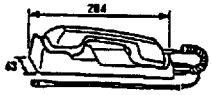
FURUNO ELECTRIC CO., LTD.

FURUNO

CODE NO.		05BN-X-9501 -3
TYPE	FP05-02700	1/1

付属品表
ACCESSORIES

FM-7000 国際VHF 無線電話装置
MARINE VHF RADIOTELEPHONE

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 CODE NO. 000-864-129	6	
2	+ﾄﾗｽﾀｯﾋﾟﾝｸﾞﾈｼﾞ +TAPPING SCREW		6X20 SUS304 1種 CODE NO. 000-802-084	6	
3	ﾉﾌﾞﾎﾞﾙﾄ KNOB BOLT		KG-B2 M8X25 CODE NO. 000-801-934	2	
4	ﾊﾝｶﾞｰ組品 HANGER ASSY.		FP05-02001 CODE NO. 005-922-690	1	
5	ﾊﾝﾄﾞｾｯﾄ HANDSET		HSC701K-BX21 CODE NO. 000-138-000	1	

DWG NO.
C5517-F01- D

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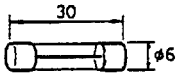
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE No.	
TYPE	SP05-01600

BOX No. _____ P _____

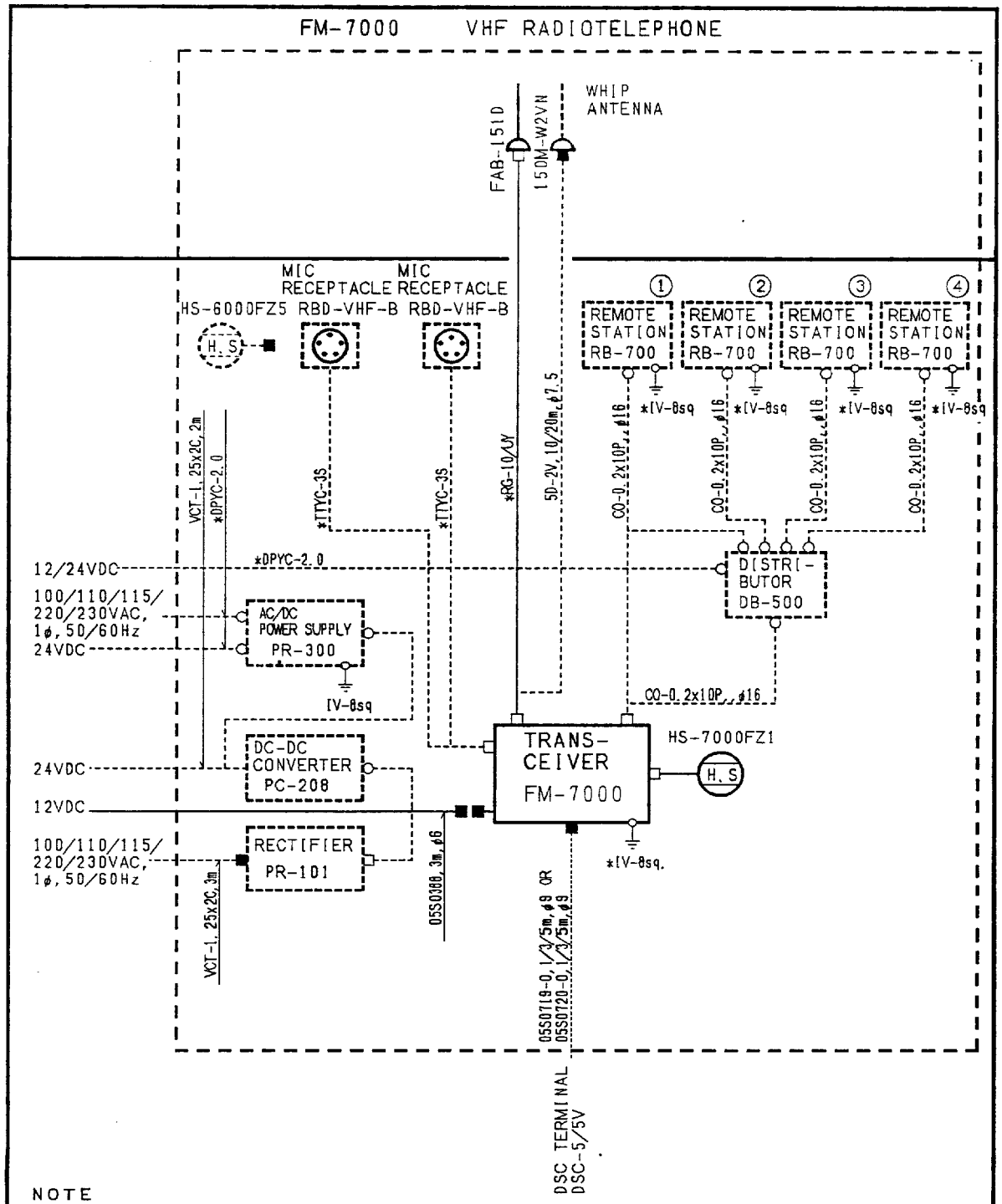
SHIP No.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL
	FM-7000 国際VHF 無線電話装置 FM-8000 MARINE VHF TRANSCEIVER		

ITEM No.	NAME OF PART	OUTLINE	DWG. No. OR TYPE No.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES.	QUANTITY SPARE	REMARKS/CODE No.
1	管入りヒューズ FUSE		FGBO 10A AC125V	1		2	000-549-065

MFR'S NAME	FURUNO ELECTRIC CO., LTD.	DWG. No.	C5517-P01-B	1/1

7

APPENDIX



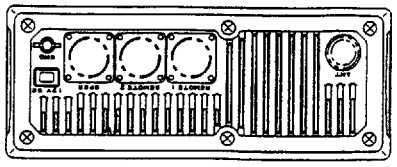
NOTE

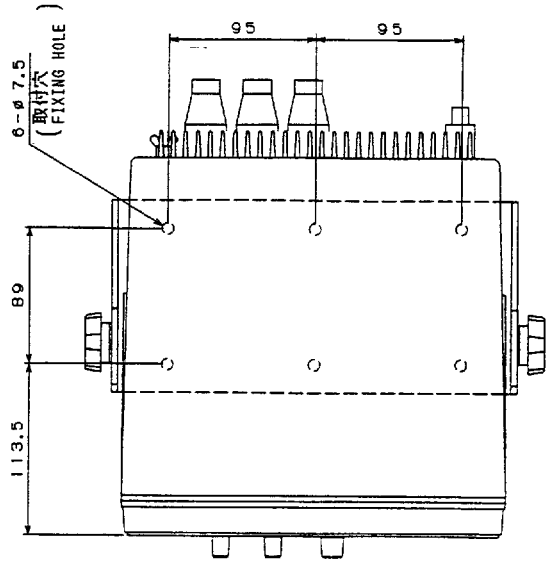
* : SHIPYARD SUPPLY
: CONNECTOR (: FACTORY-FITTED)
: CRIMP-ON LUG (: FACTORY-FITTED)
: GROUNDING COPPER STRAP
: GROUNDING WIRE IV-8sq.
: CABLE SUPPLY SIDE
---: OPTIONAL SUPPLY
CO-0.2x2P: CO-SPEVV-SB-C-0.2x2P,φ10.5
CO-0.2x10P: CO-SPEVV-SB-C-0.2x10P,φ16

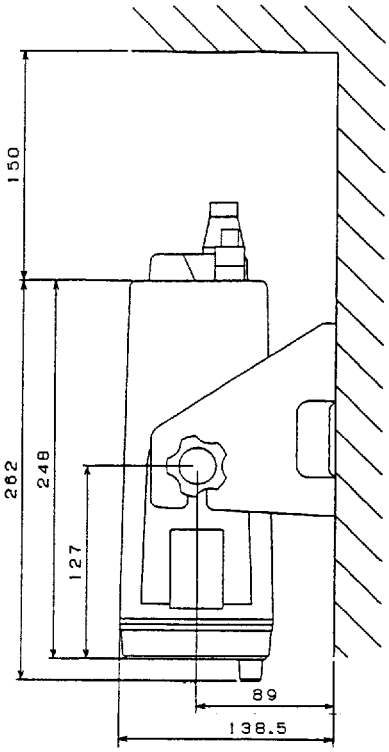
APPROVED	Aug. 18,' 94 K. Ota	TITLE	FM-7000 VHF RADIOTELEPHONE
CHECKED	Aug. 18,' 94 K. Kusunoki		
DRAWN		DWG. NO.	E5517D01H000

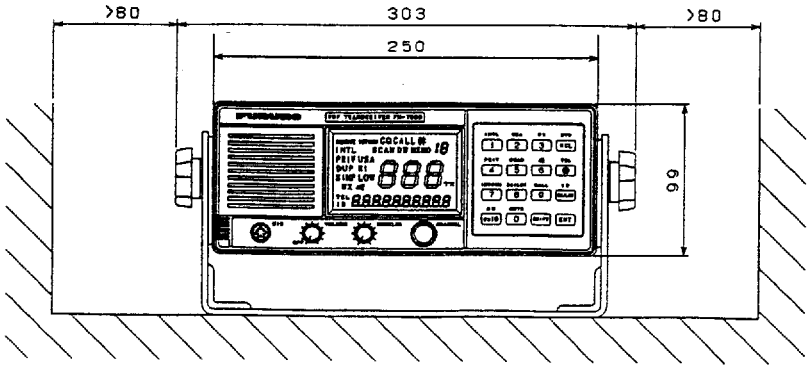
FURUNO

D – 2







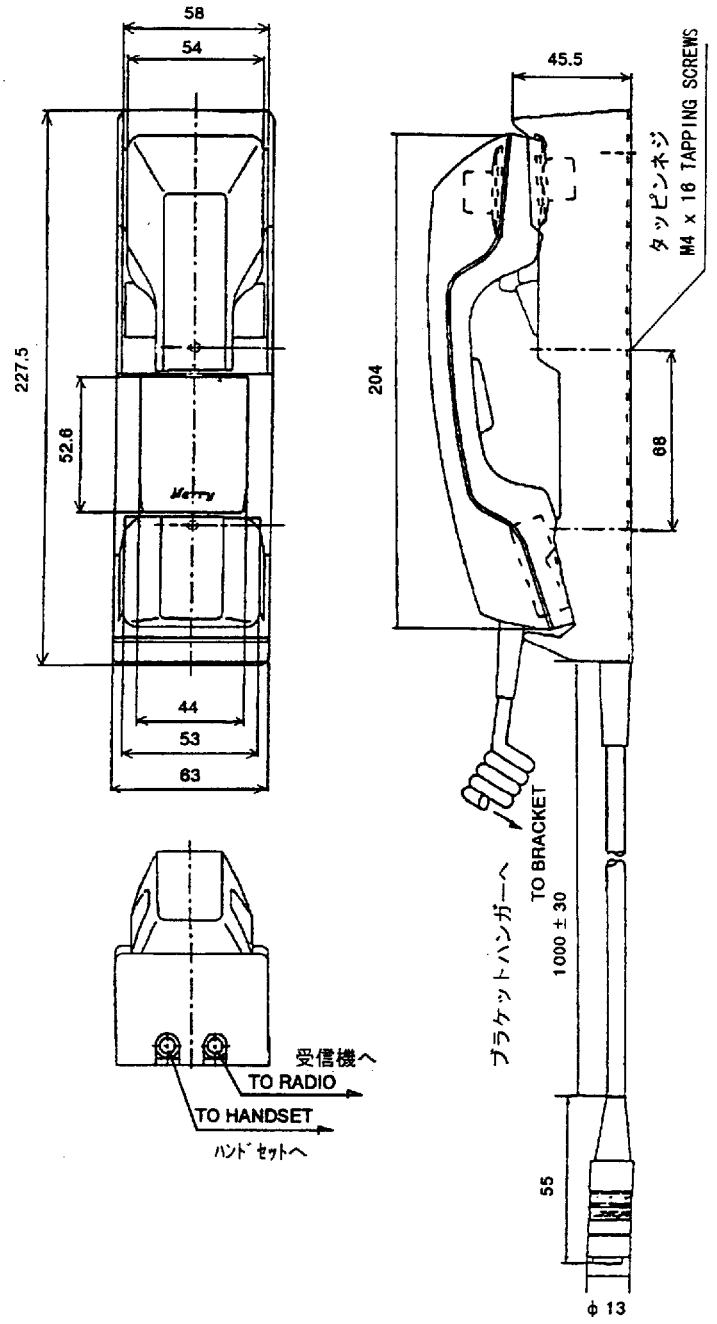


FM-7000

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

承認 APPROVED	MAR.23.'90 T.NAKAUO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	国際 VHF 無線電話装置
検図 CHECKED	MAR.23.'90 M.IKEDA	尺度 SCALE	—	FM-7000	MARINE VHF RADIOTELEPHONE
製図 DRAWN	Mar.23.'90 S.Nishi	重量 WEIGHT	4.6 kg	図番 DWG.NO.	C5517 - G01 - C

FURUNO ELECTRIC CO., LTD.



DRAWN Mar. 11 '97 T. YAMASAKI		FS15**ETC FM8000 FM7000 FM2677/78 FM2610 FM2510		TYPE HSC701K-BX21
CHECKED Mar. 12. '97 T. SHISHIDO				名称 ハンドセット
APPROVED Mar. 12. '97 T. Yamazaki				外寸図
SCALE 1/4	MASS 0.65 kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME HANDSET REST
DWG NO. C5603-G06- B				OUTLINE DRAWING

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FURUNO

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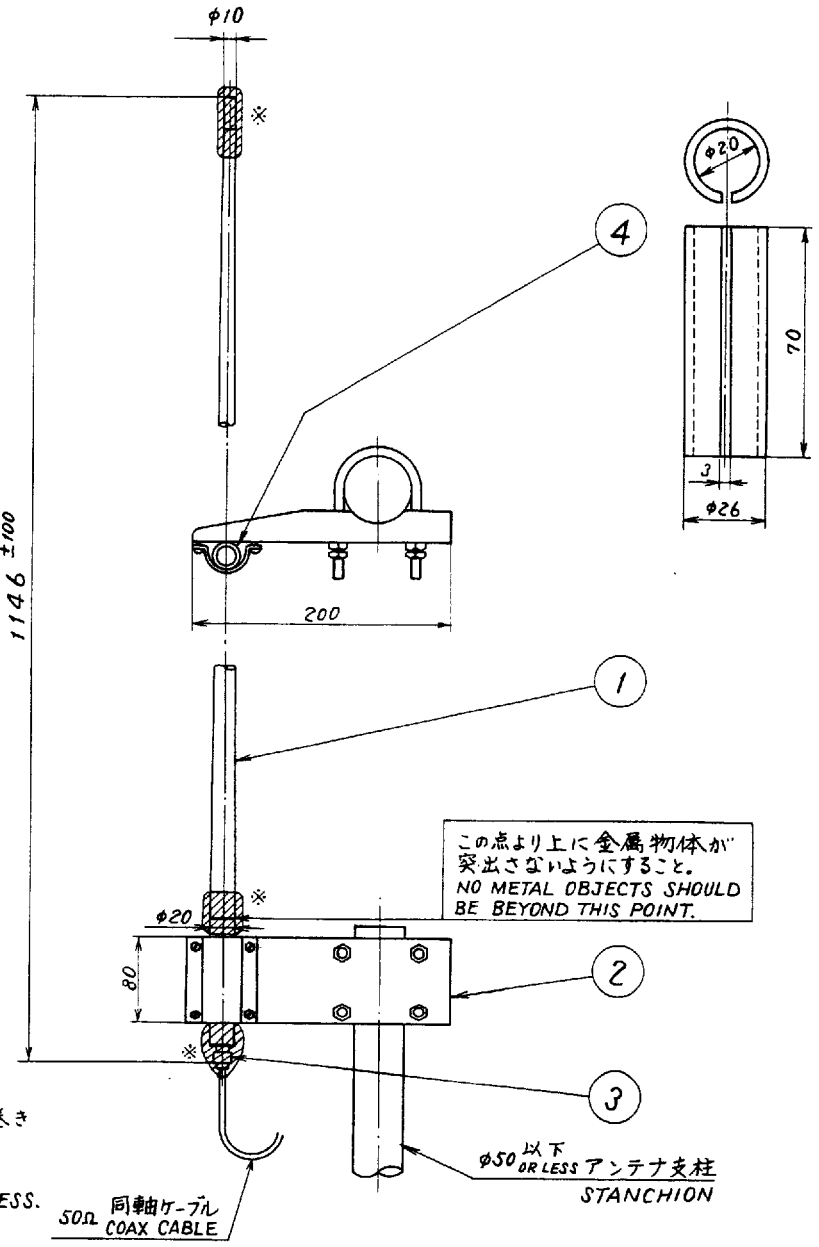

※ 斜線部は自己融着テープを巻き
更にビニールテープを巻いて
防水処理を行なうこと。
TAPING FOR WATERTIGHTNESS.

ITEM	NAME	MATERIAL	Q'TY	DWG. NO.	REMARKS
4	固定用パイプ LINER PIPE	硬質塩ビ VINYL CHLORIDE	1		
3	同軸コネクタ COAX CONNECTOR		1		M-R
2	アンテナ取付金具 ANTENNA BRACKET	SUS	1 式 SET	4-310071	0.6 kg
1	アンテナ棒 ANTENNA ELEMENT	FRP	1		0.25 kg

承認 APPROVED	JUL. 7 '80	三角法 THIRD ANGLE PROJECTION	名称 TITLE: FAB-151D 150MHz アンテナ外観図 VHF MARINE ANTENNA
検図 CHECKED	Jun. 8 '80 K. Kobayashi	尺度 SCALE	
製図 DRAWN	July. 8 '80	重量 WEIGHT: 0.85 kg	図番 DWG. NO.: C5013-019-F (4-110718)

FURUNO ELECTRIC CO., LTD.

FURUNO

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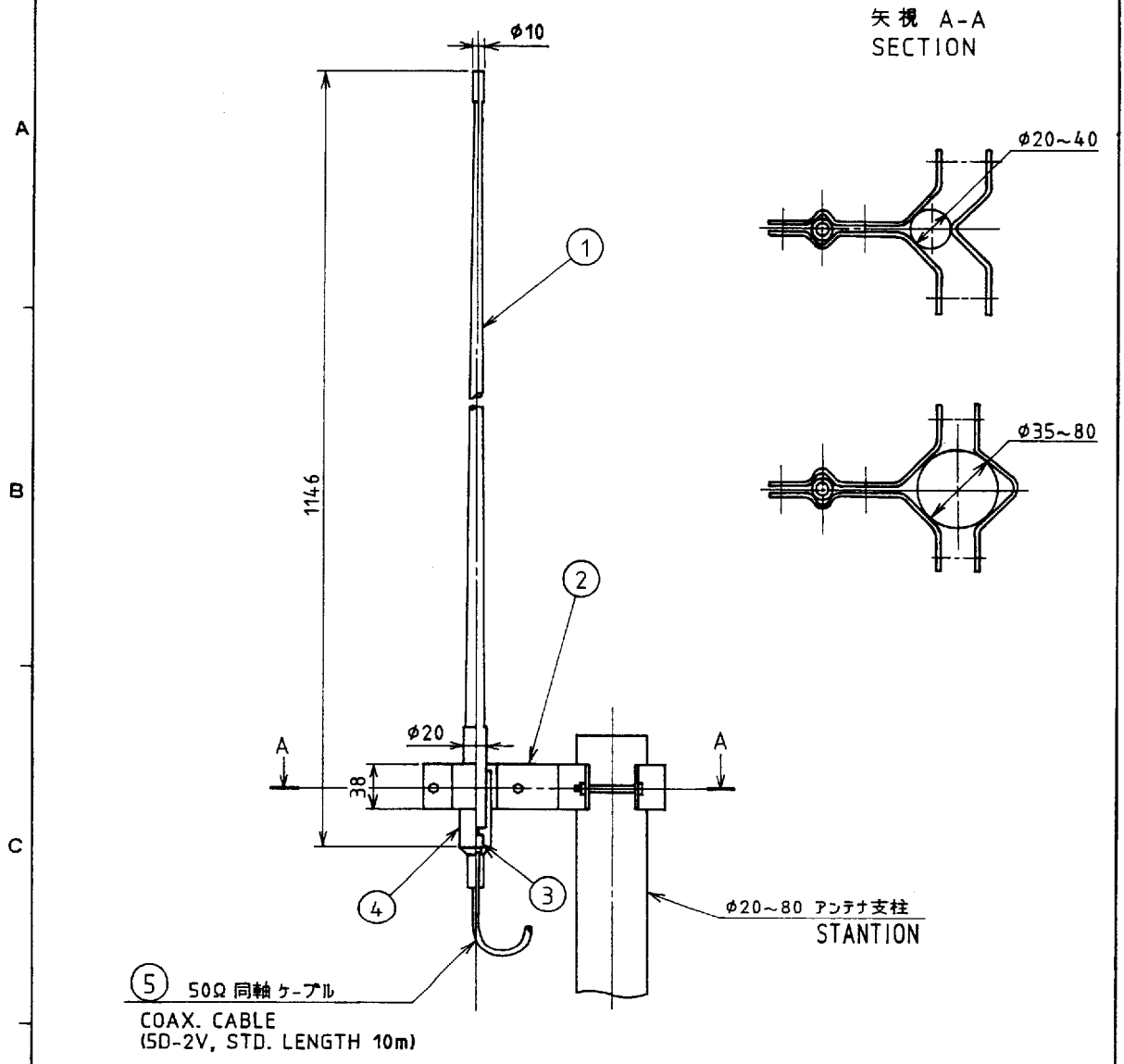

ITEM	NAME	MATERIAL	Q'TY	DWG.NO.	REMARKS
5	同軸ケーブル 50Ω COAX. CABLE		10m	5D-2V	
4	塩ビキャップ CONNECTOR CAP		1		
3	同軸コネクタ COAX. CONNECTOR		2	M-P-5	
2	アンテナ取付金具 ANTENNA BRACKET		式 1 SET		t2
1	アンテナ棒 ANTENNA ELEMENT	FRP	1	150M-W2VN	0.25kg

承認 APPROVED	OCT・31・'86 T.NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	150M-W2VN 150MHz アンテナ VHF MARINE ANTENNA
検図 CHECKED	OCT・31・'86 M. IKEDA	R 度 SCALE			
製図 DRAWN	Oct・31・'86 M. Banda	重量 WEIGHT	0.7 kg	図番 DWG. NO.	C5011-042-A

FURUNO ELECTRIC CO., LTD.

FURUNO

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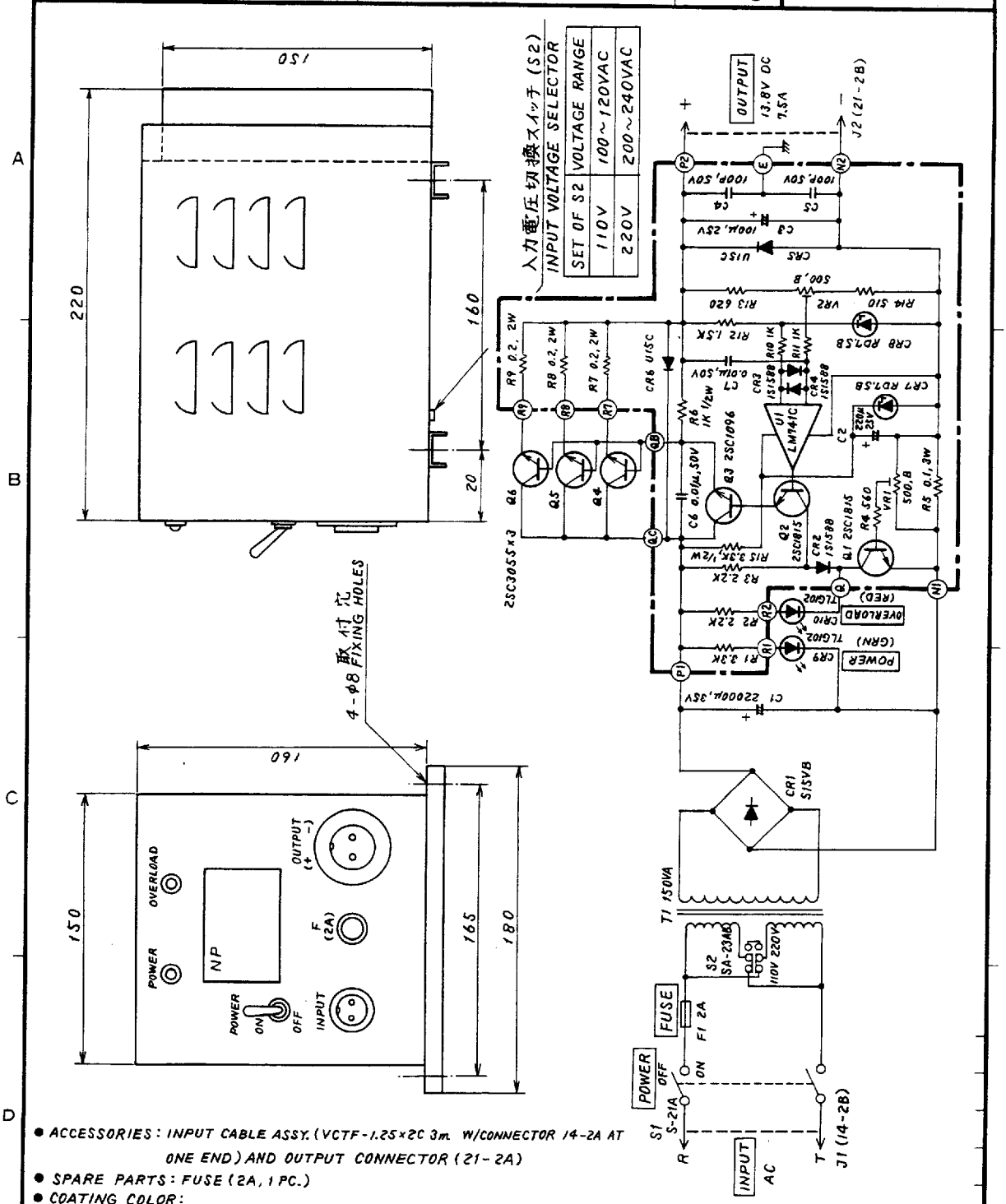

- ACCESSORIES : INPUT CABLE ASSY. (VCTF-1.25×2C 3m W/CONNECTOR 14-2A AT ONE END) AND OUTPUT CONNECTOR (21-2A)
- SPARE PARTS : FUSE (2A, 1 PC.)
- COATING COLOR:
  MUNSELL N3.0 (PANEL)
  MUNSELL N6.0 (COVER)

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

承認 APPROVED	Aug. 17. '84	三角法 THIRD ANGLE PROJECTION	名称 TITLE	PR-101 (12V, 100W) 整流器 RECTIFIER	
検図 CHECKED	Aug. 17. '84	尺度 SCALE			
製図 DRAWN	Aug. 17. '84	重量 WEIGHT	6 kg	図番 DWG.NO.	C5003-035-B

FURUNO ELECTRIC CO., LTD.

FURUNO

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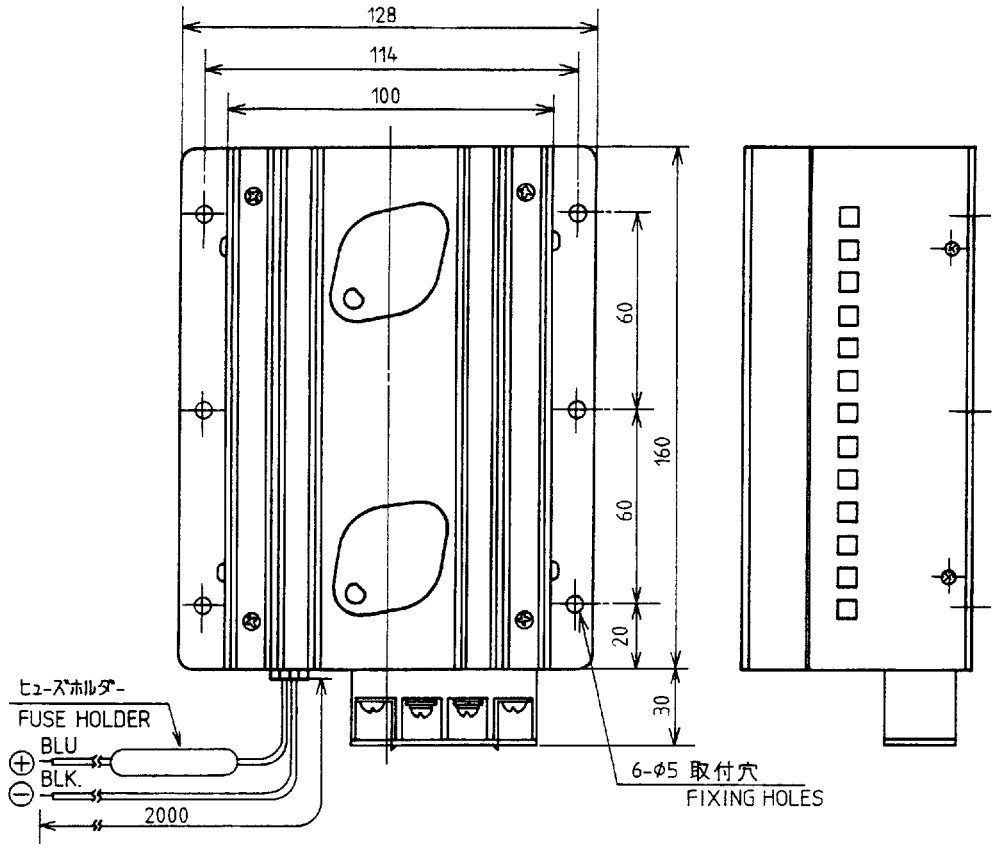

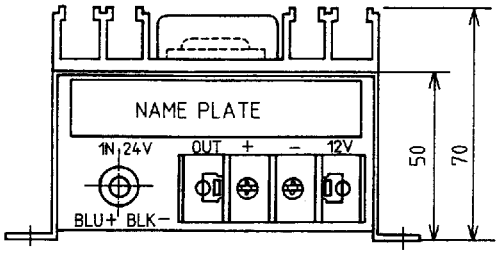

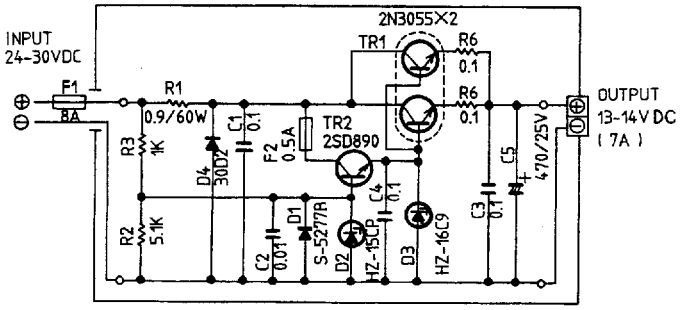

COMPASS SAFE DISTANCE

STANDARD	0.5m
STEERING	0.4m

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

承認 APPROVED	DEC 3 '87 T. NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	DC-DC コンバータ CONVERTER (24VDC → 13.6VDC)
検図 CHECKED	Dec. 3 '87 M. IKEDA	尺度 SCALE	∝	PC-208	
製図 DRAWN	Dec 3 '87 S. Nishi	重量 WEIGHT	1.3 kg	図番 DWG.NO.	C5006-031-B

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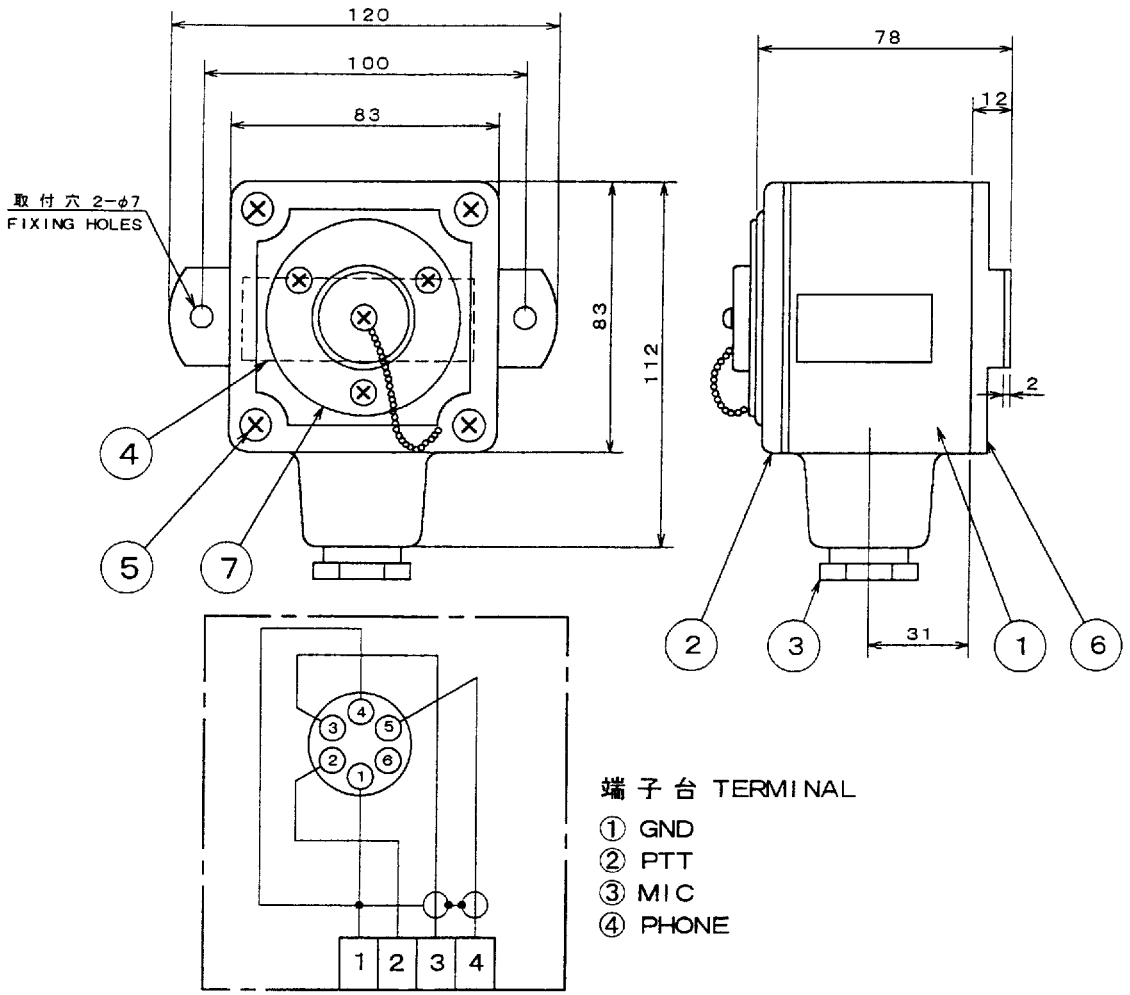

端子台 TERMINAL

① GND
② PTT
③ MIC
④ PHONE

塗装色
COATING COLOR

MUNSELL 2.5G7/2

指定 SPECIFIED

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG NO	摘要 REMARKS
7	レセプタクル用 RECEPTACLE		1	FM−10RS (1) −6HA	
6	取付板 MOUNTING PLATE	鉄 SS	1		
5	固定ネジ SCREW	真鍮 BS	4		
4	端子台 TERMINAL		1		JIS F8813 C20−4
3	ケーブルグランド CABLE GLAND	真鍮 BS	1		JIS F8801 B25
2	蓋 COVER	ステンレス SUS	1		
1	ケース BODY	FRP (DMC)	1		

DRAWN	Dec. 25 '96 K.Kusunoki	TITLE	RBD−VHF−B (FOR HS−6000−FZ5/11)
CHECKED	Dec. 25. '96 T. Shishido	名称	マイクレセプタクルボックス
APPROVED	Dec 25 '96 K. OTA		外寸図
SCALE	1/2	NAME	MIC RECEPTACLE BOX
MASS	0.6 kg		OUTLINE DRAWING
DWG No.	C5517−G08−D		

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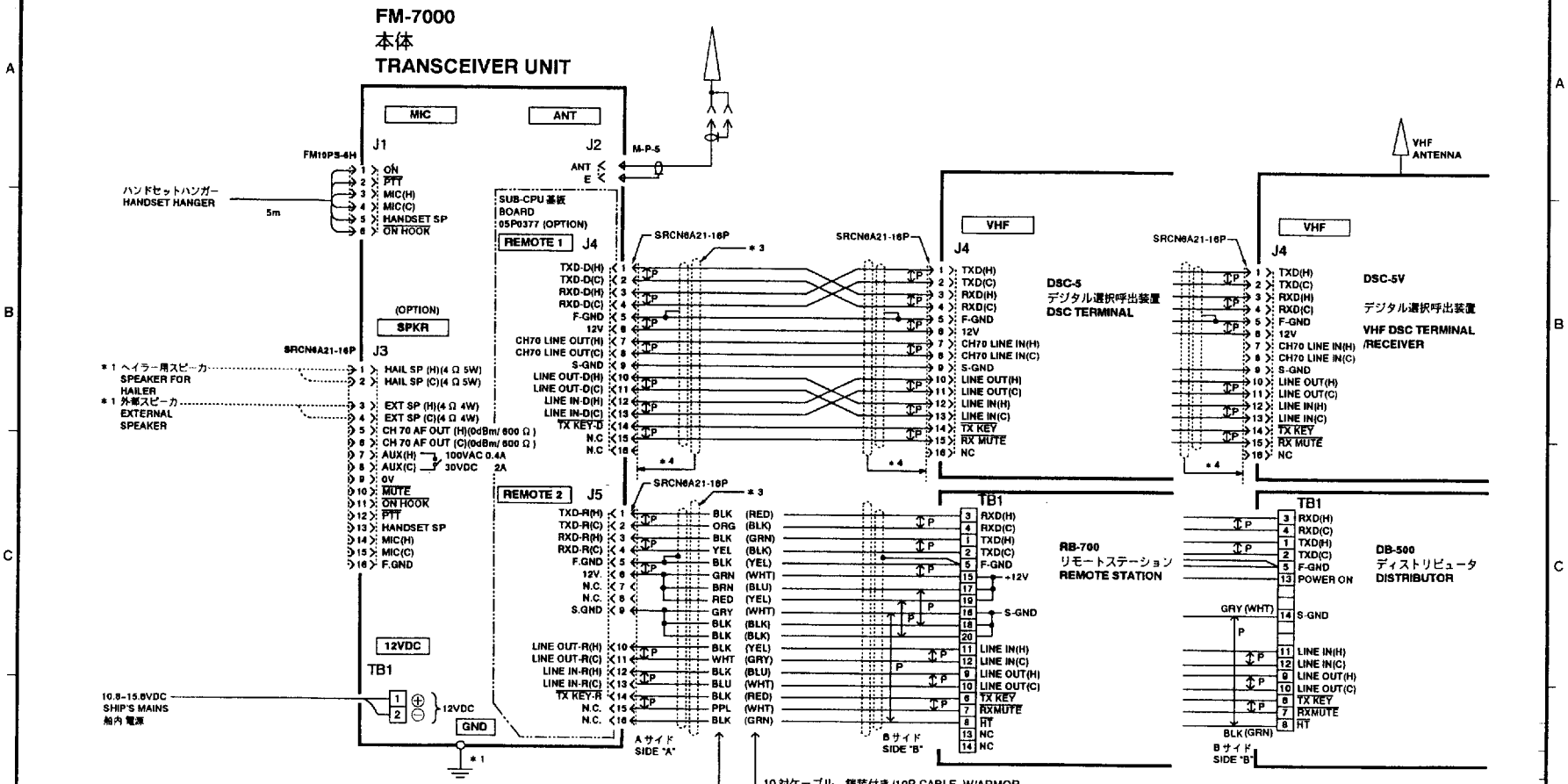
FURUNO

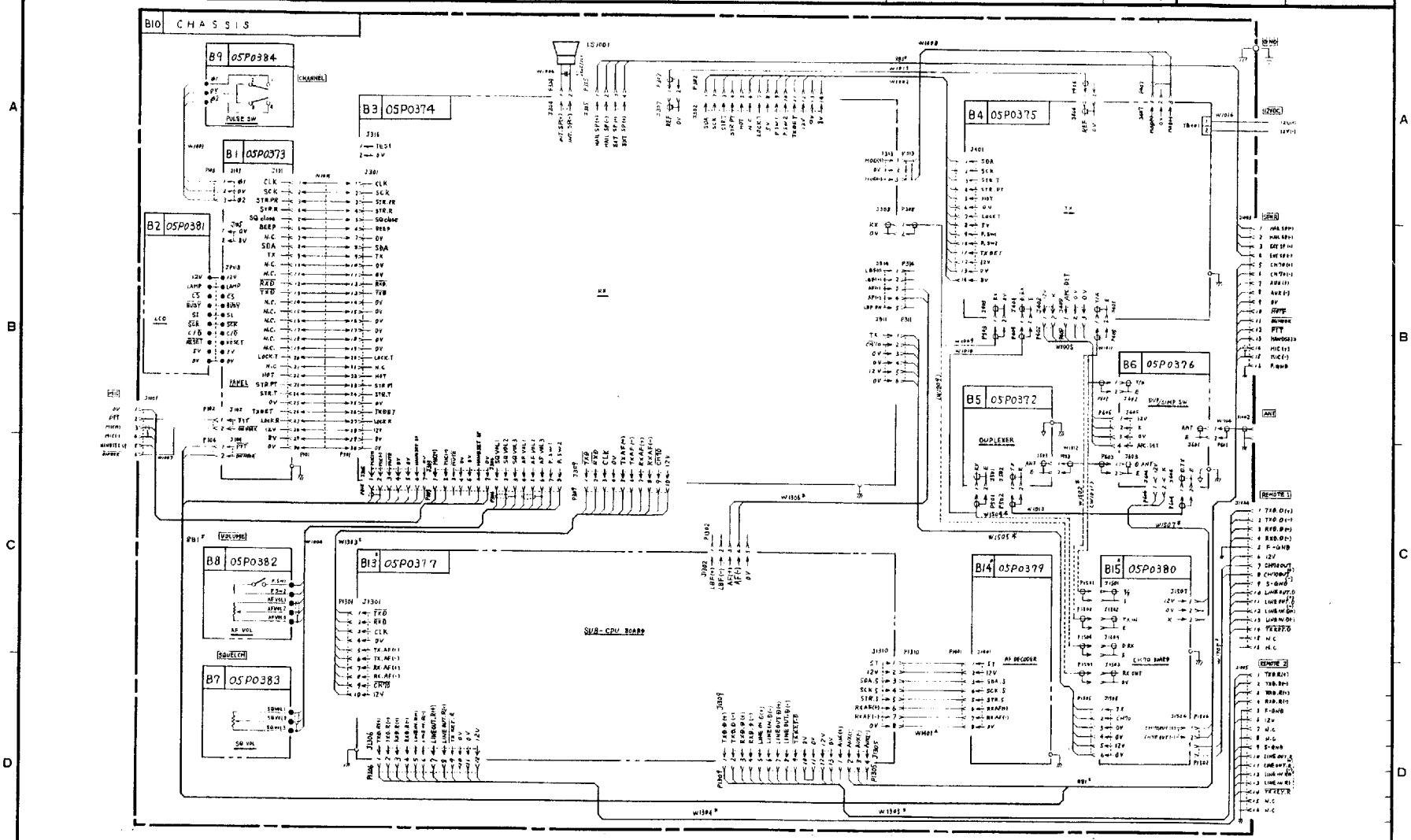


* 1: 造船所支給 / SHIPYARD SUPPLY
* 2: "P" はツイストペア線 / "P" DENOTES TWISTED-PAIR.
* 3: シールド付ペアケーブルを使用すること。
10対ケーブル (コネクターなし 又は両端コネクター付) をオプション支給可。(鎧装付きのものもオプション支給可。)
16P コネクター内の結線 (線色) は C5522-Y01 を参照。
USE TWISTED PAIR CABLE WITH SHIELD. 10P TWISTED PAIR CABLE (WITHOUT CONNECTOR OR WITH CONNECTORS AT BOTH ENDS) CAN BE OPTIONALLY SUPPLIED (VINYL SHEATHED ARMORED CABLE CAN ALSO BE SUPPLIED). INNER CONNECTIONS OF 16P CONNECTOR ARE SHOWN IN DWG. No. C5522-Y01.
* 4: 鎧装ケーブルの場合は、鎧装をコネクタのクランプ経由でアースに落とす。
WHEN ARMORED CABLE IS USED, GROUND CABLE ARMOR THROUGH CONNECTOR CLAMP.

承認 APPROVED	SEP・9・'91 T.SAKAMOTO	名称 TITLE	相互結線図 INTERCONNECTION DIAGRAM
検図 CHECKED	Sep・9・'91 M.IKEDA	FM-7000	
製図 DRAWN	Sep・9・'91 M.OSAKO	図番 DWG.NO.	C5517 – C01 – G

FURUNO ELECTRIC CO., LTD.

S-1-1



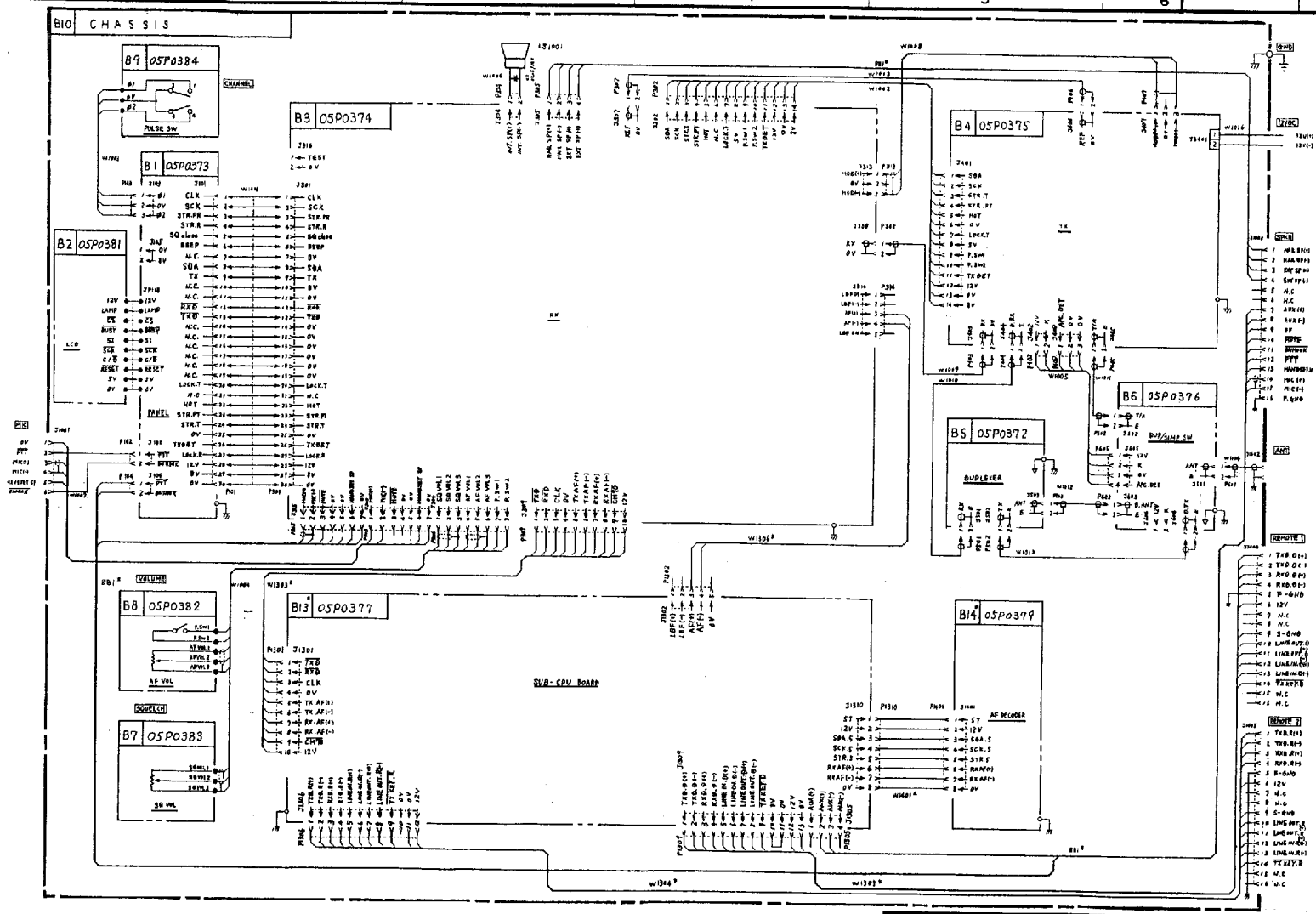
NOTE 1: * 印の基板とケーブルはオプション。
BOARDS AND CABLES MARKED * ARE OPTIONAL SUPPLY.
2: 破線は、オプションの基板を装備した時の結線。
DASHED LINES IS CONNECTION WHEN THE OPTIONAL BOARDS ARE INSTALLED.

FM-7000

承認 APPROVED	MAR・23・'90 T.NAKAJO	名称 TITLE	総合回路図
検図 CHECKED	MAR・23・'90 M.IKEDA	FM-7000	GENERAL SCHEMATIC DIAGRAM
製図 DRAWN	MAR・23・'90 S.Nishi	図番 DWG. NO.	C5517-K02-C

FURUNO ELECTRIC CO., LTD.

FURUNO



NOTE 1: * 印の基板とケーブルはオプション。
BOARDS AND CABLES MARKED * ARE OPTIONAL SUPPLY.
2: 破線は、オプションの基板を装備した時の結線。
DASHED LINES IS CONNECTION WHEN THE OPTIONAL BOARDS ARE INSTALLED.

CH70基板未装備
NO CH70 BOARD

承認 APPROVED	Sep・9・'91 T.NAKANO	名称 TITLE	総合回路図
検図 CHECKED	Sep・9・'91 M.IKEDA	FM-7000	GENERAL SCHEMATIC DIAGRAM
製図 DRAWN	Sep・9・'91 M OSAKO	図番 DWG.NO.	C5517-K12-A

FURUNO ELECTRIC CO., LTD.

MARINE VHF CHANNEL FREQUENCIES

INTERNATIONAL CHANNELS

CH	TX	RX	CH	TX	RX
01	156.050	160.650	60	156.025	160.625
02	156.100	160.700	61	156.075	160.675
03	156.150	160.750	62	156.125	160.725
04	156.200	160.800	63	156.175	160.775
05	156.250	160.850	64	156.225	160.825
06	156.300	156.300	65	156.275	160.875
07	156.350	160.950	66	156.325	160.925
08	156.400	156.400	67	156.375	156.375
09	156.450	156.450	68	156.425	156.425
10	156.500	156.500	69	156.475	156.475
11	156.550	156.550	70	156.525	156.525
12	156.600	156.600	71	156.575	156.575
13	156.650	156.650	72	156.625	156.625
14	156.700	156.700	73	156.675	156.675
15	156.750	156.750	74	156.725	156.725
16	156.800	156.800	77	156.875	156.875
17	156.850	156.850	78	156.925	161.525
18	156.900	161.500	79	156.975	161.575
19	156.950	161.550	80	157.025	161.625
20	157.000	161.600	81	157.075	161.675
21	157.050	161.650	82	157.125	161.725
22	157.100	161.700	83	157.175	161.775
23	157.150	161.750	84	157.225	161.825
24	157.200	161.800	85	157.275	161.875
25	157.250	161.850	86	157.325	161.925
26	157.300	161.900	87	157.375	161.975
27	157.350	161.950	88	157.425	162.025
28	157.400	162.000			

(MHz)

USA CHANNELS

CH	TX	RX	CH	TX	RX
01A	156.050	156.050	60	156.025	160.625
02A	156.100	156.100	61	156.075	160.675
03A	156.150	156.150	62	156.125	160.725
04A	156.200	156.200	63A	156.175	156.175
05A	156.250	156.250	64	156.225	160.825
06	156.300	156.300	65A	156.275	156.275
07A	156.350	156.350	66A	156.325	156.325
08	156.400	156.400	67	156.375	156.375
09	156.450	156.450	68	156.425	156.425
10	156.500	156.500	69	156.475	156.475
11	156.550	156.550	70	156.525	156.525
12	156.600	156.600	71	156.575	156.575
13	156.650	156.650	72	156.625	156.625
14	156.700	156.700	73	156.675	156.675
15		156.750	74	156.725	156.725
16	156.800	156.800	77	156.875	156.875
17	156.850	156.850	78A	156.925	156.925
18A	156.900	156.900	79A	156.975	156.975
19A	156.950	156.950	80A	157.025	157.025
20	157.000	161.600	81A	157.075	157.075
21A	157.050	157.050	82A	157.125	157.125
22A	157.100	157.100	83A	157.175	157.175
23A	157.150	157.150	84	157.225	161.825
24	157.200	161.800	85	157.275	161.875
25	157.250	161.850	86	157.325	161.925
26	157.300	161.900	87	157.375	161.975
27	157.350	161.950	88A	157.425	157.425
28	157.400	162.000			

(MHz)

WEATHER CHANNELS

CH	RX
WX0	162.550
WX1	162.400
WX2	162.475
WX3	162.425
WX4	162.450
WX5	162.500
WX6	162.525
WX7	161.650
WX6	161.775
WX9	163.275

(MHz)

MEMORY CHANNEL LIST

MEMO NO.	CHANNEL			REMARKS
0	INTL	USA		
	WX	PRIV		
1	INTL	USA		
	WX	PRIV		
2	INTL	USA		
	WX	PRIV		
3	INTL	USA		
	WX	PRIV		
4	INTL	USA		
	WX	PRIV		
5	INTL	USA		
	WX	PRIV		
6	INTL	USA		
	WX	PRIV		
7	INTL	USA		
	WX	PRIV		
8	INTL	USA		
	WX	PRIV		
9	INTL	USA		
	WX	PRIV		
10	INTL	USA		
	WX	PRIV		
11	INTL	USA		
	WX	PRIV		
12	INTL	USA		
	WX	PRIV		
13	INTL	USA		
	WX	PRIV		
14	INTL	USA		
	WX	PRIV		
15	INTL	USA		
	WX	PRIV		
16	INTL	USA		
	WX	PRIV		
17	INTL	USA		
	WX	PRIV		
18	INTL	USA		
	WX	PRIV		
19	INTL	USA		
	WX	PRIV		