FURUNO®

INSTALLATION MANUAL
COLOR DGPS/PLOTTER/SOUNDER
GP-1850DF
COLOR GPS/PLOTTER/SOUNDER
GP-1850F

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(HIMA)

⚠ SAFETY INSTRUCTIONS

Safety Instructions for the Installer

⚠ WARNING

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

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

Turn off the power at the mains switchboard before beginning the installation. Post a sign near the switch to indicate it should not be turned on while the equipment is being installed.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

⚠ 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 can 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.

Keep the following compass safe distance.

	Standard	Steering
Display Unit	0.98 m	0.74 m

When handling the transducer cable, keep in mind the following points.

- **Keep the cable away from oil and fuel.**
- **Keep the cable away from the place where it may be damaged during the installation.**
- **Do not paint the cable.**

The sheath of the transducer cable is made of chlorophrene rubber (or vinyl chloride). Therefore, do not paint the sheath with organic liquid (such as toluene) since it may harm the sheath.

Equipment Lists

Standard supply

No.	Name	Type	Code No.	Qty	Remarks
1	Display unit	GP-1850F-E	-	1	for GP-1850F
		GP-1850DF-E	-		for GP-1850DF
2	Antenna unit	GPA-017	-	1	for GP-1850F
		GPA-018	-		for GP-1850DF
		GPA-019	-		for GP-1850DF
3	Transducer	520-5PSD	000-015-125	1	for 600W output, select one.
		520-5PWD	000-015-126		
		520-5MSD	000-015-127		
4	Spare parts	SP14-02501	004-375-260	1	Fuse
5	Installation materials	CP14-05200	000-041-496	1	Power cable, Cable assy.
6	Accessories	FP14-02401	004-375-270	1	Hard cover
		FP14-02402	004-376-150	1	Screws, output mark label, rubber cushion

Optional equipment

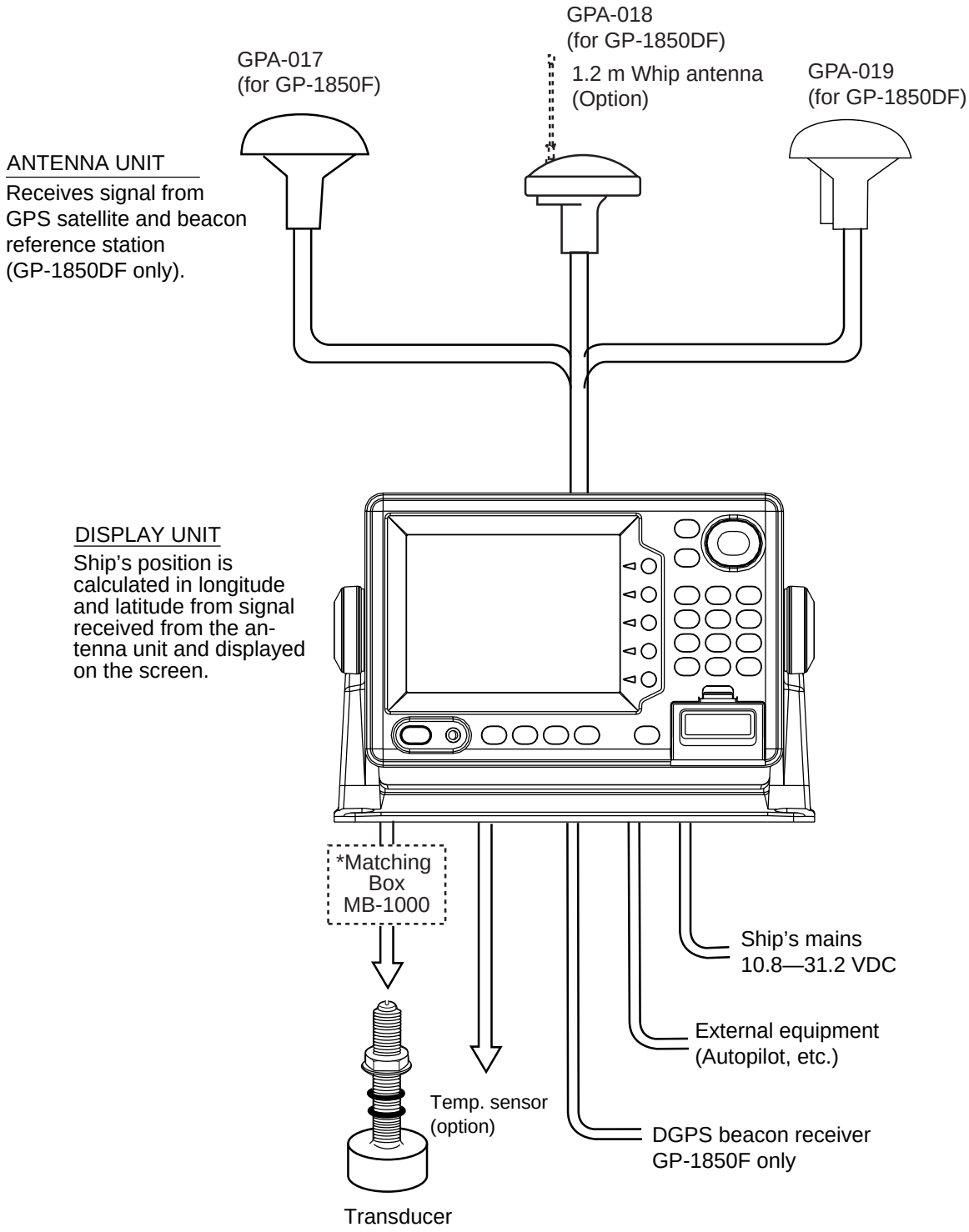
NO.	Name	Type	Code No.	Remarks
1	Beacon receiver kit	GR-802-1850-10A-018	000-041-498	GPA-018, GR-7000A, whip antenna
		GR-802-1850-10N-018	000-041-504	GPA-018, GR-7000A
		GR-902-1850-15A-018S	000-041-499	GPA-018S, GR-7000A, whip antenna
		GR-802-1850-15N-018S	000-041-505	GPA-018, GR-7000A
		GP-802-1850-10N-019	000-041-648	GPA-019, GR-7000A
		GR-902-1850-15N-019S	000-041-649	GPA-019S, GR-7000A
2	Antenna cable assy.	TNC-PS-3D-15	000-133-670	15m, for antenna cable extension
3	Antenna cable set	CP20-01700	004-372-110	30m, for antenna cable extension
		CP20-01710	004-372-120	50m, for antenna cable extension
4	Cable Assy.	MJ-A7SPF0003-050	000-136-730-01	
5	Mast mount fixture	CP20-0111	004-365-780	
6	Right-angle antenna base	No.13-QA330	000-803-239	for mounting antenna unit
7	L-angle antenna base	No.13-QA310	000-803-240	
8	Antenna base for rail mounting	No.13-RC5160	000-806-114	

Optional equipment (con't)

No.	Name	Type	Code No.	Remarks
9	Antenna unit	GPA-018S	000-041-462	for GP-1850DF
		GPA-016	000-041-536	for GP-1850F
		GPA-019S	000-041-554	for GP-1850DF
10	Transducer	520-5PSD	000-015-125	for 600 W
		520-5PWD	000-015-126	w/8m cable transom mount, for 600 W
		520-5MSD	000-015-127	w/8m cable and water proof connector, for 600 W
		50/200-1T	000-015-170	for 1 kW
11	Cable assy	02S4092	000-134-484	for 1 kW transducer connection
12	Matching box	MB-1000	000-040-809	for 1 kW transducer connection
13	ST sensor	ST-02MSB	000-137-986	Thru-hull type
		ST-02PSB	000-137-987	w/8m cable, thru-hull type
14	Inner hull kit S	No.13-QA330	000-803-240	for mounting antenna unit
15	Temperature sensor	T-02MTB	000-040-026	
		T-02MSB	000-040-040	
		T-03MSB	000-040-027	
16	Triducer	524ST-MSD	000-015-224	for 600 W
		525ST-MSD	000-015-263	
		520ST-PWD	000-015-128	for 600 W
		525ST-PWD	000-015-261	
17	Converter connection	02S4147	000-141-082	
18	Rectifier	PR-62	000-013-484	for 100VAC
			000-013-485	for 110 VAC
			000-013-486	for 220 VAC
			000-013-487	for 230 VAC
19	Cable assy.	MJ-A6SPF0011-050	000-132-244	for connection radar, 6P-4P, 5m
		MJ-A6SPF0011-100	000-132-336	for connection radar, 6P-4P, 10m
		MJ-A6SPF0012-050	000-134-424	for navaid or E/S, 6P-6P, 5m
		MJ-A6SPF0012-100	000-133-817	for navaid or E/S, 6P-6P, 10m
20	Whip antenna	FAW-1.2	000-136-046	for GP-1850DF
21	Remote controller	RMC-185F-E	004-375-320	Controller, vinyl cover, battery
22	RAM Card	00RAM02MC-004	004-371-790	2MB
23	DGPS Beacon Receiver	GR-80	-	for GP-1850F

System Configuration

The GP-1850F/1850DF mainly consists of a display unit, a GPS antenna and a dual frequency transducer. A DGPS beacon receiver is provided inside the display unit for GP-1850DF type. The mini chart card drive in the display unit loads electronic charts. External equipment which can be connected include water temperature and speed sensors, autopilot, and DGPS beacon receiver (GP-1850F).



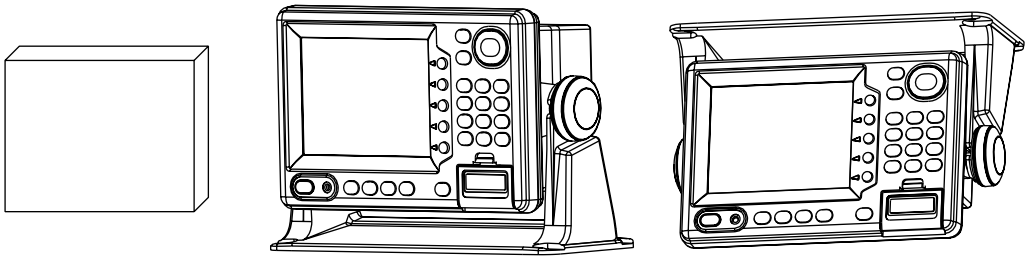
*Required for 1 kW transducer only

1. Installation of Standard Equipment

1.1 Installation of Display Unit

Mounting considerations

The display unit can be installed on a tabletop, on the overhead or flush mounted in a console or panel.



Hard Cover Tabletop Overhead

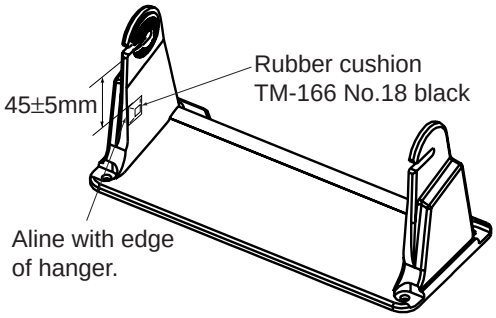
Figure 1-1 Tabletop, overhead mounting methods

When selecting a mounting location for the display unit keep the following in mind:

- Keep the display unit out of direct sunlight.
- The temperature and humidity should be moderate and stable.
- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Keep the unit away electromagnetic field generating equipment such as motor, generator.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the unit and leave slack in cables.
- A magnetic compass will be affected if placed too close to the display unit. Observe the following compass safe distances to prevent disturbance to the magnetic compass:

  Standard compass: 0.98 meters
  Steering compass: 0.74 meters

- Rubber cushions which absorb vibration (supplied) may be attached as below if vibration is a problem.



Mounting procedure

Follow the procedure below to mount the display unit on a tabletop or the overhead.

Tabletop, overhead mounting

1. Fix the hanger by four tapping screws M5 X 16.
2. Screw knob bolts in display unit, set it to hanger, and tighten knob bolts.
3. Attach hard cover to protect LCD.

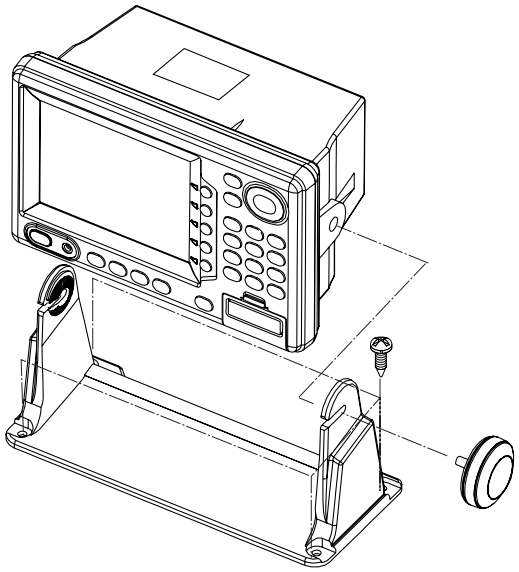
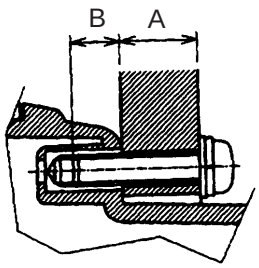


Figure 1-2 Tabletop, overhead mounting of display unit

Flush mounting

Note: Use supplied pan head screws when the thickness of the bulkhead is from 11 to 14 mm. For bulkhead which exceeds 14 mm in thickness the length of the pan head screws should be bulkhead thickness plus 7.3±1.5 mm. Also the length of B below should max. 7 mm.



1. Prepare a cutout in the mounting location whose dimensions are as shown in Figure 1-3.
2. Fix the display unit by six pan head screws. Refer to the outline drawing on page D-2.

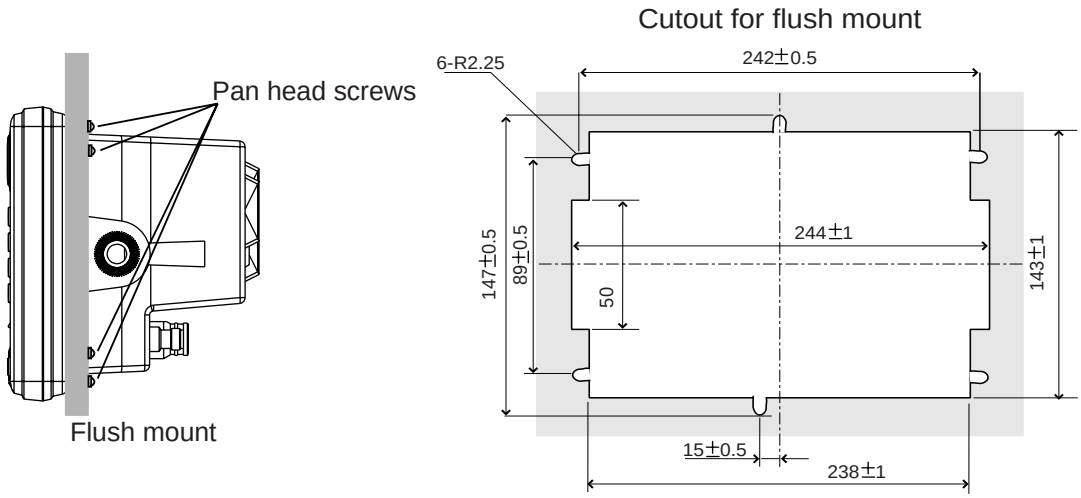


Figure 1-3 Flush mounting of display unit

1.2 Installation of Antenna Unit

Mounting considerations

Install the antenna unit referring to the installation diagram on page D-3 or D-4. When selecting a mounting location for the antenna unit, keep in mind the following points:

- Select a location out of the radar beam. The radar beam will obstruct or prevent reception of the GPS satellite signal.
- The location should be well away from a VHF antenna. A GPS receiver is interfered by a harmonic wave of a VHF antenna.
- There should be no interfering object within the line-of-sight to the satellites. Objects within line-of-sight to a satellite, for example, a mast, may block reception or prolong acquisition time.
- Mount the antenna unit as high as possible. Mounting the antenna unit as high as possible keeps it free of interfering objects and water spray, which can interrupt reception of GPS satellite signal if the water freezes.
- The length of the whip antenna for the GP-1850DF should be no longer than 1.2 meter to prevent antenna damage. **Do not use a 2.5 meter whip antenna.**
- If the antenna cable is to be passed through a hole which is not large enough to pass the connector, you may unfasten the connector with a needle nose pliers and 3/8-inch open-end wrench. Refasten it as shown in Figure 1-4 after running the cable through the hole.

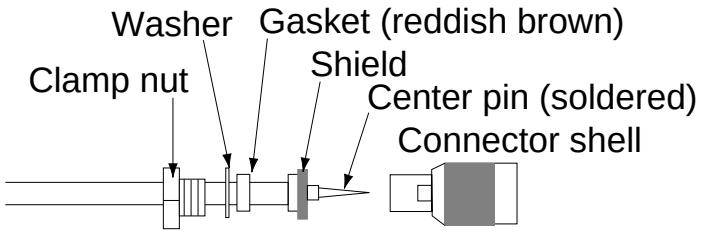


Figure 1-4 How to assemble the connector

1.3 Installation of Transducers

Installing the inside-hull mount transducer

Necessary tools

You will need the following tools:

- Sandpaper (#100)
- Silicone sealant

Remarks on installation

- Do the installation with the boat hauled out of the water.
- Turn off the engine while installing the equipment.
- Install the transducer in the engine room.

Selecting the mounting location

Keep the following points in mind when selecting a mounting location:

- The mounting location should be where the hull is of single-hull thickness and is void of air or flotation materials other than solid fiberglass between the transducer face and the water.
- Do not place the transducer over hull struts or ribes which run under the hull.
- Avoid a location where the rising angle of the hull exceeds 15°, to minimize the effect of the boat's rolling.
- You will finalize the mounting location through some trial and error. The procedure for this is shown later.

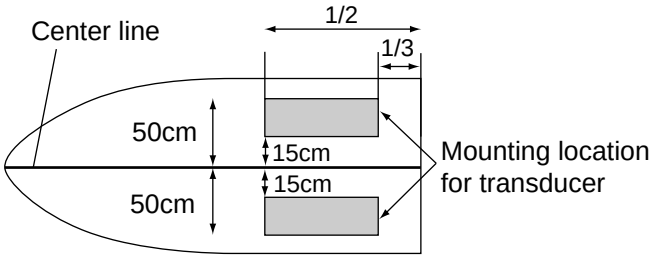


Figure 1-5 Inside-hull transducer mounting location

Attaching the transducer

1. Clean the transducer face to remove any foreign material. Lightly roughen the transducer face with #100 sandpaper. Also, roughen the inside of the hull where the transducer is to be mounted.
2. Warm the silicone sealant to 40°C before usage to soften it. Coat the transducer face and mounting location with silicone sealant.

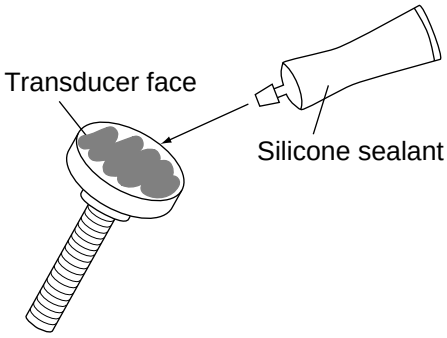


Figure 1-6 Coating the transducer face with silicone sealant

3. Press the transducer firmly down on the hull and gently twist it back and forth to remove any air which may be trapped in the silicone sealant.

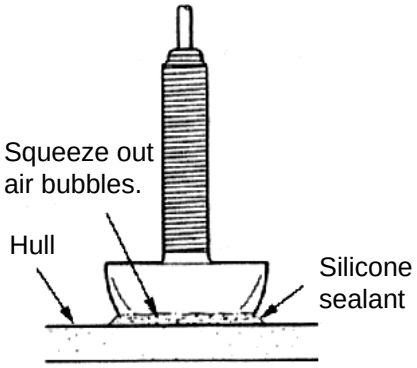


Figure 1-7 Attaching transducer to hull with silicone sealant

Observing the picture

1. Press the [POWER] key to turn on the display unit.
2. Press the [SNDR] key to select the sounder display.
3. Press the soft key labeled "MODE/FREQ" to display the following message.

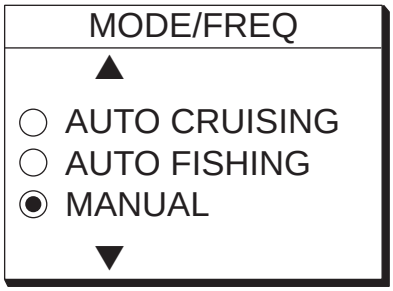


Figure 1-8 MODE FREQ selection screen

4. Select "MANUAL" by the arrow key.
5. Press the soft key labeled "RETURN".
6. Press the soft key labeled "GAIN" to display the following message.

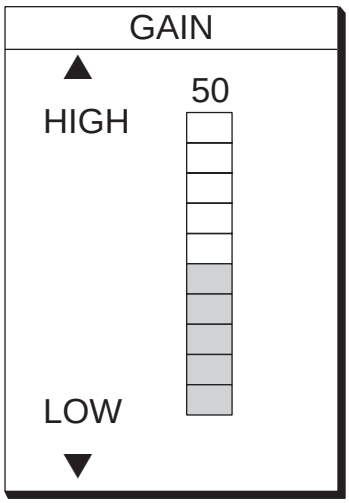


Figure 1-9 GAIN adjustment screen

7. Confirm that Gain is set at 50 (midpoint).
8. Press the soft key labeled "RETURN".
9. Press the soft key labeled "RANGE".
10. Select "15ft" by the [▲] key.
11. Note the depth to the seabed.

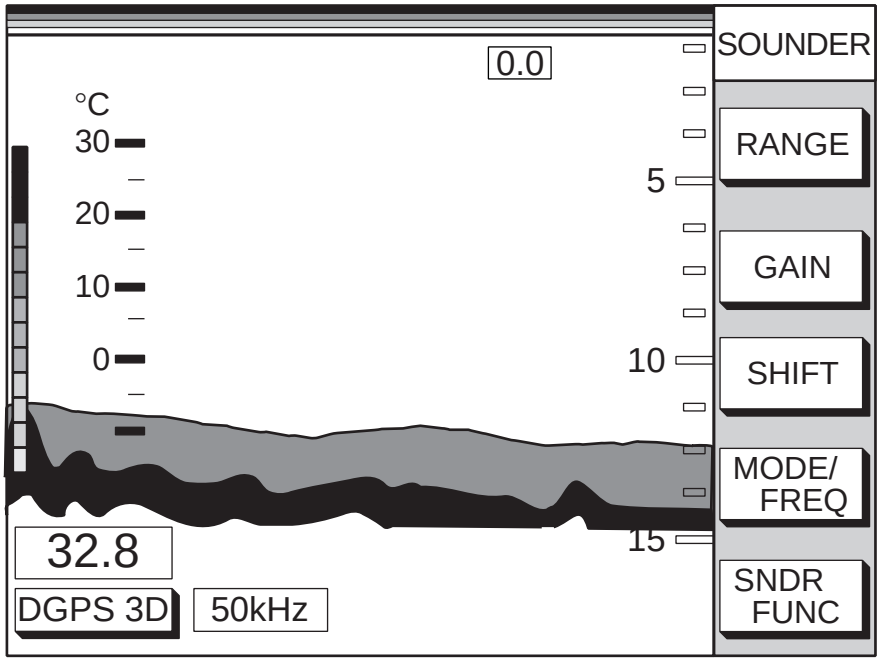


Figure 1-10 Video sounder picture

If the bottom is displayed in red and the light-blue color appears the mounting location is suitable. You can leave the transducer in position.

If the bottom is not displayed in reddish brown, the mounting location is unsuitable. Relocate the transducer and do the following.

1. Press the [POWER] key to turn off the power.
2. Gently dismount the transducer with piece of wood.
3. Do steps 1 through 5 in the previous procedure. Repeat until a suitable location is found.

Final preparation

Support the transducer with a piece of wood to keep it in place wile it is drying. Let the transducer dry 24–72 hours.

Installing the thru-hull mount transducer

Transducer mounting location

This type of mounting provides the best performance of all, since the transducer protrudes from the hull and the effect of air bubbles and turbulence neat the hull skin is reduced. When the boat has a keel, the transducer should be at least 30 cm away from it. Typical through hull mountings are shown in the figure on the next page.

The performance of the video sounder is directly related to the mounting location of the transducer, especially for high-speed cruising. The installation should be planned in advance, keeping the standard cable length (8 m) and the following factors in mind:

- Air bubbles and turbulence caused by movement of the boat seriously degrade the sounding capability of the transducer. The transducer should, therefore, be located in a position where water flow is the smoothest. Noise from the propellers also adversely affects performance and the transducer should not be mounted nearby. The lifting strakes are notorious for creating acoustic noise, and these must be avoided by keeping the transducer inboard of them.
- The transducer must always remain submerged, even when the boat is rolling, pitching or up on a plane at high speed.
- A practical choice would be somewhere between 1/3 and 1/2 of the boat's length from the stern. For planing hulls, a practical location is generally rather far astern, so that the transducer is always in water regardless of the planing attitude.

Transducer outline drawings

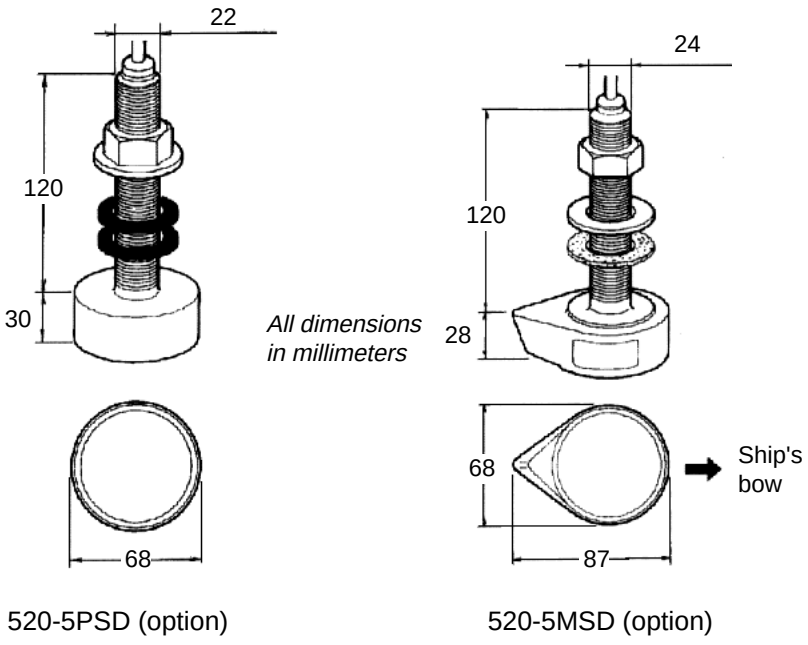
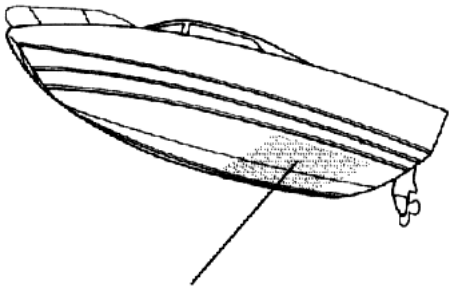


Figure 1-11 Transducer outline drawings

Acceptable transducer mounting locations

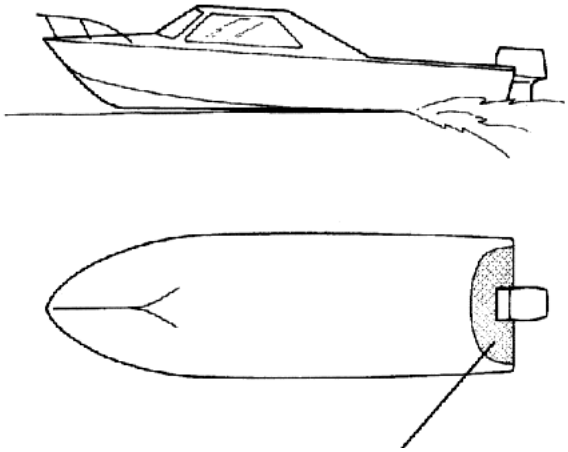
Deep-V hull



• Position 1/2 to 1/3 length of the hull from stern
• 15 to 30 cm off center line (inside first lifting strakes).

Figure 1-12 Transducer mounting location on deep-V hull

High speed V-planing hull



• Within the wetted bottom area
• Deadrise angle within 15°

Figure 1-13 Transducer mounting location on high speed V-planing hull

Typical through-hull mount transducer installations

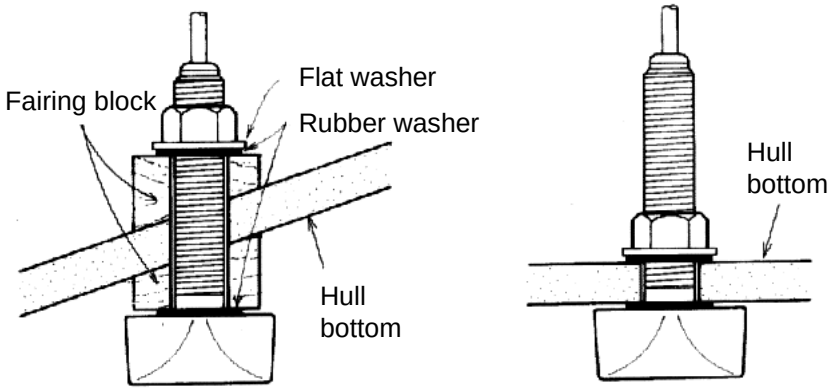


Figure 1-14 Typical through-hull mount transducer installations

Procedure for installing the thru-hull mount transducer

1. With the boat hauled out of the water, mark the location selected for mounting the transducer on the bottom of the hull.
2. If the hull is not level within 15° in any direction, fairing blocks made out of teak should be used between the transducer and hull, both inside and outside, to keep the transducer face parallel with the water line. Fabricate the fairing block as shown below and make the entire surface as smooth as possible to provide an undisturbed flow of water around the transducer. The fairing block should be smaller than the transducer itself to provide a channel to divert turbulent water around the sides of the transducer rather than over its face.

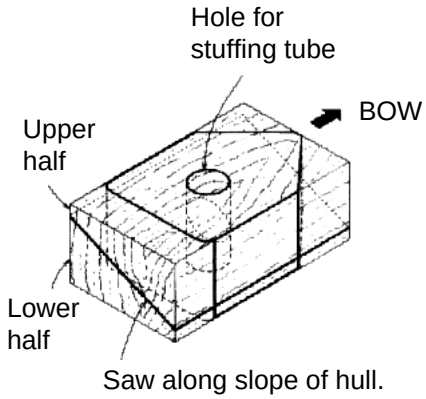


Figure 1-15 Construction of fairing block

3. Drill a hole just large enough to pass the threaded stuffing tube of the transducer through the hull, making sure it is drilled vertically.
4. Apply a sufficient amount of high quality caulking compound to the top surface of the transducer, around the threads of the stuffing tube and inside the mounting hole (and fairing blocks if used) to ensure watertight mounting.
5. Mount the transducer and fairing blocks and tighten the locking nuts. Be sure that the transducer is properly oriented and its working face is parallel to the waterline.

Note: Do not over-stress the stuffing tube and locking nuts through excessive tightening, since the wood block will swell when the boat is placed in the water. It is suggested that the nut be tightened lightly at installation and retightened several days after the boat has been launched.

Installing the transom mount transducer

This type of mounting is very commonly employed, usually on relatively small I/O or outboard boats. Do not use this method on an inboard motor boat because turbulence is created by the propeller ahead of the transducer.

There are two methods of installation: flush with hull (for flat hulls) and projecting from hull (for deep V-hulls).

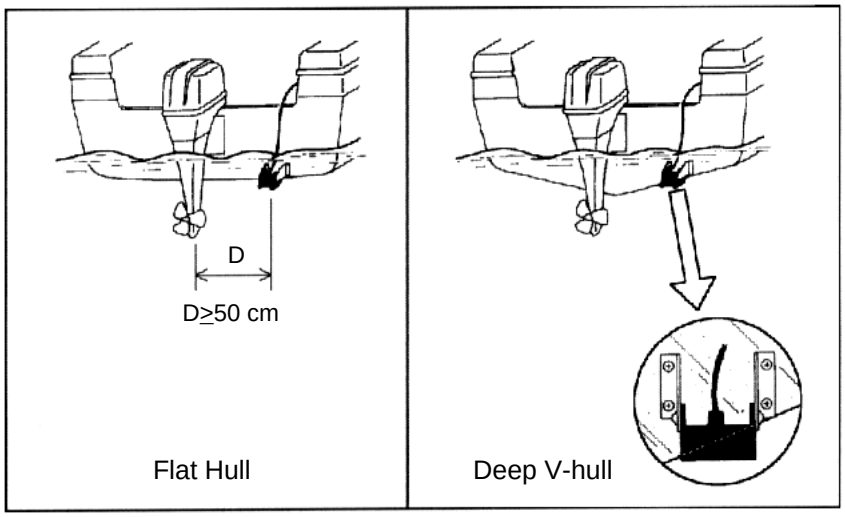


Figure 1-16 Transom mount transducer mounting locations

Installing the transom mount transducer flush with hull (for flat hulls)

A suitable mounting location is at least 50 cm away from the engine and where the water flow is smooth.

1. Drill four pilot holes in the mounting location.
2. Attach the transducer to the bracket with tapping screws (supplied).
3. Adjust the transducer position so the transducer faces right to the seabed.

   Note: If necessary, to improve water flow and minimize air bubbles staying on the transducer face, incline the transducer about 5° at the rear. This may require a certain amount of experimentation for fine tuning at high cruising speeds.

4. Fill the gap between the wedge front of the transducer and transom with epoxy material to eliminate any air spaces.

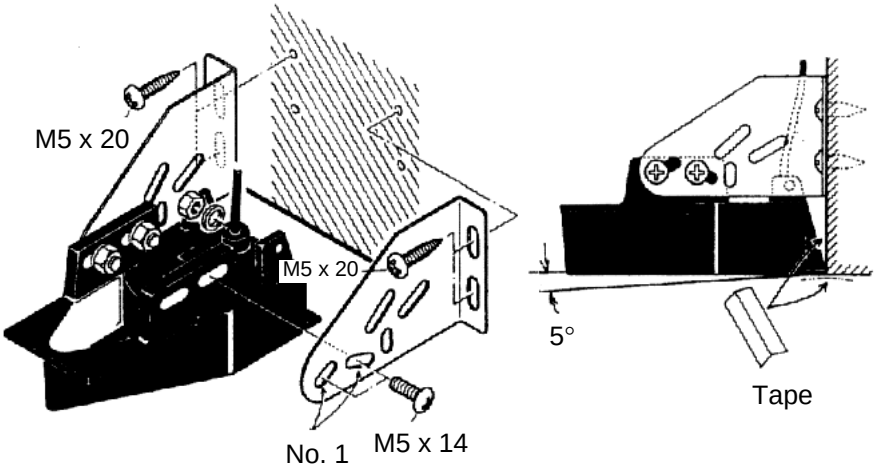


Figure 1-17 Transom mount transducer, mounting flush with hull

Installing the transom mount transducer projecting from hull (for deep-V hulls)

This method is employed on deep-V hulls and provides good performance because the effects of air bubbles are minimal. Install the transducer parallel with water surface; not flush with hull. If the boat is placed on a trailer care must be taken not to damage the transducer when the boat is hauled out of the water and put on the trailer.

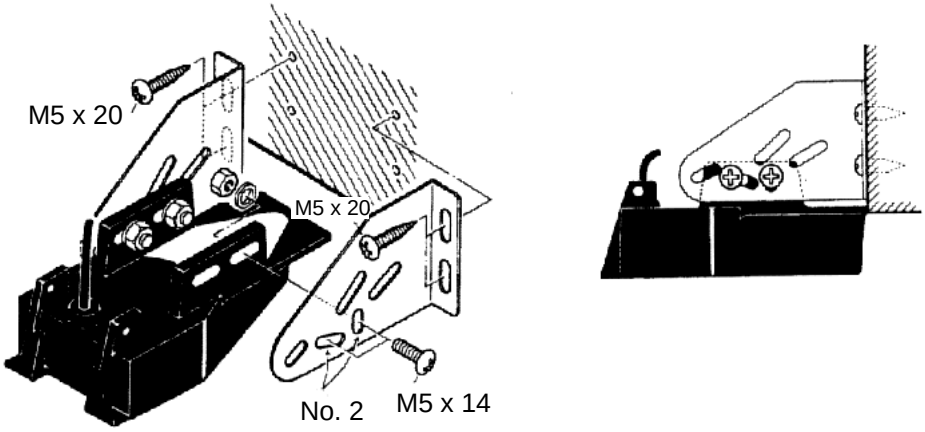


Figure 1-18 Transom mount transducer, projecting from hull

Transducer preparation

Before putting the boat in water, wipe the face of the transducer thoroughly with a detergent liquid soap. This will lessen the time necessary for the transducer to have good contact with the water. Otherwise the time required for complete "saturation" will be lengthened and performance will be reduced.

Do not paint the transducer. Performance will be affected.

Triducer 524ST-MSD, 525ST-MSD

The triducer is designed for thru-hull mounting.

Mounting considerations

When selecting a mounting location keep the following points in mind:

- Air bubbles and turbulence caused by movement of the boat seriously degrade the sounding capability of the transducer. The transducer should, therefore, be located in a position where water flow is the smoothest. Noise from the propellers also adversely affects performance and the transducer should not be mounted nearby. The lifting strakes are notorious for creating acoustic noise, and these must be avoided by keeping the transducer inboard of them.
- The transducer must always remain submerged, even when the boat is rolling, pitching or up on a plane at high speed.
- A practical choice would be somewhere between 1/3 and 1/2 of the boat's length from the stern. For planing hulls, a practical location is generally rather far astern, so that the transducer is always in water regardless of the planing attitude.

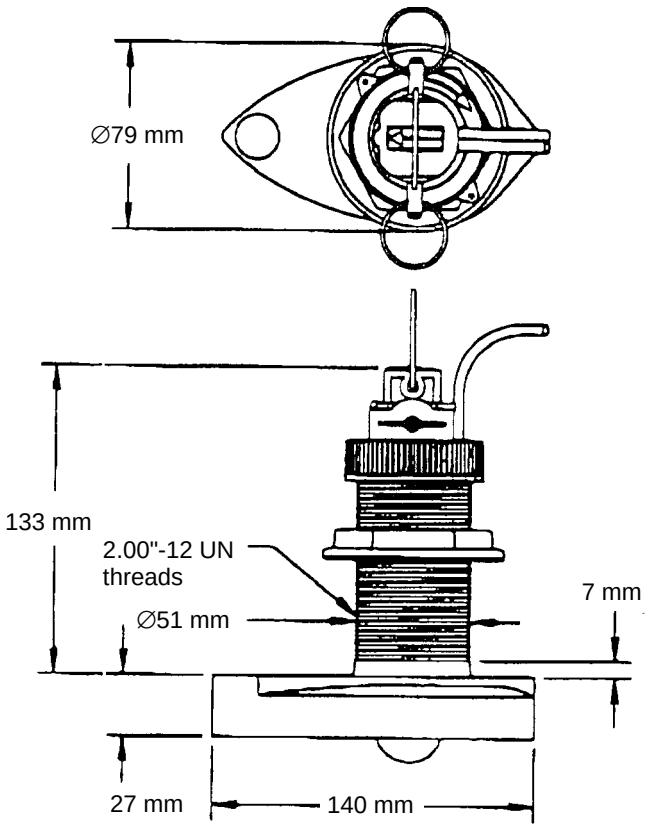


Figure 1-19 Dimensions of triducer 524ST-MSD/525ST-MSD

1.4 Installation of Sensors

Transom mount water temperature sensor T-02MTB

- Fix the cable at a convenient location with cable clamp.
- When the cable is led in through the transom board, make a hole of approx. 17 mm diameter to pass the connector. After passing the cable, fill the hole with a sealing compound.

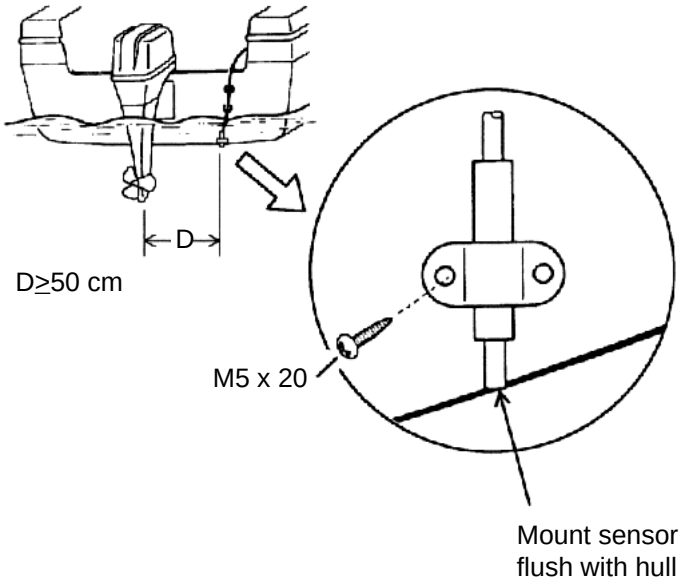


Figure 1-20 How to install transom mount water temperature sensor T-02MTB

Thru-hull mount water temperature sensor T-02MSB, T-03MSB

- Select a mid-boat flat position. The sensor does not have to be installed perfectly perpendicular. The sensor must not be damaged in dry-docking operation.
- Select a place apart from equipment generating heat.
- Select a place in the forward direction viewing from the drain hole, to allow for circulation of cooling water.
- Select a place free from vibration.

Mount the sensor as shown below.

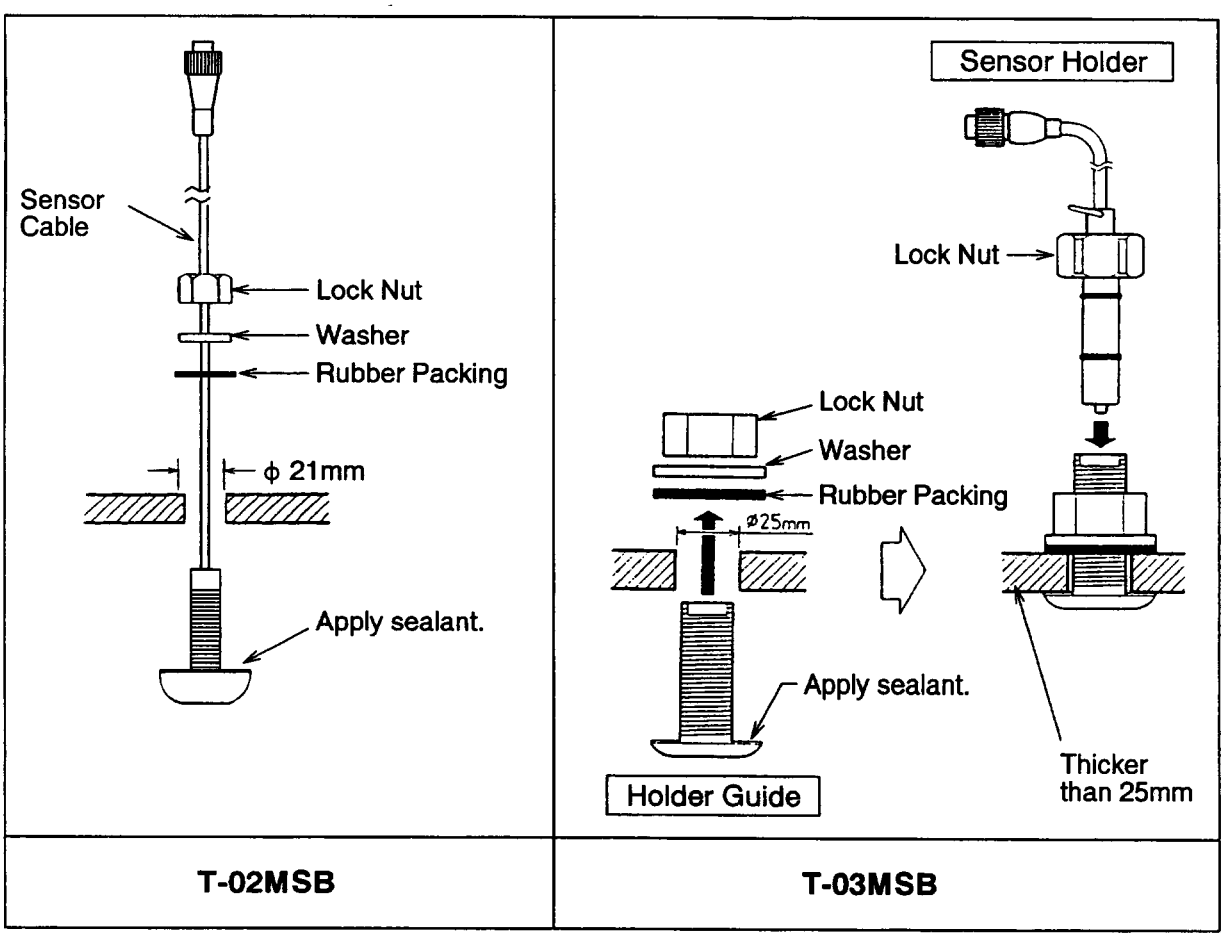


Figure 1-21 Thru-hull mount water temperature sensors T-02MSB, T-03MSB

Through-hull mount water temperature/speed sensor ST-02MSB, ST-02PSB

Select a suitable mounting location considering the following:

- Select a mid-boat flat position. The sensor does not have to be installed perfectly perpendicular. The sensor must not be damaged in dry-docking operation.
- Select a place apart from equipment generating heat.
- Select a place in the forward direction viewing from the drain hole, to allow for circulation of cooling water.
- Select a place free from vibration.

1. Dry-dock the boat.
2. Make a hole of approx. 51 mm diameter.
3. Unfasten locknut and remove the sensor section.
4. Apply high-grade sealant to the flange of the sensor.
5. Pass the sensor casing through the hole.
6. Face the notch on the sensor toward boat's bow and tighten the flange.
7. Set the sensor section to the sensor casing and tighten the locknut.
8. Launch the boat and check for water leakage around the sensor.

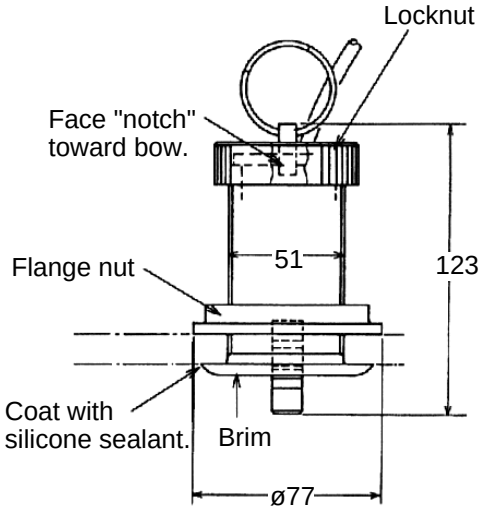


Figure 1-22 Water temperature/speed sensor ST-02MSB, ST-02PSB

2. Wiring

All wiring are terminated at the rear of the display unit.

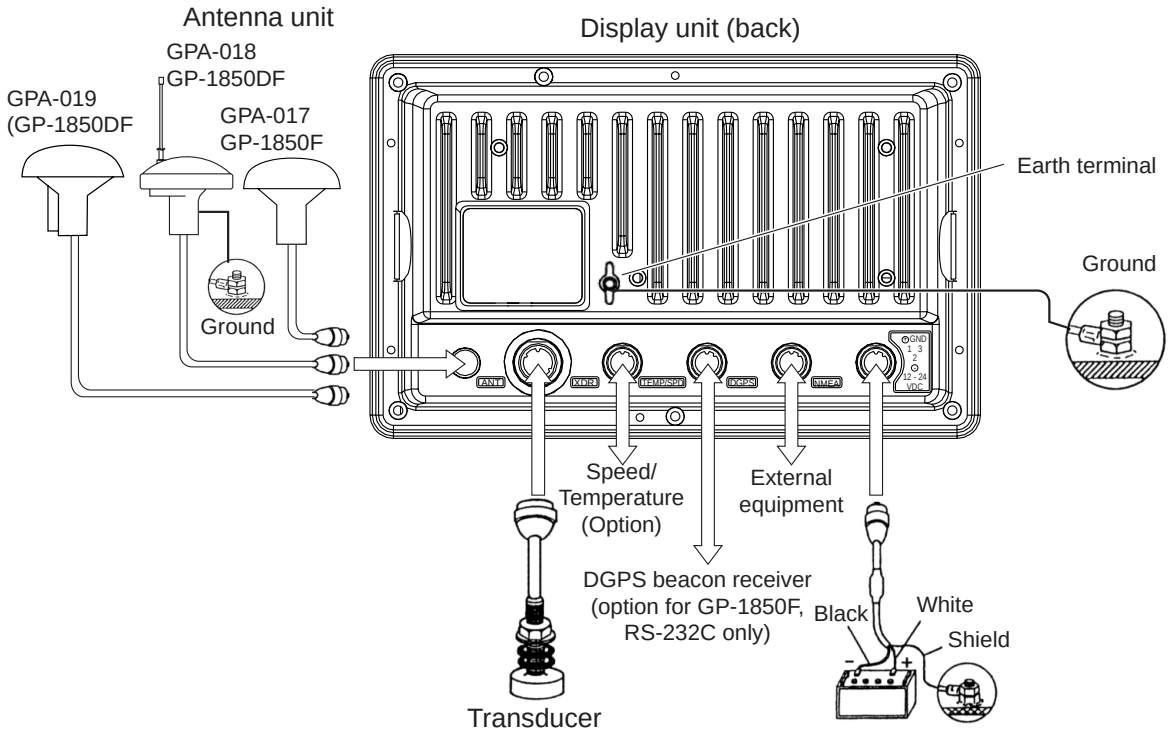


Figure 2-1 Display unit, rear view

Power cable

Connect the power cable to the power connector. Connect the leads to the battery (12 or 24 VDC); white to plus(+) terminal and black to minus(-) terminal.

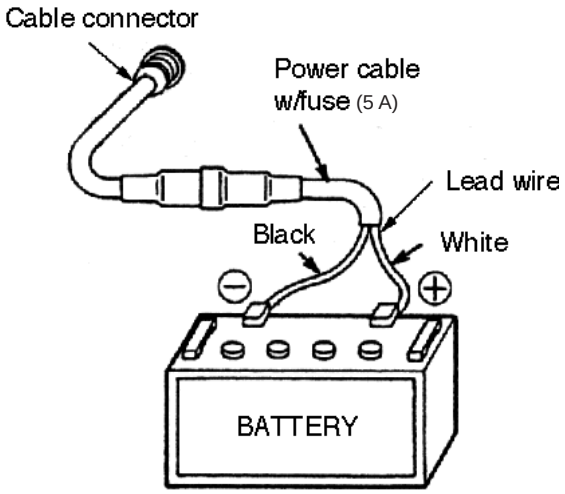


Figure 2-2 Connecting the power cable to the battery

Antenna unit

Connect the antenna cable to the ANT connector.

Transducer

Connect the transducer cable to the XDR connector.

Water temperature/speed sensor

Connect the water temperature sensor (option) or water temperature/speed sensor (option) to the TEMP/SPD connector.

Ground

The display unit contains several CPUs. While they are operating, they radiate noise, which can interfere with radio equipment. Ground the unit to prevent interference. The grounding wire should be 1.25 sq or larger and as short as possible. Connect the grounding wire to ship's ground. On a fiberglass boat, it is best to install a ground plate that measures about 20 cm by 30 cm on the outside of the hull bottom to provide a ground point. If this is not practical, the engine block can be used.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Also, the antenna unit GPA-018S (option) should be grounded.

Note: Use a “closed” lug to make the ground connection at the display unit. Do not use an “open-type” lug ().

Extending antenna cable length

The standard cable is 10m long. For extension, in case of the GPA-016, GPA-018 and GPA-018S, an antenna cable set of 15m (GPA-018S and GPA-019S), 30m or 50m is available. Extension cable cannot be used with the GPA-017 or GPA-018.

◆ Extension cable line-up (in case of 30 m or 50 m)

Fabricate the end of the antenna cable and attach the coaxial connector. Details are shown on next page.

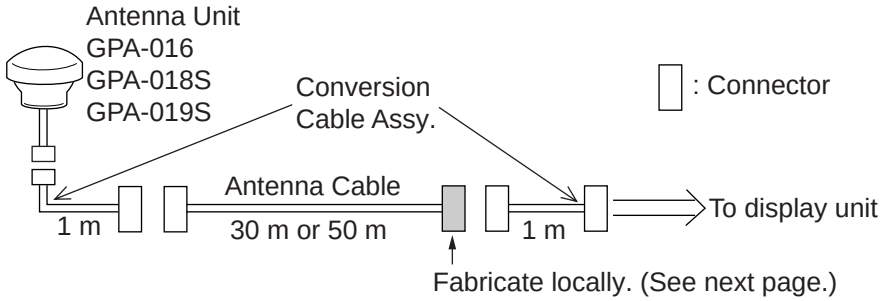


Figure 2-3 Cable extension

◆ Waterproofing connector

Wrap connector with vulcanizing tape and then vinyl tape. Bind the tape end with cable-tie.

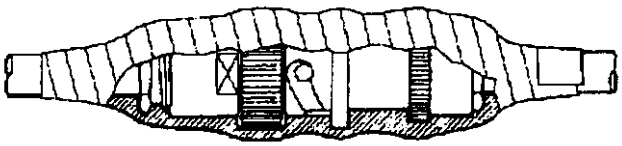
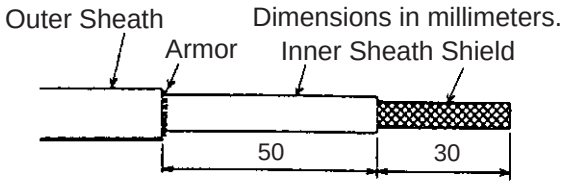
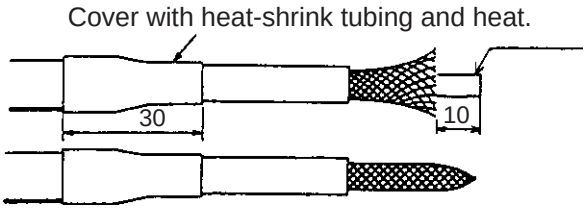


Figure 2-4 Waterproofing connector

How to attach the N-P-8DFB connector

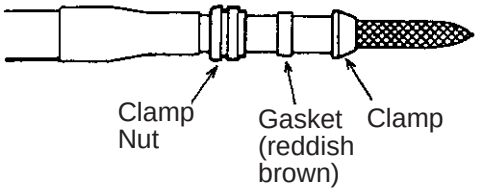


Remove outer sheath and armor by the dimensions shown left.
Expose inner sheath and shield by the dimensions shown left.

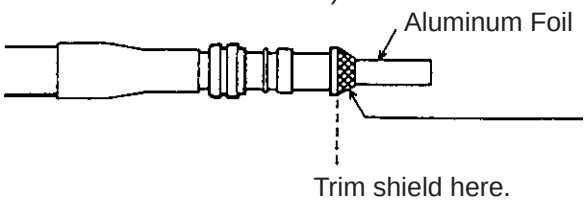


Cut off insulator and core by 10mm.

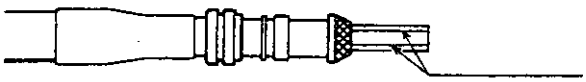
Twist shield end.



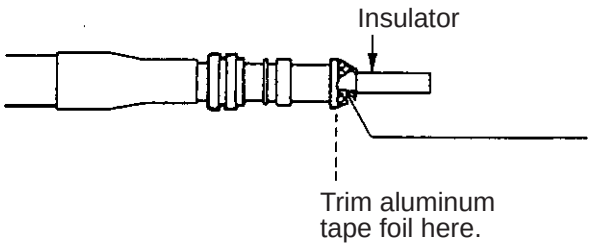
Ship on clamp nut, gasket and clamp as shown left.



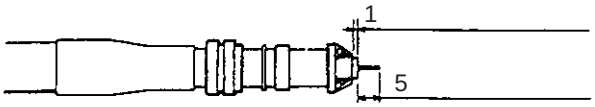
Fold back shield over clamp and trim.



Cut aluminum foil at four places, 90° from one another.

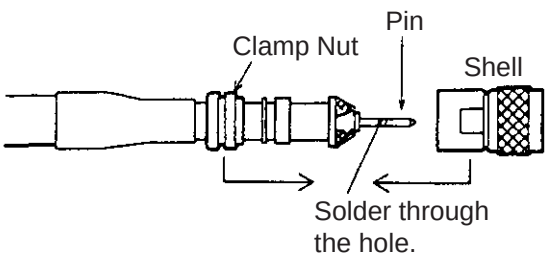


Fold back aluminum foil onto shield and trim.



Expose the insulator by 1mm.

Expose the core by 5mm.



Slip the pin onto the conductor. Solder them together through the hole on the pin.

Insert the pin into the shell. Screw the clamp nut into the shell.
(Tighten by turning the clamp nut. Do not tighten by turning the shell.)

Figure 2-5 Fabrication of coaxial cable

3. Initial Setting

3.1 NMEA Setting

NMEA port

1. Press the [MENU] key.
2. Press the software key labeled "CONFIGURATION".
3. Press the software key labeled "SETUP NMEA PORT 1".
4. Select "FORMAT" by the arrow key.
5. Press the software key labeled "EDIT" to display the following message.

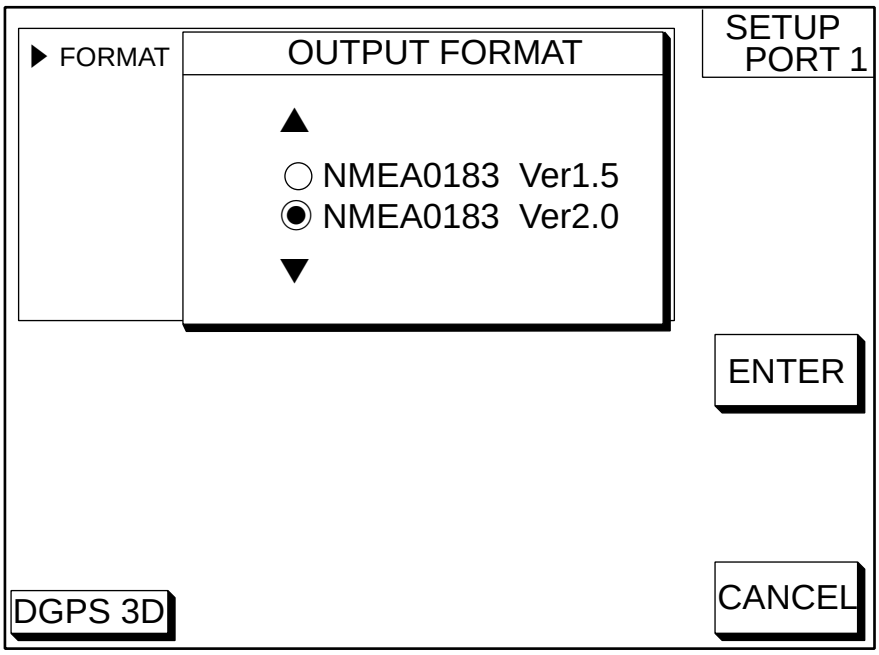


Figure 3-1 Output Format Display, NMEA port

6. Select NMEA version desired by the arrow key.
7. Press the software key labeled "ENTER".
8. Press the [PLOT] key to finish.

DGPS port

1. Press the [MENU] key.
2. Press the software key labeled "CONFIGURATION".
3. Press the software key labeled "SETUP NMEA/DGPS PORT 2".
4. Select "FORMAT" by the arrow key.
5. Press the software key labeled "EDIT" to display the following message.

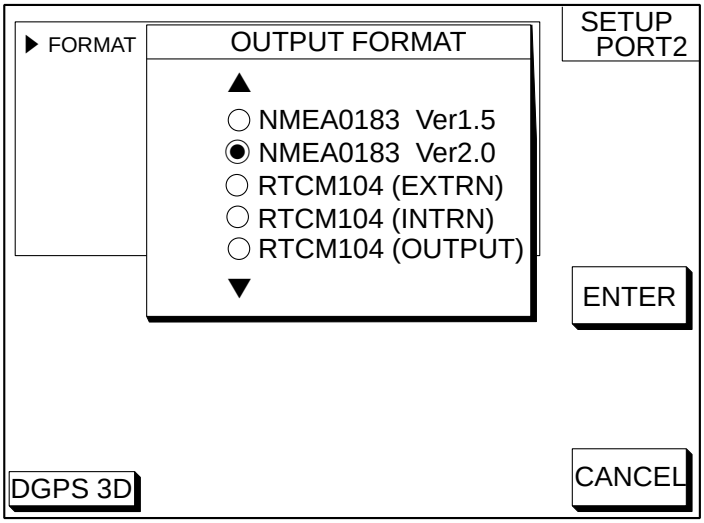


Figure 3-2 Output Format Display, DGPS port

6. Select NMEA version, external DGPS or internal DGPS by the arrow key.

NMEA0183 Ver1.5/Ver2.0	: Select one when connecting PC or RS-232C equipment.
RTCM104(EXTRN)	: Select this when connecting external DGPS beacon receiver.
RTCM104(INTRN)	: Select this for builtin internal DGPS beacon receiver.
RTCM104(OUTPUT)	: Selecct this when outputting differential data of the internal DGPS beacon receiver to other GPS navigator.

Note 1) You cannot setup sentences when you select RTCM104 as the format.

Note 2) For RS-422 format, the level converter (IF-1432) is required for connection of external equipment.

7. Press the software key labeled "ENTER".
8. Press the [PLOT] key to finish.

3.2 Output Data Sentences

Select output data sentences for external equipment as follows.

1. Press the [MENU] key.
2. Press the software key labeled "CONFIGURATION".
3. Press the software key labeled "SETUP NMEA PORT 1".
4. Press the software key labeled "SELECT SNTNC." to display the following list.

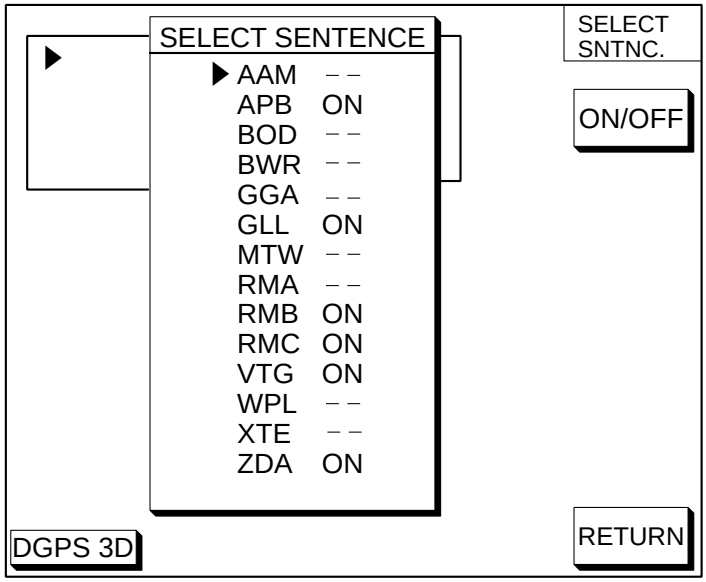


Figure 3-3 Output Date Sentences Display

5. Select data sentence you want to output data by the arrow key.
6. Press the software key labeled "ON/OFF". To output data, set to "ON".
7. Repeat to select other sentences.
8. Press the software key labeled "RETURN".
9. Press the [PLOT] key to finish.

Input/Output Sentences

Port	I/O	Format	Data	Remarks
1	Input	• NMEA-0183 Ver. 2.0 Ver. 1.5 • IEC1162	TLL*1, DWM, WPL*1	WPL : GP talker only
	Output		AAM, APB, BOD, BWC/BWR, GGA, GLL, RMA, RMB, RMC, VTG, WPL, XTE, ZDA, DBT/DPT, MTW, GTD*2	GREAT CIRCLE: BWC RHUMB LINE: BWR NMEA Ver 1.5: DBT NMEA Ver 2.0: DPT
2	Input	• NMEA-0183 Ver. 2.0 Ver. 1.5 • RS232C • RTCM104	TLL*1, DWM, WPL*1	WPL: GP talker only
	Output		AAM, APB, BOD, BWC/BWR, GGA, GLL, RMA, RMB, RMC, VTG, WPL, XTE, ZDA, DBT/DPT, GTD*2	GREAT CIRCLE: BWC RHUMB LINE: BWR NMEA Ver 1.5: DBT NMEA Ver 2.0: DPT

*1: Cannot be input consecutively.
*2: Output automatically when LC or LA is selected.

3.3 Antenna Height

1. Press the [MENU] key.
2. Press the software key labeled "GPS/DGPS/TD OPTIONS".
3. Press the software key labeled "GPS SETUP OPTIONS".
4. Select "ANT. HEIGHT" by the arrow key.
5. Press the software key labeled "EDIT" to display the following message.

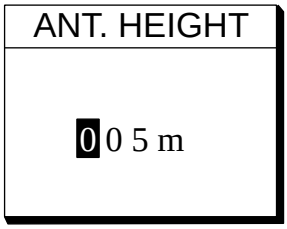


Figure 3-4 Antenna Height Display

6. Enter the height (3 digits) of the antenna above sea level using the numeric keys.

   If you enter wrong antenna height, press the software key labeled "CLEAR".
7. Press the [ENTER] key.
8. Press the [PLOT] key to return to finish.

3.4 Baud Rate Setting (GP-1850DF only)

This setting may not be done when AUTO MODE is selected.

1. Press the [MENU] key.
2. Press the software key labeled "GPS/DGPS/TD OPTIONS".
3. Press the software key labeled "DGPS SETUP OPTIONS" to display the following message.

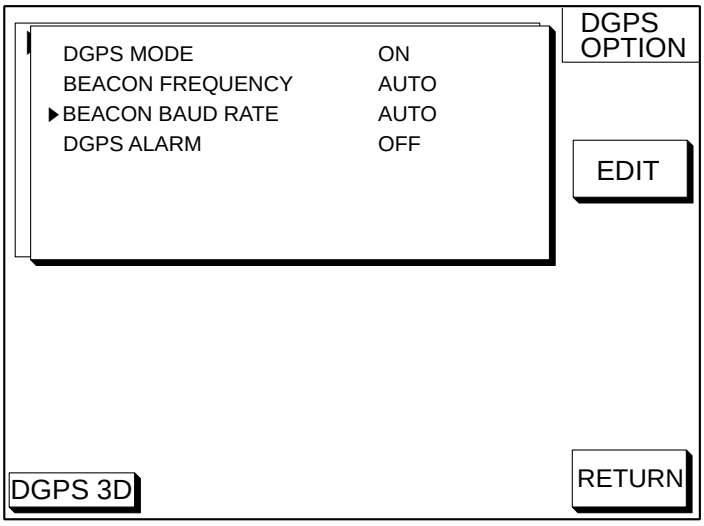


Figure 3-5 DGPS Setup Options Display

4. Confirm that "ON" is selected at "DGPS MODE" field for GP-1850DF.
5. Select "BEACON BAUD RATE" by the arrow key.
6. Press the software key labeled "EDIT" to display the following message.

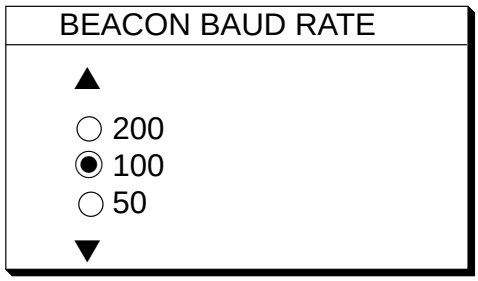


Figure 3-6 Beacon Baud Rate Display

7. Select beacon baud rate corresponding to DGPS reference station to use.
8. Press the [ENTER] key.
9. Press the [PLOT] key to return to finish.

3.5 Beacon Frequency Setting (GP-1850DF only)

1. Press the [MENU] key.
2. Press the software key labeled "GPS/DGPS/TD OPTIONS".
3. Press the software key labeled "DGPS SETUP OPTIONS" to display the following message.

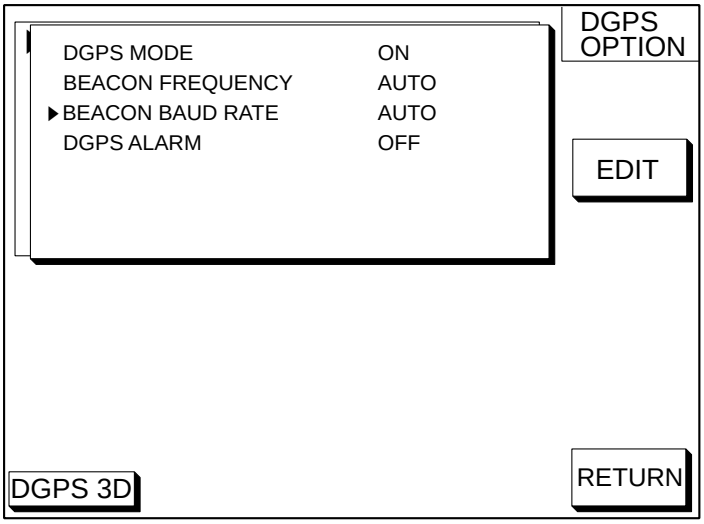


Figure 3-7 DGPS Setup Options Display

4. Select "BEACON FREQUENCY" by the arrow key.
5. Press the software key labeled "EDIT" to display the following message.

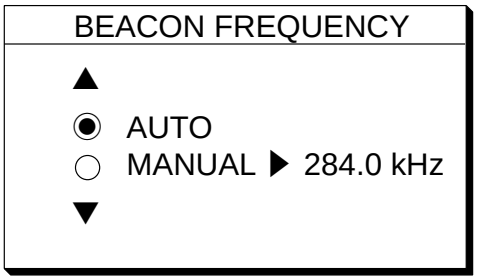


Figure 3-8 Beacon Frequency Display

6. Select "AUTO" or "MANUAL" by the arrow key. When you select "MANUAL", operate the cursor pad to move the cursor to frequency dialog box. And press the arrow key to select the frequency desired.
7. Press the [ENTER] key.
8. Press the [PLOT] key to finish.

3.6 Depth Adjustment

1. Press the [MENU] key.
2. Press the software key labeled "DISPLAY OPTIONS".
3. Press the software key labeled "NEXT PAGE".
4. Select "DEPTH ADJ." by the arrow key.
5. Press the software key labeled "EDIT" to display the following message.

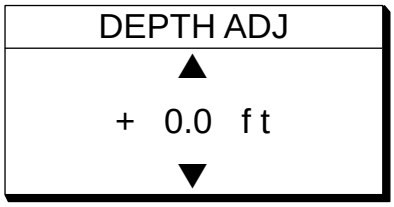


Figure 3-9 Depth Adjustment Display

6. Set depth adjustment by the arrow key. The adjustment range is -9.9~+9.9 ft.

   For example, if the depth readout from the draft to the transducer is 5 feet lower than actual depth, enter +5 feet.
7. Press the software key labeled "RETURN".
8. Press the [PLOT] key to finish.

3.7 External Equipment Setup (Option)

This section shows you how to set up the GP-1850F/1850DF when external equipment is connected. If a water temperature/speed sensor is installed, you should complete this section with the boat in the water and running, to confirm speed/water temperature readout.

Speed Source

1. Press the [MENU] key.
2. Press the software key labeled "DISPLAY OPTIONS".
3. Press the software key labeled "NEXT PAGE" to display the following display.

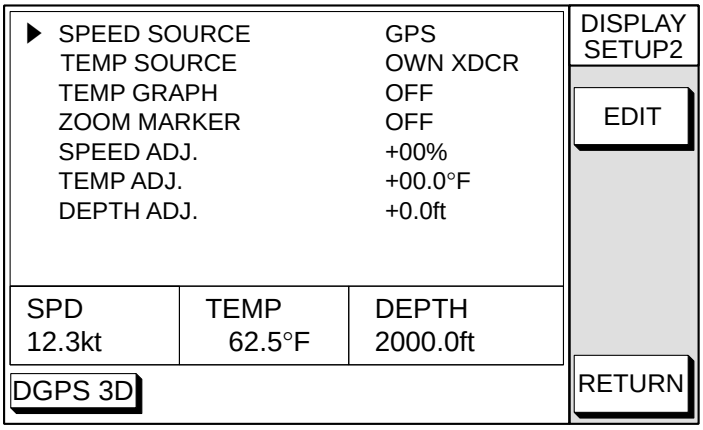


Figure 3-10 Display Setup 2 Display

4. Select "SPEED SOURCE" by the arrow key.
5. Press the software key "EDIT" to display the following message.

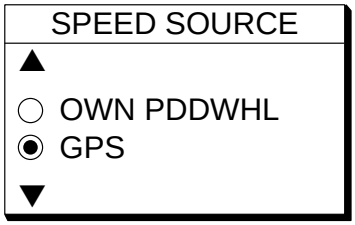


Figure 3-11 Speed Source Display

6. Select source of speed by the arrow key; "OWN PDDWHL" (speed sensor) or "GPS".
   Adjust speed when you select "OWN PDDWHL". Refer to next page.
7. Press the software key labeled "ENTER".
8. Press the [PLOT] key to finish.

Speed Adjustment

Adjust speed when you select own speed source "OWN PDDWHL".

1. Press the [MENU] key.
2. Press the software key labeled "DISPLAY OPTIONS".
3. Press the software key labeled "NEXT PAGE" to display the following display.

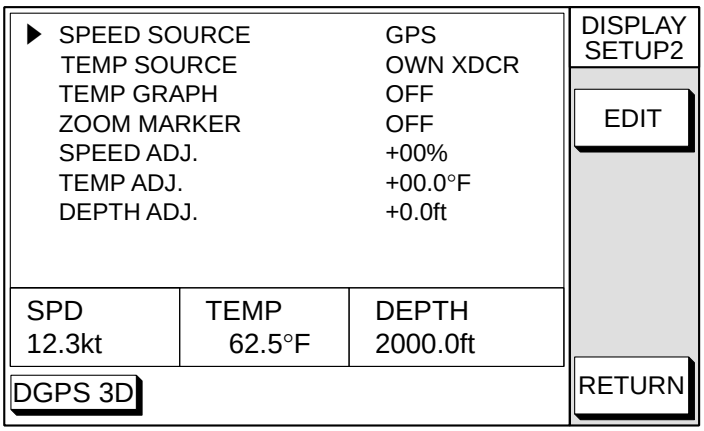


Figure 3-12 Display Setup 2 Display

4. Select "SPEED ADJ." by the arrow key.
5. For speed sensor-equipped sets, you may offset the speed readout if it is wrong. Run the boat at various speeds and watch the speed readout at the bottom of the screen. If it is unreasonably wrong, press the software key "EDIT" to display the following message.

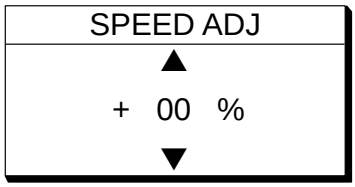


Figure 3-13 Speed Adjustment Display

6. Correct speed readout by the arrow key. The adjustment range is -50%~+50%. For example, if readout is 10% lower than actual speed, enter +10%.
7. Press the software key "RETURN".
8. Press the [PLOT] key to finish.

Temperature Adjustment

1. Press the [MENU] key.
2. Press the software key labeled "DISPLAY OPTIONS".
3. Press the software key labeled "NEXT PAGE" to display the following display.

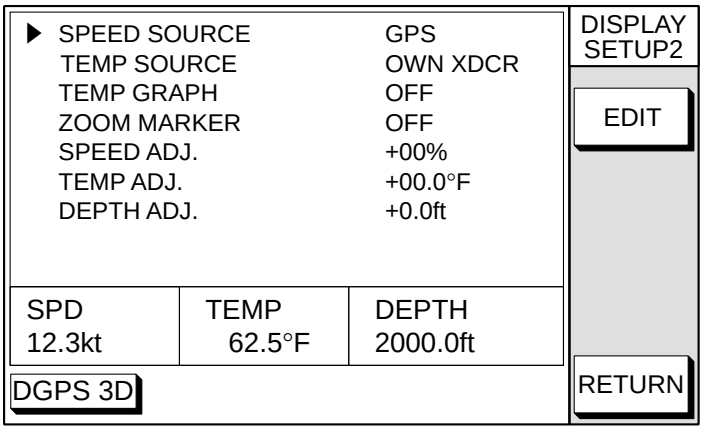


Figure 3-14 Display Setup 2 Display

4. Select "TEMP ADJ." by the arrow key.
5. For water temperature sensor-equipped sets, you may offset the water temperature readout if it is wrong. Watch the water temperature readout at the bottom of the screen. If it is unreasonably wrong, press the software key labeled "EDIT" to display the following message.

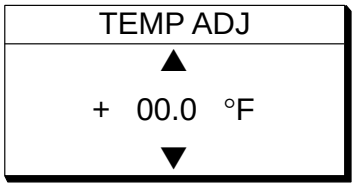


Figure 3-12 Temperature Adjustment Display

6. Correct water temperature readout by the arrow key. The adjustment range is -99.9°~+99.9°.
   For example, if the readout is 2° higher than actual temperature, enter -2°.
7. Press the software key labeled "RETURN".
8. To display a water temperature graph (shows present water temperature), select "TEMP GRAPH" by arrow key.
9. Press the software key labeled "EDIT" to display following message.

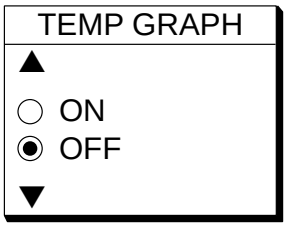


Figure 3-13 Temperature Graph Display

10. Select "ON".
11. Press the software key labeled "ENTER".
12. Press the [SNDR] key to finish.

3.8 Selecting the Echo Sounder Output Power

The echo sounder output power can be selected for 600 W (for transducer 520-5PSD, 520-5PWD, 520-5MSD) or 1 kW (50/200-1T), and the default setting is 600 W.

Note: Matching Box MB-1000 and cable assembly 02S4092 are required for 1kW transducer connection. For details, see the interconnection diagram at the end of this manual.

Attach the TX power label (supplied) to the place shown below, and draw a line through the power which you don't use by oil base magic marker.

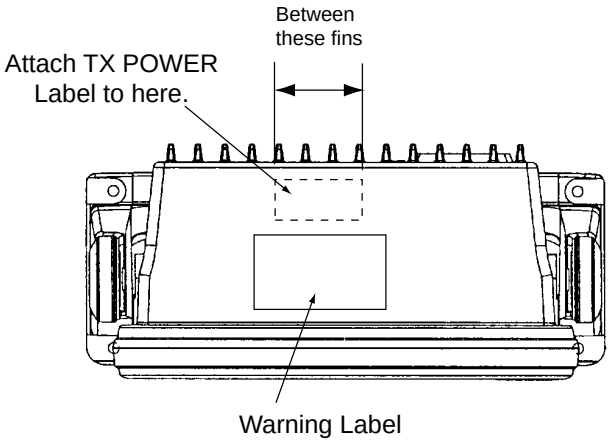


Figure 3-14 Display unit, top view

To change to 1 kW power, do the following:

1. Turn off the power. Wait at least one minute before opening the cover, to allow capacitors to discharge.
2. Remove nuts attached to XDR, SPD/TEMP. DGPS, NMEA and power supply connectors at the rear of the display.
3. Remove nut and washer attached to the ANT connector.
4. Remove ten binding screws (M3 x 10) from the rear of the display unit to separate the panel/chassis assembly from the cover assembly.

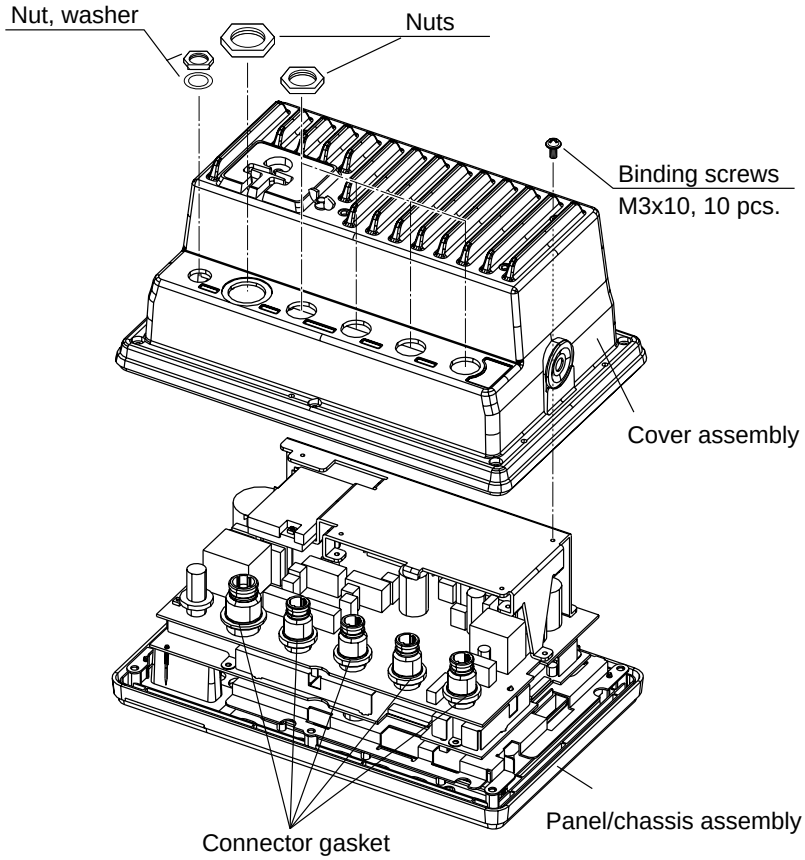


Figure 3-15 Removing cover assembly

⚠ WARNING

Do not connect the power cable with the cover removed.

5. Move the jumper block on JP1 from 3-4 to 1-2 on the ANLG Board.

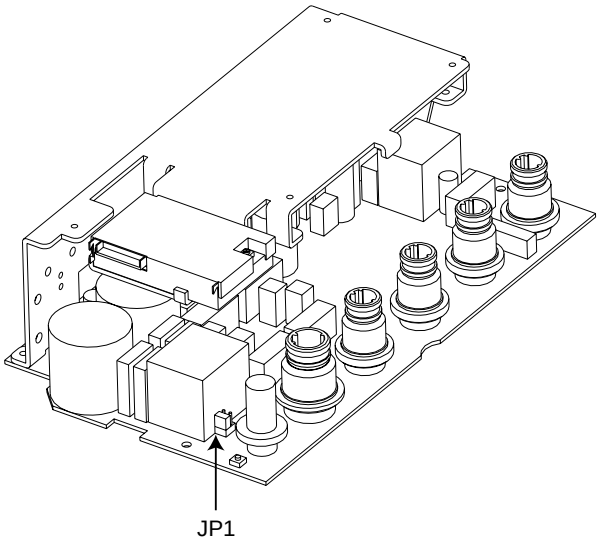


Figure 3-16 ANLG Board

6. Remount the cover assembly.

Note: Confirm that the following parts are attached:
• Inside of the cover: Shield gaskets, GN gasket (See Figure 3-17.)
• On ANLG Board: Connector gasket (See Figure 3-15.)

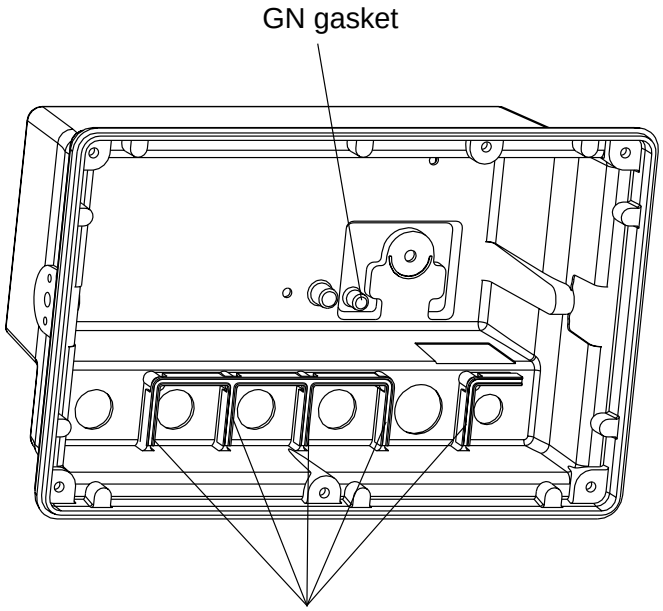


Figure 3-17 Inside of the cover

7. Tighten nuts to torque shown below and in the order shown in Figure 3-18.
   No. 1 through No. 5 : 7.5 - 8 kgf/cm
   No. 6 : 14 -16 kgf/cm

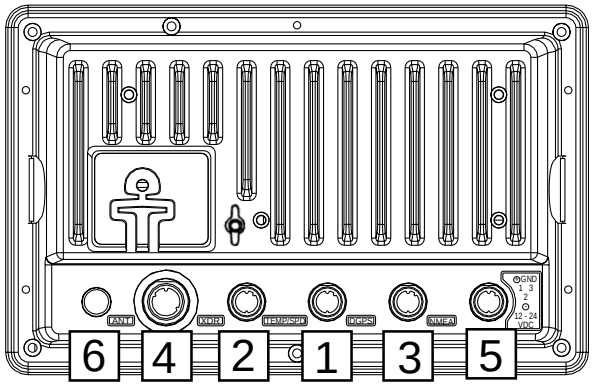


Figure 3-18 Display unit, rear view

8. Tighten ten binding screws (M3 x 10) fixing the cover to torque of 7.5-8 kgf/cm.

4. Installation of DGPS Beacon Receiver (for GP-1850F)

The DGPS beacon receiver GR-7000A can be incorporated in the GP-1850F to provide it with DGPS capability. Six installation kits are available as shown.

GR-802-1650-10A-018 (W/whip ant.)
GR-802-1650-10N-018

Name	Type	Code No.	Qty
Antenna Unit	GPA-018	000-041-471	1
Beacon Receiver	GR-7000A	000-143-249	1
Whip antenna (10A type only)	FAW-1.2	000-130-046	1
Connector Assy.	PH6P-W-L240	000-141-548	1
Cable tie	CV-100	000-570-322	2
Pan head screws*	M3X10 C2700W	000-881-405	4
Screw*	M3X12 SUS304	000-805-905	6
Cable Assy.*	S.FL2-2LP0.7-D-WHT (121)	000-141-491	1
Clamp	HP-2N	000-570-000	1
Cable Assy.	S.FL2-2LP0.7-D-WHT (250)	000-143-877	1
Screw	3X8 SUS410	000-802-951	4

* Not used

GR-802-1650-15A-018S (W/whip ant.)
GR-802-1650-15N-018S

Name	Type	Code No.	Qty
Antenna Unit	GPA-018S	000-041-462	1
Beacon Receiver	GR-7000A	000-143-249	1
Cable Assy.	TNC-PS-3D-15	000-133-670	1
Whip antenna (15A type only)	FAW-1.2	000-130-046	1
Connector Assy.	PH6P-W-L240	000-141-548	1
Cable tie	CV-100	000-570-322	2
Pan head screws*	M3X10 C2700W	000-881-405	4
Screw*	M3X12 SUS304	000-805-905	6
Cable Assy.*	S.FL2-2LP0.7-D-WHT (121)	000-141-491	1
Clamp	HP-2N	000-570-000	1
Cable Assy.	S.FL2-2LP0.7-D-WHT (250)	000-143-877	1
Screw	3X8 SUS410	000-802-951	4

* Not used

GR-802-1650-10N-019

Name	Type	Code No.	Qty
Antenna Unit	GPA-019	000-041-552	1
Beacon Receiver	GR-7000A	000-143-249	1
Connector Assy.	PH6P-W-L240	000-141-548	1
Cable tie	CV-100	000-570-322	2
Pan head screws*	M3X10 C2700W	000-881-405	4
Screw*	M3X12 SUS304	000-805-905	6
Cable Assy.*	S.FL2-2LP0.7-D-WHT (121)	000-141-491	1
Clamp	HP-2N	000-570-000	1
Cable Assy.	S.FL2-2LP0.7-D-WHT (250)	000-143-877	1
Screw	3X8 SUS410	000-802-951	1

* Not used

GR-802-1650-15N-019S

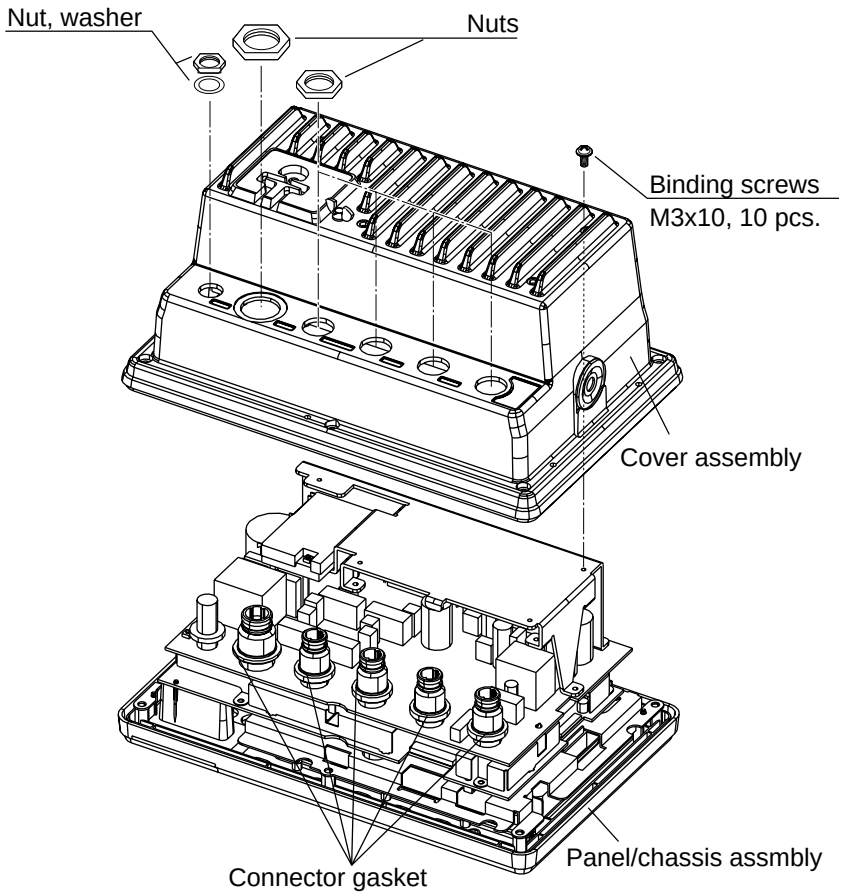
Name	Type	Code No.	Qty
Antenna Unit	GPA-019S	000-041-554	1
Beacon Receiver	GR-7000A	000-143-249	1
Cable Assy.	TNC-PS-3D-15	000-133-670	1
Connector Assy.	PH6P-W-L240	000-141-548	1
Cable tie	CV-100	000-570-322	2
Pan head screws*	M3X10 C2700W	000-881-405	4
Screw*	M3X12 SUS304	000-805-905	6
Cable Assy.*	S.FL2-2LP0.7-D-WHT (121)	000-141-491	1
Clamp	HP-2N	000-570-000	1
Cable Assy.	S.FL2-2LP0.7-D-WHT (250)	000-143-877	1
Screw	3X8 SUS410	000-802-951	4

* Not used

Disassembly

Procedure

1. Turn off the power. Wait at least one minute before opening the cover, to allow capacitors to discharge.
2. Remove nuts attached to DGPS, NMEA and power supply connectors at the rear of the display unit.



⚠ WARNING

Do not connect the power cable with the cover removed.

Figure 4-1 Removing cover assembly

3. Remove nut and washer attached to ANT connector.
4. Remove ten screws at rear of the display unit to detach panel/chassis assembly from the cover assembly.

Installation of DGPS receiver

Procedure

1. Dismount chassis assembly from panel/chassis assembly by disconnecting the connector and PH8P from J8 on MAIN Board shown in the figure below.

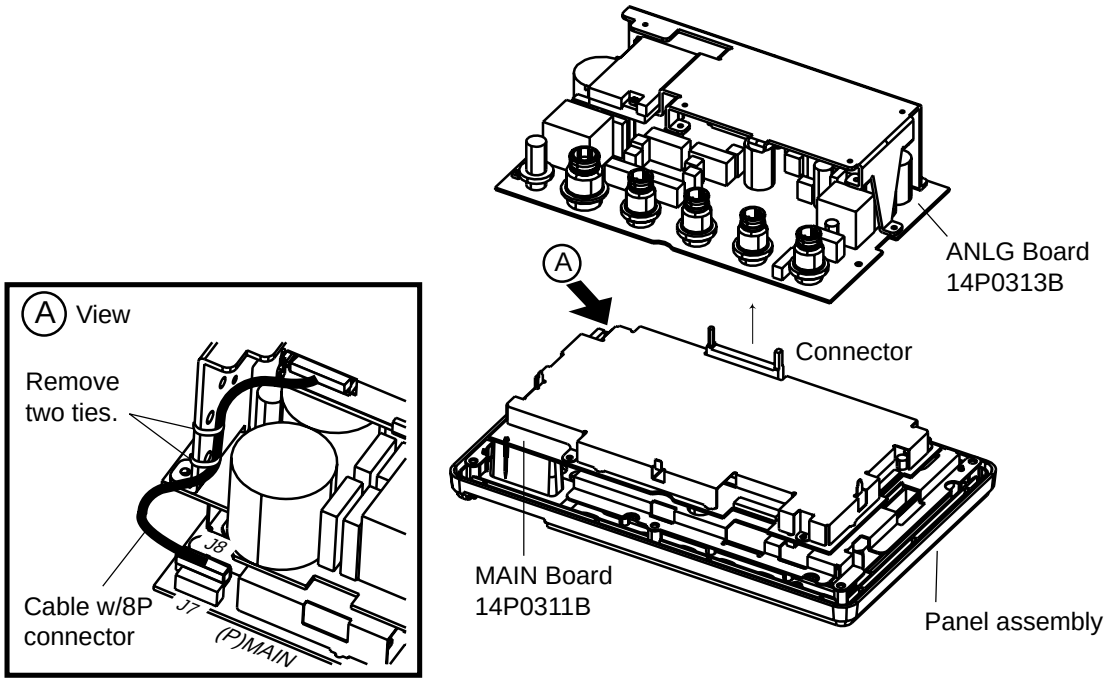


Figure 4-2 Dismounting chassis assembly

2. Dismount heat sink from chassis assembly by unfastening three screws on the ANLG board, loosening two screws at TR fixing plates and disconnecting the connector of the mini pin coaxial cable.

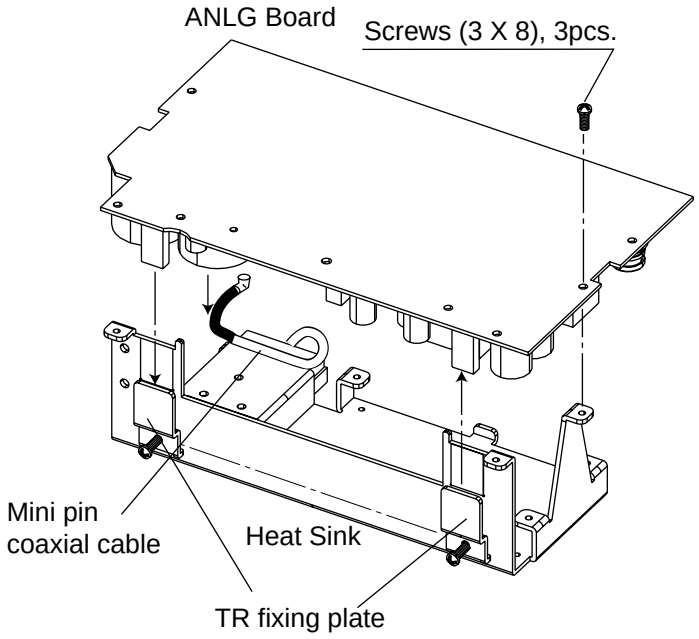


Figure 4-3 Chassis assembly

Handling of Coaxial Cable

- Do not touch the connector with bare hands; use gloves.
- Use radio pincers to remove, and pull out straightly.
- Plug in connector straightly.

3. Fasten the GR-7000A (DGPS beacon receiver) to the heat sink with four 3X8 screws as shown in the figure below.

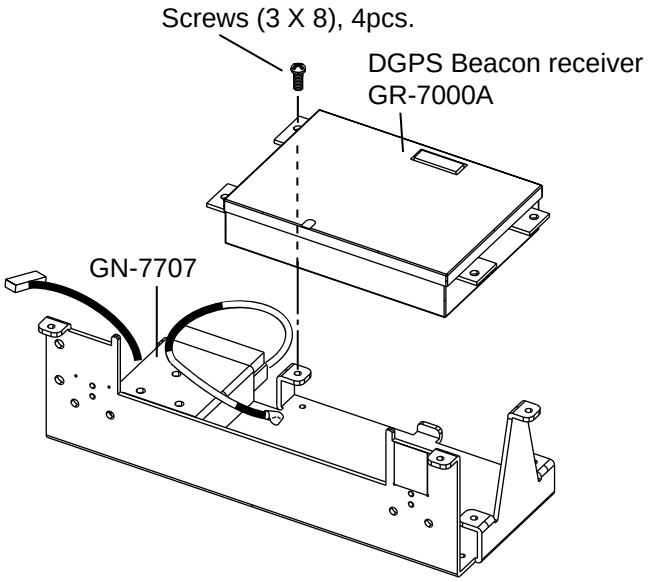


Figure 4-4 Installation of DGPS beacon receiver

4. Open the cover of GR-7000A to connect two coaxial cables shown below.

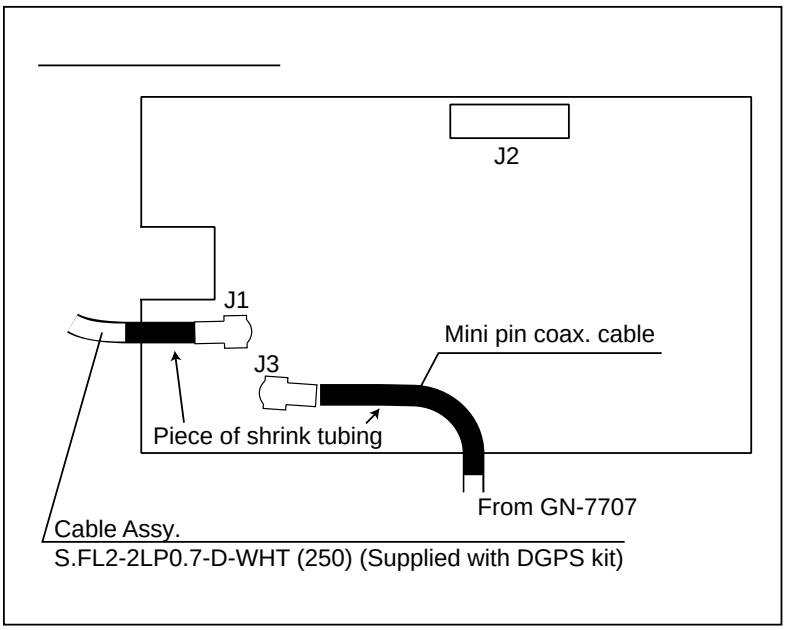


Figure 4-5 Connecting the coaxial cables in GR-7000A

5. Close the cover of GR-7000A passing the two cables out through respective notches in the cover.
6. Plug PH6P-W-L240 connector to J2 on the GR-7000A through the cover.

7. Wire cable assembly as shown in the figure below.

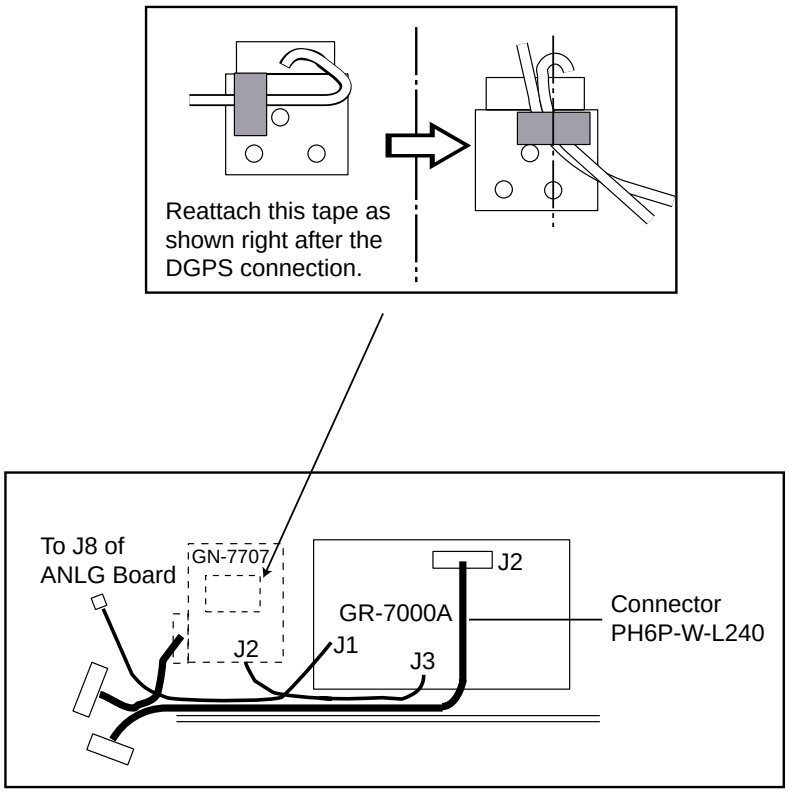


Figure 4-6 Wiring the Cable assembly

8. Mount the ANLG board on the heat sink referring to step 2. Fasten cable assy. S.FL2-2LP0.7-D-WHT (250), 8P connector cable and 6P connector cable by cable tie (CV-100, supplied) as shown in the figure below. Fix cable assy. S.FL2-2LP0.7-D-WHT (250) with vinyl tape.

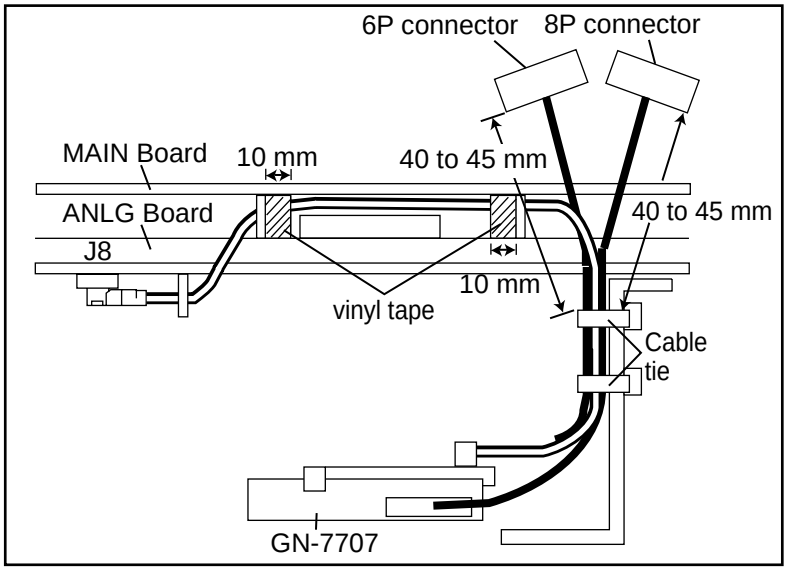
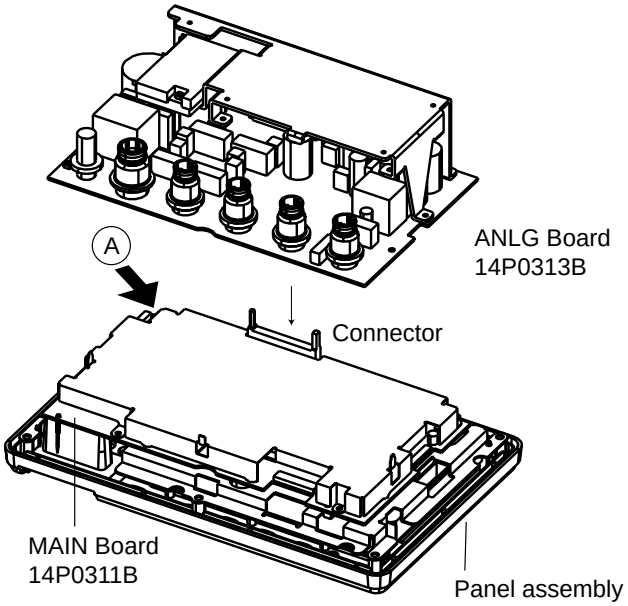


Figure 4-7 Attaching cable tie

9. Connect J1 of GR-7000A to J8 of ANLG board (Refer to Figure 4-6).
10. Mount chassis assembly on the panel assembly. Connect 8P connector and 6P connector to Main board as shown in Figure 4-8.



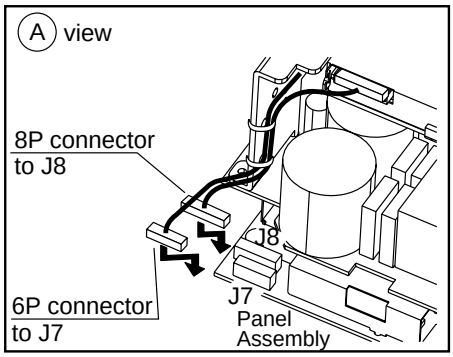


Figure 4-8 Attaching chassis assembly

11. Reassemble the display unit.

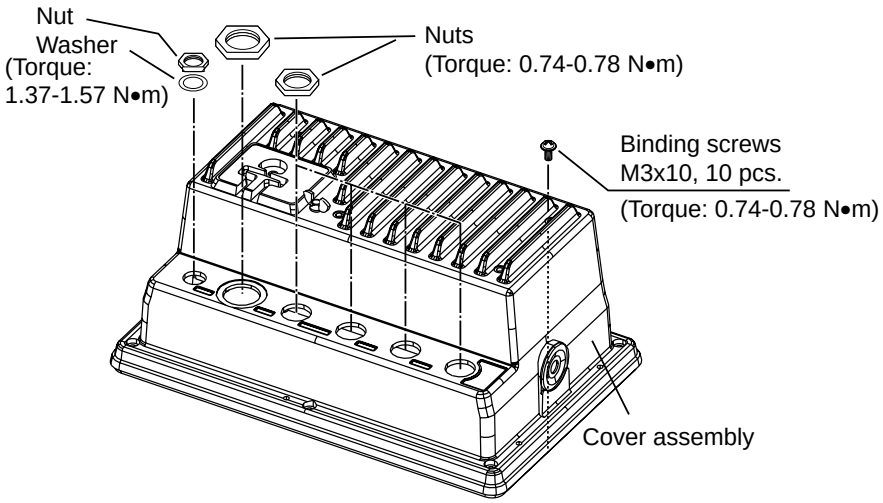


Figure 4-9 Remounting the cover

Note : When reattaching the cover, confirm the following parts are attached.

- Inside of the cover : Shield gaskets, GN gasket (See Figure 4-10.)
- On ANLG Board : Connector gasket (See Figure 4-1.)

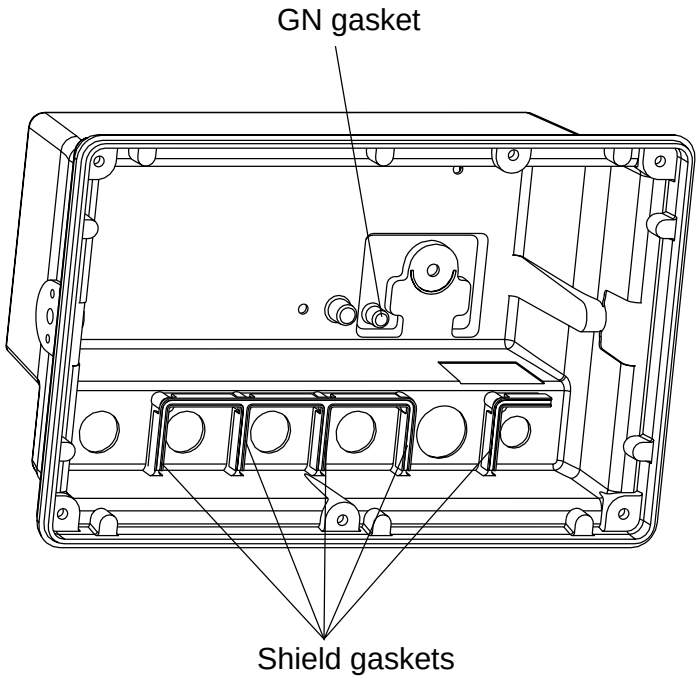
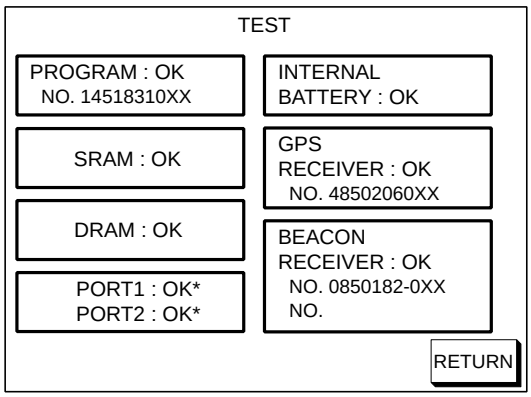


Figure 4-10 Inside of the cover

Checking the DGPS installation

1. Press the [MENU] key.
2. Press the software key labeled "CONFIGURATION".
3. Press the software key labeled "SYSTEM MENU".
4. Press the software key labeled "SELF TEST".
5. Press the software key labeled "MEMORY•I/O TEST" to display the following message.



*: Special connections are required to check these port.
Otherwise, "--" (bar) appears.

Figure 4-10 Memory, I/O Test Display

6. Confirm that "BEACON RECEIVER: OK" is displayed.
7. Press the soft key labeled "RETURN".
8. Press the [PLOT] key to return the plotter display.

APPENDIX
TRIDUCER 525ST-PWC/PWD

This appendix provides a copy of the installation instructions for AIRMAR triducer. If you loose the original supplied with the triducer, use this appendix.

INSTALLATION INSTRUCTIONS

Transom Mount Transducer or TRIDUCER® Multisensor with Integral Release Bracket

Model P66

U.S. Patents: 4,555,938; 4,644,787; 5,606,253; Des. 334,335
Canadian Patent 1,233,341

IMPORTANT *Please read the instructions completely before proceeding with the installation. These directions supersede any other instructions in your instrument manual if they differ.*

Applications

- Powerboats with outboard, inboard, inboard/outboard, or jet drive. *Not* recommended for boats with large or twin screw inboard motor.
- Bracket protects the sensor form frontal impact only
- Good operation up to 44kn (50MPH)
- Orients the sound beam vertically on hulls with a deadrise angle up to 30°
- Adjusts to transom angles from 2-22°

Tools and Materials Needed

Scissors
Masking tape
Safety goggles
Dust mask
Electric drill
Drill bit for:

Bracket holes	4mm, #23, *or* 9/64”
Fiberglass hull	chamfer bit (preferred), 6mm, *or* 1/4”
Transom hole	19mm *or* 3/4” (optional)
Cable clamp holes	3mm *or* 1/8”

Screwdrivers
Straight edge
Marine sealant
Pencil
Zip-ties
Water-based antifouling paint (**mandatory in salt water**).

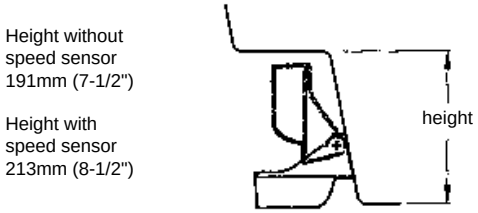


Figure 1. Height required at mounting location

Pre-test for Speed and Temperature

Connect the sensor to the instrument and spin the paddlewheel. Check for a speed reading and the approximate air temperature. If there is no reading, return the sensor to your place of purchase.

Mounting Location

To ensure the best performance, the sensor *must* be submerged in aeration-free and turbulence-free water. Mount the sensor close to the centerline of the boat. On slower heavier displacement hulls, positioning it farther from the centerline is acceptable.

Allow adequate space above the bracket for it to release and rotate the sensor upward (see Figure 1).

Caution: *Do not mount the sensor in an area of turbulence or bubbles:*
Near water intake or discharge openings;
Behind strakes, struts, fittings, or hull irregularities;
Behind eroding paint (an indication of turbulence).

Caution: *Avoid mounting the sensor where the boat may be supported during trailering, launching, hauling, and storage.*

- **Single drive boat**—Mount on the starboard side at least 75mm (3”) beyond the swing radius of the propeller (see Figure 2).
- **Twin drive boat**—Mount between the drives.

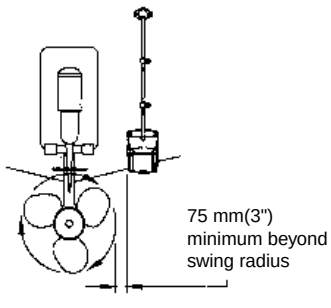


Figure 2. Mounting location on single drive boat

P66 Installation template

for starboard side of boat

Drill at locations labeled "B"
for the following transom angles:
16° through 22°

B B B
A A A

Drill at locations labeled "A"
for the following transom angles:
2° through 15°

Align arrow with bottom of transom

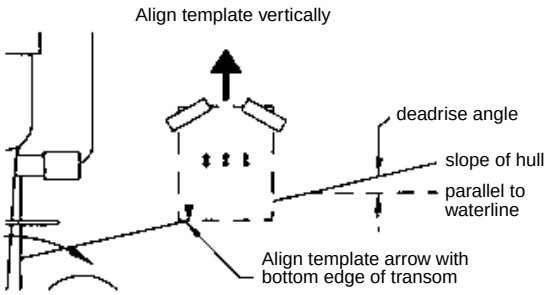


Figure 3. Template position

Caution: Never Use Solvents!

Cleaners, gasoline, paint, sealants, and other products may contain strong solvents such as acetone which can attack many plastics dramatically reducing their strength.

Installation

Bracket

1. Cut out the installation template shown on the left.
2. At the selected location, position the template, so the arrow at the bottom is aligned with the bottom edge of the transom. *Being sure* the template is parallel to the waterline, tape it in place (see Figure 3).

   Warning: *Always wear safety goggles and a dust mask.*
3. Using a 4mm, #23, or 9/64" bit, drill three holes 22mm (7/8") deep at the locations indicated. To prevent drilling too deeply, wrap masking tape around the bit 22mm (7/8") from the point.
   Fiberglass hull—Minimize surface cracking by chamfering the gelcoat. If a chamfer bit or countersink bit is not available, start drilling with a 6mm or 1/4" bit to a depth of 1mm (1/16").
4. **If you know your transom angle**—The bracket is designed for a standard 13° transom angle.
   11°-18° angle—No shim is required. Skip to "Adjusting", step 3.
   Other angles—The shim is required. Skip to "Adjusting", step 2.

   If you do not know the transom angle—Temporarily attach the bracket and sensor to the transom to determine if the plastic shim is needed.
5. Using the two #10 x 1-1/4" self-tapping screws, temporarily screw the bracket to the hull. *Do not* tighten the screws completely at this time. Follow the instructions for "Attaching the Sensor to the Bracket", steps 1-4 before proceeding with "Adjusting".

Adjusting

1. Using a straight edge, sight the underside of the sensor relative to the underside of the hull. The stern of the sensor should be 1-3mm (1/16-1/8") below the bow of the sensor or parallel to the bottom of the hull (see Figure 5).

   Caution: *Do not position the bow of the sensor lower than the stern because aeration will occur.*

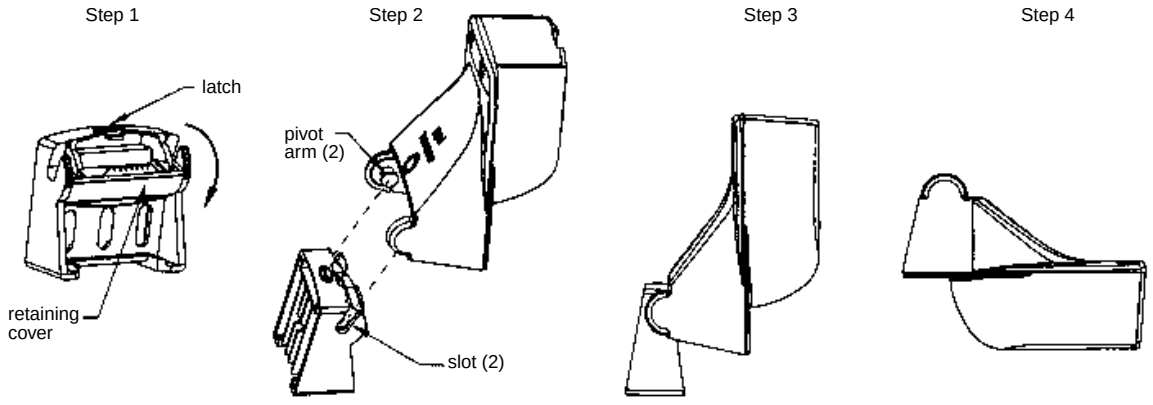


Figure 4. Attaching the sensor to the bracket

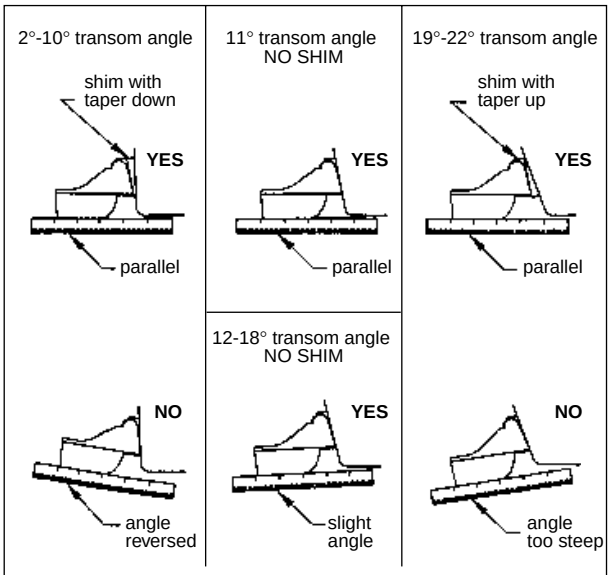


Figure 5. Sensor angle adjustment on transom

2. To adjust the sensor's angle relative to the hull, use the tapered plastic shim provided. If the bracket has been temporarily fastened to the transom, remove it, Key the shim in place on the back of the bracket.
   2°-10° transom angle (stepped transom and jet boats)—Position the shim with the tapered end down.
   19°-22° transom angle (small aluminum and fiberglass boats)—Position the shim with the tapered end up.

3. If the bracket has been temporarily fastened to the transom, remove it. Apply a marine sealant to the threads of the two #10 x 1-1/4" self tapping screws to prevent water seeping into the transom. Screw the bracket to the hull. *Do not* tighten the screws completely at this time.

4. Repeat step 1 to ensure that the angle of the sensor is correct.

   Caution: *Do not position the sensor farther into the water than necessary to avoid increasing drag, spray, and water noise and reducing boat speed.*

5. Using the vertical adjustment space on the bracket slots, slide the sensor up or down to provide a projection of 3mm (1/8"). Tighten the screws (see Figure 6).

Attaching the Sensor to the Bracket

1. If the retaining cover near the top of the bracket is closed, open it by depressing the latch and rotating the cover downward (see Figure 4).

2. Insert the sensor's pivot arms into the slots near the top of the bracket.

3. Maintain pressure until the pivot arms click into place.

4. Rotate the sensor downward until the bottom snaps into the bracket.

5. Close the retaining cover to prevent the accidental release of the sensor when the boat is underway.

Cable Routing

Route the sensor cable over the transom, through a drain hole, or thorough a new hole drilled in the transom **above the waterline**.

Caution: *Never cut the cable or remote the connector; this will void the warranty.*

Warning: *Always wear safety goggles and a dust mask.*

1. If a hole must be drilled, choose a location well above the waterline. Check for obstructions such as trim tabs, pumps, or wiring inside the hull. Mark the location with a pencil. Drill a hole through the transom using a 19mm or 3/4" bit (to accommodate the connector).

2. Route the cable over or through the transom.

3. On the outside of the hull secure the cable against the transom using the cable clamps. Position a cable clamp 50mm(2") above the bracket and mark the mounting hole with a pencil (see Figure 6).

4. Position the second cable clamp halfway between the first clamp and the cable hole. Mark this mounting hole.

5. If a hole has been drilled in the transom, open the appropriate slot in the transom cable cover. Position the cover over the cable where it enters the hull. Mark the two mounting holes.

6. At each of the marked locations, use a 3mm or 1/8" bit to drill a hole 10mm (3/8") deep. The prevent drilling too deeply, wrap masking tape around the bit 10mm (3/8") from the point.

7. Apply marine sealant to the threads of the #6 x 1/2" self-tapping screw to prevent water from seeping into the transom. If you have drilled a hole through the transom, apply marine sealant to the space around the cable where it passes through the transom.

8. Position the two cable clamps and fasten them in place. If used, push the cable cover over the cable and screw it in place.

9. Route the cable to the instrument being careful not to tear the cable jacket when passing it though the bulkhead(s) and other parts of the boat. To reduce electrical interference, separate the sensor cable from other electrical wiring and "noise" sources. Coil any excess cable and secure it in place with zip-ties to prevent damage.

10. Refer to your echosounder owner's manual to connect the sensor to the instrument.

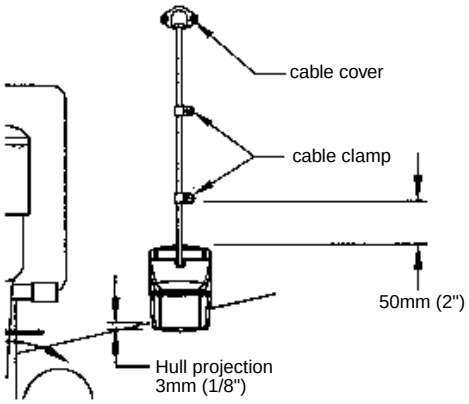
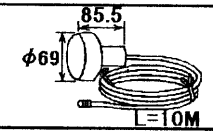
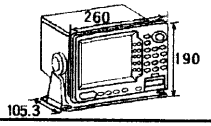
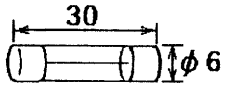
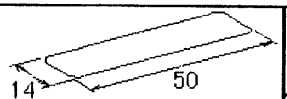
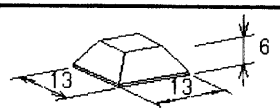
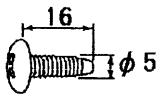
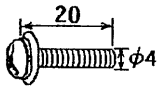
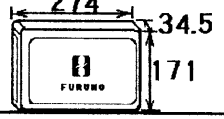


Figure 6. Vertical adjustment and cable routing

PACKING LIST GP-1850F (E017)

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線部 ANTENNA UNIT		GPA-017 000-041-403	1
指示器 DISPLAY UNIT		GP-1850F-E 000-041-493	1
予備品 SPARE PARTS		**SP14-02501**	
ﾋｭｰｽﾞ FUSE		FGBO-A 5A AC125V 000-549-064	3
付属品 ACCESSORIES		**FP14-02402**	
出力ﾊﾘﾏｰｸ(E) OUT PUT MARK LABEL(E)		14-063-1025-1 100-274-611	1
ｺﾞﾑｱｼ RUBBER FOOT		TM-166 No.18 ｸﾛ 000-808-732	2
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X16 SUS304 1種 000-805-494	4
+ﾅﾍﾞｾﾑｽﾈｼﾞB WASHER HEAD SCREW		M4X20 SUS304 000-804-742	6
付属品 ACCESSORIES		**FP14-02401**	

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ﾊｰﾄﾞｶﾊﾞｰ組品 HARD COVER ASSY.		FP14-02401 004-375-270	1
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A3SPF0013-035 000-129-613	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0003-050 000-117-603	1

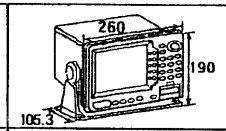
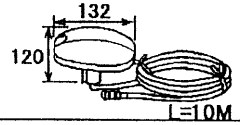
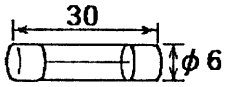
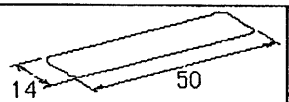
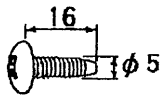
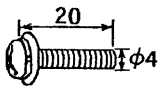
注記) 1.送受波器他ｵﾌﾟｼｮﾝ等は別梱包になります。
OPTIONS, FOR EXAMPLE TRANCDUCER ARE SUPPLIED IN OTHER BOX.

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

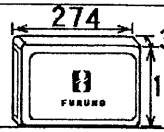
DWG NO.
C4395-Z10- B

A-1

PACKING LIST GP-1850DF (E018)

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
指示器 DISPLAY UNIT		GP-1850DF-E 000-041-495	1
空中線部 ANTENNA UNIT		GPA-018 000-041-407	1
予備品 SPARE PARTS			SP14-02501
ﾋｭｰｽﾞ FUSE		FGBO-A 5A AC125V 000-549-064	3
付属品 ACCESSORIES			FP14-02402
出力ﾊﾘﾏｰｸ(E) OUT PUT MARK LABEL(E)		14-063-1025-1 100-274-611	1
ｺﾞﾑｱｼ RUBBER FOOT		TM-166 No.18 ｸﾛ 000-808-732	2
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X16 SUS304 1種 000-805-494	4
+ﾅﾍﾞｾﾑｽﾈｼﾞB WASHER HEAD SCREW		M4X20 SUS304 000-804-742	6
付属品 ACCESSORIES			FP14-02401

注記) 1.ﾎｲｯﾌﾟｱﾝﾃﾅ、送受波器他ｵﾌﾟｼｮﾝ等は別梱包になります。
OPTIONS, FOR EXAMPLE WHIP ANTENNA, TRANCDUCER ARE SUPPLIED IN OTHER BOX.

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ﾊｰﾄﾞｶﾊﾞｰ組品 HARD COVER ASSY.		FP14-02401 004-375-270	1
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A3SPF0013-035 000-129-613	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0003-050 000-117-603	1

DWG NO. C4395-Z12- A

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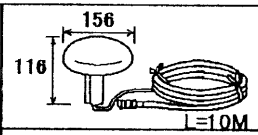
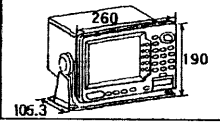
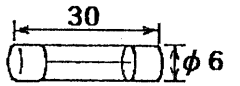
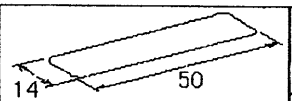
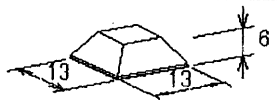
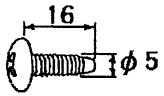
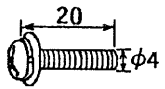
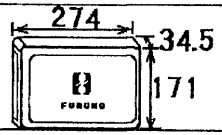
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST GP-1850DF (E019)

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線部 ANTENNA UNIT		GPA-019 000-142-416	1
指示器 DISPLAY UNIT		GP-1850DF-E 000-041-495	1
予備品 SPARE PARTS		SP14-02501	
ﾋｭｰｽﾞ FUSE		FGBO-A 5A AC125V 000-549-064	3
付属品 ACCESSORIES		FP14-02402	
出力ﾊﾘﾏｰｸ(E) OUT PUT MARK LABEL(E)		14-063-1025-1 100-274-611	1
ｺﾞﾑｱｼ RUBBER FOOT		TM-166 No.18 ｸﾛ 000-808-732	2
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X16 SUS304 1種 000-805-494	4
+ﾅﾍﾞｾﾑｽﾈｼﾞB WASHER HEAD SCREW		M4X20 SUS304 000-804-742	6
付属品 ACCESSORIES		FP14-02401	

注記) 1.送受波器他ｵﾌﾟｼｮﾝ等は別梱包になります。
OPTIONS, FOR EXAMPLE WHIP ANTENNA ARE SUPPLIED IN OTHER BOX.

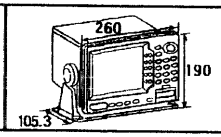
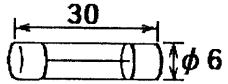
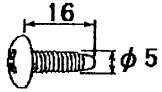
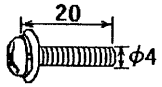
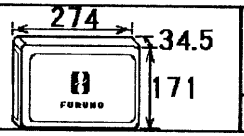
NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ﾊｰﾄﾞｶﾊﾞｰ組品 HARD COVER ASSY.		FP14-02401 004-375-270	1
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A3SPF0013-035 000-129-613	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0003-050 000-117-603	1

DWG NO.
C4395-Z08- B

A-3

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

PACKING LIST GP-1850D/DF (E/J)

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
指示器 DISPLAY UNIT		GP-1850D-J 000-041-490**	1
予備品 SPARE PARTS		**SP14-02501**	
ﾋｭｰｽﾞ FUSE		FGBO-A 5A AC125V 000-549-064	3
付属品 ACCESSORIES		**FP14-02403**	
ｺﾞﾑｱｼ RUBBER FOOT		TM-166 No.18 ｸﾛ 000-808-732	2
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X16 SUS304 1種 000-805-494	4
+ﾅﾍﾞｾﾑｽﾈｼﾞB WASHER HEAD SCREW		M4X20 SUS304 000-804-742	6
付属品 ACCESSORIES		**FP14-02401**	
ﾊｰﾄﾞｶﾊﾞｰ組品 HARD COVER ASSY.		FP14-02401 004-375-270	1
その他工材 OTHER INSTALLATION MATERIALS			

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A3SPF0013-035 000-129-613	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0003-050 000-117-603	1

注記) 1.ｺｰﾄﾞ末尾に[**]の付いたﾕﾆｯﾄは代表の型式/ｺｰﾄﾞを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.
2.送受波器他ｵﾌﾟｼｮﾝ等は別梱包になります。
OPTIONS, FOR EXAMPLE WHIP ANTENNA ARE SUPPLIED IN OTHER BOX.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

DWG NO.
C4395-Z13- B

Connecting DGPS beacon receiver

A DGPS beacon receiver whose output format is RS-232C can be connected to the GP-1850F.

Below is the example of interconnection between the GP-1850F and FURUNO beacon receiver GR-80.

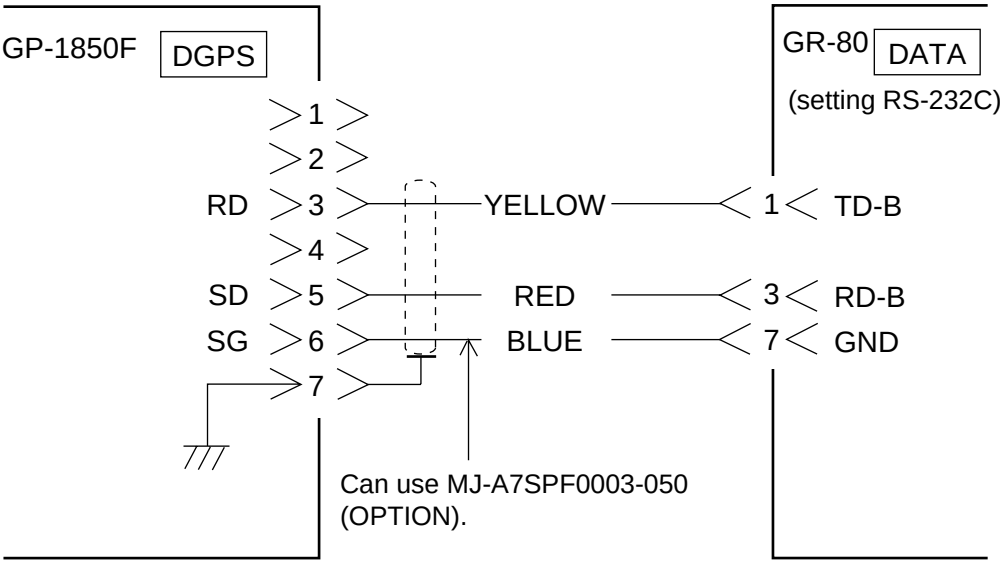
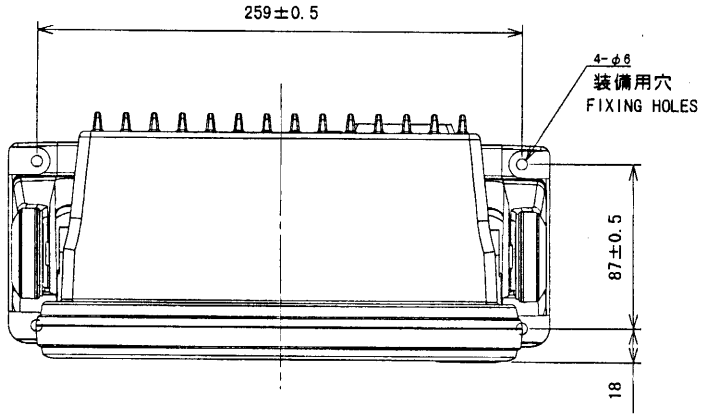


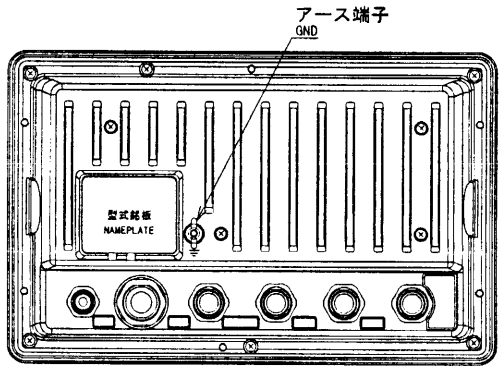
Figure 4-11 Connecting DGPS beacon receiver

FURUNO

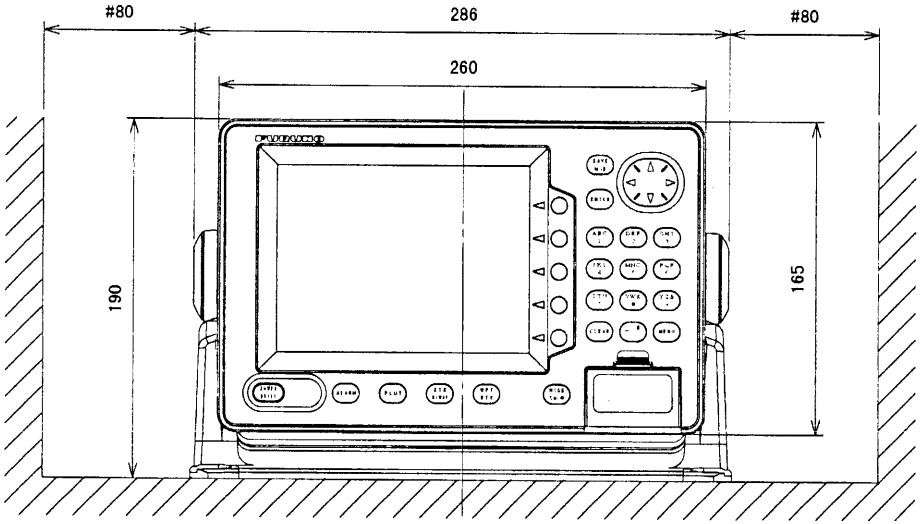
寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

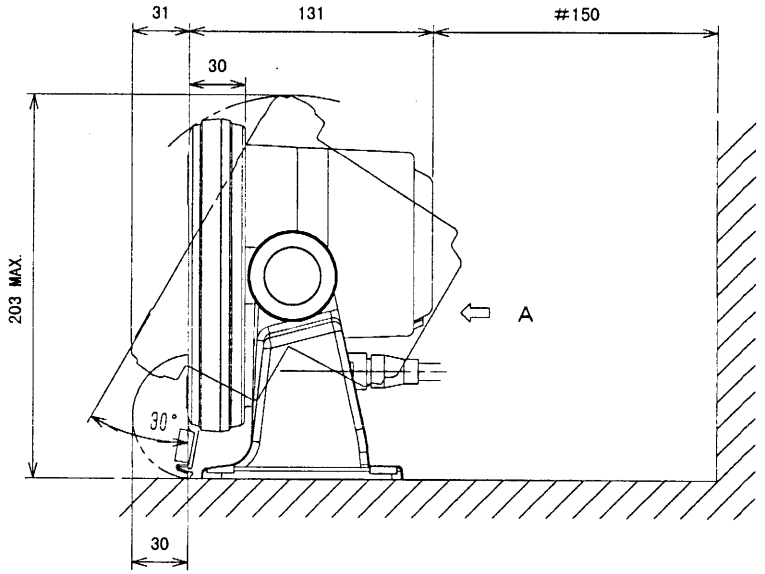
表 1 TABLE 1





矢視 A VIEW A





注 記

1）装備ケーブルはサービス時、指示部を前方に十分引き出せるよう余裕を持たせること。
2）取付用ネジはトラスタッピングネジ呼び径5×16を使用のこと。
3）指定外寸法公差は、表1による。
4）#印寸法は最小サービス空間とする。

NOTE

1. KEEP ENOUGH CABLE LENGTH BEHIND UNIT.
2. USE φ5x16 TAPPING SCREW FOR FIXING UNIT.
3. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
4. #: RECOMMENDED SERVICE CLEARANCE.

DRAWN Dec 8'98 T.Yamazaki		TITLE	GP-1850/D/F/DF
CHECKED Dec 8'98 K.Kusunoki		名称	指示部（ハンガー付）
APPROVED Dec 8'98 K.Kusunoki			外寸図
SCALE 1/4 MASS 3.0 kg		NAME	DISPLAY UNIT W/ HANGER
DWG. No. C4395-G01- A	14-063-1000-G1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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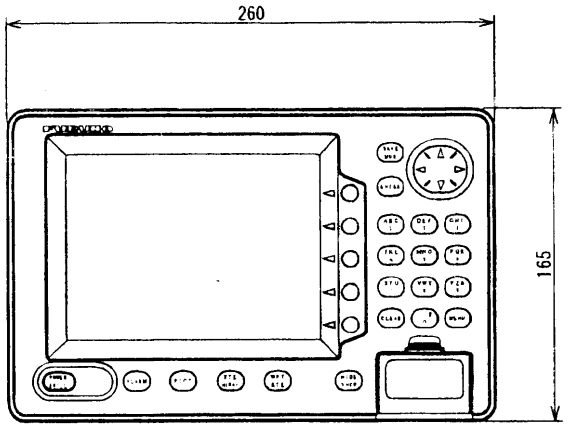
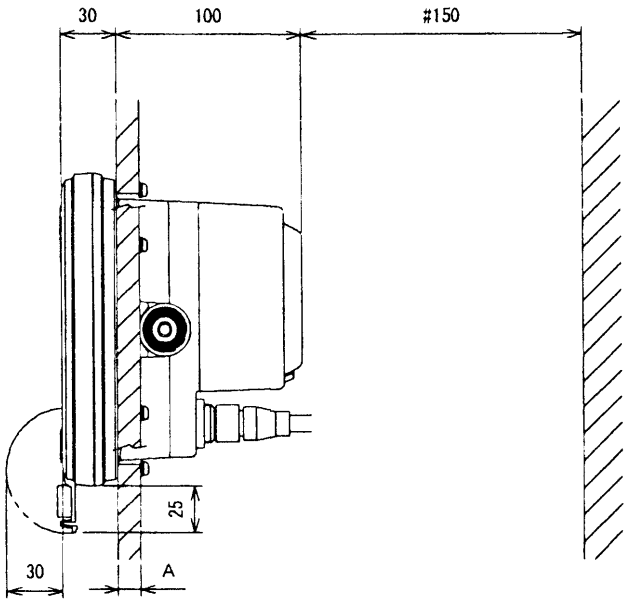
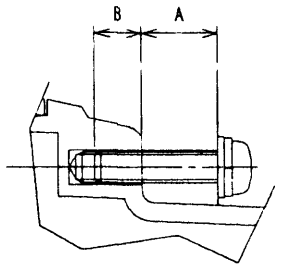
FURUNO



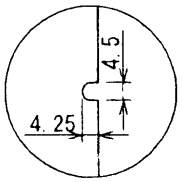


寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

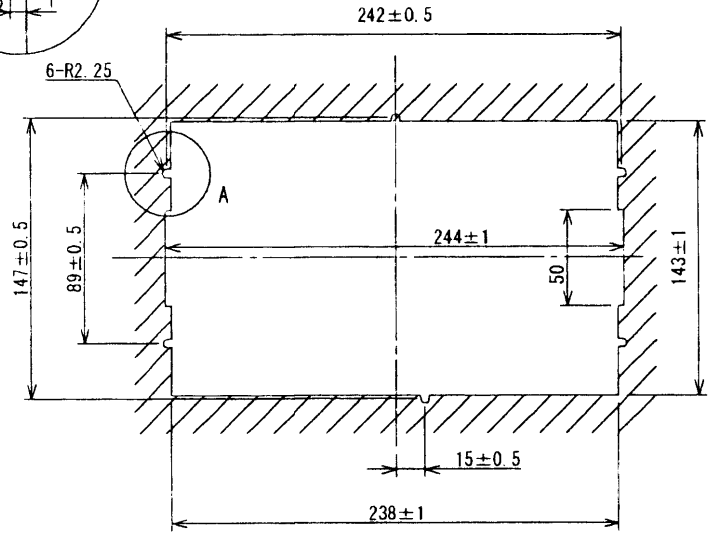
表 1 TABLE 1



取付ネジ部断面（尺度１／１）
DETAIL FOR FASTENING
(SCALE: 1/1)



A部詳細
DETAIL OF 'A'



取付穴寸法（正面）
CUTOUT DIMENSIONS (FRONT)

注　記

1）装備ケーブルはサービス時、指示部を前方に十分引き出せるよう余裕を持たせること。
2）取付用ネジは、セムスネジB M4X20を使用のこと。
壁の厚さ（A）は最小１１ 最大１４とする。
上記以外の壁に装備する場合、使用するネジの長さは(A+7.3)±1.5とする。（セムスネジBを使用）
筐体にはネジ部を７mm以上入れないこと。（B≦７）
3）指定外寸法公差は、表１による。
4）#印寸法は最小サービス空間とする。

NOTE

1. KEEP ENOUGH CABLE LENGTH BEHIND UNIT.
2. USE φ4x20 TAPPING SCREWS FOR FIXING THE UNIT.
THICKNESS A: 11≦A≦14 OR SCREW LENGTH: (A+7.3)±1.5.
DO NOT FASTEN SCREWS INTO UNIT MORE THAN 7 mm. (B≦7)
3. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
4. #: RECOMMENDED SERVICE CLEARANCE.

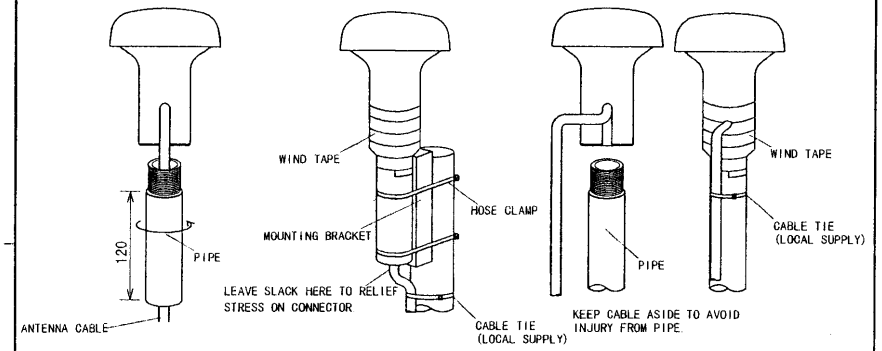
DRAWN Jan 21 '01 T. YAMASAKI		TITLE	GP-1850/D/F/DF
CHECKED Jan 22 '01 Y. K.		名称	指示部（フラッシュマウント）
APPROVED Jan 23 '01 S. Yoshimura			外寸図
SCALE 1/4 MASS ±10% 2.8 kg		NAME	DISPLAY UNIT(FLASH MOUNT)
DWG. No C4395-G02- B	14-063-1100-GI		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD

FURUNO

A) MAST MOUNTING

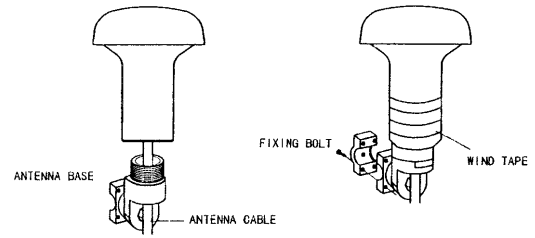
a) USE MAST MOUNTING KIT CP20-01111.



b) USE A PIPE ONLY.

B) HANDRAIL MOUNTING

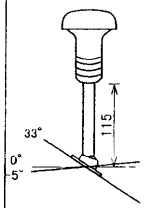
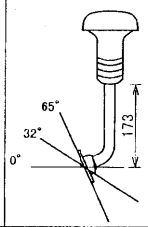
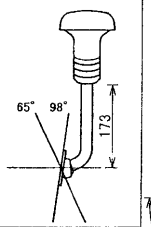
USE HANDRAIL MOUNTING BASE No. 13-RC5160 (CODE No. 000-806-114, OPTION).
THE DIAMETER OF THE HANDRAIL MAY BE FROM ϕ19mm TO ϕ32mm.



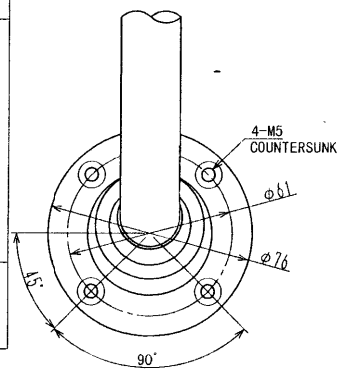
NOTE 1. FASTEN PIPE(ANTENNA BASE) TO ANTENNA UNIT FIRST THEN FIX THEM TO MAST OR HANDRAIL.
2. WHEN FIXING ANTENNA, TURN PIPE OR ANTENNA BASE; NOT THE ANTENNA.
TURNING THE ANTENNA MAY TWIST THE CABLE AND PLACE STRESS ON CONNECTOR.

C) ANTENNA BASE MOUNTING

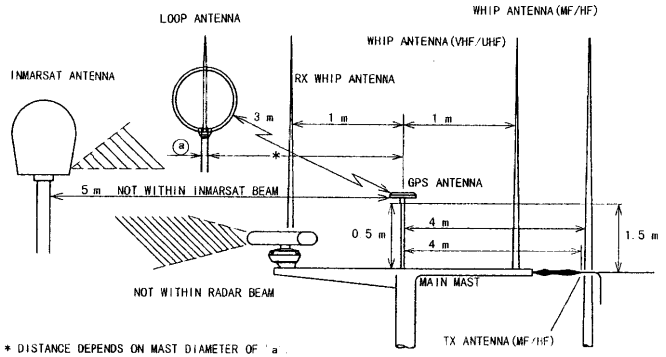
USE OPTIONAL ANTENNA BASE No. 13-QA330/QA310.

INCLINATION	-5° - 33°	32° - 65°	65° - 98°
MOUNTING METHOD			
ANTENNA BASE TYPE	RIGHT ANGLE ANTENNA BASE No. 13-QA330	L-TYPE ANTENNA BASE No. 13-QA310	
CODE No.	000-803-239	000-803-240	

MOUNTING DIMENSIONS OF ANTENNA BASE

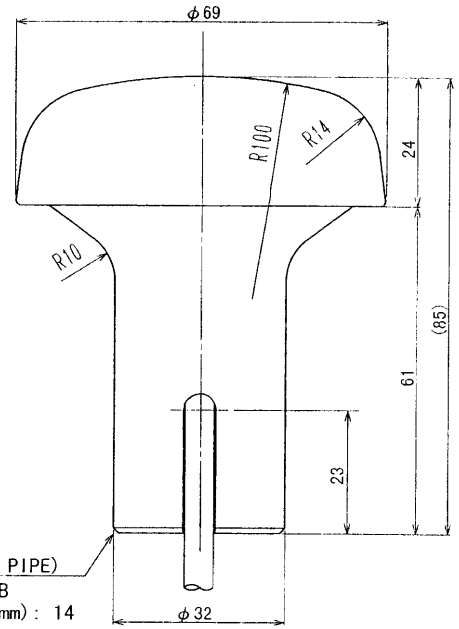


MOUNTING LOCATION THE FIGURE BELOW SHOWS THE RECOMMENDED SEPARATION DISTANCES FROM OTHER ANTENNAS TO AVOID MUTUAL INTERFERENCE.



* DISTANCE DEPENDS ON MAST DIAMETER OF 'a'

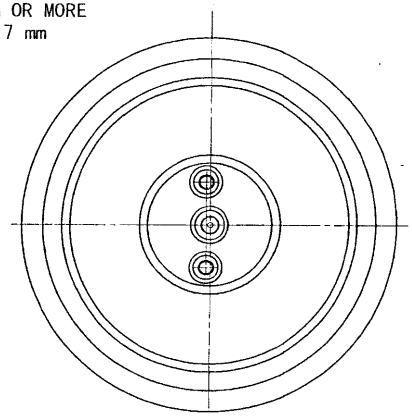
DIA. OF 'a'	DISTANCE (MIN.)
10 cm	1.5 m
30 cm	3 m



THREAD DIMENSION (FOR PIPE)
THREAD TYPE: 1x14UNS1B
THREADS PER INCH (25.4mm): 14
PITCH: 1.8143 mm
THREAD LENGTH: 19 mm OR MORE
PITCH DIAMETER: 24.17 mm

DIMENSION (mm)	TOL. (mm)
L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

TABLE 1



NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

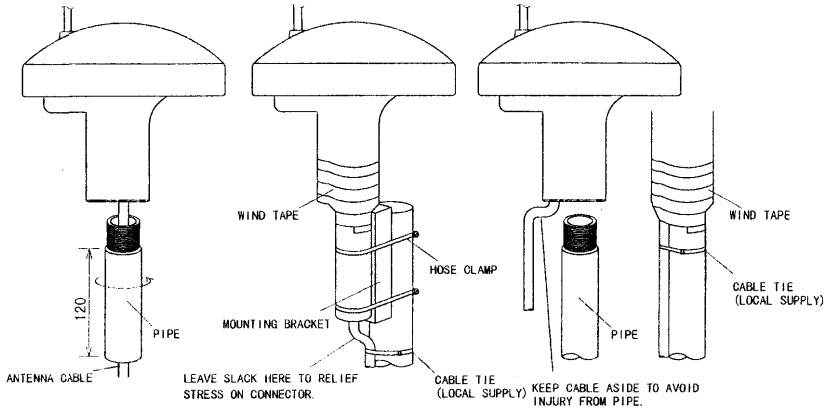
DRAWN June 17 '99 T.YAMASAKI		TITLE	GPA-017
CHECKED Jun 17 '99 K.Kusunoki		名称	空中線部
APPROVED Jun 17 '99 K.Kusunoki			外寸図
SCALE 1/1 MASS 0.59 kg		NAME	ANTENNA UNIT
DWG. No. E4384-G04- F			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

A) MAST MOUNTING

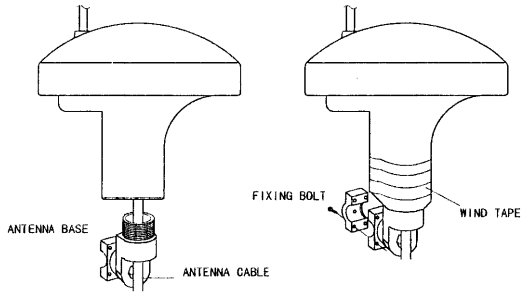
a) USE MAST MOUNTING KIT CP20-01111.



b) USE A PIPE ONLY.

B) HANDRAIL MOUNTING

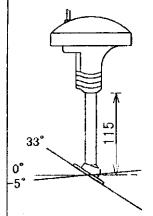
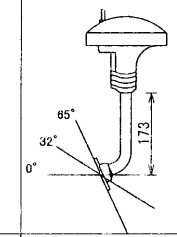
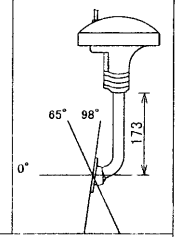
USE HANDRAIL MOUNTING BASE No. 13-RC5160 (CODE No. 000-806-114, OPTION).
THE DIAMETER OF THE HANDRAIL MAY BE FROM ϕ19mm TO ϕ32mm.



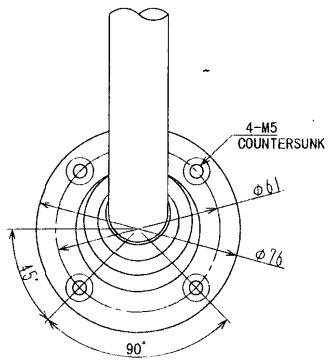
NOTE 1. FASTEN PIPE(ANTENNA BASE) TO ANTENNA UNIT FIRST THEN FIX THEM TO MAST OR HANDRAIL.
2. WHEN FIXING ANTENNA, TURN PIPE OR ANTENNA BASE; NOT THE ANTENNA.
TURNING THE ANTENNA MAY TWIST THE CABLE AND PLACE STRESS ON CONNECTOR.

C) ANTENNA BASE MOUNTING

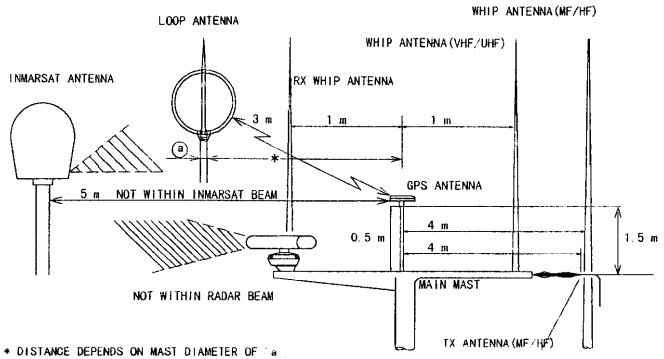
USE OPTIONAL ANTENNA BASE No. 13-QA330/QA310.

INCLINATION	-5° - 33°	32° - 65°	65° - 98°
MOUNTING METHOD			
ANTENNA BASE TYPE	RIGHT ANGLE ANTENNA BASE No. 13-QA330	L-TYPE ANTENNA BASE No. 13-QA310	
CODE No.	000-803-239	000-803-240	

MOUNTING DIMENSIONS OF ANTENNA BASE

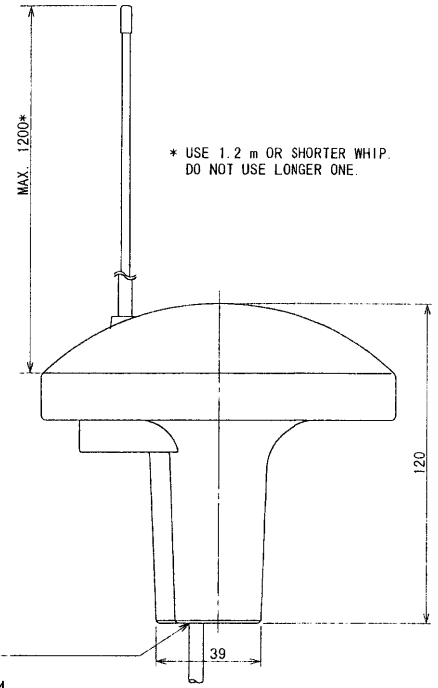


MOUNTING LOCATION THE FIGURE BELOW SHOWS THE RECOMMENDED SEPARATION DISTANCES FROM OTHER ANTENNAS TO AVOID MUTUAL INTERFERENCE.



* DISTANCE DEPENDS ON MAST DIAMETER OF 'a'

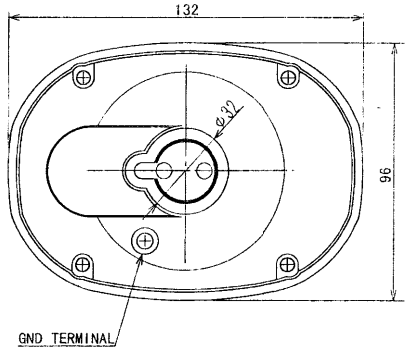
DIA. OF 'a'	DISTANCE (MIN.)
10 cm	1.5 m
30 cm	3 m



DIMENSION (mm)	TOL. (mm)
L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

TABLE 1

THREAD DIMENSION (FOR PIPE)
THREAD TYPE: 1x14UNS1B
THREADS PER INCH(25.4mm): 14
PITCH: 1.8143 mm
THREAD LENGTH: 19 mm OR MORE
PITCH DIAMETER: 24.17 mm



NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

TYPE	CABLE LENGTH(m)	PLAG	MASS (kg)
GPA-018	10	TNC-P-3	0.79
GPA-018S	0.2	TNC-J-3	0.35

TABLE 2

DRAWN	Jun 17 '99 T.YAMASAKI	TITLE	GPA-018/018S
CHECKED	Jun 17 '99 K.Furuno	名称	空中線部
APPROVED	Jun 17 '99 K.Furuno		外寸図
SCALE	1/2 MASS TABLE 2	NAME	ANTENNA UNIT
DWG No.	E4385-G01- G		OUTLINE DRAWING

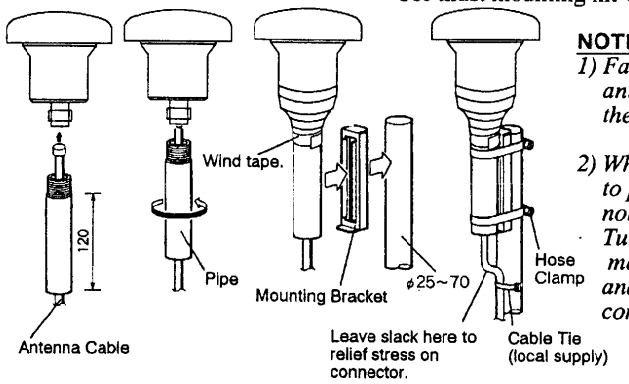
FURUNO ELECTRIC CO., LTD.

D-4

FURUNO

A) Mast mounting

Use mast mounting kit CP20-01111.



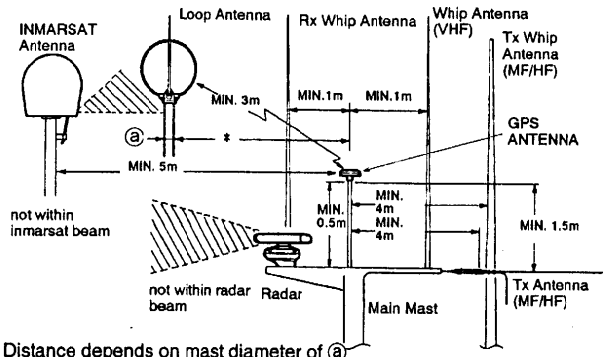
NOTES

1) Fasten pipe to antenna first then fix them to mast.

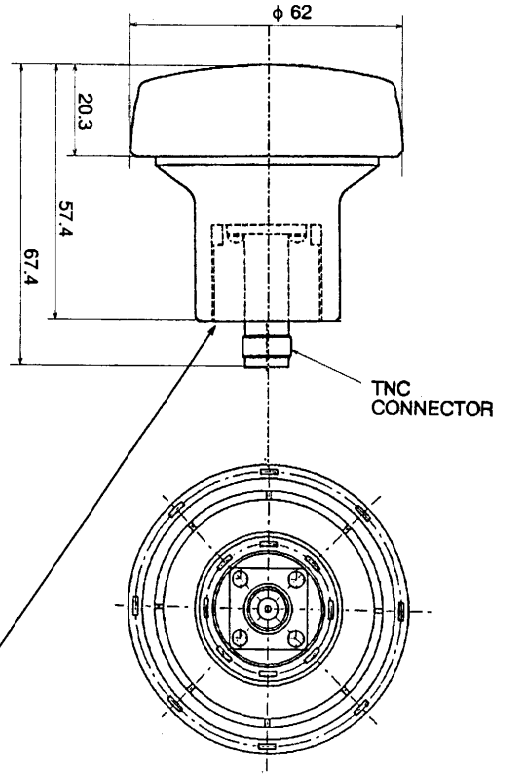
2) When fixing antenna to pipe, turn pipe; not the antenna. Turning the antenna may twist the cable and place stress on connector.

Mounting location

The figure below shows the recommended separation distances from other antennas to avoid mutual interference.

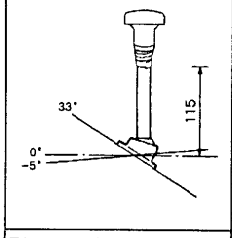
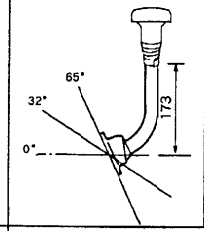
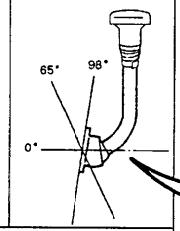


* Distance depends on mast diameter of ⓐ
ⓐ mast diameter 10cm : minimum 1.5m
ⓐ mast diameter 30cm : minimum 3m

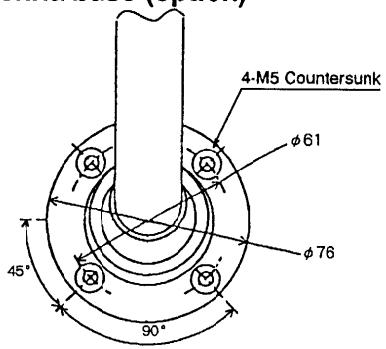


B) Antenna base mounting

Use optional antenna base No.13-QA300 or No.13-QA310.

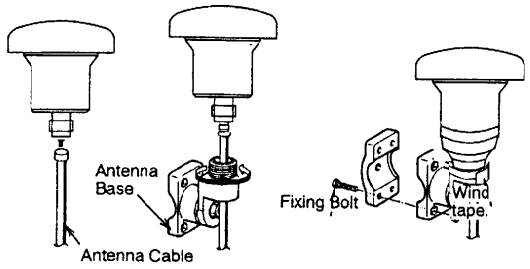
Inclination -5° to 33°	32° to 65°	65° to 98°
		
Right angle antenna base No.13-QA330 (code No. 000-803-239)	L-type antenna base No.13-QA310 (code No. 000-803-240)	

Mounting dimensions of antenna base (option)



Thread Type	Threads per 25.4 mm (1 inch)	Pitch	Thread Length	Pitch Diameter
1 × 14UNS1B	14	1.8143 mm	15.17 mm	24.17 mm

C) Handrail mounting



Use handrail mounting base No.13-RC5160 (Code No. 000-861-114, option). The diameter of the handrail may be from ϕ19mm to ϕ32mm.

NOTES

1) Fasten antenna base to antenna first then fix them to handrail.

2) When fixing antenna to antenna base, turn antenna base; not the antenna. Turning the antenna may twist the cable and place stress on connector.

DRAWN Nov 20'98 T.YAMASAKI	GP-50MK3 PS-8000M2 GP-1600/F GP-8000M2 GP-3100M2 GP-80		TYPE GPA-016
CHECKED Nov 24'98 K.KUSUNOKI			名称 空中線部
APPROVED Nov 24'98 K.KUSUNOKI			外寸図
SCALE 1/1	MASS 0.1kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME ANTENNA UNIT
DWG NO. E4374-G04- F				OUTLINE DRAWING

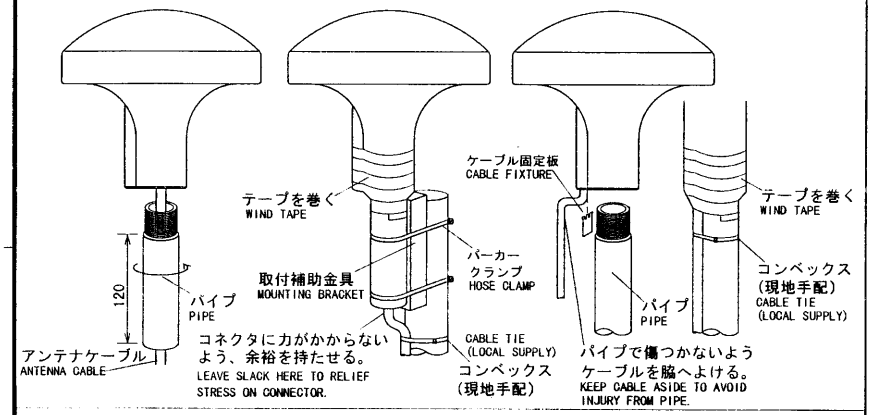
FURUNO ELECTRIC CO., LTD.

FURUNO

A) マストへの取付け　MAST MOUNTING

a) マスト取付金具CP20-01111(工事材料)でマストに固定する。
USE MAST MOUNTING KIT CP20-01111.

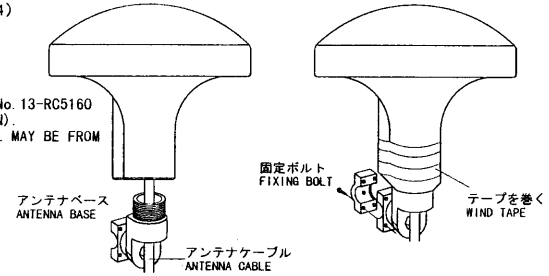
b) パイプのみを使うとき
USE A PIPE ONLY.



B) スタンションやパルピットにつけるとき　HANDRAIL MOUNTING

レール用アンテナベース No. 13-RC5160 (取付可能レール直径：φ19～φ32)
(コード番号：000-806-114)

USE HANDRAIL MOUNTING BASE No. 13-RC5160
(CODE No. 000-806-114, OPTION).
THE DIAMETER OF THE HANDRAIL MAY BE FROM φ19mm TO φ32mm.

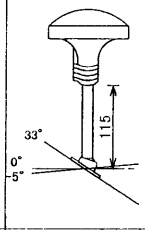
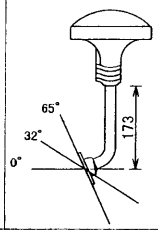
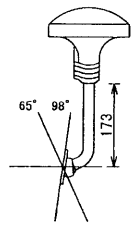


注記 1) パイプ(アンテナベース)はアンテナユニットにねじ込んだ後に固定する。
2) アンテナを固定するときはパイプ（アンテナベース）をアンテナにねじ込むこと。
アンテナ側をねじるとコネクタ部やケーブルに無理がかかり、故障の原因となる。

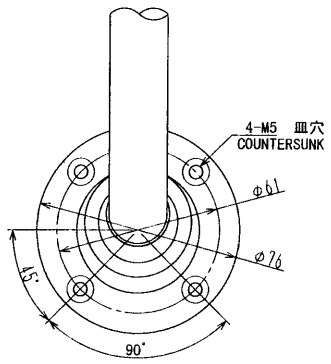
NOTE 1. FASTEN PIPE(ANTENNA BASE) TO ANTENNA UNIT FIRST THEN FIX THEM TO MAST OR HANDRAIL.
2. WHEN FIXING ANTENNA, TURN PIPE OR ANTENNA BASE; NOT THE ANTENNA.
TURNING THE ANTENNA MAY TWIST THE CABLE AND PLACE STRESS ON CONNECTOR.

C) 取付ける場所が傾斜しているとき　ANTENNA BASE MOUNTING

オプションのアンテナベースを使う。
USE OPTIONAL ANTENNA BASE No. 13-QA330/QA310.

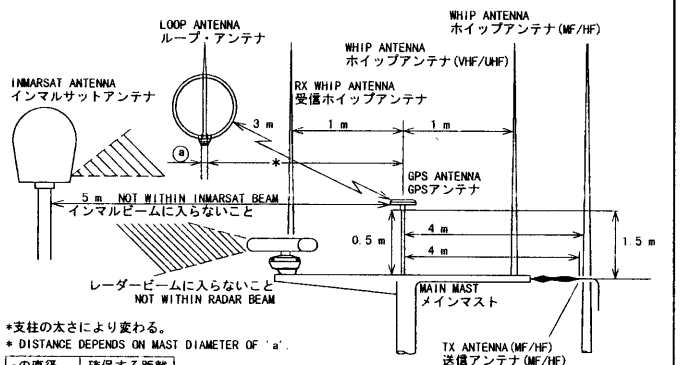
傾斜 INCLINATION	-5° - 33°	32° - 65°	65° - 98°
装備方法 MOUNTING METHOD			
アンテナベース型式 ANTENNA BASE TYPE	直型アンテナベース RIGHT ANGLE ANTENNA BASE No. 13-QA330	L型アンテナベース L-TYPE ANTENNA BASE No. 13-QA310	
コード番号 CODE No.	000-803-239	000-803-240	

アンテナベース基部
MOUNTING DIMENSIONS OF ANTENNA BASE



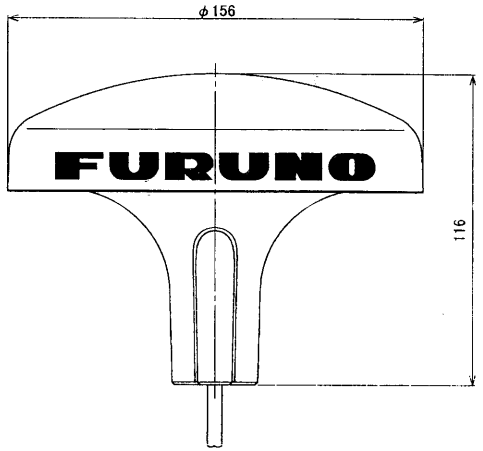
取付場所　MOUNTING LOCATION

THE FIGURE BELOW SHOWS THE RECOMMENDED SEPARATION DISTANCES FROM OTHER ANTENNAS TO AVOID MUTUAL INTERFERENCE.
他の機器のアンテナから下の図の距離以上離す。



*支柱の太さにより変わる。
* DISTANCE DEPENDS ON MAST DIAMETER OF 'a'.

aの直径 DIA. OF 'a'	確保する距離 DISTANCE (MIN.)
10 cm	1.5 m
30 cm	3 m

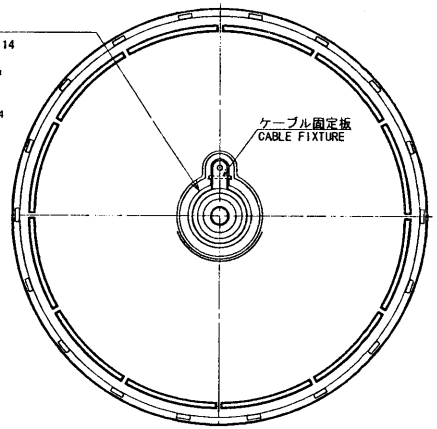


寸法区分(mm) DIMENSION	公差(mm) TOL.
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

表 1　TABLE 1

1-14UNS1B
ねじ山数(25.4mmにつき)：14
ピッチ：1.8143 mm
オネジ有効長さ：15.17 mm
オネジ有効径：24.17 mm

THREAD PER 25.4mm (1 INCH): 14
PITCH: 1.8143 mm
THREAD LENGTH: 15.17 mm
PITCH DIAMETER: 24.17 mm



注記：　指定外の寸法公差は表1による

NOTE: TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

型式 TYPE	ケーブル長(m) CABLE LENGTH	プラグ PLAG	質量 (kg) MASS
GPA-019	10	TNC-P-3	1.0
GPA-019S	0.2	TNC-J-3	0.54

表 2　TABLE 2

DRAWN	Jun 17'99 T.YAMADA	TITLE	GPA-019/019S
CHECKED	Jun 17'99 K.Furuuchi	名称	空中線部
APPROVED	Jun 17'99 K.Furuuchi		外寸図
SCALE	1/2	NAME	ANTENNA UNIT
MASS	TABLE 2 表2参照		OUTLINE DRAWING
DWG. No.	C4400-G01- D		

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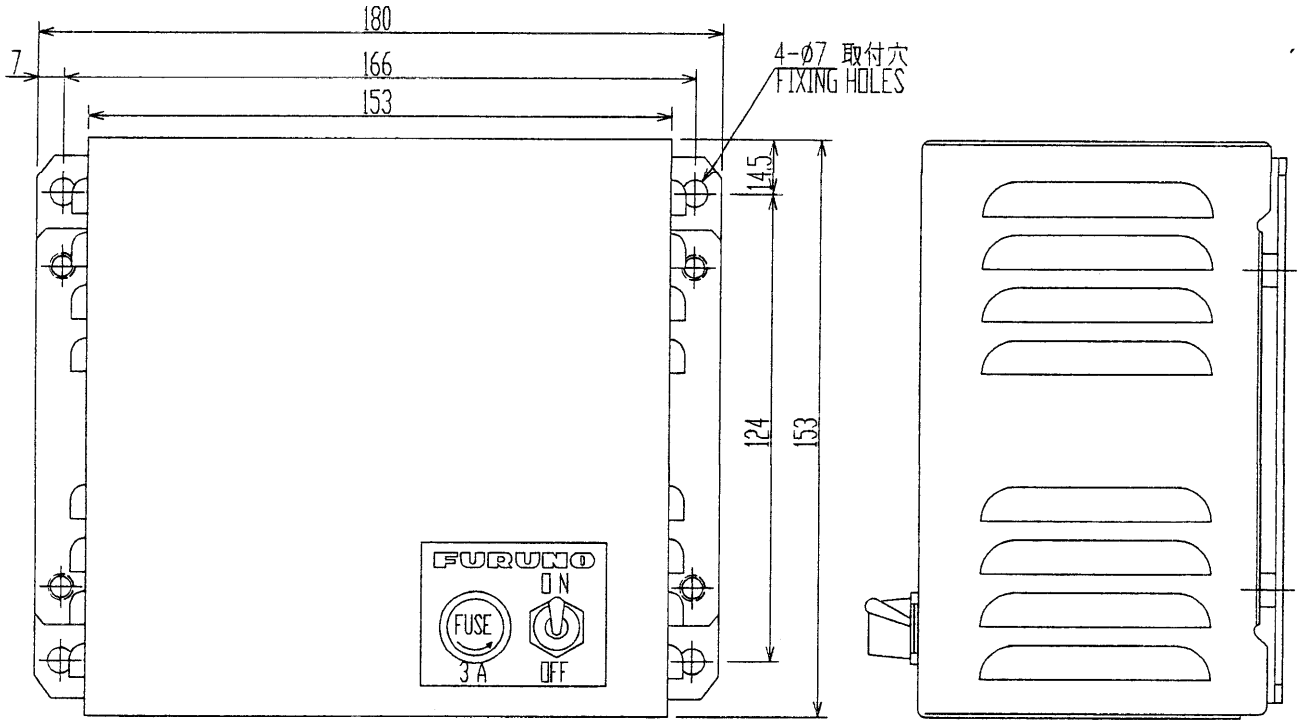
D-16



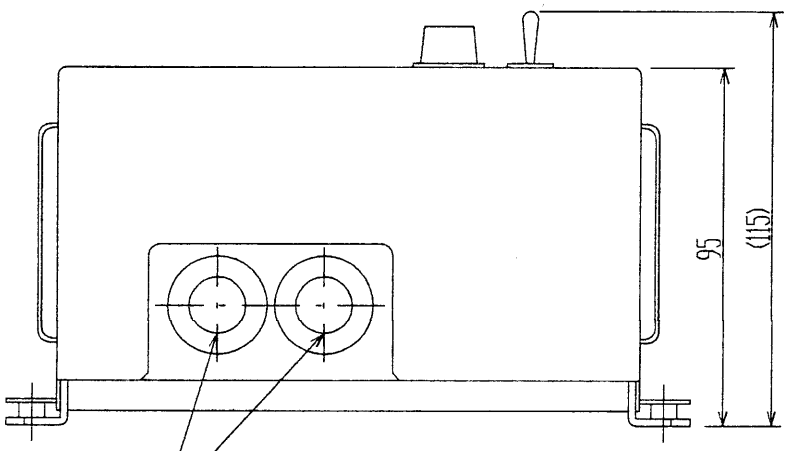
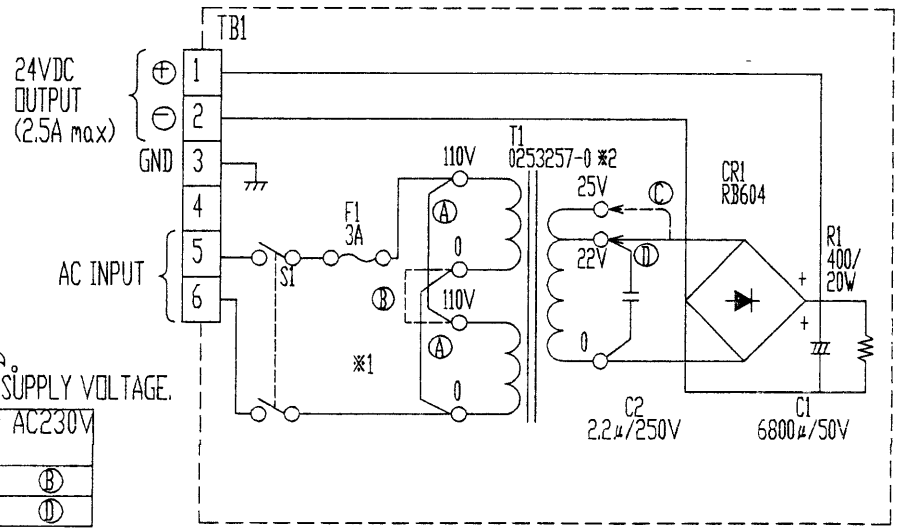


表1 TABLE 1

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3



入力電圧に応じて接続を変更して下さい。
CHANGE TAP CONNECTIONS DEPENDING ON SUPPLY VOLTAGE.

	AC100V	AC110/115V	AC220V	AC230V
※1	Ⓐ	Ⓐ	Ⓑ	Ⓑ
※2	Ⓒ	Ⓓ	Ⓓ	Ⓓ

DRAWN Sep. 14 '01 T.YAMASAKI		TITLE	PR-62
CHECKED Sep 14 '01 Y.K		名称	整流器
APPROVED Sep 14 '01			外寸図
SCALE 1/2	MASS 3 ±10% kg	NAME	RECTIFIER
DWG.No. C5003-034- E			OUTLINE DRAWING

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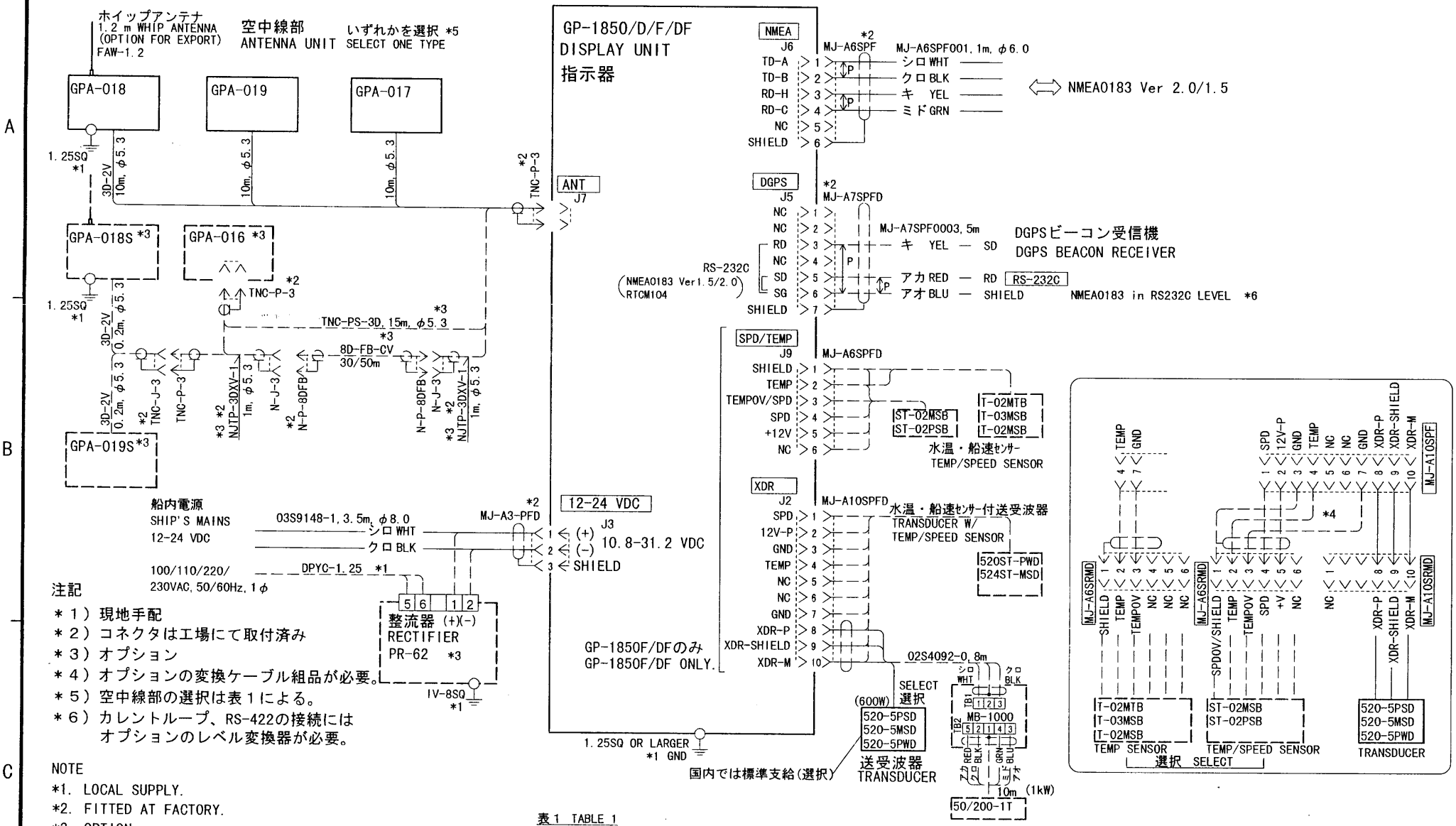

注記

*1）現地手配
*2）コネクタは工場にて取付済み
*3）オプション
*4）オプションの変換ケーブル組品が必要。
*5）空中線部の選択は表1による。
*6）カレントループ、RS-422の接続には
　　オプションのレベル変換器が必要。

NOTE

*1. LOCAL SUPPLY.
*2. FITTED AT FACTORY.
*3. OPTION
*4. THREE-WAY CONVERSION CABLE NEEDED (OPTION).
*5. REFER TO TABLE 1 FOR ANTENNA UNIT SELECTION.
*6. OPTIONAL LEVEL CONVERTER REQUIRED FOR
　　CURRENT LOOP OR RS422 OUTPUT.

表1 TABLE 1

型式 TYPE	空中線部 ANTENNA UNIT
GP-1850/F	GPA-017 GPA-016
GP-1850D/DF	GPA-018/018S GPA-019/019S

DRAWN	June 10 '99 T.YAMASAKI		TITLE GP-1850/D/F/DF
CHECKED	June 10 '99 K.Kusunoki		名称 GPSプロッタ／GPSプロッタ魚探
APPROVED	Jun 16 '99 K.Kusunoki		相互結線図
SCALE	MASS kg		NAME GPS PLOTTER, GPS PLOTTER/SOUNDER
DWG. No.	C4395-C01- H		INTERCONNECTION DIAGRAM

S-1-1

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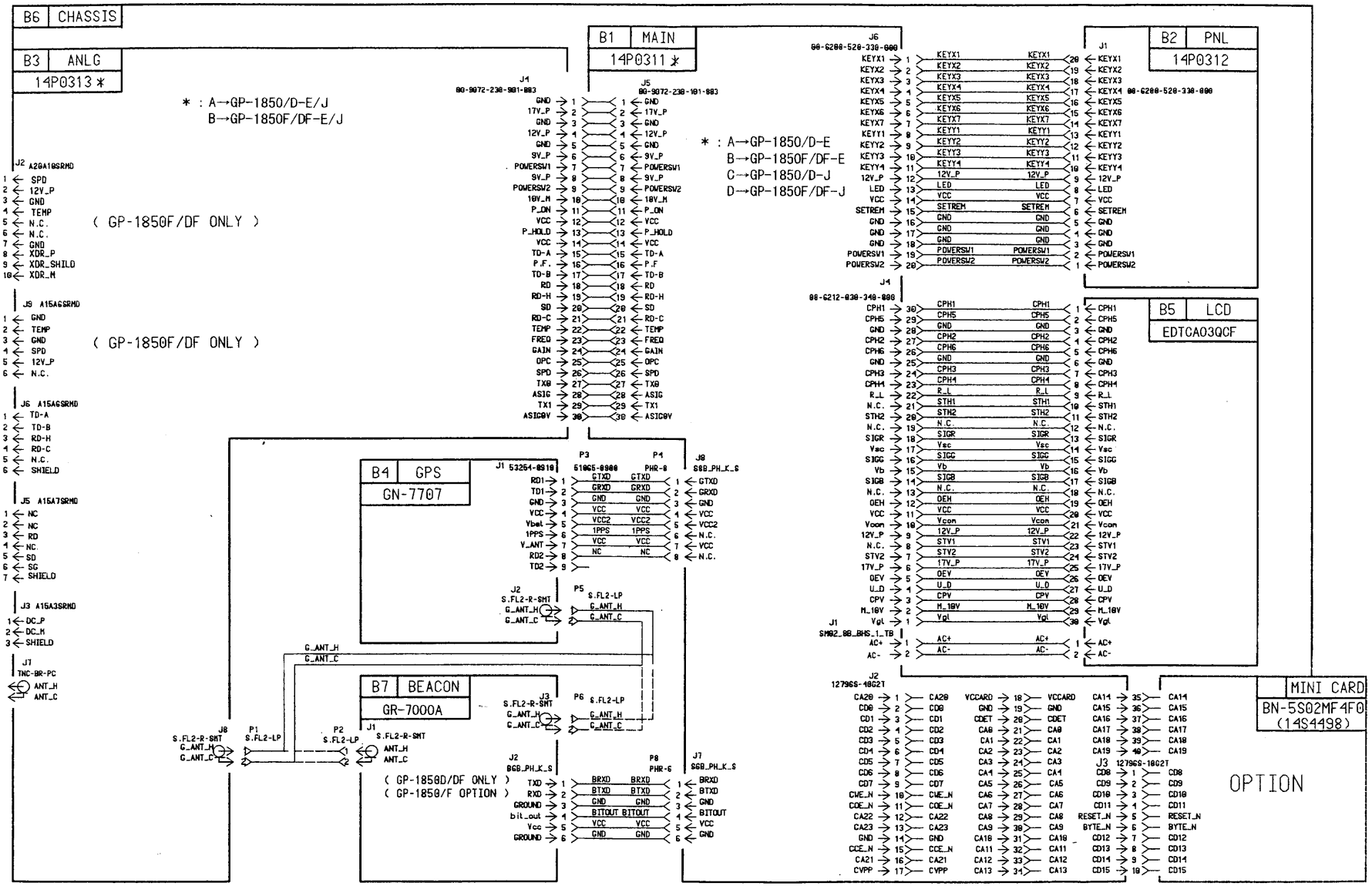

DRAWN Dec22'99 T.TANASAKA			TYPE GP-1850/D/F/DF
CHECKED Dec22'99 K.Kusumoto	GP-1850DF GP-1850F GP-1850/D		名称 指示器（総合） 回路図
APPROVED Dec22'99 K.Kusumoto			
SCALE / MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME DISPLAY UNIT(GENARAL)
DWG NO. C4395-K01- D	14-063-0001- 3		SCHEMATIC DIAGRAM

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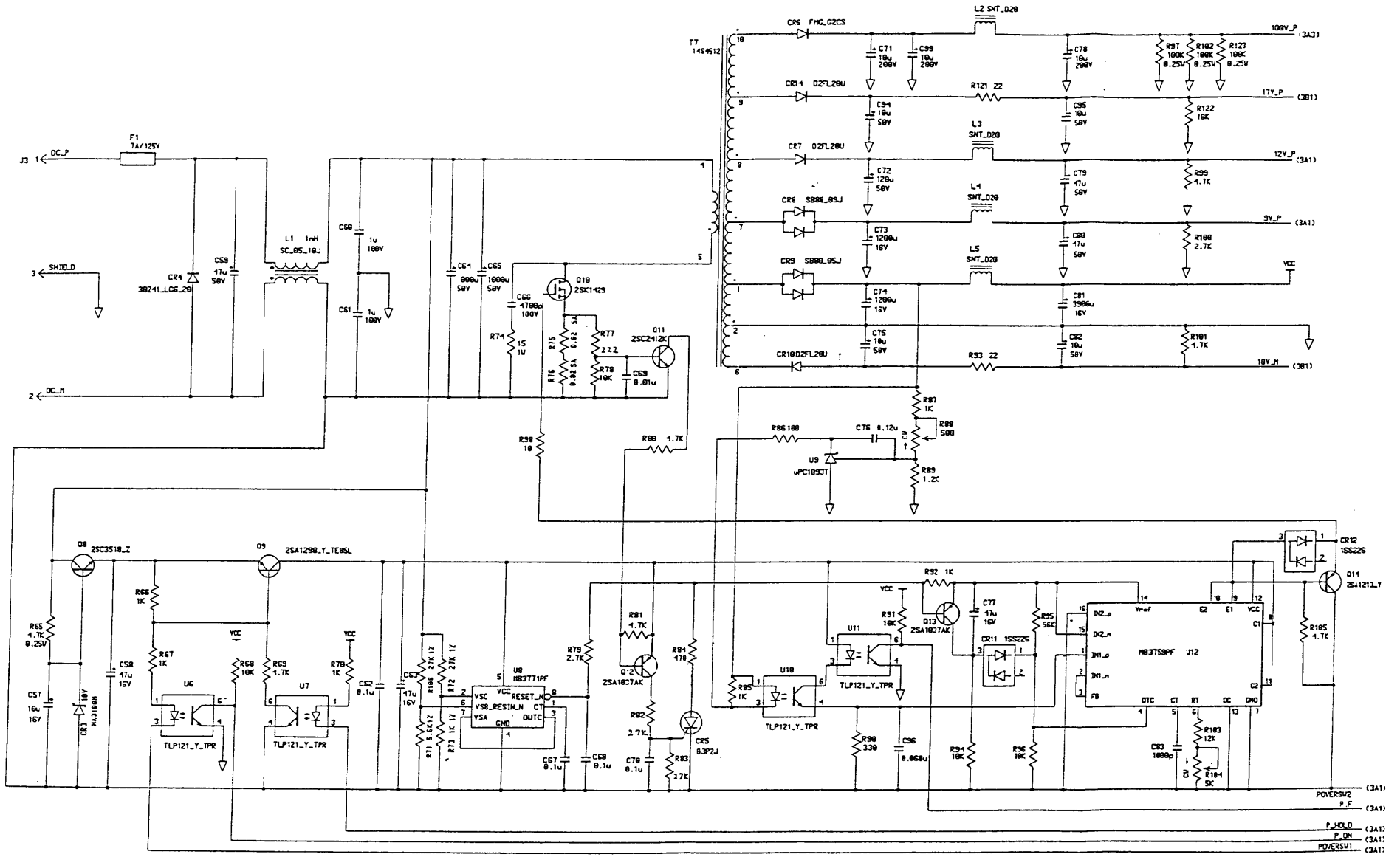

DRAWN Dec 17 '98 T.TAMASAKI			TYPE	14P0313
CHECKED Dec 17 '98 K.KISHIMOTO			名称	アナログ基板 (2/3)
APPROVED Dec 17 '98 K.KISHIMOTO	GP1850SER			回路図
SCALE /	MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME ANLG PCB(2/3)
DWG NO. C4395-K03- A	14-063-0004- 1			SCHEMATIC DIAGRAM

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