FURUNO

OPERATOR'S MANUAL

NETWORK SOUNDER

MODEL **DFF1**

FURUNO ELECTRIC CO., LTD.

www.furuno.co.jp

IMPORTANT NOTICES

- The descriptions in this manual are intended for readers with a solid knowledge of English.
- No part of this manual may be copied or reproduced without written permission.
- If this manual is lost or worn, contact your dealer about replacement.
- The contents of this manual and equipment specifications are subject to change without notice.
- The example screens (or illustrations) shown in this manual may not match the screens you see on your display. The screen you see depends on your system configuration and equipment settings.
- Store this manual in a convenient place for future reference.
- FURUNO will assume no responsibility for the damage caused by improper use or modification of the equipment (including software) by an unauthorized agent or a third party.
- When it is time to discard this product it must be done according to local regulations for disposal of industrial waste. For disposal in the USA, refer to the Electronics Industries Alliance (http://www.eiae.org/).

⚠ SAFETY INSTRUCTIONS

The user and installer must read the appropriate safety instructions before attempting to install or operate the equipment.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

⚠ Warning, Caution ⃠ Prohibitive Action ❗ Mandatory Action

Safety instructions for the operator

⚠ WARNING

Do not open the equipment.

Only qualified personnel should work inside the equipment.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

Turn off the equipment immediately if it is emitting smoke or fire.

Fire or electrical shock can result if the power is left on.

Turn off the power immediately if water leaks into the equipment or an object is dropped inside the equipment.

Continued use can cause fire or electrical shock.

T**urn off the power immediately if you feelthe equipment is acting abnormally.**

If the equipment is very warm or is emitting strange noises turn off the power immediately and contact your dealer for advice.

⚠ WARNING

Do not operate the equipment with wet hands.

Electrical shock can result.

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

Electrical shock can result.

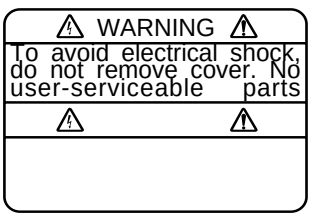
Do not install the network sounder unit where it may be subjected to rain or water splash.

Fire or electrical shock can result if water gets inside the equipment.

Use the proper fuse.

Use of a wrong fuse can damage the equipment and may cause fire.

A warning label is attached to the equipment. Do not remove these labels. If a label is missing or illegible, contact a FURUNO agent or dealer about replacement.



Name: Warning Label (1)
Type: 86-003-1011-2
Code No.: 100-236-232

Safety instructions for the installer

⚠ WARNING

Do not open the equipment.

Only qualified personnel should work inside the equipment.

Turn off the power before beginning the installation.

Fire or electrical shock can result if the power is left on.

Confirm that is no water leakage at the transducer and temperature sensor.

Water leakage can sink the vessel. Also, confirm that neither the transducer or sensor will loosen by vibration. The installer is solely responsible for the installation.

Confirm that the power supply voltage is within the rating of this equipment.

Incorrect voltage will damage the equipment and may cause fire.

⚠ CAUTION

The transducer cable must be handled carefully, following the guidelines below.

- **Keep fuels and oils away from the cable.**
- **Locate the cable away from chemicals.**
- **Locate the cable away from locations where it might be damaged.**

Do not turn on the power with the transducer exposed to air.

Damage to the transducer may result.

Observe the following compass safe distances to prevent interference to a magnetic compass:

Standard compass	Steering compass
0.30 m	0.30 m

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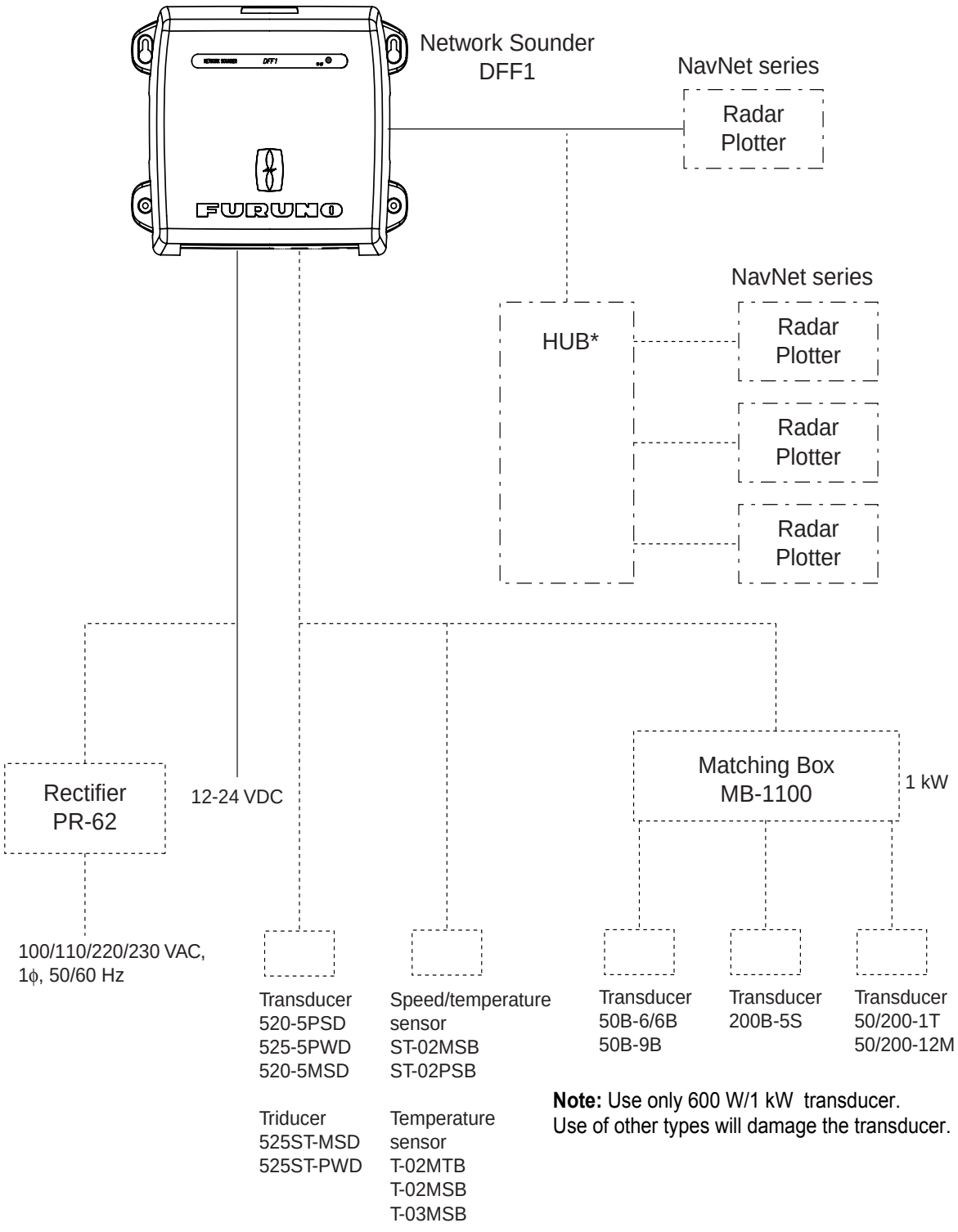
SYSTEM CONFIGURATION



*: HUB may be connected to 3 sets of NavNet radar or plotter.

———— : Standard supply
---------- : Optional supply
— - — - — : External equipment

1. MOUNTING

1.1 Equipment Lists

Standard supply

Name	Type	Code No.	Qty	Remarks
Network Sounder	DFF1	-	1	
Spare Parts	SP02-05201	001-007-860	1 set	Fuse
Installation Materials	CP02-08100	000-010-153	1 set	Power cable, LAN cable, Self-tapping screws

Optional supply

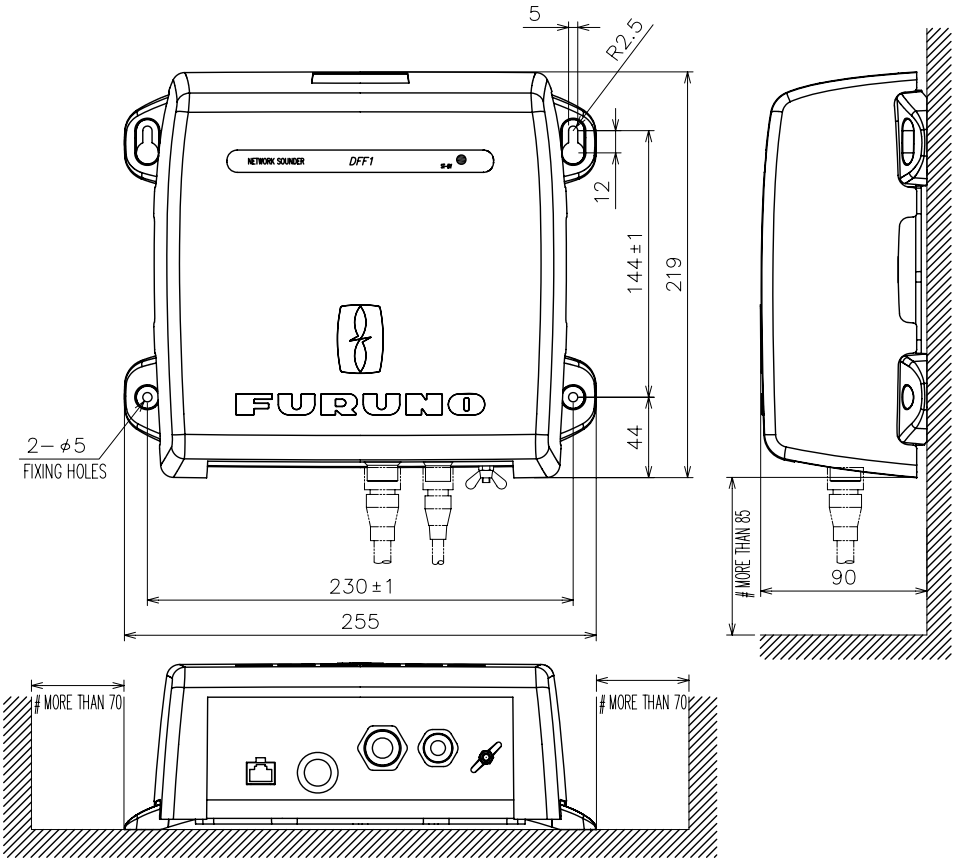
Name	Type	Code No.	Remarks
Matching Box	MB-1100	000-041-353	For 1 kW
Cable Assy.	MJ-A6SPF0017-010C	000-159-704-11	1 m, for NavNet
	MJ-A6SPF0017-100C	000-159-706-11	10 m, for NavNet
	MJ-A6SPF0017-200C	000-159-707-11	20 m, for NavNet
	MJ-A6SPF0017-300C	000-159-708-11	30 m, for NavNet
	MJ-A6SRMD/TM11AP8-005	000-144-463	For HUB
	MOD-Z072-020+	000-167-175-10	2 m, for NavNet 3D
	MOD-Z072-050+	000-167-176-10	5 m, for NavNet 3D
	MOD-Z072-100+	000-167-177-10	10 m, for NavNet 3D
Inner Hull Kit S	22S0191-2	000-802-598	
Triducer	525ST-MSD	000-015-263	Thru-hull mount
	525ST-PWD	000-015-261	Transom mount
Transducer	520-5PSD	000-015-204	Thru-hull mount
	520-5PWD	000-015-126	Transom mount
	520-5MSD	000-015-212	Thru-hull mount
	50B-6	000-015-042	10 m, 1 kW
	50B-6B	000-015-043	15 m, 1 kW
	50B-9B	000-015-065	15 m, 1 kW
	200B-5	000-015-027	10 m, 1 kW
	200B-5S	000-015-029	10 m, 1 kW
	50/200-1T	000-015-170	10 m, 1 kW
	50/200-12M	000-015-171	10 m
Speed/Temperature Sensor	ST-02MSB	000-137-986	Thru-hull mount
	ST-02PSB	000-137-987	Thru-hull mount
Temperature Sensor	T-02MTB	000-040-026	Transom mount
	T-02MSB	000-040-040	Thru-hull mount
	T-03MSB	000-040-027	
Cable Assy.	02S4147	000-141-082	For Speed/Temp sensor, Temp. sensor
Rectifier	PR-62	000-013-484	100 VAC
		000-013-485	110 VAC
		000-013-486	220 VAC
		000-013-487	230 VAC

Note: Use only 600 W/1 kW transducer. Use of other types will damage the transducer.

1.2 Network Sounder

The network sounder can be installed on a desktop, deck or on a bulkhead. When selecting a mounting location for the network sounder, keep the following in mind:

- 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 from electromagnetic field-generating equipment such as motors and generators.
- Leave slack in cables for maintenance and servicing ease.
- A magnetic compass will be affected if the network sounder is placed too close to it. Observe the compass safe distances noted in the safety instructions to prevent disturbance to the magnetic compass.
- Fasten the network sounder to the mounting location with four self-tapping screws (4×20).

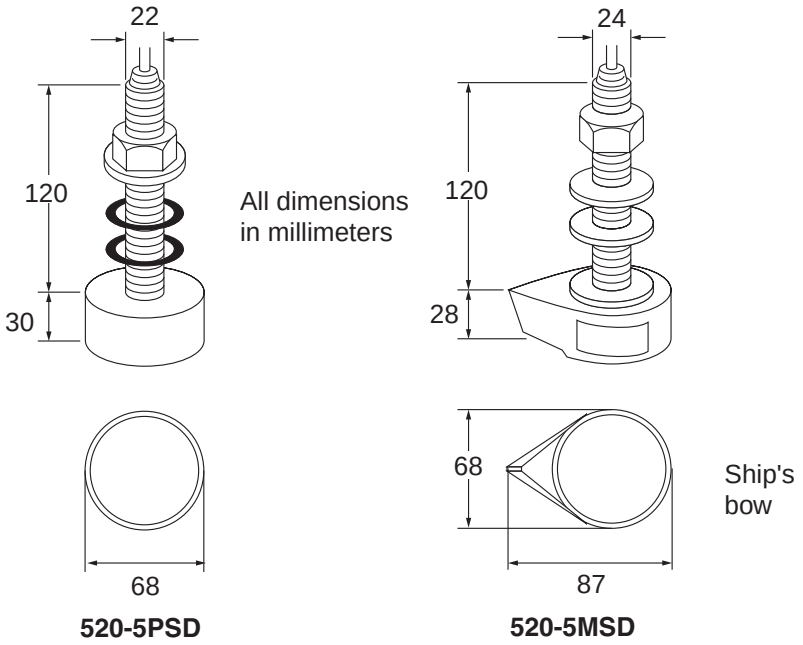


1.3 Transducer 520-5PSD, 520-5MSD

1.3.1 Mounting location

.The performance of this 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 and the following factors in mind:

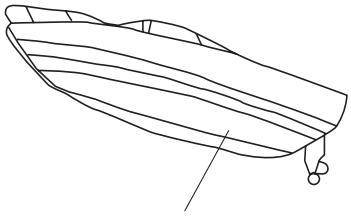
- When the boat has a keel, the transducer should be at least 15-30 cm away from it. Typical thru-hull mountings are shown in the figure on the next page.
- Air bubbles and turbulence caused by movement of the boat seriously degrade the sounding capability of the transducer. The transducer should, therefore, 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.



Dimensions of transducers 520-5PSD, 520-5MSD

1.3.2 Acceptable mounting locations

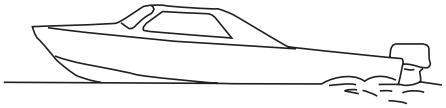
Deep-V hull

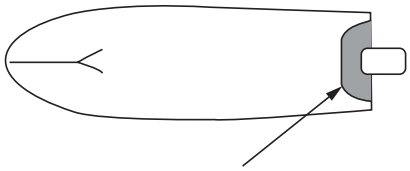


* Position 1/2 to 1/3 length of the hull from stern.
* 15-30 cm from center line (inside first lifting strakes).

Transducer mounting location on deep-V hull

High speed V-planing hull





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

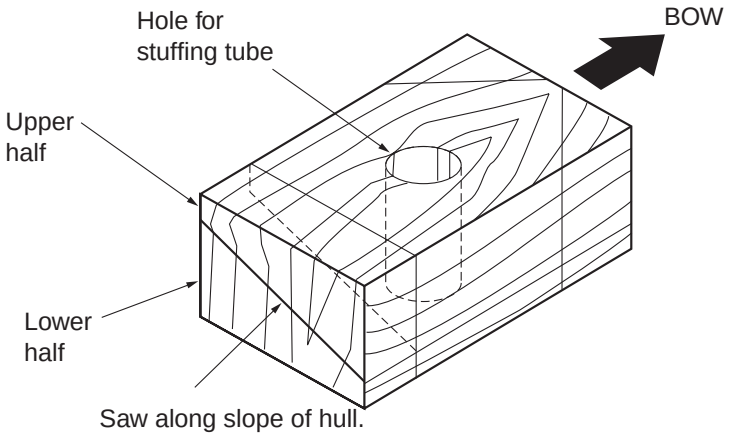
Transducer mounting location on high speed V-planing hull

1.3.3 Installation procedure

1. With the boat hauled out of the water, mark the location selected for mounting the transducer on the bottom of the hull.

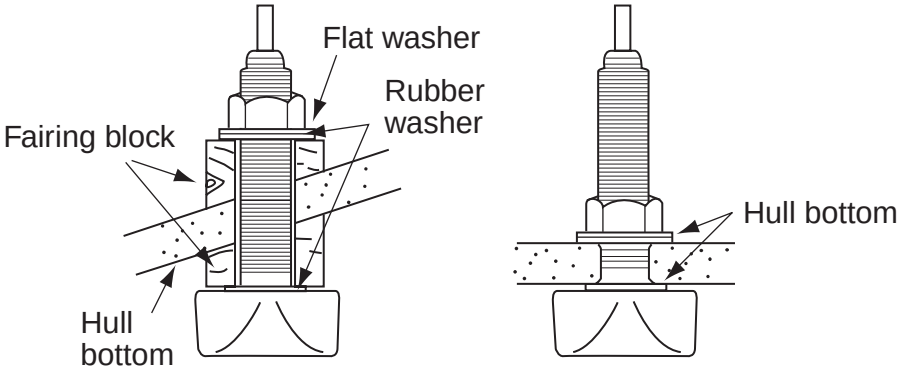
   If the hull is not level within 15° in any direction, fairing blocks made out of teak should be used between the transducer and hull, both inside and outside, to keep the transducer face parallel with the water line. Fabricate the fairing block as shown below and make the entire surface as smooth as 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.



Construction of fairing block

2. Drill a hole just large enough to pass the threaded stuffing tube of the transducer through the hull, making sure it is drilled vertically.
3. 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.
4. 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 water line.

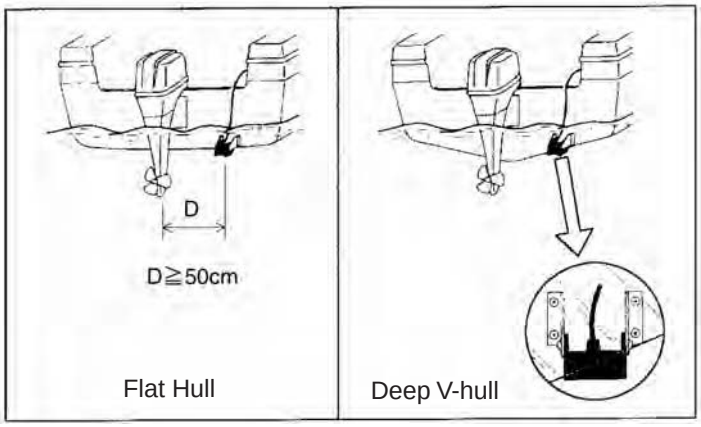


Note: Do not over-stress the stuffing tube and locking nuts through excessive tightening, since the wood block will swell when the boat is placed in the water. It is suggested that the nut be tightened lightly at installation and retightened several days after the boat has been launched.

1.4 Transducer 525-5PWD (transom mount)

This type of mounting is very commonly employed for outboard motor 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).



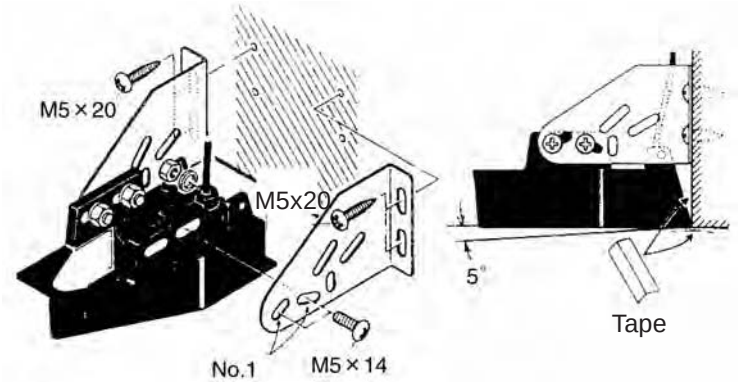
Transom mount transducer mounting locations

1.4.1 Installation 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 self-tapping screws (supplied).
3. Adjust the transducer position so the transducer faces right to the seabed.

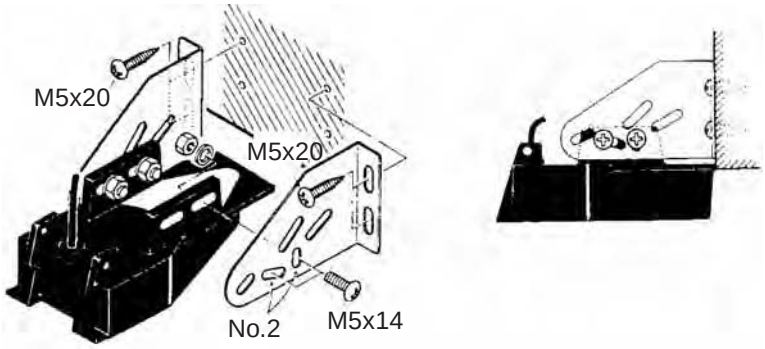
   Note: If necessary, to improve water flow and minimize air bubbles staying on the transducer face, incline the transducer about 5° at the rear. This may require a certain amount of experimentation for fine tuning at high cruising speeds.
4. Fill the gap between the wedge front of the transducer and transom with epoxy material to eliminate any air spaces.



Transom mount transducer, mounting flush with hull

1.4.2 Installation 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.



Transom mount transducer, projecting from hull

1.4.3 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.

Note: Do not paint the transducer. Performance will be affected.

1.5 Inside Hull Mount

This mounting method is available for FRP boats.

1.5.1 Necessary tools

You will need the following tools:

- Sandpaper (#100)
- Silicone sealant
- Silicone grease

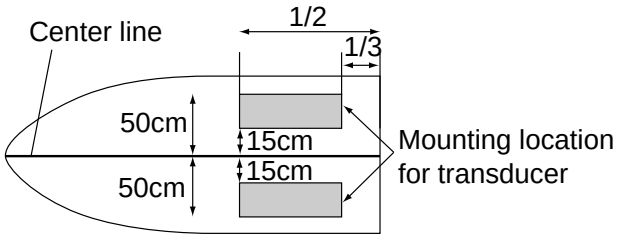
1.5.2 Remarks on installation

- Turn off the engine and anchor the boat while installing the equipment.
- Install the transducer in the engine room.

1.5.3 Mounting location

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

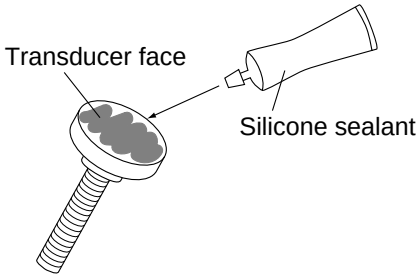
- The mounting location should be where the hull is of single-hull thickness and is void of air or flotation materials other than solid fiberglass between the transducer face and the water.
- Do not place the transducer over hull struts or ribs which run under the hull.
- Avoid a location where the rising 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.



Inside-hull transducer mounting location

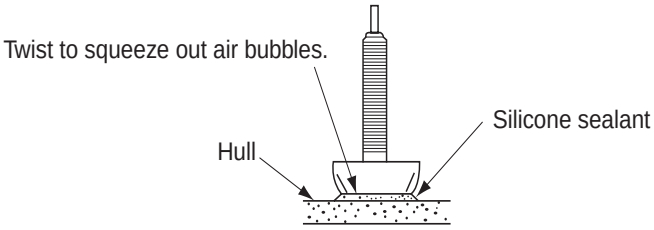
1.5.4 Installation procedure

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.



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.



Attaching transducer to hull with silicone sealant

4. Connect this unit to NavNet equipment and turn on the NavNet equipment.
5. Set up the NavNet equipment to show “single frequency display”.
6. Set the gain to “50”.
7. Set the range to “10”.

   Case 1

   The installation is proper if the bottom echo is displayed in red and the depth indication is shown. Go to step 9.

   Case 2

   The bottom echo is not displayed in red when ultrasound attenuation is great. Relocate the transducer as shown in step 8

8. Re-locating the transducer.

   1) Turn off the power.
   2) Detach the transducer. Insert a knife or wooden stick under transducer to remove it
   3) Repeat steps 1 thru 7.

9. Fix the transducer.

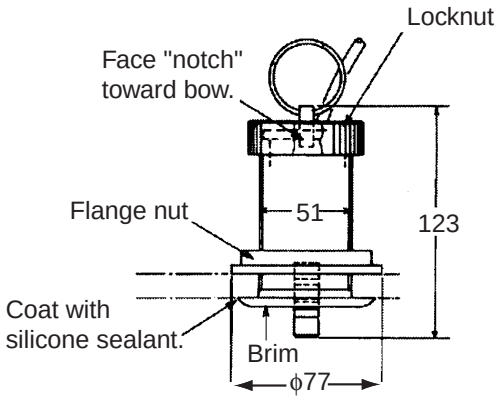
1.6 Optional Water Temperature Sensor ST-02MSB, ST-02PSB

Select a suitable mounting location considering the following points:

- 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.

Procedure

1. Dry-dock the boat.
2. Make a hole of approx. 51 mm in diameter in the mounting location.
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.

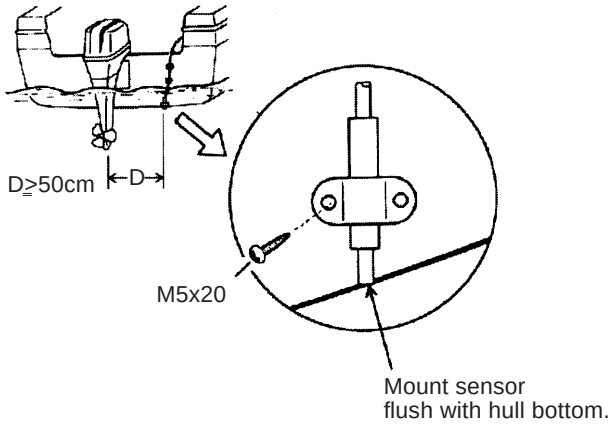


Speed/Temperature sensor ST-02MSB, ST-02PSB

1.7 Optional Temperature Sensors

1.7.1 Transom mount 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 in diameter to pass the connector. After passing the cable, fill the hole with a sealing compound.

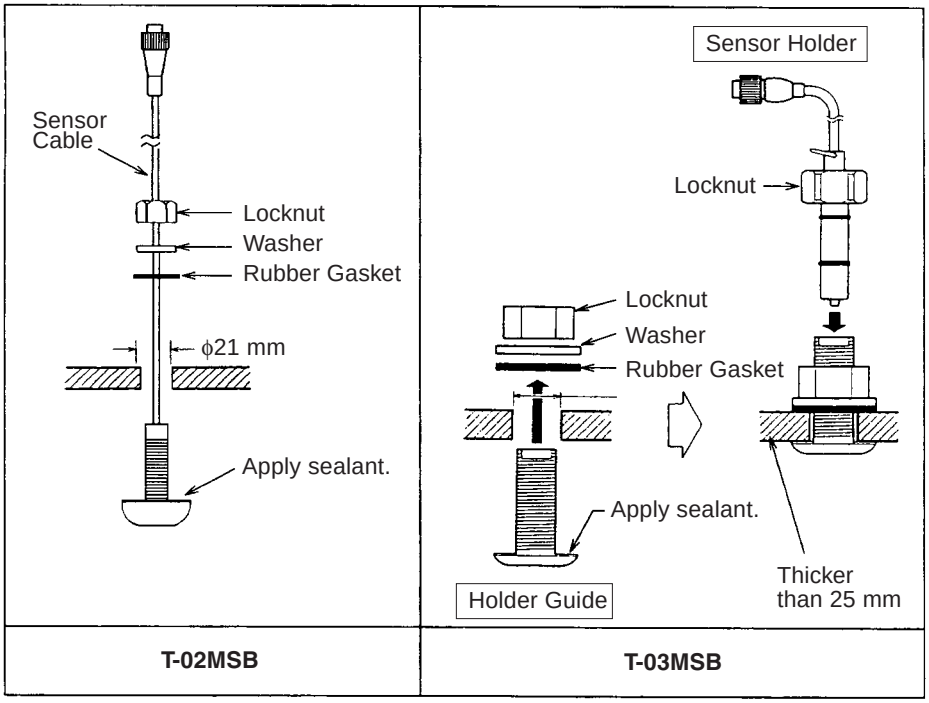


Temperature sensor T-02MTB

1.7.2 Thru-hull temperature sensor T-02MSB, T-03MSB

Select a suitable mounting location considering the following points:

- Select a mid-boat flat position. The sensor does not have to be installed perfectly perpendicular. However, the location should not be such that the transducer may be damaged when the boat is dry-docked.
- Locate away from equipment which gives off heat.
- Locate away from drain pipes.
- Select a location where vibration is minimal.

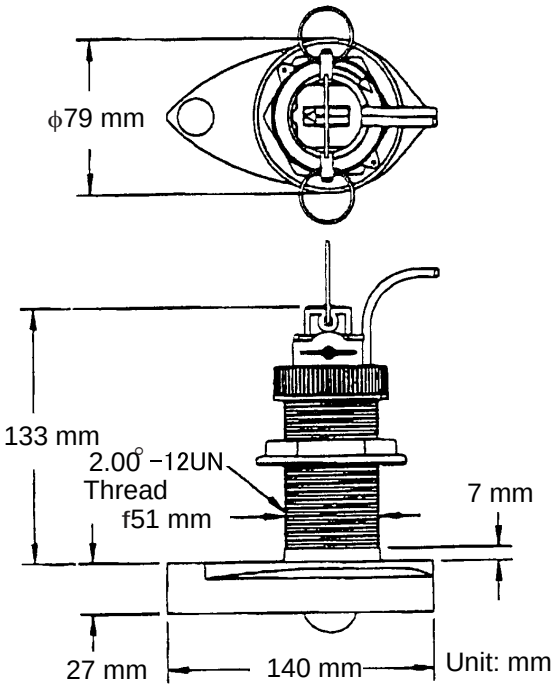


Assembling temperature sensor T-02MSB, T-03MSB

1.8 Optional Triducers

1.8.1 Thru-hull triducer 525ST-MSD

See section 1.2 for how to install the 525ST-MSD.



1.8.2 Transom mount triducer 525ST-PWD

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.

Tools and materials needed

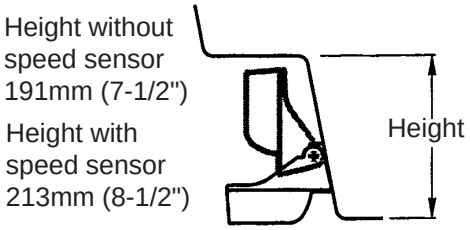
- Scissors
- Masking tap
- Safety goggles
- Dust mask
- Electric drill
- Drill bit for:
  - Bracket holes: 4mm, #23, or 9/64"
  - Fiberglass hull: chamfer bit (preferred), 6mm, or 1/4"
  - Transom hole: 19mm or 3/4" (optional)
  - Cable clamp holes: 3mm or 1/8"
- Screwdrivers

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

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.

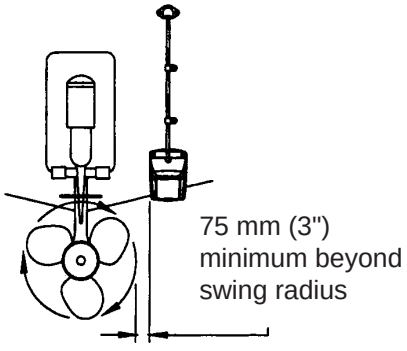


Height required at mounting location

Note 1: 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).

Note 2: Avoid mounting the sensor where the boat may be supported during trailering, launching, hauling, and storage.

Note 3: For single drive boat, mount on the starboard side at least 75 mm (3") beyond the swing radius of the propeller.

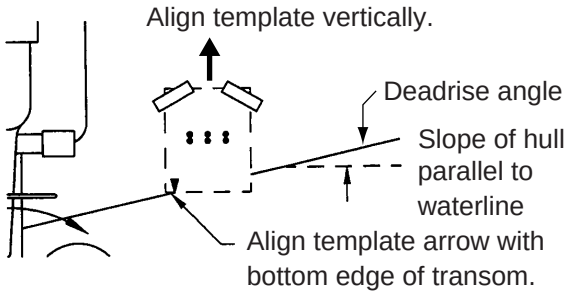


Mounting location on single drive boat

Note 4: For twin drive boat, mount between the drives.

Installation of bracket

1. Cut out the installation template (enclosed with transducer) along the dotted line.
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.



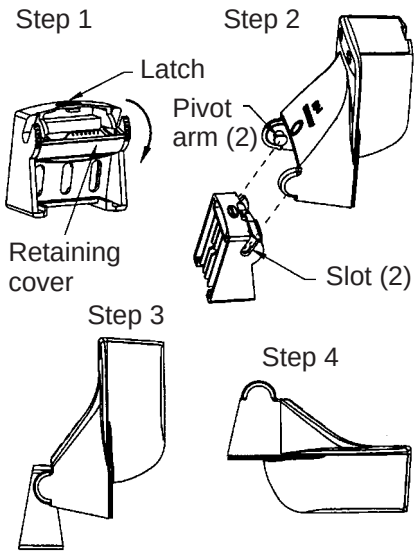
Positioning the template

Warning: Always wear safety goggles and a dust mask.

3. Using a 4 mm, #23, or 9/64" bit, drill three holes 22 mm (7/8") deep at the locations indicated. To prevent drilling too deeply, wrap masking tape around the bit 22 mm (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 1 mm (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 step 3 in "Adjusting".
   Other angles: The shim is required. Skip to step 2 of "Adjusting".
   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 three #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 step 1-4 in "Attaching the sensor to the bracket", before proceeding with "Adjusting".

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.



Attaching the sensor to the bracket

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.

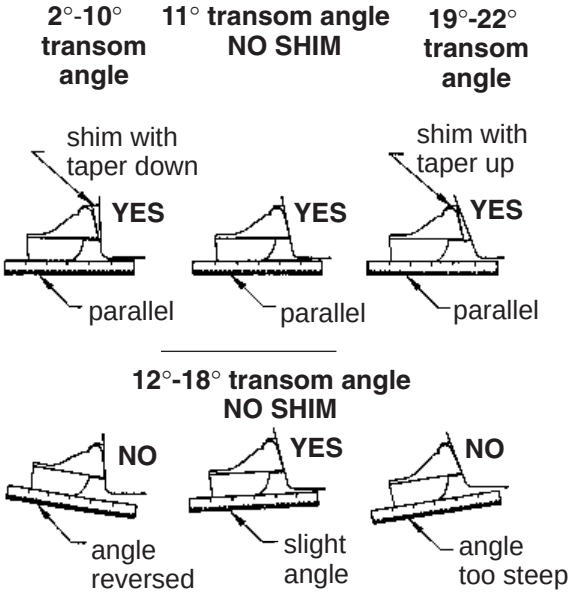
Adjusting

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 1-3 mm (1/16-1/8") below the bow of the sensor or parallel to the bottom of the hull.

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

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.

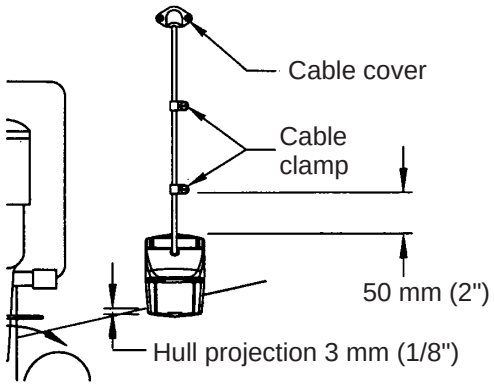
19°-22° transom angle (small aluminum and fiberglass boats): Position the shim with the tapered end up.



Sensor position and transom angle

3. If the bracket has been temporarily fastened to the transom, remove it. Apply a marine sealant to the threads of the three #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.

   Note: 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 3 mm (1/8”). Tighten the screws.



Vertical adjustment and cable routing

Cable routing

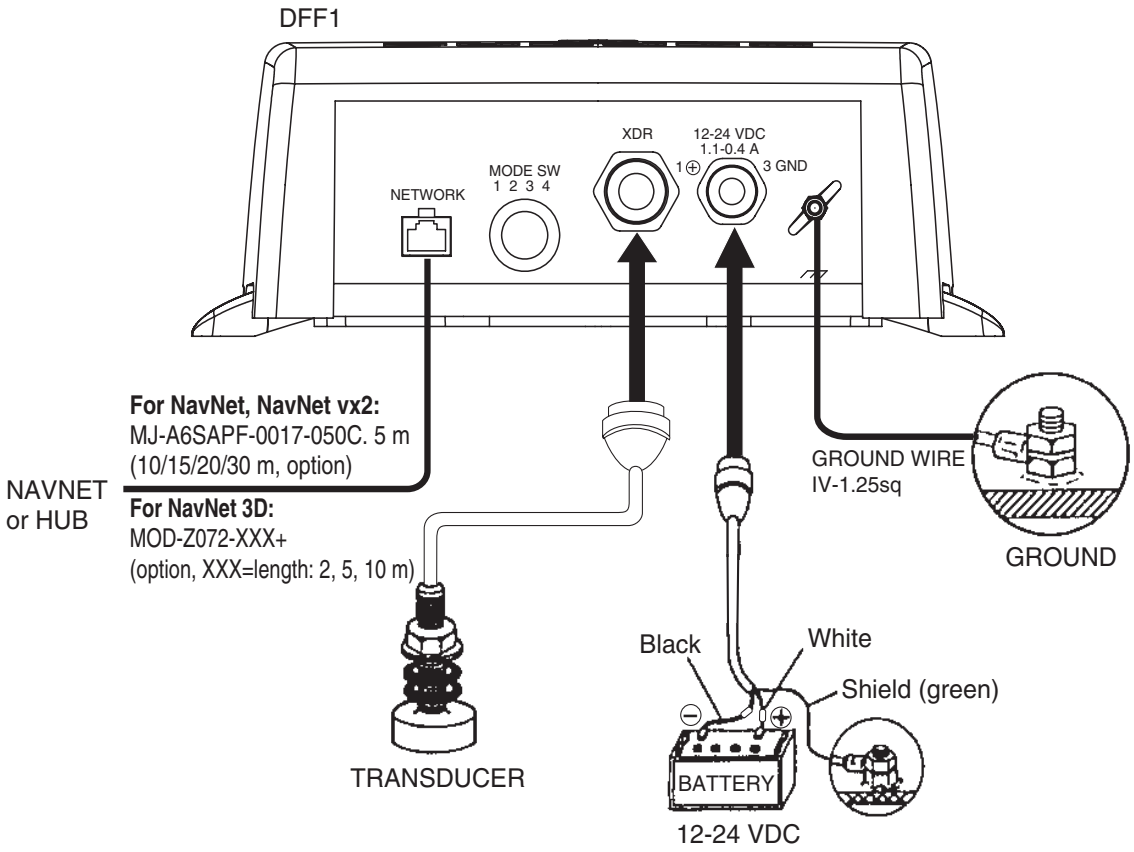
Route the sensor cable over the transom, through a drain hole, or thorough a new hole drilled in the transom above the waterline.

Never cut the cable or remote the connector; this will void the warranty. 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 19 mm 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 50 mm (2") above the bracket and mark the mounting hole with a pencil.
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 3 mm or 1/8" bit to drill a hole 10 mm (3/8") deep. The prevent drilling too deeply, wrap masking tape around the bit 10 mm (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.

2. WIRING

Connect the power cable, transducer cable, external equipment and ground wire as shown in the figure below.



DFF1, rear view

Ground

Connect the ground wire (1.25sq) to ship's ground to prevent interference to the picture. Shorten the ground wire as much as possible. For FRP vessels, install a ground plate that measures about 20 cm by 30 cm on the outside of the hull bottom to provide a ground point.

⚠ CAUTION

Ground the equipment to prevent mutual interference.

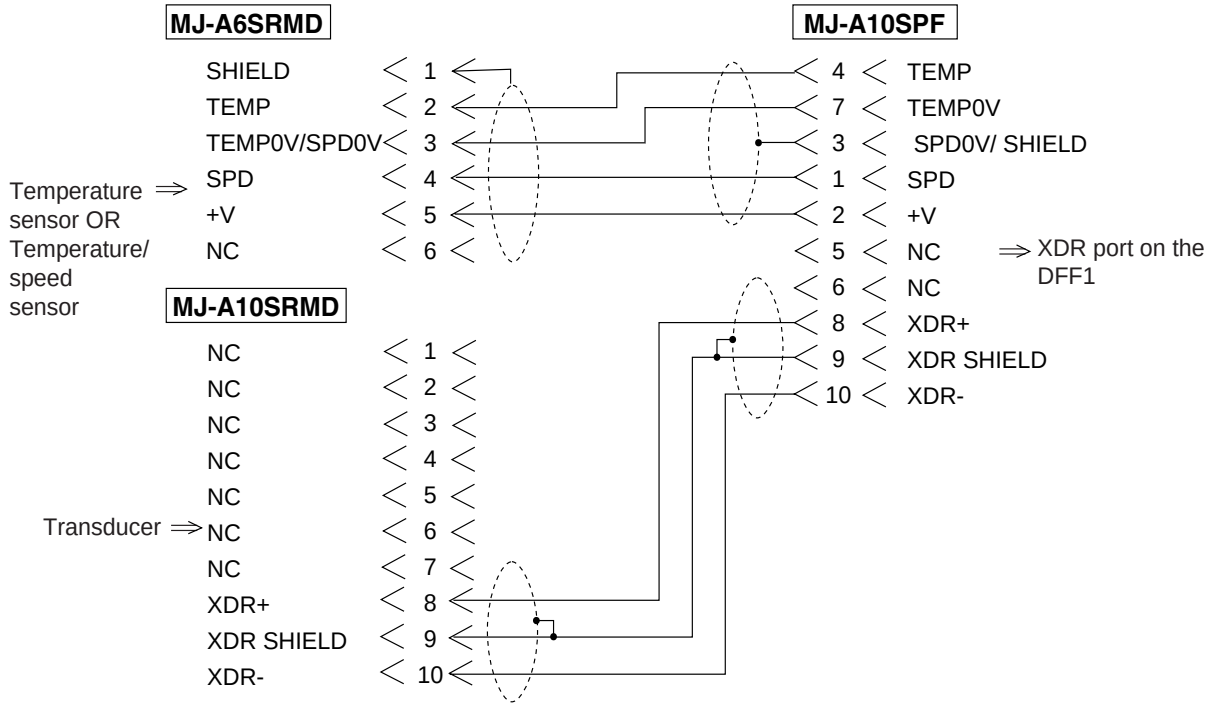
Note: Use a "closed-type" lug ( ) to make the ground connection at the network sounder. Do not use an "open-type" lug ( ).

External KP

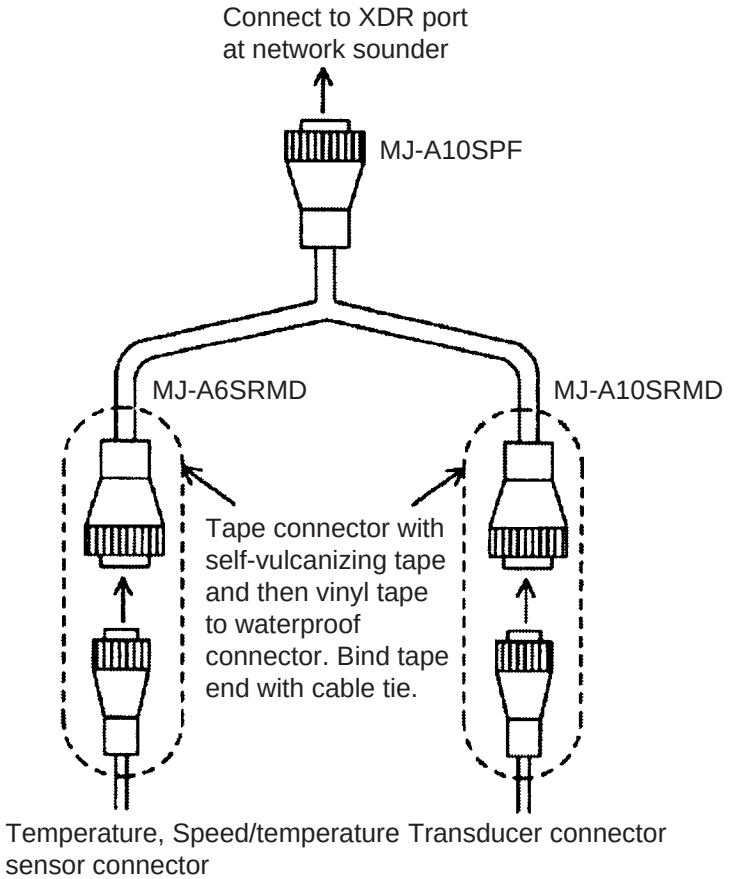
Consult with your dealer if connection of an external KP is required to reduce interference from another transducer.

2.1 Optional Temperature/Speed Sensor, Temperature Sensor

Connect the temperature/speed sensor or temperature sensor to the XDR port with the converter connector (Type: 02S4147, Code No.: 000-141-082, option).



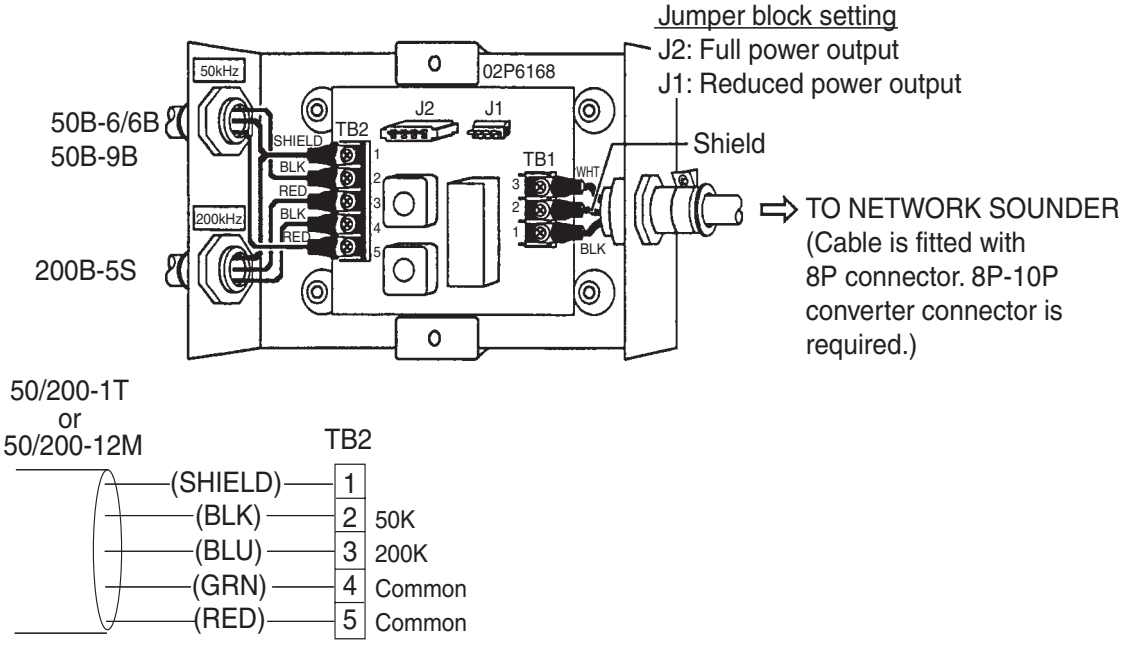
Connection of temperature/speed sensor



Connection of transducer, temperature sensor, speed/temperature sensor

2.2 Wiring Optional 1 kW Transducer

To connect optional transducer 50B-6, 50B-6B, 50B-9B, 200B-5, 200B-5S, 50/200-1T or 50/200-12M, the optional Matching Box MB-1100 is required.



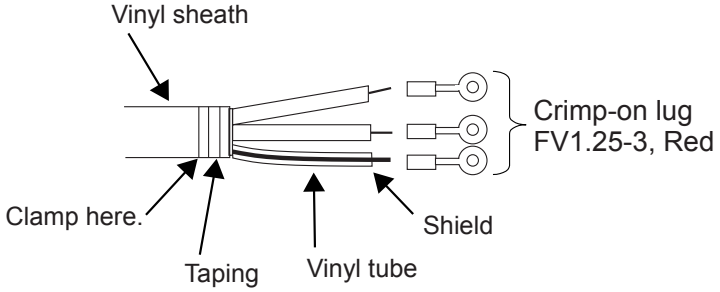
Matching Box MB-1100

Matching Box Kit (Type: MB-1100, Code No.: 000-041-353)

Name	Type	Code No.	Qty	Remarks
Matching Box	MB-1100	000-041-000	1	Cable w/8P connector supplied for connection to network sounder
Crimp-on Lug	FV1.25-3 Red	000-538-113	6	
Cord Lock	NC-1	000-516-650	1	For use with separate transducer

Fabrication of transducer cable

Fabricate the transducer cable as illustrated below to connect it to the Distribution Box.



Fabrication of transducer cable

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3. INITIAL SETTINGS, OPERATION

⚠ WARNING

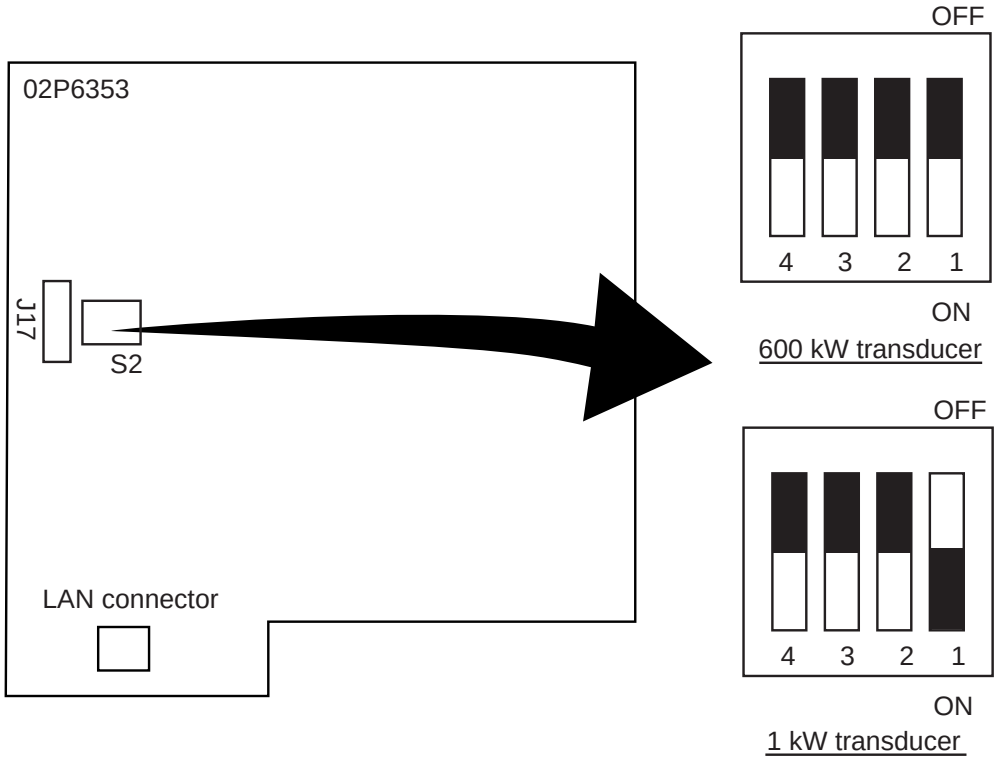
Do not open the equipment unless totally familiar with electrical circuits and service manual.

Only qualified personnel should work inside the equipment.

3.1 Selecting the Transmission Power

The default transmission power is 600 W. If the 1 kW transducer is installed, turn on the #1 segment of DIP SW S2 on the pcb 02P6353 inside the network sounder.

1. Detach the power cable.
2. Detach the cover of the DFF1; grasp the cover at opposing sides with hands, pull outward slightly and lift up to detach.
3. Loosen three screws fixing the inside cover, and slide cover forward to detach it.
4. Set the #1 segment of DIP SW S2 according to transducer connected.

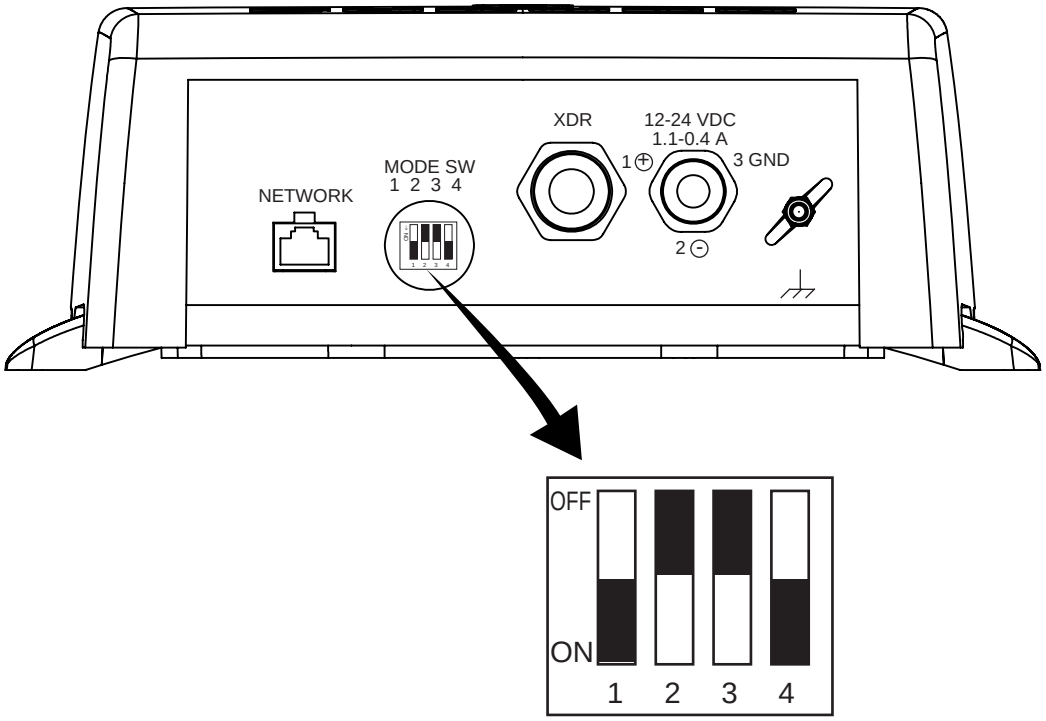


PCB 02P6353

5. Close the inside and outside covers and connect the power cable.

3.2 MODE SW

The MODE switch provides the functions described in the table below. Remove the rubber cap to access the switch and set switches with a plastic screwdriver or the like.



Description of MODE SW

SW No.	Function, description	Setting content
1 (Default:ON)	Power from NavNet	OFF: Sounder powered on/off by NavNet ON: Sounder not powered on/off by NavNet
2 Default: OFF)	IP number (Currently no use)	OFF: IP0 ON: IP1
3 Default: OFF)	Factory testing	OFF: Testing OFF ON: Testing ON
4 (Default: ON)	Automatic IP setting (Currently no use)	OFF: Automatic IP enabled ON: Automatic IP disabled

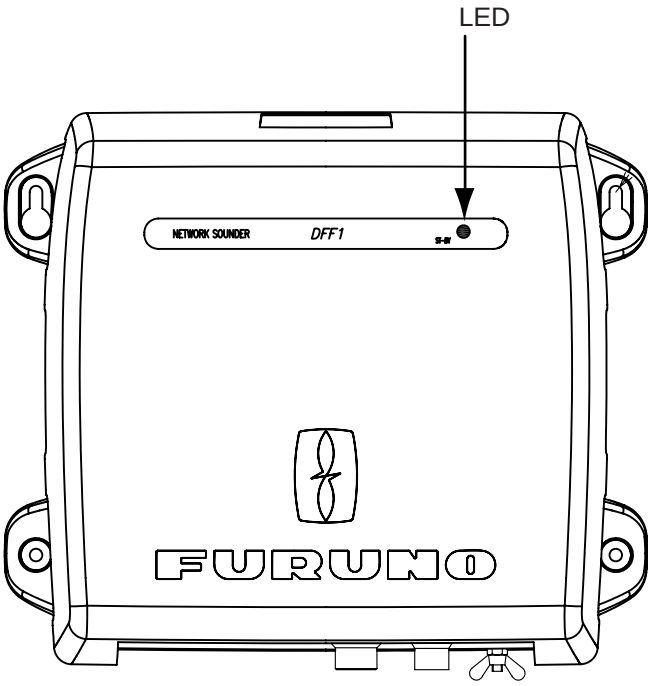
For NavNet 3D, turn off all switches.

3.3 Operation Check (LED)

The network sounder is powered on/off from ship's switchboard. The LED on the network sounder lights or flashes according to equipment state, as described in the table below.

LED state	Meaning
Lighting continuously*	NavNet is not showing the sounder display, or sounder is not connected to NavNet
Flashing every two seconds	Normal operation
Flashing every four seconds	Factory test mode

* The LED lights for approximately 20 seconds after turning on the power while the equipment is being initialized.



DFF1, top view

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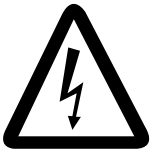
4. MAINTENANCE

⚠ WARNING



Do not open the equipment unless totally familiar with electrical circuits and service manual.

Only qualified personnel should work inside the equipment.

4.1 Maintenance

Regular maintenance is essential for good performance. Check the items listed in the table below monthly to help keep your equipment in good shape for years to come.

Checking

Item	Action
Transducer cable	Check that cable is tightly fastened and is not damaged. Replace if damaged.
Power cable, transducer cable plug	Check that they are tightly fastened and not damaged. Refasten if necessary. Replace if damaged.
Ground	Check for corrosion. Clean if necessary.
Power supply voltage	Check voltage. If out of rating correct problem.
Cleaning the network sounder's cabinet	Dust or dirt on the cabinet may be removed with a dry cloth. Do not use chemical-based cleaners to clean the cabinet; they can remove paint and markings.
Transducer	Marine life on the transducer face will result in a gradual decrease in sensitivity. Check the transducer face for cleanliness each time the boat is dry-docked. Carefully remove any marine life with a piece of wood or fine-grade sandpaper.

4.2 Replacing the Fuse

The two 3 A fuses (Type: FGBO-A 125V 3A PBF, Code No. 000-155-850-10) in the snap-in fuse holder on the power cable protect the equipment from equipment fault and reverse polarity of the ship's mains. If the equipment cannot be powered, a fuse may have blown. Find out the cause for blown fuse before replacing a fuse. If a fuse blows again after replacement, contact a FURUNO agent or dealer for advice.

⚠ WARNING

Use the proper fuse.

Use of a wrong fuse can result in damage to the equipment or cause fire.

SPECIFICATIONS OF THE NETWORK SOUNDER
DFF1

1. GENERAL

1.1.	Output Power	600 W/ 1 kW rms nominal, 1 kW requires optional MB-1100
1.2.	TX Frequency	50 kHz or 200 kHz, 50/200 kHz exchangeable
1.3.	Amplifier type	Wide dynamic linear amp (double superheterodyne)
1.4.	Network protocol	Ethernet 100/10BASE-TX

1.5. Depth Range and Pulse Repetition Rate

Range (m)	PRR (/min.)
2	3000
5	3000
10	1990
40	485
100	195
200	95
400	65
1200	34

2. POWER SUPPLY

12-24 VDC: 1.1-0.4 A (at 1 kW output)

3. ENVIRONMENTAL CONDITION

3.1.	Ambient Temperature	-15°C to +55°C
3.2.	Relative Humidity	93% at 40°C
3.3.	Dustproofing, waterproofing (IEC60529)	IP20 (not waterproof)

3.4. Vibration (IEC 60945 Ed4)

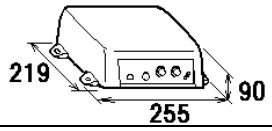
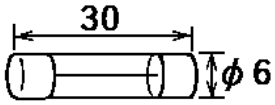
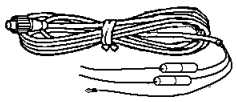
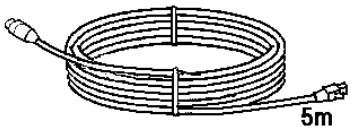
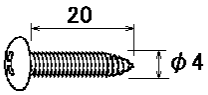
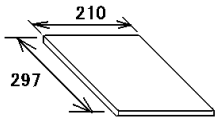
- 2-5 Hz and up to 13.2 Hz with an excursion of ±1 mm ±10 % (7 m/s^2 maximum acceleration at 13.2 Hz)
- 13.2-100 Hz with a constant maximum acceleration of 7 m/s^2

4. COATING COLOR

4.1.	Main Unit	N3.0

PACKING LIST

DFF1-J/E

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
ﾈｯﾄﾜｰｸ魚探 NETWORK SOUNDER		DFF1 000-010-154-00	1
予備品 SPARE PARTS		**SP02-05201**	
ﾋｭｰｽﾞ FUSE		FGBO-A 125V 3A PBF 000-155-850-10	2
工事材料 INSTALLATION MATERIALS		**CP02-08100**	
ｹｰﾌﾞﾙ組品MJ POWER CABLE ASSY.		MJ-A3SPF0028-035C 000-164-952-10	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0017-050C 000-159-705-11	1
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ 1ｼｭ SELF-TAPPING SCREW		4X20 SUS304 000-158-850-10	4
図書 DOCUMENT			
取扱説明書 OPERATOR'S MANUAL		OM*-20360-* 000-164-956-0* **	1

ｺｰﾄﾞ番号末尾の[**]は、選択品の代表ｺｰﾄﾞを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

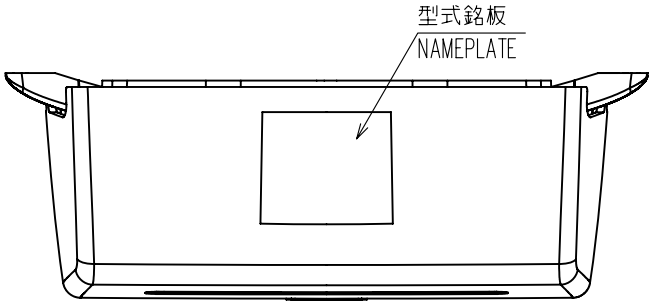
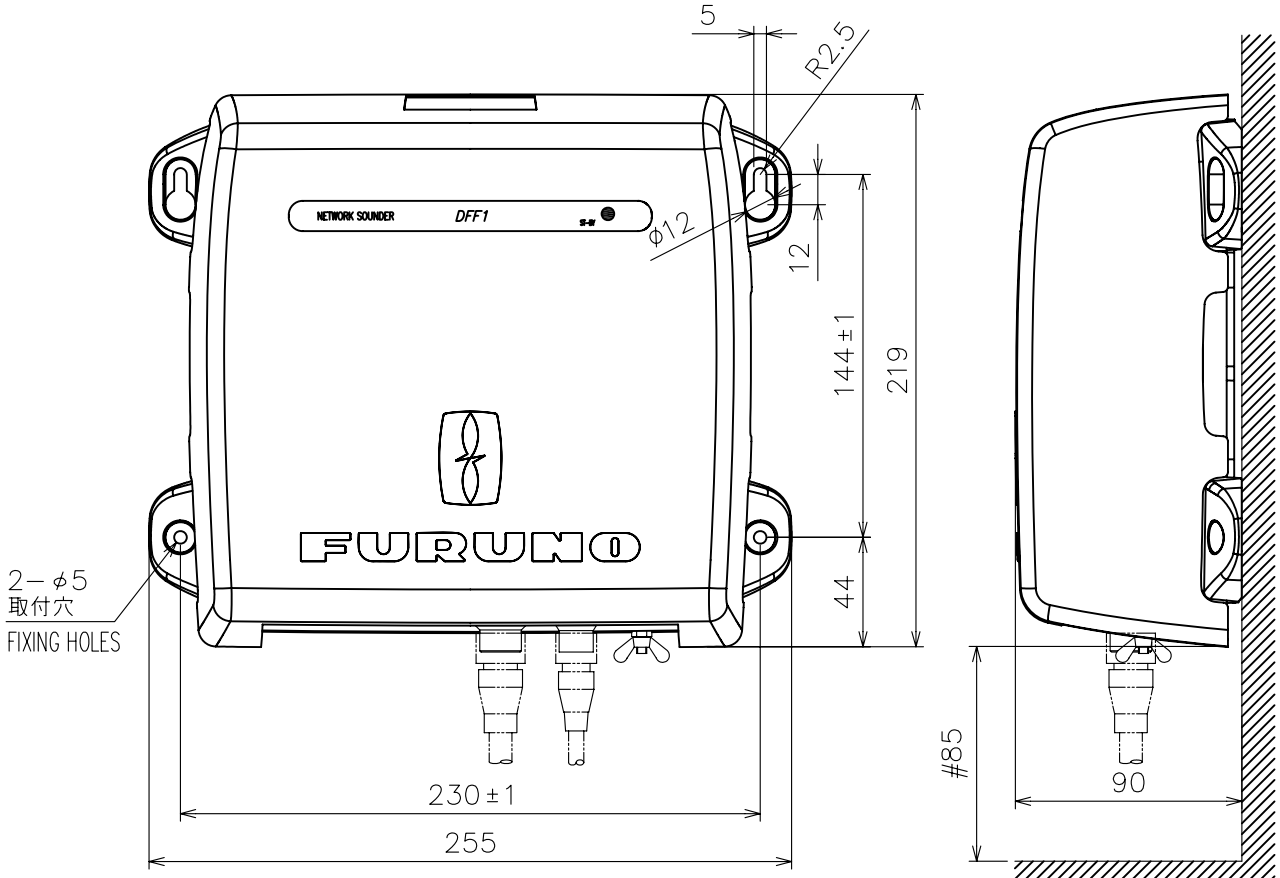
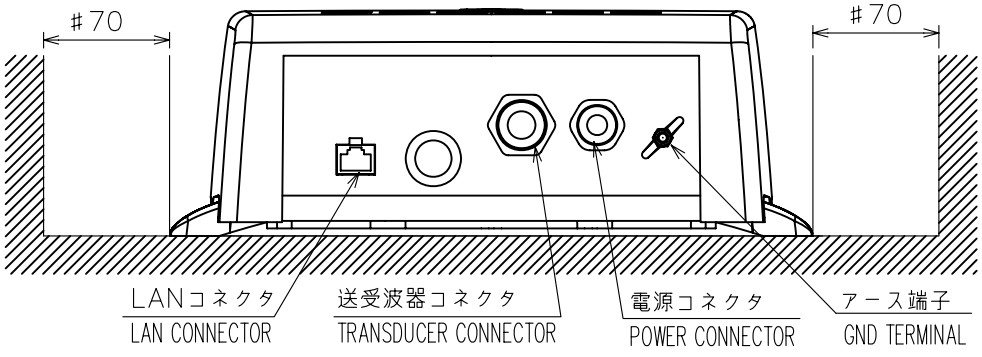


表 1 TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０<Ｌ≦１００	±２．５
１００<Ｌ≦５００	±３

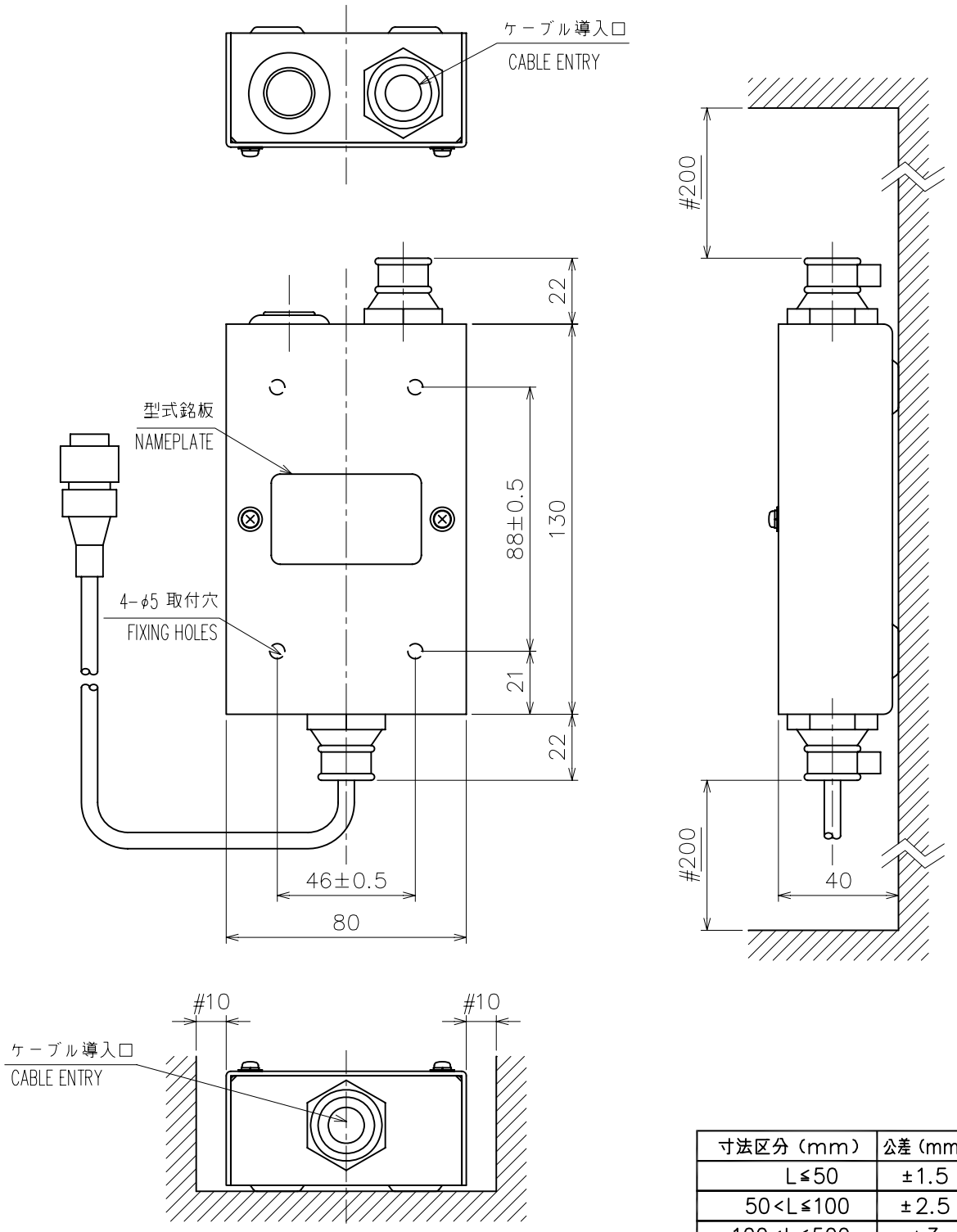




注　記　１）　#印寸法は最小サービス空間寸法とする。
　　２）　指定外の寸法公差は表１による。
　　３）　取付用ネジは＋トラスタッピンネジ呼び径4x20を使用のこと。

NOTE　1.　#: MINIMUM SERVICE CLEARANCE.
　　2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　3.　USE SELF-TAPPING SCREWS 4x20 FOR FIXING THE UNIT.

DRAWN Jan. 9, '07 E. MIYOSHI		TITLE	DFF1
CHECKED TAKAHASHI. T		名称	ネットワーク魚探
APPROVED Y. Hatai			外寸図
SCALE 1/3	MASS 1.2 ±10% kg	NAME	NETWORK SOUNDER
DWG.No. C2036-G01- B	REF.No. 02-158-100G-2		OUTLINE DRAWING



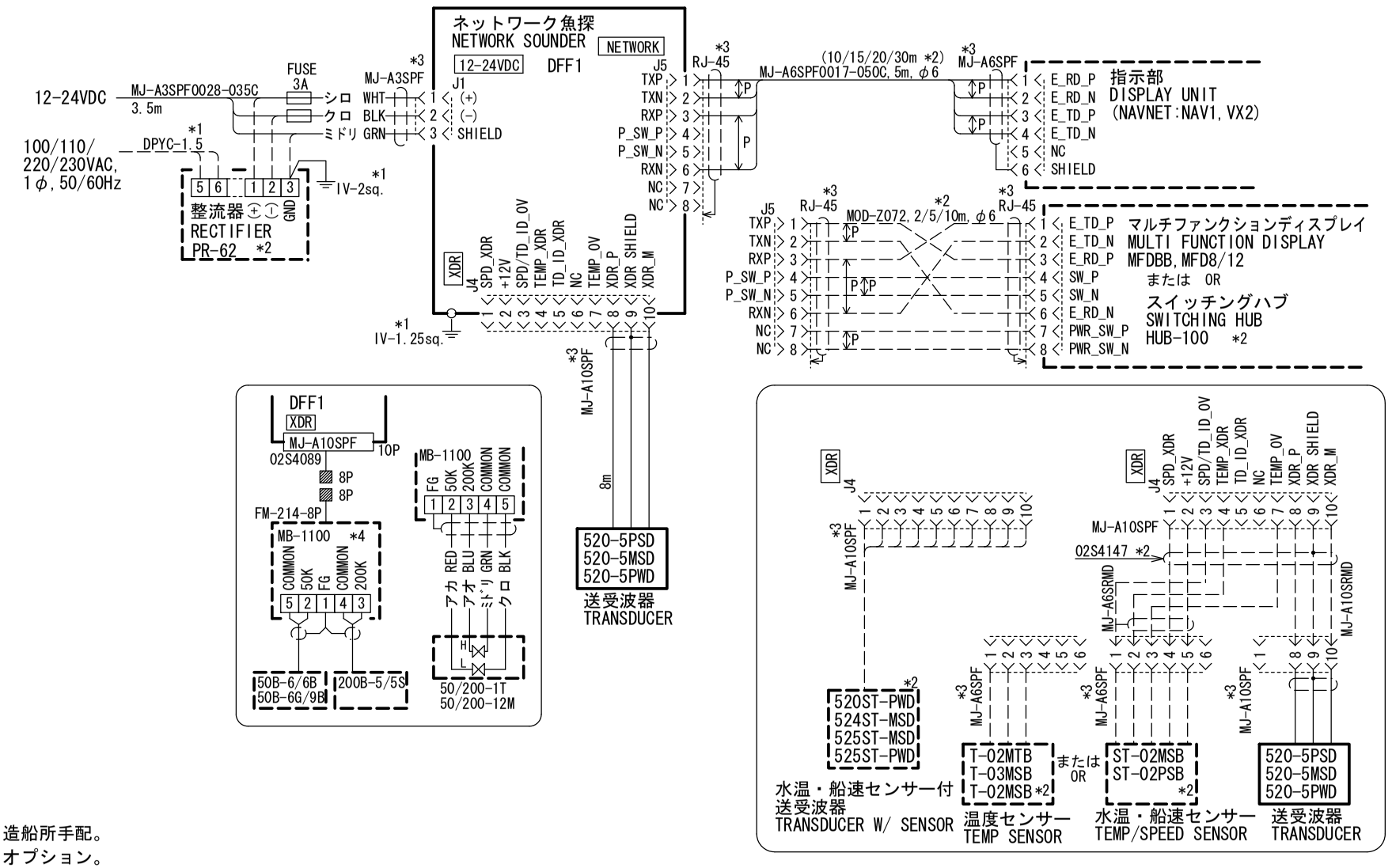
寸法区分（mm）	公差（mm）
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注　記　1）　#印寸法は最小サービス空間寸法とする。
2）　指定外の寸法公差は表1による。
3）　質量にケーブルを含む。

NOTE　1.　#: MINIMUM SERVICE CLEARANCE.
2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3.　MASS INCLUDES CABLE.

DRAWN Jun. 16, '06 E. MIYOSHI		TITLE	MB-1100
CHECKED TAKAHASHI. T		名称	分配箱
APPROVED Y. Hatai	FCV-585		外寸図
SCALE 1/2	MASS 0.65 ±10% kg	NAME	MATCHING BOX
DWG.No. C2375-G03- B	REF.No. 02-155-200G- 1		OUTLINE DRAWING

FURUNO



注記
＊１）造船所手配。
＊２）オプション。
＊３）工場にて取付済み。
＊４）DFF1のジャンパー設定変更が必要。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: FITTED AT FACTORY.
*4: CHANGE JUMPER SETTING OF DFF1.

DRAWN 10/Mar/08 T.YAMASAKI		TITLE	DFF1
CHECKED 10/Mar/08 T.TAKENO		名称	ネットワーク魚探
APPROVED 28/Apr/08 R.Esumi			相互結線図
SCALE / MASS kg		NAME	NETWORK SOUNDER
DWG.No. C2036-C01- B	REF.No. 02-158-1001-2		INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

ECF
(Elemental Chlorine Free)
The paper used in this manual
is elemental chlorine free.

FURUNO ELECTRIC CO., LTD.

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(DAMI) DFF1

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