# FURUNO

# OPERATOR'S MANUAL

*NETWORK SOUNDER*

**MODEL** **DFF3**

[] 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.

- 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 power immediately if the equipment 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.

**Turn off the power immediately if you feel the equipment is acting abnormally.**

If the equipment is hot to the touch 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 equipment 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 this label. If the label is missing or illegible, contact a FURUNO agent or dealer about replacement.**

| ⚠ WARNING ⚠ |
|---|
| To avoid electrical shock, do not remove cover. No user-serviceable parts |
| ⚠                    ⚠ |

Name: Warning Label (1)
Type: 86-003-1011-3
Code No.: 100-236-233-10

## *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.

**Be sure no water leaks 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 apply 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 |
|---|---|
| 0.95 m | 0.60 m |

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# FOREWORD

## A Word to the Owner of the DFF3

Congratulations on your choice of the FURUNO DFF3 Network Sounder. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

For 60 years FURUNO Electric Company has enjoyed an enviable reputation for quality marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

This equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless operated and maintained properly. Please carefully read and follow the recommended procedures for operation and maintenance.

Thank you for considering and purchasing FURUNO.

## Features

The DFF3 network sounder is a dual frequency echo sounder designed for use with the FURUNO NavNet/NavNet vx2/NavNet 3D series. The DFF3 feeds data about underwater conditions via a LAN.

A few of the features are

- FURUNO Free Synthesizer (FFS) transceiver design allows use of user-selectable operating frequencies (28 - 200 kHz).
- Automatic operation selects correct range and gain to show fish echoes and bottom in both shallow and deep waters.
- Improved discrimination of near-surface fish by eliminating the transmission line.
- Heaving compensation* stabilizes the picture against ship's pitching and rolling.
  * Requires NavNet 3D display device and Satellite Compass SC-30, heading data fed in NMEA 2000$^®$ format.
- ACCU-FISH$^®$ feature estimates length and depth of individual fish.
  (Transducer 50/200-1T only for use with NavNet 3D.)
- 1/2/3 kW output

**Note:** The terms "NavNet" and "Navnet 3D" refer to the models listed below.

| Navnet/NavNet vx2 | NavNet 3D |
|---|---|
| Model 17x2 Series, Model 17x2C Series, Model 17x4 Series, Model 17x4C Series, GD-1720, GD-1720C, Model 18x3C(-BB) Series, Model 18x4C(-BB) Series, Model 19x3C(-BB) Series, Model 19x4C(-BB) Series, GD-1900C(-BB), GD-1920C(-BB) | MFDBB, MFD8, MFD12 |

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# SYSTEM CONFIGURATION

Basic configuration shown with solid line.

```
          ┌─────────────────────┐
          │   NavNet Series     │
          │  NavNet 3D Series   │
          └─────────────────────┘
                    │
          ┌ ─ ─ ─ ─ ┐   * HUB-100 (For NavNet)
          │  HUB*   │     HUB-101 (For NavNet 3D)
          └ ─ ─ ─ ─ ┘
                    │        Network Sounder
                    │            DFF3
          ┌─────────────────────────────┐
          │         FURUNO DFF3          │
12-24 VDC─┤                              │
          │                              ├─┐ Speed/Temperature Sensor
┌ ─ ─ ─ ┐ │                              │ │ ST-02MSB
│Rectifier├─┘                            │ │ ST-02PSB
│ PR-62 │                                │ │
└ ─ ─ ─ ┘                                │ │ Temperature Sensor
                                         │ │ T-02MTB
100/110/115/                             │ │ T-02MSB
220/230 VAC                              │ │ T-03MSB
1φ, 50/60 Hz                             └─┘
              ┌──────┐      ┌──────┐
              │ High │      │ Low  │
              │ Freq.│      │ Freq.│
              └──────┘      └──────┘
             Transducer    Transducer
```
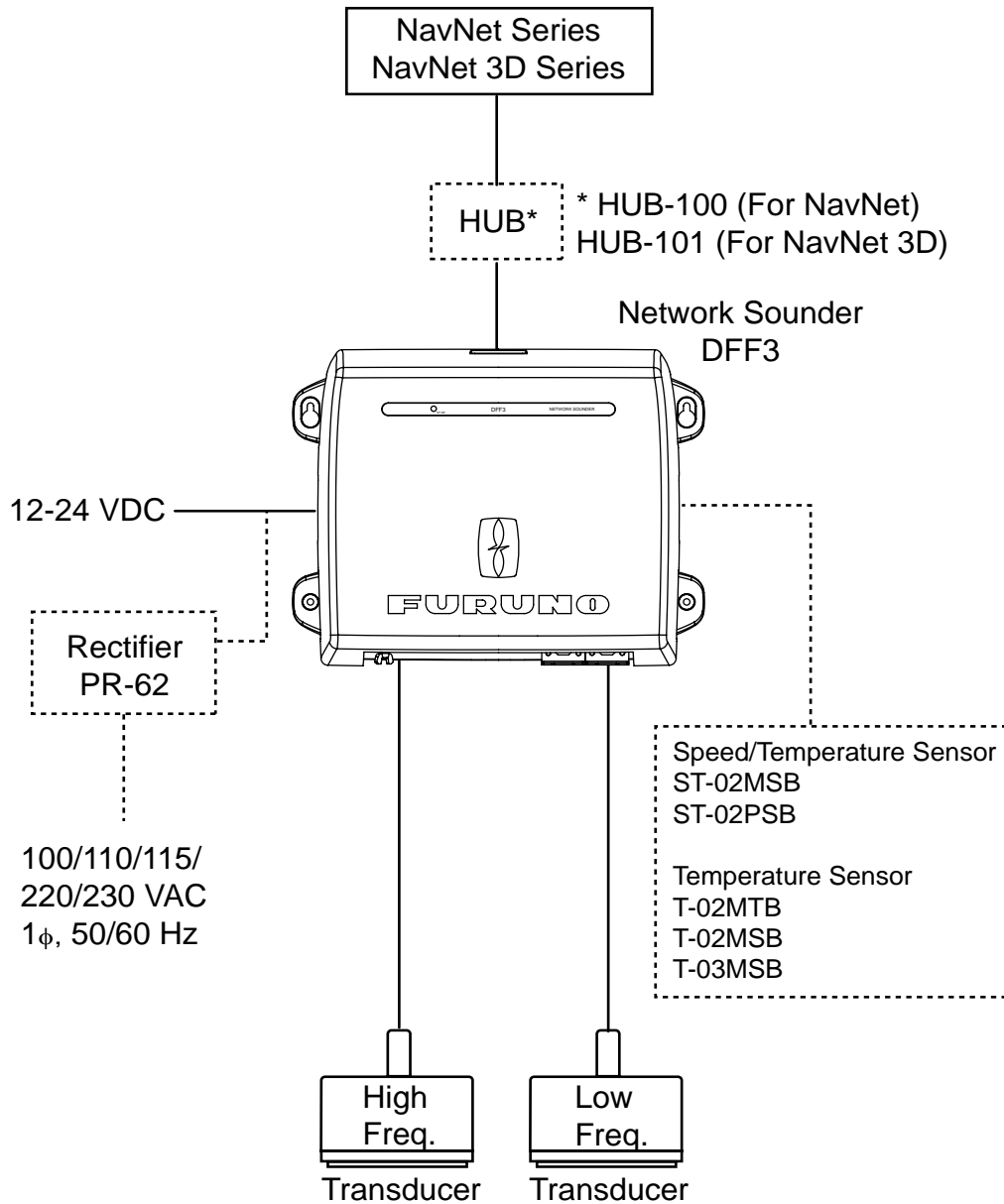
# 1. MOUNTING

## 1.1 Equipment Lists

**Standard supply**

| Name | Type | Code No. | Qty | Remarks |
|---|---|---|---|---|
| Network Sounder | DFF3 | — | 1 | |
| Spare Parts | SP02-05601 | 001-033-740 | 1 set | Fuse |
| Installation Materials | CP02-08500 | 000-011-917 | 1 set | - Power cable (3.5 m)<br>- LAN cable (5 m for NavNet 3D)<br>- Self-tapping screws |

**Optional supply**

| Name | Type | Code No. | Remarks |
|---|---|---|---|
| Transducer | 1/2/3kW available. See next page for choices. | — | |
| Thru-hull pipe | | — | |
| Tank | | — | |
| Cable Assembly | MJ-A6SPF0017-010C | 001-159-704-10 | 1 m, for NavNet |
| | MJ-A6SPF0017-050C | 001-159-705-10 | 5 m, for NavNet |
| | MJ-A6SPF0017-100C | 001-159-706-10 | 10 m, for NavNet |
| | MJ-A6SPF0017-200C | 001-159-707-11 | 20 m, for NavNet |
| | MJ-A6SPF0017-300C | 001-159-708-11 | 30 m, for NavNet |
| | MOD-Z072-020+ | 000-167-175-10 | 2 m, for NavNet 3D (HUB-101) |
| | MOD-Z072-100+ | 001-167-177-10 | 10 m, for NavNet 3D (HUB-101) |
| Speed/Temperature Sensor | ST-02MSB | 000-137-986 | Thru-hull mount, steel hull |
| | ST-02PSB | 000-137-987 | Thru-hull mount, plastic hull |
| Temperature Sensor | T-02MTB | 000-040-026 | Transom mount |
| | T-02MSB | 000-040-040 | Thru-hull mount |
| | T-03MSB | 000-040-027 | Thru-hull mount |
| Rectifier | PR-62 | 000-013-484 | 100 VAC |
| | | 000-013-485 | 110 VAC |
| | | 000-013-486 | 220 VAC |
| | | 000-013-487 | 230 VAC |

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1.  MOUNTING

## Transducer, thru-hull pipe and tank combinations

| Output (W) | Frequency (kHz) | Ship type | Transducer | Thru-hull pipe | Tank |
|---|---|---|---|---|---|
| 1k/1k | 28/50 | Steel | 28F-8 50B-9B | TWB-6000(2) | T-656 |
| | | FRP | | - | - |
| | 28/88 | Steel | 28F-8 88B-8 | TWB-6000(2) | T-657 |
| | | FRP | | - | - |
| | 50/88 | Steel | 50B-9B 88B-8 | TWB-6000(2) | T-658 |
| | | FRP | | - | - |
| | 50/200 | Steel | 50/200-1T or 50/200-1ST | TFB-5000(1) | T-603 |
| | | FRP | | - | T-603F |
| | | Steel | 50/200-12M | - | - |
| | | FRP | | - | - |
| 1k/2k | 28/200 | Steel | 28F-8 200B-8/8B | TWB-6000(2) | T-657 |
| | | FRP | | - | - |
| | 50/200 | Steel | 50B-9B 200B-8/8B | TWB-6000(2) | T-658 |
| | | FRP | | - | - |
| | 88/200 | Steel | 88B-8 200B-8/8B | TWB-6000(2) | T-659 |
| | | FRP | | - | - |

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| Output (W) | Frequency (kHz) | Ship type | Transducer | Thru-hull pipe | Tank |
|---|---|---|---|---|---|
| 2k/2k | 28/50 | Steel | 28F-18 50B-12 | TFB-7000(2) | T-634 |
| | | FRP | | TRB-1100(2) | T-634-F |
| | 28/82 | Steel | 28F-18 82B-35R | TFB-7000(2) | T-636 |
| | | FRP | | TRB-1100(2) | T-636-F |
| | 28/88 | Steel | 28F-18 88B-10 | TFB-7000(2) | T-636 |
| | | FRP | | TRB-1100(2) | T-636-F |
| | 28/200 | Steel | 28F-18 200B-8/8B | TFB-7000(2) | T-638 |
| | | FRP | | TRB-1100(2) | T-638-F |
| | | Steel | 28BL-6HR 200B-8/8B | TFB-7000(2) | T-693 |
| | | FRP | | TRB-1100(2) | T-693-F |
| | 38/200 | Steel | 38BL-9HR 200B-8/8B | TFB-7000(2) | T-693 |
| | | FRP | | TRB-1100(2) | T-693-F |
| | 50/82 | Steel | 50B-12 82B-35R | TFB-7000(2) | T-643 |
| | | FRP | | TRB-1100(2) | T-643-F |
| | 50/88 | Steel | 50B-12 88B-10 | TFB-7000(2) | T-643 |
| | | FRP | | TRB-1100(2) | T-643-F |
| | 50/200 | Steel | 50B-12 200B-8/8B | TFB-7000(2) | T-645 |
| | | FRP | | TRB-1100(2) | T-645-F |
| | | Steel | 50BL-12HR 200B-8/8B | TFB-7000(2) | T-693 |
| | | FRP | | TRB-1100(2) | T-693-F |
| | | Steel | 50BL-12 200B-8/8B | TFB-7000(2) | T-693 |
| | | FRP | | TRB-1100(2) | T-693-F |
| | 82/200 | Steel | 82B-35R 200B-8/8B | TFB-7000(2) | T-649 |
| | | FRP | | TRB-1100(2) | T-649-F |
| | 88/200 | Steel | 88B-10 200B-8/8B | TFB-7000(2) | T-649 |
| | | FRP | | TRB-1100(2) | T-649-F |
| | 28/107 | Steel | 28F-18 100B-10R | TFB-7000(2) | T-636 |
| | | FRP | | TRB-1100(2) | T-636-F |

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## 1. MOUNTING

| Output (W) | Frequency (kHz) | Ship type | Transducer | Thru-hull pipe | Tank |
|---|---|---|---|---|---|
| 2k/3k | 28/150 | Steel | 28F-18 150B-12H | TFB-7000(2) | T-637 |
| | | FRP | | TRB-1100(2) | T-637-F |
| | 50/107 | Steel | 50B-12 100B-10R | TFB-7000(2) | T-643 |
| | | FRP | | TRB-1100(2) | T-643-F |
| | 50/150 | Steel | 50B-12 150B-12H | TFB-7000(2) | T-644 |
| | | FRP | | TRB-1100(2) | T-644-F |
| 3k/2k | 68/200 | Steel | 68F-30H 200B-8/8B | TFB-7000(2) | T-647 |
| | | FRP | | TRB-1100(2) | T-647-F |
| | 107/200 | Steel | 100B-10R 200B-8/8B | TFB-7000(2) | T-649 |
| | | FRP | | TRB-1100(2) | T-649-F |
| 3k/3k | 28/38 | Steel | 28BL-12HR 38BL-15HR | TFB-7000(2) | T-681 |
| | | FRP | | TRB-1100(2) | T-681-F |
| | | Steel | 28F/24H 38BL-15HR | TFB-7000(2) | T-681 |
| | | FRP | | TRB-1100(2) | T-681-F |
| | 28/50 | Steel | 28BL-12HR 50BL-24HR | TFB-7000(2) | T-681 |
| | | FRP | | TRB-1100(2) | T-681-F |
| | | Steel | 28BL-12HR 50F-24H | TFB-7000(2) | T-681 |
| | | FRP | | TRB-1100(2) | T-681-F |
| | | Steel | 28F-24H 50BL-24H | TFB-7000(2) | T-696 |
| | | FRP | | TRB-1100(2) | T-696-F |
| | | Steel | 28F-24H 50BL-24HR | TFB-7000(2) | T-681 |
| | | FRP | | TRB-1100(2) | T-681-F |
| | | Steel | 28F-24H 50F-24H | TFB-7000(2) | T-681 |
| | | FRP | | TRB-1100(2) | T-681-F |

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| Output (W) | Frequency (kHz) | Ship type | Transducer | Thru-hull pipe | Tank |
|---|---|---|---|---|---|
| 3k/3k (con't) | 28/88 | Steel | 28BL-12HR 88F-126H | TFB-7000(2) | T-682 |
| | | FRP | | TRB-1100(2) | T-682-F |
| | | Steel | 28F-24H 88F-126H | TFB-7000(2) | T-682 |
| | | FRP | | TRB-1100(2) | T-682-F |
| | 28/150 | Steel | 28BL-12HR 150B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |
| | | Steel | 28F-24H 150B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |
| | 28/200 | Steel | 28BL-12HR 200B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |
| | | Steel | 28F-24H 200B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |
| | 38/50 | Steel | 38BL-15HR 50BL-24HR | TFB-7000(2) | T-681 |
| | | FRP | | TRB-1100(2) | T-681-F |
| | | Steel | 38BL-15HR 50F-24H | TFB-7000(2) | T-681 |
| | | FRP | | TRB-1100(2) | T-681-F |
| | 38/88 | Steel | 38BL-15HR 88F-126H | TFB-7000(2) | T-682 |
| | | FRP | | TRB-1100(2) | T-682-F |
| | 38/150 | Steel | 38BL-15HR 150B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |
| | 38/200 | Steel | 38BL-15HR 200B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |
| | 50/88 | Steel | 50BL-24H 88F-126H | TFB-7000(2) | T-697 |
| | | FRP | | TRB-1100(2) | T-697-F |
| | | Steel | 50BL-24HR 88F-126H | TFB-7000(2) | T-682 |
| | | FRP | | TRB-1100(2) | T-682-F |
| | | Steel | 50F-24H 88F-126H | TFB-7000(2) | T-682 |
| | | FRP | | TRB-1100(2) | T-682-F |
| | 50/150 | Steel | 50BL-24HR 150B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |
| | | Steel | 50F-24H 150B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |

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1. MOUNTING

| Output (W) | Frequency (kHz) | Ship type | Transducer | Thru-hull pipe | Tank |
|---|---|---|---|---|---|
| 3k/3k (con't) | 50/200 | Steel | 50BL-24H 200B-12H | TFB-7000(2) | T-695 |
| | | FRP | | TRB-1100(2) | T-695-F |
| | | Steel | 50BL-24HR 200B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |
| | | Steel | 50F-24H 200B-12H | TFB-7000(2) | T-683 |
| | | FRP | | TRB-1100(2) | T-683-F |
| | 68/150 | Steel | 68F-30H 150B-12H | TFB-7000(2) | T-646 |
| | | FRP | | TRB-1100(2) | T-646-F |
| | 68/200 | Steel | 68F-30H 200B-12H | TFB-7000(2) | T-646 |
| | | FRP | | TRB-1100(2) | T-646-F |
| | 88/150 | Steel | 88F-126H 150B-12H | TFB-7000(2) | T-685 |
| | | FRP | | TRB-1100(2) | T-685-F |
| | 88/200 | Steel | 88F-126H 200B-12H | TFB-7000(2) | T-685 |
| | | FRP | | TRB-1100(2) | T-685-F |
| 1k | 28 | Steel | 28F-8 | TFB-5000(1) | T-604 |
| | | FRP | | TRB-1000(1) | T-604-F |
| | 50 | Steel | 50B-6/6B | TFB-5000(1) | T-605 |
| | | FRP | | TRB-1000(1) | T-605-F |
| | | Steel | 50B-9B | TFB-5000(1) | T-603 |
| | | FRP | | TRB-1000(1) | T-603-F |
| | 68 | Steel | 68F-8H | TFB-5000(1) | T-621 |
| | | FRP | | TRB-1000(1) | T-621-F |
| | 88 | Steel | 88B-8 | TFB-5000(1) | T-606 |
| | | FRP | | TRB-1000(1) | T-606-F |
| | 200 | Steel | 200B-5S | TFB-5000(1) | T-605 |
| | | FRP | | TRB-1000(1) | T-605-F |
| 2k | 28 | Steel | 28F-18 | TFB-5000(1) | T-612 |
| | | FRP | | TRB-1000(1) | T-612-F |
| | | Steel | 28BL-6HR | TFB-5000(1) | T-702 |
| | | FRP | | TRB-1000(1) | T-702-F |
| | 38 | Steel | 38BL-9HR | TFB-5000(1) | T-702 |
| | | FRP | | TRB-1000(1) | T-702-F |

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| Output (W) | Frequency (kHz) | Ship type | Transducer | Thru-hull pipe | Tank |
|---|---|---|---|---|---|
| 2k (con't) | 50 | Steel | 50B-12 | TFB-5000(1) | T-611 |
| | | FRP | | TRB-1000(1) | T-611-F |
| | | Steel | 50BL-12 | TFB-5000(1) | T-702 |
| | | FRP | | TRB-1000(1) | T-702-F |
| | | Steel | 50BL-12HR | TFB-5000(1) | T-702 |
| | | FRP | | TRB-1000(1) | T-702-F |
| | 82 | Steel | 82B-35R | TFB-5000(1) | T-609 |
| | | FRP | | TRB-1000(1) | T-609-F |
| | 88 | Steel | 88B-10 | TFB-5000(1) | T-609 |
| | | FRP | | TRB-1000(1) | T-609-F |
| | 200 | Steel | 200B-8/8B | TFB-5000(1) | T-608 |
| | | FRP | | TRB-1000(1) | T-608-F |

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| Output (W) | Frequency (kHz) | Ship type | Transducer | Thru-hull pipe | Tank |
|---|---|---|---|---|---|
| 3k | 28 | Steel | 28F-24H | TFB-4000(1) | T-616 |
| | | FRP | | TRB-1000(1) | T-616-F |
| | | Steel | 28BL-12HR | TFB-4000(1) | T-616 |
| | | FRP | | TRB-1000(1) | T-616-F |
| | 38 | Steel | 38BL-15HR | TRB-4000(1) | T-616- |
| | | FRP | | TRB-1000(1) | T-616-F |
| | 50 | Steel | 50F-24H | TFB-4000(1) | T-616 |
| | | FRP | | TRB-1000(1) | T-616-F |
| | | Steel | 50BL-24HR | TFB-4000(1) | T-616 |
| | | FRP | | TRB-1000(1) | T-616-F |
| | | Steel | 50BL-24H | TFB-4000(1) | T-694 |
| | | FRP | | TRB-1000(1) | T-694-F |
| | 68 | Steel | 68F-30H | TFB-5000(1) | T-614 |
| | | FRP | | TRB-1000(1) | T-614-F |
| | 88 | Steel | 88F-126H | TFB-4000(1) | T-618 |
| | | FRP | | TRB-1000(1) | T-618-F |
| | 107 | Steel | 100B-10R | TFB-5000(1) | T-609 |
| | | FRP | | TRB-1000(1) | T-609-F |
| | 150 | Steel | 150B-12H | TFB-5000(1) | T-615 |
| | | FRP | | TRB-1000(1) | T-615-F |
| | 200 | Steel | 200B-12H | TFB-5000(1) | T-615 |
| | | FRP | | TRB-1000(1) | T-615-F |

## 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 at the mounting site 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 (5×20), referring to the outline drawing at the back of this manual for mounting dimensions.

# 1.3 Transducer

The performance of the echo sounder largely depends upon the transducer position. Select a place least affected by air bubbles since turbulence blocks the sounding path. Further, select a place least influenced by engine noise. It is known that air bubbles are fewest at the place where the bow first falls and the next wave rises, at usual cruising speed.

**Note:** The face of the transducer must be facing the sea bottom in normal cruising trim of the boat.

# 1.4 Optional Speed/Temperature Sensors ST-02MSB, ST-02PSB

## 1.4.1 Mounting considerations

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 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.

• Do not install near the transducer of an echo sounder, to prevent interference to the echo sounder.

## 1.4.2 Mounting 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.



**9**

# 1.5 Optional Temperature Sensors

## 1.5.1 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.



D≥50cm

5x20

Mount sensor
flush with hull bottom.

**10**
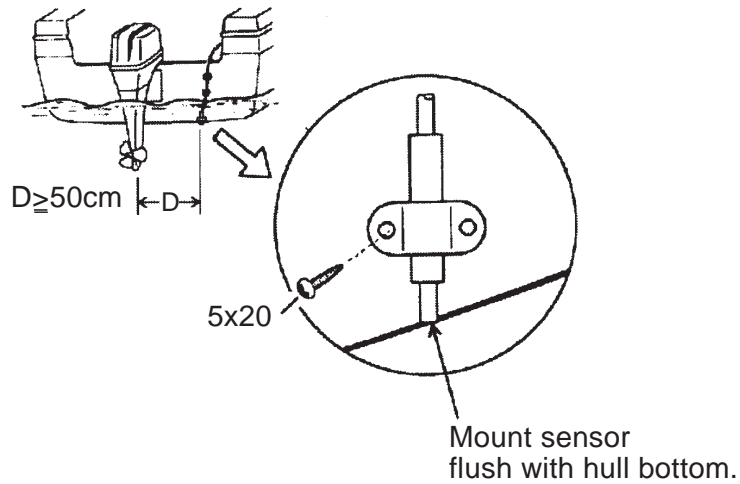
## 1.5.2 Thru-hull temperature sensor T-02MSB, T-03MSB
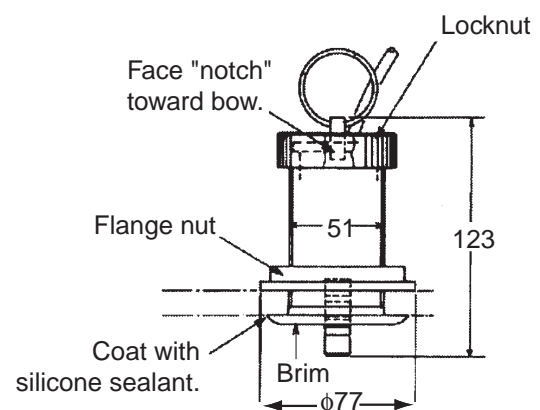
Select a suitable mounting location considering the following points:

• 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.

| T-02MSB | T-03MSB |
|---|---|
|  |  |

**T-02MSB**

Sensor cable 8 m
Locknut
Washer
Gasket
φ21 mm
M20
Coat with sealant.
70 mm
φ42 mm

*Mounting procedure*
1. Drill a hole of 21 mm in diameter in the mounting location.
2. Pass the sensor cable through the hole.
3. Pass gasket, washer and locknut onto cable in that order.
4. Coat the sensor flange with high quality sealant and then fasten the sensor with the locknut. (Torque: max. 59N·m)
5. Launch the boat to check for water leakage around the sensor.

**T-03MSB**

Sensor Holder
cable 8 m
Locknut
Locknut
Washer
Gasket
φ25 mm
M24
Coat with sealant.
70 mm
φ50 mm
Holder Guide
Plate thickness within 25 mm

*Mounting procedure*
1. Drill a hole of 25 mm in diameter in the mounting location.
2. Coat holder guide with high quality sealant, and pass gasket, washer and locknut onto holder guide in that order and then tighten the locknut.
3. Set the sensor holder to the holder guide from inside the boat and then tighten the locknut.
4. Launch the boat to check for water leakage around the sensor.

**11**

# 2. WIRING

## 2.1 Wiring Outline

Connect the power cable, transducer cables, sensor cable, network cable and ground wire to their respective locations on the network sounder. See the next page for how to connect the transducer cables.
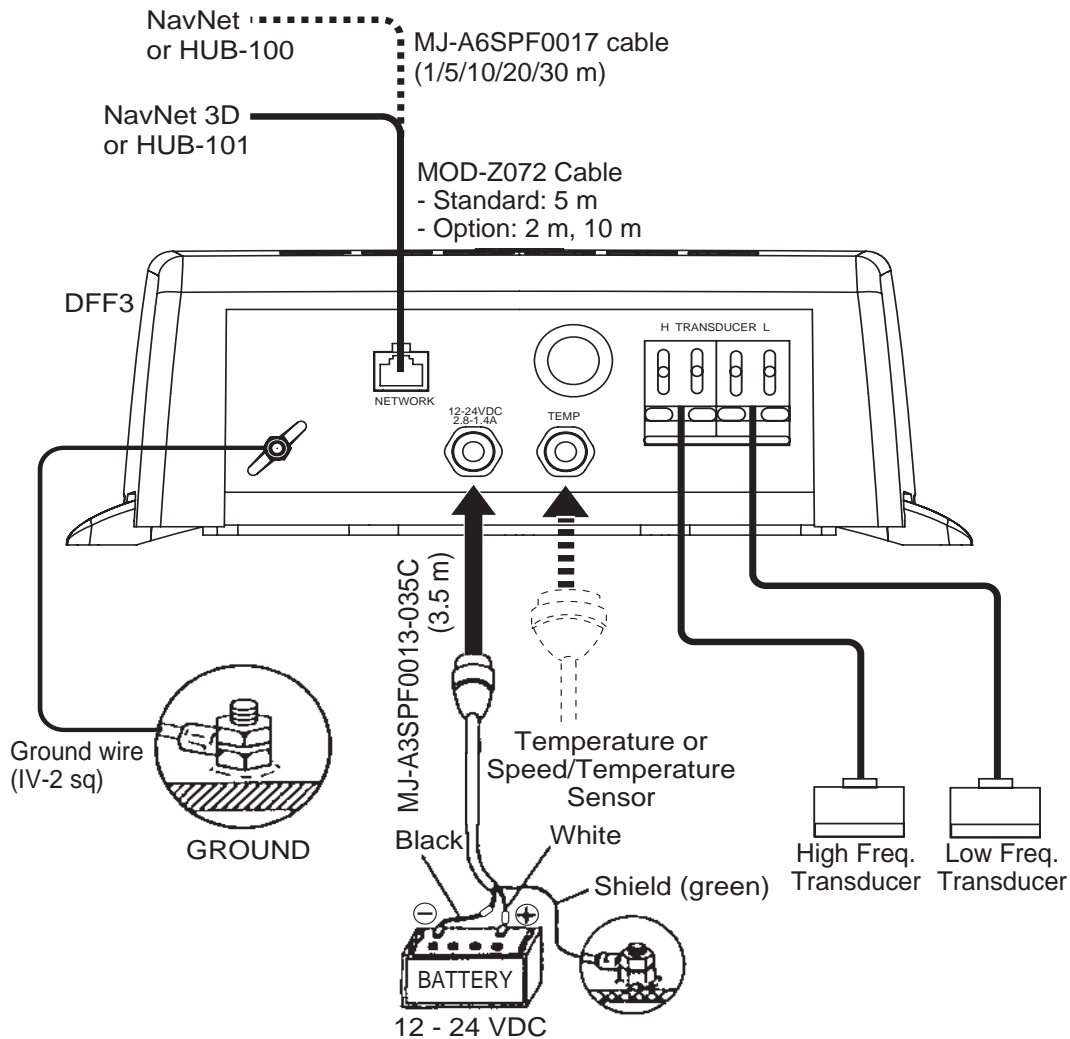


**Ground**

Connect a ground wire (IV-2 sq, local supply) between the ground terminal and ship's ground to prevent interference to the sounder picture. Make the length of the wire as short as possible. For FRP vessels, install a ground plate that measures about 20 cm by 30 cm on the outside of the hull bottom and connect the ground wire there.

⚠ **CAUTION**

**Ground the equipment to prevent mutual interference.**

**12**

# 2.2 Transducer Cable

### TD-ID transducer (Airmar make transducer)

The TD-ID type transducer can be connected to this equipment. However, note the following limitations:

- TD-ID transducer cannot be used with NavNet, NavNet vx2.
- TD-ID transducer cannot be used with non-TD-ID transducer.
- Connect single TD-ID transducer to low frequency WAGO connector, regardless of actual frequency.

### Cable fabrication

Fabricate the transducer cable as shown below. Separate the transducer cable well away from other electric cables to prevent interference to the sounder. This is especially important in the case of power cables from televisions and monitors.
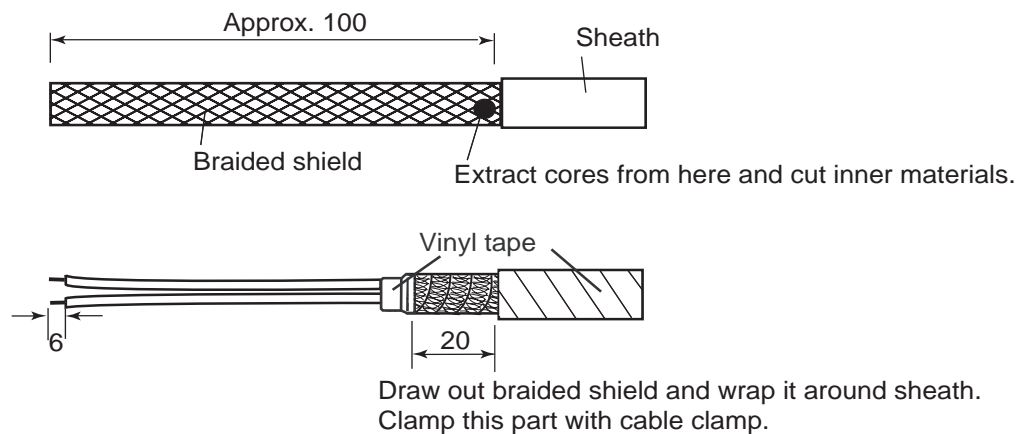


### Cable connection

After fabricating the transducer cable, connect the transducer cables to the equipment with WAGO connectors.

1. Open the cover: Grasp the cover at two sides, spread cover slightly and lift.
2. Unfasten six screws to remove the shield cover.
3. Detach the two WAGO connectors (low and high frequency) inside the equipment.



**13**
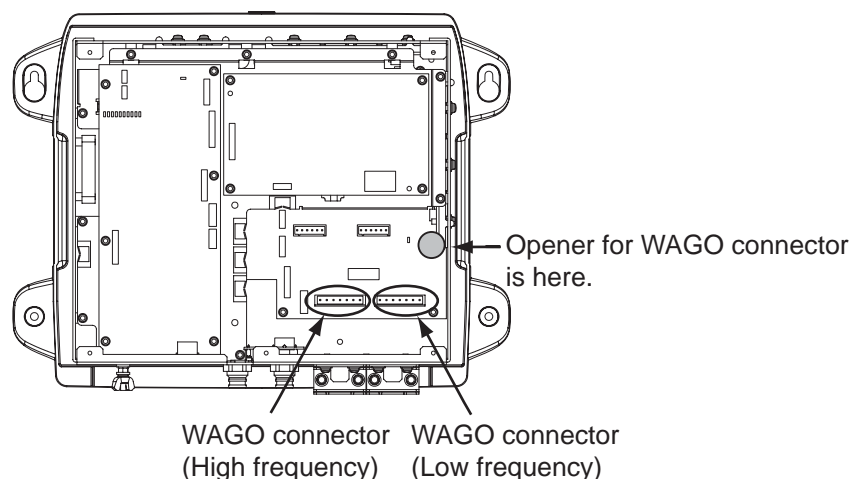
4. Connect the transducer cable to the WAGO connector, following the instructions in the figure below and the interconnection diagram. (The opener for the WAGO connector is attached inside the equipment. See the figure above.)

Push

Opener **(attached inside the equipment)**

1. Twist conductors.
2. Insert opener as directed and press it down.
3. Insert core to hole.
4. Release opener.
5. Pull the core to make sure it is correctly inserted.

Twist.

Core
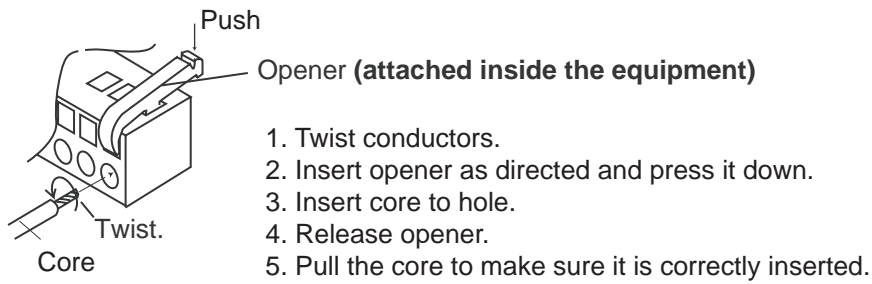
5. Unfasten the two screws labeled Screw A in the figure below.

6. Loosen the two screws labeled Screw B and slide cable clamp upward.

Cable clamp

Screw B

Screw A

Clamping plate
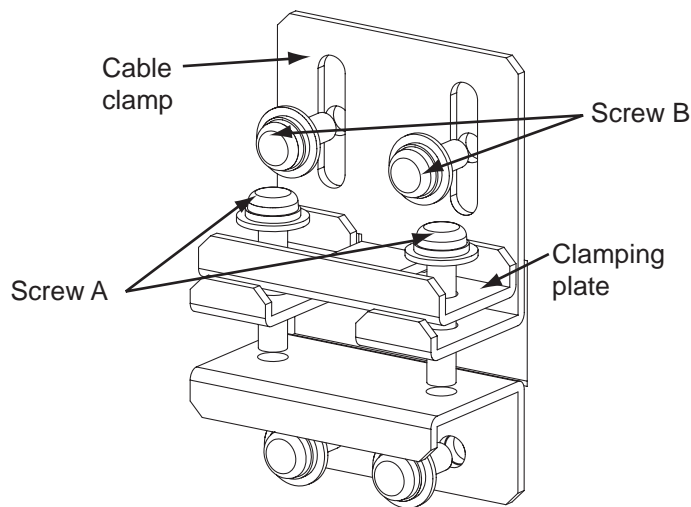
7. Pass the transducer cables through the cable entrance and connect their WAGO connectors to respective terminals inside the equipment.

8. Slide the cable clamp downward and tighten screws B and A in that order to fasten the cable clamp.

Transducer cable

**14**
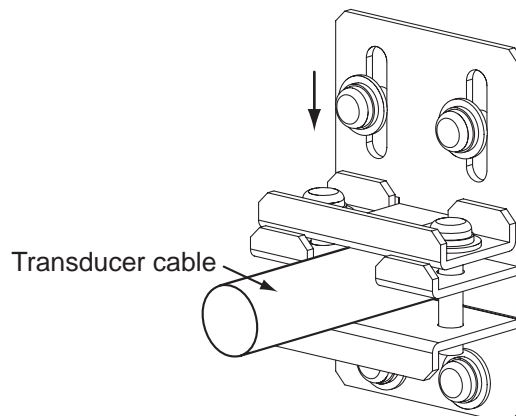
# 3. INITIAL SETTINGS

⚠ **WARNING**



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

Only qualified personnel should work inside the equipment.

## 3.1 Tap Setting

This equipment is preprogrammed for use with certain transducers. A jumper wire inside the equipment is set according to transducer model. Check the jumper wire setting instructions on the sticker attached to the chassis. Use the opener attached inside the unit to set the jumper wire. One end of the jumper wire is connected to COMMON; connect the other end to A - E in the jumper block as applicable.

**For transducers not programmed,** for example, Airmar make TD-ID transducer, consult a FURUNO agent or dealer for advice.
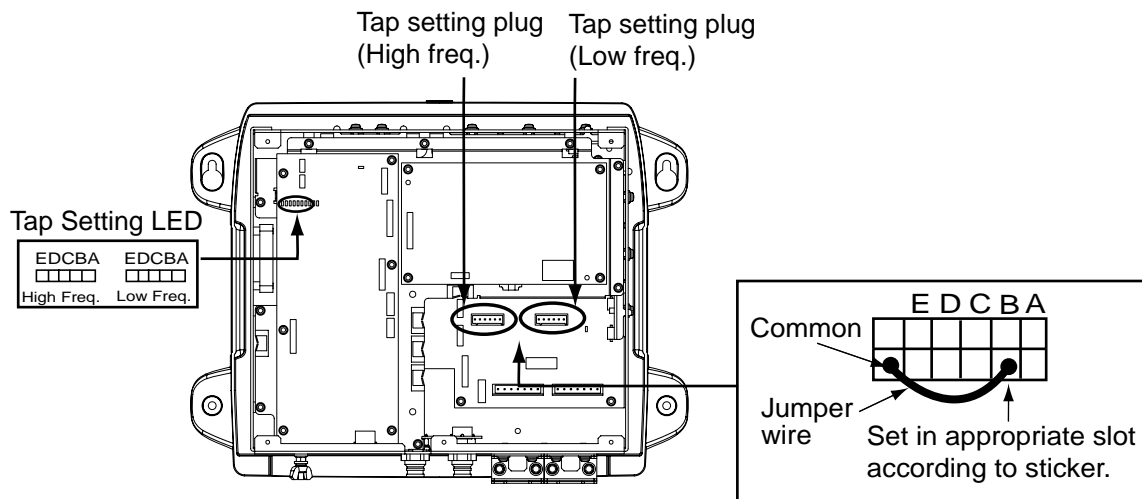


**Note 1:** For NavNet, the tap settings shown on the NETWORK SOUNDER SETUP are different from actual ones. Therefore, follow the instructions on the sticker inside the equipment.

**Note 2:** For transducers 50/200-1ST, 50/200-1T and 50/200-12M, use the tap settings for 50/200-1T (50: Tap B, 200: Tap C).

# 3.2 DIP Switch Setting

The DIP switch S2 sets up the system according to the equipment connected. In the default setting all switches (1-8) are OFF. The DIP switch S3 should not be adjusted; leave all switches in the OFF position.
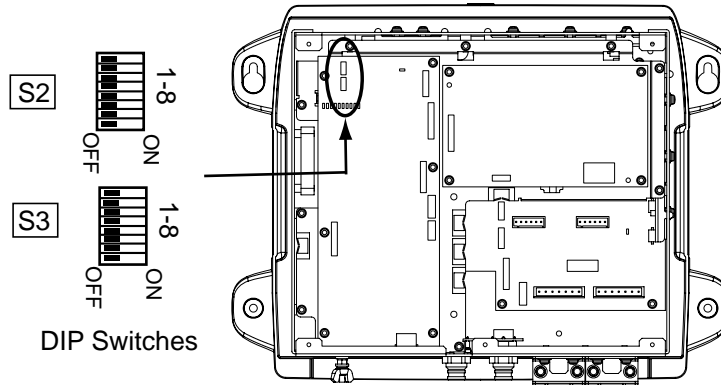


DIP Switches

*DIP switch S2 description*

| Switch No. | Function | Setting |
|---|---|---|
| 1 | Power on/off by NavNet or NavNet 3D | **OFF:** Power sync (for NavNet 3D)[*1] <br> **ON:** No power sync (for NavNet) |
| 2 | Automatic/Manual IP address selection | **OFF:** Automatic IP address assignment. Use this setting for NavNet 3D. <br> **ON:** Manual IP address assignment. Use this setting for NavNet, and refer to the table on the next page for IP addresses. |
| 3 - 6 | Manual IP address assignment | Valid when switch no. 2 is ON. For connection of multiple network sounders, assign each one an IP address with the Mode DIP switch, referring to the table on the next page. |
| 7 | Restore default settings (other than LAN and transducer) | See section 4.3. |
| 8 | Restore ALL default settings | See section 4.3. |

*1: Power sync setting enabled at NavNet 3D.

**16**

**DIP SW S2 setting, sounder and IP address**

| SW No.3 | SW No.4 | SW No.5 | SW No.6 | Host Name | IP Address |
|---------|---------|---------|---------|-----------|------------|
| OFF | OFF | OFF | OFF | SOUNDER | 172.031.092.001 |
| ON | OFF | OFF | OFF | SOUNDER1 | 172.031.092.011 |
| OFF | ON | OFF | OFF | SOUNDER2 | 172.031.092.012 |
| ON | ON | OFF | OFF | SOUNDER3 | 172.031.092.013 |
| OFF | OFF | ON | OFF | SOUNDER4 | 172.031.092.014 |
| ON | OFF | ON | OFF | SOUNDER5 | 172.031.092.015 |
| OFF | ON | ON | OFF | SOUNDER6 | 172.031.092.016 |
| ON | ON | ON | OFF | SOUNDER7 | 172.031.092.017 |
| OFF | OFF | OFF | ON | SOUNDER8 | 172.031.092.018 |
| ON | OFF | OFF | ON | SOUNDER9 | 172.031.092.019 |
| OFF | ON | OFF | ON | | |
| ON | ON | OFF | ON | | |
| OFF | OFF | ON | ON | | |
| ON | OFF | ON | ON | | |
| OFF | ON | ON | ON | | |
| ON | ON | ON | ON | | |

**Transducer setting at NavNet/NavNet3D**

After setting up the transducer at the DFF3, set transducer type at NavNet, NavNet 3D. See respective Installation Manual for the procedure.

**17**

# 3.3 Operation Check

For NavNet, the DFF3 is powered on/off from ship's switchboard. For NavNet 3D, it is powered on/off from the display unit. The LED on the cover of the DFF3 lights or blinks according to equipment state, as described in the table below.

*LED state and meaning*

| LED state | Meaning |
| --- | --- |
| Lighting continuously | • Standby state. (If, for NavNet, NavNet 3D no signal is received via LAN for more than 10 minutes, the equipment automatically goes into standby to lessen power consumption.)<br>• Power on (20 seconds during initialization)<br>• IP address not set |
| Blinking every two seconds | Normal operation |
| Blinking every 0.4 seconds | Transducer settings at NavNet, NavNet 3D not properly set. |
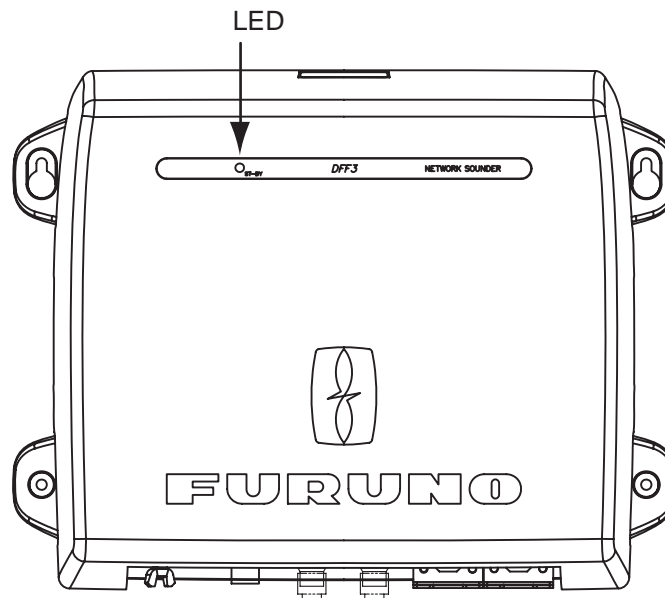
# 4.   MAINTENANCE

<table>
<tr>
<td>

⚠ **WARNING**

**ELECTRICAL SHOCK HAZARD**
**Do not open the equipment.**

Only qualified personnel should work inside the equipment.

</td>
<td>

**NOTICE**

**Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.**

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

</td>
</tr>
</table>

## 4.1   Maintenance

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

| Item | Check point, action | Check interval |
|------|---------------------|----------------|
| Transducer cables | Check that cables are tightly fastened and are not damaged. Refasten if necessary. Replace if damaged. | Once a month |
| Power cable, sensor cable | Check that these cables are tightly fastened and not damaged. Refasten if necessary. Replace if damaged. | Once a month |
| Ground | Check for corrosion. Clean if necessary. | Once a month |
| Power supply voltage | Check voltage. If out of rating correct problem. | Once a month |
| 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 markings and damage the cabinet. | Once a month |
| 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. | When vessel is dry-docked |

## 4.2 Replacing the Fuse

The 5A fuse (Type: FGBO-A 125V 5A PBF, Code No. 000-155-853-10) in the snap-in fuse holder on the power cable protects the equipment from equipment fault and reverse polarity of the ship's mains. If the equipment cannot be powered, the fuse may have blown. Find out the cause for blown fuse before replacing it. If the fuse blows again after replacement, contact a FURUNO agent or dealer for advice.

> ⚠ **WARNING**
>
> **Use the proper fuse.**
>
> Use of a wrong fuse can damage the equipment and cause fire.
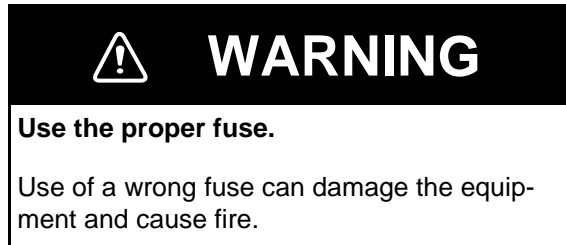
## 4.3 Restoring Default Settings

This procedure restores all default sounder settings on the NavNet, NavNet 3D. You can restore all default settings or restore those other than transducer and LAN. This procedure should only be performed by a suitably qualified FURUNO technician.
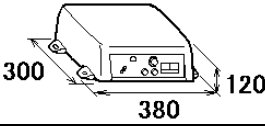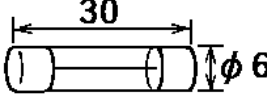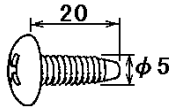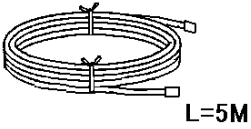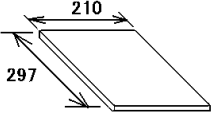
1. Disconnect the power and LAN cables from the DFF3.

2. Turn on the #1 and #2 switches of the Mode switch. See section 3.2 for the location.

3. Turn on the #7 or #8 switch of the Mode switch as applicable.
   #7: Restore default settings other than LAN and transducer.
   #8: Restore all default settings. Use this when changing transducers.

4. Connect the power cable to the DFF3, and turn on the power at the ship's switchboard.

5. The LED blinks (every four seconds) when default settings are completely restored.

**DFF3-J/E**

A-1

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| ユニット　　　　　UNIT | | | |
| ネットワーク魚探<br>NETWORK SOUNDER | 300　380　120 | DFF3<br>000-011-916-00 | 1 |
| 予備品　　　SPARE PARTS | | SP02-05601 | |
| ヒューズ<br>FUSE GLASS TUBE TYPE | 30　φ6 | FGBO-A 125V 5A PBF<br>000-155-853-10 | 2 |
| 工事材料　　　INSTALLATION MATERIALS | | CP02-08500 | |
| +トラスタッピンネジ　1シュ<br>SELF-TAPPING SCREW | 20　φ5 | 5X20 SUS304<br>000-162-608-10 | 4 |
| ケーブル(組品)LAN<br>CABLE ASSY. | L=5M | MOD-Z072-050+<br>000-167-176-10 | 1 |
| ケーブル組品MJ<br>CABLE ASSY. | L=3.5M | MJ-A3SPF0013-035C(5A)<br>000-157-939-10 | 1 |
| 図書　　　　DOCUMENT | | | |
| 取扱説明書<br>OPERATOR'S MANUAL | 210　297 | OM*-20370-*<br>000-168-581-1*　** | 1 |

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

型式/コード番号が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.）

C2037-Z01-A

# SPECIFICATIONS OF NETWORK SOUNDER
# DFF3

## 1    GENERAL

1.1    TX frequency            28-200 kHz, two frequencies alternately transmitted (selectable)

1.2    Output power            1/2/3 kW nominal

1.3    Amplifier type          Wide dynamic range linear amplifier (double superheterodyne)

1.4    Depth range and Pulse repetition rate (PRR)

200 kHz, TX rate: 20

| Range (m) | PRR ( /min.) |
|-----------|--------------|
| 2         | 2403 (max)   |
| 5         | 2403         |
| 10        | 1621         |
| 40        | 476          |
| 100       | 222          |
| 200       | 117          |
| 400       | 58           |
| 1200      | 34           |

## 2    INTERFACE

2.1    Number of port          LAN: 1 port, Transducer: 2 port, Temp/speed sensor: 1 port

2.2    Network                 Ethernet 10BASE-T/100BASE-TX

## 3    POWER SUPPLY

3.1    Network sounder         12-24 VDC: 2.8-1.4 A

3.2    Rectifier (PR-62, option) 100/110/220/230 VAC, 1 phase, 50/60 Hz

## 4    ENVIRONMENTAL CONDITION

4.1    Ambient temperature     -15°C to +55°C

4.2    Relative humidity       93% at 40°C

4.3    Degree of protection    IP20

4.4    Vibration requirement   IEC 60945

## 5    COATING COLOR

N2.5 (not changed)

型式銘板
NAMEPLATE

表1 TABLE1

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

2-取付穴
FIXING HOLES

6

R8

12

取付穴
2-φ6
FIXING HOLES

O ST-BY    DFF3    NETWORK SOUNDER

FURUNO

コネクタ（WAGO）
CONNECTOR 7P

185±0.5

60

#20

300

#150

120

348±0.5

アース端子
GND TERMINAL

LAN

ケーブル導入口
CABLE ENTRY

#70

380

#70

電源
SORCE

水温・船速センサー
TEMP/SPEED SENSOR
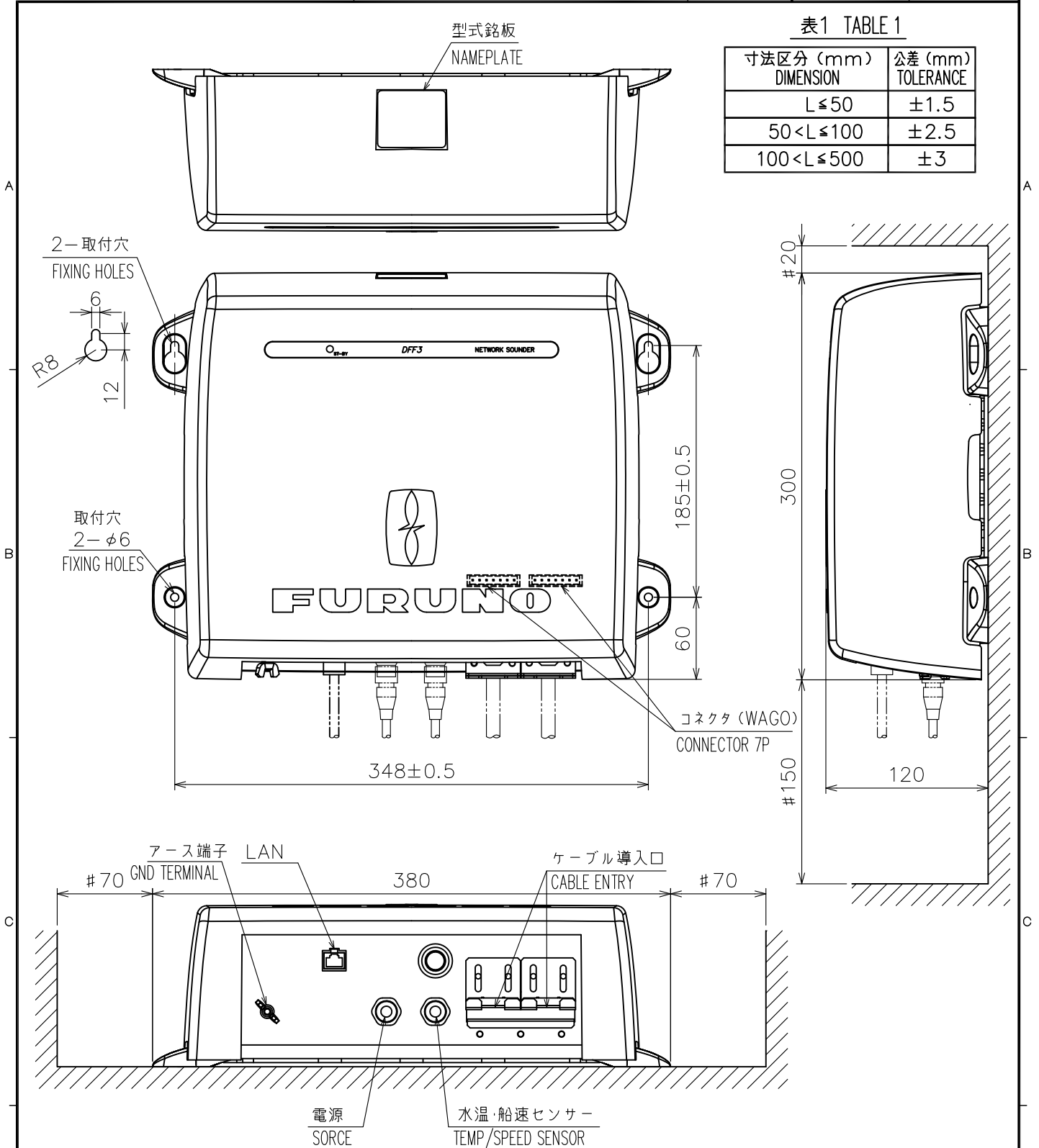
注 記 1) #印寸法は最小サービス空間寸法とする。
2) 指定外の寸法公差は表1による。
3) 取付用ネジはトラスタッピンネジ呼び径5×20を使用のこと。

NOTE 1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

| DRAWN | Jan. 17 '08 T.YAMASAKI | | TITLE DFF3 |
|---|---|---|---|
| CHECKED | Jan. 18 '08 T.TAKENO | | 名称 ネットワーク魚探 |
| APPROVED | Jan. 18' 08 R. Esumi | | 外寸図 |
| SCALE 1/4 | MASS 3.9 ±10% kg | | NAME NETWORK SOUNDER |
| DWG.No. C2037-G01- A | REF.No. 02-161-100G-1 | | OUTLINE DRAWING |

FURUNO ELECTRIC CO., LTD.

FURUNO

イーサネットハブ
ETHERNET HUB
HUB-101 *2

または OR

マルチファンクションディスプレイ
MULTI-FUNCTION DISPLAY
MFD8/12 *2

指示部
DISPLAY UNIT
(NAVNET 1/VX2)

RJ45
1 TXP
2 TXN
3 RXP
4 NC
5 NC
6 RXN
7 NC
8 NC

MJ-A6SPF
1 E_TD-P
2 E_TD-N
3 E_RD-P
4 E_RD-N
5 NC
6 SHIELD

MJ-A6SPF0017-050C
5m, φ6 (MAX. 30m)
*2

MOD-Z072-050+.5m (2/10m *2)

RJ45
1 TXP
2 TXN
3 RXP
4 NC
5 NC
6 RXN
7 NC
8 NC

MJ-A6SPF0017-050C

KP OUT
KP IN
NET KP

J7
3 TD_HF-L  ミドリ GRN
2 GND
1 TD_HF-H  アオ BLU

J6
3 TD_LF-L  クロ BLK
2 GND
1 TD_LF-H  アカ RED

*2
50/200-1T/1ST
50/200-12M

15m (1ST)
10m (1T/12M)

ネットワーク魚探
NETWORK SOUNDER
DFF3

J19
1 TXP
2 TXN
3 RXP
4 P_SW-P
5 P_SW-N
6 RXN
7 NC
8 NC

1B1 02P6358

J23 (PH4P)
1 KP0
2 GND
3 KP1
4 GND

J24 (XH3P)
1 NET_KP1_IO
2 GND
3 SHIELD

J25 (XH3P)
1 NET_KP2_IO
2 GND
3 SHIELD

7 TEMP_XDR-H
6 XDR-H_GND
5 TDID_XDR-H
4 NC
3 TD_HF-L  BLK
2 GND
1 TD_HF-H  RED

J7 (231-337/001-000)

7 TEMP_XDR-HL
6 XDR-HL_GND
5 TDID_XDR-HL
4 NC
3 TD_LF-L  BLK
2 GND
1 TD_LF-H  RED

J6 (231-337/001-000)

1B2 02P6359

送受波器
TRANSDUCER

HF
8/10/15m, φ12

LF
8/10/15m, φ12

ネットワーク魚探
NETWORK SOUNDER
DFF3

J1
1 (+)
2 (−)
3 SHIELD

J2
1 SHIELD
2 TEMP
3 TEMP_0V
4 SPEED
5 12V_P
6 GND

1B3 02P6360

MJ-A3SPF
シロ WHT
クロ BLK
ミドリ GRN

MJ-A6SPF

8m

水温・船速
センサー
TEMP/SPEED
SENSOR
ST-02MSB/PSB
T-02MTB/MSB

MJ-A3SPF0013-035C, 3.5m  5A

12-24VDC (+)
         (−)
         GND

DPYC-1.5 *1

100/110/
220/230VAC
1φ, 50/60Hz

整流器
RECTIFIER
PR-62 *2

5 6  1 2 3
        GND
(+) (−)

*1
IV-2sq.

*1
IV-2sq.

*1
IV-2sq.

注記
*1) 造船所手配。
*2) オプション。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.

TITLE  DFF3

名称  ネットワーク魚探

相互結線図

NAME  NETWORK SOUNDER

INTERCONNECTION DIAGRAM

DRAWN  Feb. 26 '08  T.YAMASAKI
CHECKED  Feb. 27 '08  T.TAKENO
APPROVED  26/Mar/08  R.Esumi

SCALE        MASS        kg

DWG. No.  C2037-C01- A

REF. No.  02-161-1001-0

FURUNO ELECTRIC CO.,LTD.

A    B    C

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

# FURUNO ELECTRIC CO., LTD.

9-52 Ashihara-cho,
Nishinomiya, 662-8580, JAPAN

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A : MAR. 2008

Pub. No. OME-20370-A

(DAMI) DFF3

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