# Installation Guide v3.2

*MFD8/12/BB software v2.07 and later*

## READ ME FIRST!

Please read this document before installing and powering ON your NavNet Display

*INSTALLATION TOOLS YOU WILL NEED: An ordinary USB MOUSE AND USB KEYBOARD for the MFDBB Installation! These are also helpful with the MFD8/12 Installation.*

**FURUNO ELECTRIC CO., LTD.**

# ⚠ 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

## ⚠ WARNING

**ELECTRICAL SHOCK HAZARD**
**Do not open the equipment unless totally familiar with electrical circuits.**

Only qualified personnel should work inside the equipment.

❗ **Turn off the power at the switchboard before beginning the installation.**

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

❗ **Be sure that the power supply is compatible with the voltage rating of the equipment.**

Connection of an incorrect power supply can cause fire or damage the equipment.

## ⚠ CAUTION

⏚ **Ground the equipment to prevent electrical shock and mutual interference.**

**Use the proper fuse.**

Use of an incorrect fuse may damage the equipment.

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

|  | Standard compass | Steering compass |
|---|---|---|
| MFD8 | 0.90 m | 0.60 m |
| MFD12 | 0.85 m | 0.55 m |
| MPU-001 | 1.45 m | 0.90 m |
| MCU-001 | 0.55 m | 0.40 m |

## Standard supply (MFD8/12)

| Name | Type | Part Number (PN) | Qty | Remarks |
|---|---|---|---|---|
| Multi Function Display | MFD8 | - | 1 | Choose one. |
| | MFD12 | - | | |
| Installation materials | CP19-00900 | 000-011-780 | 1 set | For MFD8, CP19-00901*, cables |
| | CP19-01000 | 000-011-781 | | For MFD12, CP19-01001*, cables |
| Spare Parts | SP19-00701 | 001-028-020 | 1 set | For MFD8, fuses |
| | SP19-00801 | 001-028-030 | | For MFD12, fuses |
| Accessories | FP19-01101 | 001-023-060 | 1 set | Panel/Bezel Removal tool |

*See the lists at the end of this manual.

## Optional supply (MFD8/12)

| Name | Type | Part Number (PN) | Remarks |
|---|---|---|---|
| NMEA0183 and NMEA2000 Micro-cable Assemblies | MJ-A7SPF0007-050C | 000-154-028 | 5 m, NMEA0183, w/7 pin Female connector (DATA1) |
| | M12-05BM+05BF-010 | 000-167-962 | $\phi$ 6, 1 m, NMEA2000, w/M-F micro connectors |
| | M12-05BM+05BF-020 | 000-167-963 | $\phi$ 6, 2 m, NMEA2000, w/M-F micro connectors |
| | M12-05BM+05BF-060 | 000-167-964 | $\phi$ 6, 6 m, NMEA2000, w/M-F micro connectors |
| | M12-05BFFM-010 | 000-167-965 | $\phi$ 6, 1 m, NMEA2000, w/micro connector |
| | M12-05BFFM-020 | 000-167-966 | $\phi$ 6, 2 m, NMEA2000, w/micro connector |
| | M12-05BFFM-060 | 000-167-967 | $\phi$ 6, 6 m, NMEA2000, w/micro connector |
| Ethernet Network Cable Assemblies | MOD-Z072-020+ | 000-167-175 | LAN cross, 4-pair, 2 m |
| | MOD-Z072-050+ | 000-167-176 | LAN cross, 4-pair, 5 m |
| | MOD-Z072-100+ | 000-167-177 | LAN cross, 4-pair, 10 m |
| | MOD-Z073-030+ | 000-167-171 | LAN straight, 2-pair, 3 m |
| | MJ-A6SPF0016-005C | 000-159-689 | For FAX-30, ETR6N/10N connection |
| NMEA 2000 Terminators and "T" Connectors | LTWSS050505FMF-TS001 | 000-168-603 | NMEA 2000 "T" Connector, micro |
| | LTWMC-05BMMT-SL8001 | 000-168-604 | NMEA 2000 terminator, male, micro |
| | LTWMC-05BFFT-SL8001 | 000-168-605 | NMEA 2000 terminator, female, micro |

## Optional supply (MFD8/12) *(continued)*

| Name | Type | Part Number (PN) | Remarks |
|---|---|---|---|
| DVI-D CABLE | DVI-D/D S-LINK | 000-149-054 | 5 m, for Multi-purpose LCD connection. Single Link only. |
| | DVI-D/D S-LINK | CBL-DVI-10M | 10 m, for Multi-purpose LCD connection. Single Link only. |
| External Buzzer | OP03-136 | 000-086-443 | Suggest Radio-Shack 273-070 or equivalent |
| Junction Box | FI-5002 | - | For FI-50 series/NMEA2000 Terminal Strip Connections |
| Network Hub | HUB-101 | - | NN3D Hub with Sleep Mode Signal Compatibility |
| RJ45 Junction Box | RJ45-to-RJ45 Straight | RJ4-5CN-STR | For Mast-Step or LAN cable extension |
| Connector Boot | OP19-7 | 001-028-090 | Waterproofing Kit for MFD8/12 exposed connection points |
| Operator's Manual | OME-4440 | 000-167-802 | - |
| NMEA 2000 Interface Unit | IF-NMEA2K1 | - | Use where NMEA2000-to-NMEA0183 Data conversion is required for legacy products |

## Standard supply (MFDBB)

| Name | Type | Part Number (PN) | Qty | Remarks | |
|---|---|---|---|---|---|
| Processor Unit | MPU-001 | - | 1 | | |
| Control Unit | MCU-001 | - | 1 | Choose one. | |
| Display Control Unit | DCU12 | - | 1 | | |
| Installation Materials | CP19-00600 | 000-011-664 | 1 set | For MPU-001, Cable, CP19-00601* | |
| | CP19-00700 | 000-011-663 | 1 set | For MCU-001, cable, CP19-00701* | Choose one |
| | CP19-00800 | 000-011-662 | | For DCU12, cables, CP19-00801* | |
| Spare Parts | SP19-00501 | 001-023-090 | 1 set | For MPU-001, Fuses | |
| | SP19-00501 | 001-023-040 | 1 set | For DCU-001, Fuses | |
| Accessories | FP19-01201 | 001-033-760 | 1 | For MCU-001, panel remover | |
| | FP19-01101 | 001-023-060 | | For DCU12, panel remover | |

*See the lists at the end of this manual.

## Optional supply (MFDBB)

| Name | Type | Part Number (PN) | Remarks |
|---|---|---|---|
| DVI-D Cable | DVI-D/D S-Link | 000-149-054 | 5 m, for Multi-purpose LCD connection. Single Link only. |
| | DVI-D/D S-LINK | CBL-DVI-10M | 10 m, for Multi-purpose LCD connection. Single Link only. |
| External Buzzer | OP03-136 | 000-086-443 | |
| Network Hub | HUB-101 | | |
| RJ45 Junction Box | RJ45-to-RJ45 Straight | RJ4-5CN-STR | For LAN cable extension |
| Junction Box | FI-5002 | 000-010-765 | For NMEA 2000 |
| Control Unit | MCU-001 | - | - |
| Display Control Unit | DCU12 | - | - |
| Cable Assembly | MJ-A7SPF0007-050C | 000-154-028 | 5 m, NMEA0183, w/7P connector |
| | MJ-A6SPF0016-005C | 000-159-689 | For FAX-30, ETR6N/10N connection |
| | MOD-Z072-020+ | 000-167-175 | 2 m, LAN |
| | MOD-Z072-050+ | 000-167-176 | 5 m, LAN |
| | MOD-Z072-100+ | 000-167-177 | 10 m, LAN |
| | MOD-Z073-030+ | 000-167-171 | 3 m, for PC connection |
| | M12-05BM+05BF-010 | 000-167-962 | $\phi$6, 1 m, NMEA 2000 |
| | M12-05BM+05BF-020 | 000-167-963 | $\phi$6, 2 m, NMEA 2000 |
| | M12-05BM+05BF-060 | 000-167-964 | $\phi$6, 6 m, NMEA 2000 |
| | M12-05BFFM-010 | 000-167-965 | $\phi$6, 1 m, NMEA 2000 |
| | M12-05BFFM-020 | 000-167-966 | $\phi$6, 2 m, NMEA 2000 |
| | M12-05BFFM-060 | 000-167-967 | $\phi$6, 6 m, NMEA 2000 |
| | CB-05PM+05BF-010 | 000-167-968 | $\phi$10, 1 m, NMEA 2000 |
| | CB-05PM+05BF-020 | 000-167-969 | $\phi$10, 2 m, NMEA 2000 |
| | CB-05PM+05BF-060 | 000-167-970 | $\phi$10, 6 m, NMEA 2000 |
| | CB-05BFFM-010 | 000-167-971 | $\phi$10, 1 m, NMEA 2000 |
| | CB-05BFFM-020 | 000-167-972 | $\phi$10, 2 m, NMEA 2000 |

## Optional supply (MFDBB) *(continued)*

| Name | Type | Part Number (PN) | Remarks |
|---|---|---|---|
| Cable Assembly | CB-05BFFM-060 | 000-167-973 | φ10, 6 m, NMEA 2000 |
| NMEA Connector | LTWSS-050505-FMF-TS001 | 000-168-603 | NMEA 2000 distributor (micro style) |
|  | LTWMC-05BMMT-SL8001 | 000-168-604 | NMEA 2000 terminator, male (micro style) |
|  | LTWMC-05BFFT-SL8001 | 000-168-605 | NMEA 2000 terminator, female (micro style) |
|  | LTWNC050505FMF-TS001 | 000-160-507 | NMEA 2000 distributor (mini style) |
|  | LTWMN-05AMMT-SL8001 | 000-160-508 | NMEA 2000 terminator, male (mini style) |
|  | LTWMN-05AFFT-SL8001 | 000-160-509 | NMEA 2000 terminater, female (mini style) |
| Operator's Manual | OME-44460 | - | - |
| NMEA2000 Interface Unit | IF-NMEA2K1 | - | - |

# 1. <u>Mounting</u>

## 1.1. MFD8/12 Mounting



MFD8                                          MFD12

When selecting a mounting location for the NN3D MFD8/12, keep the following in mind:

- The temperature and humidity of the mounting location should be moderate and stable.
- Install the unit away from exhaust pipes and ventilators.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Keep the units away from electromagnetic field generating equipment such as motors and generators.
- For maintenance and checking purposes, leave sufficient space from the sides and the rear of the unit and leave slack in cables.  Minimum recommended space is shown the outline drawing for the display units.
- A magnetic compass will be affected if the display unit is placed too close to it. Observe the compass safe distances shown in the **SAFETY INSTRUCTIONS** to prevent disturbances to the magnetic compass.

The MFD8/12 can be flush or bracket mounted in a variety of ways.

### 1.1.1. MFD8/12 Flush Mounting

1. Prepare a cutout in the mounting location using the template sheet (supplied) for the MFD8 or 12.
2. Remove the front panel from the MFD by grasping it at its sides and pulling it towards you.
3. Attach the mounting gasket (sponge) to the display unit.
4. Fix the display unit by using four self-tapping screws (supplied).
5. Attach the front panel to the display.
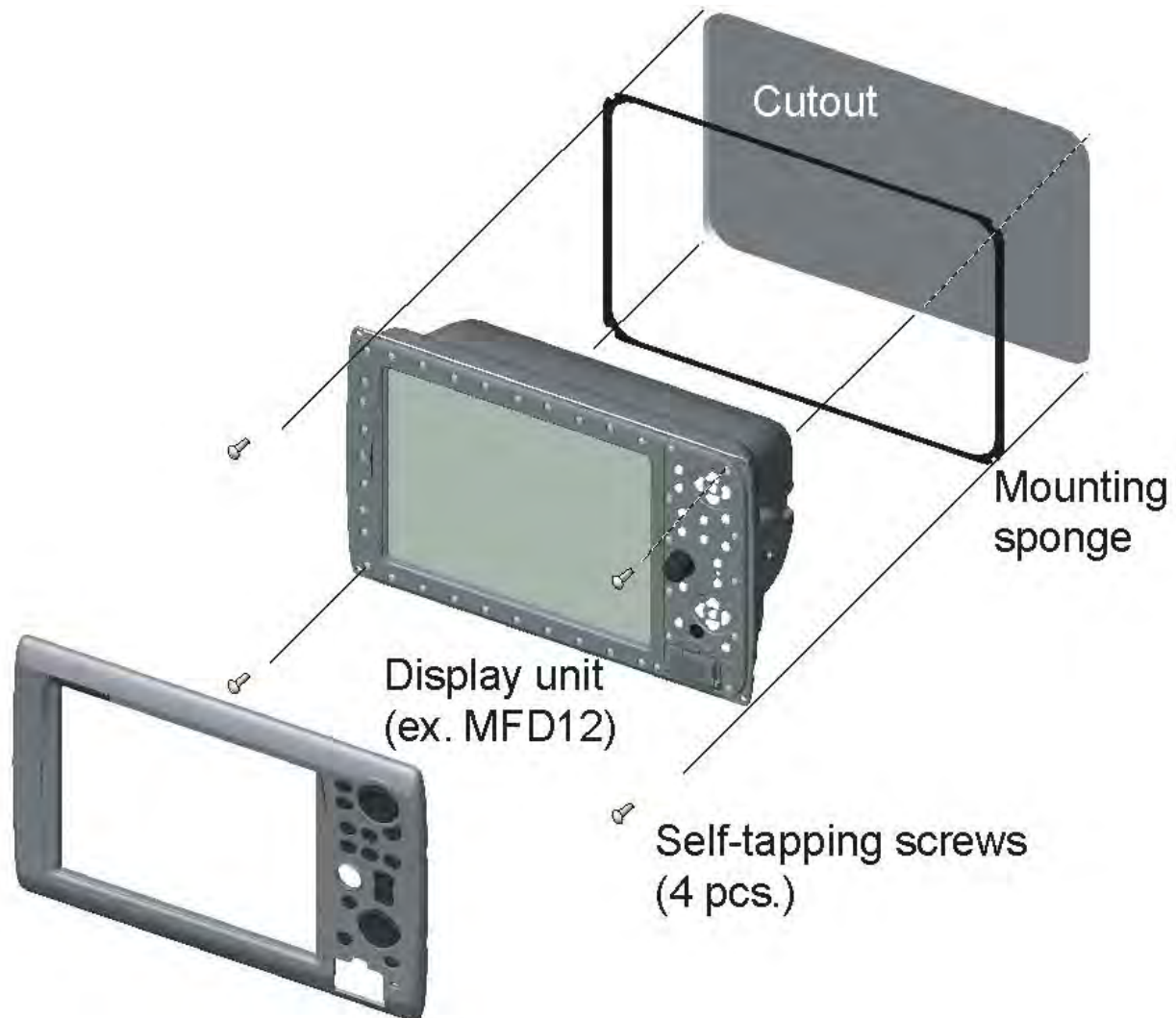
**How to detach the front cover when flush mounted**.
To detach the front panel when the unit is flush mounted, use the special tool (supplied) as below.
**WARNING:** The front cover may be damaged if this procedure is not followed!

1. Insert the tool in the notch on the lower side of the unit.



2. Pull the tool to raise the panel slightly. Repeat this action for all notches on the lower side of the unit.



3. Insert the tool into the small notches located on the sides of the panel, and pull the tool to raise the panel slightly.

4. Use your hands to detach the front panel from the lower side.

## 1.1.2. MFD 8/12 Desktop and Overhead Mounting

Follow the procedure below to mount the MFD8 or 12 on a desktop or overhead.

1. For MFD12, attach the liner to each side of the display unit. (Reverse the MFD12 Liners for overhead mounting.)
2. Fix the bracket (Hanger) by using self-tapping screws (supplied).
3. Screw knob bolts into the display unit, set it to the bracket (Hanger), and tighten the knob.

# 1.2.    MFDBB Processor Mounting

The unit can be mounted on the deck, a desktop or on a bulkhead.  Take special note that the MFDBB **IS NOT WATERPROOF**. Select a mounting location considering the points below:

- Select a location where temperature and humidity are moderate and stable.
- Consider the lengths of the cables connected among the processor unit, radar sensor and control unit.
- For mounting on a bulkhead, be sure the mounting location is strong enough to support the unit under the pitching and rolling normally encountered on the vessel.
- Leave sufficient space around the unit for maintenance and servicing.  Minimum recommended maintenance space appears in the outline drawing at the back of this manual.
- A magnetic compass will be affected if the processor unit is placed too close to the magnetic compass.  Observe the compass safe distances in **SAFETY INSTRUCTIONS** to prevent disturbance to the magnetic compass.

## 1.2.1. MFDBB Processor Desktop or Deck Mounting

Fasten with four self-tapping screws.

## 1.2.2. MFDBB Processor Bulkhead Mounting

Mark four fixing holes positions on the bulkhead. Screw in two 6x30 self-tapping screws at upper fixing positions, leaving 5 mm protruding. Set the processor unit to the screws and screw in two self-tapping screws at lower positions. Tighten all screws.

4 pcs.
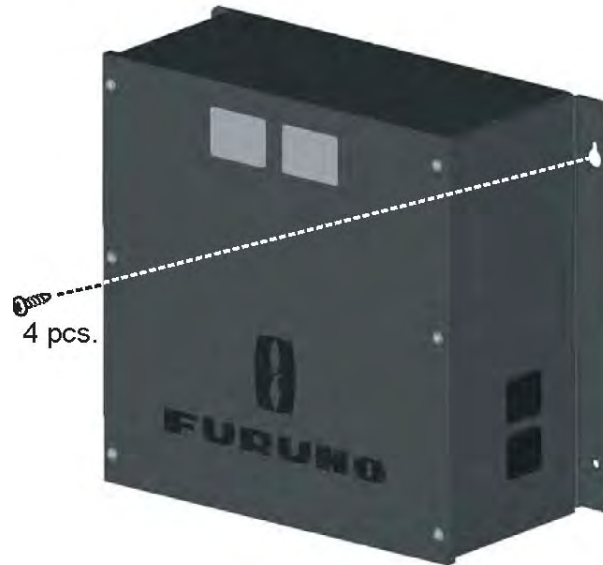
## 1.2.3. MFDBB Keyboard Mounting

The BlackBox keyboard (control unit MCU-001) is designed to be flush mounted in a console or panel.

1. Prepare a cutout in the mounting location using the template sheet (supplied) for the MCU-001.
2. Remove the front panel from the MCU-001 by grasping it at its sides and pulling it towards you.
3. Attach the mounting gasket (sponge) to the MCU-001.
4. Fix the MCU-001 by using four self-tapping screws (supplied).
5. Attach the front panel to the MCU001.

Cutout

Mounting sponge

MCU-001

Self-tapping screws (4 pcs.)
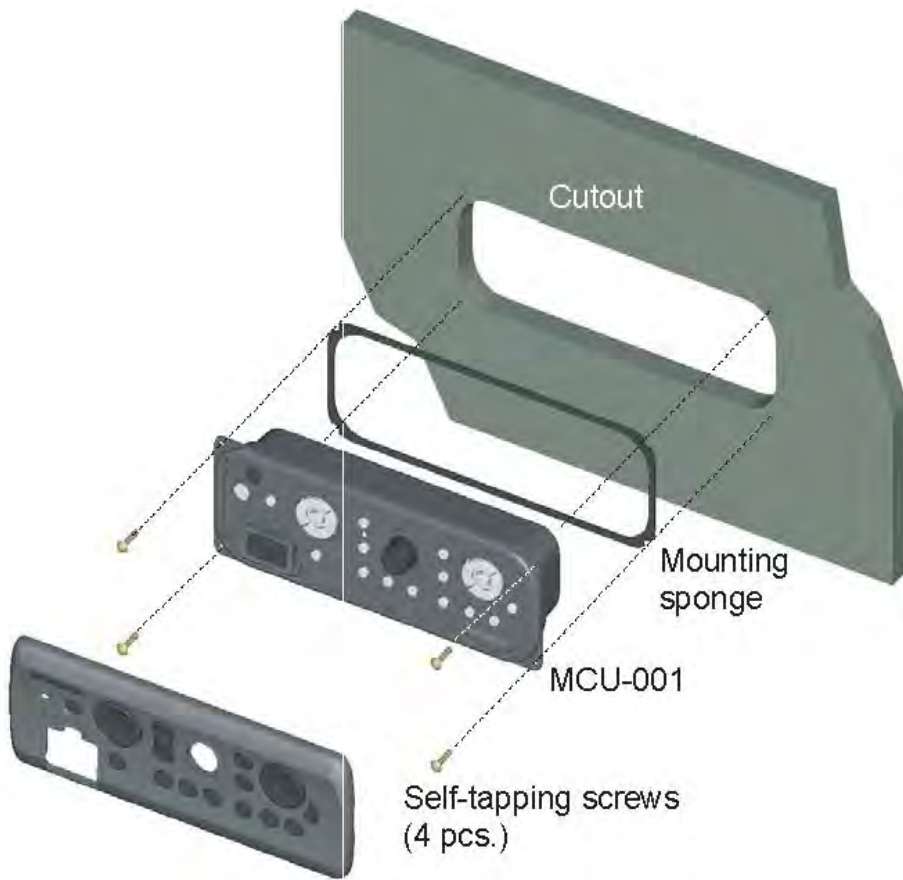
## How to detach the front panel when flush mounted

To detach the front panel when the unit is flush mounted, use the tool (supplied) as below. Do not attempt to remove it by any other method, to prevent damage to the unit.

1. Insert the tool to the left-side notch at the bottom of the unit

2.  Pull the tool to raise the panel slightly.



3.  Similarly use the tool to raise the panel at the right-side notch.

4.  Insert the tool to the space at the one end of the unit, and pull it to raise the panel slightly. Repeat this procedure for the opposite side.



5.  Use the tool to raise the panel at the two notches on the upper side of the unit.

6.  Use your hands to detach the front panel at both sides of it

# 2. Wiring

## 2.1. Overview

### 2.1.1. MFD8/12 Overview



12-24 VDC

MJ-A3SPF0017-050ZC (MFD8)
MJ-A3SPF0018-050ZC (MFD12)

To ship's ground

Radar Sensor or
PSU-012/013

Ground wire
IV-8sq.

NMEA 0183
(ex. GP-320B)

Radar Sensor
(two-way cable supplied with DRS),
HUB-101 (MOD-WPAS0001-030+),
etc.

NMEA 2000 port

FRUDD-18AFFM-L180

NMEA 0183 equipments
(GPS plotter. Echo sounder,
External buzzer, etc.)

External display    DVI-D/D cable
(MU-150C etc.)      5 m/10 m

*Remove the cover to
access these connectors.

DVI-D*

USB port*
(Ver. 1.1, mouse, keyboard, etc.)

Video interface devices*    AUDIO*
(L: line out, R: line in (future use))

————————— : Standard supply
.................... : Option
— — — — — : Local supply

### 2.1.2. MFDBB Overview



## 2.2. Power Connections

### 2.2.1. MFD8/12

The MFD8/12 can be powered directly using nominal 12V or 24V DC. Only use the power cable supplied with the unit and connect it to the Power Connector at the rear of the unit.

### 2.2.2. MFDBB

The MCU001 - MFDBB processor unit can be powered using 12V or 24V. Make up a 10 AWG power cable as shown below.

Sheath — Armor

Cut the sheath.

47 | 3

20 | 20

7

8 to 12 | Vinyl tape | Remove the paint.

5.5

1 | Crimp-on lug (local supply)

DPYC-6

Armor
Sheath
$\phi$ = 15.2 mm

Conductor
S = 6 mm$^2$
$\phi$ = 3.12 mm
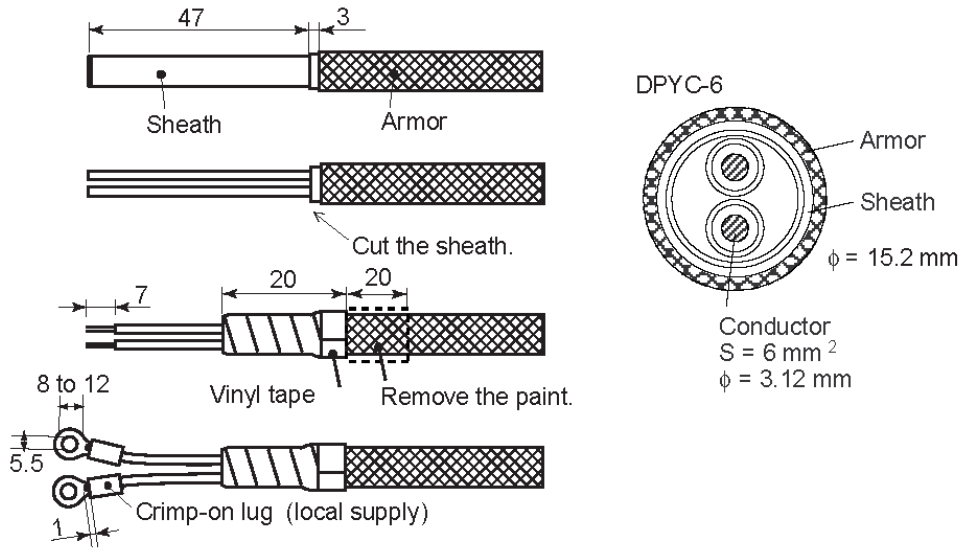
To connect the power cable, remove the Power Terminal cover. Unfasten the four pan head screws and connect the power cable to the power terminal (upper: **+**, lower: **-**). Reattach the cover. Note that the recommended maximum cable length is 5 m.



Power terminal cover

Power terminal

## 2.3.    DATA Ports (NMEA0183)

### 2.3.1. Overview

Every MFD8/12 and MFDBB has THREE full NMEA0183 I/O Data Ports. One is available on the DATA1 (7-Pin Connector) and is pin compatible with NavNet 1/VX2 DATA1 Connector. Two additional NMEA Ports are available on the DATA2 (18-Pin connector).

These NMEA connections can accept a baud rate of 4800 or 38.4K. Any instrument (GPS, AIS, Smart Sensor, etc…) can be connected to any port.

**Heading:** Heading input to NavNet 3D will allow functions such as Radar Overlay and course stabilization (North Up, Course Up, etc.) in Radar operating modes.

**IMPORTANT:** The NMEA0183 **heading refresh rate needs to be 100ms** (10 times per second or faster) in order for the Radar ARPA function to work properly. If ARPA is not used, the refresh rate of heading information can be 200ms (5 times per second) to support radar overlay on the plotter. **NavNet 3D MFDs WILL NOT ACCEPT NMEA 0183 heading information if the refresh rate is only updated at 1 or 2 times per second!!** NMEA0183 heading can be accepted on any NMEA port at a baud rate up to 38.4kbps. Note that changing the baud rate on any of the three NMEA0183 Data ports will affect both the receive and transmit baud rate. In other words, data sent and received, must use the same baud rate for each individual data port.
Please refer to the Appendix (p. 74) for installation example with the Furuno Pilot and Magnetic Compass PG500R.

*Note:* Heading data from a NMEA2000 source/sensor will always be at the correct refresh speed for the DRS ARPA function.

### 2.3.2. DATA 1 description

DATA1 uses a 7 Pin round plug. In many cases the DATA1 will be used to directly connect a Furuno GPS GP320B (P/N BBWGPS).

Other NMEA0183 compatible devices (Compass, AIS, Sounder, Smart Sensor…) can be connected by using a 7pin connector-to-pigtail cable (P/N 000-154-028).

**Wiring Information**

| Pin No. | Color | Function |
|---------|-------|----------|
| 7 | Shield | Shield |
| 6 | Black | GND |
| 5 | Red | 12V_OUT |
| 4 | Green | RD1-B [(-)NMEA1 IN] |
| 3 | Yellow | RD1-A [(+)NMEA1 IN] |
| 2 | Blue | TD1-B [(-)NMEA1 OUT] |
| 1 | White | TD1-A [(+)NMEA1 OUT] |

## 2.3.3. DATA 2 Description

The DATA2 Port can be used to connect additional NMEA 0183 instruments.  Use the included cable assembly FRUDD-18AFFM-L180 (P/N 000-164-608).  This included Pig-Tail Cable has an 18-Pin connector.  DATA2 also provides additional Input/Output interfacing connections (Buzzer, Event …).  For example, a MOB Contact Closure Input may be connected to PIN 15 and 11*.

*Note that any MFD will interface to virtually any MOB System or Event switch (Point Save) contact closure signal using these pins.



**Wiring Information**

| Pin No. | Color | Function | Remark (Port No.) |
|---|---|---|---|
| 18 | Light green | NET-C IN (0V) | NMEA 2000 Power IN: When 12V DC power is applied on these pins, the NMEA2000 port will provide power (up to 1 amp) |
| 17 | Pink | NET-S IN (+12V IN) | |
| 16 | Purple | Shield | |
| 15 | White | BUZZER or EVENT IN | External Buzzer Output or MOB/Event Input (Contact Closure) |
| 14 | Gray | SPEED-ALARM C | Speed alarm contact. Can trigger and external alarm or device when speed reaches a setup limit |
| 13 | Yellow | SPEED-ALARM H | |
| 12 | Black/White | +12V | External buzzer power ONLY (100mA Max) |
| 11 | Black | GND | GND for Event/MOB Input |
| 10 | Blue/White | RD3-B [(-)NMEA3 IN] | Port 3 |
| 9 | Blue | RD3-A [(+)NMEA3 IN] | |
| 8 | Green/White | TD3-B [(-)NMEA3 OUT] | |
| 7 | Dark Green | TD3-A [(+)NMEA3 OUT] | |
| 6 | Orange/White | GND | |
| 5 | Orange | GND | |
| 4 | Brown/White | RD2-B [(-)NMEA2 IN] | Port 2 |
| 3 | Brown | RD2-A [(+)NMEA2 IN] | |
| 2 | Red/White | TD2-B [(-)NMEA2 OUT] | |
| 1 | Red | TD2-A [(+)NMEA2 OUT] | |

## 2.4. NMEA2000 Description and Information

### 2.4.1. MFD

Every MFD has one NMEA2000 port (Standard "DeviceNet Micro" style connector). This port is not powered unless External Power is applied on Pins 18 and 17 of DATA2, and must be connected to a properly configured NMEA2000 network.

**IMPORTANT:** Each MFD is designed to connect to separate NMEA2000 Networks/Backbones! All MFD and DRS use "Ethernet bridging" to link separate NMEA2000 networks/backbones. NEVER connect NMEA2000 ports between MFDs and/or DRS products.

### 2.4.2. DRS Radar

In addition to the NMEA2000 port found on the MFD processor, all DRS radar sensors have one powered CANBUS port (Terminal Strip connector). You may directly connect various Furuno NMEA2000 sensors to the DRS radar sensor without having to run a separate NMEA2000 cable up the mast. The total number of sensors that can be connected to the CANBUS DRS port without external power connection depends on power consumption. The DRS can supply up to 1 amp (20 LEN) to the DRS CANBUS network.

Please note that the CANBUS network connected to the DRS behaves like an independent NMEA2000 Backbone and needs to be terminated at both ends by a Terminating Resistor. A 120 Ohm resistor is standard supply with the DRS to terminate one side of the backbone. For example, if you install a SC30, WS200, or GP330 with the DRS CANBUS Port, you must have two terminators in the backbone. One can be at the sensor and the other located inside the DRS as shown below:
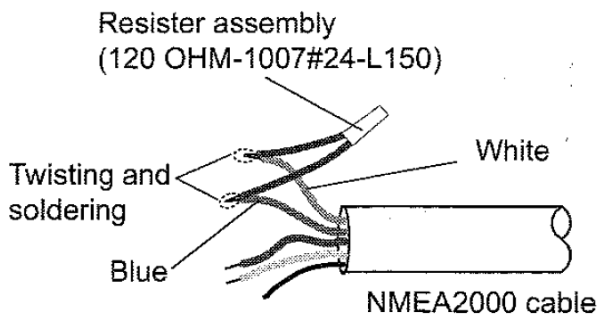


Please refer to the DRS Installation Guide for more information about connection.

## 2.4.3. NMEA2000-0183 Data Conversion and NMEA2000 Bridging

**NMEA0183 to NMEA2000 conversion**

NMEA0183 sentences and NMEA2000 PGNs, which are used and accepted in the MFD network can be converted and output in either/both NMEA0183/NMEA2000 formats. Note that only one type of data can be converted and output at a time (one position, one depth, one heading…). In case of multiple GPS sensors, the position output is the one currently selected as the primary sensor in an MFD network. This NN3D prioritizing function allows NMEA2000 products to utilize older NMEA0183 sensors and vice-versa. For example, you can connect a NMEA0183 Wind Instrument such as the Airmar PB100 to NavNet3D, and have the corresponding information output on one (or several) MFD NMEA2000 ports to feed a NMEA2000 display such as the Furuno FI50. The opposite is also true.

**Ethernet Bridging of Individual NMEA2000 Networks/Backbones**



You may ONLY connect one MFD or DRS to the same NMEA2000 Network. Some NN3D vessels may contain several smaller NMEA2000 Networks where data from each NMEA2000 network is linked via the High-Bandwidth NN3D Ethernet Network. In these cases, each separate NMEA2000 network will be "Bridged" together via the NN3D Ethernet Network. NN3D MFD NMEA2000 and DRS CANBUS ports shall also not be connected together. In the case where NMEA2000 engine data, or other ship's data, is introduced to the NN3D Network, the connection is made to only one MFD, and this MFD will bridge the data to other MFDs in the network.
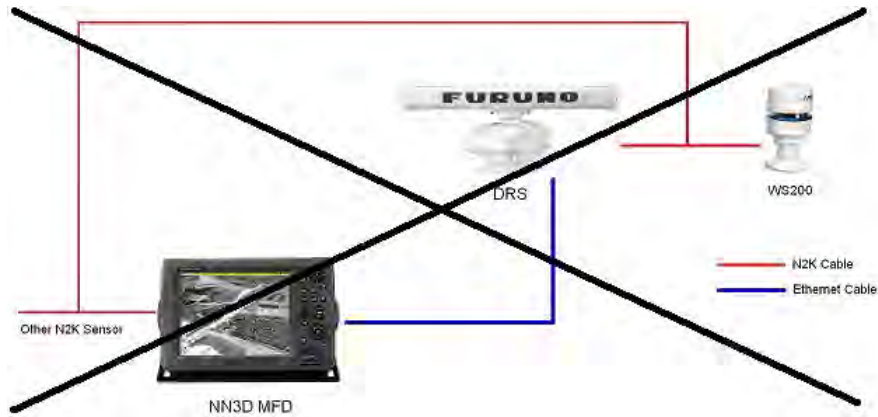
## 2.5.    DRS (Radar) Connection

Up to two DRS (Digital Radar Sensors) can be connected to a NavNet3D network. Every DRS comes with a supplied 15 Meter cable (FUSA P/N 000-167-636). Other cable lengths may be purchased if necessary (Note that the part numbers for the DRS25A are different):

- 10 Meter Cable (FUSA P/N 000-167-635)
- 20 Meter Cable (FUSA P/N 000-167-637)
- 30 Meter Cable (FUSA P/N 000-167-638)

The Radar cable is a "Siamese" type cable that carries power (48V) and Data (Ethernet).  All MFD have a dedicated Power Port (48V) used to connect the Radar Power Cable.  Some combinations require an additional Power Supply Unit (PSU) in order to provide enough power for the DRS.  Please refer to the following table:
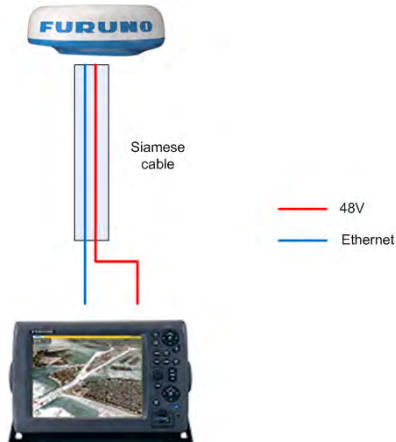
|  | DRS2D | DRS4D | DRS4A | DRS6A | DRS12A | DRS25A |
|---|---|---|---|---|---|---|
| MFD8 |  |  | PSU-012 | PSU-012 | PSU-012 | PSU-013 |
| MFD12 |  |  |  |  | PSU-012 | PSU-013 |
| MFDBB |  |  |  |  |  | PSU-013 |

*Note:  DRS25A antenna includes PSU-013 as standard supply*

### 2.5.1. Connecting the DRS to MFD8/12

**Standalone Installation:**

When the MFD8/12 and the Radar are the only Ethernet sensors, you can connect the Radar Ethernet connection directly to the back of the MFD8/12.



**Network Installation:**

As soon as multiple MFD8/12 or other Ethernet sensors (i.e. DFF1 Fish Finder, BBWX1 Sirius receiver, etc.) are used, the Radar Ethernet connection must be connected to an Ethernet Hub.  In this case an Ethernet coupler can be used to extend the Ethernet part of the Siamese Cable
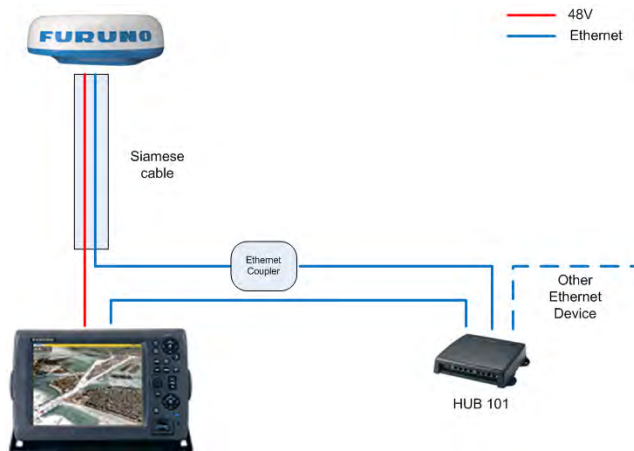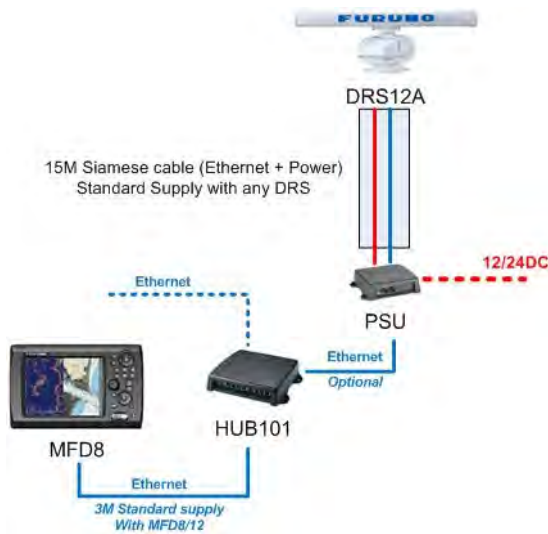


Example of straight Ethernet Coupler (FUSA P/N= RJ4-5CN-STR):



*Note: This Ethernet coupler is not waterproof.*

## PSU Installation with the HUB101:

When a PSU is used with the Furuno HUB101, connect the MFD(s) and Radar as shown below:



**IMPORTANT:** Make sure that the Power Synchronization Dip switches are set to ON inside the HUB101 where the MFD(s) and PSU are connected.  (Please refer to the paragraph "Power Synchronization" p.26 for more information)

## PSU Installation with a regular Hub:

When a PSU is used with a regular HUB, the MFD MUST BE directly connected to the Ethernet port on the PSU:
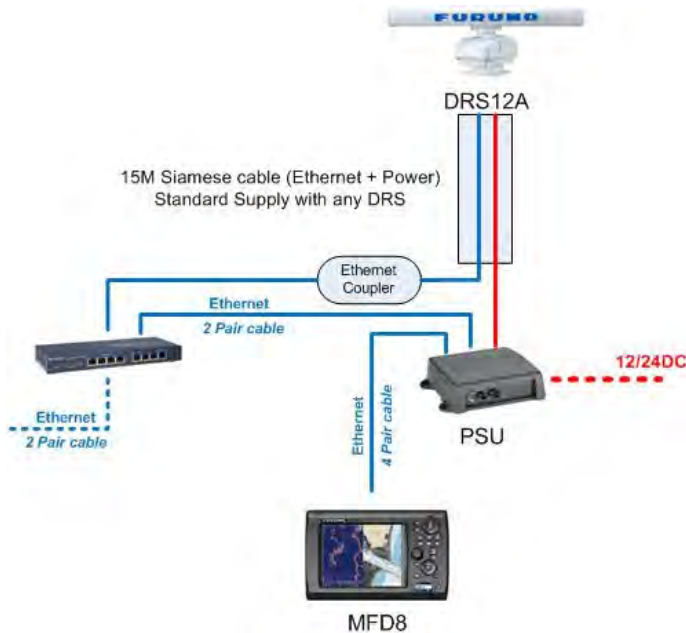
*Note: In case of multiple MFDs, connect the MFD set as "Master" directly to the PSU. (Please refer to the paragraph "Which MFD should be set as " p.46 for more information)*

Ethernet Cables that can be used to extend the Ethernet Radar Connection:

- 2 Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-175)
- 5 Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-176)
- 10  Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-177)

*Please refer to the DRS Installation Guide for more information on connections inside the antenna.*

## 2.5.1. Connecting the DRS to MFDBB

The MFDBB has an integrated HUB that allows simultaneous connection of the DRS Ethernet cable and other Ethernet devices (HUB101 for example).

*Note: Ethernet Ports 1 and 2 are dedicated for connection of the MCU001 Keyboard.*

Connect the DRS Ethernet Cable to Ethernet Port 3. Ethernet Port 4 will be available to connect the HUB 101 or other Ethernet sensor.
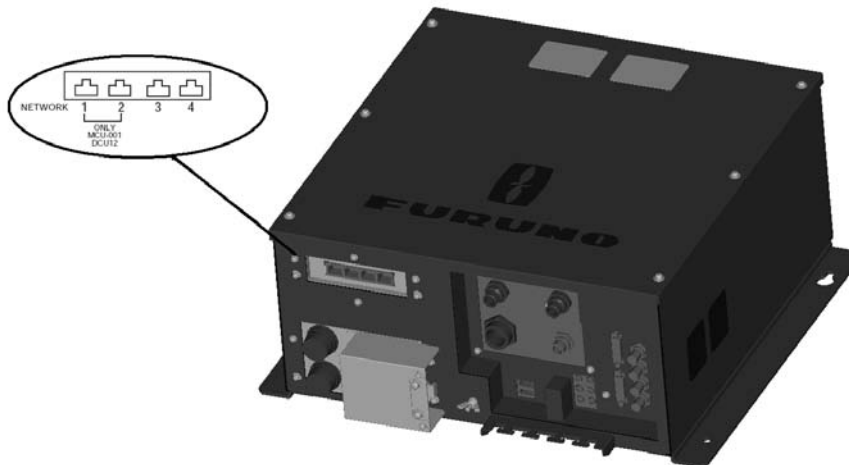
## 2.6. Network

### 2.6.1. Introduction

NavNet3D (just like NavNet1 and VX2) uses standard TCP/IP Ethernet to share radar/sounder images and other navigation information from devices connected within a networked system.  In any single NavNet 3D network, a combination of UP to TEN NavNet3D MFDs may be networked together.  All NavNet3D Network Components have one integrated regular RJ45 Ethernet port (with the exception of the MFDBB which has an integrated hub).  Legacy NavNet components such as the ETR-6/10N (FUSA P/N  BBFF1) or ETR-30N (FUSA P/N BBFF3) network sounder will need to be connected using the Hub Adapter Cable 6 Pin to RJ45 (FUSA P/N = 000-144-463).
AUTO MDI/X - All NN3D MFDs, DRS and the HUB101 incorporate automatic straight and cross-over Ethernet Cable detection and switching.  Therefore any combination of straight and cross-over Ethernet Cables can be utilized when installing network cabling.

**MFD8/12**
The MFD8/12 has one Waterproof Ethernet Port on the rear of the unit.  It comes with standard supply of a 3 meter Ethernet Cable (FUSA P/N =000-164-809) terminated at one end with a Waterproof connector and at the other end with a regular RJ45.
This cable can be extended using a coupler (FUSA P/N= RJ4-5CN-STR) and a regular Ethernet Cable.  Please note that the coupler is not waterproof and thus needs to be installed accordingly.

**MFDBB**
The MFDBB Processor Unit contains an integrated hub that provides 4x Ethernet ports. Two of these ports are **exclusively dedicated** to the keyboard (control unit MCU001) connection.  The MFDBB keyboard must be directly connected to one of the dedicated Ethernet ports on the BB (the MCU001 Control Unit cannot be connected to an Ethernet Hub/Switch).  The Keyboard comes standard with a 5 meter Ethernet cable, but other lengths may be used:

- 2 Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-175)
- 5 Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-176)
- 10  Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-177)


*Note: The Keyboard uses the Ethernet cable for both Power and Data.  Do not plug anything else beside the Keyboard in Ethernet Port 1 or Port 2 on the MFDBB.  These two ports are NOT standard POE (Power over Ethernet) and POE devices cannot be connected to these two ports.*

## 2.6.2. Power Synchronization

A NN3D network is a system in which all components share information (navigation data, settings, points, routes, etc) with each other. Furuno developed special Power Synchronization features to allow proper network synchronization and functionality.

**Sleep Mode:**

The MFDs have a special "sleep mode" that allows each MFD to process data while consuming low power. NN3D MFDs can be in 3 states:
**- ON:** This is the regular mode of operation. The screen is ON, the Power Light is green and the user can interact with the device. The unit can process and share information on the network.
**- OFF:** The MFD is completely OFF and doesn't process information. No power is consumed in this state.
**- Sleep Mode:** The screen is off, the Power Light is orange and no user interaction is possible (except turning the unit ON with the Power Key). Even though the MFD appears off and the LCD is black, it will still process and share information with other MFDs on the network. The MFD consumes lower current in this state. Any NMEA2000/0183 and DRS sensors attached to the MFD ports will still function normally when an MFD is in Sleep Mode.

**NN3D Sleep Mode Functional Description:** (Software Version 2.01 and higher)
When the first MFD in a network is powered ON (using the power key), all the other networked MFD(s) will start automatically (power synchronization) and will go into sleep mode. Pressing the Power key of an MFD in sleep mode will turn it ON. Pressing the power key to turn OFF one MFD will turn OFF all the other networked MFD(s). In order to put a specific MFD back into sleep mode, select the RotoKey "Sleep"

**IMPORTANT:** Power Synchronization functionality requires the use of Furuno proprietary Hubs. The Internal MFDBB Hub and the optional Furuno HUB101 both provide NN3D Power Synchronization functionality. **Use of other generic Ethernet Hubs/Switches, while allowed, will not enable NN3D Power Synchronization!** Caution must also be used in that only "Two Pair" Ethernet cables may be utilized with generic hubs/switches so that the Power Synchronization signals are not short circuited by "Four Pair" Ethernet cables. Note also that enabling the Power Synchronization function in Navnet 3D is also very important for proper Data Synchronization and system integrity! Please refer to next paragraph for more information.

**Why use the Furuno HUB (HUB101):**

The Furuno HUB101 allows the Power Synchronization signal to reach the MFDs and other Power Synchronization compatible devices.  Here is a list of all devices that support Power Synchronization:

- All NN3D Displays: MFD8, MFD12, MFDBB
- All NN3D Radar Power Supplies: PSU012 and PSU013
- Sounders: DFF1 and DFF3
- HUB101

**Note:** the DRS itself does NOT need the Power Synchronization Signal as its power comes directly from an MFD or a PSU.  These units provide the Power to the DRS directly.

Here is a list of all devices that are not compatible with the Power Synchronization Signal (ignore):
- BBWX1
- DRS antenna (only the PSU needs the Power Synchronization signal)
- BB Keyboard (MCU001)
- FA30 and FA50
- FAX30
- BBFF1 and BBFF3
- Computer

The Power Synchronization signal is transmitted using a normally unused wire of the Ethernet Cable (PIN 4 and Pin 5) thus a "4-Pair" Ethernet cable must be used to connect Power Synchronization compatible device.  If a regular Ethernet switch is used instead of the Furuno HUB101, "2-Pair" Ethernet cables must be used between each MFD and the generic Ethernet Switch so that the Furuno Power Synchronization signal does not interfere with or harm the Ethernet Switch.  Furuno offers a 3 meter 2 Pair Ethernet cable (FUSA P/N= 000-167-171).

Note: The Power Synchronization signal is only used for starting up the system.   The shutdown is an Ethernet software command and thus will also work with a regular HUB.

Example of "2-Pair" Ethernet Cable:
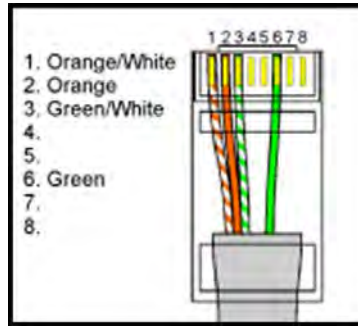


In addition to allow the Power Synchronization signal to pass, the Furuno HUB101 has switches that can be set to "block" this signal thus allowing connection with non-compatible Power Synchronization devices (PC, FAR-Series Radar …).  Please refer to next paragraph for more information.

The Power Synchronization feature also allows the NN3D's unique "Data Synchronization" feature to operate properly providing redundancy and Point/Route/Track Data Synchronization between networked MFDs.   Failure to enable Power Synchronization in a multiple MFD system could lead to system data loss or unintentional data updating and overwriting!

Note: If the Power Synchronization is **NOT (not using HUB101)** used, make sure that the MFD set as Master is **ALWAYS** the first MFD powered on the network!!!

*(Please refer to the paragraph "Which MFD should* be set as *" p.4641 for more information)*

**How to configure the Power Synchronization:**

**HUB101:** The Furuno HUB101 has switches for each individual Ethernet port that can enable/disable its Power Synchronization function.  When connected to an MFD or other Power Synchronization compatible devices (PSU, DFF1…), the switch must be configured to allow Power Synchronization.  When connected to any other device (PC, previous generation sensors…) the switch MUST be configured to disable the Power Synchronization to protect other devices from the Power Synchronization signal.  Please refer to the Installation Guide of the HUB101 for more information.

*Note: A 2-Pair Ethernet cable is recommended when connecting a PC to a NavNet3D network (FUSA P/N= 000-167-171).*

**MFDBB:** The MFDBB processor unit has an Internal Hub that is compatible with Power Synchronization.  DIP switches inside the processor unit can be turned ON or OFF to enable/disable the Power Synchronization feature.  The number on each DIP switch corresponds to the port number.
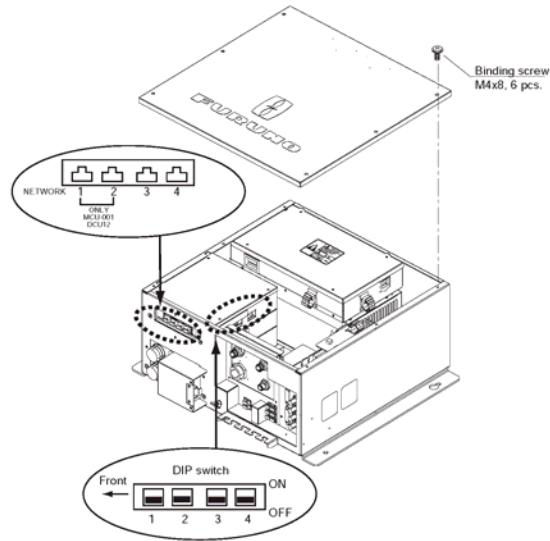
*Note: The MFDBB Ethernet Port1 and Port2 are dedicated to connect the BB Keyboard. Leave these switches on OFF as the Keyboard does not need the Power Synchronization signal.*

**DFF1/DFF3:** The DFF1 has DIP switches that need to be set up differently if you use a regular hub or the Furuno HUB101 (with Power Synchronization).
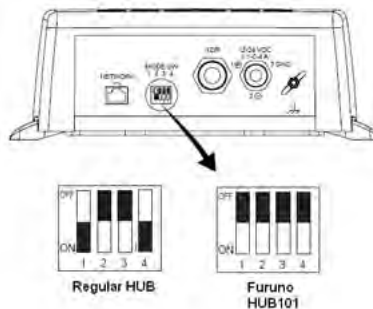


When you set up the Dip switches for the HUB101 (all dip switches in the UP position), the DFF1 will NOT power ON until one MFD is powered on (until the Power Synchronization Signal is received). If the Power Synchronization signal is not received on the DFF1, the Power LED (green light) will not light up even if you apply 12-24V to the unit. In this case make sure that you are using 4-Pair Ethernet cable and that the Power Synchronization DIP switches inside the HUB101 and MFDBB (if applicable) are ON.

If you are using a regular Hub that cannot pass the Power Synchronization signal, make sure that the Dip switches are "Down-Up-Up-Down". In this configuration, the DFF1 will power ON as soon as power is applied to the unit.

The DFF3 follows the same concept (only the DIP switches change):

- Regular HUB (no Power Synch.) = DIP switch 1 and 2 are set to ON
- HUB101 (Power Synch.) = DIP Switch 1 and 2 are set to OFF

## 2.7. Video Inputs

NavNet3D can use regular analog video inputs (PAL or NTSC) that connect to the MFDs directly or use IP Cameras that connect directly to the network HUB.  IP Cameras can be seen by all MFDs connected to the NN3D network unlike analog video that can be viewed only on the MFD where the source is connected.  Additionally some IP Cameras can be controlled from NavNet3D (Pan-Tilt–Zoom "PTZ" IP Cameras only)

### 2.7.1. Analog Video Inputs

**MFD8/12**
The MFD8/12 units have 2 Analog Video inputs (PAL/NTSC) on 2 mm RCA (cinch) type connectors located on the rear of the display

**MFDBB**
The MFDBB unit has 4 Analog Video inputs (PAL/NTSC) on BNC type connectors (75 Ohms) located on the processor unit



Insulator

Shield

Vinyl sheath

Conductor
S = 0.19 mm$^2$
∅ = 0.5 mm
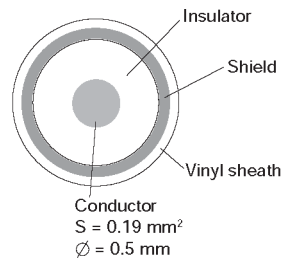
### 2.7.2. IP Cameras

IP Cameras are network devices that connect directly to a HUB. Up to 4 IP Cameras can be connected to one NavNet3D network.  At this time, only AXIS IP Cameras that support MPEG4 Video are compatible with NN3D.  Certain Axis PTZ (Pan-Tilt-Zoom) IP Cameras may also be controlled with NN3D Systems for features such as pan, tilt, and zooming.  When connecting an IP Camera to the HUB101, make sure that the dip switch for Power Synchronization is set to OFF (refer to the paragraph "Power Synchronization" p.26 for more information).

When Power Over Ethernet (POE) AXIS IP cameras are installed (example: AXIS212PTZ) Furuno recommends utilizing a separate POE Ethernet Switch to provide

power and Ethernet data to each AXIS IP Camera with a single cable. Then, utilize a non-POE port on this switch to link the IP Cameras to a HUB101 in a NN3D Network.
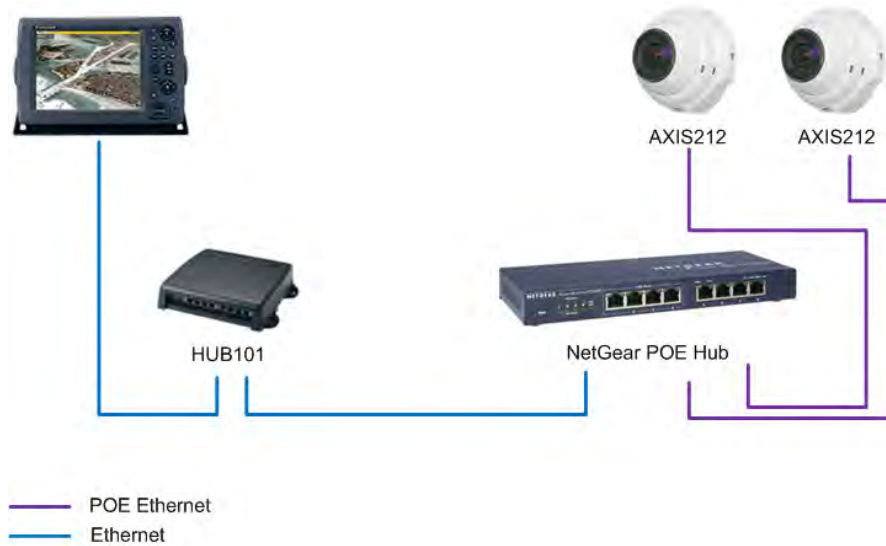


**IMPORTANT:** Never connect a POE port to the HUB101. Always use one of the NON-Powered ports to connect the HUB101 to the POE Hub.

The IP cameras need to have a specific assigned IP address (from 172.31.200.003 through 172.31.200.006).

Please refer to the appendix for more information on how to configure the AXIS IP Camera.

## 2.8.    External Monitors

**IMPORTANT:** Never connect or disconnect a DVI or VGA cable while the MFD is running.  Always power OFF the MFD before making any change to a connection.  The same remark applies when powering ON or OFF a monitor.

### 2.8.1. MFD8/12

A DVI monitor can be connected to the MFD8/12 to repeat the screen at a remote location.  The plug is DVI-D format and only a DVI monitor can be connected.

The MFD8 has a 640x480 (VGA) DVI-D output. The MFD12 has an 800x600 (SVGA) DVI-D output. Furuno offers the following DVI cables:

- 5 Meter DVI Cable (FUSA P/N= 000-149-054)
- 10 Meter DVI Cable (FUSA P/N= CBL-DVI-10M)

Note: The DVI-D Vertical frequency output is 56Hz on the MFD12 and 60Hz on the MFD8. Make sure that the monitor is compatible with these frequencies.

Please refer to the paragraph "Waterproof Connection" p.42 when a waterproof connection is needed.

### 2.8.2. MFDBB

The MFDBB has two DVI-I output ports (Matched Selectable Res from 800x600 up to 1280x1024). The DVI-I output of the MFDBB will "Autosense" the monitors and allow either DVI monitors or VGA monitors to be plugged in using a "DVI-I-to-VGA" adaptor:



**IMPORTANT:** When a DVI cable is used, we recommend using only "single link" type DVI Cables (avoid "double link" type cables).

Single Link
DVI Cable

Double Link
DVI Cable

<u>Note:</u> The DVI and VGA Vertical frequency output is 60Hz on the MFDBB.

When two monitors are connected to the MFDBB, you can choose to configure the monitors either in Clone Mode or in Extended Mode.

*<u>Note:</u> When two monitors are connected to the MFDBB processor unit, they need to be capable of displaying the same resolution. The MFDBB cannot output a different resolution on each port.*

When Extended Mode is used the two screens need to be located in close proximity to each other (Side-by-Side). The two monitors will show two different screen displays that can be configured independently. Only one Keyboard is used to control both monitors (the cursor will "jump" back and forth from monitor to monitor).

Clone mode is selected when either one or two monitors are installed for separate station configurations. A dual station requires a dual keyboard installation from one processor unit. In this case both monitors will show the same picture information.



[Single]          [Dual station–Clone Mode]          [Single station–Extended Mode]
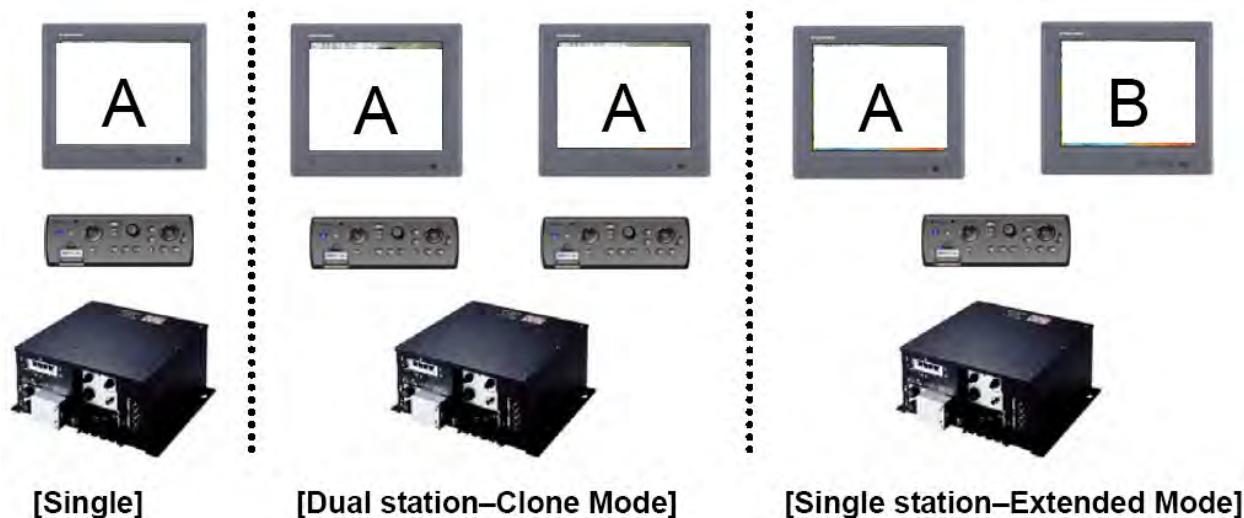
Furuno offers the following DVI cable:

- 5 Meter DVI Cable (FUSA P/N= 000-149-054)
- 10 Meter DVI Cable (FUSA P/N= CBL-DVI-10M)

*Note:* All the DVI cables provided by Furuno are single link DVI-D Cables.

## 2.9. USB and Audio Connection

### 2.9.1. USB Ports

The MFD8/12 has one USB Ver. 1.0 port and the MFDBB has two USB Ver. 2.0 ports.

These USB ports are used to connect a generic USB mouse and Keyboard.  Virtually any "off the shelf" USB mouse (wired or RF wireless but NOT Bluetooth) will work with NavNet3D.  However, in order to utilize full RotoKey functionality, you will need a mouse that has a scroll wheel that is also "clickable" with a middle click, which will emulate selection and confirmation of a desired RotoKey function.  No loading of additional mouse software is permitted.  However, the standard Mouse HID drivers will load automatically, allowing most mice and wireless mice to work fine.

Generic USB keyboards may be used to enter Name and Numerical Position.  The Keyboard can also emulate the key of NavNet3D:

| USB Keyboard | Action |
| --- | --- |
| ESC | CANCEL |
| F2 | SAVE/MOB |
| F3 | DISP |
| F4 | MENU |
| F5 | GAIN/TX |
| F6 | CTRL |
| F7 | DATA/VOL |
| F8 | GO TO/LIST |
| F9 | POINTS/ROUTE |
| F10 | RANGE OUT |
| F11 | RANGE IN |
| F12 | SHIP/3D |
| Arrows (up, down, left, right) | SCROLLING PAD |

| Page Up | RotoKey Counter Clockwise |
|---------|---------------------------|
| Page Down | RotoKey Clockwise |
| Enter | Push on RotoKey |
| End | Power/Brill |

Note: The USB port can also be used to load charts on the MFDBB (using a USB flash Drive or a SD-Card to USB adapter). Due to the USB speed limitation (USB ver. 1.0) this is not possible on the MFD8/12

### 2.9.2. Audio

Audio In and Audio out are reserved for future Development.

## 2.10.   MFD8/12 Video, USB and Audio Connection

The DVI, USB, Analog Video Input and Audio In/Out ports are behind the connector cover on the rear panel. To access to the ports and connect the cables, please refer to the instructions below. Note that these connection points require an optional waterproof connector boot if necessary. These connection points are not a waterproof design without this option. Any water egress in this area will not be covered by the limited warranty.

*Note: The Waterproof Connector Boot is only required if the DVI, USB or Audio connections are used and waterproofing is necessary for the MFD's location.*

### 2.10.1.   Waterproof Connection

Waterproof connections for the DVI, USB, Analog Video Input and Audio I/O ports require the optional connector boot (Type: OP19-7, PN: 001-028-090).

Content of Waterproofing Kit

| Name | Type | Code No. | Qty |
|---|---|---|---|
| Boot cover | 19-028-3141 | 100-342-642-10 | 1 |
| Fixing metal | 19-028-3142 | 100-342-650-10 | 1 |
| Rubber stopper | 19-028-3143 | 100-342-660-10 | 1 |
| Cable tie | CV-150B | 000-167-183-10 | 1 |
| Binding screw | M3x10 | 000-162-662-10 | 4 |

1. Unfasten the four screws to remove the connector cover at the rear of the display unit.



Binding screw (4 pcs.)  Connector cover
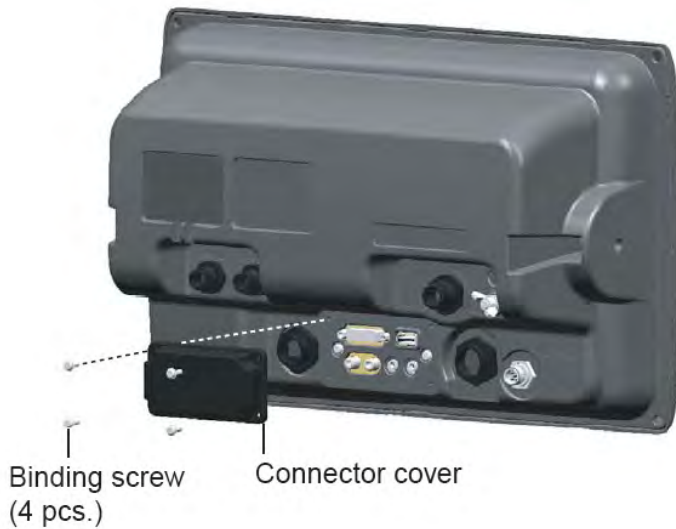
2. Pass DVI-D, VIDEO, AUDIO and/or USB cables through the fixing plate (supplied).



Fixing metal
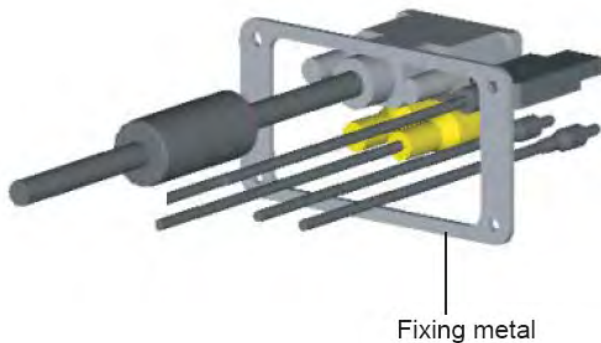
3. Attach each connector to the appropriate location at the rear of the display unit.

4. Pass cables through the slit on the boot cover.

5. Install the rubber stopper to each cable. The largest hole is for the DVI-D cable.

Rubber stopper
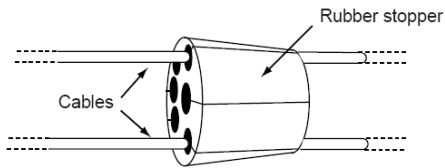
Cables

6. Use the four plate screws (M3x10, supplied) to fasten the fixing plate and boot cover to the display unit.

Rubber boot

Cables

Push

Wind the cable tie around here.
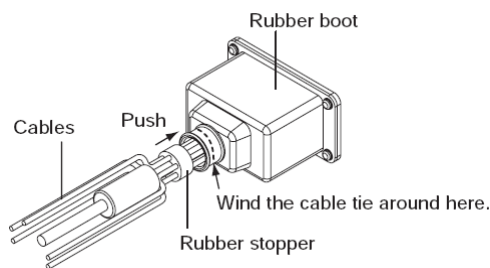
Rubber stopper

7. Slide the rubber stopper into the hole of the rubber boot, and fasten the cable tie to hold the rubber boot and stopper.

Connectors

Boot cover

Fixing metal

Binding screws

Rubber stopper
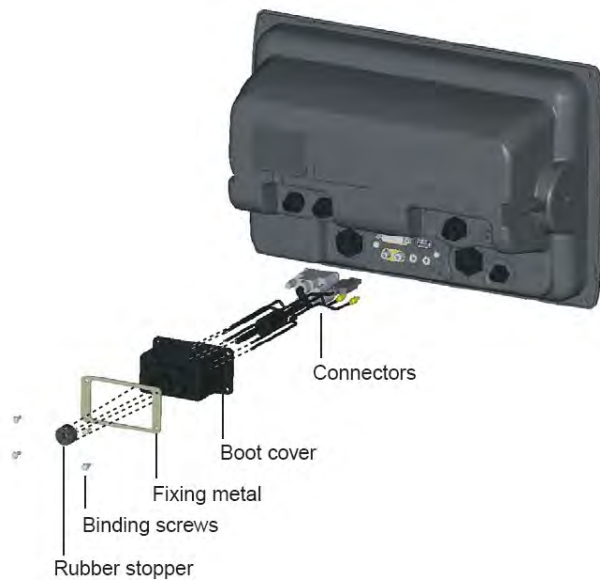
*Note: When only the Ethernet, Power, DRS, DATA1, DATA2 and NMEA2000 connection are used the Waterproof Connector boot is not necessary.*

## 2.10.2.    Non Waterproof connection

When you do not need waterproofing, use the cable fixing plate (supplied in standard installation materials).

1. Unfasten the four screws to detach the connector cover at the rear of the display unit.



Binding screw          Connector cover
(4 pcs.)

2. Attach the cable fixing plate by using the binding screw (M3x10, supplied as the installation materials).



Binding screw (M3x10)
Cable fixing plate
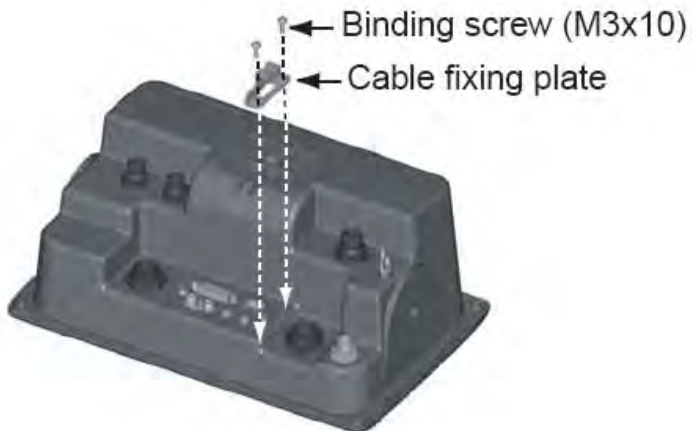
3. Attach each connector to the appropriate location at the rear of the display unit.

4. Wind the cable tie (supplied as the installation materials) to fix the cables to the cable fixing plate.

# 3. <u>Configuration</u>

## 3.1.    Introduction

NavNet3D (just like NavNetVX2) uses Ethernet to share radar/sounder images and other navigation information from devices connected within a networked system.  In any single NN3D network, a combination of up to ten NavNet3D MFDs may be connected to each other via Ethernet. All NavNet3D Network Components have an integrated regular RJ45 Ethernet port for this purpose.  Legacy NavNet components such as the ETR-6/10N (FUSA P/N= BBFF1) or ETR-30N (FUSA P/N= BBFF3) network sounders will need to be connected using the Hub Adapter Cable 6Pin to RJ45 (FUSA P/N= 000-144-463).

This chapter shows you how to set up your NavNet3D system.  Most of the configuration will be done using the Installation Wizard that is automatically launched during the first start up or can be manually launched by pressing the [MENU] key and selecting "System" then "Installation Wizard".  Before trying to configure a NN3D system, make sure that any and all instruments are correctly interfaced.  Please refer to the previous chapter (Wiring) for more information.

On the MFD8/12, the initial configuration is done using the Cursor Pad (upper pad) and the Center click (which emulates a left click mouse).



On the MFDBB, a generic **USB mouse connected to one of the USB ports is required** to perform the initial configuration.

Properly designing the layout of a NavNet3D network is key to a successful installation: read carefully the following Chapters and refer to the appendix for Installation examples.

### 3.1.1. Which MFD should be set as Master?

When multiple MFDs are connected in a network, one MFD (and only one) needs to be designated as the "Master". The MFD set as Master will act as a DHCP server and automatically performs the network configuration of all the other MFDs in the network. (The Master sets up the Hostnames, IP addresses etc…).

*Note: The notion of "Master" and "Slave" is only an installation setting for internal configuration, in other words, the MFDs set as "Slaves" do not have fewer features than the "Master". All MFDs will function and operate similarly.*

When choosing the MFD that will be designated as the Master, keep this in mind:
- The Master should be the MFD that will be used primarily (be turned ON all the time when using the system).
- It is recommended (but not necessary) to have as many instruments as possible (NMEA0183, NMEA2000) connected directly to the Master.
- When MFD8/12 and MFDBB are used, the MFDBB will be more likely to be configured as the Master in a given network (primary MFD) with the Radar Antenna directly connected to it (on Ethernet port 3).

*Note: In a single MFD installation (only one MFD in the network), this MFD must be configured as the "Master".*
*Please refer to Paragraph 3.2 for explanation on How to set up a Master*

### 3.1.2. Data Source Selection

In a network installation (and even in a standalone system), multiple sensors can provide the same information (i.e.: Sounder and Smart Sensor can both provide depth information). NavNet3D allows you to select for each type of data, (Position, Depth, Temperature, and Heading…) the sensor that will be used as a primary source.
In addition, if the primary sensor fails, and if another sensor providing the same information is detected on the network, NavNet3D will automatically switch to the other source after giving you an alert.

### 3.1.3. Installation Wizard Conceptual Description

The Installation Wizard is divided into sections (Tabs) that are targeted to configure specific aspects of the system:

**"Own Setting" Tab**

This Tab configures the local ports of the MFD (NMEA0183 Input/Output, NMEA2000 Output) on which the Installation Wizard is currently used.

**"Global" Tab**

This Tab contains configuration information that is global to the system and shared among MFDs. This is the section where the Data Source (Sensors) can be selected to be used as primary information. You will be able to customize sensor names (ex. Assign Location Nicknames) that will help you configure the system.

This Tab will also allow you to enter vessel's specifications (size, Engine configuration…)

*Note:* *It is recommended to perform the Global Configuration from the MFD set up as Master*

**"Sounder" Tab**

When a Network Sounder is detected, this Tab will appear and allow you to configure your sounder module. NavNet3D is compatible with the Airmar Transducer ID protocol. This feature enables compatible transducers to transmit important data to the DFF1 or DFF3, including transducer model, functions, frequency, power rating, beam pattern, impedance, ceramic element configuration and acoustic window material. Through this Transducer ID feature, the DFF1 and DFF3 Sounder Modules will automatically know the connected transducer's precise frequency, operating power and impedance, so it can "tune" its operation to automatically adjust and optimize echo sounder performance.

**"Radar" Tab**

When a DRS (Radar) is detected, this Tab will appear and allow you to configure your Radar and perform the Heading Alignment adjustment, Radar Optimization and Main Bang suppression

## 3.2. Master Setting and initial configuration

- Press the power switch of the MFD you want to designate as Master to power it ON. After few minutes, the Installation Wizard starts.
*Note*: *The start up time of NavNet3D will be shorter once the system is fully configured.*
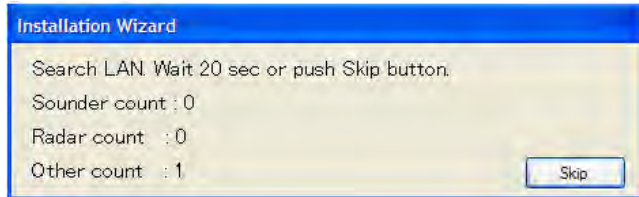


- The system will search for sensors on the network. At this time you can skip the search since no master is configured yet. Press on the "Skip" button

- If the MFD has factory default setting, the language selection screen appears. The default language is English. Use the Cursor Pad and the center click (or the USB mouse for the MFDBB) then click on "Next:
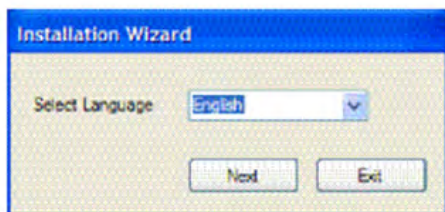


- On the Master Selection window that just appears, select Master = ON and press "Save and Exit"
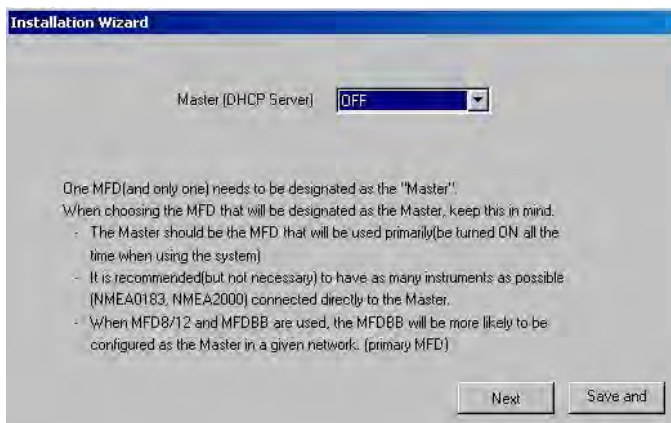


- Wait for the MFD to completely turn OFF (the MFDBB will restart then power off, be patient!)

*Note: A "No Master Warning window" can appear to inform you than a Master is not yet configured. If this is the case, simply click on "Installation Wizard" to configure the Master.*

*Note: If the Master Selection does NOT appear, this means that there is already a MFD set as a Master on the network. If you want to change the Master setting to another MFD, you will have to turn the Master setting to OFF (on the MFD that is currently the Master) and restart the system to turn the Master ON on another MFD.*

- When the MFD turns OFF (after being set up as a Master), make sure that every other MFD in the network are turned OFF and correctly wired to the HUB.

- Turn ON the Master MFD, then every slave on the network. Make sure that the LED on the HUB shows good traffic information (for the MFD, DFF1, DRS…)

- The Installation Wizard launches on every MFD and begins to scan the devices available on the network. Do not click on Skip. This will allow the scanning process to end normally.
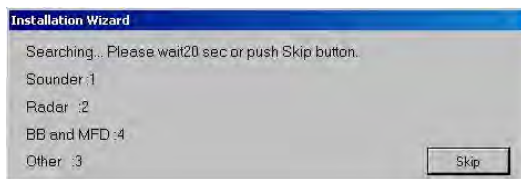


*Note: If the Installation Wizard doesn't launch on the MFD, go to the [MENU] then "System" and select "Installation Wizard".*

- During the Installation Wizard countdown make sure that all MFD(s) see the Radar and Sounder (if you missed the countdown, look for the Radar and Sounder tab in the Installation Wizard: if they appear, radar and sounder are correctly detected).

*Note: If the Radar and Sounder are not available on one MFD, you will need to troubleshoot the Ethernet connections (cables). Power OFF the MFD, make sure the connections are OK, repower the MFD and launch the Installation Wizard (and make sure it sees the Radar and/or Sounder).*

*Important: If you are using an MFDBB, the Keyboard will not work until it is properly "Linked" to a processor unit. Please refer to the paragraph "*

MFDBB Keyboard/Processor Linking*" p.61 to properly link the MFDBB keyboard at this time*

When the Radar and Sounder (if applicable) are correctly detected, you can continue the installation on the Master MFD.

# 3.3.    Installation Wizard Own Settings

## 3.3.1. Monitor (MFDBB only)

On the MFDBB, you can set up the video output resolution (DVI or VGA). Leave it to Auto when you use a Furuno monitor.
You can also set up the Clone or Extended mode

*Note: If only one monitor is connected to the MFDBB, leave the setting to "Clone"*
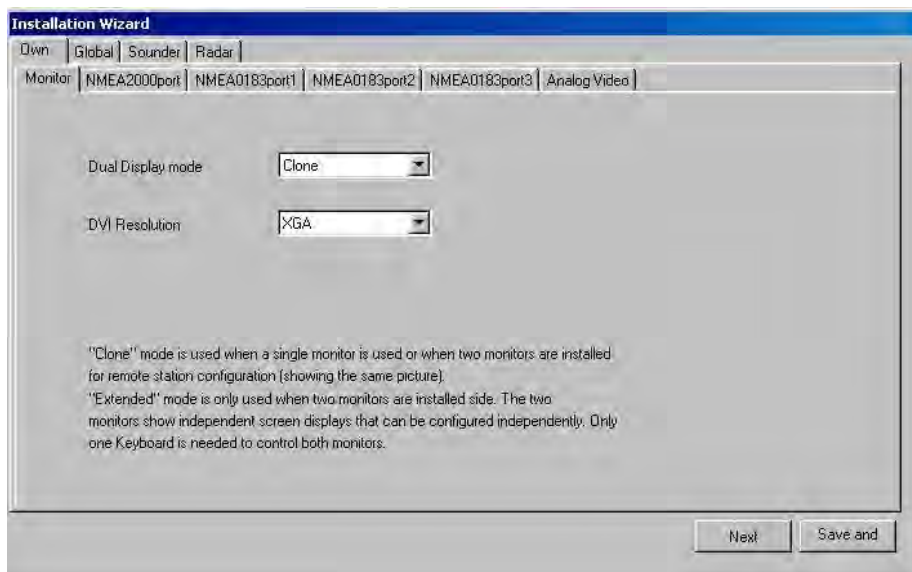


*Please refer to the "External Monitors" paragraph on p.32 for more information on Clone and Extended mode when two monitors are connected to a single MFDBB processor.*

## 3.3.2. NMEA2000 Data Configuration

This page configures the information that the MFD will output on its own NMEA2000 port. The information embedded in the PGN will be the information coming from the Sensor that will be chosen as the Primary Source (see next paragraph). Enable each NMEA2000 Data PGN that will be sent through the individual MFD's NMEA2000 port.

Note that in a multi-MFD network, each MFD's NMEA2000 backbone is separate and independent. Therefore, you may have to perform the same procedure on each MFD where external NMEA2000 displays (i.e. FI-50, etc...) or sensors are connected.
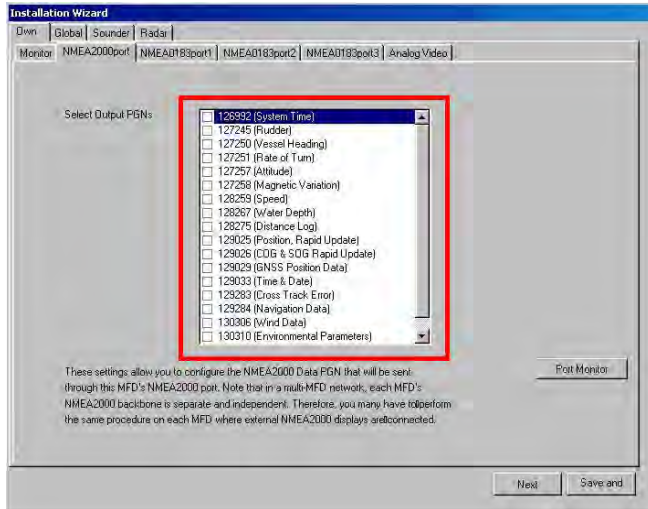


*Note:* *This setting only configures the NMEA2000* *Output* *Data. The NMEA2000 data received (Input) at each MFD and DRS is global and automatically recognized by the network.  Each NMEA2000 Data Source at each MFD will automatically appear and may be selected as a Primary System Data Source.*

Click on the "Port Monitor" button if you want to make sure that the NMEA2000 devices are correctly seen by the MFD

The list of every NMEA2000 devices connected to the MFD will appear at the top of the window. Simply select one device (by clicking on the line) and choose a tab (Receive PGN List or Transmitted PGNs) to have more information on a specific device.
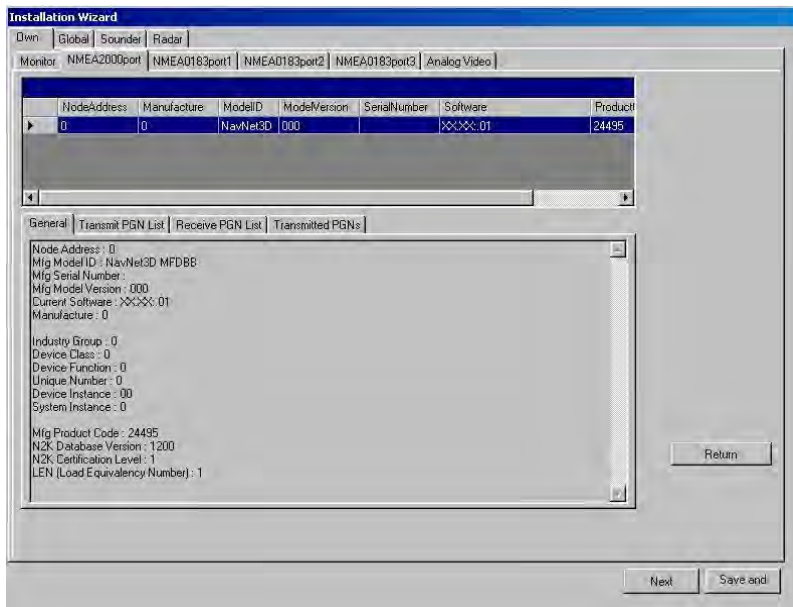
On the "Transmitted PGNs", you have to click on "Stop" before expanding and viewing the incoming information
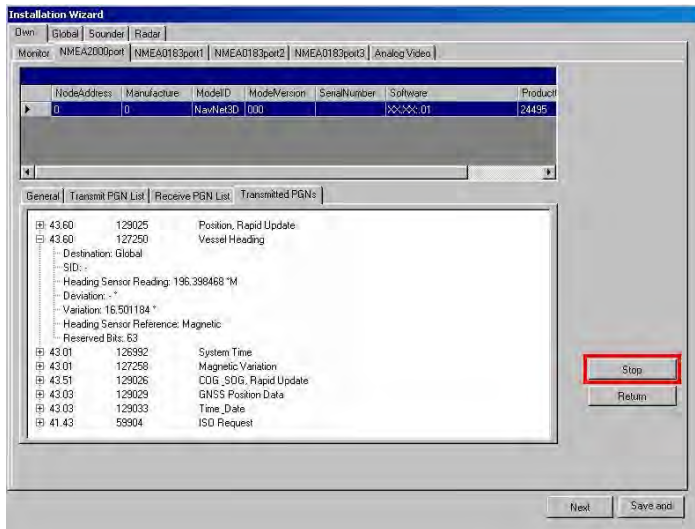


Click on the "Next" button to continue the configuration.

### 3.3.3. NMEA0183

The three "NMEA0183 Port" tabs are used to configure the Input and Output of the individual MFD's own NMEA0183 ports.  It is important to understand that it is not possible to filter any received NMEA0183 Data at any of these ports on individual MFDs.  And unlike the automatic recognition capability with NMEA2000 Data sources, it

is instead necessary to manually specify or declare the specific type of NMEA0183 sensor that is interfaced to the each NMEA0183 Input Port.
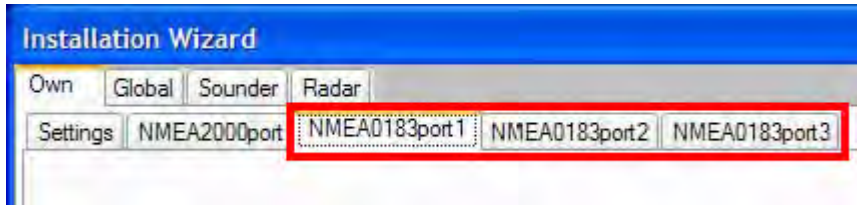


In these Tabs, you will have to configure the NMEA0183 Output Port specification (Version, Baud rate…) and the sentences needed to be output. You can also give a Nickname to the NMEA port (for example "Heading" or "Primary GPS")
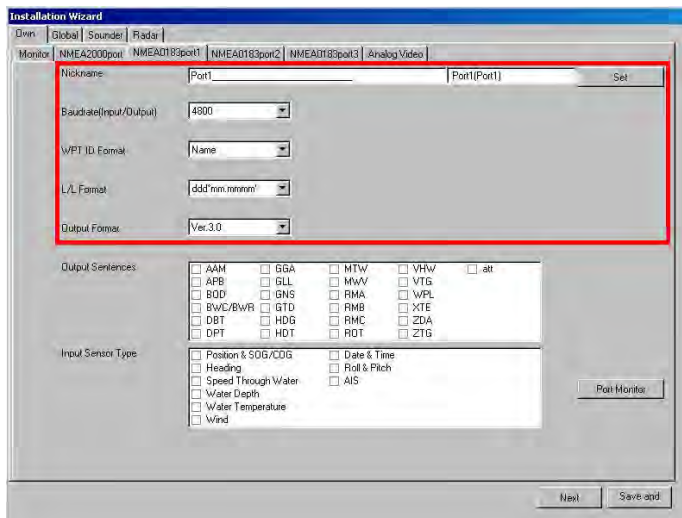


*Note: "WPT ID Format" allows you to select, if the name of the WPT or the WPT sequence number is transmitted to an Autopilot.*
*The "L/L format" dialog box, allows you to choose how many digits (seconds) to display after the decimal point in latitude and longitude of the position sentences.*

Next, you must declare the type of NMEA sensor(s) connected to the corresponding NMEA0183 Input Ports on the Master MFD. This information will be used in the Global Data Source Tab for selecting the Primary System Data Sources.
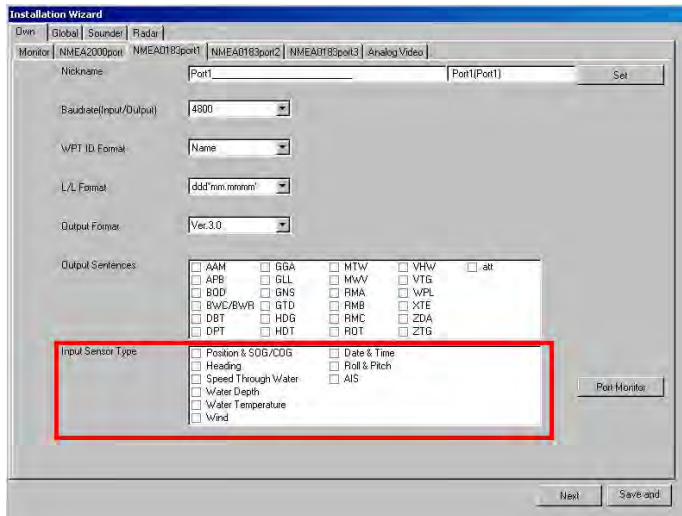
Example: If you connect a sensor such as a PB100 which provides Wind information but also Position, you will have to check "Position & SOG/COG" as well as "Wind".
You can click on the "Port Monitor" Button to make sure that the sensor is correctly sending the corresponding Data.

When you connect a GP320B (FUSA P/N= BBWGPS) to NMEA Port 1, a "Page 2" button automatically appears in the lower right corner of the page. Click on this button to configure advanced settings of the GP320B.

| Name | Description |
|------|-------------|
| POS. Smoothing | When the receiving condition is unfavorable, the GPS fix may change, even if the vessel is stopped. This change can be reduced by smoothing the raw GPS fixes. A setting between 000 to 999 is available. The higher setting the more smoothed the raw data, however too high a setting slows response time to change in latitude and longitude. This is especially noticeable at high ship's speeds. Increase the setting if the GPS fix changes. |
| SOG/COG Smoothing | During position fixing, ship's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing the more smoothed the raw data. If the setting is too high, however, the response to speed and course change slows. For no smoothing, enter all zeroes. |
| Disable Satellite | Every GPS satellite is broadcasting abnormal satellite number(s) in its Almanac, which contains general orbital data about all GPS satellites, including those which are malfunctioning. Using this information, the GPS receiver automatically eliminates any malfunctioning satellite from the GPS satellite schedule. However, the Almanac sometimes may not contain this information. If you hear about a malfunctioning satellite from another source, you can disable it manually. Enter satellite number (max. 3 |

| | satellites) in two digits. |
|---|---|
| INIT. Position | Set initial latitude/longitude position for cold start. |
| ANT. Position | Enter the GPS antenna positioning bow-stern and port-starboard position. |
| ANT. Height | Enter the height of the GPS antenna unit above sea surface. |
| Rx Mode | Choose position fixing method: 2D (three satellites in view), 2D/3D (three or four satellites in view whichever is greater). |
| WAAS Mode | Select ON to use the WAAS mode. |
| WAAS Search | WAAS satellite can be searched automatically or manually. For manual search, enter appropriate WAAS satellite number. |
| WAAS Alarm | When the WAAS signal is lost, the audible alarm sounds one of two ways. On: Alarm sounds continuously until the WAAS positioning mode is available again or the alarm is acknowledged (by key operation). Off: Alarm sounds three times. |

IMPORTANT:  After configuring any NMEA0183 Input Port Sensors on the Master MFD, you must REPEAT THIS PROCEDURE on any other Slave MFDs in the network where you have connected NMEA0183 Input Sensors!!  If this is not done, the sensors will not be available for selection as a Primary System Data Source in the Global Settings Tab.

-Click "Next" to continue the configuration

### 3.3.4. Analog Video

The Analog Video input can be renamed in this page. These names will be used by the RotoKey and for the Video ID in the main interface.
On the MFDBB, four Analog Video inputs are available and can be either set to NTSC or PAL format.
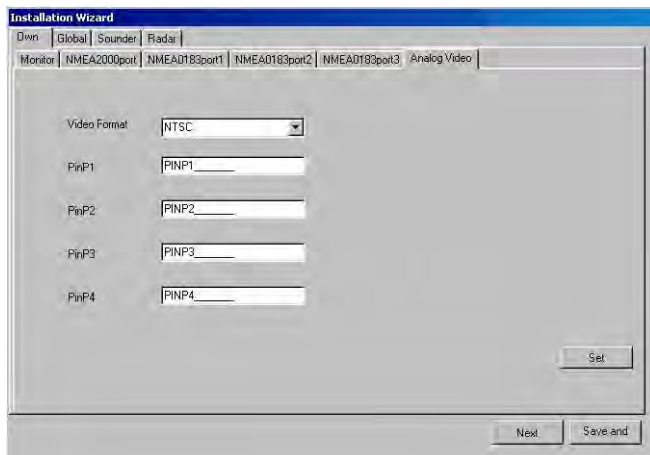
The MFD8/12 has two Analog Video inputs and the format detection (NTSC/PAL) is automatic
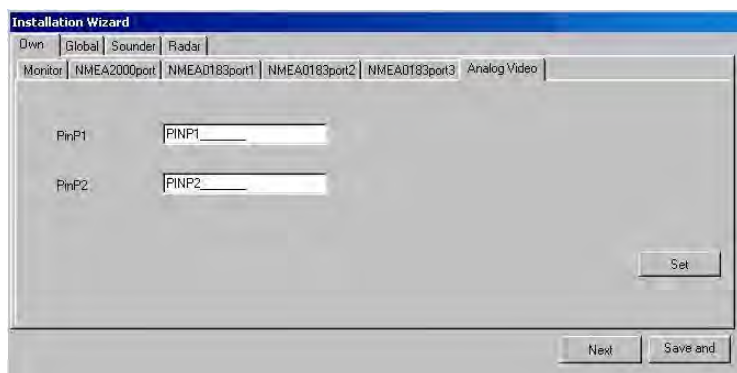


*Note: The Analog Video inputs are only available on the MFD where they are connecting to. Unlike the IP Camera, these video feeds are not available on the network*

## 3.4. Installation Wizard Global Settings

Usually, the Global Settings are performed from the Master MFD in the network.

### 3.4.1. Boat Parameter Settings

First, choose the unit you want to use to enter the boat dimension, and then enter the dimensions in the appropriate fields.
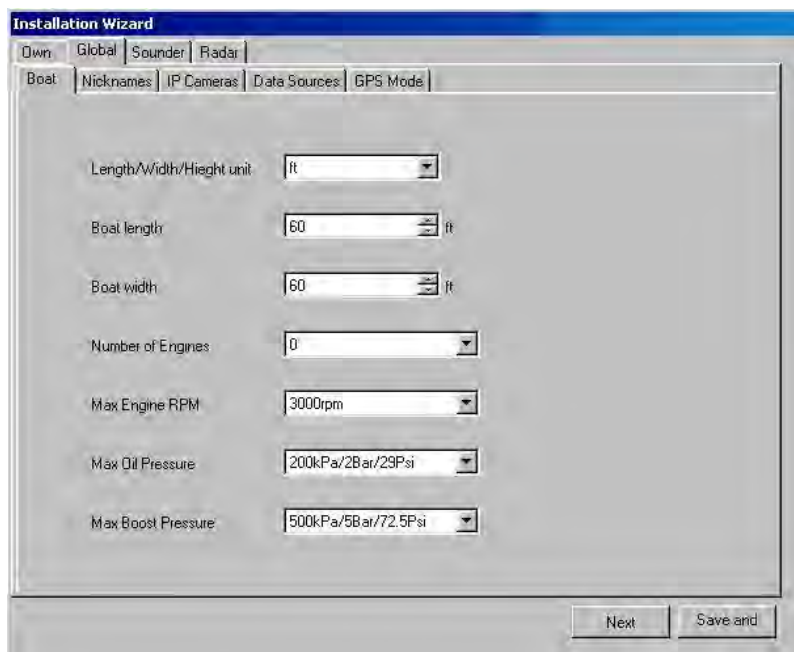
When an Engine(s) with a NMEA2000 Port is connected to an MFD in the network, the Maximum Value of the RPM, Oil and Boost pressure needs to be set up in order to correctly adjust the scale of the Analog Engine Gauges.

*Note: Currently accepted engine data is as follows:*
*- Engine Parameters (PGN 127488)*
    *Engine Speed*
    *Engine Boost Pressure*
*- Engine Parameters (PGN 127489)*
    *Engine Oil Pressure*
    *Engine Temp*
    *Engine Temperature Status*
    *Engine Warning Status*
    *Fuel Flow*

## 3.4.2. Assigning Nicknames

You can assign Nicknames to every Ethernet Sensor, NMEA2000 instrument and NMEA0183 Receive Port for every MFD in a network. This will help you remember locations and assign the sensors designated as the Primary System Data Source during the next step.
In order to enter new names, the use of a USB keyboard is required. After assigning new names on the left column, don't forget to push the "Set" button (lower right) in order to validate the new names.
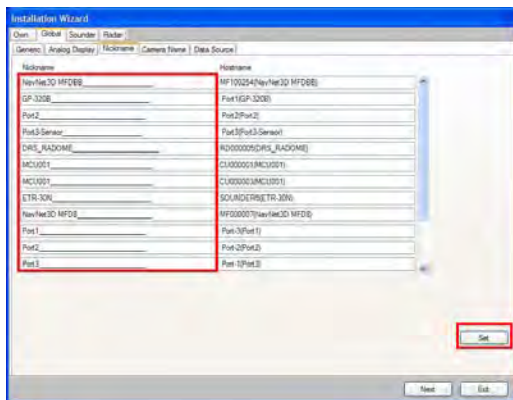


*Note: If you have not renamed the NMEA0183 ports from their own tab, this page will display the NMEA0183 Input Ports of every MFD connected to the network as "Port1", "Port2" and "Port3". Each port refers to the MFD listed just above.*

### 3.4.3. IP Camera

You can assign names to each connected IP Camera. These names will be used by the RotoKey and for the Video ID in the main interface.
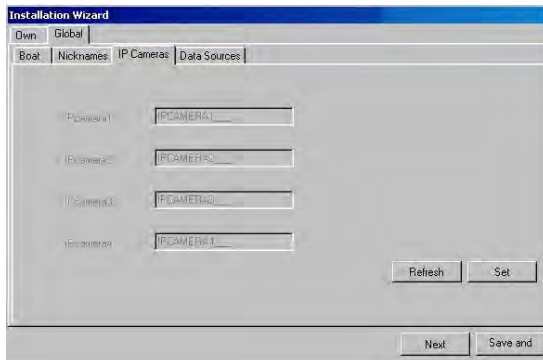


*Note:* *If the IP camera selection is unavailable, make sure that it has a correct IP address (Refer to the Appendix "Configuring AXIS IP Camera")*

### 3.4.4. Primary Data Source selection

IMPORTANT: As explained in the "NMEA0183" p.47, if you have NMEA0183 sensors connected to the input ports of MFD(s) on the network, you first need to configure the "Own" settings for each MFD(s) before being able to select the corresponding instruments as a data source.

Select the "Data Source" Tab. This tab allows you to select the Primary System Data Source for various data types used by the Navnet 3D Network. Make sure to press the "Refresh" button (on the lower right corner) before configuring the source to make sure that all the source are scanned and available in each pop-up menu.
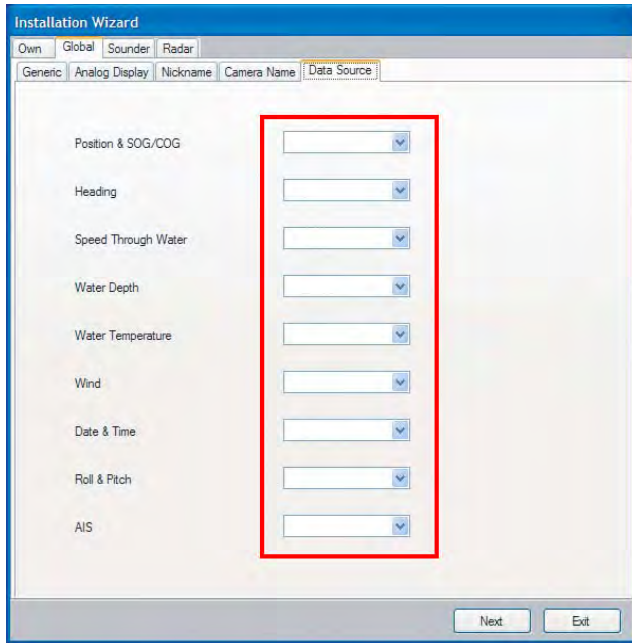
### 3.4.5. GPS Mode

The "GPS Mode" tab appears when a GP330B or WS200 (NMEA2000 sensors) are connected. This tab allow you to set up the WAAS Mode

| Name | Description | Example |
|---|---|---|
| Position & SOG/COG | Choose the position-fixing sensor to use. | GP-320B, GP-330, SC30, Generic NMEA2000 GPS |
| Heading | Choose the heading sensor to use | SC-30, SC-50 (@10Hz), PG-500 (@10Hz), Generic NMEA2000 Heading sensor |
| Speed Through Water | Choose the speed (STW) sensor to use. | Smart sensor (NMEA 0183 or NMEA2000), Transducer with Speed sensor (DFF1/DFF3) |
| Water Depth | Choose the depth sensor to use. | Smart sensor (NMEA 0183 or NMEA2000), DFF1, DFF3 |
| Water Temperature | Choose the temperature sensor to use. | Smart sensor (NMEA 0183 or NMEA2000), Transducer with Temp sensor (DFF1/DFF3) |
| Wind | Choose the wind sensor to use. | FI-501/502, PB-150, WS-200, Generic NMEA2000 wind sensor |
| Date & Time | Choose the date and time source to use. | GP-320B, GP-330, SC30, Generic NMEA2000 GPS |
| Roll and Pitch | Choose the motion sensor to use. | SC-30, SC-50, SC110 |
| AIS | Choose the AIS equipment to use | FA-150, FA-30, FA-50, Generic NMEA0183 AIS |

*Note: If a NMEA0183 Instruments does not appear as a selection in the list, make sure that the Input Type was correctly connected and assigned at each MFD (in the "Own" configuration) then press on the "Refresh" button   Please refer to the "NMEA0183" paragraph p.47.*

*Note: Generic NMEA2000 instrument will appear as a selection for any type of data. Select the correct Data Source or leave the default selection ("Select…") if no other instruments are available.*

-If you don't have any DRS (Radar) and Network sounder click on "Save & Exit" to finish the installation. If you have a radar or sounder, click on "Next" to continue the configuration.

### 3.4.6. Sounder Configuration

Up to 2 Network Sounders can be connected on the NavNet3D network.
NavNet3D is compatible with the DFF1, DFF3, FCV1150 (limited operation), ETR 30
(BBFF1) and ETR60 (BBFF3).

**DFF1 and DFF3**

Select the DFF1 or DFF3 tab and select the Sounder Source:
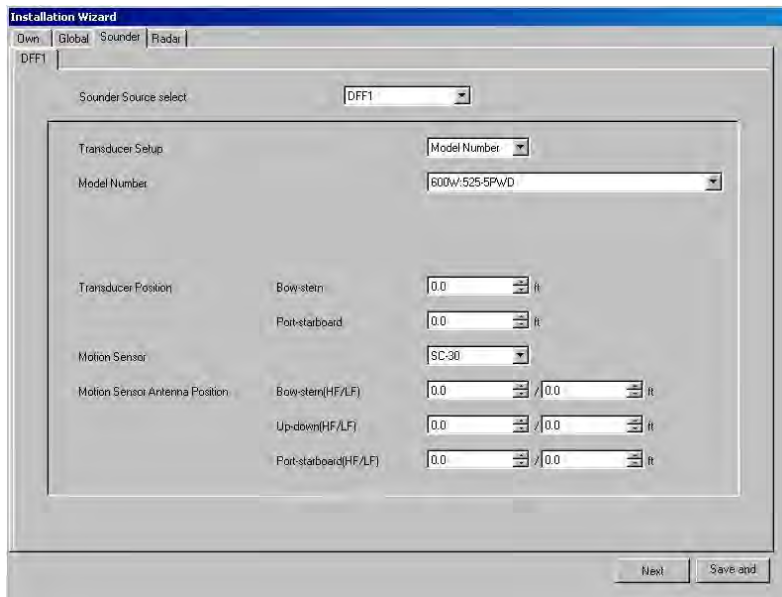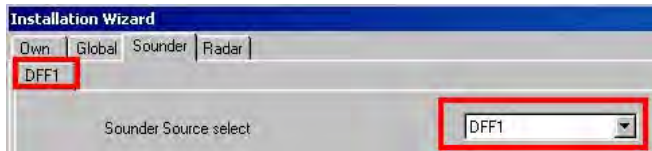




a) <u>Transducer Setup:</u>
   If you have a TD-ID transducer, "TD-ID" will appear in the pull down menu and
   the settings (power and frequency) will be automatically adjusted.
   If you don't have a TD-ID transducer, you can choose between "Model Number"
   (for Furuno Transducer only) and Manual (to manually set up the power and
   frequency).

b) <u>Transducer Position:</u>
   For future use.

c) <u>Motion Sensor and Motion Sensor Antenna Position:</u>
   If a Furuno satellite compass SC-30 or SC-50/110 is connected, set the distance

between antenna unit (or sensor) of the satellite compass and transducer (high frequency and low frequency) at the "Motion Sensor Antenna Position" pull-down menus.

*Note: If a dual frequency transducer is used, the value for High and Low will be the same.*

When entering the value, the point of origin is the antenna of the satellite compass.

> Bow-stern: Set the distance from the satellite compass antenna unit to the sounder transducer (HF and LF). The value is positive when going toward the bow.
>
> Up-down: Set the distance from the transducer to the antenna unit in the vertical direction (this value is always positive)
>
> Port-starboard: Set the distance from the satellite compass antenna unit to the sounder (HF and LF). The value is positive when going starboard.

Example:
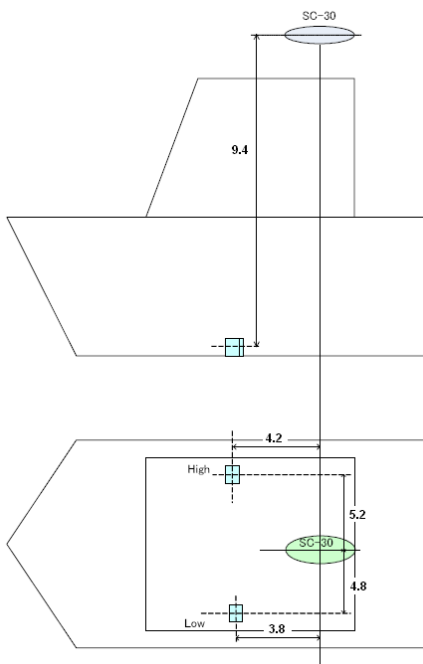


| Motion Sensor | | SC-30 | | |
|---|---|---|---|---|
| Motion Sensor Antenna Position | Bow-stern(HF/LF) | 4.2 | / 3.8 | ft |
| | Up-down(HF/LF) | 9.4 | / 9.4 | ft |
| | Port-starboard(HF/LF) | 5.2 | / -4.8 | ft |

d) <u>Temperature Source (DFF3 only)</u>

If the DFF3 is equipped with a water temperature sensor, click the Temperature

Port pull-down menu, and choose the temperature source, MJ (NMEA0183 connector), High-frequency or Low-frequency.

IMPORTANT NOTE:  The MFD8 and MFD12 cannot accept a decimal point in the frequency fields for this setting.  Therefore, certain fields in this Setup Page must be typed using a multiplier of (x0.1).  In other words, setting a frequency of 201.5 kHz must be typed as "2015" (2015 x 0.1=201.5).   Setting a frequency of 52.3 kHz must be typed as "523" (523 x 0.1=52.3).
*Note: For DFF3, set the tap setting in the network sounder after setting up all the MFDs. For details, see the Operator's Manual of the DFF3.*

## ETR 30/60 (BBFF1/3)
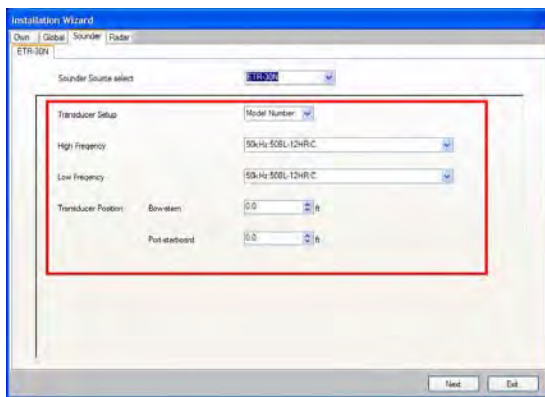


a) Transducer Setup:
You can choose between "Model Number" (for Furuno Transducer only) and Manual (to manually set up the power and frequency).

IMPORTANT NOTE:  The MFD8 and MFD12 cannot accept a decimal point in the frequency fields for this setting.  Therefore, certain fields in this Setup Page must be typed using a multiplier of (x0.1).  In other words, setting a frequency of 201.5 kHz must be typed as "2015" (2015 x 0.1=201.5).   Setting a frequency of 52.3 kHz must be typed as "523" (523 x 0.1=52.3).

b) Transducer Position:
For future use.

*Note: Set the tap setting in the network sounder after setting up all the MFDs. For details, see the Operator's Manual of your sounder*

**FCV1150**

The FCV1150 must have version 3.01 software or higher to work in a NN3D system.

NavNet3D offers remote compatibility with the FCV1150. You will have to set up the FCV1150 for "NavNet Mode" from the System menu (start the FCV1150 while pressing the MENU key). Once the FCV1150 is in NavNet mode and connected to the NavNet network, it will appear as a selection in the Installation Wizard and in the Sounder Source menu of NN3D.

The sounder setups are done from the FCV1150 menu.
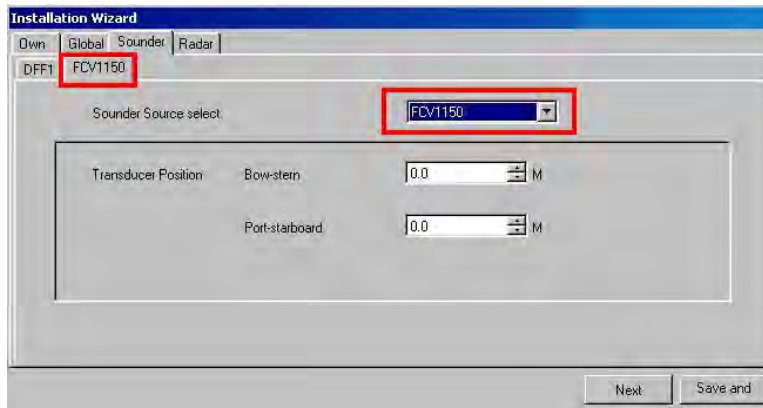


Transducer Position:
For future use.


*Note: NavNet 3D offers limited control over the FCV1150. From NavNet3D, you can only control:*
   - *Range*
   - *Shift*
   - *Auto Mode (Cruising, Fishing, Manual)*
   - *Auto Range*

If you don't have any DRS (Radar), click on Exit to finish the installation. If you have radar, click on "Next" to continue the configuration.

## 3.4.7. DRS (Radar) Configuration

Up to two DRS (or one DRS and one FAR21X7) can be connected on a NavNet3D network.

**DRS**
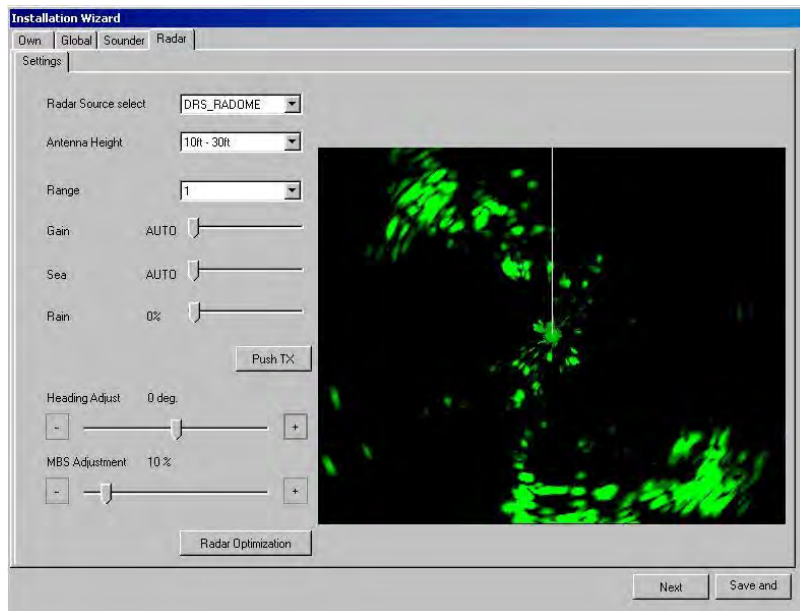


- Click the Antenna Height pull-down menu, and choose the height of the antenna above the waterline, under 10ft, 10ft-30ft or over 30ft.

- Push the TX button and adjust the range and the gain slider to have a clear picture Recommended Settings:
  - Range = 1
  - Gain = AUTO
  - Sea = Auto
  - Rain = 0

- Click on "Radar Optimization" and wait 30 sec

- Perform the heading adjustment as follows:
  - Steer towards a suitable visible target (for example, moored ship or buoy).
  - Click the Range pull-down menu, and choose a range between 0.125 and 0.25 nautical miles.
  - While the vessel is pointed at the target, turn the RotoKey or drag the Slide Bar to bisect the target with the displayed line.

- As a final test, steer towards a small buoy and confirm that the buoy shows up dead ahead on the radar when it is visually dead ahead.

- Perform the Main Bang Adjustment as follows:

The Main bang is the "black hole" which appears at the display center on short ranges. Select "MBS Adjustment" and rotate the RotoKey to suppress the main bang. After adjusting, push the RotoKey to validate.

- Push on STBY (to stop the antenna rotation)

- If you have another DRS, choose it from the "Radar Source Select" pull down menu and repeat the process

**FAR21X7**

No setup is required in the Installation Wizard for the 21X7 (setup is done from the 21X7 radar processor)

Click on "Exit" (make sure that the Radar is on STBY or the button will not be available).

*Important:  If you are using an MFDBB, the Keyboard will not work until it is properly "Linked" to a processor unit. Please refer to the next paragraph "*

## 3.5. MFDBB Keyboard/Processor Linking

MFDBB Keyboards are Ethernet network devices that need to be assigned (linked) to a specific MFDBB processor unit during installation. A special "key-push" sequence is used to cycle through the "Linking Codes" for all the MFDBB processor unit(s).

**If only one MFDBB processor unit is on the Network:**

Simultaneously press and hold the Left key of the Scrolling Pad, the Right key of the Cursor pad and push the RotoKey for 5sec. (This intentionally requires two hands)



The Keyboard will beep two times. You can release the button at this time. The keyboard will now control the MFDBB.

*Note: If this process fails, make sure that one MFD is set as Master on the network. Disconnect and reconnect the keyboard from the processor unit and try again.*

**If multiple MFDBB Processor Units are on the Network:**

Make sure that all MFDBBs are ON. Repeat the process (as explained above) until two beeps are heard. Try to push the RotoKey and/or use the scrolling pad to see if the MFDBB you are looking at can be controlled with the current keyboard.
If the MFDBB does not respond (meaning that the keyboard is actually linked to another processor unit on the network), repeat the process until the keyboard controls the correct MFDBB processor.

Repeat this process to link the other MFDBBs to their Keyboards.

# 4. <u>Registering the System</u>

## 4.1. SystemID Description

The Navnet 3D SystemID is a unique number assigned to a complete NN3D networked system with one or more MFDs. On the same boat, all networked MFDs have the same SystemID. This number will not change if an MFD or other NavNet Component is added to the system. The SystemID is used to identify the customer when he purchases data or services. Note that the unique SystemID will be created automatically only when the system is set-up (when all MFDs are networked together and one Master is assigned).

To access the SystemID, press the [MENU] key on any MFD, turn the RotoKey to select the "My NavNet" page. The SystemID is the 20 digit number (beginning by "SI") at the bottom of the page.

It is highly recommended to immediately write down the SystemID on the Furuno Registration Card.

## 4.2. Registration Card

A registration Card comes with every MFD. This Registration Card contains the Serial Number and the Registration Number that are required to correctly register the system online. Note that customers will not be able to purchase additional data and receive information about his system if the System is not properly registered online.

In order to register, the customer will need to enter the Registration Number of each MFD. It is also recommended to enter the SystemID at the time of registration

# 5. <u>Checklist</u>

## 5.1. Master

Make sure that one (and only one) MFD is assign as a Master on any given NN3D Network. You can check the status of every MFD (Master or Slave) by pressing the [MENU] key then scrolling down to the "My NavNet" menu page. "MFD Type" will indicate if the current MFD is a Slave or a Master.

## 5.2. Power Synchronization Configuration

The Power Synchronization signal can be seen as a "chain" that must NOT be broken. You break the chain if you use a 2-Pair Ethernet cable or if one DIP switch (in the HUB101 or BB) is set to OFF among the chain.
<u>Note:</u> *The Power Synchronization signal is only used for powering ON the MFDs. The Shutdown is a software command and thus will work even if the DIP switches are set to OFF or if a regular hub is used.*

Be sure to check the following:

**Network Cable**
Make sure that you use 4-pair Ethernet Cable to link all Power Synchronization compatible devices to the HUB101 or MFDBB. The Power Synchronization compatible devices are:
- Every NN3D MFD (MFD8, MFD12 and MFDBB)
- DFF1 and DFF3
- DCU12
- Radar PSU012 and PSU013

**HUB101**
When you want the Power Synchronization to pass, make sure that the DIP switch(s) are ON. When you are connecting a device that is not compatible with the Power Synchronization signal (BBWX1, computer…), make sure that the DIP switch(s) are OFF and/or that you are using 2-Pair Ethernet cable

**MFDBB**
Inside every MFDBB (NN3D BlackBox) there is a "mini" HUB101 with DIP switches. You will need to turn ON the dip switch inside the BB if you want the Power Synchronization signal to pass.

As a reminder, Port 1 and Port 2 on the BB are ONLY used to connect the MFDBB Keyboard(s). You can ONLY use port 3 and port 4 to connect Ethernet cables to the DRS, HUB101, DFF1, and other Ethernet devices.
On port 1 and 2 (reserved for the Keyboard), leave the DIP switch to OFF as the BB keyboard (MCU001) does not need the power synchronization signal.

**DFF1/DFF3**
The DFF1 has DIP switches that need to be set up differently if you use a regular hub or the Furuno HUB101 (with Power Synchronization).

For the DFF1:
-        Regular HUB (no Power Synch.) = Dip switches are "Down-Up-Up-Down"
-        HUB101 (Power Synch.)= DIP switches are all UP

For the DFF3:
-        Regular HUB (no Power Synch.) = DIP switch 1 and 2 are set to ON
-        HUB101 (Power Synch.)= DIP Switch 1 and 2 are set to OFF

## 5.3.    Heading Input

If you connect a heading sensor to NavNet3D (using one of the NMEA0183 ports), the heading refresh rate needs to be 100ms (10 times per second = 10Hz or faster).
You can check the heading refresh rate using the port monitor of the MFD (in the Installation Wizard). To check the refresh rate, Clear the page and immediately start to count how many seconds are required to fill up the page. Count the number of HDG sentence and divide it by the number of seconds. This will give you an approximation of the refresh rate:
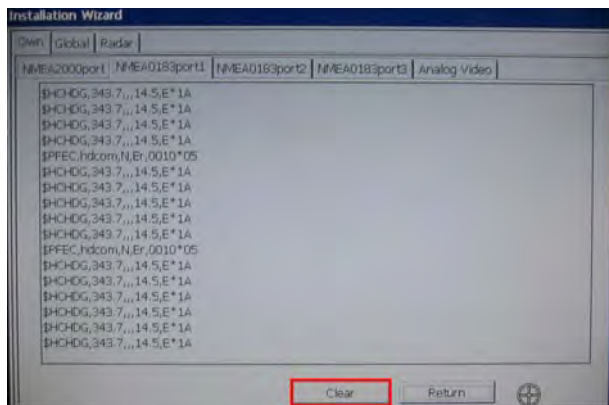


_Note:_ _Heading data from a NMEA2000 source/sensor will always be at the correct refresh speed for the DRS ARPA function_

## 5.4. NMEA2000 and NMEA0183 output sentences

Only output on the NMEA2000 and NMEA183 the sentences that are needed. Uncheck every output sentences if nothing is connected to the corresponding port. This will help you in the future confirm that nothing is connected to the port (without having to look physically on the back of the MFD).

Make sure also that you don't create any NMEA0183 data loop. For example, if a PB150 is connected to one port; do NOT output position information (GGA, GLL, RMC...) to this port (the PB150 will try to use this position information instead of its internal GPS and an alarm will result). Again, this can be avoided by only selecting the minimum sentences required by the device connected to the port.

## 5.5. Powering Sequence

**Power ON:**

While the Power Synchronization should turn ON all the MFD at the same time, it is recommended to power ON the system from the Master MFD.
If a regular Hub is used (without Power Synchronization), the MFD set as Master <u>must</u> be the first one powered ON.

**Power OFF:**

The system can be turn off from any MFD. To properly shut down an MFD, you have to release the Power Key just after the countdown reach 0. This will properly shut down the MFD (and the network). If you Hold the Power Key for 5 seconds (and don't release just after the countdown), you "hard shut down" the MFD.
When you hard shut down an MFD, the Power Synchronization will not work on this MFD until you shut it down properly. Understand that if you Hard Shut down the Master then power ON the system by pressing the Power button on a slave, the Master will not automatically power on, and every MFD slaves will display the "No Master Warning".

# 6. <u>Appendix</u>

## 6.1. Example NN3D System Configurations

### 6.1.1. Basic Plotter/Fish Finder Installation

The Furuno GPS (FUSA P/N BBWGPS) is directly connected to 7-Pin Port DATA1 of the MFD. The DFF1 Fish Finder (FUSA P/N DFF1) is directly connected to the Ethernet port of the MFD using the standard supply cable (3Meter). If the Ethernet connection needs to be extended, use a longer cable or add a LAN Coupler (FUSA P/N= RJ4-5CN-STR) with the following longer Ethernet Cables:
   - 2 Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-175)
   - 5 Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-176)
   - 10  Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-177)
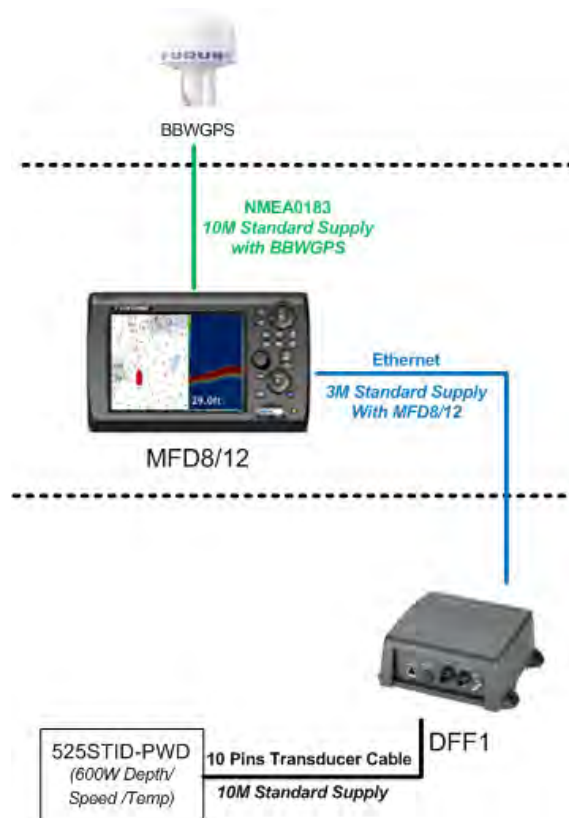


### 6.1.2. Basic Plotter/Radar/Fish Finder Installation

This is a single station Plotter/Radar/Fish Finder installation.
The Furuno GPS (FUSA P/N BBWGPS) is directly connected to 7-Pin Port DATA1 of the MFD. Since two Ethernet sensors are on the network (DRS Radar and Fish Finder), a network switch (FUSA P/N HUB101) is necessary. In this case the Radar power cable is directly connected to the back of the MFD8/12 (DRSxD (Domes) can be powered

directly by any MFD. For DRSxA (Open) check compatibility). The Ethernet side of the DRS Siamese cable may be extended using a coupler (FUSA P/N= RJ4-5CN-STR) and an Ethernet cable.

Optional Ethernet Cables that can be used:
- 2 Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-175)
- 5 Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-176)
- 10  Meter RJ45 to RJ45 Ethernet Cable (P/N 000-167-177)

*-Note that the HUB101 and all MFDs have "AUTO MDX" Ethernet Ports.  This means that they will automatically adjust for straight and cross-over Ethernet cables!*

*-Note that this installation will not allow Radar Overlay or ARPA target acquisition.  If these functions are desired, a Heading Compass sensor such as the Furuno PG500/SC30/SC50 is required (see installation example on pg72)*
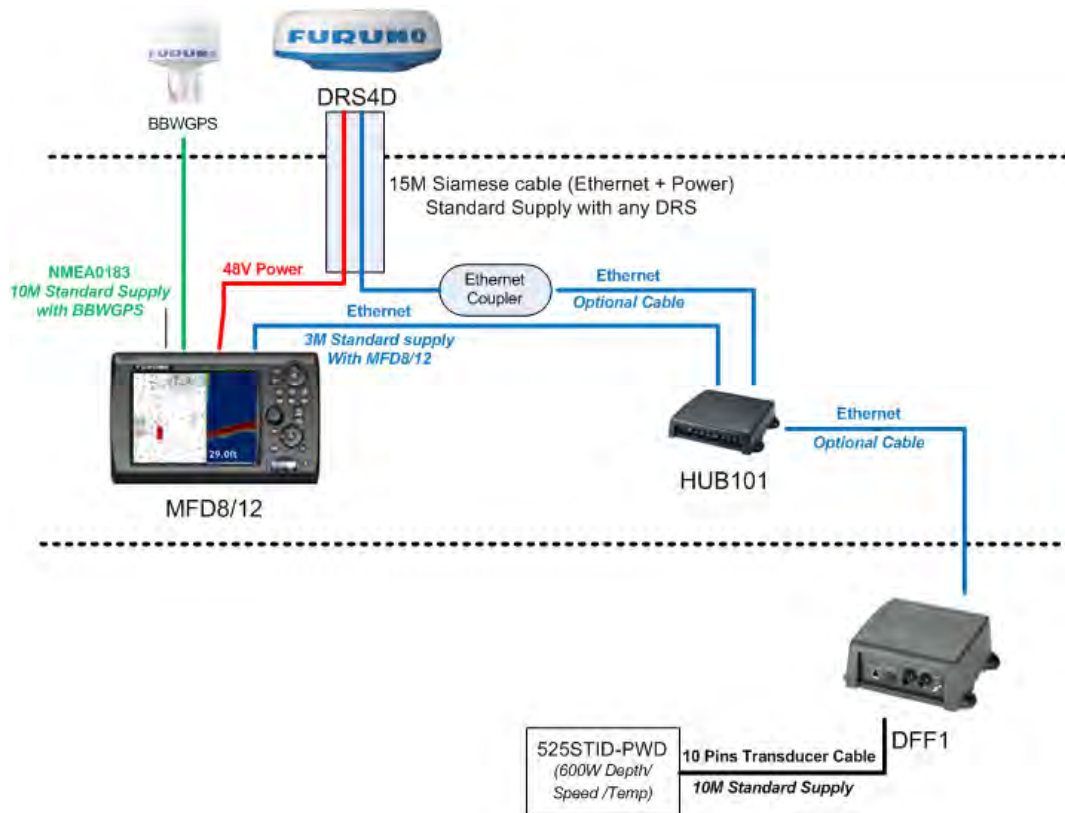


Additional Furuno Network Sensors can also be plugged directly to the HUB (using a regular Ethernet cable):
- FA30 AIS Receiver/FA50 AIS Class B Transponder
- BBWX1 Sirius Satellite Weather Receiver
- FAX30 - Weather Fax Receiver

## 6.1.3. Dual MFD Installation Example

This installation is a dual MFD installation with Radar Overlay and ARPA functionality (PG500 Heading Sensor included). The Furuno GPS (FUSA P/N BBWGPS) is directly connected to 7-Pin Port DATA1 of the MFD. The Furuno Heading Compass (FUSA P/N PG500) is connected to port DATA2 of the MFD.

*Note that in this installation, the DRS is a 12kW "DRS12A" and therefore an optional power supply (PSU12) is required to supply power to the DRS12.*
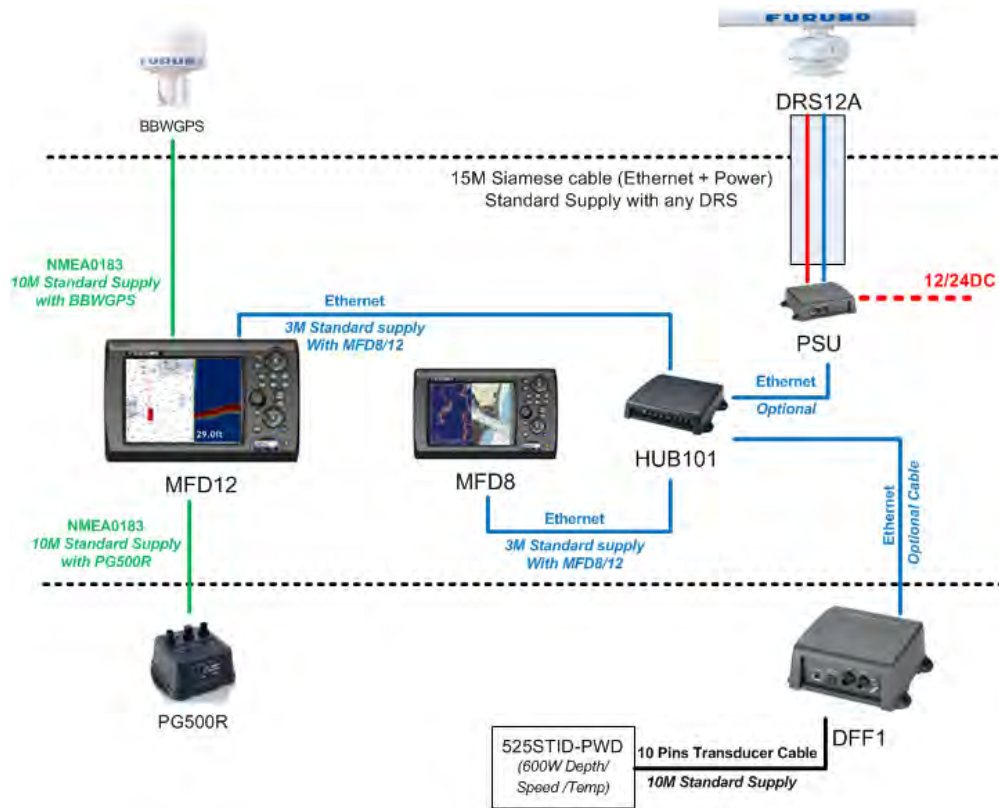


Additional sensors can also be plugged directly to the HUB (using regular Ethernet cable):
- FA30 AIS Receiver
- FA50 AIS Class B Transponder
- BBWX1 Sirius Satellite Weather Receiver
- FAX30 - Weather Fax Receiver

## 6.1.4. Dual Screen MFDBB Installation with Pilot Integration

Navpilot 500 Series Integration with NN3D MFDs is similar to Navnet vx2 integration. One difference is that NN3D MFDs no longer have an AD10 Heading Port.  However, NN3D MFDs do require high speed NMEA0183 heading information (10Hz) for ARPA functionality.

Heading Interface to MFD:

To meet the High Speed Heading requirement, it is necessary to directly connect the output from the NMEA Port (Middle Connector) on the PG500 to one of the three NMEA0183 Receive Ports on a NN3D MFD.  It is easy to make this connection by cutting and splicing the standard 6 pin-to-6 pin cable, that is supplied standard with the PG500, to either NMEA0183 Receive Port 2 or Port 3 on the DATA2 Cable of an MFD:

| PG500 | MFD DATA2 Pig Tail (NMEA Port3) |
|-------|----------------------------------|
| White | Blue |
| Black | Blue/White |

Nav Data Interface to MFD:

The Nav Data connection to the Navpilot processor from one of the NMEA0183 Output Ports of the NN3D MFD is similar to that of Navnet vx2:

| Navpilot Processor TB7 (NMEA In/Out) | MFD DATA2 Pig Tail (NMEA Port2) |
|--------------------------------------|----------------------------------|
| Pin 1* | Brown |
| Pin 2* | Brown/White |
| Pin 3 | Red |
| Pin 4 | Red/White |

*Note that this connection is only necessary if Rudder Angle Information is needed because an FI-50 series FI-506 Rudder Display is used on an MFD NMEA 2000 Backbone. In this case, make sure that ONLY the "RSA" Sentence is turned on from the software of the Navpilot System.  If Rudder Angle is not needed, the receive port may alternatively be used to bring in the Heading Data from the PG500 or connection to another NMEA0183 transmitting device.
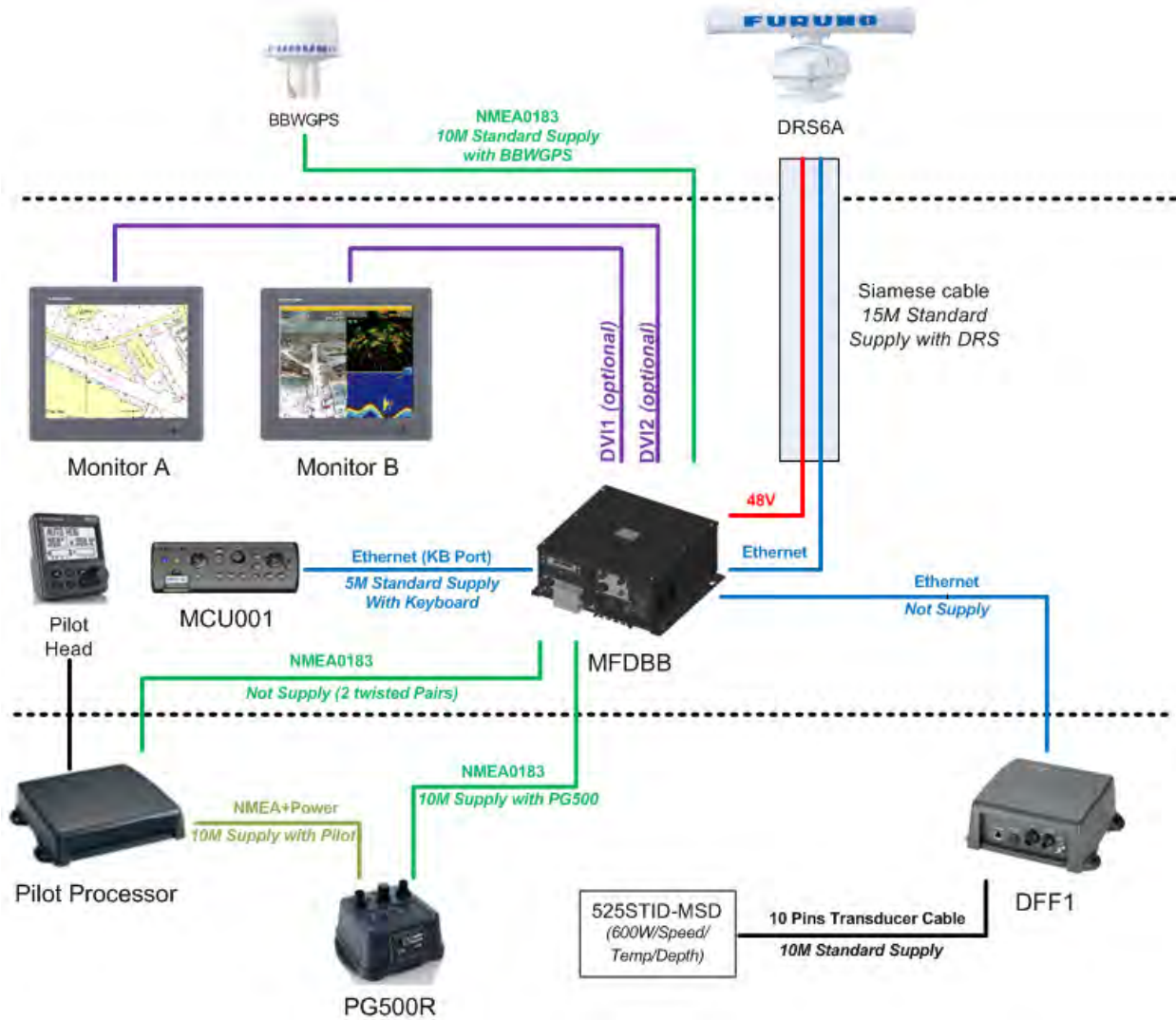
In the above example, the MFDBB is configured for Extended Mode. The two monitors show independent screen displays that can be configured independently. Only one Keyboard is used to control both monitors (the cursor will "jump" back and forth from monitor to monitor). The two screens need to be located in close proximity to each other.

Optional DVI Cables that can be used:
- 5 Meter DVI Cable (P/N 000-149-054)
- 10 Meter DVI Cable (P/N CBL-DVI-10M)

## 6.1.5. Dual Screen MFDBB with DRS and FAR21X7

This installation is a simple dual radar installation (one DRS and one 21X7).
Note that the SC30 is directly plugged into the CANBUS port of the DRS (it provides accurate heading and position to the system). The 21X7 processor is simply connected to the HUB 101 (with DIP switch OFF) through its Ethernet port
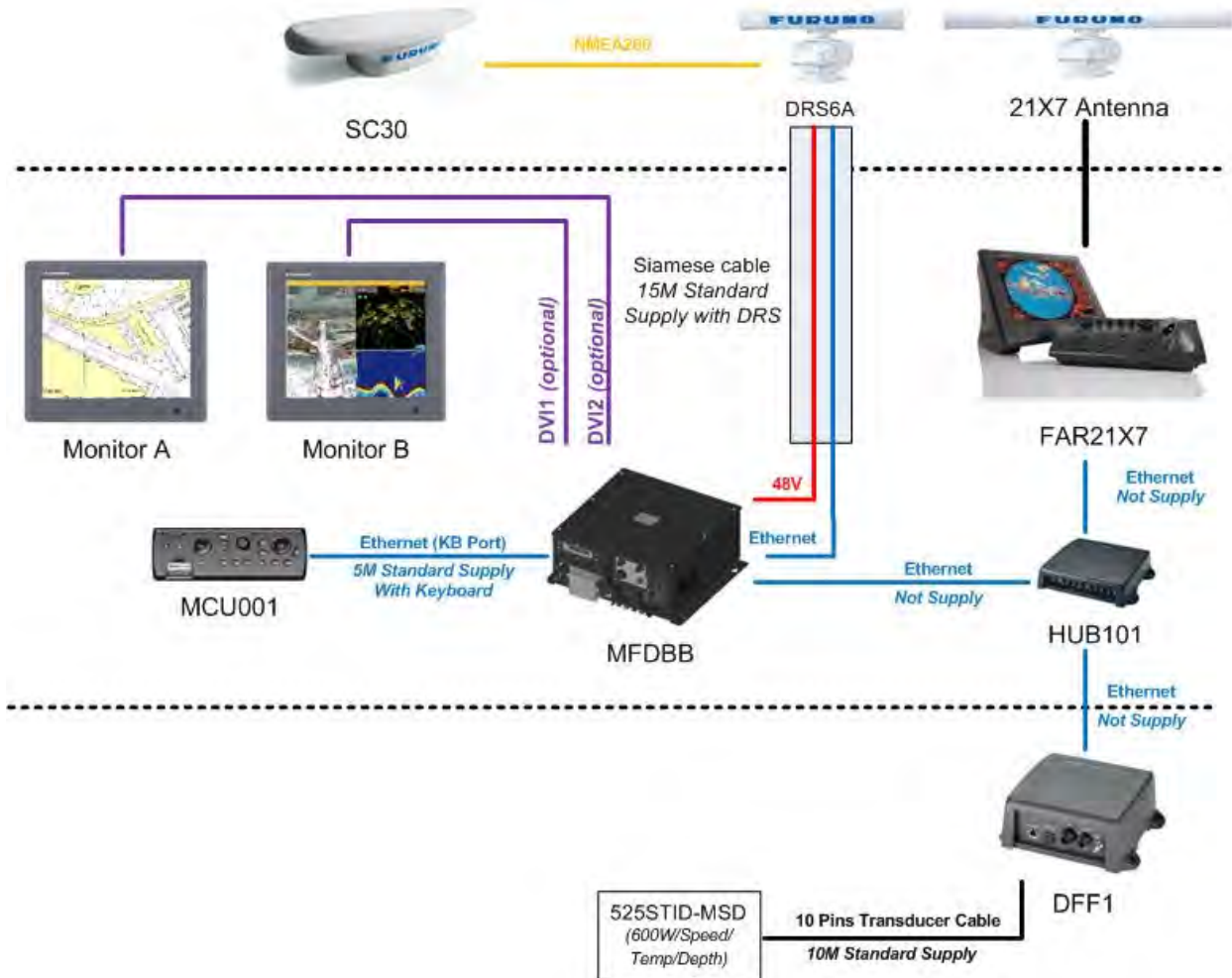
## 6.2. Master Reset

### 6.2.1. MFDBB

A USB keyboard is needed to perform a Master Reset on the MFDBB

*Note: The USB Keyboard needs to repeat the key command when the corresponding key is held. Some keyboards (such as wireless keyboard) will not be able to reset the MFDBB*

1) Disconnect any network device (only connect one MCU001 Keyboard controller)
2) If the MFDBB is on, Power it OFF by pressing the "Power" key of the MCU001 keyboard for more than 5 sec.
3) Make sure the USB keyboard is correctly plugged into one of the USB ports of the MFDBB
4) Turn ON the MDDBB. As soon as the last screen of the following sequence appears (NavNet3D logo on a blue and white cloud background), push and hold the ESC key until the MFDBB restarts automatically.
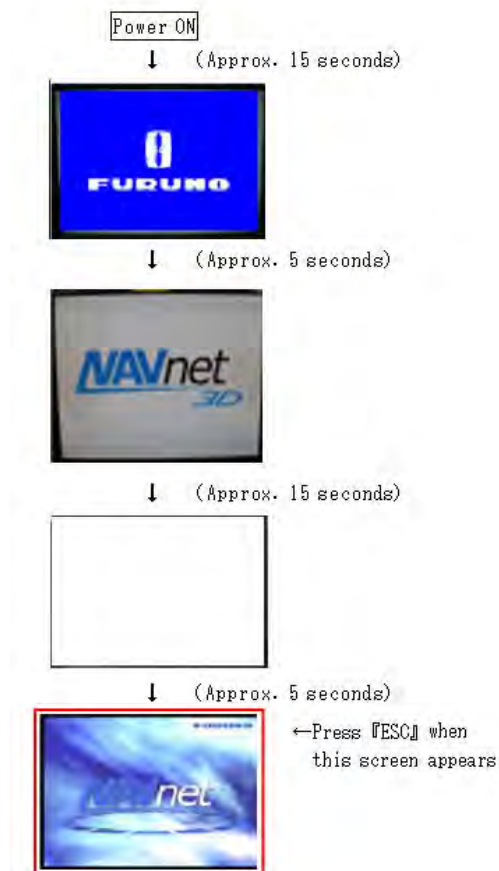
5) When the MFDBB restarts, you can release the ESC key. After approximately 1-2 minutes the MFDBB will power OFF completely
6) Re-connect the network and NMEA devices and power ON the MFDBB again. The Installation Wizard will start with the default factory settings.

### 6.2.2. MFD8/12

1) Disconnect any network device
2) Disconnect any NMEA0183 Instruments
3) If the MFD8/12 is ON, power it OFF by pressing the "Power" key for more than 5 sec.
4) Press and Hold the [CANCEL] key
5) Start the MFD and continue to press the [CANCEL] key
6) The Cursor will appear, continue to hold the [CANCEL] key until the Installation Wizard appears (approximately 1-2 minutes)
7) The MFD8/12 will not shut OFF (unlike the MFDBB) but the Installation Wizard should appear with the language selection (confirming the Master Reset)

# 6.3. Configuring AXIS IP Cameras

## 6.3.1. Introduction:

As of April 2009, the following MPEG-4 capable AXIS IP cameras are compatible with NN3D: 207 / 211 / 212PTZ / 216FD /215PTZ / 225FD / 233D
In order to view and control Axis IP Cameras from an MFD in a Navnet 3D network, it is first necessary to assign the IP Address of the AXIS IP Camera. This procedure will require a Windows PC connected via Ethernet to the AXIS IP Camera(s). Pre-wiring and installing the cameras on the vessel first is recommended so that all AXIS IP cameras can be networked to the PC through a Hub and can be configured at the same time. It will be necessary to setup the IP Address of the PC and use the AXIS IP Utility Program (Provided with the Camera) to configure the Camera's IP Address.

## 6.3.2. Setting the IP of the computer

Go to "Start" and select "Control Panel"

Open "Network Connections"

Right Click on "Local Area Connection" and select "Properties"
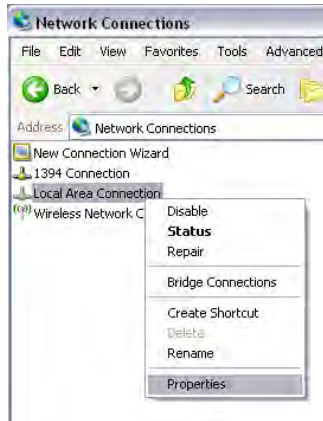
Select "Internet Protocol (TCP/IP)" and click on "Properties"
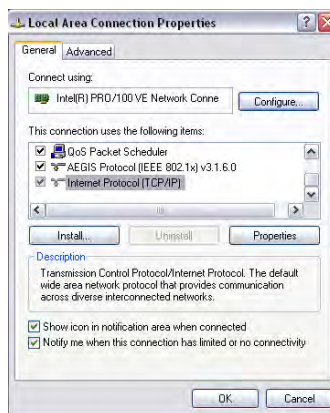


Fill the IP fields as shown below.
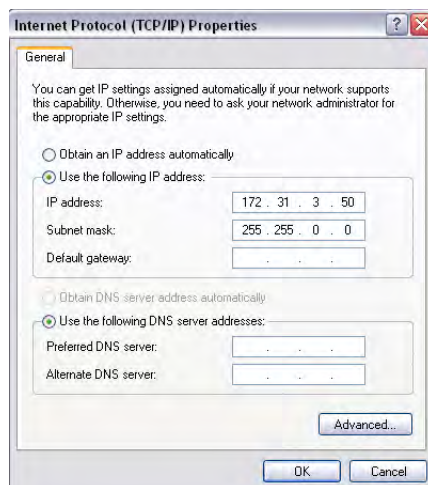


Click on OK to confirm and close the 2 windows.

*Note that the new IP can take up to 20 seconds to be recognized. A pop-up in the lower right corner should show when the IP is correctly set. Turn OFF any Firewall that could*

*prevent data to be exchanged between NavNet and the PC. You may also have to restart your computer.*



## 6.3.3. Set up the IP address of the camera

To work in a NavNet3D system, the IP cameras need to be set up with specific IP Addresses. Up to 4 IP cameras can be connected on a network.
IP Camera number 1 = 172.031.200.003
IP Camera number 2 = 172.031.200.004
IP Camera number 3 = 172.031.200.005
IP Camera number 4 = 172.031.200.006

In this example, we will set up 3 IP cameras:
- A moving IP camera (AXIS 212PTZ) that will be configured as IP Camera 1
- A non moving IP Camera (AXIS 207) that will be configured as IP Camera 2
- A non moving IP Camera (AXIS 207) that will be configured as IP Camera 3

Load the AXIS CD "Network Video Products" that was including with the IP camera. The Autorun software should appear (If the autorun is not working on your computer, browse the CD and double click on "Setup")

Select "Install Product"



Click on "Copy to PC"

The following window should appear. Just double click on "IPUtility" to launch the configuration software
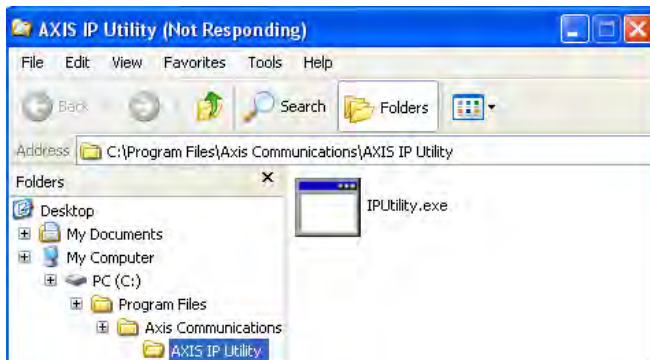


*Note:* *If the Windows Firewall appears, click on "Unblock" to allow the software to configure correctly the IP Camera*
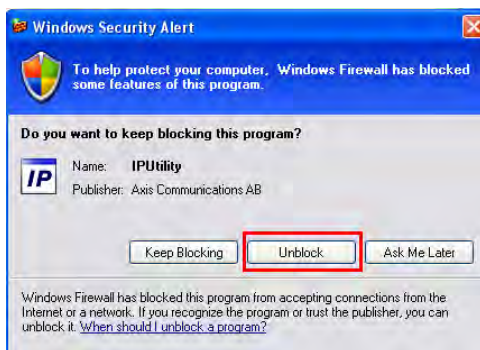


The AXIS IP utility will detect all the IP cameras connected on the network
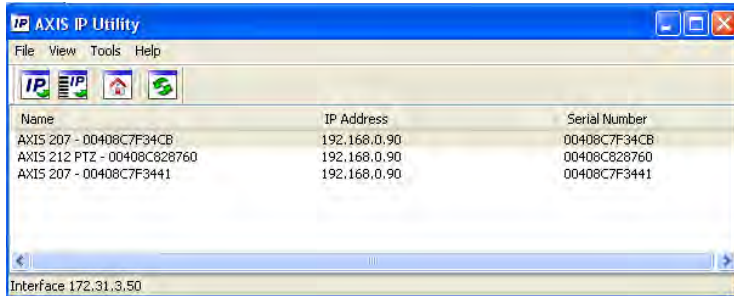
_Note:_ *If you use the same camera models in multiple locations, BE SURE to WRITE DOWN the IP Camera serial number (that can be found on the back of the camera) with the intended location to help correctly assign the IP camera's name.*

In this example, we will assign a moving camera (212 PTZ) to IP Camera 1 (Deck), a non-moving camera with the SN ending with 34CB to IP Camera 2 (Engine Port) and a non-moving camera with the SN ending with 3441 to IP Camera 3 (Engine Starboard).

To change the IP address of the Camera, just select the camera in the list and click on the "assign new IP address to selected device" button
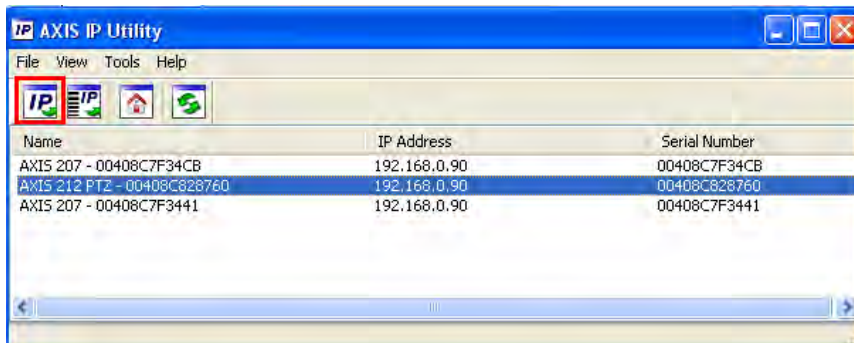


Enter the correct IP address and click on "Assign"
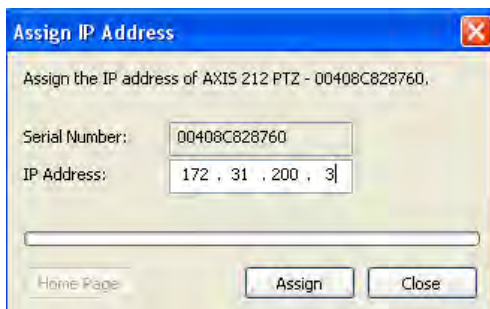


You will need to restart (power OFF and ON) the camera after the address is changed. (Just unplug and plug back the Ethernet cable if you are using the POE).

It can take a while before the confirmation box appears.
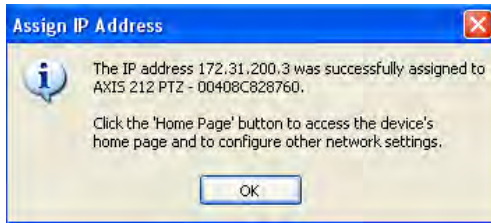
Click the "Close" button.

The first IP camera has been correctly assigned
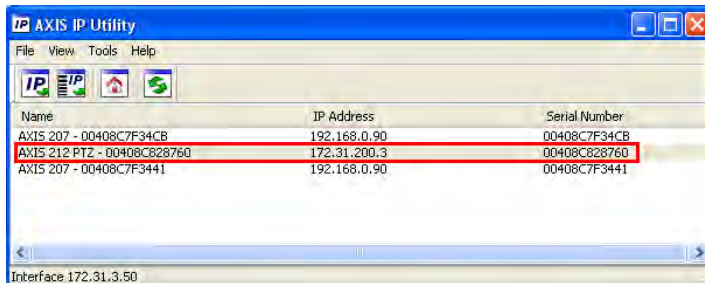


Repeat the process with the other cameras



### 6.3.4. Configure the camera

The cameras need to be configured using an Internet Explorer.

Enter the IP address of the first IP camera:
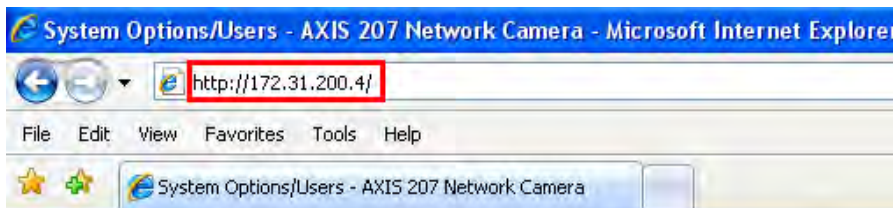


Set the password of the IP camera to "pass" and click "OK"
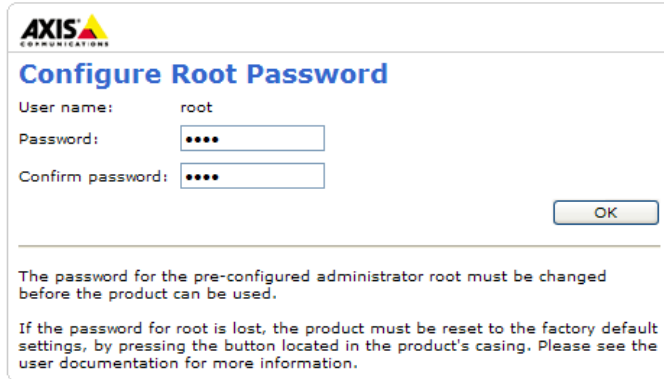
Important: You cannot use another password and must use the word "pass".

When you press OK, a dialog box asking for a login/password will appear. Just use "root" and "pass".



When the webpage loads, pay attention to the top of the page to authorize the installation of the ActiveX. Click on the yellow bar and choose "Install ActiveX"



At this point a camera image should appear
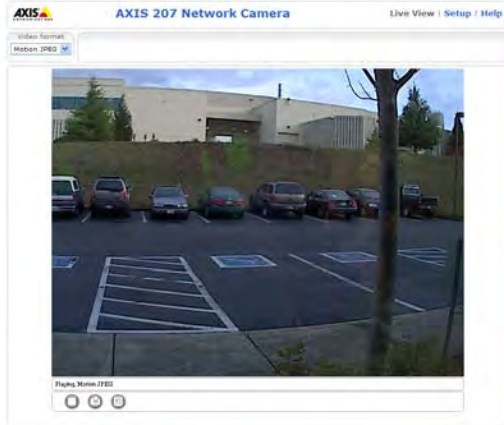
Now, click on Setup
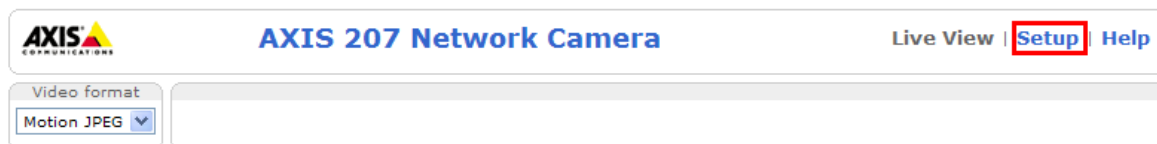


1) In "Basic Configuration -> Users" select "Enable anonymous viewer…" and click on "Save"
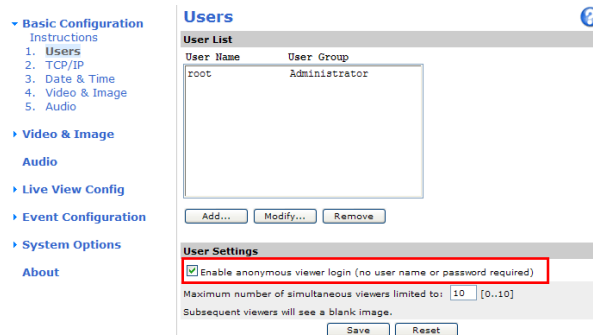


2) In "Basic Configuration -> Date and Time" select "Synchronize with computer time" and click on "Save"

3) In "Live View Config -> Layout" select "MPEG4" as the default video format and click on save



4) Optional: When using a PTZ (moving) camera, you can set-up the default "Home" position. In "PTZ configuration -> Preset Positions", adjust the view of the default camera position using the control
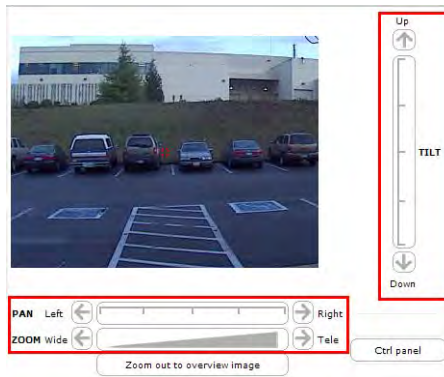
*Note:* *It is recommended to zoom in on the image (Tele) to have a better "Home" preset.*

When the view is correctly set up, type "Home" for the Current position and select "Use current position as Home". Click on "Add" to validate.



If you don't want the camera to return to the "Home" position automatically after 30 sec, just put 0 and validate.



5) Some IP Camera models (such as the 215 or 233) need to have the "Aspect Ratio" setting checked and the resolution set to "4CIF" or "640*480" to be compatible with the MFD8/12. This setting can be found under the "Video & Image" section.
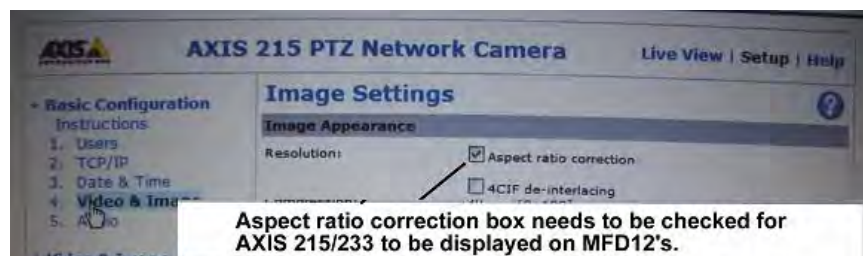


6) Under the "Video & Image" menu -> "Advanced" -> "MPEG-4"

- Check "ISMA Compliant" (when available)
  *Note: on some camera models, this settings is not available (simply proceed to the next step)*
- Limit the Maximum Bit Rate to 500kbit/s for engine monitoring (fixed picture) and to 800kbit/s for outdoor camera (where the picture changes)



7) Under the "Video & Image" menu -> "Image"
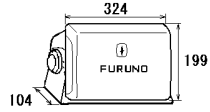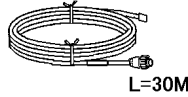
- Set the Maximum Frame Rate to 15fps

## UNIT

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| MULTI FUNCTION DISPLAY | 324 / 199 / 104 | MFD8-J/E<br>000-011-776-00  ** | 1 |

## SPARE PARTS

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| SPARE PARTS | | SP19-00701<br>001-028-020-00 | 1 |

## ACCESSORIES

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| ACCESSORIES | | FP19-01101<br>001-023-060-00 | 1 |

## INSTALLATION MATERIALS            CP19-00900

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| LAN CABLE ASSEMBLY | L=30M | MOD-WPAS0001-030+<br>000-164-609-10 | 1 |
| CABLE ASSEMBLY | L=2M | FRUDD-18AFFM-L180<br>000-164-608-10 | 1 |
| CABLE ASSY. | L=5M | MJ-A3SPF0017-050ZC<br>000-157-995-10 | 1 |
| INSTALLATION MATERIALS | | CP19-00901<br>001-028-050-00 | 1 |

## DOCUMENT

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| DOCUMENTS CASE | 25 / 233 / 293 | H293XW230XT18<br>000-168-580-10 | 1 |
| OPERATOR'S MANUAL CD | 142 / 125 | NAVNET3 O/M *CD-ROM*<br>000-167-721-1* | 1 |
| FLUSH MOUNTING TEMPLATE | 420 / 297 | C42-00709-* ワ/エイ<br>000-167-941-1* | 1 |
| NOTIFICATION DOCUMENT | 210 / 297 | C42-00706-*<br>000-167-809-1* | 1 |
| INSTALLATION MANUAL | 210 / 297 | IM*-44440-*<br>000-167-806-1*  ** | 1 |
| OPERATOR'S GUIDE | 182 / 257 | MLG-44440-*<br>000-167-805-1* | 1<br>(*1) |
| OPERATOR'S GUIDE | 182 / 257 | OSJ-44440-*<br>000-167-803-1* | 1<br>(*1) |
| OPERATOR'S MANUAL | 182 / 257 | OM*-44441-*<br>000-167-814-1*  ** | 1 |

CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

ACCESSORIES AND A PART OF THE DOCUMENTS IS PUT IN THE DOCUMENTS CASE.

(*1)INDICATE SPECIFICATION SELECTIVE ITEM.

DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)
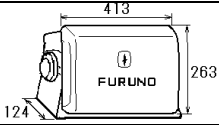
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM.  THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF

THE UPPER PRODUCT. QUALITY IS THE SAME.
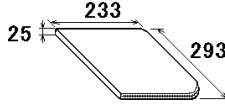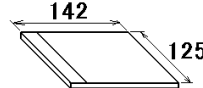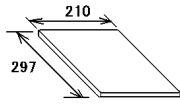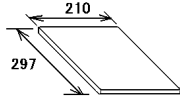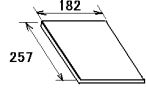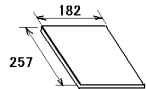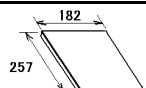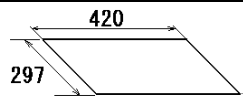
## UNIT

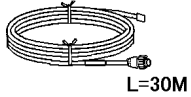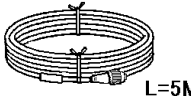| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| MULTI FUNCTION DISPLAY | 413 / 263 / 124 | MFD12-J/E<br>000-011-778-00      ** | 1 |

## SPARE PARTS

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| SPARE PARTS | | SP19-00801<br>001-028-030-00 | 1 |

## ACCESSORIES

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| ACCESSORIES | | FP19-01101<br>001-023-060-00 | 1 |

## INSTALLATION MATERIALS          CP19-01000

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| LAN CABLE ASSEMBLY | L=30M | MOD-WPAS0001-030+<br>000-164-609-10 | 1 |
| CABLE ASSEMBLY | L=2M | FRUDD-18AFFM-L180<br>000-164-608-10 | 1 |
| CABLE ASSEMBLY | L=5M | MJ-A3SPF0027-050ZC<br>000-153-769-11 | 1 |
| INSTALLATION MATERIALS | | CP19-01001<br>001-028-060-00 | 1 |

## DOCUMENT

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| DOCUMENTS CASE | 25 / 233 / 293 | H293XW230XT18<br>000-168-580-10 | 1 |
| OPERATOR'S MANUAL CD | 142 / 125 | NAVNET3 O/M *CD-ROM*<br>000-167-721-1* | 1 |
| NOTIFICATION DOCUMENT | 210 / 297 | C42-00706-*<br>000-167-809-1* | 1 |
| INSTALLATION MANUAL | 210 / 297 | IM*-44440-*<br>000-167-806-1*      ** | 1 |
| OPERATOR'S GUIDE | 182 / 257 | MLG-44440-*<br>000-167-805-1* | 1 (*1) |
| OPERATOR'S GUIDE | 182 / 257 | OSJ-44440-*<br>000-167-803-1* | 1 (*1) |
| OPERATOR'S MANUAL | 182 / 257 | OM*-44441-*<br>000-167-814-1*      ** | 1 |
| FLUSH MOUNTING TEMPLATE | 420 / 297 | C42-00704-* ワ/エイ<br>000-167-224-1* | 1 |
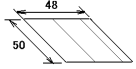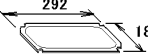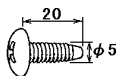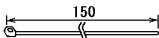
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

ACCESSORIES AND A PART OF THE DOCUMENTS IS PUT IN THE DOCUMENTS CASE.

(*1)INDICATE SPECIFICATION SELECTIVE ITEM.

DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

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.

# FURUNO
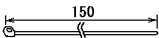
| CODE NO. | 001-028-050-00 | 19BA-X-9401 -2 |
|---|---|---|
| TYPE | CP19-00901 | 1/1 |

**INSTALLATION MATERIALS**

MULTI FUNCTION DISPLAY

MFD8

| NO. | NAME | OUTLINE | DESCRIPTIONS | Q'TY | REMARKS |
|---|---|---|---|---|---|
| 1 | FUSE LABEL | 48 / 50 | 19-028-2231-0 / CODE NO. 100-346-980-10 | 1 | |
| 2 | Fマウントヨウスポンジ8 MOUNTING SPONGE | 292 / 182 | 19-028-3122-1 / CODE NO. 100-343-141-10 | 1 | |
| 3 | CABLE FIXING PLATE | 48 / 11 / 20 | 19-028-3123-2 / CODE NO. 100-342-592-10 | 1 | |
| 4 | SELF-TAPPING SCREW | 20 / φ5 | 5X20 SUS304 / CODE NO. 000-162-608-10 | 4 | |
| 5 | CABLE TIE | 150 | CV-150B / CODE NO. 000-167-183-10 | 1 | |
| 6 | BINDING HEAD SCREW | 10 / φ3 | M3X10 SUS304 / CODE NO. 000-162-662-10 | 2 | |

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.
 (DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO ., LTD.          19BA-X-9401

# FURUNO
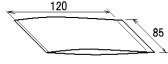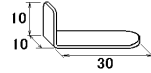
| CODE NO. | 001-028-060-00 | 19BA-X-9402 -2 |
|---|---|---|
| TYPE | CP19-01001 | 1/1 |

**INSTALLATION MATERIALS**

MULTI FUNCTION DISPLAY

MFD12

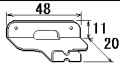| NO. | NAME | OUTLINE | DESCRIPTIONS | Q'TY | REMARKS |
|---|---|---|---|---|---|
| 1 | MOUNTING SPONGE | 384 / 246 | 19-028-2062-0 / CODE NO. 100-340-040-10 | 1 | |
| 2 | FUSE LABEL | 48 / 50 | 19-028-2231-0 / CODE NO. 100-346-980-10 | 1 | |
| 3 | CABLE FIXING PLATE | 48 / 11 / 20 | 19-028-3123-2 / CODE NO. 100-342-592-10 | 1 | |
| 4 | SELF-TAPPING SCREW | 20 / φ5 | 5X20 SUS304 / CODE NO. 000-162-608-10 | 4 | |
| 5 | CABLE TIE | 150 | CV-150B / CODE NO. 000-167-183-10 | 1 | |
| 6 | BINDING HEAD SCREW | 10 / φ3 | M3X10 SUS304 / CODE NO. 000-162-662-10 | 2 | |

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.
 (DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO ., LTD.          19BA-X-9402

## FURUNO

| CODE NO. | 001-023-060-00 | 19AY-X-9501 -1 |
|---|---|---|
| TYPE | FP19-01101 | 1/1 |

MCU-001/DCU12

ACCESSORIES

| NO. | NAME | OUTLINE | DESCRIPTIONS | Q'TY | REMARKS |
|---|---|---|---|---|---|
| 1 | LCD CLEANING CLOTH | 120 / 85 | 02-155-1082-1 / CODE NO. 100-332-651-10 | 1 | |
| 2 | PANEL REMOVER | 10 10 30 | 19-028-3124-1 / CODE NO. 100-340-471-10 | 1 | |

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.
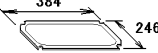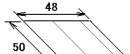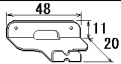    (DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO ., LTD.          19AY-X-9501

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## FURUNO

| CODE NO. | 001-028-020-00 | 19BA-X-9301 -0 1/1 |
|---|---|---|
| TYPE | SP19-00701 | BOX NO.    P |

| SHIP NO. | SPARE PARTS LIST FOR | U S E | SETS PER VESSEL |
|---|---|---|---|

MULTI FUNCTION DISPLAY

MFD8

| ITEM NO. | NAME OF PART | OUTLINE | DWG. NO. OR TYPE NO. | QUANTITY WORKING PER SET | PER VES | SPARE | REMARKS/CODE NO. |
|---|---|---|---|---|---|---|---|
| 1 | FUSE GLASS TUBE TYPE | 30 φ6 | FGBO-A 125V 5A PBF | | | 2 | 000-155-853-10 |
| 2 | FUSE GLASS TUBE TYPE | 30 φ6 | FGBO 125V 10A PBF | | | 2 | 000-155-826-10 |
| | | | | | | | |
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| | | | | | | | |

| MFR'S NAME | FURUNO ELECTRIC CO.,LTD. | DWG NO. | 19BA-X-9301 | 1/1 |
|---|---|---|---|---|

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.
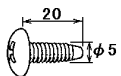
# FURUNO

| CODE NO. | 001-028-030-00 | 19BA-X-9302 -1 1/1 |
|---|---|---|
| TYPE | SP19-00801 | BOX NO.　P |

| SHIP NO. | SPARE PARTS LIST FOR | U S E | SETS PER VESSEL |
|---|---|---|---|
| | MULTI FUNCTION DISPLAY<br><br>MFD12 | | |

| ITEM NO. | NAME OF PART | OUTLINE | DWG. NO. OR TYPE NO. | WORKING PER SET | WORKING PER VES | SPARE | REMARKS/CODE NO. |
|---|---|---|---|---|---|---|---|
| 1 | FUSE GLASS TUBE TYPE | 30　φ6 | FGB0 125V 10A PBF | | | 2 | 000-155-826-10 |
| 2 | FUSE GLASS TUBE TYPE | 30　φ6 | FGB0 125V 20A | | | 2 | 000-155-780-10 |
| | | | | | | | |
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| MFR'S NAME | FURUNO ELECTRIC CO.,LTD. | DWG NO. | 19BA-X-9302 | 1/1 |
|---|---|---|---|---|

DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

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.
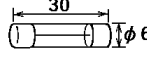
# FURUNO

231±0.5

4-ø7
FIXING HOLES

POWER OUTPUT FOR ANT. UNIT

SIGNAL CONNECTOR

SORCE

アース端子
GND TERMINAL

NAMEPLATE

104

62±0.5

13

9±5

331

SIGNAL CONNECTOR

#80

335±5

#80

308

55±5

23

113

#150

40°

13

VIEW A

SIGNAL CONNECTOR

217±5

190

34

⇐A

## TABLE 1

| DIMENSION (mm) | TOLERANCE (mm) |
|---|---|
| L ≤ 50 | ±1.5 |
| 50 < L ≤ 100 | ±2.5 |
| 100 < L ≤ 500 | ±3 |

NOTE
1.    #: MINIMUM SERVICE CLEARANCE.
2.    TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3.    USE TAPPING SCREWS ø5x20 FOR FIXING THE UNIT.

# FURUNO



TABLE 1

| | (mm)<br>DIMENSION | (mm)<br>TOLERANCE |
|---|---|---|
| | L ≤ 50 | ±1.5 |
| | 50 < L ≤ 100 | ±2.5 |
| | 100 < L ≤ 500 | ±3 |

PILOT HOLES

282±0.5

172±0.5

176±1

286±1

R27

CUTOUT DIMENSIONS

#40    308    #40

4−⌀6
FIXING HOLES

172±0.5

282±0.5

13    116    #150

#40

190

#40

34    23

POWER OUTPUT FOR ANT. UNIT

型式銘板
NAMEPLATE

SORCE

GND TERMINAL

SIGNAL CONNECTOR    SIGNAL CONNECTOR

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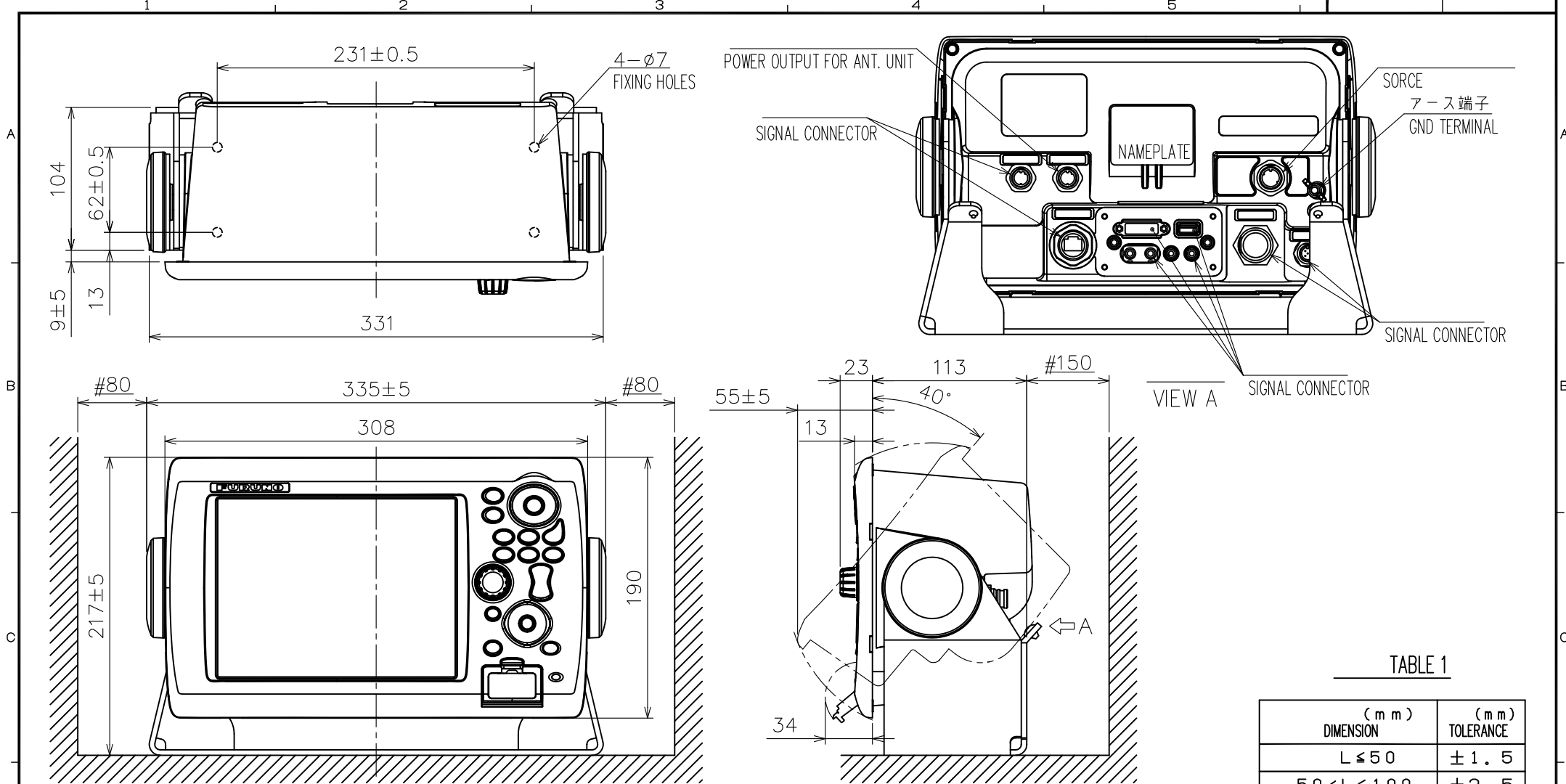
NOTE
1.    #: MINIMUM SERVICE CLEARANCE.
2.    TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3.    USE TAPPING SCREWS ⌀5x20 FOR FIXING THE UNIT.

| DRAWN | Oct. 17 '07  T.YAMASAKI | | TITLE | MFD8 |
|---|---|---|---|---|
| CHECKED | Oct. 18 '07  T.TAKENO | | | |
| APPROVED | Oct. 22 '07  R. Esumi | | | |
| SCALE | 1/4 | MASS 3.9 ±10% kg | 質量はケーブルを含まず<br>MASS W/O CABLES | NAME | MULTI FUNCTION DISPLAY (FLUSH MOUNT) |
| DWG.No. | C4444-G02- A | REF.No. | 19-028-300G-1 | | OUTLINE DRAWING |
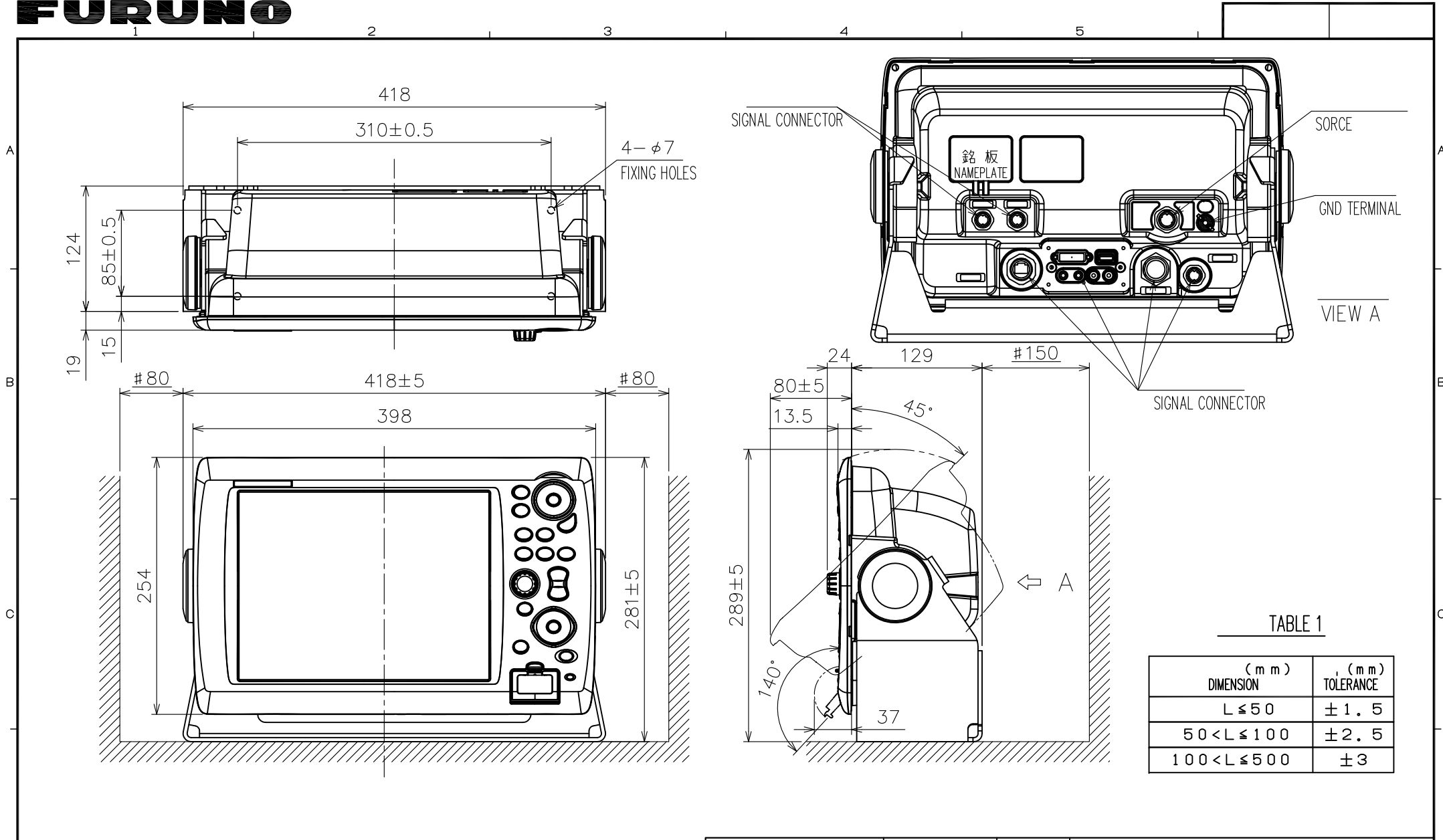
D-2

FURUNO ELECTRIC CO., LTD.

FURUNO

418

310±0.5

4−φ7
FIXING HOLES

124

85±0.5

19    15

#80    418±5    #80

398

254    281±5

NOTE
1.    #: MINIMUM SERVICE CLEARANCE.
2.    TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3.    USE TAPPING SCREWS φ5x20 FOR FIXING THE UNIT.

SIGNAL CONNECTOR

銘 板
NAMEPLATE

SORCE

GND TERMINAL

VIEW A

SIGNAL CONNECTOR

24    129    #150

80±5

13.5    45°

289±5

140°    37

⇐ A

TABLE 1

| DIMENSION (mm) | TOLERANCE (mm) |
|---|---|
| L≦50 | ±1.5 |
| 50<L≦100 | ±2.5 |
| 100<L≦500 | ±3 |

D-3

# FURUNO

## TABLE 1

| 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 |
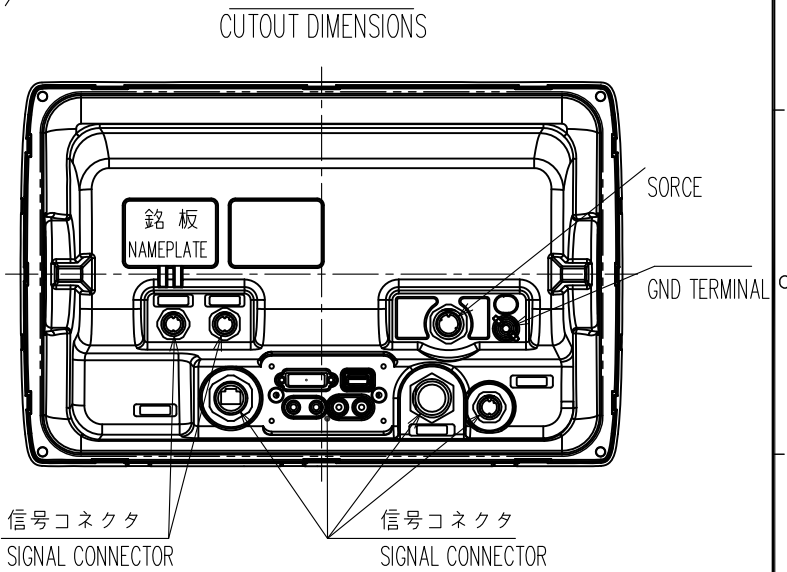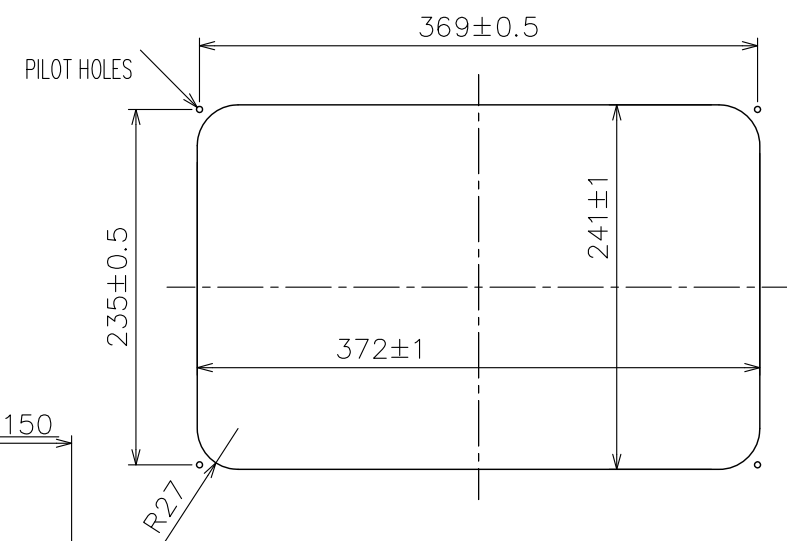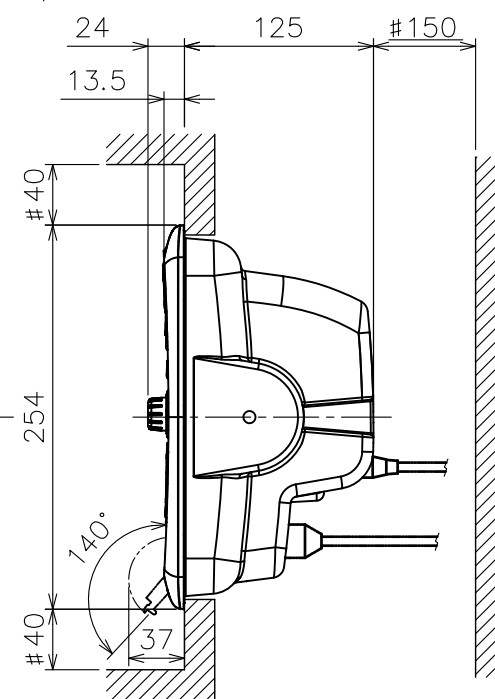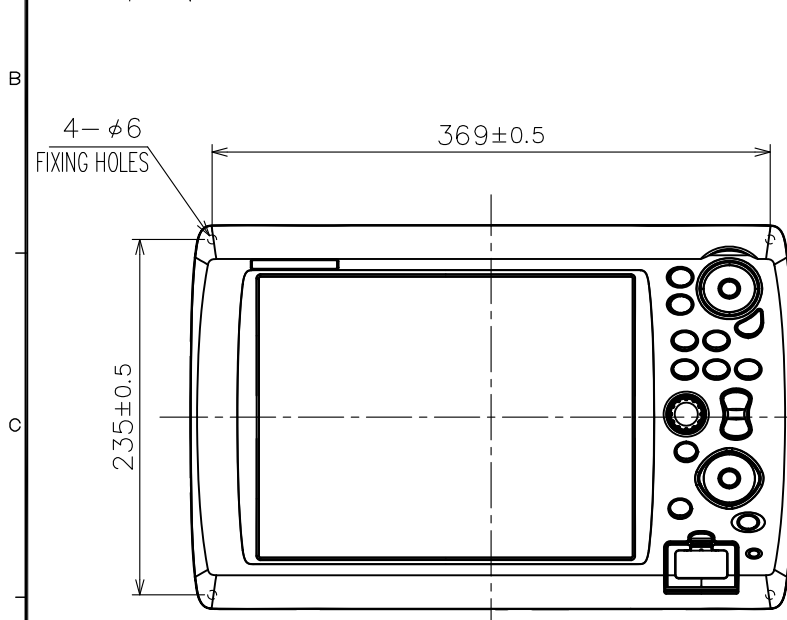
#40    398    #40

4－φ6
FIXING HOLES

369±0.5

235±0.5

`` ⁔

24    125    #150

13.5

#40

254

#40

140°

37

369±0.5

PILOT HOLES

235±0.5

241±1

372±1

R27

CUTOUT DIMENSIONS

SORCE

GND TERMINAL

銘 板
NAMEPLATE

信号コネクタ
SIGNAL CONNECTOR

信号コネクタ
SIGNAL CONNECTOR

NOTE
1.   #: MINIMUM SERVICE CLEARANCE.
2.   TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3.   USE TAPPING SCREWS ø5x20 FOR FIXING THE UNIT.

| DRAWN | Oct. 17 '07  T.YAMASAKI | | | TITLE | MFD12 |
|---|---|---|---|---|---|
| CHECKED | Oct. 18 '07  T.TAKENO | | | | |
| APPROVED | Oct. 23' 07  R. Esumi | | | | |
| SCALE | 1/5 | MASS 5.4 ±10% kg | MASS W/O CABLES | NAME | MULTI FUNCTION DISPLAY (FLUSH MOUNT) |
| DWG.No. | C4445-G02- A | REF.No. 19-028-220G-1 | | | OUTLINE DRAWING |

D-4

## FURUNO ELECTRIC CO., LTD.

1     2     3

| MODEL | FUSE (12/24V) |
|---|---|
| MFD8 | 10/5 A |
| MFD12 | 20/10 A |

MULTI FUNCTION DISPLAY   DVI_D
MFD8/12   J7

POWER_IN

MJ-A3SPF0017 (MFD8)
MJ-A3SPF0027-050ZC (MFD12)
5m

12/24VDC
100/110/
220/230VAC
1φ, 50/60Hz

DPYC-1.5 *1

*2 *4
RECTIFIER
PR-62
OR RU-3423   *1

IV-8sq.

MJ-A3SPF *3
WHT — 1 DC_INPUT+
BLK — 2 DC_INPUT-
3 SHIELD

*3 MJ-A7SPF   DATA1
1 TD1-A
2 TD1-B
3 RD1-H
4 RD1-C
5 12V_OUT_P
6 GND
7 SHIELD

GPS RECEIVER
GP-320B *2   10m

CONVERTER
IF-NMEA2K1
OR
JUNCTION BOX
FI-5002

*3 M12-05PMMP   NMEA2000
CB-05BFFM, 1/2/6m
1 SHIELD
アカ RED — 2 NET-S
クロ BLK — 3 NET-C
シロ WHT — 4 NET-H
アオ BLU — 5 NET-L

LTWDD-18AFFM, 2m   LTWDD-18P *3   DATA2
U-AIS TRANSPONDER
FA-150
RED — 1 TD2-A
RED/WHT — 2 TD2-B
BRN — 3 RD2-H
BRN/WHT — 4 RD2-C
ORG — 5 GND
HEADING SENSOR
PG-500
ORG/WHT — 6 GND
GRN — 7 TD3-A
GRN/WHT — 8 TD3-B
BLU — 9 RD3-H
BLU/WHT — 10 RD3-C
EVENT SWITCH
BUZZER
BLK — 11 GND
BLK/WHT — 12 12V_OUT_P
YEL — 13 SPEED_ALARM-A
PATLIC SYSTEM
GRY — 14 SPEED_ALARM-B
WHT — 15 BUZZ_C_EVENT_IN
PPL — 16 SHIELD
+15VDC
(FOR NMEA2000 I/F)
PNK — 17 NET-S-IN
L-GRN — 18 NET-C-IN

PLUG φ3.5   LINE_OUT
1 GND
SPEAKER
2 SIG_L
3 SIG_R
PLUG φ3.5   MIC_IN
1 GND
MICROPHONE
2 SIG_MIC
3 GND
A TYPE   USB
USB DEVICE
(MOUSE/KB/HD/HUB)
1 USB_VBUS
2 USB_D_N
3 USB_D_P
4 GND
NTSC/PAL
J11
VIDEO EQUIPMENT
(CCD CAMERA, ETC.)
1 SIGNAL_1
2 GND
J10
1 SIGNAL_2
2 GND

DVI-D/D S-LINK
5/10m, φ7
TMDS_DATA2_N — 1
TMDS_DATA2_P — 2
TMDS_DATA2_4_SHIELD — 3
NC — 4
NC — 5
NC — 6
NC — 7
NC — 8
TMDS_DATA1_N — 9
TMDS_DATA1_P — 10
TMDS_DATA1_3_SHIELD — 11
NC — 12
NC — 13
5V_OUT+ — 14
GND — 15
HOT_PLUG_DETECT — 16
TMDS_DATA0_N — 17
TMDS_DATA0_P — 18
TMDS_DATA0_5_SHIELD — 19
NC — 20
NC — 21
TDMS_CLOCK_SHIELD — 22
TDMS_CLOCK_P — 23
TDMS_CLOCK_N — 24

EXTERNAL MONITOR *2
MU-120C/155C/170C/201C

MOD-WPAS0001, 3m *2   RJ45
(STRAIGHT)
JOINT BOX
TL-CAT-012 *2

MOD-Z072, 2/5/10m *2   RJ45
φ6 (CROSS)
HUB-101 *2
DRS12A/25A
(PSU-012/013)

NETWORK   *3
J5   RJ45
E_TD_P — 1
E_TD_N — 2
E_RD_P — 3
SW_P — 4
SW_N — 5
E_RD_N — 6
PWR_SW_P — 7
PWR_SW_N — 8

MOD-ASW0001, φ6 *3
10/15/20/30m   RJ45
P
X
P

NETWORK
1 E_TD_P
2 E_TD_N
3 E_RD_P
4 NC
5 NC
6 E_RD_N
7 PWR_SW_P
8 PWR_SW_N

RADAR SENSOR
DRS2D/4D
DRS4A/6A
(RSB-118)

DRS
J2   MJ-A3SPF *3
48V_OUT — 1 — WHT
GND — 2 — BLK
SHIELD — 3

*4
1 48V
2 GND

IV-8sq. *1

## NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: CONNECTOR PLUG FITTED AT FACTORY.
*4: USE RECTIFIER RU-3423 TO CONNECT A RADAR SENSOR.

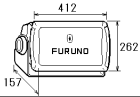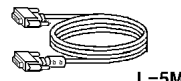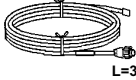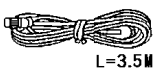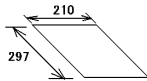| DRAWN | Jan. 24 '08 | T. YAMASAKI | | TITLE | MFD8/12 |
|---|---|---|---|---|---|
| CHECKED | Jan. 24 '08 | T. TAKENO | | | |
| APPROVED | Feb. 20 '08 | R. Esumi | | | |
| SCALE | MASS | kg | | NAME | MULTI-FUNCTION DISPLAY |
| DWG No. | C4444-C01- B | REF. No. | 19-028-5002-2 | | INTERCONNECTION DIAGRAM |

# FURUNO ELECTRIC CO., LTD.

# PACKING LIST

## DCU12

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| **UNIT** | | | |
| DISPLAY CONTROL UNIT | 412 / 262 / 157 | DCU12 / 000-011-671-00 | 1 |
| **SPARE PARTS** | | | |
| SPARE PARTS | | SP19-00601 / 001-023-040-00 | 1 |
| **ACCESSORIES** | | | |
| ACCESSORIES | | FP19-01101 / 001-023-060-00 | 1 |
| **INSTALLATION MATERIALS** | | **CP19-00800** | |
| CABLE ASSY. | L=5M | DVI-D/D SINGLELINK 5M / 000-149-054-00 | 1 |
| LAN CABLE ASSEMBLY | L=3M | MOD-WPAS0001-030+ / 000-164-609-10 | 1 |
| CABLE ASSY. | L=3.5M | MJ-A3SPF0013-035C(5A) / 000-157-939-10 | 1 |
| SPARE PARTS | | CP19-00801 / 001-023-050-00 | 1 |
| **DOCUMENT** | | | |
| FLUSH MOUNTING TEMPLATE  JP/EN | 210 / 297 | C42-00704-* ワ/エイ / 000-167-224-1* | 1 |
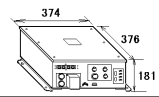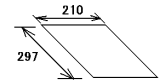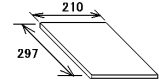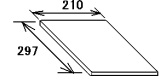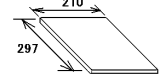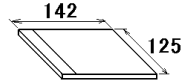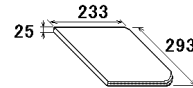
19AY-X-9852

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# PACKING LIST

## MPU-001-E/J

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| **UNIT** | | | |
| PROCESSOR UNIT | 374 / 376 / 181 | MPU-001-E/J / 000-011-919-00  ** | 1 |
| **SPARE PARTS** | | | |
| SPARE PARTS | | SP19-00501 / 001-023-090-00 | 1 |
| **INSTALLATION MATERIALS** | | **CP19-00600** | |
| CABLE ASSEMBLY | L=2M | FRUDD-18AFFM-L180 / 000-164-608-10 | 1 |
| INSTALLATION MATERIALS | | CP19-00601 / 001-023-100-00 | 1 |
| **DOCUMENT** | | | |
| NOTICE FOR FUSE REPLACEMENT | 210 / 297 | C42-00705-* / 000-167-240-1* | 1 |
| OPERATOR'S MANUAL | 210 / 297 | OM*-44461-* / 000-167-235-1*  ** | 1 |
| OPERATOR`S GUIDE(MLG) | 210 / 297 | OSJ/MLG-44460-* / 000-167-220-1*  ** | 1 |
| INSTALLATION MANUAL | 210 / 297 | IM*-44460-* / 000-167-222-1*  ** | 1 |
| OPERATOR'S MANUAL CD | 142 / 125 | NAVNET3 O/M *CD-ROM* / 000-167-721-1* | 1 |
| DOCUMENTS CASE | 233 / 25 / 293 | H293XW230XT18 / 000-168-580-10 | 1 |

CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

A PART OF THE DOCUMENTS IS PUT IN THE DOCUMENTS CASE.

19AY-X-9853

# FURUNO

| CODE NO. | 001-023-100-00 | 19AY-X-9401 -1 |
|---|---|---|
| TYPE | CP19-00601 | 1/1 |

MPU-001

**INSTALLATION MATERIALS**

| NO. | NAME | OUTLINE | DESCRIPTIONS | | Q'TY | REMARKS |
|---|---|---|---|---|---|---|
| 1 | +トラスタッピンネジ 1シュ<br>SELF-TAPPING SCREW | 30 φ6 | 6X30 SUS304 | | 4 | |
| | | | CODE<br>NO. | 000-162-614-10 | | |
| 2 | コンベックス<br>CABLE TIE | 100 | CV-100N | | 4 | |
| | | | CODE<br>NO. | 000-162-167-10 | | |

**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.**
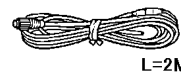**(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)**
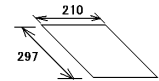
**FURUNO ELECTRIC CO ., LTD.**          19AY-X-9401

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# PACKING LIST

19AY-X-9851 -2    1/1

MCU-001
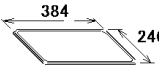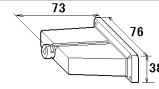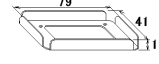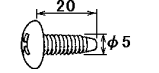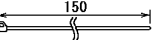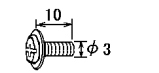
| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---|---|---|
| **UNIT** | | | |
| CONTROL UNIT | 307 77 106 | MCU-001<br>000-011-666-00 | 1 |
| **ACCESSORIES** | | | |
| ACCESSORIES | | FP19-01201<br>001-033-760-00 | 1 |
| **INSTALLATION MATERIALS** | | **CP19-00700** | |
| CABLE ASSY. | L=5M | MOD-Z072-050+<br>000-167-176-10 | 1 |
| INSTALLATION MATERIALS | | CP19-00701<br>001-023-070-00 | 1 |
| **DOCUMENT** | | | |
| FLUSH MOUNTING TEMPLATE JP/EN | 210 297 | C42-00703-* ワエイ<br>000-167-223-1* | 1 |

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.
(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)          19AY-X-9851

**FURUNO**

| CODE NO. | 001-023-050-00 | 19AY-X-9403 -1 |
|---|---|---|
| TYPE | CP19-00801 | 1/1 |

INSTALLATION MATERIALS — DCU12

| NO. | NAME | OUTLINE | DESCRIPTIONS | Q'TY | REMARKS |
|---|---|---|---|---|---|
| 1 | MOUNTING SPONGE | 384 / 246 | 19-028-2062-0 / CODE NO. 100-340-040-10 | 1 | |
| 2 | DVI COVER | 73 / 76 / 38 | 19-028-2131-1 / CODE NO. 100-340-111-10 | 1 | |
| 3 | COVER FIXING PLATE | 79 / 41 / 10 | 19-028-2132-1 / CODE NO. 100-340-121-10 | 1 | |
| 4 | SELF-TAPPING SCREW | 20 / $\phi 5$ | 5X20 SUS304 / CODE NO. 000-162-608-10 | 4 | |
| 5 | CONVEX | 150 | CV-150B / CODE NO. 000-167-183-10 | 1 | |
| 6 | BINDING HEAD SCREW | 10 / $\phi 3$ | M3X10 SUS304 / CODE NO. 000-162-662-10 | 4 | |

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.
  (DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO ., LTD.     19AY-X-9403

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**FURUNO**
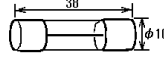
| CODE NO. | 001-023-070-00 | 19AY-X-9402 -1 |
|---|---|---|
| TYPE | CP19-00701 | 1/1 |

INSTALLATION MATERIALS — MCU-001

| NO. | NAME | OUTLINE | DESCRIPTIONS | Q'TY | REMARKS |
|---|---|---|---|---|---|
| 1 | MOUNTING SPONGE | 279 / 94 | 19-028-1581-2 / CODE NO. 100-340-742-10 | 1 | |
| 2 | SELF-TAPPING SCREW | 20 / $\phi 4$ | 4X20 SUS304 / CODE NO. 000-158-850-10 | 4 | |

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.
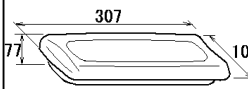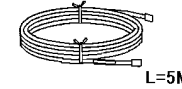  (DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO ., LTD.     19AY-X-9402

## FURUNO

| CODE NO. | 001-023-090-00 | 19AY-X-9302 -0 1/1 |
|---|---|---|
| TYPE | SP19-00501 | BOX NO. P |

| SHIP NO. | SPARE PARTS LIST FOR | U S E | SETS PER VESSEL |
|---|---|---|---|
| | MPU-001 | | |

| ITEM NO. | NAME OF PART | OUTLINE | DWG. NO. OR TYPE NO. | QUANTITY WORKING PER SET | PER VES | SPARE | REMARKS/CODE NO. |
|---|---|---|---|---|---|---|---|
| 1 | FUSE | 30 φ10 | FGB01 250V 10A PBF | | | 4 | 000-155-787-10 |
| 2 | FUSE | 30 φ10 | FGB01 250V 20A | | | 4 | 000-155-775-10 |
| | | | | | | | |
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| MFR'S NAME | FURUNO ELECTRIC CO.,LTD. | DWG NO. | 19AY-X-9302 | 1/1 |
|---|---|---|---|---|
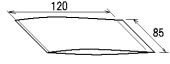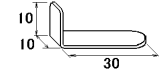
(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

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.

## FURUNO
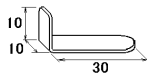
| CODE NO. | 001-023-060-00 | 19AY-X-9501 -1 |
|---|---|---|
| TYPE | FP19-01101 | 1/1 |

| ACCESSORIES | MCU-001/DCU12 | | | | |
|---|---|---|---|---|---|
| NO. | NAME | OUTLINE | DESCRIPTIONS | Q'TY | REMARKS |
| 1 | LCD CLEANING CLOTH | 120 85 | 02-155-1082-1 / CODE NO. 100-332-651-10 | 1 | |
| 2 | PANEL REMOVER | 10 10 30 | 19-028-3124-1 / CODE NO. 100-340-471-10 | 1 | |

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.
(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO ., LTD.          19AY-X-9501

**FURUNO**

| CODE NO. | 001-033-760-00 | 19AY-X-9502 -0 |
|---|---|---|
| TYPE | FP19-01201 | 1/1 |

MCU-001

ACCESSORIES

| NO. | NAME | OUTLINE | DESCRIPTIONS | Q'TY | REMARKS |
|---|---|---|---|---|---|
| 1 | パネルリムーバー<br>PANEL REMOVER | 10<br>10<br>30 | 19-028-3124-1<br>CODE NO. 100-340-471-10 | 1 | |
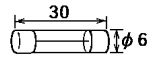
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM.   THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER
PRODUCT. QUALITY IS THE SAME.
　(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

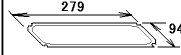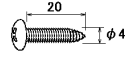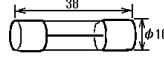FURUNO ELECTRIC CO ., LTD.　　　　19AY-X-9502

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**FURUNO**

| CODE NO. | 001-023-040-00 | 19AY-X-9301 -0 1/1 |
|---|---|---|
| TYPE | SP19-00601 | BOX NO.    P |

| SHIP NO. | SPARE PARTS LIST FOR | U S E | SETS PER VESSEL |
|---|---|---|---|
| | DCU12 | | |

| ITEM NO. | NAME OF PART | OUTLINE | DWG. NO. OR TYPE NO. | WORKING PER SET | WORKING PER VES | SPARE | REMARKS/CODE NO. |
|---|---|---|---|---|---|---|---|
| 1 | ヒューズ<br>FUSE GLASS TUBE TYPE | 30 $\phi$6 | FGBO-A 125V 5A PBF | | | 2 | 000-155-853-10 |
| | | | | | | | |
| | | | | | | | |
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| MFR'S NAME | FURUNO ELECTRIC CO.,LTD. | DWG NO. | 19AY-X-9301 | 1/1 |
|---|---|---|---|---|

(DIMENSIONS IN DRAWING  FOR REFERENCE ONLY.)

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.

# FURUNO

| TABLE 1 | |
|---|---|
| (mm) DIMENSION | (mm) TOLERANCE |
| L ≤ 50 | ±1.5 |
| 50 < L ≤ 100 | ±2.5 |
| 100 < L ≤ 500 | ±3 |

184
181

ファン
FAN

430
400±0.5
15

FIXING HOLES
R3.5
R8

48

NAMEPLATE

411
280±0.5

FURUNO

2−φ8
FIXING HOLES

CABLE CLAMP

#100
374
#100

SIGNAL CONNECTOR
POWER LAMP

FUSE

POWER OUT TO ANTENNA UNIT

POWER TERMINAL

SIGNAL CONNECTOR

GND TERMINAL

SIGNAL CONNECTOR

#30
376
AIR INLET

#200
CABLE ENTRY
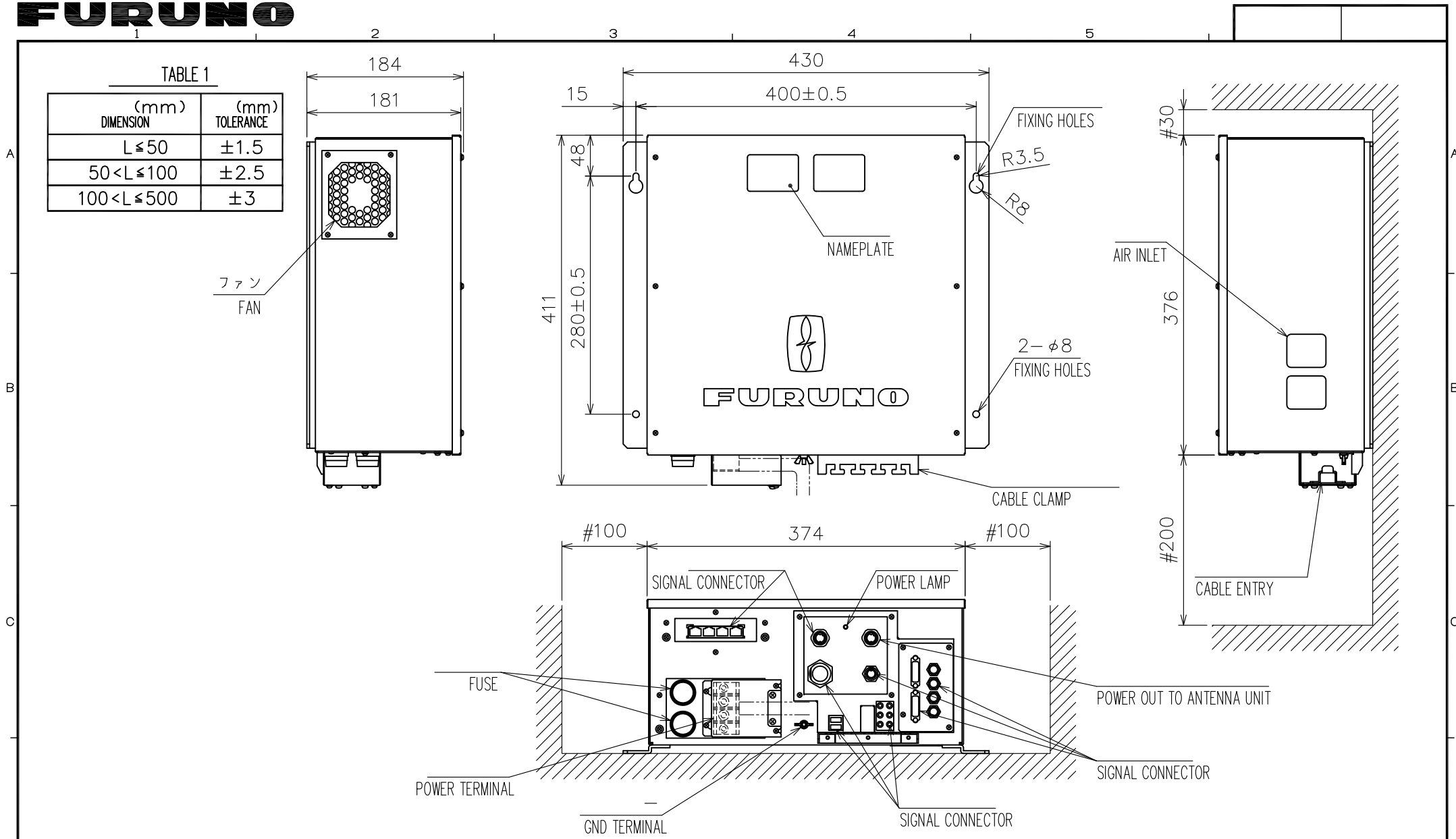
NOTE

1. #: MINIMUM SERVICE CLEARANCE.

2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

3. USE TAPPING SCREWS φ6x30 FOR FIXING THE UNIT.

| DRAWN | Jun. 19 '07  T.YAMASAKI | | | TITLE | MPU-001 |
|---|---|---|---|---|---|
| CHECKED | Jun. 19 '07  T.TAKENO | | | | |
| APPROVED | Jun. 27' 07  R.Esumi | MFDBB | | | |
| SCALE | 1/6 | MASS 15 ±10% kg | | NAME | PROCESSOR UNIT |
| DWG.No. | C4446-G01-A | REF.No. 19-028-100G-2 | | | OUTLINE DRAWING |

D-1

FURUNO ELECTRIC CO., LTD.

# FURUNO

## TABLE 1

| (mm) DIMENSION | (mm) TOLERANCE |
|---|---|
| L ≤ 50 | ±1.5 |
| 50 < L ≤ 100 | ±2.5 |
| 100 < L ≤ 500 | ±3 |

PILOT HOLES

R27

87±1

83±0.5

272±1

268±0.5

CUTOUT DIMENSIONS

293

83±0.5

268±0.5

4−φ5
FIXING HOLES

24.5

13

#40

100

#40

(36)

49

#50

SIGNAL CONNECTOR          GND TERMINAL     NAMEPLATE
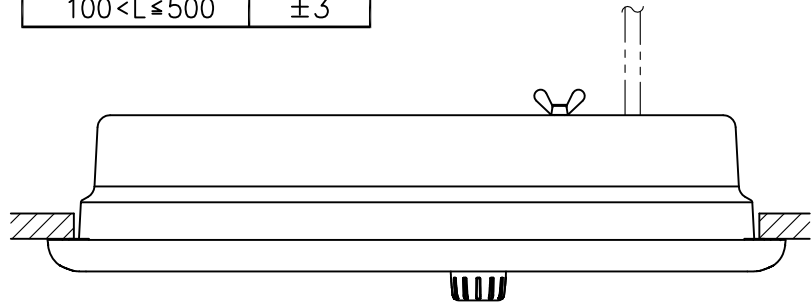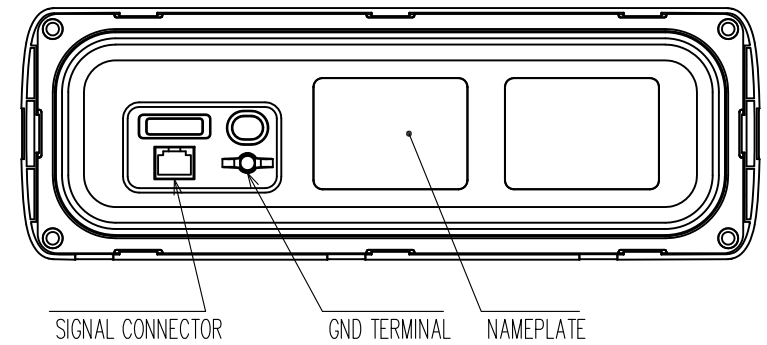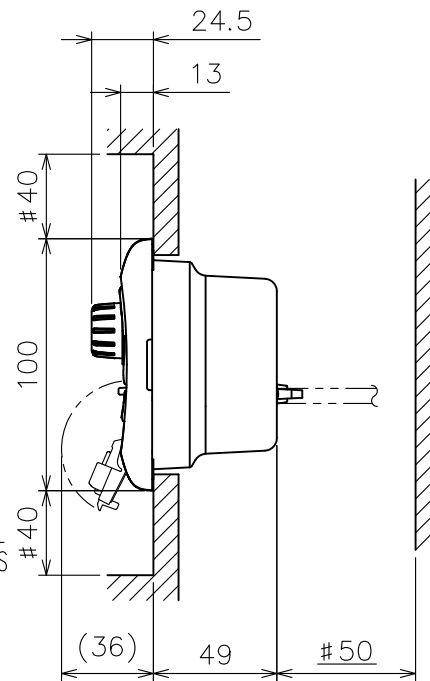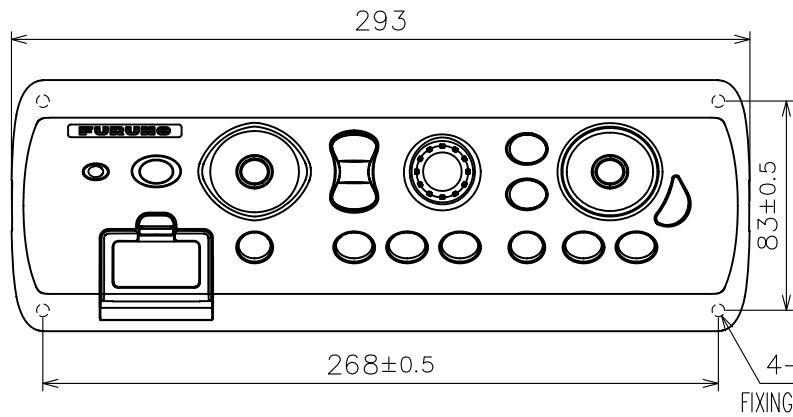
## NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS ø4x20 FOR FIXING THE UNIT.

| DRAWN | Jun. 19 '07 T.YAMASAKI | | | TITLE | MCU-001 |
|---|---|---|---|---|---|
| CHECKED | Jun. 19 '07 T.TAKENO | | | | |
| APPROVED | Jun. 27' 07 R. Esumi | MFDBB | | | |
| SCALE 1/3 | MASS 1.0 ±10% kg | | | NAME | CONTROL UNIT |
| DWG.No. C4446-G02-A | REF.No. 19-028-150G-1 | | | | OUTLINE DRAWING |
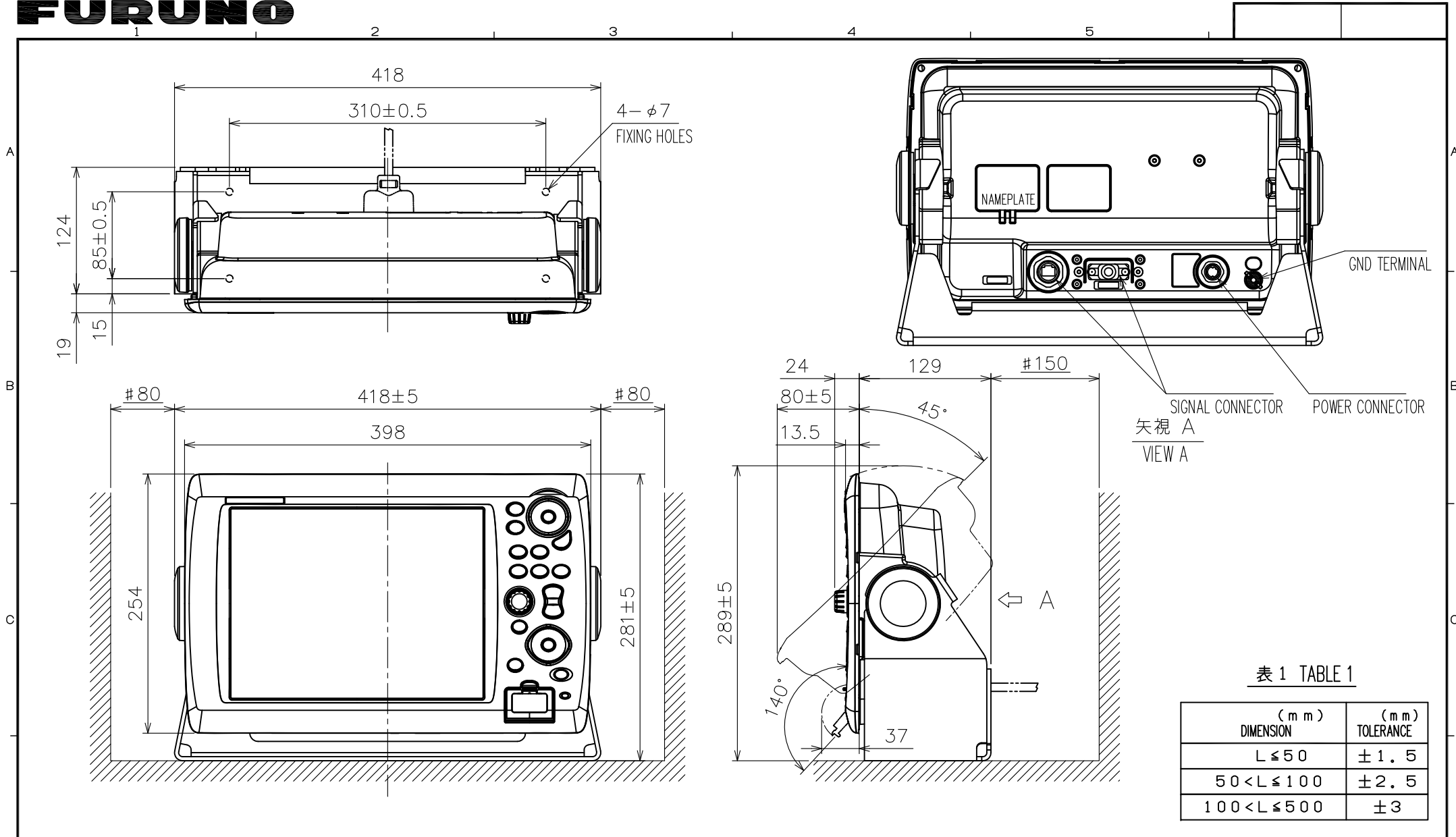
## FURUNO ELECTRIC CO., LTD.

# FURUNO

418

310±0.5

4－φ7
FIXING HOLES

124

85±0.5

19

15

NAMEPLATE

GND TERMINAL

#80

418±5

#80

398

254

281±5

24

129

#150

80±5

45°

13.5

矢視 A
VIEW A

SIGNAL CONNECTOR

POWER CONNECTOR

289±5

140°

⇐ A

37

表1 TABLE 1

| DIMENSION (mm) | TOLERANCE (mm) |
|---|---|
| L≦50 | ±1.5 |
| 50<L≦100 | ±2.5 |
| 100<L≦500 | ±3 |

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS φ5x20 FOR FIXING THE UNIT.

# FURUNO

TABLE 1

| DIMENSION (mm) | TOLERANCE (mm) |
|---|---|
| L≦50 | ±1.5 |
| 50<L≦100 | ±2.5 |
| 100<L≦500 | ±3 |

369±0.5

PILOT HOLES

235±0.5

241±1

372±1

R27

CUTOUT DIMENSIONS

4－φ6
FIXING HOLES

398

369±0.5

235±0.5

24   85   #150

13.5

254

130°

37

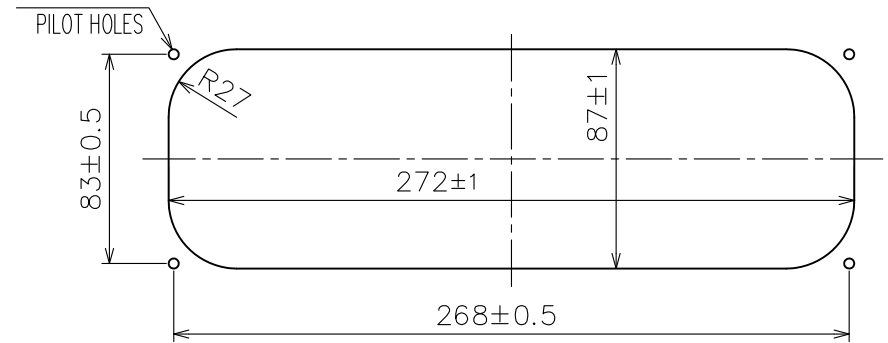#40

銘板
NAMEPLATE

GND TERMINAL

POWER CONNECTOR

SIGNAL CONNECTOR

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS ø5x20 FOR FIXING THE UNIT.

| DRAWN | Oct. 17 '07 T.YAMASAKI | | | TITLE | DCU12 |
|---|---|---|---|---|---|
| CHECKED | Oct. 18 '07 T.TAKENO | | | | |
| APPROVED | Oct. 22 '07 R.Esumi | MFDBB | | | |
| SCALE | 1/5 | MASS 4.2 kg | ±10% | NAME | DISPLAY CONTROL UNIT (FLUSH MOUNT) |
| DWG.No. | C4446-G04- B | REF.No. 19-028-210G-2 | | | OUTLINE DRAWING |

D-4

FURUNO ELECTRIC CO., LTD.

# FURUNO

S-1

PROCESSOR UNIT
POWER MPU-001

DVI1 J14

100/110/220/230VAC 1φ, 50/60Hz *1 DPYC-2.5
RECTIFIER RU-1746B-2 (+) 5 (−) 6
12-24VDC *1 DPYC-6
IV-8sq. *1

TB1 1 (+) 2 (−)

ANALOG_RED_VIDEO_OUT C1
ANALOG_GREEN_VIDEO_OUT C2
ANALOG_BLUE_VIDEO_OUT C3
ANALOG_H_SYNC C4
ANALOG_GND C5
TMDS_DATA2_N 1
TMDS_DATA2_P 2
TMDS_DATA2_4_SHIELD 3
TMDS_DATA4_N 4
TMDS_DATA4_P 5
DDC_CLOCK 6
DDC_DATA 7
ANALOG_V_SYNC 8
TMDS_DATA1_N 9
TMDS_DATA1_P 10
TMDS_DATA1_3_SHIELD 11
TMDS_DATA3_N 12
TMDS_DATA3_P 13
5V_OUT+ 14
GND 15
HOT_PLUG_DETECT 16
TMDS_DATA0_N 17
TMDS_DATA0_P 18
TMDS_DATA0_5_SHIELD 19
TMDS_DATA5_N 20
TMDS_DATA5_P 21
TDMS_CLOCK_SHIELD 22
TDMS_CLOCK_P 23
TDMS_CLOCK_N 24

GPS RECEIVER GP-320B *2
10m MJ-A7SPF DATA1
1 TD1-A
2 TD1-B
3 RD1-H
4 RD1-C
5 12V_OUT_P
6 GND
7 SHIELD

CONVERTER IF-NMEA2K1 OR JUNCTION BOX FI-5002
CB-05BFFM, 1/2/6m M12-05PMMP NMEA2000
SHIELD 1
RED NET-S 2
クロ BLK NET-C 3
WHT NET-H 4
BLU NET-L 5

U-AIS TRANSPONDER FA-150
LTWDD-18AFFM, 2m LTWDD-18P DATA2
RED 1 TD2-A
RED/WHT 2 TD2-B
BRN 3 RD2-H
BRN/WHT 4 RD2-C
ORG 5 GND
HEADING SENSOR PG-500
ORG/WHT 6 GND
GRN 7 TD3-A
GRN/WHT 8 TD3-B
BLU 9 RD3-H
BLU/WHT 10 RD3-C
EVENT SWITCH BUZZER
BLK 11 12V_OUT_P
BLK/WHT 12 12V_OUT_P
YEL 13 SPEED_ALARM-A
PATLIC SYSTEM
GRY 14 SPEED_ALARM-B
WHT 15 BUZZ_C_EVENT_IN
PPL 16 SHIELD
+15VDC (FOR NMEA2000 I/F)
PNK 17 NET-S-IN
L-GRN 18 NET-C-IN

PLUG φ3.5 LINE OUT
1 GND
SPEAKER 2 SIG_L
3 SIG_R

PLUG φ3.5 MIC IN
1 GND
MICROPHONE 2 SIG_MIC
3 GND

USB DEVICE (MOUSE/KB/HD/HUB)
A TYPE USB1
1 USB_VBUS
2 USB_D_N
3 USB_D_P
4 GND

A TYPE USB2
1 USB_VBUS
2 USB_D_N
3 USB_D_P
4 GND

VIDEO EQUIPMENT
COAX. CABLE (50Ω) BNC VIDEO1
1 V_SIG
2 GND
BNC VIDEO2
1 V_SIG
2 GND
BNC VIDEO3
1 V_SIG
2 GND
BNC VIDEO4
1 V_SIG
2 GND

DVI2 J15
SAME AS J14

NETWORK1 J5 RJ45
1 E_TD_P
2 E_TD_N
3 E_RD_P
4 SW_P
5 SW_N
6 E_RD_N
7 PWR_SW_P
8 PWR_SW_N

NETWORK2 J6 RJ45

NETWORK3 *4 J7 RJ45

NETWORK4 *4 J8 RJ45

POWER OUT MJ-A3SPF
48V_OUT_P 1
GND 2
SHIELD 3

EXTERNAL MONITOR *2 MU-120C/155C/170C/201C
DVI-D/D S-LINK, 5/10m, φ7

PROCESSOR UNIT MPU-001
DVI1 J14
C1, C2
1 ... 24
DVI-D/D S-LINK, 5/10m, φ7

NETWORK1/2 J5/J6 RJ45
MOD-Z072, 2/5/10m, φ6
1 E_TD_P
2 E_TD_N
3 E_RD_P
4 SW_P
5 SW_N
6 E_RD_N
7 PWR_SW_P
8 PWR_SW_N

DISPLAY CONTROL UNIT DCU12 *3
DVI J4
1 ... 24
NETWORK J5
1 E_TD_P
2 E_TD_N
3 E_RD_P
4 SW_P
5 SW_N
6 E_RD_N
7 PWR_SW_P
8 PWR_SW_N

POWER J3
WHT 1 (+)
BLK 2 (−)
3 SHIELD
12-24VDC MJ-A3SPF0013-035C 3.5m, φ6 5A MJ-A3SPF
IV-1.25sq. *1

EXTERNAL MONITOR *2 MU-120C/155C/170C/201C
NETWORK J801
CONTROL UNIT MCU-001 *3
1 E_TD_P
2 E_TD_N
3 E_RD_P
4 NC
5 NC
6 E_RD_N
7 PWR_SW_P
8 PWR_SW_N
IV-1.25sq. *1

DITTO

MOD-WPAS0001, 3m RJ45 JUNCTION BOX TL-CAT-012 RJ45 NAVNET3 EQUIPMENT OR FA-30/50, ETC.

MOD-ASW0001, *2 10/15/20/30m, φ6 RJ45
1 E_TD_P
2 E_TD_N
3 E_RD_P
6 E_RD_N
8 NC
RADAR SENSOR DRS2D/4D *2 DRS4A/6A (RSB-118)

WHT 1 48V
BLK 2 GND

HUB-101 OR DFF1, ETC.

RADAR SENSOR DRS25A (12A)
POWER SUPPLY UNIT PSU-013 (012)
J2 RJ45
1 E_TD_P
2 E_TD_N
3 E_RD_P
6 E_RD_N
8 NC
MOD-ASW0002, 10/15/20/30m
ANTENNA UNIT RSB-118 J207
1 E_TD_N
3 E_RD_N
8 NC

J1 VL3P-VVS2x2C, 5m
WHT 1 (+)
2
BLK 3 (−)
12-24VDC
J4 48V_OUT_P 1 48V
GND 2 GND
TX_HV_COLD 3
J5 TX_HV_HOT 1 TX_HV_HOT
NC 2
IV-2sq. *1
J301 1 48V
2 GND
J305 3 GND
1 TX_HV_HOT
RW-4747, 0.3m *1

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: SELECTABLE STANDARD.
*4: NETWORK 3/4 ARE USED EQUIVALENTLY.

| DRAWN Jan. 24 '08 T. YAMASAKI | TITLE MFDBB |
| CHECKED Jan. 24 '08 T. TAKENO | |
| APPROVED Feb. 20 '08 R. Esumi | |
| SCALE | MASS kg | NAME MULTI-FUNCTION DISPLAY |
| DWG No. C4446-C01-B | REF. No. 19-028-7003-2 | INTERCONNECTION DIAGRAM |

FURUNO ELECTRIC CO., LTD.

# FURUNO

# INSTALLATION GUIDE
# ETHERNET HUB     HUB-101

## ⚠ WARNING

**Do not open the shield cover unless totally familiar with electrical circuits.**

Only qualified personnel should work inside the equipment.

---

**Do not install the unit where it may get wet from rain or water splash.**

Water in the unit can result in fire, electrical shock or damage the equipment.

---

**Use only the specific power cable.**

Fire or damage to the equipment can result if a different cable is used.

---

**Do not disassemble or modify the equipment.**

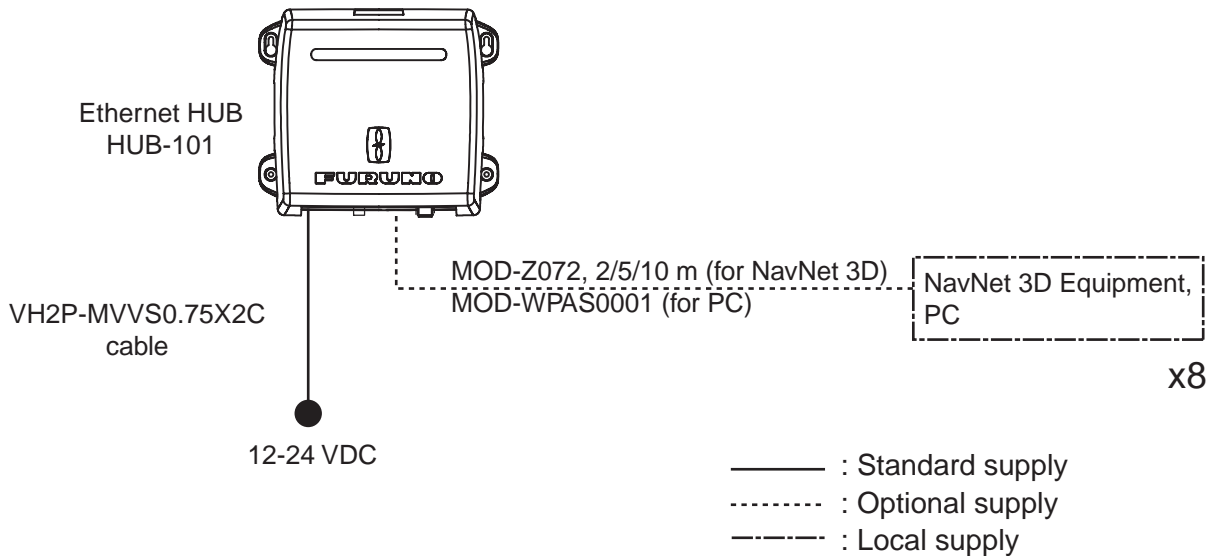Fire, electrical shock or sirious injury can result.

## ⚠ CAUTION

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

|  | standard compass | steering compass |
|---|---|---|
| HUB-101 | 0.80 m | 0.50 m |

## NAVnet 3D

# System Configurations

The HUB-101 Ethernet HUB uses an Ethernet interface (100BASE-TX/10BASE-T) to provide the network communication among the NavNet 3D equipments, and PC. Eight ports are provided on this HUB. Three HUB-101 can be installed in a LAN series.



Ethernet HUB
HUB-101

VH2P-MVVS0.75X2C
cable

MOD-Z072, 2/5/10 m (for NavNet 3D)
MOD-WPAS0001 (for PC)

NavNet 3D Equipment,
PC

x8

12-24 VDC

———— : Standard supply
-------- : Optional supply
—·—·— : Local supply

# Specifications ETHERNET HUB HUB-101

| Transmission speed | Half-duplex/Full-duplex: 10 Mbps/100 Mbps | |
|---|---|---|
| I/O Ports | 8 ports | |
| Environmental conditions | Ambient temperature | -15 to 55 °C |
| | Relative humidity | 93% (at 40 °C) |
| | EMC | IEC 60945 Ed.4 |
| | Dustproofing, waterproofing | IP20 (IEC 60529) |
| Power supply | 12-24 VDC/0.5-0.25 A | |
| Body color | N2.5 | |

# Equipment List

| Name | Type | Code No. | Qty | Remarks |
|---|---|---|---|---|
| Ethernet HUB | HUB-101 | - | 1 | |
| Installation materials | MOD-Z072-050+ | 000-167-176-10 | 1 | LAN cable (for connection with NavNet 3D equipment) |
| | VH2P-MVVS0.75X2C | 000-167--944-10 | 1 | Power cable assy |
| | CP19-01101 | 001-027-250 | 1 set | Self-tapping screws (Type: 3x20, Code No.: 000-167-940-10) |
| Spare parts | SP19-00901 | 001-027-240 | 1 set | 1.5A Fuses (2 pcs, Type: FGMB 125V 1.5A PBF, Code No.: 000-157-464-10) |

# Installation

## Mounting considerations

The HUB-101 can be mounted on a desktop or a bulkhead. When choosing a mounting location for desktop or bulkhead mounting, keep in mind the following points:

• Locate the unit well away from areas subject to water splash and rain.

• Keep the unit out of direct sunlight because of heat that can build up inside the cabinet.

## Mounting

Fix the unit to the mounting location with four self-tapping screws (3x20), referring to the outline drawing in this manual.

# Wiring

## Connecting the cable assy (power)

1. Detach the body cover by hands.
2. Loosen four pan head screws (M3x8) and slide the shield cover upward to remove it.
3. Unfasten two pan head screws (M4x12) to remove the cable clamp.
4. Connect the cable assy VH2P-MVVS0.75X2C (supplied) to the power jack in the HUB-101.

Body cover

Shield cover

Pan head screw
(M4x12, 2 pcs.)

Cable clamp

Power jack

Pan head screw
(M3x8, 4 pcs.)
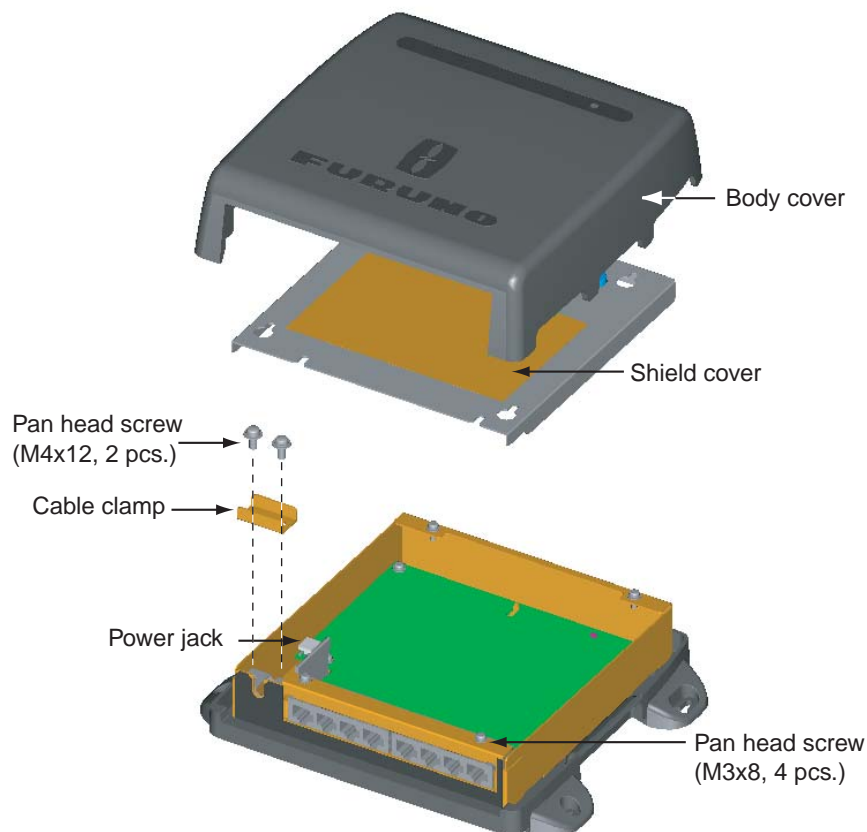
5. Remount the cable clamp, shield cover and body cover in that order.

## Interconnection

To connect the NavNet 3D equipments, use the NavNet 3D optional cables shown below depending on the unit connected.

| Connected unit | Type | Code No. | Cable length |
|---|---|---|---|
| NavNet 3D equipment | MOD-Z072-020+ | 000-167-175-10 | 2 m |
| | MOD-Z072-050+ | 000-167-176-10 | 5 m |
| | MOD-Z072-100+ | 000-167-177-10 | 10m |
| PC | MOD-WPAS0001-030+ | 000-164-609-10 | 3m |
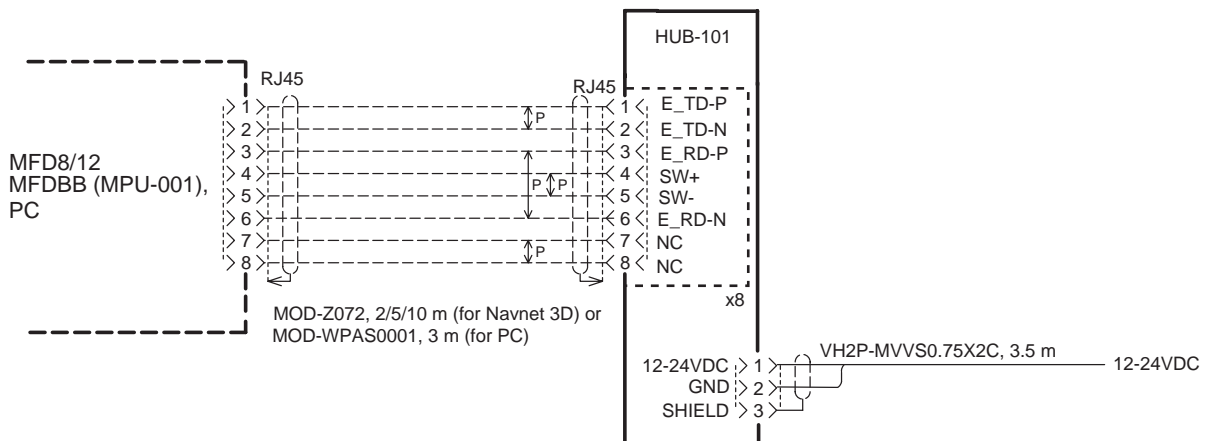


## DIP switch setting

When multiple MFD8/12/-BBs are connected to the HUB-101 by using MOD-Z072 cables, you can power all of them by turning on one. The number of DIP switch shows the port number, and turn on ALL DIP switches used for the ports.
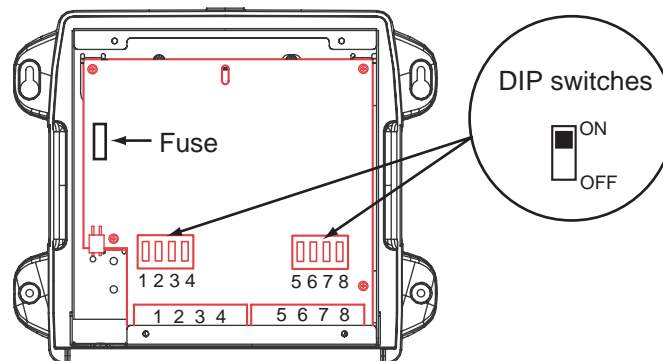


**Note:** When connecting with PC(s),  use the MOD-WPAS0001-030+ cable and set the applicable DIP switch(es) to OFF.

# Turning Power on, LED function

No operation is required for the user. Simply turn on the HUB-101's DC power source to power it.

## LED display

There are LEDs to monitor power and LAN communication on the unit. The LEDs light, blink or go off according to equipment status as the table shown below. The LEDs show link, mode (full-duplex or half-duplex) and collision statuses. When the equipment is powered, LEDs light as following;
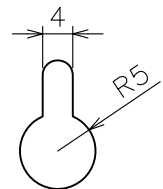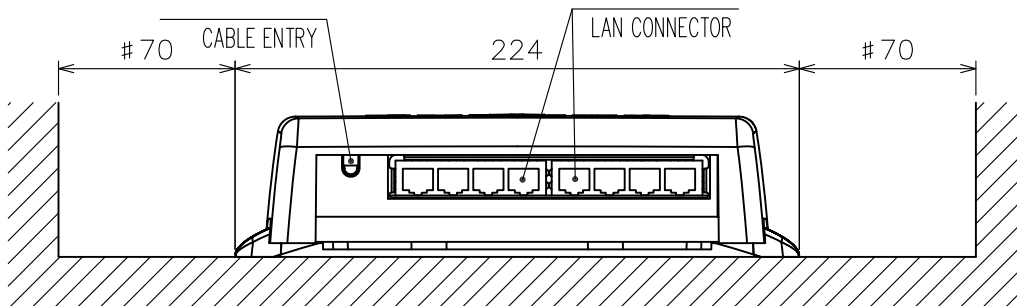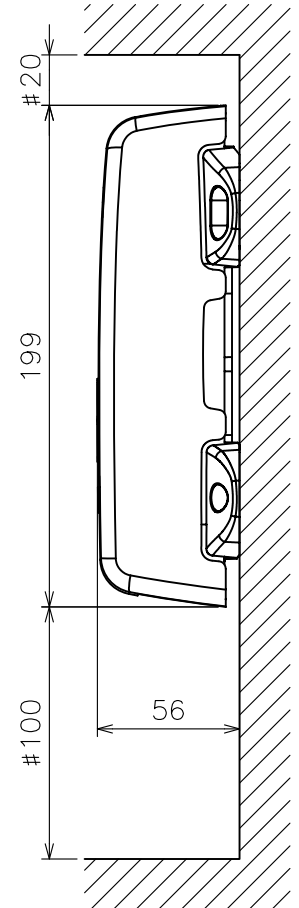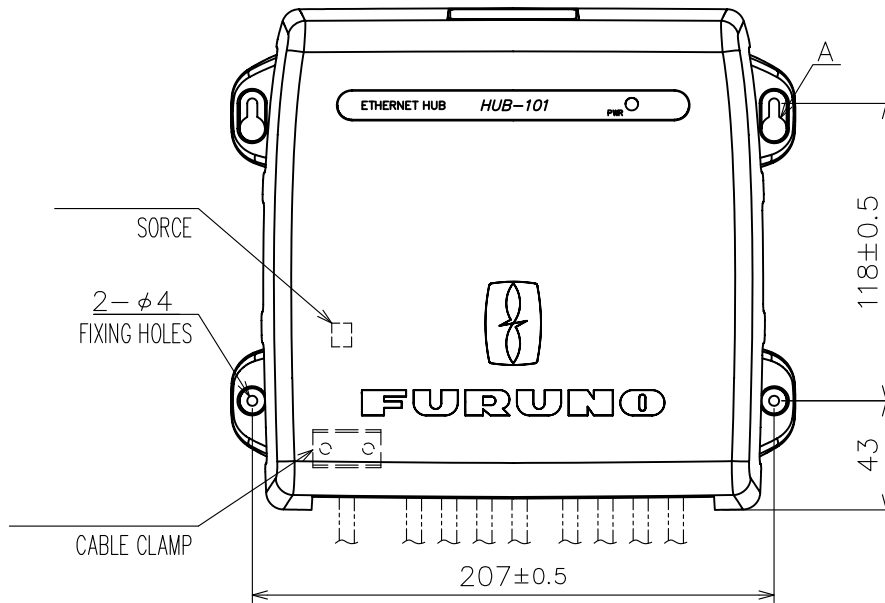
**Power on sequence**

• Power LED: ON

• LAN LEDs: Blink once, then go off.
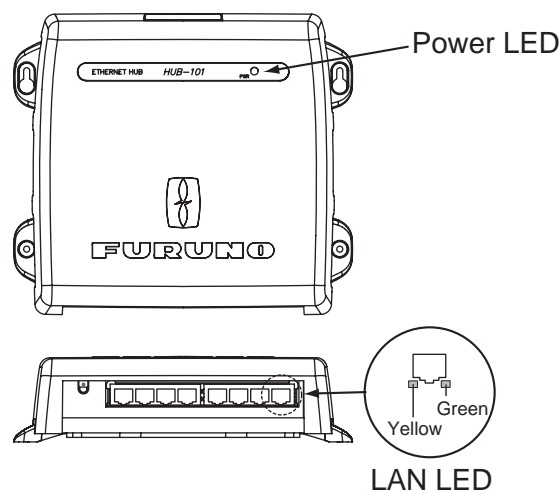


| LED | Status | Meaning |
|---|---|---|
| Power | On<br>Off | Equipment powered<br>Equipment off |
| LAN LED (yellow) | On<br>Off<br>Blinking | Full-duplex<br>Half-duplex<br>Data collision |
| LAN LED (green) | On<br>Off<br>Blinking | Connected to terminal<br>Disconnected from terminal<br>Data TX or RX |

# FURUNO

TABLE 1

| DIMENSION (mm) | TOLERANCE (mm) |
|---|---|
| L ≤ 50 | ±1.5 |
| 50 < L ≤ 100 | ±2.5 |
| 100 < L ≤ 500 | ±3 |

NAMEPLATE

ETHERNET HUB   HUB-101   PWR

A

SORCE

2-φ4
FIXING HOLES

118±0.5

43

CABLE CLAMP

207±0.5

#20

199

#100

56

#70   CABLE ENTRY   224   LAN CONNECTOR   #70

4

R5
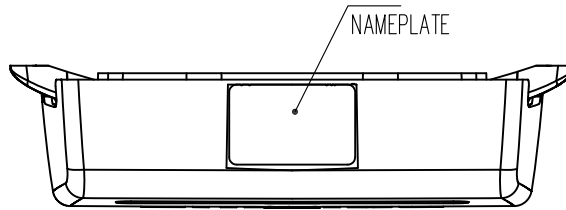
DETAIL OF A (SCALE: 1/1)

NOTE   1.   #: MINIMUM SERVICE CLEARANCE.
2.   TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3.   USE TAPPING SCREWS φ3x20 FOR FIXING THE UNIT.