

## *Installation Manual* *Multi Function Display* *Model TZTL12F/TZTL15F*

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9-52, Ashihara-cho,  
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# SAFETY INSTRUCTIONS

The installer must read the appropriate safety instructions before attempting to install the equipment.

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

(Examples of symbols)



Warning, Caution



Prohibitive Action

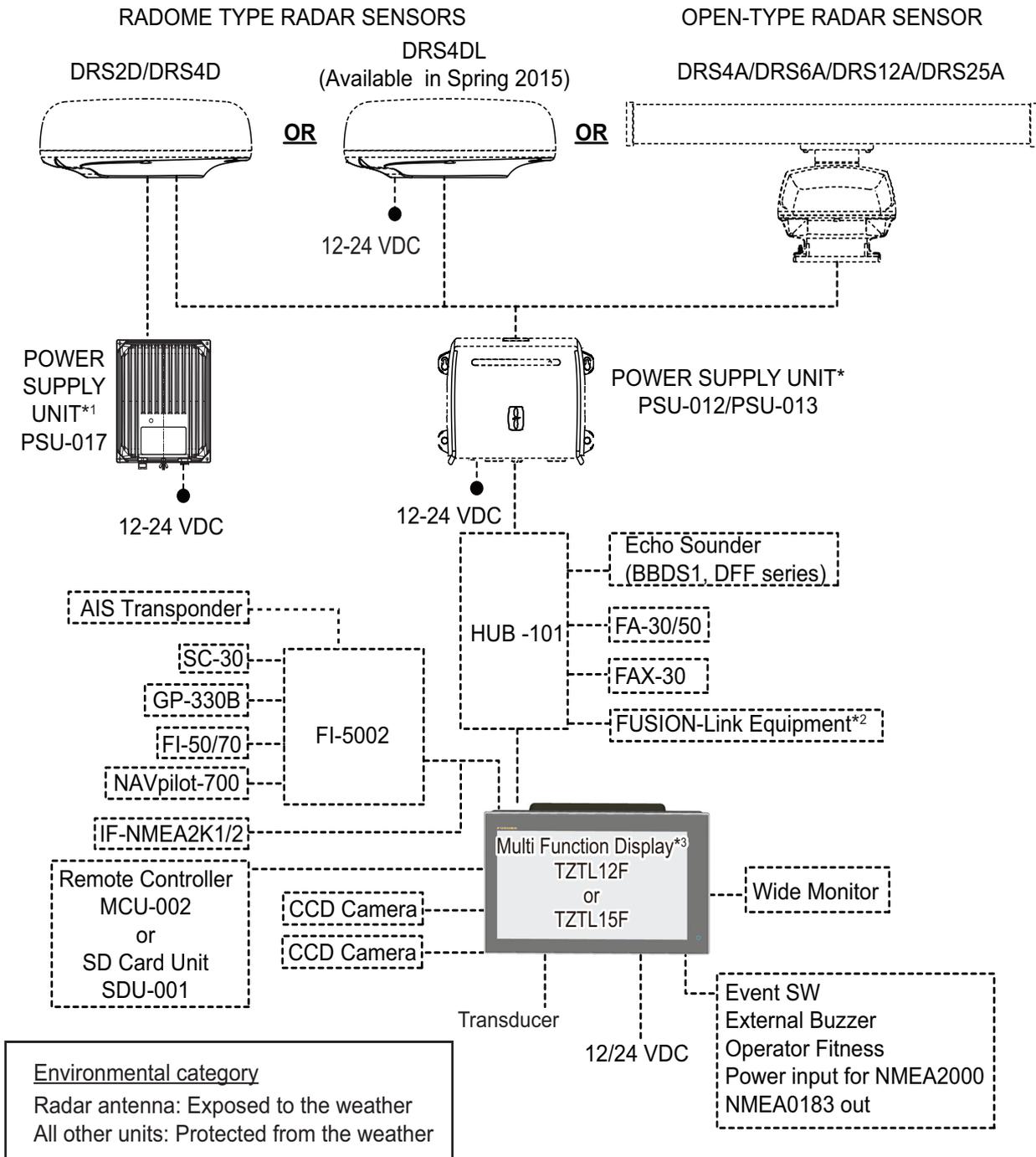


Mandatory Action

 <b>WARNING</b>	
	<b>ELECTRICAL SHOCK HAZARD</b> Do not open the equipment unless totally familiar with electrical circuits.  Only qualified personnel should work inside the equipment.
	<b>Turn off the power at the switchboard before beginning the installation.</b>  Fire or electrical shock can result if the power is left on.
	<b>Be sure that the power supply is compatible with the voltage rating of the equipment.</b>  Connection of an incorrect power supply can cause fire or damage the equipment.

 <b>CAUTION</b>										
	Ground the equipment to prevent electrical shock and mutual interference.									
	<b>Use the proper fuse.</b>  Use of an incorrect fuse may damage the equipment.									
	<b>The front panel is made of glass. Handle it with care.</b>  Injury can result if the glass breaks.									
	Observe the following compass safe distances to prevent interference to a magnetic compass:									
<table border="1"> <thead> <tr> <th>Model</th> <th>Standard compass</th> <th>Steering compass</th> </tr> </thead> <tbody> <tr> <td>TZTL12F</td> <td>0.75 m</td> <td>0.50 m</td> </tr> <tr> <td>TZTL15F</td> <td>0.75 m</td> <td>0.45 m</td> </tr> </tbody> </table>		Model	Standard compass	Steering compass	TZTL12F	0.75 m	0.50 m	TZTL15F	0.75 m	0.45 m
Model	Standard compass	Steering compass								
TZTL12F	0.75 m	0.50 m								
TZTL15F	0.75 m	0.45 m								

# SYSTEM CONFIGURATION



\*1 Radar sensor other than the DRS4DL requires a power supply unit.

\*2 FUSION Electronics MS-700 series only (as of 12/2014).

\*3 Max. 4 NavNet TZtouch2 units (Connected via Ethernet hub).

This unit has a built-in GPS antenna and sounder.

**Note:** When connecting an external monitor to the multi function display, use a monitor whose aspect ratio is the same as that of the multi function display (16:9). The pictures may be stretched or shrunk with a different aspect ratio. Output to an HPD (Hot Plug Detect) monitor is not possible.

# EQUIPMENT LISTS

## Standard supply

Name	Type	Code No.	Qty	Remarks
Multi Function Display	TZTL12F	-	1	
	TZTL15F	-		
Installation Materials	CP19-01800	000-027-063	1	For TZTL12F
	CP19-01900	000-027-064	1	For TZTL15F
Accessories	FP19-02011	001-337-390	1	
Spare Parts	SP19-00601	001-023-040	1	Fuses (Type: FBG0-A 125V 5A PBF, Code: 000-155-853-10, 2 pcs.)

## Optional supply

Name	Type	Code No.	Remarks
Joint Box	TL-CAT-012	000-167-140-10	For LAN network
Remote Control Unit	MCU-002	-	
SD Card Unit	SDU-001	-	
NMEA2000-Interface Unit	IF-NMEA2K1	-	
NMEA Data Converter	IF-NMEA2K2	-	
Network HUB	HUB-101	-	
Matching Box	MB-1100	000-041-353-00	Required for some transducers. See next page.
Power Supply Unit	PSU-012	000-021-609-00	w/DRS2D/4D/4A/6A/12A
	PSU-013	000-021-610-00	w/DRS25A
	PSU-017	000-022-997-00	w/DRS2D/4D
Rectifier	RU-3423	000-030-443-00	
	PR-62	000-013-484-00	100 VAC
		000-013-485-00	110 VAC
		000-013-486-00	220 VAC
		000-013-487-00	230 VAC
RU-1746B-2	000-030-439-00		
CAN bus Cable Assy.	M12-05BM+05BF-010	001-105-750-10	w/connectors (light), 1 m
	M12-05BM+05BF-020	001-105-760-10	w/connectors (light), 2 m
	M12-05BM+05BF-060	001-105-770-10	w/connectors (light), 6 m
	M12-05BFFM-010	001-105-780-10	w/connector (light), 1 m
	M12-05BFFM-020	001-105-790-10	w/connector (light), 2 m
	M12-05BFFM-060	001-105-800-10	w/connector (light), 6 m
	CB-05PM+05BF-010	000-167-968-10	w/connectors (heavy), 1 m
	CB-05PM+05BF-020	000-167-969-10	w/connectors (heavy), 2 m
	CB-05PM+05BF-060	000-167-970-10	w/connectors (heavy), 6 m
	CB-05BFFM-010	000-167-971-10	w/connector (heavy), 1 m
	CB-05BFFM-020	000-167-972-10	w/connector (heavy), 2 m
	CB-05BFFM-060	000-167-973-10	w/connector (heavy), 6 m
Cable Assy.	02S4147-1	000-141-082	For speed/temp. and temp. sensors

## EQUIPMENT LISTS

Name	Type	Code No.	Remarks
MJ Cable Assy.	MJ-A6SPF0016-005C	000-159-689-10	For FAX-30
External Buzzer	OP03-136	000-086-443-00	Buzzer: PKB5-3A40
Network (LAN) Cable	MOD-Z072-020+	001-167-880-10	LAN cable, cross-pair, 2 m
	MOD-Z073-030+	000-167-171-10	LAN cable, straight, 2 pairs, 3 m
	MOD-Z072-050+	001-167-890-10	LAN cable, cross-pair, 5 m
	MOD-Z072-100+	001-167-900-10	LAN cable, cross-pair, 10 m
CAN bus Connector	SS-050505-FMF-TS001	000-168-603-10	Micro style: 3
	NC-050505-FMF-TS001	000-160-807-10	Mini style: 2, micro style: 1
	LTWMC-05BMMT-SL8001	000-168-604-10	Micro style, male, termination resistor
	LTWMN-05AMMT-SL8001	000-160-508-10	Mini style, male, termination resistor
	LTWMC-05BFFT-SL8001	000-168-605-10	Micro style, female, termination resistor
	LTWMN-05AFFT-SL8001	000-160-509-10	Mini style, female, termination resistor
	FRU-0505-FF-IS	001-077-830-10	w/in-line terminator
Transducer	520-5PSD (*)	000-015-204-00	
	520-5MSD (*)	000-015-212-00	
	525-5PWD (*)	000-146-966-00	
	520-PLD (*)	000-023-680-00	
	525T-BSD (*)	000-023-020-00	
	525T-PWD (*)	000-023-019-00	
	SS60-SLTD/12 (*)	000-023-676-00	
	SS60-SLTD/20 (*)	000-023-677-00	
	525T-LTD/12 (*)	000-023-679-00	
	525T-LTD/20 (*)	000-023-678-00	
	50/200-1T *10M* (*)	000-015-170-00	Matching box MB-1100 required for installation of these transducers.
	50B-6 *10M*	000-015-042-00	
	50B-6B *15M*	000-015-043-00	
200B-5S *10M*	000-015-029-00		
Triducer	526TID-HDD (*)	000-023-021-00	
	525STID-PWD (*)	000-011-784-00	
	525STID-MSD (*)	000-011-783-00	
Speed/Temperature Sensor	ST-02MSB	000-137-986-01	Thru-hull type, metal
	ST-02PSB	000-137-987-01	Thru-hull type, plastic
Temperature Sensor	T-04MSB	000-026-893	Thru-hull type
	T-04MTB	000-026-894	Transom mount
Bracket 12	OP19-13	001-337-410-00	For TZTL12F
Bracket 15	OP19-14	001-337-420-00	For TZTL15F
Retrofit Kit For VX2 10.4"	OP19-15	001-337-430-00	For TZTL12F
Retrofit Kit For MDF12	OP19-16	001-337-440-00	For TZTL12F
Front Fixing Panel Kit	OP19-17	001-337-450-00	For TZTL15F
Operator's Manual	OME-44870-*	000-190-069-1*	English (* denotes version number)

\*: Compatible with ACCU-FISH™ and Bottom Discrimination.

# 1. MOUNTING

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## 1.1 Mounting Considerations



*TZTL12F*



*TZTL15F*

When selecting a mounting location for NavNet TZtouch2, keep the following in mind:

- The temperature at the mounting location shall be between  $-15^{\circ}\text{C}$  and  $+55^{\circ}\text{C}$ .
- The humidity at the mounting location shall be 93% or less at  $40^{\circ}\text{C}$ .
- Locate the unit away from exhaust pipes and ventilators.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal (compliant with IEC 60945 Ed.4).
- Keep the unit away from electromagnetic field generating equipment such as motors and generators.
- For maintenance and checking purposes, leave sufficient space around the unit and leave slack in cables. Minimum recommended space is shown in the outline drawing for the display units.
- Do not mount the NavNet TZtouch2 on the overhead.
- A magnetic compass will be affected if the equipment is placed too close to it. Observe the compass safe distances shown in the SAFETY INSTRUCTIONS to prevent disturbance to the magnetic compass.
- Mount the unit in a location where the internal GPS antenna can transmit and receive GPS data without obstruction. Where this is not possible, connect the NavNet TZtouch2 to an external GPS antenna, such as the GP-330B, via a NMEA2000 network.

The NavNet TZtouch2 can be flush mounted in a console or panel, or mounted on a desktop.

### **When removing the equipment**

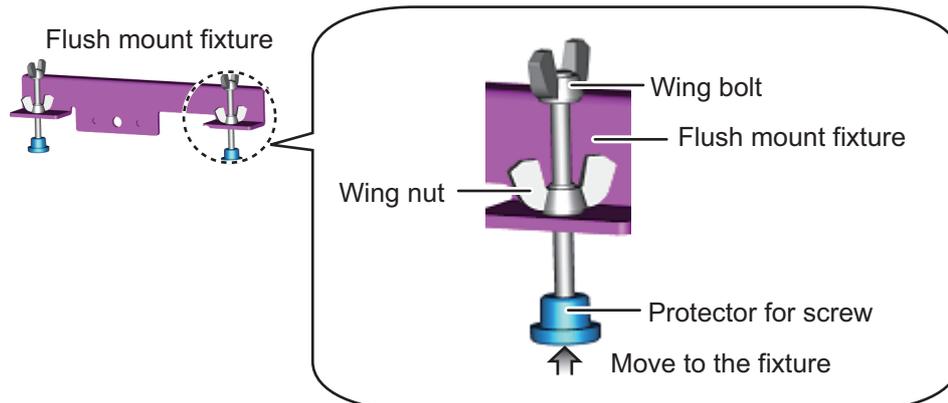
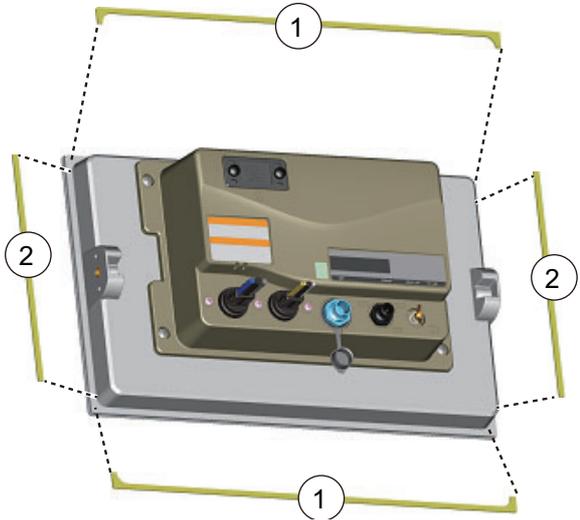
If the equipment is removed from the vessel, cover the connector of the cable with the supplied cap to keep dust out of the connector.

## 1.2 Flush Mounting

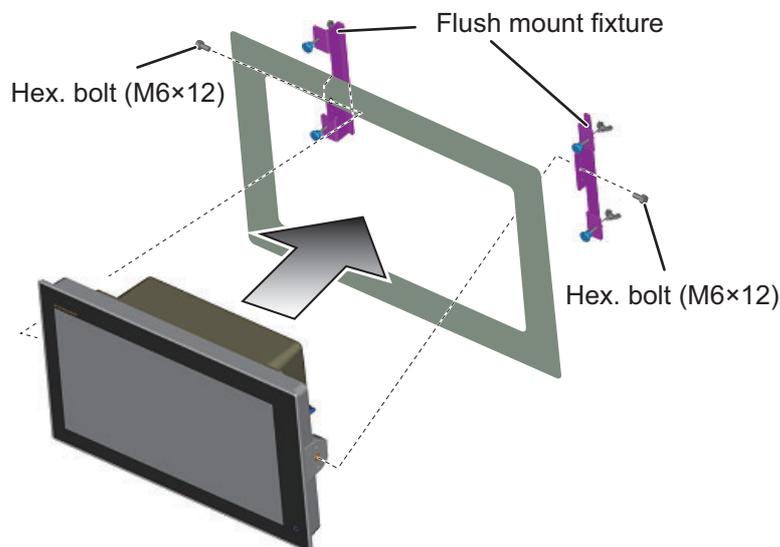
Select a flat mounting location and install the unit as shown below.

**Note:** Ensure the mounting location is flat, with no indents or protrusions, to allow a secure fit.

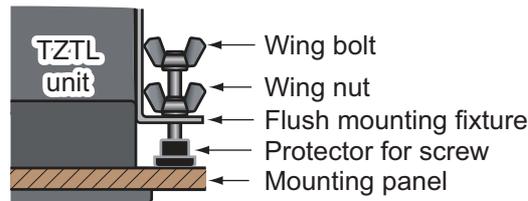
1. Prepare a cutout in the mounting location using the template (supplied) for the TZTL12F or TZTL15F.
2. Attach the flush mounting sponge, in the order indicated in the figure to the right (supplied as installation materials), to the back of the NavNet TZtouch2.
3. Screw the wing bolts and the wing nuts of the flush mount fixture so that the protector for screw moves to the flush mount fixture.
4. Connect all cables at the back of the NavNet TZtouch2. (See chapter 2.)
5. Set the NavNet TZtouch2 to the cutout.



6. Fasten the flush mount fixtures to the holes for the hanger at both sides of the NavNet TZtouch2 with two hex. bolts (M6×12, supplied).



7. Fasten each wing bolt so that the protector for screw touches the mounting panel.
8. Fasten the wing nuts tightly.



### 1.3 Retrofit Kit for TZTL12F (option) and Front Fixing Panel Kit for TZTL15F (option)

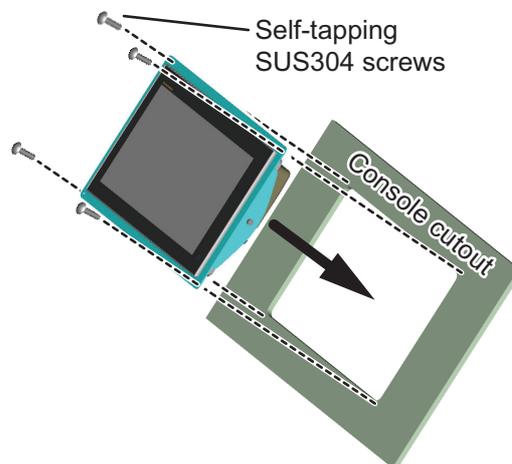
When upgrading to the TZTL12F or front-mounting the TZTL15F, use the kit which matches your old equipment. (Refer to the table below for details.)

Optional kit	Code No.	Contains	Remarks
OP19-15	001-337-430	F Mount Panel A (Code No.: 100-397-090-10), 5×20 SUS304, 4 pcs. (Code No.: 001-336-820)	For NavNet/NavNet Vx2 displays. (RDP-138/139/149/151) (For TZTL12F)
OP19-16	001-337-440	F Mount Panel B (Code No.: 100-397-100-10), 5×20 SUS304, 4 pcs. (Code No.: 001-336-820)	For NavNet3D MFD12. (For TZTL12F)
OP19-17	001-337-450	F Mount Panel 15 (Code No.: 100-397-600-10), 5×20 SUS304, 4 pcs. (Code No.: 001-336-820)	TZTL15F Front Fixing Panel Kit. (For TZTL15F)

1. Prepare a cutout in the mounting location using the template (supplied) for the TZTL12F or TZTL15F.



2. Place the NavNet TZtouch2 unit face-down on a soft, clean surface.
3. Set the F Mount Panel to the NavNet TZtouch2 unit, then using the hex bolts supplied with the flushmount bracket installation materials (CP19-01800/CP19-01900), fix the F Mount Panel to the unit.



## 1. MOUNTING

- Set the unit and F Mount Panel into the cutout as shown in the figure to the right, then use the supplied self-tapping screws (SUS304 × 4 pcs.), fix the F Mount Panel to the console.

**Note:** Where the mounting location may be exposed to water (spray or splash), apply a bead of marine sealant around the rear of the F Mount Panel, for waterproofing, before setting the F Mount Panel and unit into the cutout. Wipe the area clean to remove any marine sealant residue and allow time for the marine sealant to dry.

## 1.4 Desktop Mounting (option)

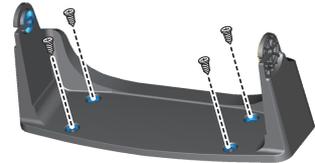
Follow the appropriate procedure below to mount the TZTL12F or TZTL15F.

### 1.4.1 How to mount the TZTL12F

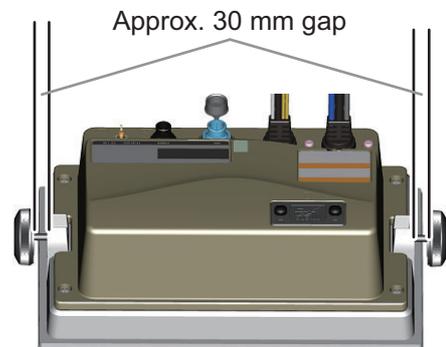
Use the optional kit Bracket12 (contents shown below), for mounting the TZTL12F.

Type	Code	Contents
OP19-13	001-337-410	Knob bolt × 2 (Code No.: 100-365-900-10), Self-tapping screws (SUS304 5×20) × 4 (Code No.: 000-162-608-10), Hanger × 1 (Code No.: 100-397-080-10).

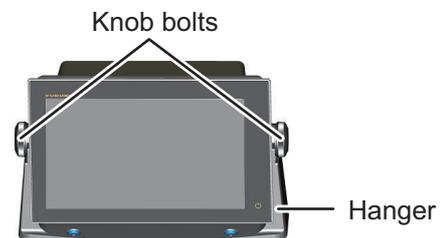
- Fix the hanger by using self-tapping screws (5×20 SUS304, supplied). The screw locations are indicated in the figure to the right.



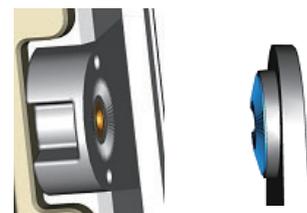
- Place the TZTL12F face-down on a soft, clean surface, then screw the knob bolts into the TZTL12F, leaving a gap of approximately 30 mm.



- Set the TZTL12F unit to the hanger and tighten the knob bolts.



**Note:** When setting the TZTL12F into the hanger, the concave section of the unit and the convex section of the hanger must be aligned.



Unit concave

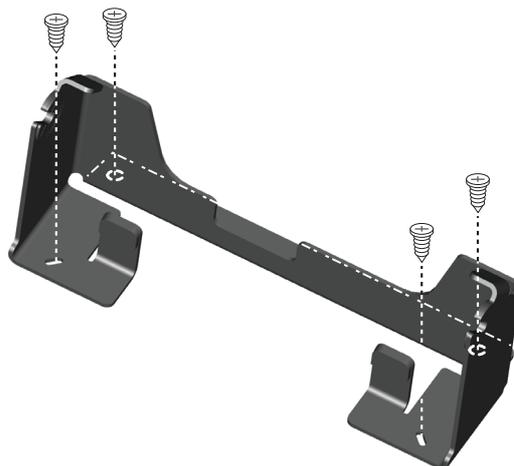
Hanger convex

## 1.4.2 How to mount the TZTL15F

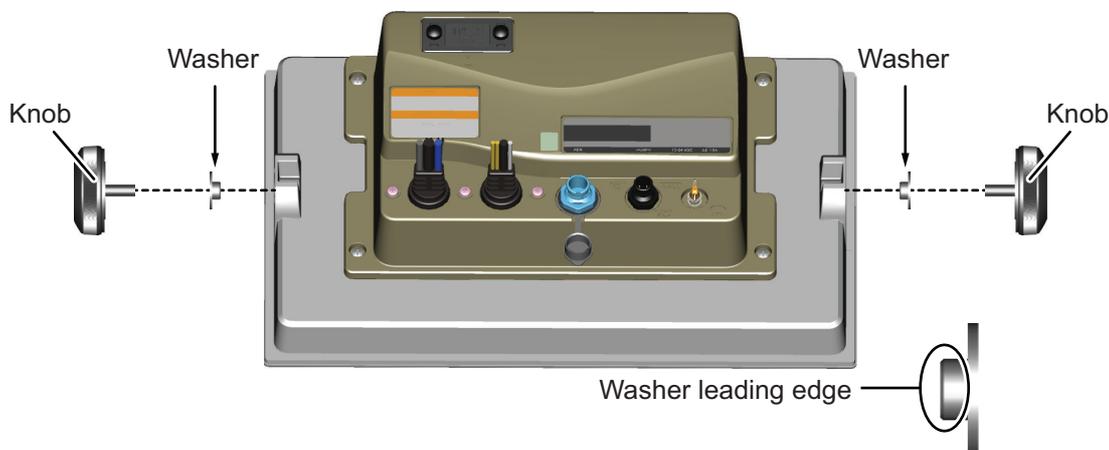
Use the optional kit Bracket15 (contents shown below), for mounting the TZTL15F.

Type	Code	Contents
OP19-14	001-337-420	Knob bolt × 2 (Code No.: 100-346-502-10), Washer × 2 (Code No.: 100-076-101-10), Self-tapping screws (SUS304 5×20) × 4 (Code No.: 000-162-608-10), Hanger × 1 (Code: No.: 001-360-970).

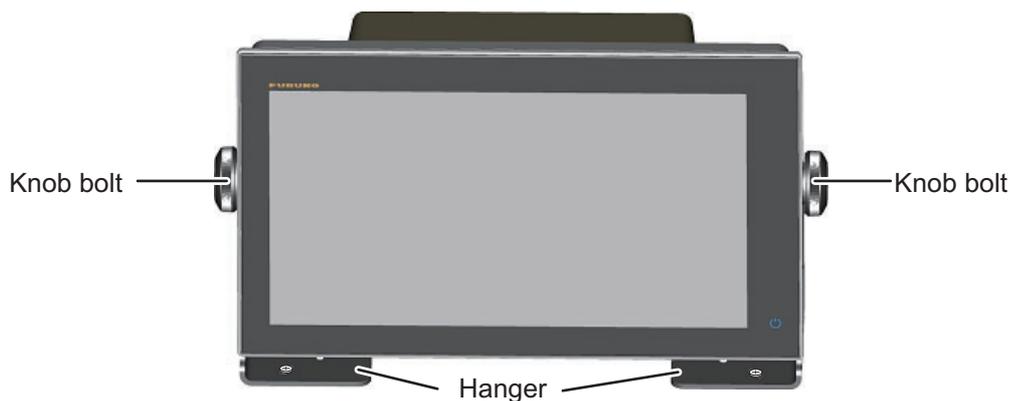
1. Fix the hanger by using self-tapping screws (5×20 SUS304, supplied). The screw locations are indicated in the figure below.



2. Place the TZTL15F face-down on a soft, clean surface, then fit the washers and knob bolts as shown in the figure below, leaving a gap of approximately 30 mm. The washers have a leading edge which must face the unit.



3. Set the TZTL15F unit to the hanger and tighten the knob bolts.



## 1.5 Installation of Transducers

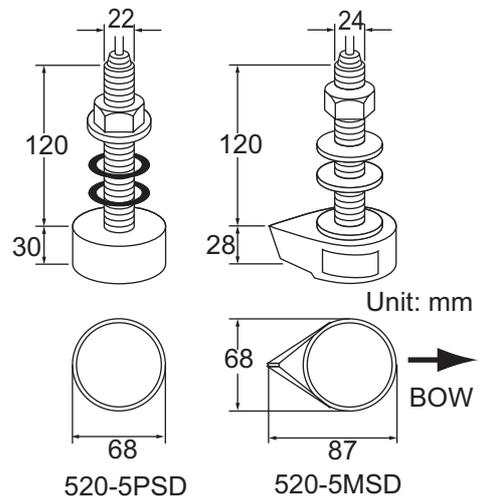
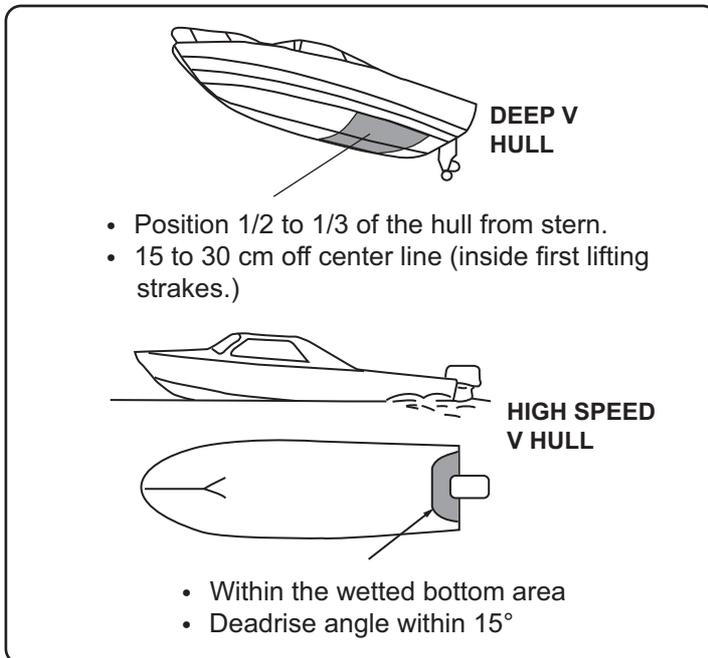
### 1.5.1 How to mount a transducer through the hull

#### Transducer mounting location

The thru-hull mount transducer provides the best performance of all, since the transducer protrudes from the hull and the effect of air bubbles and turbulence near the hull skin is reduced. If your boat has a keel, the transducer should be at least 30 cm away from it.

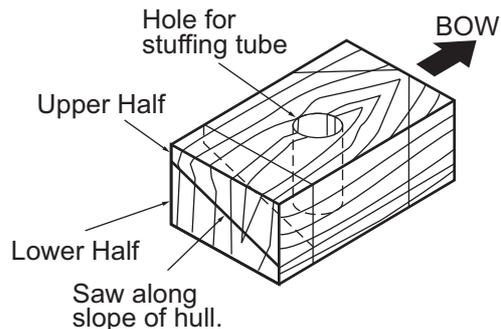
The performance of this fish finder is directly related to the mounting location of the transducer, especially for high-speed cruising. The installation should be planned in advance, keeping the length of the transducer cable and the following factors in mind:

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

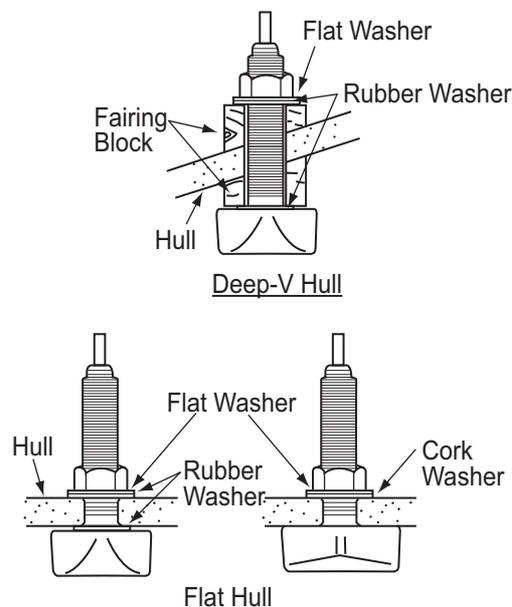


**Installation procedure**

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



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



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

## 1. MOUNTING

### Transducer preparation

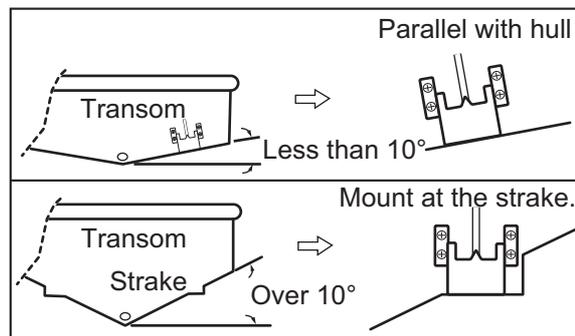
Before putting your boat in water, wipe the face of the transducer thoroughly with a detergent liquid soap. This will lessen the time necessary for the transducer to have good contact with the water. Otherwise the time required for complete "saturation" will be lengthened and performance will be reduced.

**DO NOT** paint the transducer. Performance will be affected.

### 1.5.2 Transom mount transducer

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

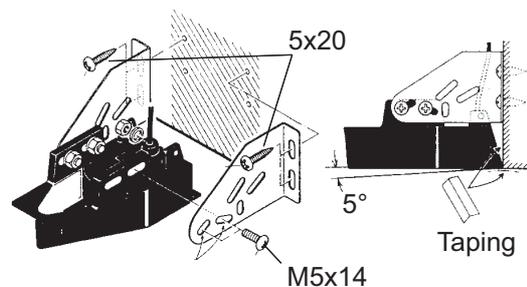
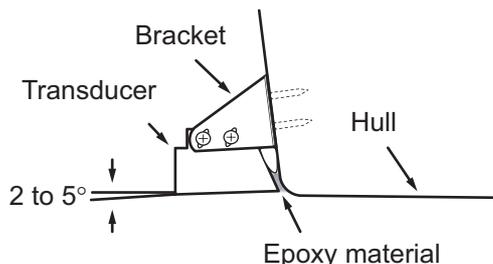
DO NOT over-tighten screws, to prevent damage to the transducer.



### Installation procedure

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

1. Drill four pilot holes for self-tapping screw (5x20) in the mounting location.
2. Coat the threads of the self-tapping screws (5x14) for the transducer with marine sealant for waterproofing. Attach the transducer to the mounting location with the self-tapping screws.
3. Adjust the transducer position so the transducer faces right to the bottom. If necessary, to improve water flow and minimize air bubbles staying on the transducer face, incline the transducer about 5° at the rear. This may require a certain amount of experimentation for fine tuning at high cruising speeds.
4. Tape the location shown in the figure below.
5. Fill the gap between the wedge front of the transducer and transom with epoxy material to eliminate any air spaces.



6. After the epoxy hardens, remove the tape.

### 1.5.3 How to mount a transducer inside the hull

The transducer may also be installed inside the hull on FRP boats. However, this installation method affects the ability to detect the bottom, fish and other objects because the ultrasound pulse is weakened when it passes through the hull.

**Note:** This mounting method should not be used to mount the transducer that supports the ACCU-FISH™ and/or bottom discrimination display feature, since performance is greatly degraded.

#### Necessary tools

The following tools are required:

- Sandpaper (#100)
- Marine sealant
- Water-filled plastic bag

#### Remarks on installation

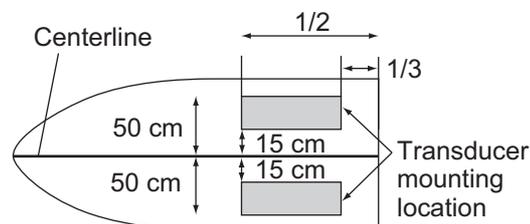
- Do the installation with the ship moored at a dock, etc. The water depth should be 6.5 to 32 feet (2 to 10 meters).
- Turn off the engine.
- Do not power the unit with the transducer in the air, to prevent damage to the transducer.
- Do not use this method on a double layer hull.
- Before attaching the transducer to the hull, check that the site is suitable, by following steps 1 to 3 in the installation procedure below.

#### Installation procedure

The attenuation of the ultrasound pulse varies with the thickness of the hull. Select a location where attenuation is the lowest.

1. Select 2-3 locations considering the four points mentioned below.

- Mount the transducer at a location  $1/2$  to  $1/3$  of the length of your boat from the stern.
- The mounting location is between 15 to 50 cm from the centerline of the hull.
- Do not place the transducer over hull struts or ribs which run under the hull.
- Avoid a location where the rising angle of the hull exceeds  $15^\circ$ , to minimize the effect of the boat's rolling.



2. Decide the most suitable site from the locations selected.
  - 1) Connect the power cable and transducer cable to the display unit.

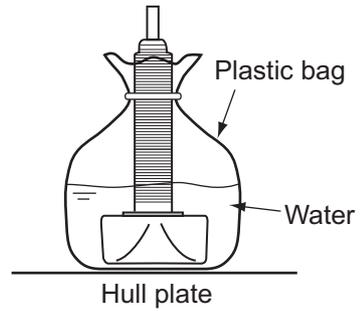
## 1. MOUNTING

2) Put the transducer into water-filled plastic bag.  
Press the transducer against the chosen site.

3) Tap  (power switch) to turn the power on.

4) After the startup procedure completes (approx. 90 seconds), the last used display appears.

Tap the [Home] icon (  Home ) to show the home screen and display mode settings. See section 3.3 for how to use the menu.



5) Drag the menu to show [Sounder] in the menu, then tap [Sounder].

6) Drag the [Sounder] menu to show the [SOUNDER INITIAL SETUP] menu.

7) Tap [Fish Finder Source].

8) Confirm the available fish finder from the list of available sounders, then tap the appropriate fish finder. For the purpose of this example, the default setting [TZTL] (internal sounder) is selected as the source.

9) Tap the [<] icon to return to the [Sounder] menu

10) Drag the [Sounder] menu to show the [SOUNDER INITIAL SETUP] menu.

11) Tap [Transducer Setup].

12) Tap [Transducer Setup Type].

13) Tap [Model], then tap the [<] icon to return to [Transducer Setup] menu.

14) Tap [Model Number], drag the menu to show your transducer model, then tap the transducer model number.

15) Tap the [<] icon twice to return to the [Sounder] menu, then drag the [Sounder] to show the [SOUNDER INITIAL SETUP] menu.

16) At the [Transmission Power] menu item, set the transmission power to a level of [2].

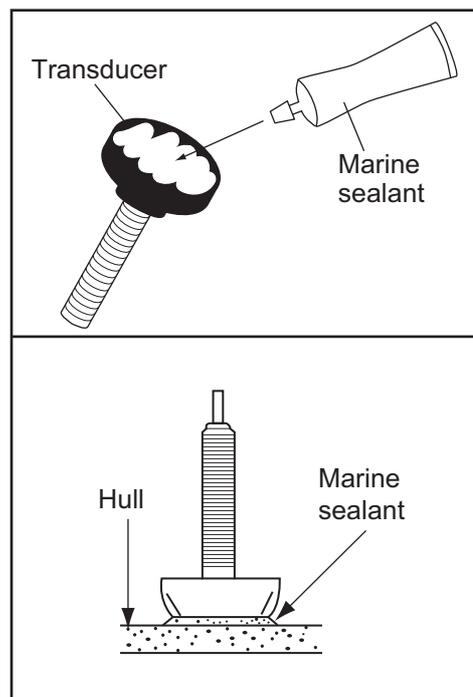
17) Drag the menu to show [Sounder Transmit], then tap [Sounder Transmit].  
Check if the bottom echo appears on the right side of the screen, in the display area.

If no bottom echo appears, repeat the procedure until a suitable location is found.

3. Remove the transducer from the plastic bag and wipe the face of transducer with a cloth to remove water and any foreign material. Lightly roughen the face with #100 sandpaper. Also, use the sandpaper to roughen the inside of the hull where the transducer is to be mounted.

4. Wipe off any sandpaper dust from the face of the transducer.

5. Dry the face of the transducer and the hull. Coat the transducer face and mounting location with marine sealant. Hardening begins in approx. 15 to 20 minutes so do this step without delay.
6. Attach the transducer to the hull. Press the transducer firmly down on the hull and gently twist it back and forth to remove any air which may be trapped in the marine sealant.
7. Support the transducer with a piece of wood to keep it in place while the sealant is drying. It takes 24 to 72 hours to harden completely.
8. Turn the power on and change the menu setting as shown below. See section 3.3 for how to use the menu.



- 1) Tap the [Home] icon to show the home screen and display mode settings.
- 2) Drag the menu to show [Sounder] in the menu, then tap [Sounder].
- 3) Drag the [Sounder] menu to show the [SOUNDER INITIAL SETUP] menu.
- 4) At the [Transmission Power] menu item, set the transmission power to a level of [10].
- 5) Adjust the Bottom Level and Gain Offset settings as shown in the table below.

Menu Item	Setting
Bottom Level HF	-40
Bottom Level LF	-40
Gain Offset HF	20
Gain Offset LF	20

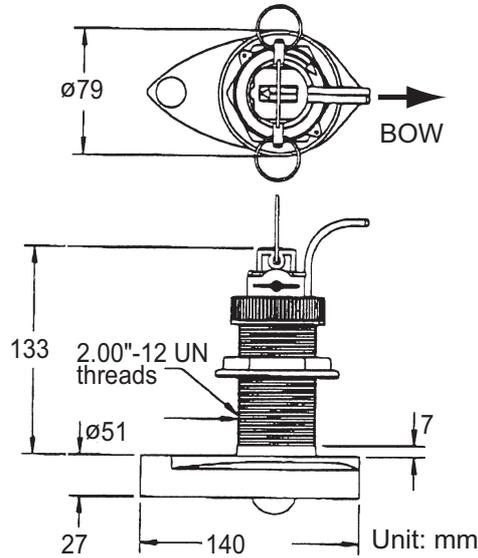
## 1. MOUNTING

### 1.5.4 Triducer

DO NOT over-tighten screws, to prevent damage to the transducer.

#### **525STID-MSD**

The optional triducer 525STID-MSD is designed for thru-hull mounting.



#### **525STID-PWD**

The optional transom mount triducer 525STID-PWD can be installed by the thru-hull method or the inside-hull method.

#### ***Pretest for speed and temperature***

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

#### ***Tools and materials required***

- Scissors
- Safety goggles
- Electric drill
- Drill bit:
  - For bracket holes: 4 mm, #23, or 9/64"
  - For fiberglass hull: chamfer bit (preferred), 6 mm, or 1/4"
  - For transom hole: 9 mm or 3/4" (optional)
  - For cable clamp holes: 3 mm or 1/8"
- Straight edge
- Pencil
- Water-based anti-fouling paint (mandatory in salt water)
- Masking tape
- Dust mask
- Screwdrivers
- Marine sealant
- Cable ties

### Mounting location

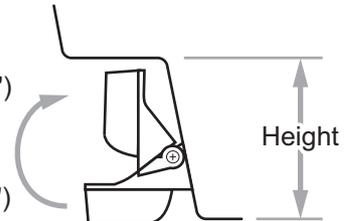
To ensure the best performance, the sensor must be submerged in aeration-free and turbulence-free water. Mount the sensor close to the centerline of your boat. On slower heavier displacement hulls, positioning it farther from the centerline is acceptable.

Allow adequate space above the bracket for it to release and rotate the sensor up-ward.

**Note 1:** Do not mount the sensor in an area of turbulence or bubbles: near water in-take or discharge openings; behind strakes, struts, fittings, or hull irregularities; behind eroding paint (an indication of turbulence).

Height without speed sensor  
191 mm (7-1/2")

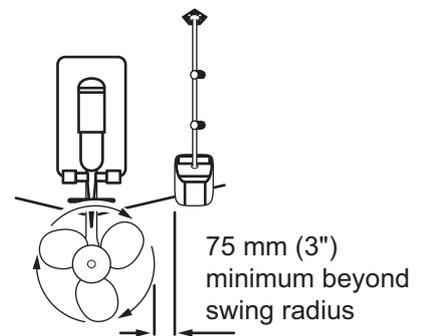
Height with speed sensor  
213 mm (8-1/2")



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

**Note 3:** For single drive boat, mount on the star-board side at least 75 mm (3") beyond the swing radius of the propeller, as shown in the right figure.

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

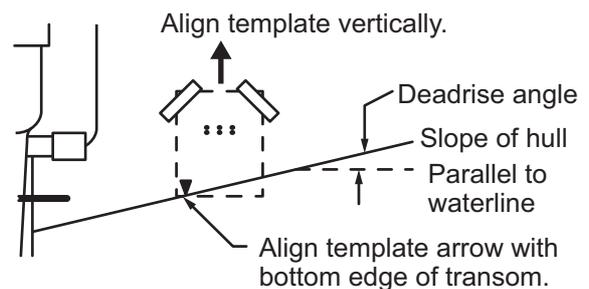


### How to install the bracket

1. Cut out the installation template (enclosed with transducer) along the dotted line.
2. At the selected location, position the template, so the arrow at the bottom is aligned with the bottom edge of the transom. Being sure the template is parallel to the waterline, tape it in place.

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

3. Using a 4 mm, #23, or 9/64" bit, drill three holes 22 mm (7/8") deep at the locations indicated. To prevent drilling too deeply, wrap masking tape around the bit 22 mm (7/8") from the point.



**Fiberglass hull:** Minimize surface cracking by chamfering the gelcoat. If a chamfer bit or countersink bit is not available, start drilling with a 6mm or 1/4" bit to a depth of 1 mm (1/16").

4. If you know your transom angle, the bracket is designed for a standard 13° transom angle.  
11°-18° angle: No shim is required. Skip to step 3 in "Adjustments".  
Other angles: The shim is required. Skip to step 2 of "Adjustments".  
If you do not know the transom angle, temporarily attach the bracket and sensor to the transom to determine if the plastic shim is needed.

## 1. MOUNTING

- Using the three #10 x 1-1/4" self-tapping screws, temporarily screw the bracket to the hull. DO NOT tighten the screws completely at this time. Follow the step 1-4 in "How to attach the sensor to the bracket", before proceeding with "Adjustments".

### Adjustments

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

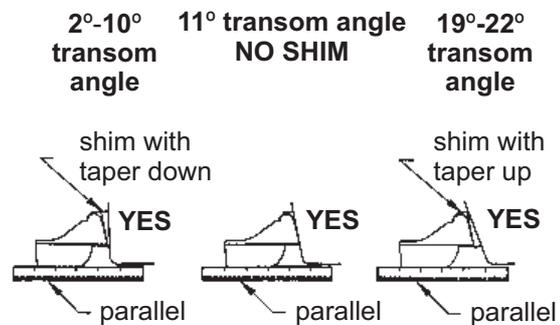
**Note:** Do not position the bow of the sensor lower than the stern because aeration will occur.

- To adjust the sensor's angle relative to the hull, use the tapered plastic shim provided. If the bracket has been temporarily fastened to the transom, remove it. Key the shim in place on the back of the bracket.

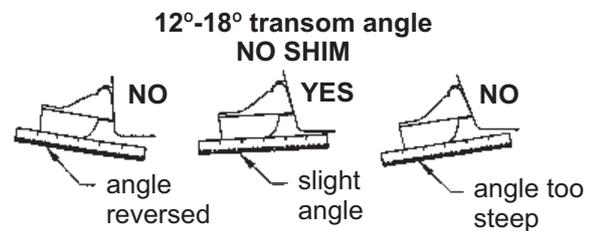
**2°-10° transom angle (stepped transom and jet boats):** Position the shim with the tapered end down.

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

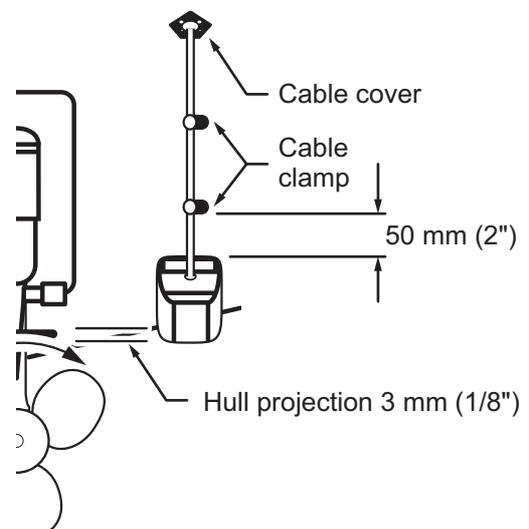
- If the bracket has been temporarily fastened to the transom, remove it. Apply a marine sealant to the threads of the three #10 x 1-1/4" self-tapping screws to prevent water seeping into the transom. Screw the bracket to the hull. Do not tighten the screws completely at this time.



- Repeat step 1 to ensure that the angle of the sensor is correct.  
**Note:** Do not position the sensor farther into the water than necessary to avoid increasing drag, spray, and water noise and reducing boat speed.

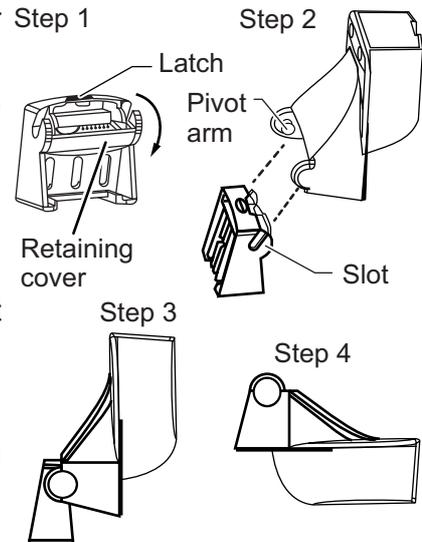


- Using the vertical adjustment space on the bracket slots, slide the sensor up or down to provide a projection of 3 mm (1/8"). Tighten the screws.



**How to attach the sensor to the bracket**

1. If the retaining cover near the top of the bracket is closed, open it by depressing the latch and rotating the cover downward.
2. Insert the sensor's pivot arms into the slots near the top of the bracket.
3. Maintain pressure until the pivot arms click into place.
4. Rotate the sensor downward until the bottom snaps into the bracket.
5. Close the retaining cover to prevent the accidental release of the sensor when your boat is underway.

**How to route the cable**

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

Never cut the cable or remote the connector; this will void the warranty. Always wear safety goggles and a dust mask.

1. If a hole must be drilled, choose a location well above the waterline. Check for obstructions such as trim tabs, pumps, or wiring inside the hull. Mark the location with a pencil. Drill a hole through the transom using a 19 mm or 3/4" bit (to accommodate the connector).
2. Route the cable over or through the transom.
3. On the outside of the hull secure the cable against the transom using the cable clamps. Position a cable clamp 50 mm (2") above the bracket and mark the mounting hole with a pencil.
4. Position the second cable clamp halfway between the first clamp and the cable hole. Mark this mounting hole.
5. If a hole has been drilled in the transom, open the appropriate slot in the transom cable cover. Position the cover over the cable where it enters the hull. Mark the two mounting holes.
6. At each of the marked locations, use a 3 mm or 1/8" bit to drill a hole 10 mm (3/8") deep. The prevent drilling too deeply, wrap masking tape around the bit 10 mm (3/8") from the point.
7. Apply marine sealant to the threads of the #6 x 1/2" self-tapping screw to prevent water from seeping into the transom. If you have drilled a hole through the transom, apply marine sealant to the space around the cable where it passes through the transom.
8. Position the two cable clamps and fasten them in place. If used, push the cable cover over the cable and screw it in place.
9. Route the cable to the display unit being careful not to tear the cable jacket when passing it though the bulkhead(s) and other parts of the boat. To reduce electrical interference, separate the sensor cable from other electrical wiring and "noise" sources. Coil any excess cable and secure it in place with zip-ties to prevent damage.

## 1.6 Installation of Sensors (option)

### 1.6.1 Speed/temperature sensors ST-02MSB, ST-02PSB

The speed/temperature sensors (ST-02MSB, ST-02PSB) are designed for thru-hull mounting. Install them as shown in this section.

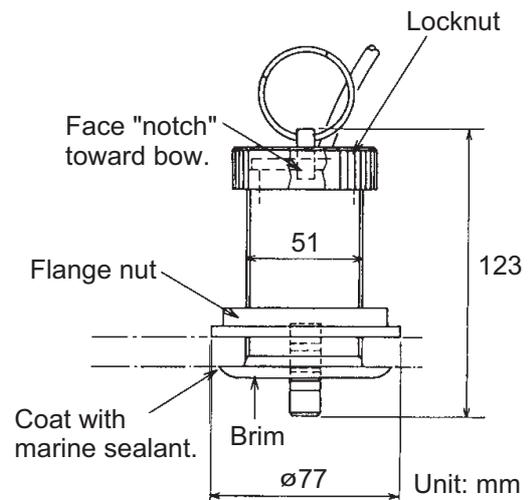
#### **Mounting considerations**

Select a suitable mounting location, considering the following:

- Select a location where the transducer will not be damaged in trailering, launching, hauling, and storage.
- Select a mid-boat flat position. The sensor does not have to be installed perfectly perpendicular.
- Select a location in the forward direction viewing from the drain hole, to allow for circulation of cooling water.
- Select a location away from water flow from keel, water discharge pipe, etc.
- Vibration at the location shall be minimal.
- Do not install fore of the transducer of a fish finder, to prevent disturbance (and loss of performance) to the fish finder.

#### **Mounting procedure**

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

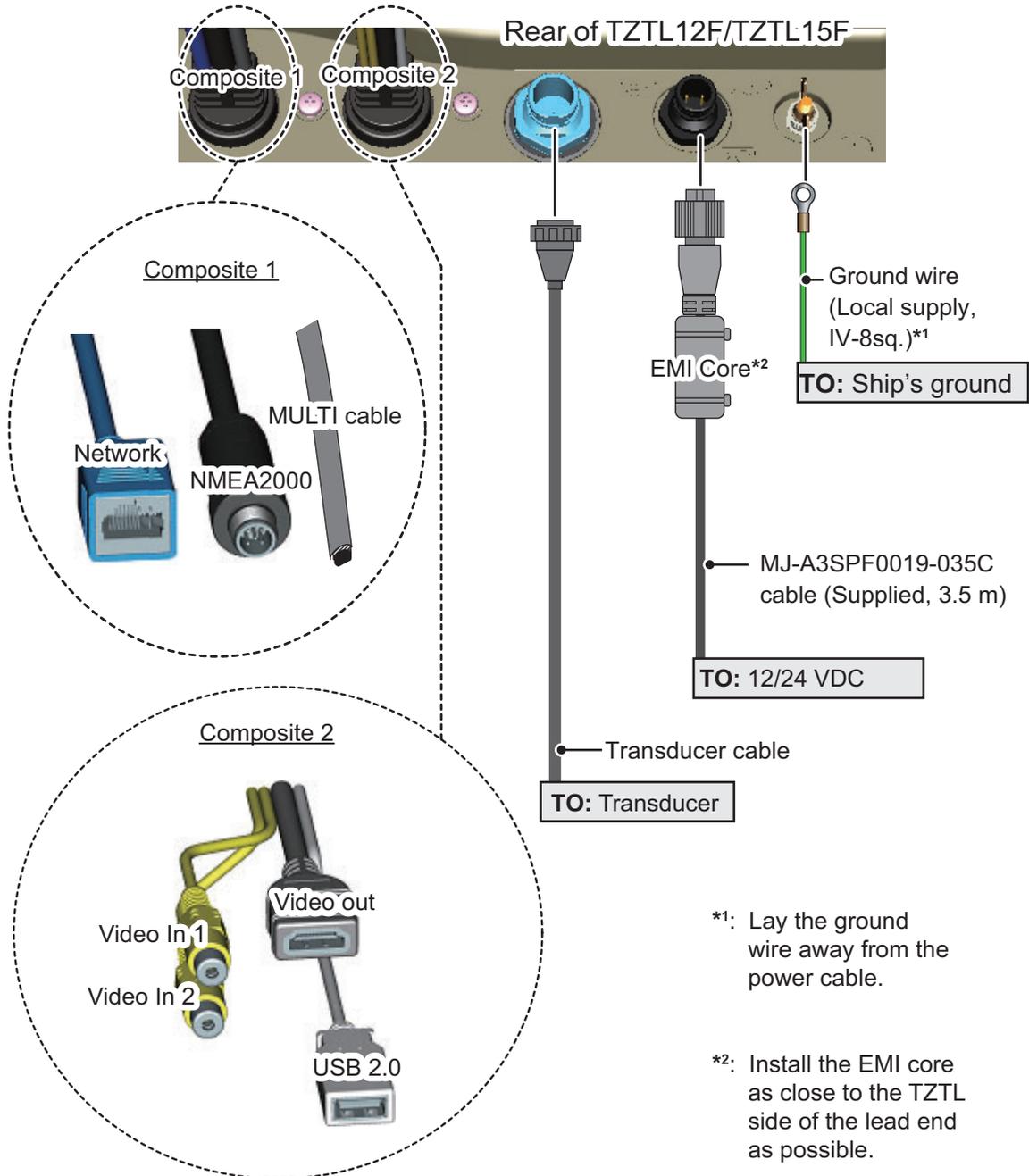


### 1.6.2 Temperature sensors T-04MSB and T-04MTB

For installation instructions for T-04MSB and T-04MTB sensors, see "INSTALLATION OF TEMPERATURE SENSORS" on page AP-1.

# 2. WIRING

## 2.1 Interface Connections (Rear of Unit)



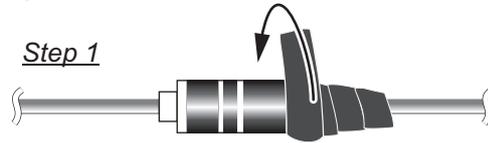
## 2.2 How to Secure and Waterproof Connections

Where the unit is exposed to water spray or moisture, Video out, USB, Video In, NMEA2000, LAN network and Multi cable connections to the NavNet TZtouch2 must have at least IPx2 waterproof rating.

All unused cable ends should be covered for protection.

### Securing and waterproofing connections

1. Wrap the connection point in vulcanizing tape, covering at approximately 30 mm of the connecting cable.
2. Wrap the vulcanizing tape with vinyl tape, covering approx. 50 mm of the connecting cable. Bind the tape ends with cable ties to prevent the tape from unraveling.



Step 1

Wrap connection in vulcanizing tape for waterproofing.

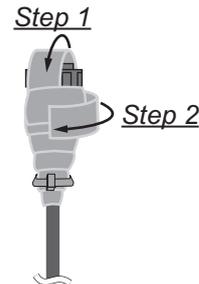


Step 2

Wrap vulcanizing tape in vinyl tape, then secure tape ends with cable ties.

### Securing and protecting unused cable connectors

1. Cover the cable connector with vinyl tape
2. Wrap the connector, covering approx. 50 mm of the connecting cable. Bind the tape end with a cable tie to prevent the tape from unraveling.



Step 1

Step 2

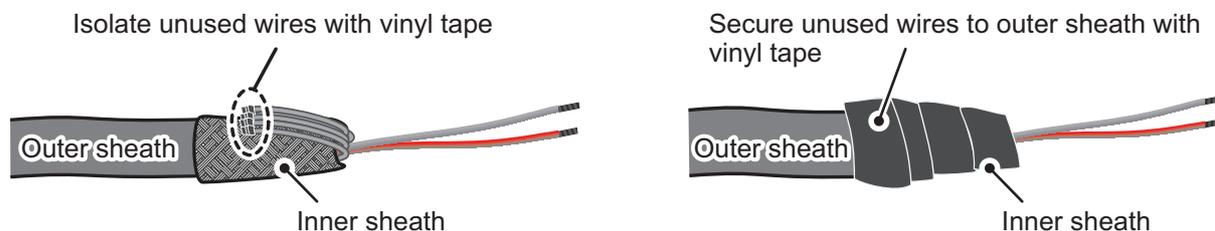
## 2.3 MULTI Cable

Use the MULTI cable for the event switch, external buzzer, contact alarm and to supply power to the CAN bus. The connector has 11 wires. Use the table below for reference when connecting the MULTI cable.

Wire color	Function	Remark (Port No.)
White	NMEA-TD-A	NMEA0183 output
Blue	NMEA-TD-B	
Gray	EXT_BUZZER	External buzzer ON/OFF
Red	+12 V	External buzzer power (12 V)
Orange	EVENT_SW	Event switch (MOB, etc.)
Black	GND	Grounding
Purple	ALARM_CONTACT_1	Alarm signal (no polarity)
Brown	ALARM_CONTACT_2	
White/Red	CAN_NET-S	CAN bus power input (+15 V)
White/Black	CAN_NET-C	CAN bus power input (0 V)
Black	Braided Shield	For grounding the connector

### 2.3.1 How to isolate and secure unused wires

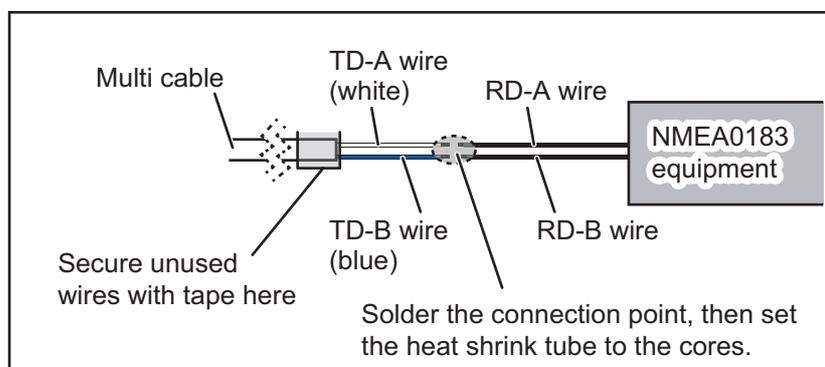
1. Cut the outer and inner sheaths lengthwise. Take care not to cut the wires.
2. Fold back the outer sheath, then fold back the inner sheath, covering the outer sheath.
3. Individually isolate unused wires using vinyl tape, then secure the unused wires as shown in the figure below.



### 2.3.2 How to set up NMEA0183 data output

**Note:** To set up data input from NMEA0183 equipment, see "NMEA0183 equipment data input" on page 2-7.

1. Cut the XH connector at the end of the external buzzer cable to an appropriate length for your installation.
2. Referring to the figure below, place heat shrink tubes on the wires, then solder the connection point.
3. Move the heat shrink tubes to the soldered connection, then apply heat to the tubes.



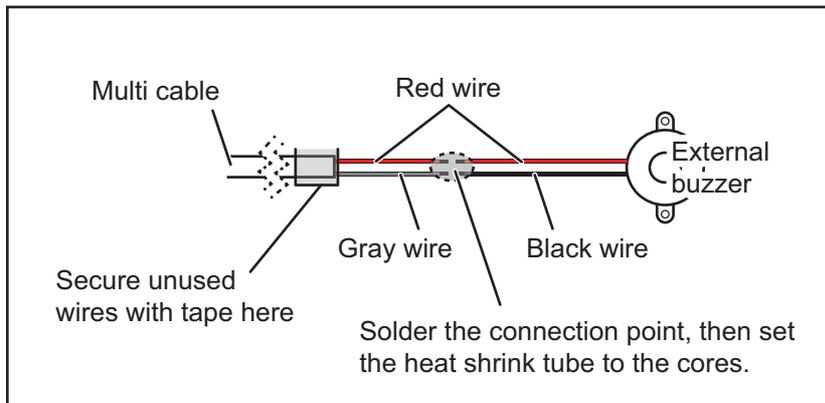
4. Isolate and secure unused wires as shown in paragraph 2.3.1.
5. Tap the [Home] icon (  ) to show the home screen and display mode settings.
6. Tap [Settings], then drag the menu to show [Initial Setup]. Tap [Initial Setup].
7. Drag the menu to show [NMEA0183 Output], then tap [NMEA0183 Output].
8. Tap [Baud Rate] to set the output baud rate. Available options are [4,800], [9,600] and [38,400]. Tap the appropriate setting then tap the  icon.
9. Tap [NMEA-0183 Version] to set the version. Available options are [1.5], [2.0] and [3.0]. Tap the appropriate setting then tap the  icon.
10. Select the appropriate sentences to output, then tap the flipswitch to set the sentence to [ON].
11. Tap the [Close] icon at the top right of the screen to close the menus.

### 2.3.3 How to connect the external buzzer

**Note:** The external buzzer does not require menu settings.

1. Cut the XH connector at the end of the external buzzer cable to an appropriate length for your installation.
2. Referring to the figure below, place heat shrink tubes on the wires, then solder the connection point.
3. Move the heat shrink tubes to the soldered connection, then apply heat to the tubes.
4. Secure the buzzer with double-sided tape (local supply) or two self-tapping screws (3×15 or 3×20, local supply).
5. Secure any unused wires, referring to "How to isolate and secure unused wires" on page 2-3.

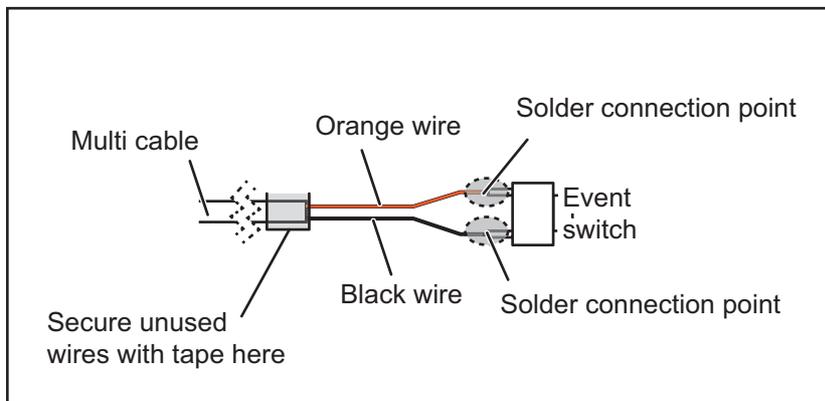
External buzzer connection example



### 2.3.4 How to connect and set up the event switch

1. Referring to the figure below, connect, then solder, the orange wire and black wire from the MULTI cable to the event switch.
2. Secure any unused wires, referring to "How to isolate and secure unused wires" on page 2-3.

Event switch connection example



3. Tap the [Home] icon to show the home screen and display mode settings.
4. Tap [Settings], then drag the menu to show [Initial Setup]. Tap [Initial Setup].
5. Drag the menu to show [Event/Buzzer Port Configuration], then tap [Event/Buzzer Port Configuration].

6. Tap [Event Input,] then tap the  icon.
7. Drag the menu to show [Event Input Configuration], then tap [Event Input Configuration].
8. Tap the appropriate setting, referring to the list below.
  - OFF: Disable the event switch.
  - Event: Place an event mark at the current location.
  - MOB: Place a Man Over Board mark at the current location.
9. Tap the [Close] icon at the top right of the screen to close the menus.

## 2.4 Network Connector

Like previous NavNet series equipment, the TZTL12F and TZTL15F may share Radar and Fish Finder images, and other information, across a TCP/IP Ethernet connection. Up to four NavNet TZtouch2 units may be connected to the same network at one time. Both the TZTL12F and TZTL15F are equipped with a network connector (RJ45).

## 2.5 Video In, Video Out and USB Connections

The composite 2 bundle, at the rear of the unit (See the figure on page 2-1), contains connection leads for Video In (two leads), one HDMI output and one USB port.

### Analog video input

The NavNet TZtouch2 can use regular analog video inputs (PAL or NTSC) that connect to the NavNet TZtouch2 directly via the Video Input 1/2 connectors. Analog video can be viewed only on the equipment where the source is connected.

Additionally FLIR and OceanView cameras may be connected to the NavNet TZtouch2. Connect the Video Out cable from the camera to the Video In (1 or 2) cable on the NavNet TZtouch2.

**Note:** Some camera models may require an adapter for connection.

Cameras may be set up using the appropriate menu item on the [Camera] menu, accessed from the [Settings] menu. For details on camera setup, see the operator's manual (OME-44870-x)

**Note:** IP cameras cannot be connected to the TZTL12F or TZTL15F.

### Video out (external HDMI monitor)

A HDMI monitor can be connected to the NavNet TZtouch2 to repeat the screen at a remote location. The TZTL15F and TZTL12F are compatible with wide-screen HDMI monitors which meet the following minimum requirements:

Resolution	Vert. Frequency	Horiz. Frequency	Pixel clock
1280 × 720	60 Hz	45 kHz	74.250 MHz

### USB port

The NavNet TZtouch2 has one USB Ver. 2.0 port. This USB port can be used to connect the optional external SD card kit or the optional remote controller.

## 2.6 CAN bus (NMEA2000 Connector)

Every NavNet TZtouch2 has one CAN bus connector (micro style connector). All NavNet TZtouch2 must be connected to the same CAN bus backbone. To connect the NavNet TZtouch2 and DRS (radar sensor), use “Ethernet Bridging” to link the DRS CAN bus and the NavNet TZtouch2 CAN bus data (see section 2.6.2).

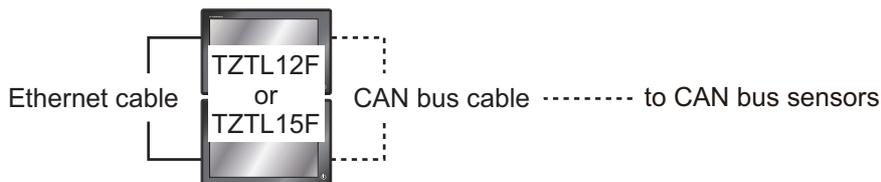
To power the NavNet TZtouch2 from the CAN bus port, the MULTI cable must be supplied with a 15 VDC power input.

### What is CAN bus?

CAN bus is a communication protocol (NMEA2000 compliant) that shares multiple data and signals through a single backbone cable. You can simply connect any CAN bus devices onto the backbone cable to expand your network on-board. With CAN bus, IDs are assigned to all the devices in the network, and the status of each sensor in the network can be detected. All the CAN bus devices can be incorporated into the NMEA2000 network. For detailed information about CAN bus wiring, see “FURUNO CAN bus Network Design Guide” (Type: TIE-00170) on Tech-Net.

### 2.6.1 How to connect the TZTL12F/TZTL14F to CAN bus equipment

Below is an example of two TZTL2 units, connected via CAN bus to CAN bus sensors.



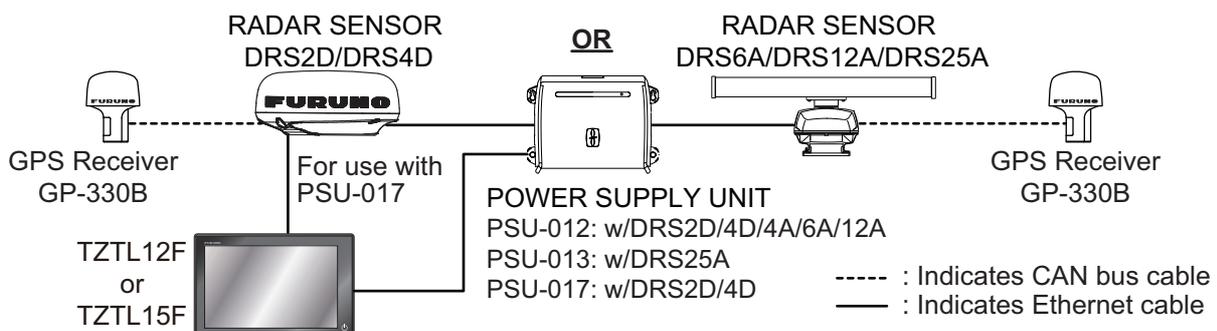
### 2.6.2 How to connect the TZTL12F/TZTL15F to DRS radar sensors

**Note:** The DRS4DL sensor does not have CAN bus connectors attached.

In addition to the CAN bus port found on the NavNet TZtouch2, all DRS radar sensors have one powered CAN bus port (terminal strip connector). The total number of sensors that can be connected to the DRS CAN bus port without external power connection depends on power consumption. The DRS can supply up to 1 amp (20LEN) to the DRS CAN bus network.

**Note:** Do not directly connect the radar sensor and TZTL unit via the CAN bus ports.

Below is an example of the TZTL2, connected to each type of DRS radar sensor.



### How to connect the DRS radar sensor to CAN bus equipment

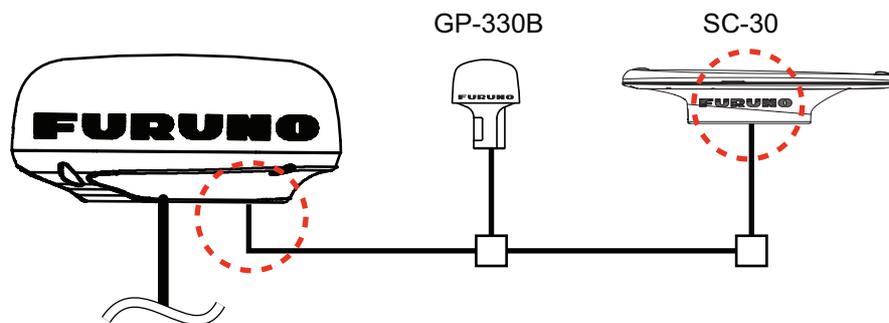
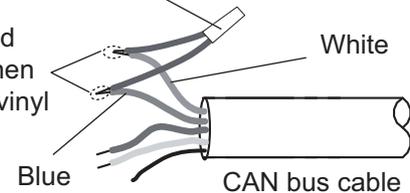
**Note 1:** The DRS4DL sensor does not have CAN bus connectors attached.

The CAN bus network connected to the DRS is its own independent CAN bus 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 the CAN bus.

All DRS radar sensors have one CAN bus port (Terminal Block connector). You can directly connect FURUNO CAN bus sensors to the DRS radar without having to run another CAN bus cable up the mast. In this case, each separate CAN bus network (the DRS CAN bus and the ship CAN bus) will be "Bridged" together via the Ether Network. For example, if you install a SC-30/GP-330B with the DRS CAN bus port, you must have two terminators on the backbone. One can be at the sensor and the other located inside the DRS as shown in the inset at right.

Resistor assembly  
(120 OHM-1007#24-L50,  
supplied with DRS)

Twist and  
solder then  
wrap in vinyl  
tape



Refer to the DRS installation manual for detailed information regarding connection.

### 2.6.3 NMEA0183 equipment data input

**Note:** To output NMEA0183 data, see paragraph 2.3.2.

To connect NMEA0183 equipment to NavNet TZtouch2, use the CAN bus network via the optional NMEA data converter IF-NMEA2K2 (or IF-NMEA2K1). This NMEA connection can accept a baud rate of 4800 or 38400.

Heading input to NavNet TZtouch2 allows functions such as Radar Overlay and course stabilization (North up, Course up, etc.) in the radar operating modes. The NMEA0183 heading refresh rate needs to be 100 ms in order for any radar function to work properly. NMEA0183 heading can be accepted on any CAN bus port at a baud rate up to 38400 bps. In other words, data sent (IF-NMEA) and received (NavNet TZtouch2) must use the same baud rate for each individual data port.

**Note 1:** When using the ARPA function, set the heading refresh rate to 100 ms.

**Note 2:** For more information on connecting and wiring IF-NMEA2K2 or IF-NMEA2K1, refer to their respective installation manuals.

**2.6.4 CAN bus (NMEA2000) input/output****Input PGN**

No.	PGN	Description
01.	059392	ISO Acknowledgment
02.	059904	ISO Request
04.	060928	ISO Address Claim
06.	126208	NMEA-Request Group Function
07.		NMEA-Command Group Function
08.		NMEA-Acknowledge Group Function
11.	126992	System Time
12.	126996	Product Information
13.	127237	Heading/Track Control
14.	127245	Rudder
15.	127250	Vessel Heading
16.	127251	Rate of Turn
17.	127257	Attitude
18.	127258	Magnetic Variation
19.	127488	Engine Parameters, Rapid Update
20.	127489	Engine Parameters, Dynamic
21.	127505	Fluid Level
22.	128259	Speed
23.	128267	Water Depth
24.	129025	Position, Rapid Update
25.	129026	COG & SOG, Rapid Update
26.	129029	GNSS Position Data
27.	129033	Local Time Offset
28.	129038	AIS Class A Position Report
29.	129039	AIS Class B Position Report
30.	129040	AIS Class B Extended Position Report
31.	129041	AIS Aids to Navigation (AtoN) Report
32.	129291	Set & Drift, Rapid Update
33.	129538	GNSS Control Status
34.	129540	GNSS Satellites in View
35.	129793	AIS UTC and Date Report
36.	129794	AIS Class A Static and Voyage Related Data
37.	129798	AIS SAR Aircraft Position Report
38.	129808	DSC Call Information
39.	129809	AIS Class B "CS" Static Data Report, Part A
40.	129810	AIS Class B "CS" Static Data Report, Part B
41.	130306	Wind Data
42.	130310	Environmental Parameters
43.	130311	Environmental Parameters
44.	130312	Temperature
45.	130313	Humidity
46.	130314	Actual Pressure
47.	130316	Temperature, Extended Range
48.	130577	Direction Data
49.	130578	Vessel Speed Component

**Output PGN**

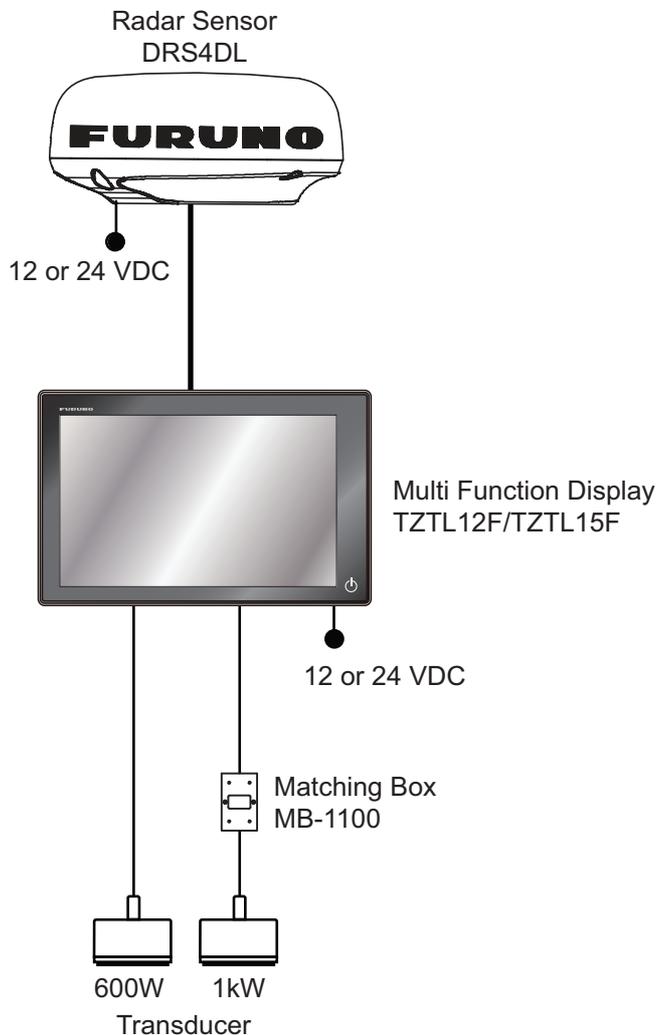
The CAN bus output PGN setting (found under the [Initial Setup] menu) is global to the network. Note that only one NavNet TZtouch2 will output CAN bus data on the network at a time: the NavNet TZtouch2 which is powered ON first. If that display is turned OFF, another will take its place to output the data.

<b>PGN</b>	<b>Description</b>	<b>Remarks</b>	<b>Output cycle (msec)</b>
059392	ISO Acknowledgment	For Certification Level A/B, Refusing output requirement	
059904	ISO Request	For Certification Level A/B, Requiring output	
060928	ISO Address Claim	For Certification Level A/B <ul style="list-style-type: none"> <li>• Address autonomy</li> <li>• Receiving output requirement</li> </ul>	
126208	NMEA-Request group function	For Certification Level A/+ $\alpha$ <ul style="list-style-type: none"> <li>• Address autonomy</li> <li>• Receiving output requirement</li> </ul>	
	NMEA-Command group function	For Certification Level A/+ $\alpha$ Changing the setting of other equipment	
	NMEA-Acknowledge group function	For Certification Level A/+ $\alpha$ Sending the confirmation for NMEA-Request group function and NMEA-Command group function	
126464	PGN List-Transmit PGN's group function	For Certification Level A/+ $\alpha$ Receiving output requirement	
	PGN List-Received PGN's group function	For Certification Level A/+ $\alpha$ Receiving output requirement	
126992	System Time		1000
126993	Heartbeat		
126996	Product Information	For Certification Level A/B Receiving output requirement	
127250	Vessel Heading		100
127251	Rate of Turn		100
127257	Attitude		1000
127258	Magnetic Variation		1000
128259	Speed		1000
128267	Water Depth		1000
129025	Position, Rapid Update		100
129026	COG & SOG, Rapid Update		250
129029	GNSS Position Data		1000
129033	Local Time Offset		1000
129283	Cross Track Error		1000
129284	Navigation Data		1000
129285	Navigation-Route/WP Information	<ul style="list-style-type: none"> <li>• Outputs when waypoint is set/changed (own ship's position is required)</li> <li>• Outputs when receiving ISO request</li> </ul>	
130306	Wind Data		100
130310	Environmental Parameters		500
130312	Temperature		2000
130313	Humidity	Outputs when receiving the ISO request	
130314	Actual Pressure		2000
130316	Temp., Extended Range		2000

## 2.7 Example NavNet TZtouch2 System Configurations

### Small vessels (Internal GPS, Internal Fish Finder, DRS4DL)

The example below shows a typical configuration for small vessels.

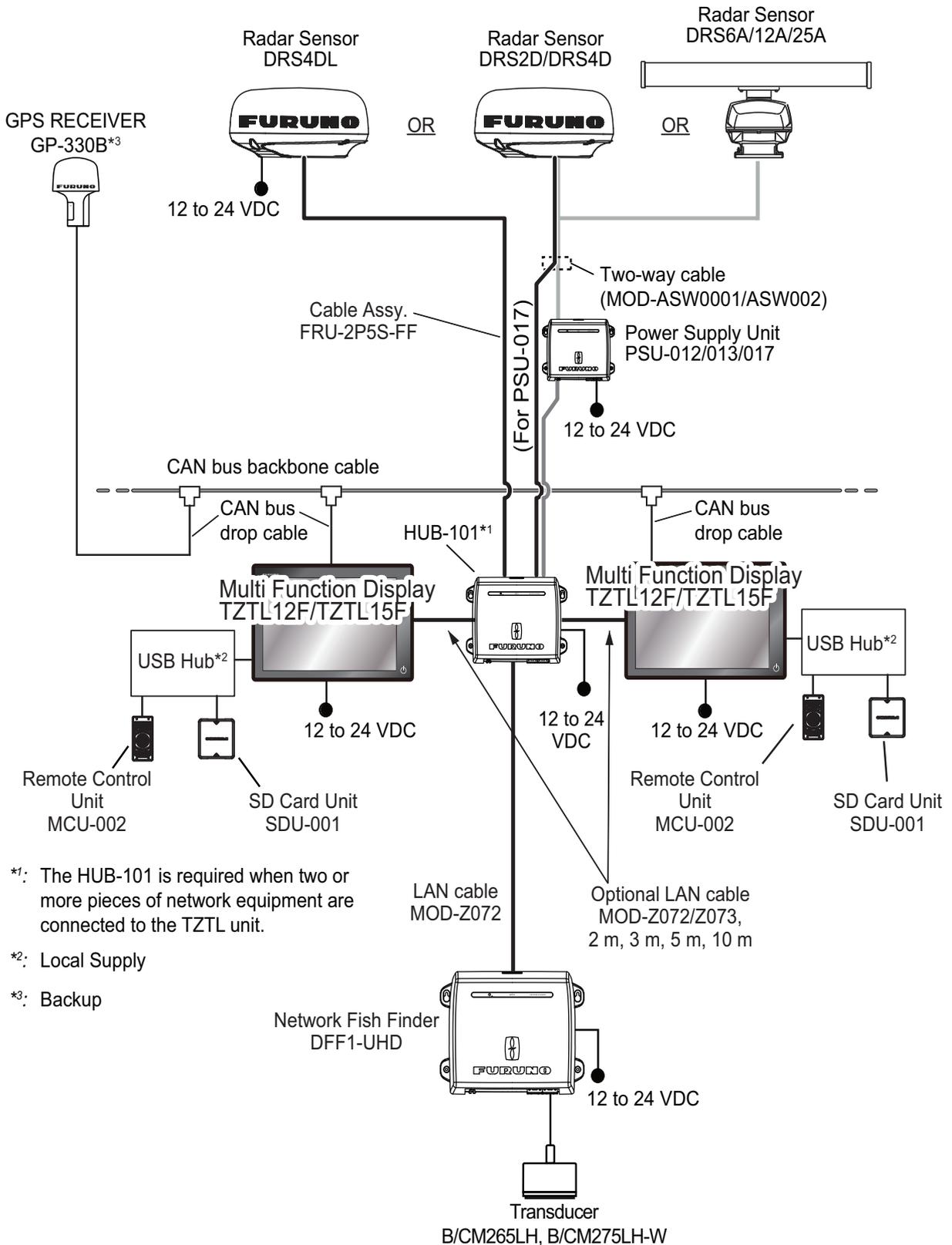


**Note 1:** Matching Box MB-1100 required for some FURUNO transducers. See the INTERCONNECTION DIAGRAM at the back of this manual.

**Note 2:** Radar Sensor DRS4DL connection available from Spring 2015.

**Mid/Large-size vessels (External GPS, Fish Finder, Radar)**

This is a single station plotter/radar/fish finder installation. Connection of multiple sensors, such as DFF1-UHD and DRS series, requires the optional Ethernet Hub HUB-101. Also, the power supply unit PSU-012, PSU-013 or PSU-017 is required for the connection with DRS sensor other than the DRS4DL.



**Note:** Radar Sensor DRS4DL connection available from Spring 2015.

## 2. WIRING

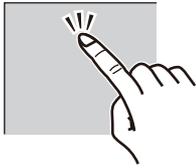
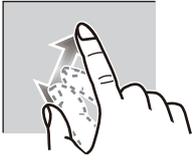
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# 3. HOW TO SET UP THE EQUIPMENT

This chapter shows you how to set up your system according to the equipment you have connected.

## Touch control description

The touch control depends on the screen type. The basic operations to use during the installation setup are in the following table.

	Operating by a finger	Function
Tap		<ul style="list-style-type: none"><li>• Select a menu item.</li><li>• Select a setting option where there are multiple options.</li><li>• Select an object.</li><li>• Display the pop-up menu where available.</li></ul>
Drag		<ul style="list-style-type: none"><li>• Scroll the menu.</li></ul>
Pinch	 Increase range  Reduce range	Change the radar range.

### 3. HOW TO SET UP THE EQUIPMENT

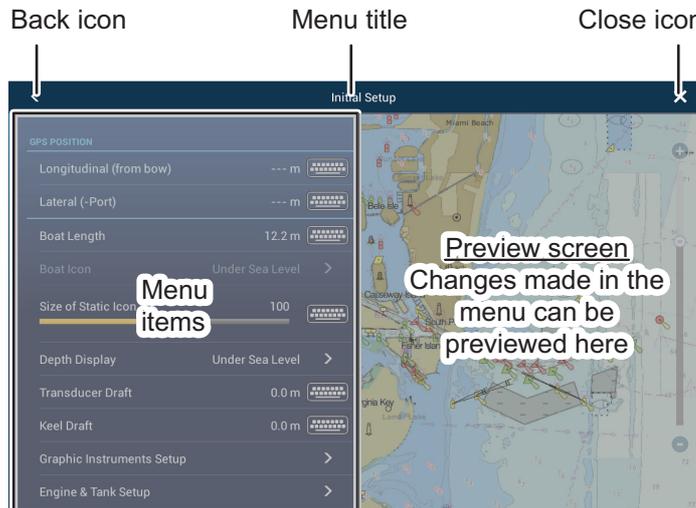
#### How to operate the menus

The following procedure shows how to use the menu system.

1. Tap  (power switch) to turn the power on.
2. After the startup process completes, the last used display appears and a warning message is displayed. After reading the message, tap [OK].
3. Tap the [Home] icon (  Home ) to show the home screen and display mode settings.



4. Tap [Settings] to open the [Settings] menu.
5. Drag the menu to show [Initial Setup], then tap [Initial Setup].

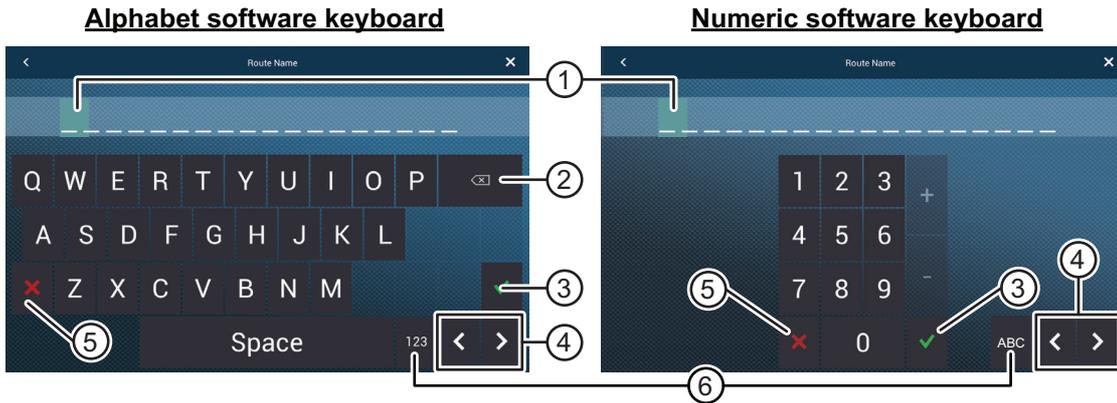


6. Depending on the menu item selected, the following operations are available:

- ON/OFF flipswitch.   
Tap to switch between [ON] and [OFF]. [ON] activates the function, [OFF] deactivates the function.
- Sidebar and keyboard icon.   
Drag the sidebar to adjust the setting. Settings may also be adjusted using the software keyboard for direct input.
- Keyboard icon.   
Referring to the figure on the following page, use the software keyboard to input alphabet or numeric characters.

7. Tap [Close] (Indicated as an "X") at the top right-hand side of the screen to exit.

**How to use the software keyboard**

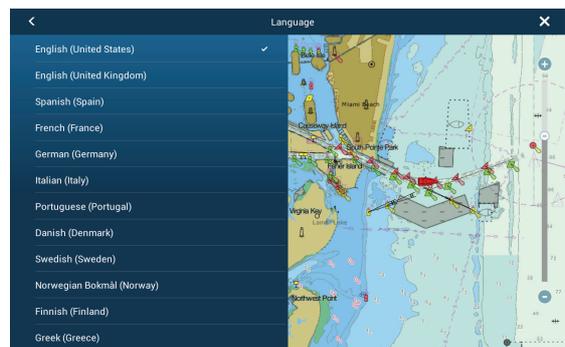
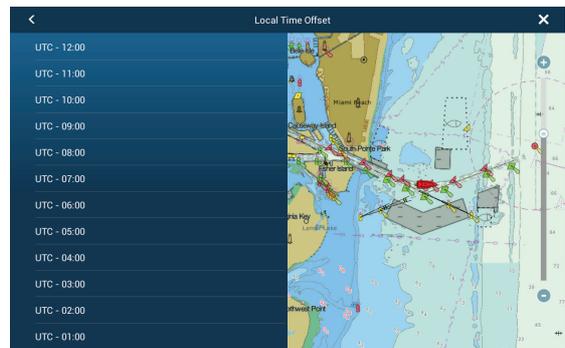


No.	Description
1	Cursor position is highlighted.
2	Backspace/Delete. Tap to erase one character at a time.
3	Enter button. Tap to complete character input and apply changes.
4	Cursor keys. Tap to move the cursor left/right.
5	Cancel button. Aborts character entry. No changes are applied.
6	Tap to switch between alphabet and numeric keyboards (where available).

**3.1 How to Set Time Zone and Language**

Before setting up your equipment, select the time zone, language and units to use on your equipment as shown below.

1. Tap the [Home] icon to show the home screen and display mode settings.
2. Tap [Settings] to show the [Settings] menu.
3. Drag the menu to display the [General] menu item, then tap [General] on the main menu to show the [General] menu.
4. Drag the menu to show the [Local Time Offset] menu item, then tap [Local Time Offset] to show the option window.
5. Tap the time difference between local time and UTC time to use local time from the list.
6. Tap the [<] at the top left of the screen to return to the [General] menu.
7. Drag the menu to display the [Language] menu item, then tap [Language] on the main menu to show the language options.
8. Tap the appropriate language to use. The unit will display a confirmation message. Tap [OK] to restart the unit and apply the new language settings.



## 3.2 How to Set Units of Measurement

1. Tap the [Home] icon to show the home screen and display mode settings.
2. Tap [Settings] to show the [Settings] menu.
3. Drag the main menu to display [Units], then tap [Units].
4. Referring to the table below, set the units to show on the display.

Menu item	Description	Options
[Bearing Display]	Adjust the bearing display format.	[Magnetic], [True]
[True Wind Calculation Reference]	Set the reference for calculating true wind speed/angle.	[Ground], [Surface]
[Position Format]	Set the display format for position (Latitude/Longitude).	[DDD°MM.mmmm'], [DDD°MM.mmm'], [DDD°MM.mm'], [DDD°MM'SS.ss"], [DDD.dddddd°]
[Short/Long Change Over]	Set the distance at which to change between short and long range.	[0.0] to [2.0] (NM)
[Range (Long)]	Set the unit of measurement for long distances.	[Nautical Mile], [Kilometer], [Mile]
[Range (Short)]	Set the unit of measurement for short distances.	[Foot], [Meter], [Yard]
[Depth]	Set the unit of measurement for depth.	[Foot], [Meter], [Fathom], [Passi Braza]
[Height/Length]	Set the unit of measurement for height and length.	[Foot], [Meter]
[Fish Size]	Set the unit of measurement for fish sizes.	[Inch], [Centimeter]
[Temperature]	Set the unit of measurement for temperature.	[Fahrenheit Degree], [Celsius Degree]
[Boat Speed]	Set the unit of measurement for boat speed.	[Knot], [Kilometer per Hour], [Mile per Hour], [Meter per Second]
[Wind Speed]	Set the unit of measurement for wind speed.	[Knot], [Kilometer per Hour], [Mile per Hour], [Meter per Second]
[Atmospheric Pressure]	Set the unit of measurement for atmospheric pressure.	[HectoPascal], [Millibar], [Millimeter of Mercury], [Inch of Mercury]
[Oil Pressure]	Set the unit of measurement for oil pressure.	[KiloPascal], [Bar], [Pound per Square Inch]
[Volume]	Set the unit of measurement for tank volume.	[Gallon] (Gallon & Gallon/hour), [Litre] (Litre & Litre/hour)
[Reset Default Settings]	Restore default unit settings.	[OK], [Cancel]

### 3.3 Initial Setup

This section shows you how to set your system according to the sensors you have connected.

**Note:** Some units are set to metric in this section, actual setting ranges vary depending on the unit of measurement set in the [Units] menu.

1. Tap the [Home] icon to show the home screen and display mode settings.
2. Tap [Settings] to show the [Settings] menu.
3. Drag the main menu, then tap [Initial Setup] to show the [Initial Setup] menu.
4. Referring to the tables on the following pages, set your equipment.

#### [Initial Setup] menu - [GPS POSITION]

Menu item	Description	Options (setting range)
[Longitudinal (from bow)]	Referring to the figure on the right, enter the GPS antenna positioning bow-stern (Longitudinal) and port-starboard (Lateral) position from the origin.	0 (m) to 999 (m)
[Lateral (-Port)]		-99 (m) to +99 (m)



Menu item	Description	Options (setting range)
[Boat Length]	Set the length of your boat.	0 (m) to 999 (m)
[Size of Static Icon]	Set the size of static (such as own ship) icons.	50 to 150
[Depth Display]	Select the start point for depth measurement.	[Under Keel], [Under Sea Level]
[Transducer Draft]	Set the transducer draft.	0.0 (m) to 99.9 (m)
[Keel Draft]	Set the keel draft.	0.0 (m) to 99.9 (m)
[Graphic Instruments Setup]	See "[Initial Setup] menu - [GRAPHIC INSTRUMENTS SETUP]" on page 3-7.	
[Engine & Tank Setup]	See "[Initial Setup] menu - [ENGINE & TANK SETUP]" on page 3-8.	

#### [Initial Setup] menu - [DATA ACQUISITION]

Menu Item	Description	Options (setting range)
[GP330B WAAS Mode]	Select [ON] to use the WAAS mode for the corresponding GPS antenna.	[ON], [OFF]
[WS200 WAAS Mode]		
[Data Source]	Select the source for each data to input to the system. If two or more sources are connected for a data, select one using the pull-down dialog box. The FURUNO products are shown at the upper part of the list.	
[Sensor List]	Show the information for sensors connected to your equipment. Also, you can set "Nickname" for them here.	
[NMEA0183 Output]	[Port Configuration] - [Baud Rate]: Select the output baud rate.	[4,800], [9,600], [38,400]
	[Port Configuration] - [NMEA-0183 Version]: Select the NMEA0183 version for output.	[1.5], [2.0], [3.0]
	[Sentences]: Select the sentences to output.	[ON], [OFF]
[NMEA2000 PGN Output]	Select [ON] for the PGN's (Parameter Group Number, CAN bus (NMEA2000) message) to output from the CAN bus port.	

### 3. HOW TO SET UP THE EQUIPMENT

Menu Item	Description	Options (setting range)
[Sky View]	Show the condition of GPS and GEO (WAAS) satellites. Number, bearing and elevation angle of all GPS and GEO satellites (if applicable) in view of your GPS receiver appear.	

#### **[Initial Setup] menu - [INTERNAL GPS SETUP]**

Menu Item	Description	Options (setting range)
[WAAS Mode]	Set to [OFF] when using external GPS.	[ON], [OFF]

#### **[Initial Setup] menu - [SC-30 SETUP]**

This menu is only available with SC-30 connection.

Menu item	Description	Options (setting range)
[WAAS Mode]	Select [ON] to use the WAAS mode.	[ON], [OFF]
[Heading Offset]	Enter the offset value for heading.	-180° to +180°
[Pitch Offset]	Enter the offset value for pitching.	-90° to +90°
[Roll Offset]	Enter the offset value for rolling.	-90° to +90°

#### **[Initial Setup] menu - [CALIBRATION]**

Menu item	Description	Options (setting range)
[Heading]	Offset heading data.	-180.0° to +180.0°
[Speed Through Water]	Calibrate speed data. Enter amount in percentage.	-50% to +50%
[Wind Speed]	Offset wind speed data. Enter amount in percentage.	-50% to +50%
[Wind Angle]	Offset wind angle data.	-180° to +180°
[Sea Surface Temperature]	Offset sea surface temperature data.	-10°C to +10 °C

#### **[Initial Setup] menu - [DATA DAMPING]**

Menu item	Description	Options (setting range)
[COG & SOG]	Set data damping time. The lower the setting the faster the response to change.	0 to 59 (seconds)
[Heading]		
[Speed Through Water]		
[Wind Speed & Angle]		
[Rate of Turn]		

#### **[Initial Setup] menu - [FUSION]**

Menu item	Description	Options (setting range)
[Connect to Fusion]	Connects to your Fusion equipment.	
[Fusion Auto Volume]	Set to [ON] to allow the NavNet TZtouch2 unit to control the FUSION volume.	
[Minimum Speed]	Set the minimum speed threshold. Exceeding this speed activates volume auto control.	0.0 (kn) to 19.9 (kn)
[Maximum Speed]	Set the maximum speed threshold.	0.1 (kn) to 99.0 (kn)
[Volume Increase]	Set the amount of extra volume to output.	10% to 50%

**[Initial Setup] menu - [BROWSER INSTALLATION]**

Menu item	Description	Option (setting range)
[FAX-30 Browser]	Show the Facsimile Receiver FAX-30 display.	
[FA30 Browser]	Show the AIS Receiver FA-30 display.	
[FA50 Browser]	Show the AIS Receiver FA-50 display.	

**[Initial Setup] menu (Other menu items)**

Menu item	Description	Option (setting range)
[Chart Master Device]	Set to [ON] to use this unit as the master, [OFF] to use this unit as a slave.	
[System ID]	The system ID for this device within the network.	
[IP Address]	IP address for this unit within the network.	
[Quick Self Test]	Displays various details regarding the TZtouch2 unit, radar and fish finder.	
[ServiceMan]	Requires login password. Used by service personnel only.	
[Event/Buzzer Port Configuration]	Select from [Event Input] or [Buzzer Input] to configure information sent to the port.	
[Event Input Configuration]	Select what data is input as an event.	[OFF], [Event], [MOB]
[Update Network Equipments]	Update the list of equipment connected to the same network as this NavNet TZtouch2 unit.	
[Reset Default Settings]	Reset the system to default settings.	[OK], [Cancel]

**[Initial Setup] menu - [GRAPHIC INSTRUMENTS SETUP]**

Menu Item	Description	Options (setting range)
Maximum Boat Speed	Set the transducer's maximum detectable speed.	1 (kn) to 99 (kn)
Maximum Wind Speed	Set the transducer's maximum detectable speed.	1 (kn) to 99 (kn)

**[GRAPHIC INSTRUMENTS SETUP] - [Depth]**

Menu Item	Description	Options (setting range)
Minimum Depth	Set the transducer's minimum detectable depth.	1 (m) to 1999 (m)
Maximum Depth	Set the transducer's maximum detectable depth.	1 (m) to 2000 (m)

**[GRAPHIC INSTRUMENTS SETUP] - [Sea Surface Temperature]**

Menu Item	Description	Options (setting range)
Minimum SST	Set the transducer's minimum detectable temperature.	0.00°C to 98.99°C
Maximum SST	Set the transducer's maximum detectable temperature.	0.01°C to 99.99°C

### 3. HOW TO SET UP THE EQUIPMENT

#### [GRAPHIC INSTRUMENT SETUP] - [Propulsion Engine] or [Other Engine]

Menu Item	Description	Options (setting range)
[Max. RPM]	Set the maximum rpm of your engine to show on the RPM display.	1 (rpm) to 20,000 (rpm)
[Red Zone Oil Pressure]	Set the starting value for the red zone area of the oil pressure meter.	0 (psi) to 59 (psi)
Max. Oil Pressure	Set the maximum oil pressure of your engine.	60 (psi) to 144 (psi)
Min. Temperature	Set the minimum temperature for your engine.	0.00°C to 99.00°C
[Red Zone Temperature]	Set the starting value for the red zone area of the engine temperature indicator.	0.01°C to 999.00°C

Menu Item	Description	Options (setting range)
Reset Instrument Pages	Resets all instrument pages to default.	[OK], [Cancel]
Reset Default Settings	Resets the [Graphic Instrument Setup] menu items to default.	[OK], [Cancel]

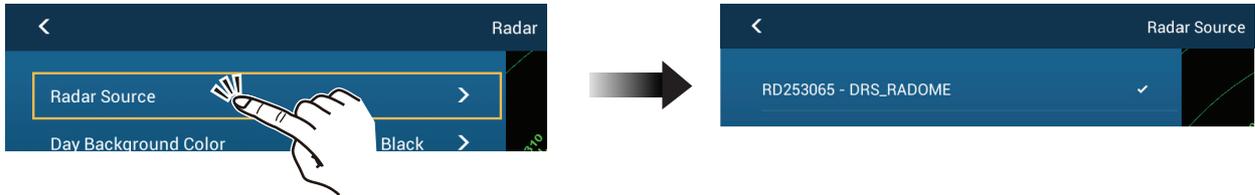
#### [Initial Setup] menu - [ENGINE & TANK SETUP]

Menu Item	Description	Options (setting range)
[Nickname]	Change the nickname for the engine or tank.	
[Used For Propulsion]	Select which engine/tank is used to calculate the distance which may be traveled using the remaining fuel. [ON] uses the engine/tank for calculations, [OFF] ignores the engine/tank.	[ON], [OFF]
[Reset]	Resets the engine/tank details to default.	

### 3.4 How to Set Up the Radar

1. Tap the [Home] icon to show the home screen and display mode settings.
2. Tap [Radar] from the [Settings] menu.
3. Tap [Radar Source], then select the appropriate radar sensor.

**Note:** If a DRS sensor is connected but does not appear in the [Radar Source] list, close the list and open it again. The name of the DRS sensor should appear with a check mark, as in the example below.



4. Drag the [Radar] menu display the menu item [Radar Initial Setup], then tap [Radar Initial Setup].
5. Referring to the tables below, set up the radar.

#### [Radar] menu - [Radar Initial Setup]

Menu item	Description	Options (setting range)
[Antenna Rotation]	Select the speed of antenna rotation.	[Auto], [24 RPM]
[Antenna Heading Align]	See "How to align the antenna heading" on page 3-10.	[-179.9°] to [+180.0°]
[Main Bang Suppression]	If main bang appears at the screen center, slide the circle icon so that the main bang disappears, while watching the radar echo at the left-hand side of the display.	[0] to [100]
[Enable Sector Blanking]	Up to two sectors may be selected for blanking (no transmission). Select [ON] to enable this feature. Set the start and end angles (0° to 359°).	[ON], [OFF]
[Enable Sector 2 Blanking]		

#### [Radar] menu - [Antenna Position]

Menu item	Description	Options (setting range)
[Longitudinal (from bow)]	Referring to the figure on the right, enter the radar antenna positioning bow-stern (Longitudinal) and port-starboard (Lateral) position from the origin.	[0] m to [999] m
[Lateral (-Port)]		[-99] m to [+99] m



Menu item	Description	Options (setting range)
[Antenna Height]	Select the height of the antenna above the waterline.	[Under 3m], [3m-10m], [Over 10m]
[Auto Tuning]	Enable/disable auto tuning for the connected radar.	[ON], [OFF]
[Tuning Source]	Select the range to tune.	[Range1], [Range2]
[Manual Tuning]	Manually tune the radar. Not available when [Auto Tuning] is enabled.	[-50] to [50]
[Radar Monitoring]	Display various information regarding the connected radar.	

### 3. HOW TO SET UP THE EQUIPMENT

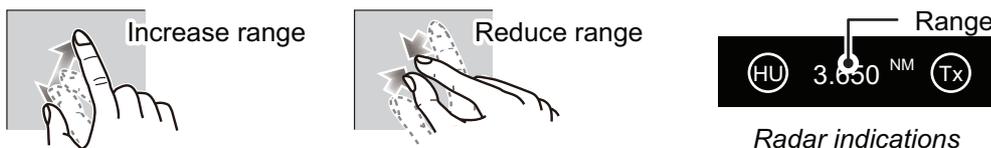
Menu item	Description	Options (setting range)
[Radar Optimization]	Automatically adjust magnetron output and tuning for the connected radar. For service personnel only. Do not change these settings.	
[ARPA Advanced Settings]	For service personnel only. Do not change these settings.	
[Set Hardware To Factory Default]	Resets the radar selected at [Radar Source] to factory default.	[OK], [Cancel]
[Reset Default Settings]	Resets [Radar] menu settings to default.	[OK], [Cancel]

#### **How to align the antenna heading**

You have mounted the antenna unit facing straight ahead in the direction of the bow. Therefore, a small but conspicuous target dead ahead visually should appear on the heading line (zero degrees).

In practice, you will probably observe some small bearing error on the display because of the difficulty in achieving accurate initial positioning of the antenna unit. The following adjustment will compensate for the error.

1. Set your radar with 0.125 and 0.25 nm range and the head up mode.  
You can select a range by using the pinch action. The range appears at the bottom right of the screen. Range may also be selected using the slide bar displayed on the right-hand side of the radar display area. Drag the bar up to zoom in, or down to zoom out.



2. Turn the vessel's bow toward a target.
3. Tap the [Home] icon to show the home screen and display mode settings.
4. Tap [Radar] to show the [Radar] menu.
5. Drag the [Radar] menu to show the [RADAR INITIAL SETUP] menu.
6. Tap [Antenna Heading Align].
7. Key in the offset value so that the target is displayed at the very top of the screen (setting range: +179.9° to -180°, +: clockwise direction, -: counterclockwise direction), then tap the .
8. Confirm that the target echo is displayed at correct bearing on the screen.

## 3.5 How to Set Up the Sounder

If you have a sounder (BBDS1 or DFF series), set up the sounder as shown in this section.

**Note:** Some menu items are restricted to certain external depth sounders and that some menu items may not be available when using the internal depth sounder.

1. Tap the [Home] icon to show the home screen and display mode settings.
2. Tap [Settings].
3. Drag the [Settings] menu to display [Sounder], then tap [Sounder].
4. Drag the Sounder menu to display the [SOUNDER INITIAL SETUP] menu.

### Sounder Initial Setup menu

Menu item	Description	Options (setting range)
[Zero line Rejection]	When you turn the zero line (transmission line) rejection on, the line is not shown, which allows you to see fish echoes near the surface. The width of the line changes with the transducer used and installation characteristics. If the width of the line is 1.4 m or more, select [ON].	[ON], [OFF]
[Zero Line Range]	Adjust the width of the zero line <b>Note:</b> DFF3 only, all other transducer models are fixed at 2.0 m	[1.4m] to [2.5m]
[Transducer Draft]	Set the distance between the transducer and the draft line to show the distance from the sea surface.	[0.0m] to [99.9m]
[Salt Water]	Select [ON] in you use this equipment in salt water.	[ON], [OFF]
[Fish Finder Source]	Select the sounder used.	[TZTL], [DFF1/BBDS1], [DFF3], [DFF1-UHD]
[Transducer Setup]	Setup Transducer and Motion Sensor. See "Transducer Setup menu" on page 3-13.	
[Transmission Power]	Set the TX power level. See the operator's manual for details. <b>Note:</b> For DFF1-UHD users, the settings are as follows: [Off], [Min], [Auto]. The default setting is set to [Auto].	[0] to [10]
[External KP]	Select on to synchronize with external sounder's keying pulse. <b>Note:</b> This menu item is not available when [Fish Finder Source] is set to [TZTL].	[ON], [OFF]
[Bottom Level HF] [Bottom Level LF]	The default bottom level setting (0) determines that two strong echoes received in sequence are bottom echoes. If the depth indication is not stable in the default setting, adjust the bottom level here. If vertical lines appear from the bottom echo in the bottom lock display, lower the bottom level to erase the vertical lines. If you can not identify the fish near the bottom from the bottom echo, increase the bottom level.	[-40] to [40]
[Gain Offset HF] [Gain Offset LF]	If the gain setting is wrong, or there is a difference in the gain between the low and high frequencies, you can balance the gain for the two frequencies here.	[-50] to [50]

### 3. HOW TO SET UP THE EQUIPMENT

Menu item	Description	Options (setting range)
[Auto Gain Offset HF]	If the auto gain offset is wrong, or there is a difference in the gain between the low and high frequencies, set an offset here to balance auto gain for the two frequencies.	[-5] to [5]
[Auto Gain Offset LF]		
[STC HF]	Adjust the low (LF) or high (HF) STC frequency. See the operator's manual for details. <b>Note:</b> This menu item is available only for DFF3 and DFF1-UHD users.	[0] to [10]
[STC LF]		
[Frequency Adjust HF]	Adjust the low (LF) or high (HF) frequency to remove interference caused by other fish finder's operating on the same frequency as your fish finder. See the operator's manual for details. <b>Note:</b> This menu item is available only for DFF3 and DFF1-UHD users.	[-50] to [50]
[Frequency Adjust LF]		
[TX Pulse HF]	The pulse length is automatically set according to range and shift. Use a short pulse for better resolution and a long pulse when detection range is important. To improve resolution on zoom displays, use [Short 1] or [Short 2]. <ul style="list-style-type: none"> <li>• [Short 1] improves the detection resolution, but the detection range is shorter than with [Std] (pulse length is 1/4 of [Std]).</li> <li>• [Short 2] raises the detection resolution, however detection range is shorter (pulse length is about 1/2 of [Std]) than [Std].</li> <li>• [Std] is the standard pulse length, and is suitable for general use.</li> <li>• [Long] increases the detection range but lowers the resolution (about 1/2 compared to the [Std] pulse length)</li> </ul> <b>Note:</b> This menu item is available only for DFF3 users.	[Short1], [Short2], [Standard], [Long]
[TX Pulse LF]		
[RX Band HF]	Set the bandwidth for low (LF) or high (HF) frequency. The RX bandwidth is automatically set according to pulse length. To decrease noise, select [Narrow]. For better resolution, select [Wide]. <b>Note:</b> This menu item available only for DFF3 users.	[Narrow], [Standard], [Wide]
[RX Band LF]		
[Temperature Port]	Set the data source for water temperature. <ul style="list-style-type: none"> <li>• [MJ Port]: Use the temperature/speed sensor for data.</li> <li>• [Low Frequency]: Use the LF sensor for data.</li> <li>• [High Frequency]: Use the HF sensor for data.</li> </ul> <b>Note:</b> Available only for DFF3 and DFF1-UHD users.	[MJ Port], [Low Frequency], [High Frequency]
[Sounder Demo Mode]	Enable or disable the demonstration mode for the sounder. <ul style="list-style-type: none"> <li>• [OFF]: Disable the demo mode.</li> <li>• [Shallow]: Enable shallow water demo mode.</li> <li>• [Deep]: Enable deep water demo mode.</li> </ul> <b>Note:</b> This menu item is not available when [Fish Finder Source] is set to [TZTL].	[OFF], [Shallow], [Deep]
[Set Hardware to Factory Default]	Reset the external fish finder to its factory default settings.	[OK], [Cancel]
[Restore Default Settings]	Restore all menu settings to default.	[OK], [Cancel]

**Transducer Setup menu**

Menu item	Description	Options (setting range)
[Transducer Setup Type]	Select the type of transducer connected. When the connected sounder is a DFF1-UHD and the transducer has a compatible TDID, [TDID] is automatically selected. <ul style="list-style-type: none"> <li>• [Manual]: Manually set up the transducer.</li> <li>• [Model]: Select the appropriate transducer model (for FURUNO or AIRMAR transducers)</li> <li>• [TDID]: Select the TDID for the transducer (for AIRMAR transducers with a TDID)</li> </ul>	[Manual], [Model], [TDID]
[Model Number]	Select the appropriate model number from the list. <b>Note:</b> Only available when Transducer Setup Type is set to [Model].	
[High Frequency Min]	Display the high frequency minimum.*	
[High Frequency Max]	Display the high frequency maximum.*	
[Low Frequency Min]	Display the low frequency minimum.*	
[Low Frequency Max]	Display the low frequency maximum.*	
[Reset Default Settings]	Reset the Transducer Setup menu settings to default.	[OK], [Cancel]

\*: This item is only available for DFF3 users.

**When [Transducer Setup Type] is set to [Model] and connected to DFF3**

Menu item	Description	Options (setting range)
[High Frequency]	Select the model and frequency (HF & LF) of the connected transducer from the appropriate drop down menu.	
[Low Frequency]		

**When [Transducer Setup Type] is set to [Manual]**

Menu item	Description	Options (setting range)
[High Frequency (KHz)]	Set the kHz frequency for high frequency. Setting ranges vary depending on the transducer connected.	
[Transducer Power HF]	Set the transmission power for high frequency. <b>Note 1:</b> This menu item is available only for DFF1, DFF1-UHD, BBDS1 and internal fish finder users. <b>Note 2:</b> For DDF1-UHD users, when the connected transducer TDID is not supported by the DFF1-UHD, the setting is fixed as [1000].	[600], [1000]
Band Width (HF)	Set the bandwidth for high frequency. <b>Note:</b> This item is only available for DFF3 users when the Transducer type is set to [Manual].	[10] to [100]
[Low Frequency (KHz)]	Set the kHz frequency for low frequency. Setting ranges vary depending on the transducer connected.	

### 3. HOW TO SET UP THE EQUIPMENT

Menu item	Description	Options (setting range)
[Transducer Power LF]	Set the transmission power for low frequency. <b>Note 1:</b> This menu item is available only for DFF1, DFF1-UHD, BBDS1 and internal fish finder users. <b>Note 2:</b> For DDF1-UHD users, when the connected transducer TDID is not supported by the DFF1-UHD, the setting is fixed as [1000].	[600], [1000]
[Band Width (LF)]	Set the bandwidth for low frequency. <b>Note:</b> This item is only available for DFF3 users.	[10] to [100]

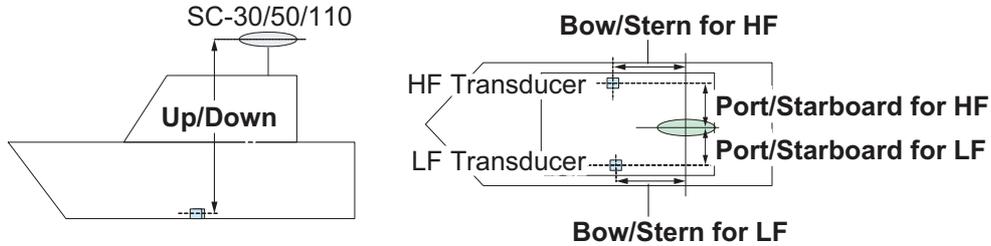
*When [Transducer Setup Type] is set to [TDID]*

Menu item	Description	Options (setting range)
[High Frequency]	Set the frequency (kHz) for the high frequency transducer. <b>Note:</b> This item is displayed when the connected transducer has an unsupported TDID.	
[Transducer Power HF]	Set the transmission power for high frequency. <b>Note 1:</b> This item is only available for DFF1, DFF1-UHD, BBDS1 and internal fish finder users. <b>Note 2:</b> For DDF1-UHD users, when the connected transducer TDID is not supported by the DFF1-UHD, the setting is fixed as [1000].	[600], [1000]
[Low Frequency]	Set the frequency (kHz) for the low frequency transducer. <b>Note:</b> This item is displayed when the connected transducer has an unsupported TDID.	
[Transducer Power LF]	Set the transmission power for low frequency. <b>Note 1:</b> This item is only available for DFF1, DFF1-UHD, BBDS1 and internal fish finder users. <b>Note 2:</b> For DDF1-UHD users, when the connected transducer TDID is not supported by the DFF1-UHD, the setting is fixed as [1000].	[600], [1000]

**Motion sensor menu**

**Note:** Motion sensor setup is not required if [Fish Finder Source] in the [Sounder] menu is set to [Internal].

When you tap [Transducer Setup] from the [Sounder] menu, the [Motion Sensor] menu is shown beneath the [Transducer Setup] menu. If the satellite compass SC-30 or SC50/110 is connected, set the distance between the antenna unit (or sensor) of the satellite compass and transducer (high and low if connected) here.



Menu item	Description	Options (setting range)
[Motion Sensor Type]	Select the sensor connected to you NavNet TZtouch2 unit.	[SC30], [SC50_SC110]
[Antenna Position Bow/Stern HF (LF)]	Set the distance from the antenna unit to the transducer in the bow-stern direction. If the transducer is located on the fore side, set a positive value.	[-99.9] to [+99.9]
[Antenna Position Up/Down HF (LF)]	Set the distance from the transducer to the antenna unit in the vertical direction.	[-0.00] to [+99.9]
[Antenna Port/Starboard HF (LF)]	Set the distance from the antenna unit to the transducer in the port-starboard direction. If the transducer is located on the starboard side, set a positive value.	[-99.9] to [+99.9]

## 3.6 Wireless LAN Setting

### 3.6.1 How to create a wireless LAN network

Smart devices connected to this wireless network may also connect directly to the unit, allowing use of the NavNet TZtouch2 applications.

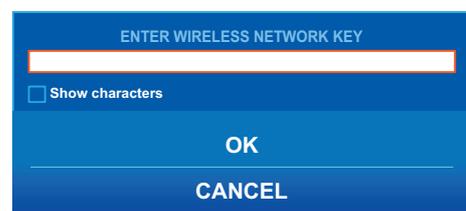
1. Tap the **Home** icon (  ) to show the home screen and display mode settings.
2. Tap [Settings] then [General], in that order.
3. Tap [Wireless LAN Settings].
4. Tap [Wireless Mode] in the [WIRELESS MODE] menu.
5. Tap [Create Local Network], then tap the [<] icon at the top left of the display.
6. Tap [Name] in the [LOCAL NETWORK SETTINGS] menu.
7. Using the software keyboard, name the unit, then tap the ✓.
8. Tap [Password] in the [LOCAL NETWORK SETTINGS] menu.
9. Using the software keyboard, set the password, then tap the ✓.
10. Tap [Local Network] in the [ENABLE LOCAL NETWORK] menu to activate the wireless network.
11. Your smart device may now be connected to the unit, through the network.
  - 1) From the smart device, select the network set at step 7.
  - 2) Input the password set at step 9.

### 3.6.2 How to join an existing wireless network

By connecting to an existing network, you may download software updates and weather information from the internet.

1. Tap the **Home** icon to show the home screen and display mode settings.
2. Tap [Settings] then [General], in that order.
3. Tap [Wireless LAN Settings].
4. Tap [Wireless Mode] in the [WIRELESS MODE] menu.
5. Tap [Connect to existing LAN], then tap the [<] icon at the top left of the display.
6. Tap [Wireless] in the [ENABLE WIRELESS] menu.
7. Tap [Scan] in the [ENABLE WIRELESS] menu. The unit will scan the vicinity for accessible WLAN networks.
8. Tap the appropriate WLAN network, listed under the [AVAILABLE WLAN NETWORKS] icon. The network key input window is displayed.
9. Using the software keyboard, input the network key, then tap [OK]. Input may be confirmed by tapping the [Show characters] box. (See figure to the right).

The unit will now attempt to connect to the network.



# APPENDIX 1 INSTALLATION OF TEMPERATURE SENSORS

The installation instructions in this chapter are copied from the manufacturer's (AIRMAR Technology Corporation) installation guide, which is included with your sensor.

The model numbers mentioned within the documentation should be read as follows:

T42 => T-04MSB

T80 => T-04MTB

## OWNER'S GUIDE & INSTALLATION INSTRUCTIONS

Thru-Hull, Analog

### High-Precision Temperature Sensor

Model T42

Record the information found on the cable tag for future reference.

Part No. \_\_\_\_\_ Date \_\_\_\_\_

05/28/14

17-437-02 rev. 01

**Follow the precautions below for optimal product performance and to reduce the risk of property damage, personal injury, and/or death.**

**WARNING:** Always wear safety goggles and a dust mask when installing.

**WARNING:** Immediately check for leaks when the boat is placed in the water. Do not leave the boat unchecked for more than three hours. Even a small leak can allow considerable water to accumulate.

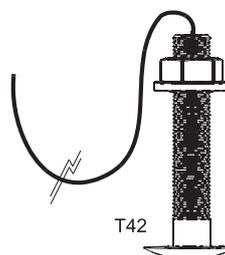
**CAUTION:** Never install a bronze sensor in a metal hull because electrolytic corrosion will occur.

**CAUTION:** Never install a metal sensor on a vessel with a positive ground system.

**CAUTION:** Never pull, carry, or hold the sensor by its cable; this may sever internal connections.

**CAUTION:** Never use solvents. Cleaner, fuel, sealant, paint, and other products may contain solvents that can damage plastic parts, especially the sensor's face.

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



### Tools & Materials

Safety goggles

Dust mask

Electric drill

Drill bit/hole saw/spade bit:

Pilot hole	3mm or 1/8"
T42	22mm or 7/8"

Sandpaper

Mild household detergent or weak solvent (alcohol)

Marine sealant (suitable for below waterline)

Slip-joint pliers

Installation in a cored fiberglass hull (see page 2)

Hole saw for hull interior: 30mm or 1-1/4"

Cylinder, wax, tape, and casting epoxy

Water-based anti-fouling paint (**mandatory in salt water**)

### Sensor Installation

#### Hole Drilling

**Cored fiberglass hull** — Follow separate instructions on page 2.

1. Drill a 3mm or 1/8" pilot hole from inside the hull. If there is a rib, strut, or other hull irregularity near the selected mounting location, drill from the outside.
2. Using the appropriate drill bit, cut a hole perpendicular to the hull from outside the boat.
3. Sand and clean the area around the hole, inside and outside, to ensure that the marine sealant will adhere properly to the hull. If there is any petroleum residue inside the hull, remove it with either mild household detergent or a weak solvent (alcohol) before sanding.

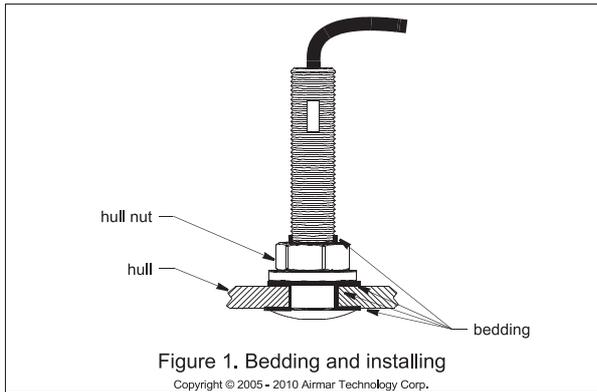
### Applications

- Bronze sensor recommended for fiberglass or wood hull only.
- The hull must be a minimum of 8mm (5/16") thick at the mounting location.

### Mounting Location

Choose a location where the temperature sensor will be in contact with the water at all times.

## APPENDIX 1 INSTALLATION OF TEMPERATURE SENSORS



### Bedding

**CAUTION:** Be sure all surfaces to be bedded are clean and dry.

1. Remove the hull nut (see Figure 1).
2. Apply a 2 mm (1/16") thick layer of marine sealant around the flange of the sensor that will contact the hull and up the stem. The sealant must extend 6 mm (1/4") higher than the combined thickness of the hull and the hull nut. This will ensure that there is marine sealant in the threads to seal the hull and hold the hull nut securely in place.
3. Apply a 2 mm (1/16") thick layer of marine sealant to the flange of the hull nut that will contact the hull.

### Installing

1. From outside the hull, thread the cable through the mounting hole.
2. Push the sensor into the mounting hole using a twisting motion to squeeze out excess marine sealant (see Figure 1).
3. From inside the hull, slide the hull nut onto the cable. Screw the hull nut in place. Tighten it with slip-joint pliers.

**Cored fiberglass hull**—Do not over tighten, crushing the hull.

**Wood hull**—Allow for the wood to swell before tightening.

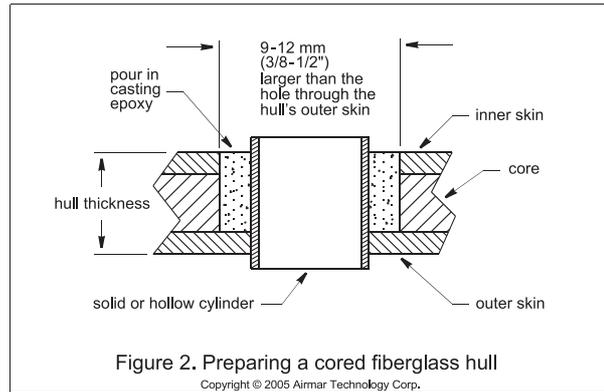
4. Remove any excess marine sealant on the outside of the hull to ensure smooth water flow over the sensor.

### Checking for Leaks

When the boat is placed in the water, **immediately** check around the thru-hull sensor for leaks. Note that very small leaks may not be readily observed. Do not leave the boat in the water for more than 3 hours before checking it again. If there is a small leak, there may be considerable bilge water accumulation after 24 hours. If a leak is observed, repeat "Bedding" and "Installing" **immediately** (see page 2).

### Cable Routing & Connecting

**CAUTION:** If the sensor came with a connector, do not remove it to ease cable routing. If the cable must be cut and spliced, use Airmar's splash-proof Junction Box No. 33-035 and follow the instructions supplied. Removing the waterproof connector or cutting the cable, except when using a water-tight junction box, will void the sensor warranty.



1. Route the cable to the instrument being careful not to tear the cable jacket when passing it through the bulkhead(s) and other parts of the boat. Use grommet(s) to prevent chafing. To reduce electrical interference, separate the transducer cable from other electrical wiring and the engine. Coil any excess cable and secure it in place with cable ties to prevent damage.
2. Refer to the instrument owner's manual to connect the transducer to the instrument.

### Installation in a Cored Fiberglass Hull

The core (wood or foam) must be cut and sealed carefully. The core must be protected from water seepage, and the hull must be reinforced to prevent it from crushing under the hull nut allowing the sensor to become loose.

**CAUTION:** Completely seal the hull to prevent water seepage into the core.

1. Drill a 3 mm or 1/8" pilot hole from inside the hull. If there is a rib, strut, or other hull irregularity near the selected mounting location, drill from the outside. (If the hole is drilled in the wrong location, drill a second hole in a better location. Apply masking tape to the outside of the hull over the incorrect hole and fill it with epoxy.)
2. Using the 21 mm or 7/8" drill bit, cut a hole from outside the hull through the *outer* skin only (see Figure 2).
3. From inside the hull using the 30mm or 1-1/4" hole saw, cut through the *inner* skin and most of the core. The core material can be very soft. Apply only light pressure to the hole saw after cutting through the inner skin to avoid accidentally cutting the *outer* skin.
4. Remove the plug of core material so the *inside* of the outer skin and the inner core of the hull is fully exposed. Clean and sand the inner skin, core, and the outer skin around the hole.
5. Coat a hollow or solid cylinder of the correct diameter with wax and tape it in place. Fill the gap between the cylinder and hull with casting epoxy. After the epoxy has set, remove the cylinder.
6. Sand and clean the area around the hole, inside and outside, to ensure that the sealant will adhere properly to the hull. If there is any petroleum residue inside the hull, remove it with either mild household detergent or a weak solvent (alcohol) before sanding.
7. Proceed with "Bedding" and "Installing" (see page 2).

## Maintenance & Replacement

Aquatic growth can accumulate rapidly on the sensor's surface reducing its performance within weeks. Clean the surface with a Scotch-Brite® scour pad and mild household detergent taking care to avoid making scratches. If the fouling is severe, lightly wet sand with fine grade wet/dry paper.

### *Anti-fouling Paint*

Surfaces exposed to salt water must be coated with anti-fouling paint. *Use water-based anti-fouling paint only.* Never use ketone-based paint since ketones can attack many plastics possibly damaging the sensor. Reapply anti-fouling paint every 6 months or at the beginning of each boating season.

### *Replacement Sensor & Parts*

The information needed to order a replacement sensor is printed on the cable tag. Do not remove this tag. When ordering, specify the part number and date. For convenient reference, record this information at the top of page one.

Lost, broken, or worn parts should be replaced immediately.

Hull nut	02-031-3
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Obtain parts from your instrument manufacturer or marine dealer.

Gemeco	Tel: 803-693-0777
(USA)	Fax: 803-693-0477
	email: sales@gemeco.com

Airmar EMEA	Tel: +33.(0)2.23.52.06.48
(Europe, Middle East, Africa)	Fax: +33.(0)2.23.52.06.49
	email: sales@airmar-emea.com

# OWNER'S GUIDE & INSTALLATION INSTRUCTIONS

## Surface Mount, Analog Temperature Sensor

Model T80

Record the information found on the cable tag for future reference.

Part No. \_\_\_\_\_ Date \_\_\_\_\_



05/28/14

17-584-01 rev. 01

**Follow the precautions below for optimal product performance and to reduce the risk of property damage, personal injury, and/or death.**

**WARNING:** Always wear safety goggles and a dust mask when installing.

**WARNING: Below the waterline mount**—When the boat is placed in the water, immediately check for leaks around the screws and any other holes drilled in the hull.

**CAUTION: Installation on a metal hull**—The stainless steel housing must be isolated from a metal hull to prevent electrolytic corrosion. Use marine sealant.

**CAUTION:** Never install a metal sensor on a vessel with a positive ground system.

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

### Tools & Materials

- Safety goggles
- Dust mask
- Pencil
- Electric drill
- Drill bit/hole saw/spade bit:
  - Pilot holes 3mm or 1/8"
  - Transom hole (some installations) 18mm or 3/4"
- 2 Stainless steel, self-tapping screws 4 x 18mm or #8 x 3/4"
- Marine sealant (suitable for below waterline)
- Screwdriver(s)
- Cable clamp(s) (some installations)
- Grommet(s) (some installations)
- Cable ties

### Installation

#### Mounting on the transom

**CAUTION:** Mount the sensor as close to the centerline (keel) of the boat as possible to ensure the sensor remains in the water when the boat is turning (see Figure1).

**CAUTION: Fiberglass hull**—Minimize surface cracking by running the drill in reverse until the gelcoat is penetrated.

**CAUTION:** If the sensor came with a connector, do not remove it to ease cable routing. If the cable must be cut and spliced, use Airmar's splash-proof Junction Box No. 33-035 and follow the instructions provided. Removing the waterproof connector or cutting the cable, except when using a water-tight junction box, will void the sensor warranty.

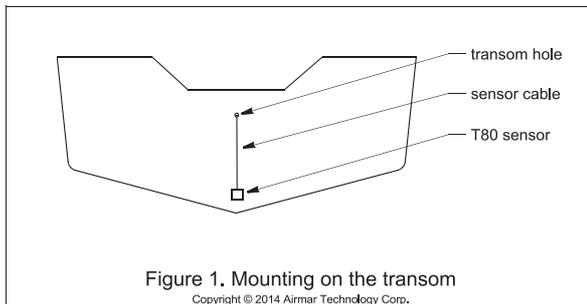
### Applications

- Measures air or water temperature.
- Stainless steel sensor is compatible with all hull materials. Recommended for aluminum hulls to prevent electrolytic corrosion, provided the stainless steel sensor is isolated from the metal hull by using marine sealant.

### Mounting Location

The sensor can be mounted anywhere that you want to know the temperature. For example, you can mount the sensor on the transom, in the live well, or in the engine compartment.

If you are measuring water temperature, choose a location where the sensor will be in contact with the water at all times.



Mount the sensor near the centerline and close to the bottom of the transom.

Route the sensor cable over the transom, through a drain hole, or through a hole that you have drilled in the transom **above the waterline**.

1. Place the sensor against the hull and mark the position of the screw holes with a pencil.
2. Using a 3mm or 1/8" drill bit, drill pilot holes at the marked locations, 10mm (3/8") deep.
3. Apply marine sealant to the threads of the purchased screws to prevent water from seeping into the transom.
4. Screw the temperature sensor to the hull.
5. If a hole must be drilled through the transom, choose a location **well above the waterline**. Check for obstructions such as trim tabs, pumps, or wiring inside the hull. Mark the location with a pencil. Drill a hole through the transom using the appropriate size hole saw or spade bit (to accommodate the connector). Do NOT remove the connector.
6. Route the cable over or through the transom.
7. On the outside of the hull, secure the cable against the transom using a purchased cable clamp(s). Mark the position of the screw hole(s) with a pencil.
8. Using a 3mm or 1/8" drill bit, drill a pilot hole(s) at the marked locations, 10mm (3/8") deep.
9. Apply marine sealant to the threads of the screw(s) to prevent water from seeping into the transom.
10. Fasten the cable clamp(s) in place.
11. If a hole has been drilled through the transom, apply marine sealant to the space around the cable leading through the transom.

### Cable Routing & Connecting

1. Route the cable to the instrument, being careful not to tear the cable jacket when passing it through the bulkhead(s) and other parts of the boat. To reduce electrical interference, separate the sensor cable from other electrical wiring and sources of noise. Coil any excess cable and secure it in place with cable ties to prevent damage.
2. Refer to the instrument owner's manual to connect the sensor to the instrument.

### Replacement Sensor & Parts

The information needed to order a replacement sensor is printed on the cable tag. Do not remove this tag. When ordering, specify the part number and date. For convenient reference, record this information at the top of page one.

Obtain parts from your instrument manufacturer or marine dealer.

Gemeco  
(USA)

Tel: 803-693-0777  
Fax: 803-693-0477  
email: sales@gemeco.com

Airmar EMEA  
(Europe, Middle East, Africa)

Tel: +33.(0)2.23.52.06.48  
Fax: +33.(0)2.23.52.06.49  
email: sales@airmar-emea.com

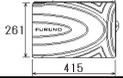
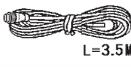


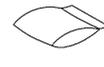
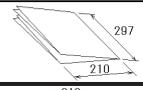
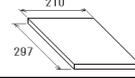
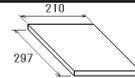
35 Meadowbrook Drive, Milford, New Hampshire 03055-4613, USA  
•www.airmar.com

# PACKING LIST TZTL15F

19BF-X-9852-2 1/1

A-2

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>ユニット UNIT</b>			
マルチファンクションディスプレイ MULTI FUNCTION DISPLAY		TZTL15F-* 000-027-061-00 **	1
<b>予備品 SPARE PARTS</b>			
予備品 SPARE PARTS		SP19-00601 001-023-040-00	1
<b>付属品 ACCESSORIES</b>			
付属品 ACCESSORIES		FP19-02001 001-337-380-00	1 (*1)
付属品 ACCESSORIES		FP19-02011 001-337-390-00	1 (*2)
<b>工事材料 INSTALLATION MATERIALS</b>			
ケーブル(ケミヒン)MJ CABLE ASSEMBLY		MJ-A3SPF0019-035C 000-156-058-10	1
工事材料 INSTALLATION MATERIALS		CP19-01802 001-337-360-00	1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>工事材料</b> INSTALLATION MATERIALS		CP19-01901 001-337-340-00	1
<b>図書 DOCUMENT</b>			
フラッシュマウント型紙 FLUSH MOUNTING TEMPLATE		C42-01408-* 000-190-077-1*	1
操作要領書 OPERATOR'S GUIDE		OS*-44870-* 000-190-070-1*	1
装備要領書 INSTALLATION MANUAL		IM*-44870-* 000-190-073-1*	1

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

2.(\*1)の付属品は、和文仕様専用です。  
2.(\*1) MARKED ACCESSORIES ARE FOR JAPANESE SET ONLY.

3.(\*2)の付属品は、英文仕様専用です。  
3.(\*2) MARKED ACCESSORIES ARE FOR ENGLISH SET ONLY.

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

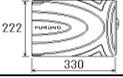
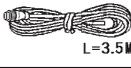
型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

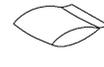
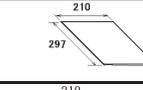
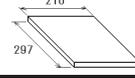
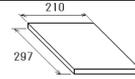
C4489-Z01-C

# PACKING LIST TZTL12F

19BF-X-9851-2 1/1

A-1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>ユニット UNIT</b>			
マルチファンクションディスプレイ MULTI FUNCTION DISPLAY		TZTL12F-* 000-027-059-00 **	1
<b>予備品 SPARE PARTS</b>			
予備品 SPARE PARTS		SP19-00601 001-023-040-00	1
<b>付属品 ACCESSORIES</b>			
付属品 ACCESSORIES		FP19-02001 001-337-380-00	1 (*1)
付属品 ACCESSORIES		FP19-02011 001-337-390-00	1 (*2)
<b>工事材料 INSTALLATION MATERIALS</b>			
ケーブル(ケミヒン)MJ CABLE ASSEMBLY		MJ-A3SPF0019-035C 000-156-058-10	1
工事材料 INSTALLATION MATERIALS		CP19-01801 001-337-330-00	1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>工事材料</b> INSTALLATION MATERIALS		CP19-01802 001-337-360-00	1
<b>図書 DOCUMENT</b>			
フラッシュマウント型紙 FLUSH MOUNTING TEMPLATE		C42-01407-* 000-190-076-1*	1
操作要領書 OPERATOR'S GUIDE		OS*-44870-* 000-190-070-1*	1
装備要領書 INSTALLATION MANUAL		IM*-44870-* 000-190-073-1*	1

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

2.(\*1)の付属品は、和文仕様専用です。  
2.(\*1) MARKED ACCESSORIES ARE FOR JAPANESE SET ONLY.

3.(\*2)の付属品は、英文仕様専用です。  
3.(\*2) MARKED ACCESSORIES ARE FOR ENGLISH SET ONLY.

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

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

C4487-Z01-C

**FURUNO**

CODE NO.	001-337-360-00	19BF-X-9402-1
TYPE	CP19-01802	1/1

**工事材料表**

INSTALLATION MATERIALS					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	フラッシュマウント金具 FLUSH MOUNT FIXTURE		CP19-01803 CODE NO. 001-337-360-00	2	
2	EMIコア EMI CORE		GRFC-9 CODE NO. 000-180-381-10	1	
3	六角スリットボルト HEX BOLT (SLOTTED HEAD)		M6X12 SUS304 CODE NO. 000-162-897-10	2	

型式/コード番号が2段の場合、下段より上段に代わる標準部品であり、どちらかが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.  
QUALITY IS THE SAME. DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)  
(略図の寸法は、参考値です。)

FURUNO ELECTRIC CO., LTD.

C4487-M02-B

**FURUNO**

CODE NO.	001-337-380-00	19BF-X-9501-1
TYPE	FP19-02001	1/1

**付属品表**

ACCESSORIES					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	液晶クリーニングシート LCD CLEANING CLOTH		I9-028-3125-2 CODE NO. 100-300-672-10	1	
2	WiFiスティッカー WIFI LABEL STICKER		I9-031-1563-0 CODE NO. 100-375-230-10	1	
3	ケーブル付属品 CABLE ACCESSORIES		CAF6-BK-PE CODE NO. 000-100-329-10	1	

型式/コード番号が2段の場合、下段より上段に代わる標準部品であり、どちらかが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.  
QUALITY IS THE SAME. DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)  
(略図の寸法は、参考値です。)

FURUNO ELECTRIC CO., LTD.

C4487-F01-B

**FURUNO**

CODE NO.	001-337-330-00	19BF-X-9401-0	1/1
TYPE	CP19-01801		

**工事材料表**

## INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	Fマウント用 スポンジ 12H F MOUNT SPONGE 12H		19-032-1062-0 CODE NO. 100-397-060-10	2	
2	Fマウント用 スポンジ 12V F MOUNT SPONGE 12V		19-032-1063-0 CODE NO. 100-397-060-10	2	

型式/コード番号が2取の場合、下取より上取に代わる運送部品であり、どちらが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.  
QUALITY IS THE SAME.  
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

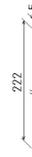
C4487-M01-A

**FURUNO**

CODE NO.	001-337-340-00	19BF-X-9403-0	1/1
TYPE	CP19-01901		

**工事材料表**

## INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	Fマウント用 スポンジ 15H F MOUNT SPONGE 15H		19-032-2062-1 CODE NO. 100-397-551-10	2	
2	Fマウント用 スポンジ 15V F MOUNT SPONGE 15V		19-032-2063-1 CODE NO. 100-397-551-10	2	

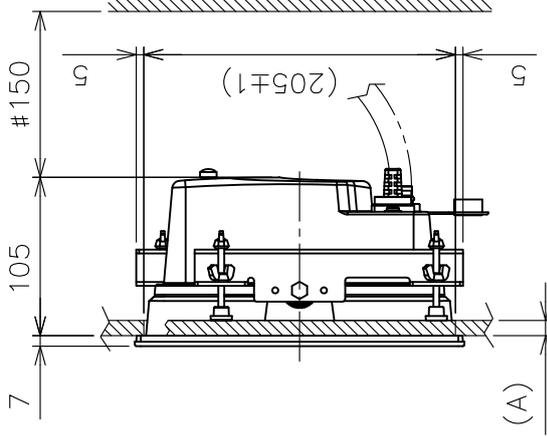
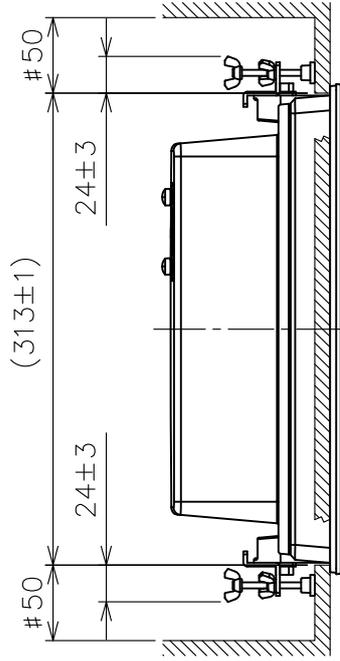
型式/コード番号が2取の場合、下取より上取に代わる運送部品であり、どちらが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.  
QUALITY IS THE SAME.  
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

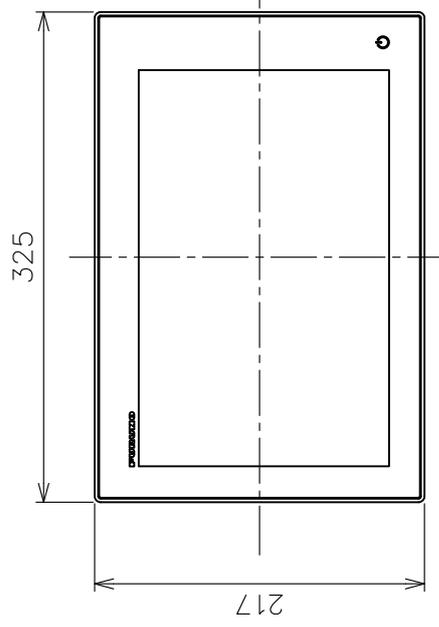
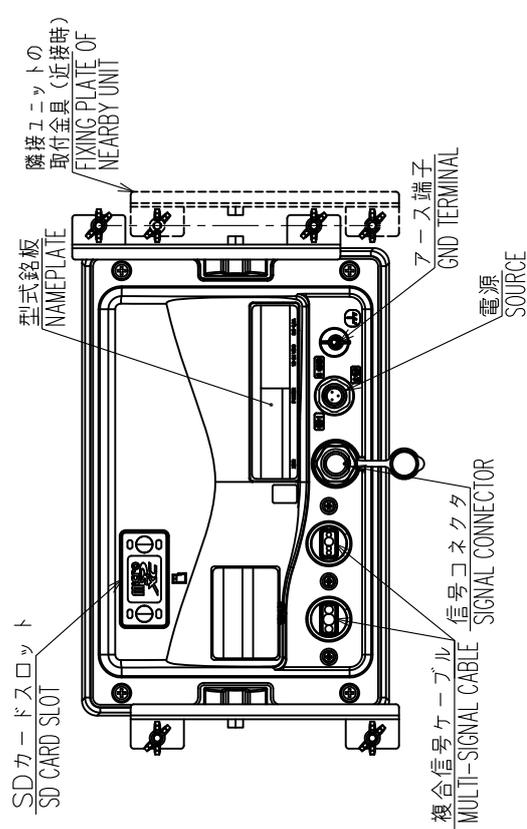
C4489-M01-A

表1 TABLE 1

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$



取付穴寸法図  
CUTOUT DIMENSIONS



注 記

- 1) 指定外の寸法公差は表1による。
- 2) #印寸法は最小サービス空間寸法とする。
- 3) 壁の厚さ(A)は最小5mm、最大20mmとする
- 4) 装備面は湾曲のない、平らなものとする。

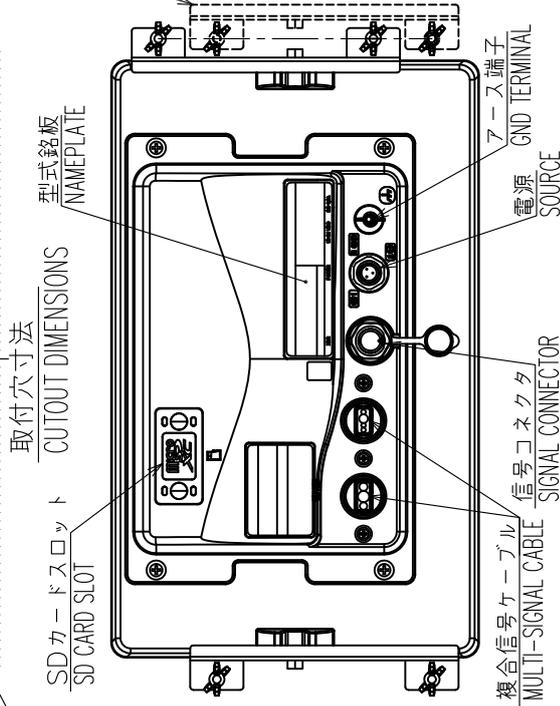
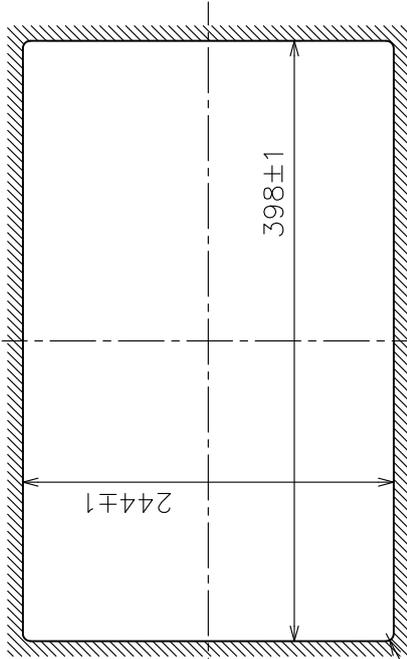
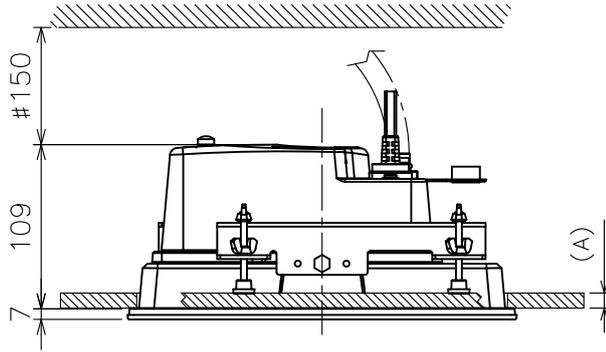
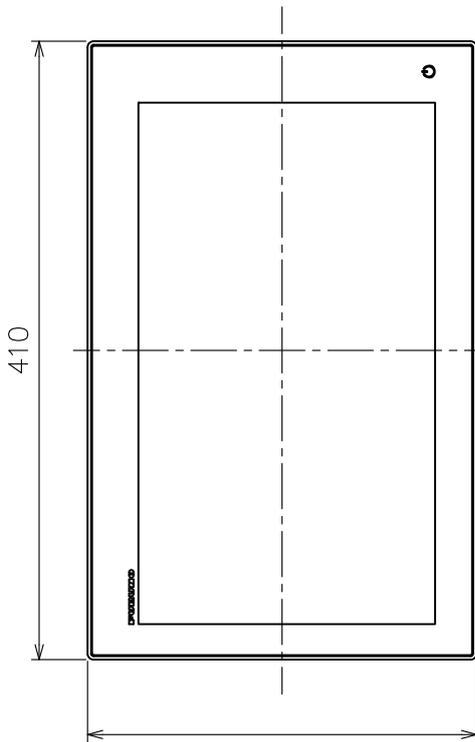
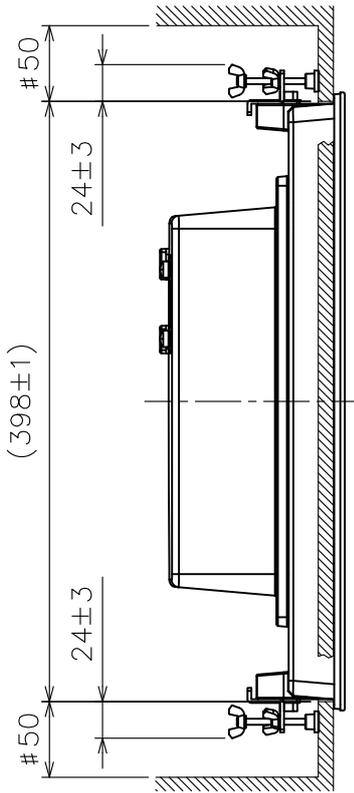
NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # MINIMUM SERVICE CLEARANCE.
3. BULKHEAD THICKNESS (A):  $5 \leq A \leq 20$ .
4. MOUNTING LOCATION SHOULD BE FLAT WITHOUT DISTORTION.

DRAWN	17/Dec/2014	I.YAMASAKI	TITLE	TZTL12F
CHECKED	17/Dec/2014	H.MAKI	名称	マルチファンクションディスプレイ (埋込装置)
APPROVED			外寸図	
SCALE	1/5	質量は複合信号ケーブルを含む #104 MASS INCLUDES MULTI-SIGNAL CABLE.	NAME	MULTI FUNCTION DISPLAY (FLUSH MOUNT S)
DWG.No.	C4487-G01-C	REF.No.	19-032-100G-0	OUTLINE DRAWING

表1 TABLE 1

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



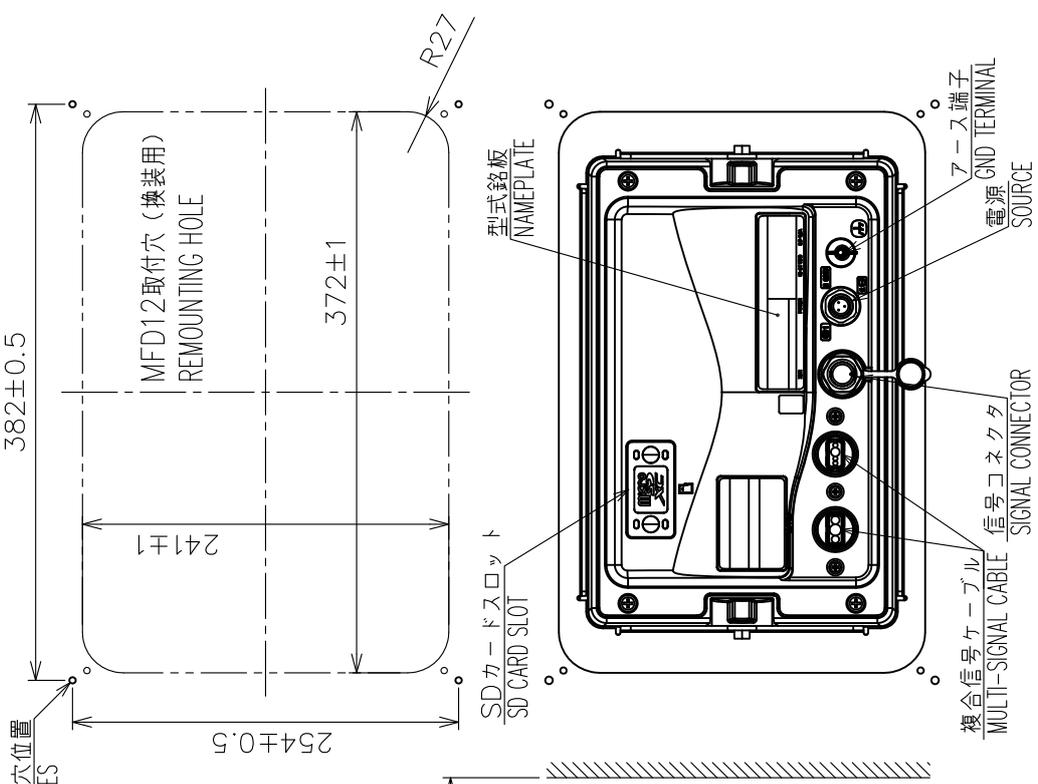
注 記

- 1) 指定外の寸法公差は表1による。
- 2) #印寸法は最小サービス空間寸法とする。
- 3) 壁の厚さ(A)は最小5mm、最大20mmとする。
- 4) 装備面は湾曲のない、平らなものとする。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. BULKHEAD THICKNESS (A): 5 ≤ A ≤ 20.
4. MOUNTING LOCATION SHOULD BE FLAT WITHOUT DISTORTION.

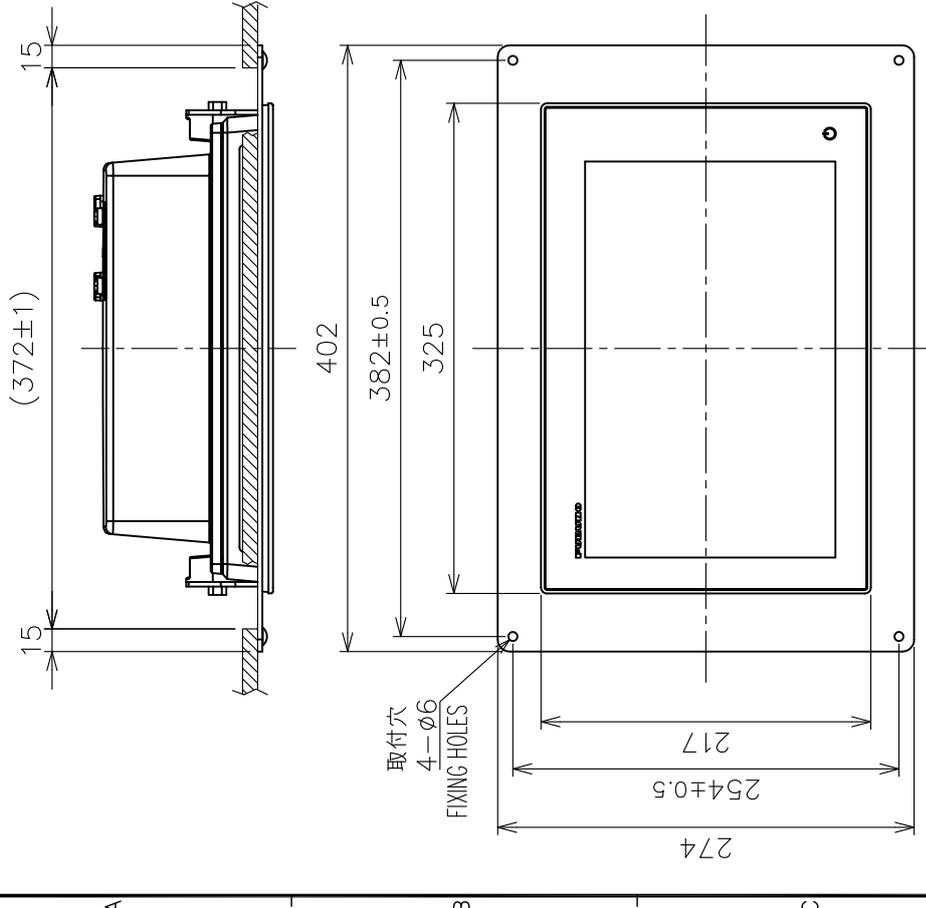
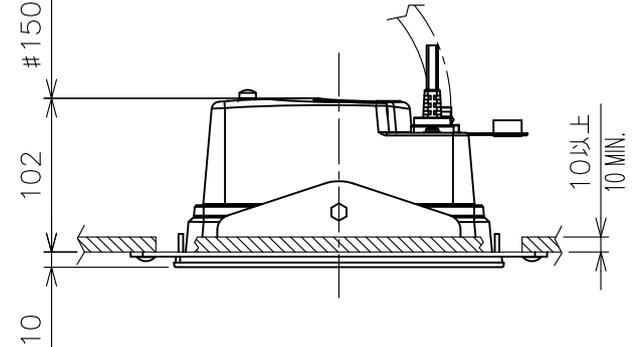
DRAWN	17/Dec/2014	I.YAMASAKI	TITLE	TZTL15F
CHECKED	17/Dec/2014	H.MAKI	名称	マルチファンクションディスプレイ (埋込装置S)
APPROVED			外形図	
SCALE	1/5	質量は複合信号ケーブルを含む #104 MASS INCLUDES MULTI-SIGNAL CABLE.	NAME	MULTI FUNCTION DISPLAY (FLUSH MOUNT S)
DWG.No.	C4489-G01-C	REF.No.	19-032-200G-1	OUTLINE DRAWING



4-取付穴位置 PILOT HOLES

表1 TABLE 1

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$



注 記

- 1) 指定外の寸法公差は表1による。
- 2) #印寸法は最小サービス空間寸法とする。
- 3) 取付用ネジは+トラスタックピッチネジ呼び径5×20を使用のこと。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS  $\phi 5 \times 20$  FOR FIXING UNIT.

DRAWN	22/Aug/2014	I.YAMASAKI	TITLE	TZTL12F
CHECKED	22/Aug/2014	H.MAKI	名称	マルチファンクションディスプレイ (埋込装備B)
APPROVED	27/Aug/2014	H.MAKI	外寸図	
SCALE	1/5	質量は複合信号ケーブルを含む #104 MASS INCLUDES MULTI-SIGNAL CABLE.	NAME	MULTI FUNCTION DISPLAY (FLUSH MOUNT B)
DWG.No.	C4487-G04-A	REF.No.	19-032-130G-0	OUTLINE DRAWING

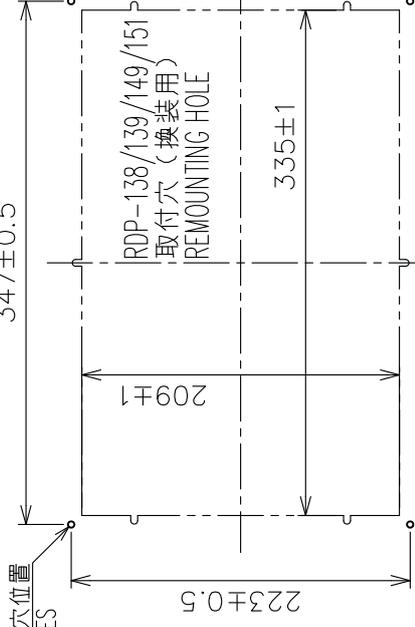


表1 TABLE 1

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

4-取付穴位置  
PILOT HOLES

取付穴寸法  
CUTOUT DIMENSIONS

SDカードスロット  
SD CARD SLOT

型式銘板  
NAMEPLATE

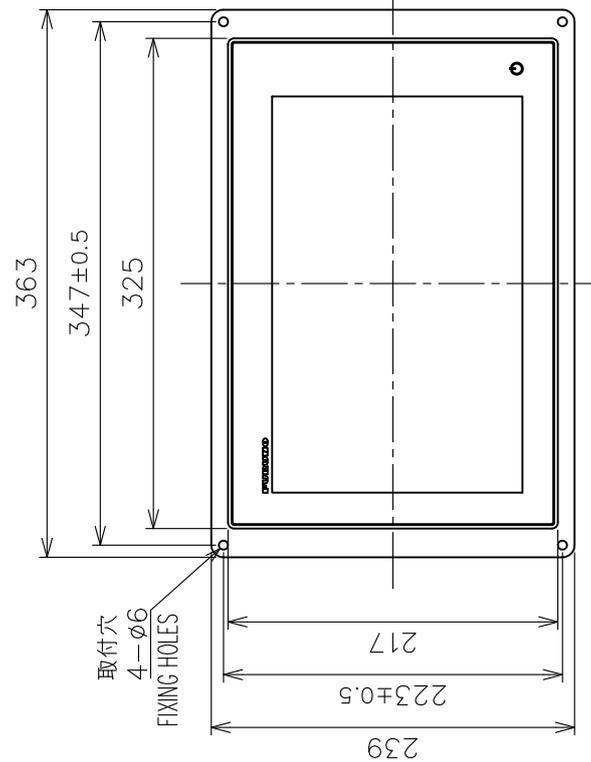
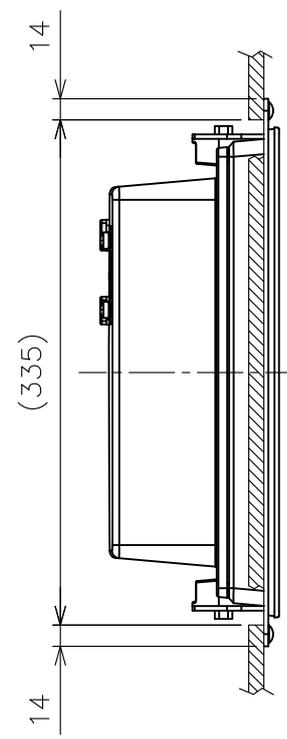
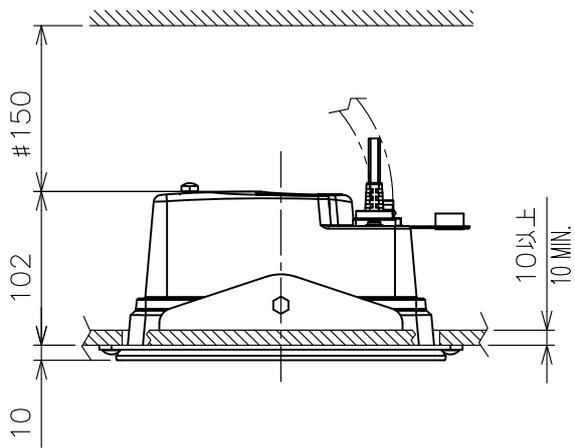
複合信号ケーブル  
MULTI-SIGNAL CABLE

信号コネクタ  
SIGNAL CONNECTOR

アース端子  
GND TERMINAL

電源  
SOURCE

外図  
OUTLINE DRAWING



取付穴  
4-φ6  
FIXING HOLES

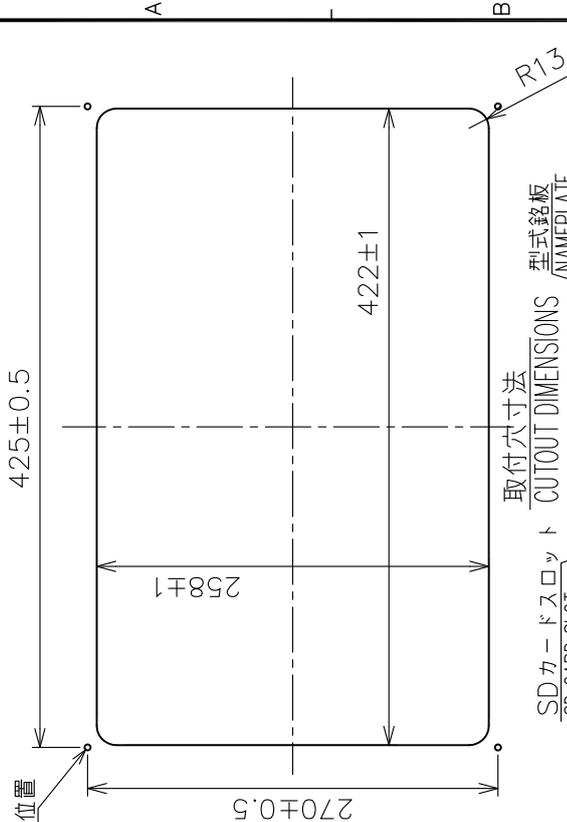
注 記

- 1) 指定外の寸法公差は表1による。
- 2) #印寸法は最小サービスクリアランスとする。
- 3) 取付用ネジは+トラスタックピンネジ呼び径5×20を使用のこと。

NOTE

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

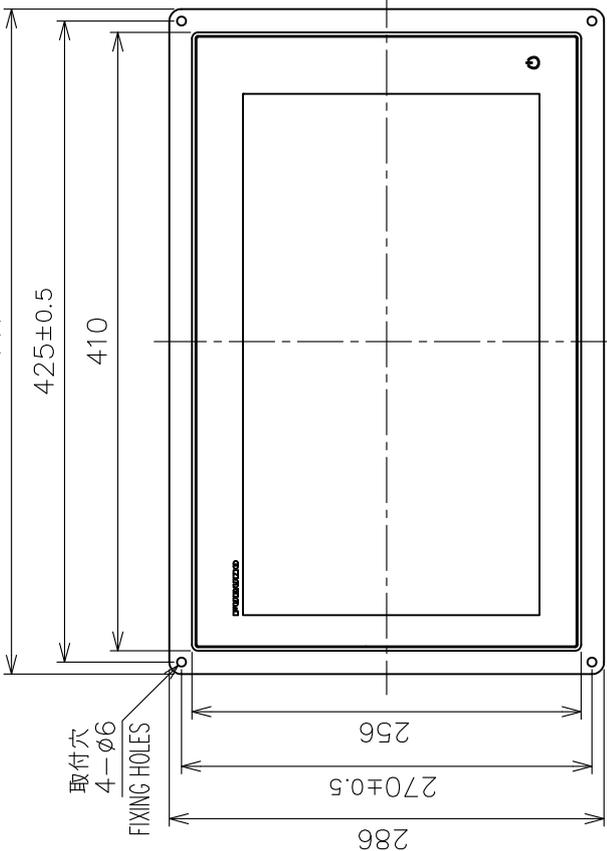
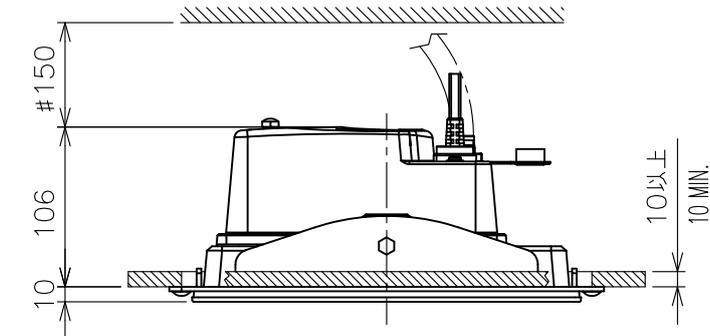
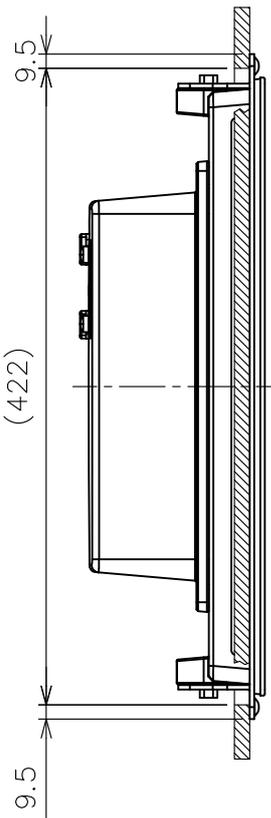
DRAWN	22/Aug/2014	T.YAMASAKI	TITLE	TZTL12F	
CHECKED	22/Aug/2014	H.MAKI	名称	マルチファンクションディスプレイ (埋込装置A)	
APPROVED	27/Aug/2014	H.MAKI	外図		
SCALE	1/5	WISS 3.6 kg	質量は複合信号ケーブルを含む MASS INCLUDES MULTI-SIGNAL CABLE.	NAME	MULTI FUNCTION DISPLAY (FLUSH MOUNT A)
DWG.No.	C4487-G03-A	REF.No.	19-032-120G-0	OUTLINE DRAWING	



4-取付穴位置  
PILOT HOLES

表1 TABLE 1

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

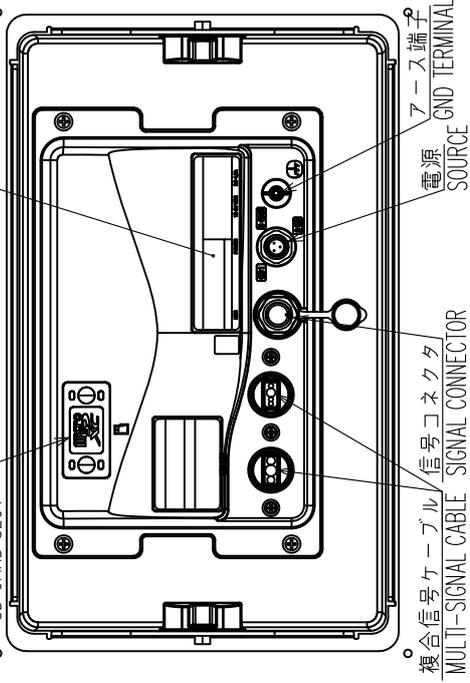


取付穴  
4-φ6  
FIXING HOLES

SDカードスロット  
SD CARD SLOT

取付穴寸法  
CUTOUT DIMENSIONS

型式銘板  
NAMEPLATE



注記

- 1) 指定外の寸法公差は表1による。
- 2) #印寸法は最小サービスマン寸法とする。
- 3) 取付用ネジは+トラスチックピンネジ5×2.0を使用のこと。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ5x2.0 FOR FIXING THE UNIT.

DRAWN	26/Aug/2014	I.YAMASAKI	TITLE	TZTL15F
CHECKED	26/Aug/2014	H.MAKI	名称	マルチファンクションディスプレイ (埋込装備F)
APPROVED	27/Aug/2014	H.MAKI	外寸図	
SCALE	1/5	質量は複合信号ケーブルを含む MASS INCLUDES MULTI-SIGNAL CABLE.	NAME	MULTI FUNCTION DISPLAY (FLUSH MOUNT F)
DWG.No.	C4489-G03-A	REF.No.	19-032-220G-1	OUTLINE DRAWING

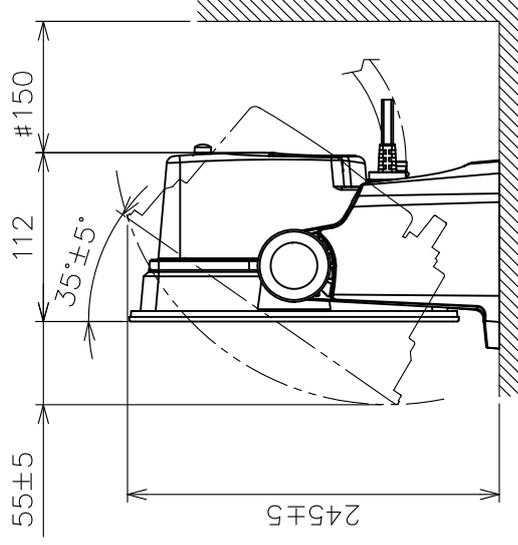
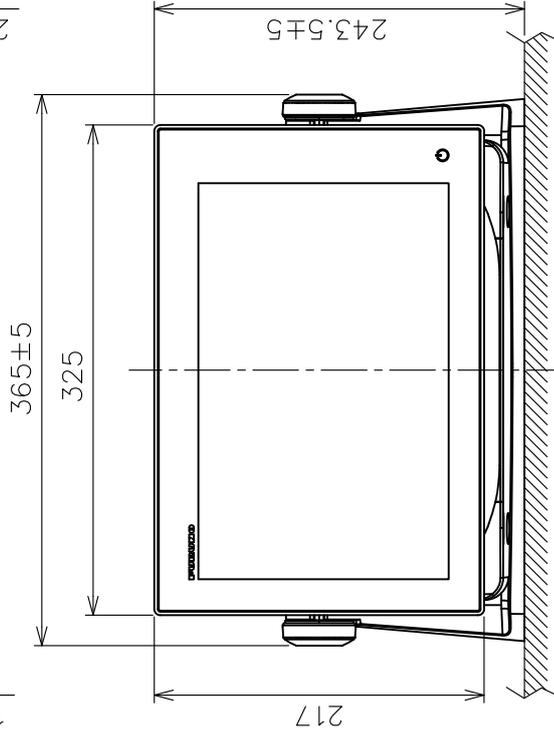
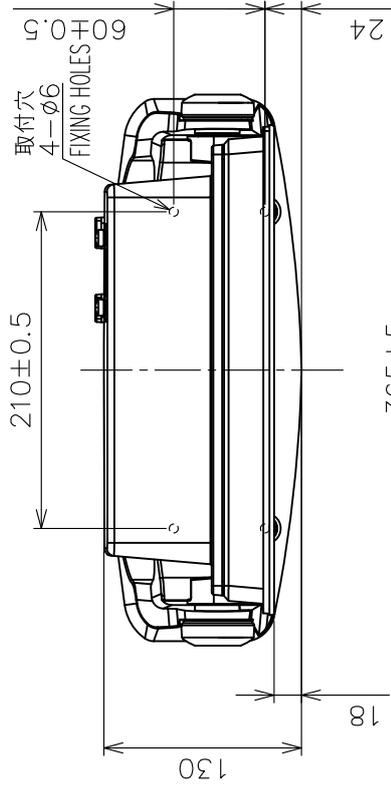
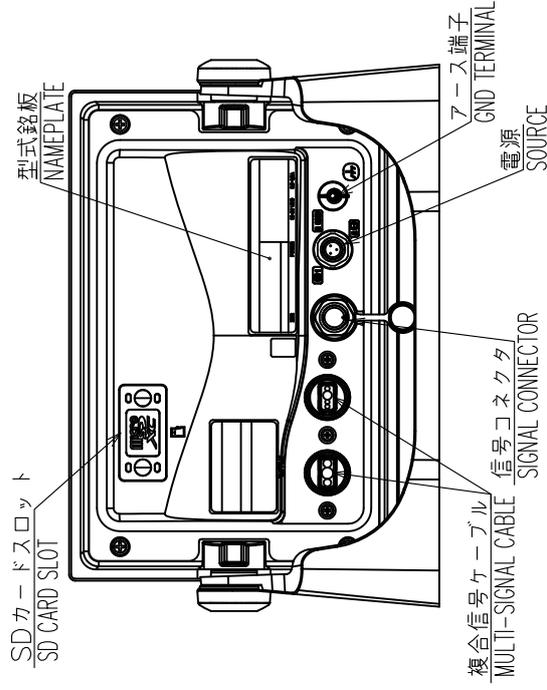


表1 TABLE 1

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



注 記

- 1) 指定外の寸法公差は表1による。
- 2) #印寸法は最小サービースペース寸法とする。
- 3) 取付用ネジは+トラスタッピンネジ呼び径5×20を使用のこと。

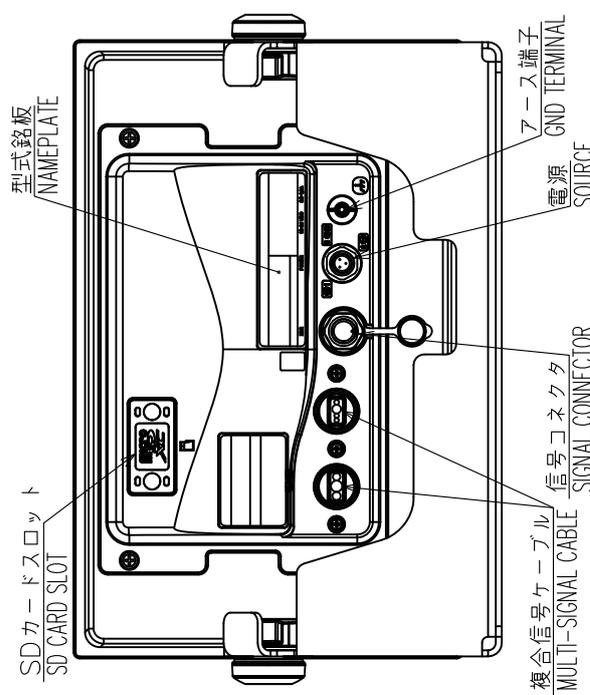
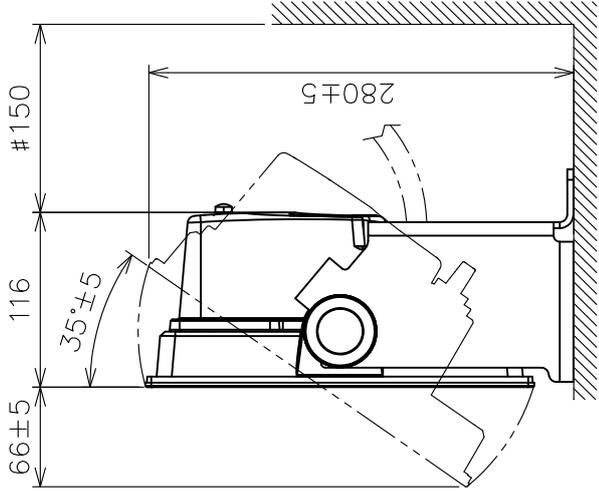
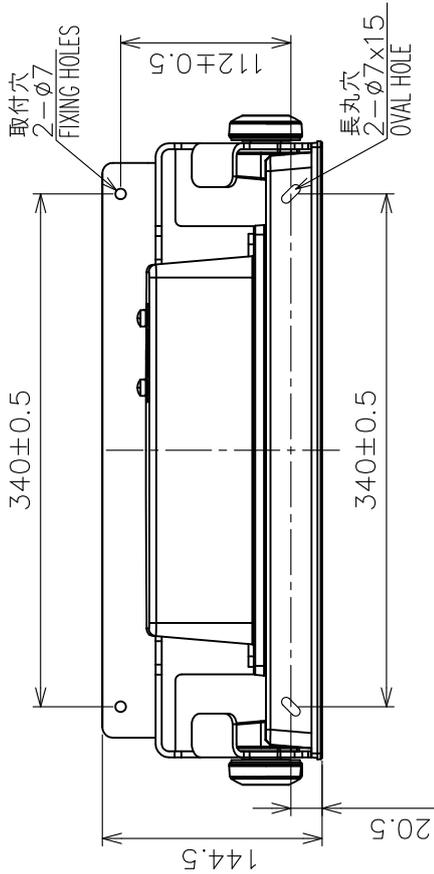
NOTE

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

DRAWN	22/Aug/2014	I.YAMASAKI	TITLE	TZTL12F
CHECKED	22/Aug/2014	H.MAKI	名称	マルチファンクションディスプレイ (卓上装備)
APPROVED	27/Aug/2014	H.MAKI	外図	
SCALE	1/5	質量は複合信号ケーブルを含む #104 MASS INCLUDES MULTI-SIGNAL CABLE.	NAME	MULTI FUNCTION DISPLAY (TABLETOP MOUNT)
DWG.No.	C4487-G02-A	REF.No.	19-032-110G-0	OUTLINE DRAWING

表 1 TABLE 1

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



注 記

- 1) 指定外の寸法公差は表 1 による。
- 2) # 印寸法は最小サービスマン空間寸法とする。
- 3) 取付用ネジは+トラスタップピンネジ呼び径5×20を使用のこと。

NOTE

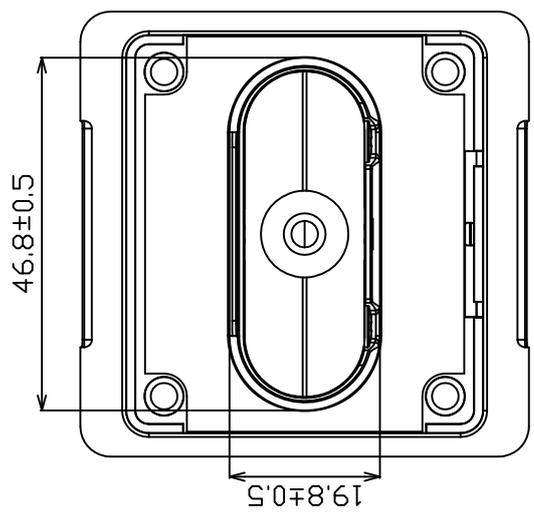
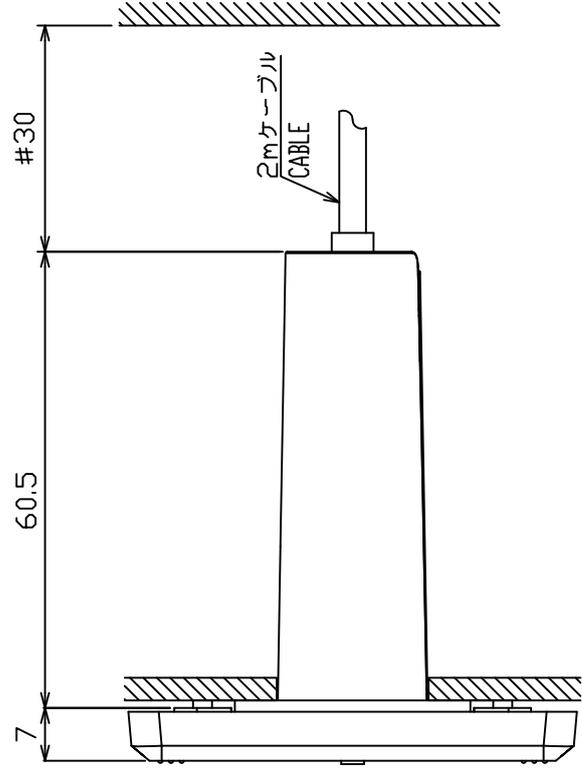
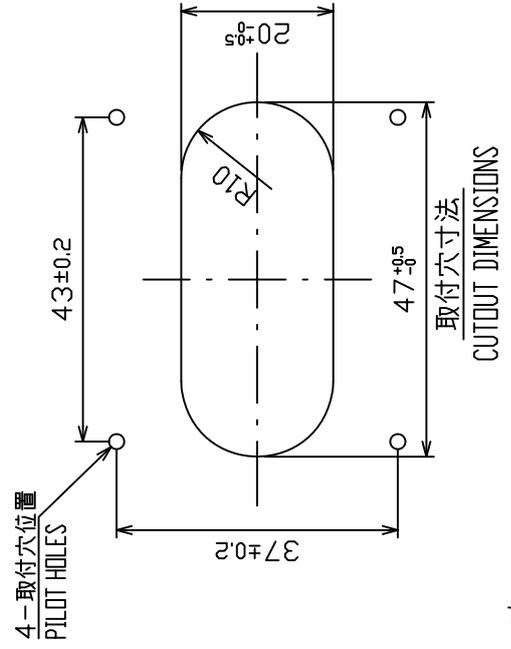
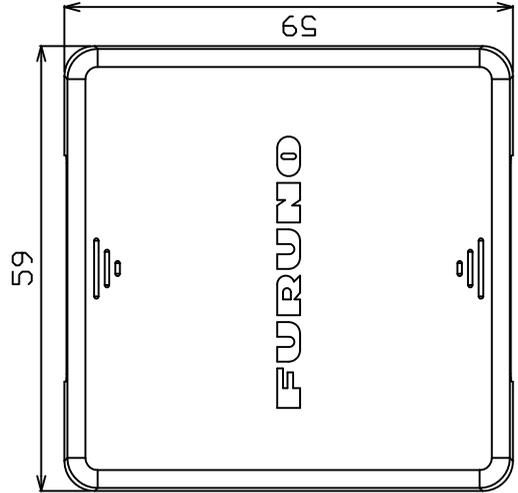
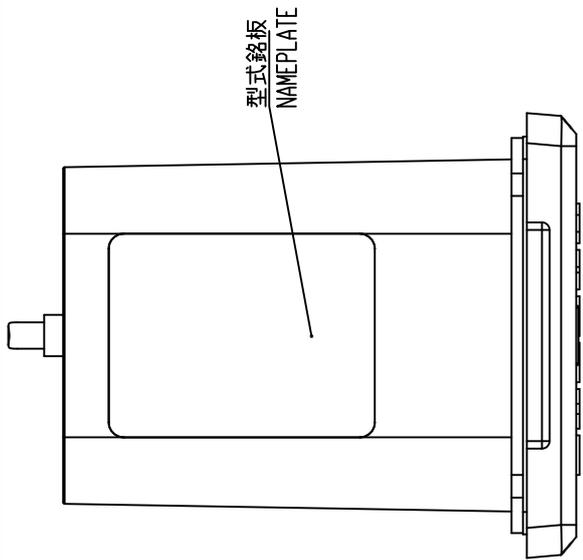
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ5x20 FOR FIXING THE UNIT.

DRAWN 4/Nov/2014 I.YAMASAKI	TITLE TZTL15F
CHECKED 4/Nov/2014 H.MAKI	名称 マルチファンクションディスプレイ (卓上装備)
APPROVED	外寸図
SCALE 1/5	質量 5.6 kg
DWG.No. C4489-G02-B	質量は複合信号ケーブルを含む MASS INCLUDES MULTI-SIGNAL CABLE.
	REF.No. 19-032-210G-2

2 3 4

表 1 TABLE 1

寸法区分(mm)	公差(mm)
DIMENSION	TOLERANCE
L ≤ 50	±0.5
50 < L ≤ 100	±1.0



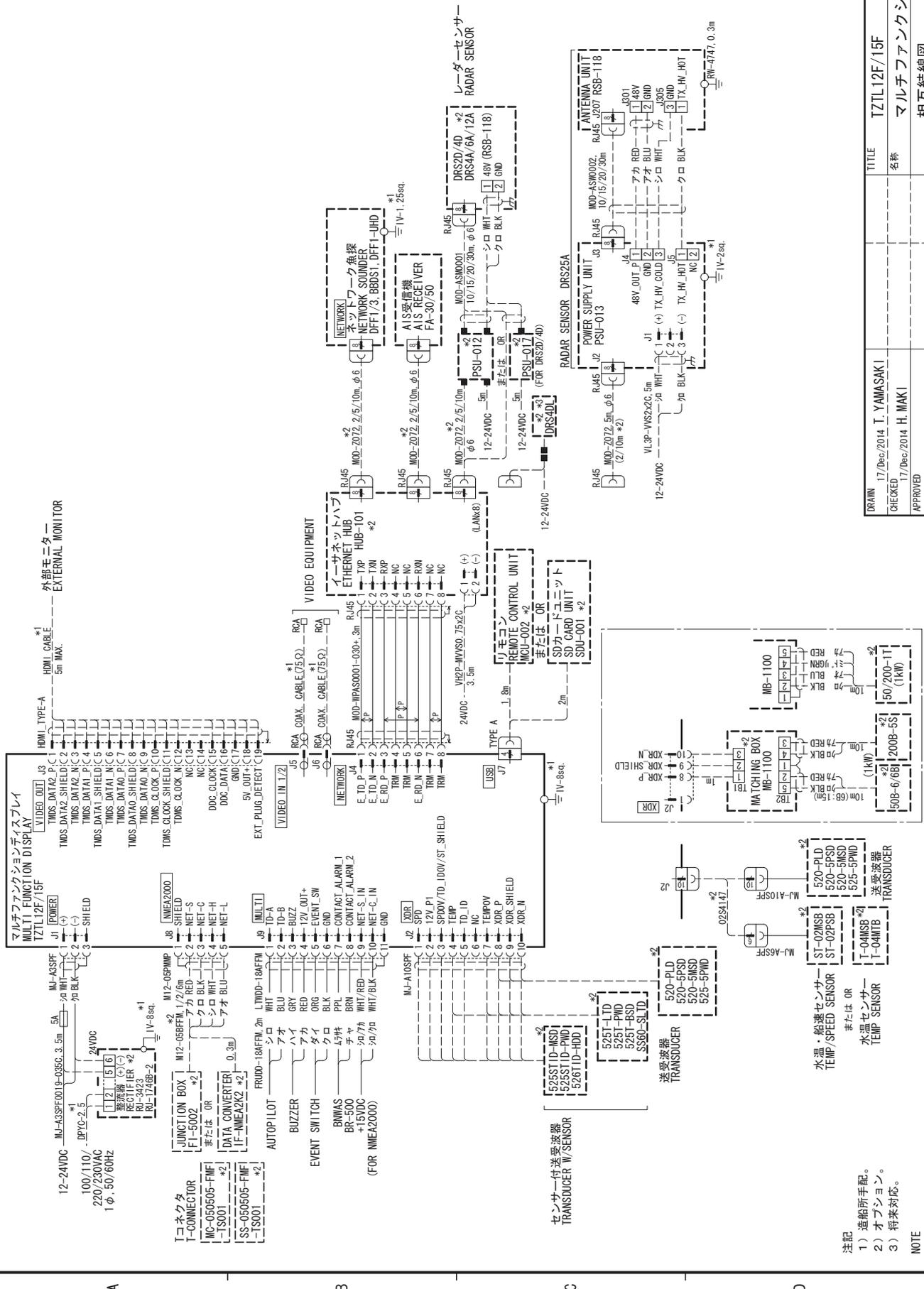
注記

- 1) 指定なき寸法公差は表 1 による。
- 2) 井印寸法は最小サービス空間とする。
- 3) 取付にはタッピングネジ呼び径3×14を使用のこと。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ3x14 FOR FIXING THE UNIT.

DRAWN	1/Sep/2014	T. YAMASAKI	TITLE	SDU-001
CHECKED	1/Sep/2014	H. MAKI	名称	SDカードユニット
APPROVED	1/Sep/2014	H. MAKI		外寸図
SCALE	1/1	±0% MASS 0.1 kg	NAME	SD CARD UNIT
DWG.No.	C4487-G05-B	17TL12E/15F 質量はケーブルを含む。 MASS INCLUDES CABLE.	REF.No.	OUTLINE DRAWING



A

B

C

D

DRAWN	17/Dec/2014	I. YAMASAKI	TITLE	TZTL12F/15F
CHECKED	17/Dec/2014	H. MAKI	名称	マルチファンクションディスプレイ
APPROVED			相互結線図	
SCALE	MASS	kg	NAME	MULTI FUNCTION DISPLAY
DWG No.	04487-C01-B	REF. No.	19-032-5001-0	INTERCONNECTION DIAGRAM

- 注記
- 1) 造船所手配。
  - 2) オプション。
  - 3) 将来対応。
- NOTE
- 1: SHIPYARD SUPPLY.
  - 2: OPTION.
  - 3: FOR FUTURE USE.