

Installation Manual MULTI FUNCTION DISPLAY

Model TZTL12F/TZTL15F

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SAFETY INSTRUCTIONS

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

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

(Examples of symbols)








Warning, Caution








Prohibitive Action

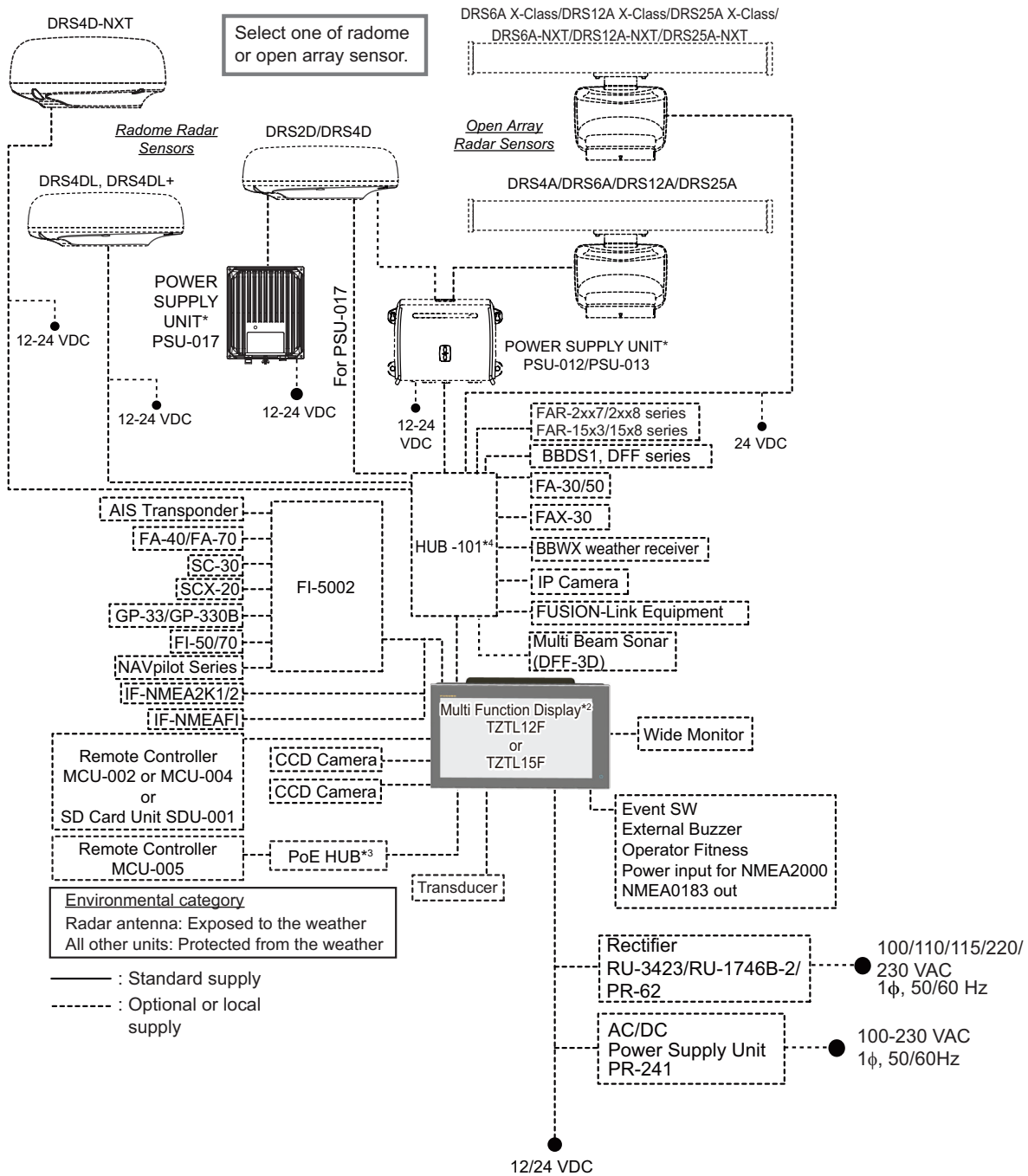


Mandatory Action

 WARNING	
	ELECTRICAL SHOCK HAZARD Do not open the equipment unless totally familiar with electrical circuits. Only qualified personnel should work inside the equipment.
	Turn off the power at the switchboard before beginning the installation. Fire or electrical shock can result if the power is left on.
	Be sure that the power supply is compatible with the voltage rating of the equipment. Connection of an incorrect power supply can cause fire or damage the equipment.
	If your vessel is configured with an autopilot system, install an autopilot control unit (or emergency autopilot stop button) at each helm station, to allow you to disable the autopilot in an emergency. If the autopilot cannot be disabled, accidents may result.

 CAUTION											
	Ground the equipment to prevent electrical shock and mutual interference.										
	Use the proper fuse. Use of an incorrect fuse may damage the equipment.										
	The front panel is made of glass. Handle it with care. 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 and required power supply unit.

DRS2D/4D/6A/12A: PSU-012; DRS25A: PSU-013; DRS2D/4D: PSU-017
See the radar sensor Installation Manual (IME-35670) for details.

*2 A maximum of 6 NavNet TZtouch2 units can be connected via Ethernet hub. With connection of a TZT2BB unit, the maximum number of units is 4. These units are internally fitted with a GPS antenna/receiver and fish finder as standard.

*3 Use an after-market PoE hub. The NETGEAR GS108PE is confirmed as compatible. Compatibility tests are limited to general use as part of this configuration and in no way indicates overall capability. Further, FURUNO cannot guarantee the functionality of any after-market hub.

*4 FURUNO networks allow for a maximum of three Ethernet Hub HUB-101s. Exceeding this can result in undesirable results.

EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks
Multi Function Display	TZTL12F	-	1	
	TZTL15F	-		
Installation Materials	CP19-01810	000-033-430	1	For TZTL12F/15F
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	-	
	MCU-004	-	
	MCU-005	-	
SD Card Unit	SDU-001	-	
NMEA Data Converter	IF-NMEA2K2	-	
	IF-NMEAFI	-	
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		
AC/DC Power Supply Unit	PR-241	-	
Ferrite Core	OP86-11	001-594-450	For PR-241

EQUIPMENT LISTS

Name	Type	Code No.	Remarks
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
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	
Extension Cable**	C332 10M	001-464-120	10m, for transducer

Name	Type	Code No.	Remarks
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
Inside Hull Kit S	22S0191	001-321-930	not available with bottom discrimination display, w/installation instructions.
Operator's Manual	OME-44870-*	000-190-069-1*	English (* denotes version number)
User's Guide	E42-01403-*	000-179-419-11	MCU-002, English
User's Guide	E42-01509-*	000-191-291-10	MCU-004, English

*: Compatible with ACCU-FISH™, Bottom Discrimination and RezBoost™ Enhanced mode. All listed transducers are compatible with RezBoost™ Standard mode.

** : Use of the extension cable may cause the following problems:

- Reduced detection ability
- Wrong ACCU-FISH™ information (fish length smaller than actual length, fewer fish detections, error in individual fish detection).
- Wrong speed data
- No TD-ID recognition

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1. MOUNTING

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°C and $+55^{\circ}\text{C}$.
- The humidity at the mounting location shall be 93% or less at 40°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.

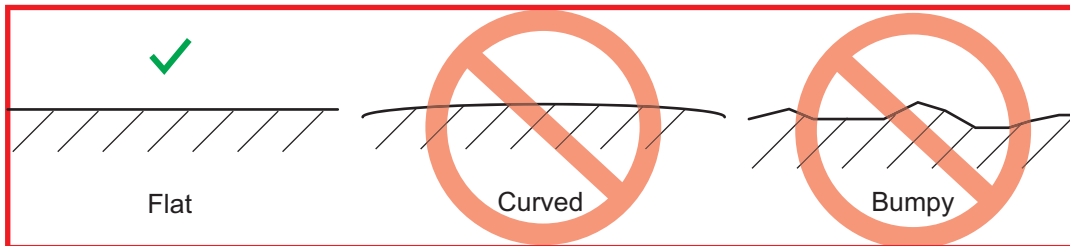
1.2 Flush Mounting

There are two methods of flush mount installation. One method uses pilot holes to secure the panel at the installation location (Method B), the other method does not use pilot holes (Method A). The merits and demerits of each method is listed in the table below.

	Method A	Method B
Merits	No pilot holes are required. Fine adjustment is available.	Shorter process than Method A.
Demerits	Longer process than Method A.	Pilot holes are required. Fine adjustment is not available.

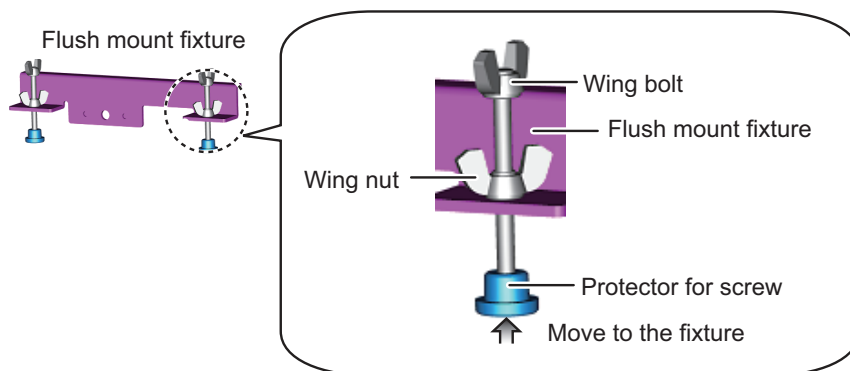
Referring to the figure below, select a flat mounting location. Read the installation instructions before starting. Pay particular attention to the notes; failure to follow these instructions may cause damage to the unit.

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

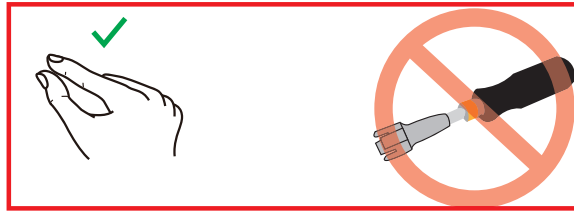


1.2.1 Method A: Pilot holes cannot be opened.

1. Prepare a cutout in the mounting location using the template (supplied) for the NavNet TZtouch2.
2. Fasten the wing bolts and the wing nuts of the flush mount fixture so that the protector for screw moves to the flush mount fixture.

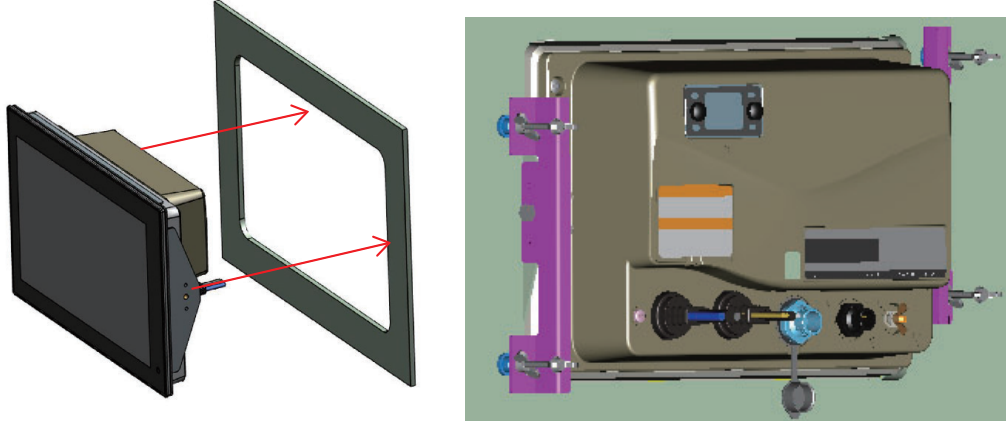


Note: Slowly fasten the four wing bolts evenly with your hand. Do not use a tool to fasten the wing bolts. A tool can be used to fasten the wing nuts; use caution so as not to damage the wings or thread.

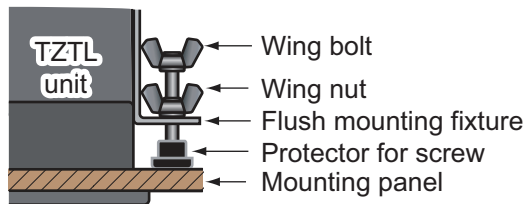


3. Connect all cables at the back of the NavNet TZtouch2. (See chapter 2.)
4. Set the NavNet TZtouch2 to the cutout.
5. Set NavNet TZtouch2 to the cutout made with step 1.

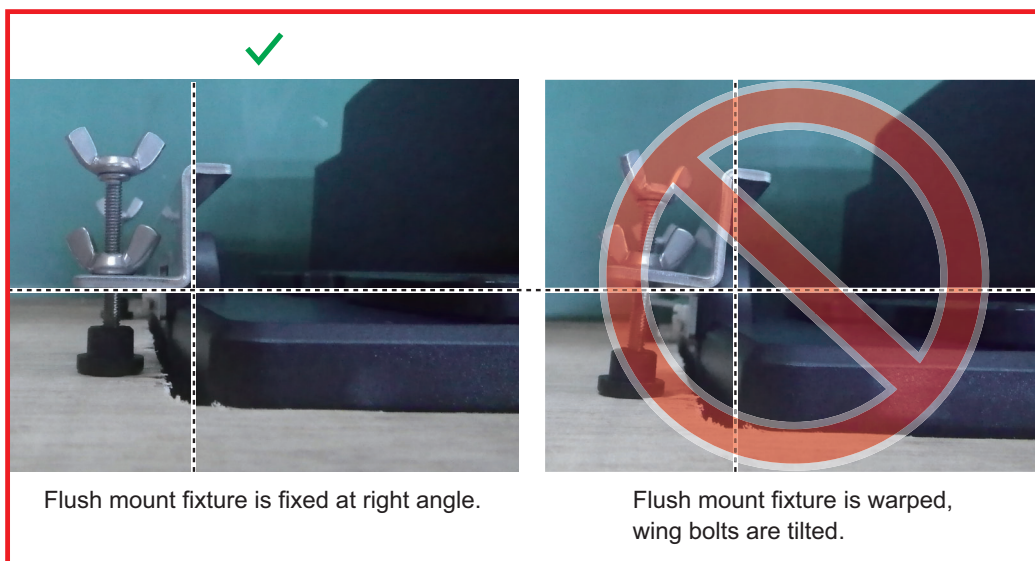
1. Set NavNet TZtouch2 to the cutout.
2. Fasten NavNet TZtouch2 with flush mount fixture.



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



Note: Use of excessive torque when fastening the wing bolts can cause the flush mount fixture to tilt or warp. Check that the flush mount fixtures and wing bolts are not tilted or warped, referring to the following examples.



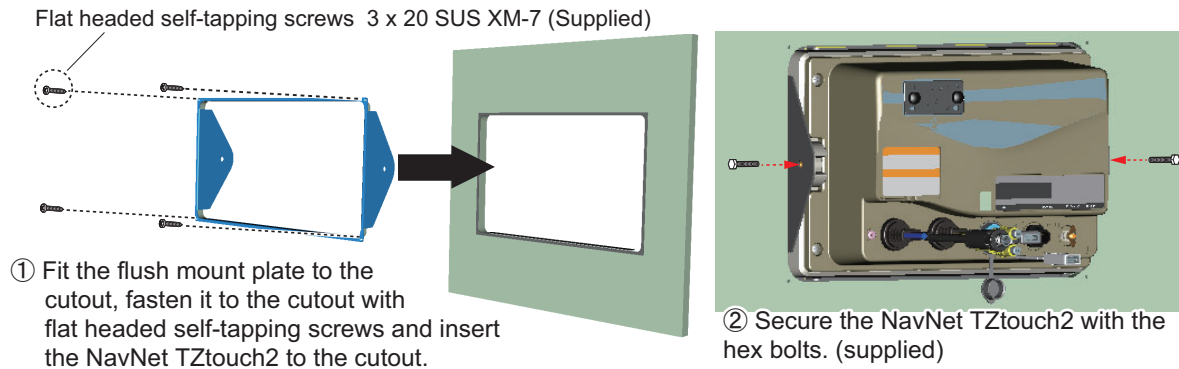
Flush mount fixture is fixed at right angle.

Flush mount fixture is warped, wing bolts are tilted.

1. MOUNTING

1.2.2 Method B: Pilot holes can be opened.

1. Prepare a cutout at the mounting location using the template. (supplied)
2. Remove the flush mount plate from the NavNet TZtouch2. The flush mount plate is not fastened to the NavNet TZtouch2, and can be easily removed.
3. Fit the flush mount plate to the cutout. Fasten the flush mount plate to the pilot holes of cutout with flat headed self-tapping screws (3 x 20 SUS XM7). Insert the NavNet TZtouch2 to the cutout and fasten with hex bolts (supplied).



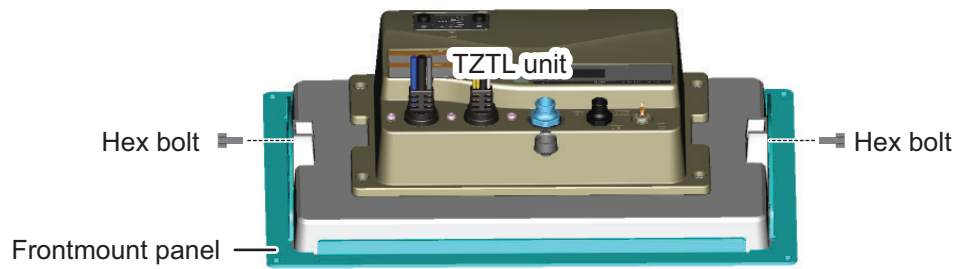
1.3 Retrofit Kit for TZTL12F (option) and Front Fixing Panel Kit for TZTL15F (option)

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.)

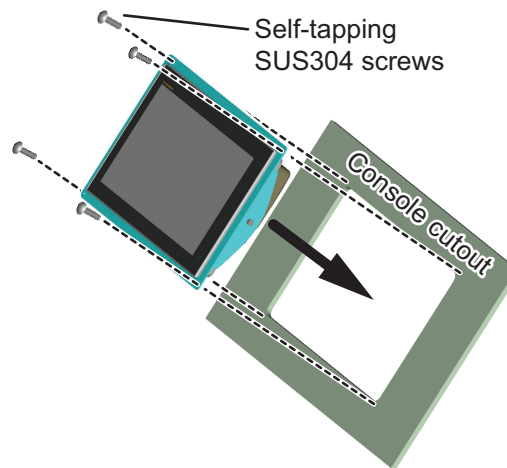
Note: Remove the flush mounting sponges attached to the back of the NavNet TZtouch2. Take care that there is no sponge left on the back of the NavNet TZtouch2.

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 NavNet TZtouch2.



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 attached to Navnet TZ touch2, fix the F Mount Panel to the unit.
4. 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 NavNet TZtouch2.

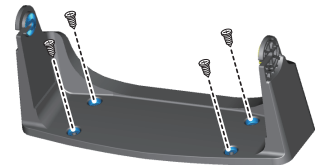
Note: Remove the flush mounting sponges attached to the back of the NavNet TZtouch2. Take care that there is no sponge left on the back of the NavNet TZtouch2.

1.4.1 How to mount the TZTL12F

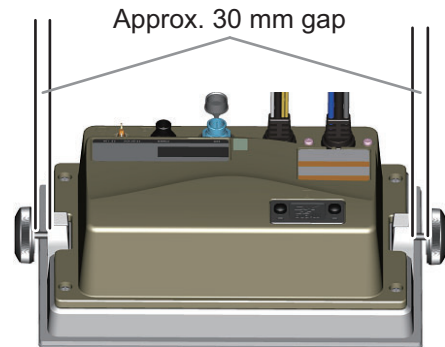
Use the optional kit Bracket12 (contents shown below), for mounting the TZTL12F.

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).

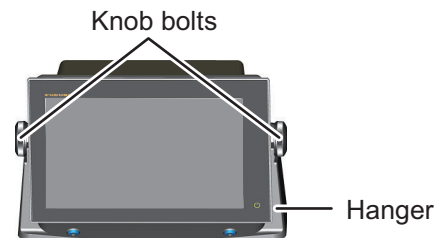
1. Fix the hanger by using self-tapping screws (5×20 SUS304, supplied). The screw locations are indicated in the figure to the right.



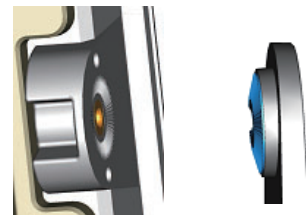
2. Place the TZTL12F face-down on a soft, clean surface, then screw the knob bolts into the TZTL12F, leaving a gap of approximately 30 mm.



3. 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

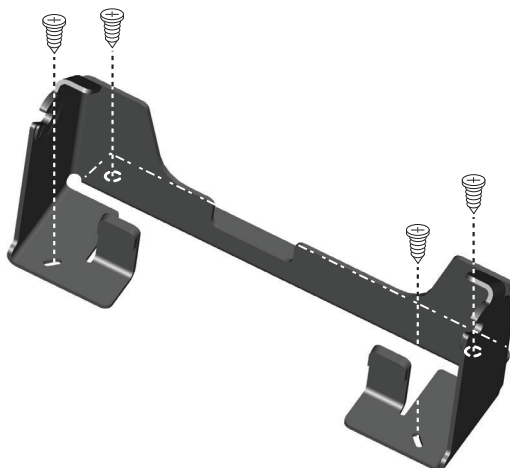
Hanger convex

1.4.2 How to mount the TZTL15F

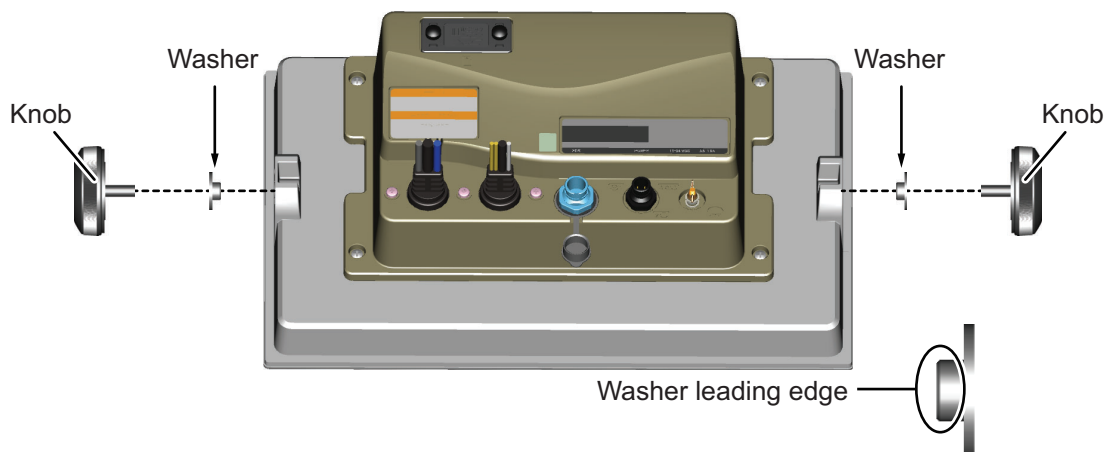
Use the optional kit Bracket15 (contents shown below), for mounting the TZTL15F.

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).

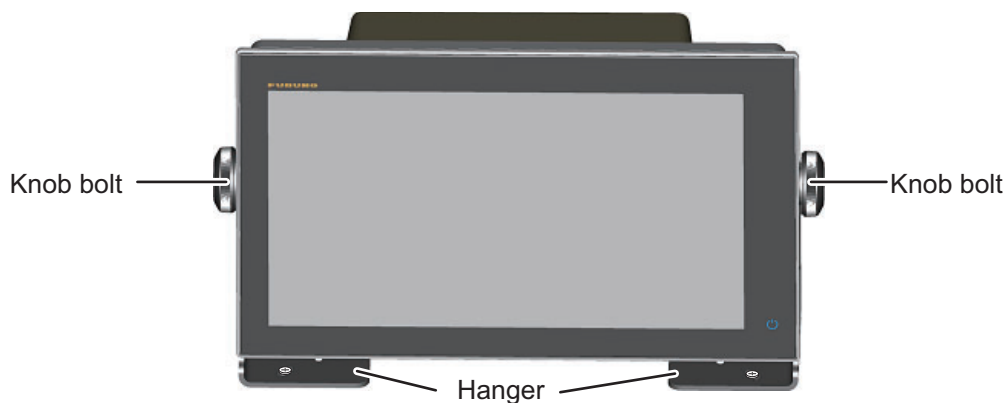
1. Fix the hanger by using self-tapping screws (5×20 SUS304, supplied). The screw locations are indicated in the figure below.



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

Note: For instructions regarding installation of DFF-3D transducers, see the DFF-3D operator's manual.

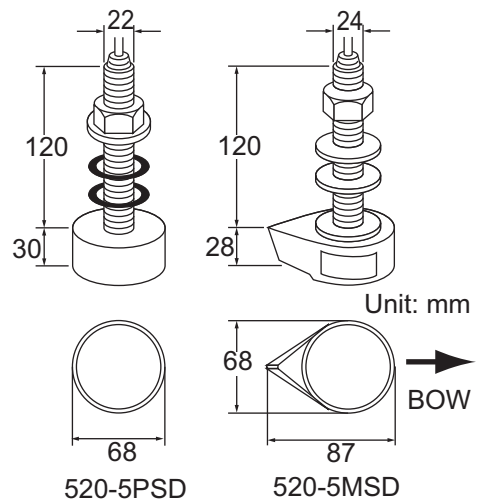
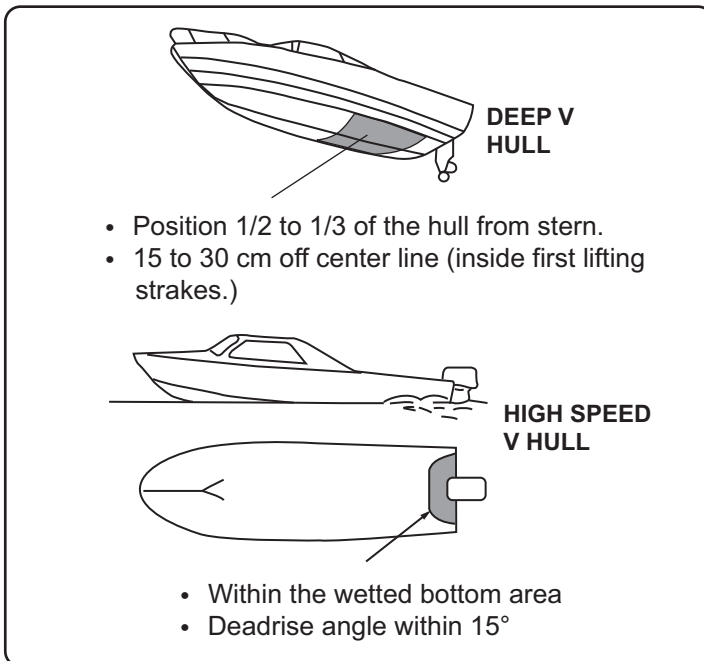
1.5.1 How to mount a transducer through the hull

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.

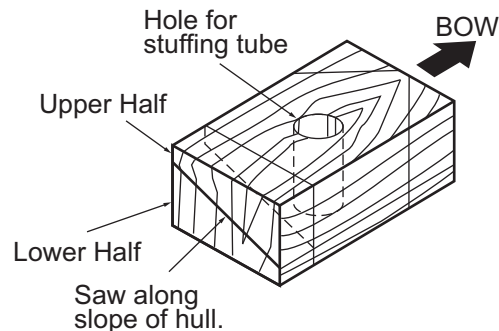
The performance of this fish finder is directly related to the mounting location of the transducer, especially for high-speed cruising. The installation should be planned in advance, keeping the length of the transducer cable and the following factors in mind:

- 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.

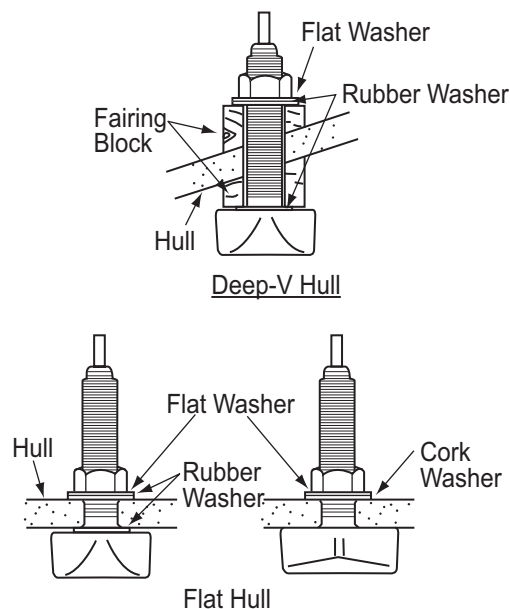


Installation procedure

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

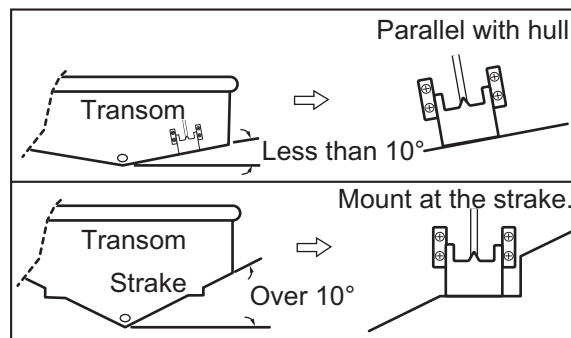
Before putting your boat in water, wipe the face of the transducer thoroughly with a detergent liquid soap. This will lessen the time necessary for the transducer to have good contact with the water. Otherwise the time required for complete "saturation" will be lengthened and performance will be reduced.

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.

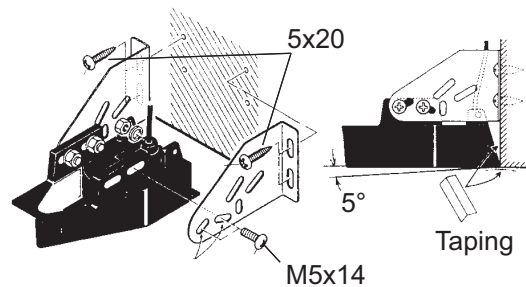
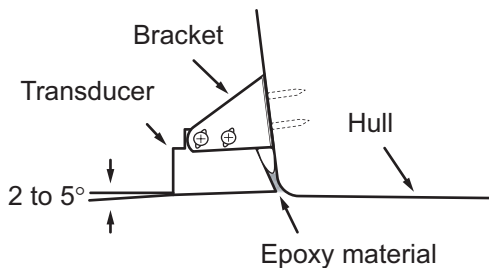
DO NOT over-tighten screws, to prevent damage to the transducer.



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 RezBoost™, 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

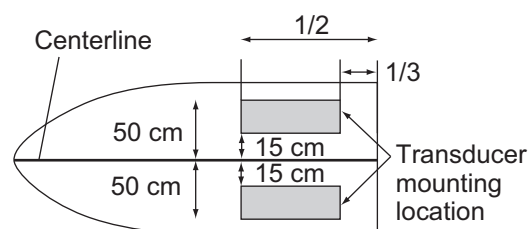
- Do the installation with the ship moored at a dock, etc. The water depth should be 6.5 to 32 feet (2 to 10 meters).
- Turn off the engine.
- Do not power the unit with the transducer in the air, to prevent damage to the transducer.
- Do not use this method on a double layer hull.
- Before attaching 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° , 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.

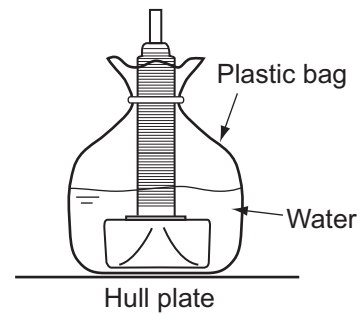
1. MOUNTING

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].

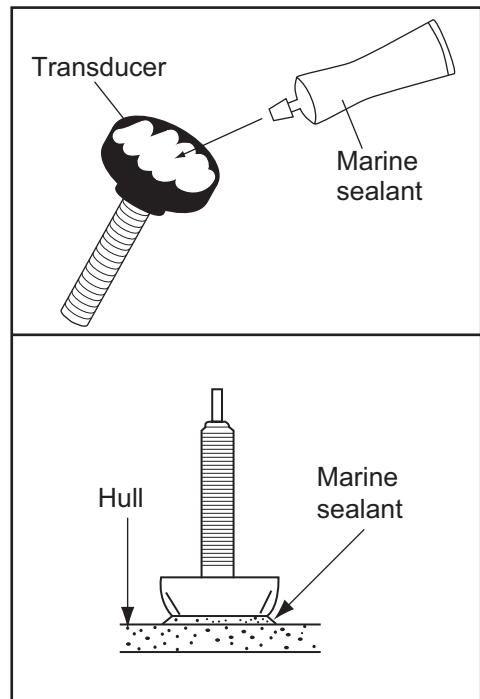
17) Drag the menu to show [Sounder Transmit], then tap [Sounder Transmit].
Check if the bottom echo appears on the right side of the screen, in the display area.

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

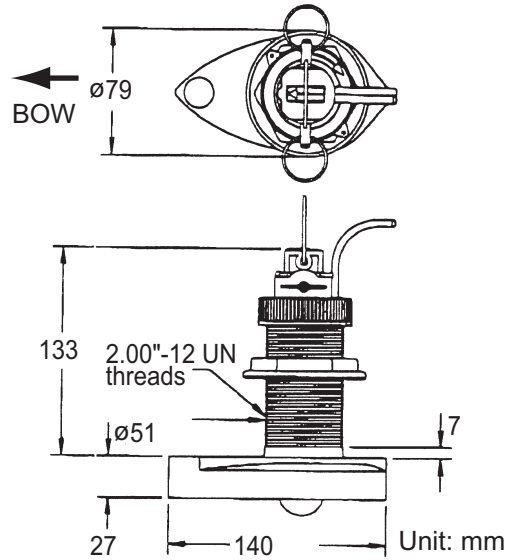
1. MOUNTING

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.

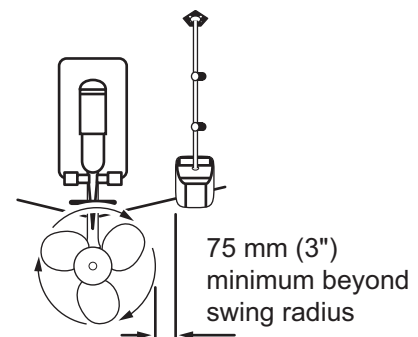
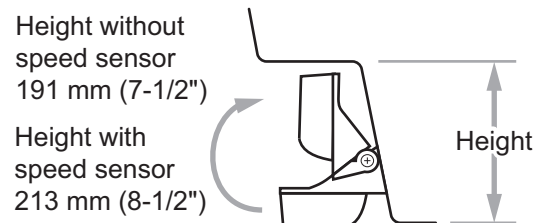
Allow adequate space above the bracket for it to release and rotate the sensor up-ward.

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).

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.

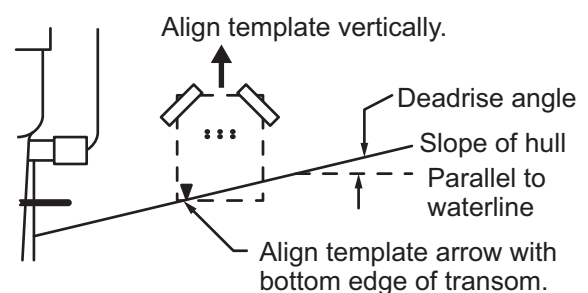


How to install the bracket

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.

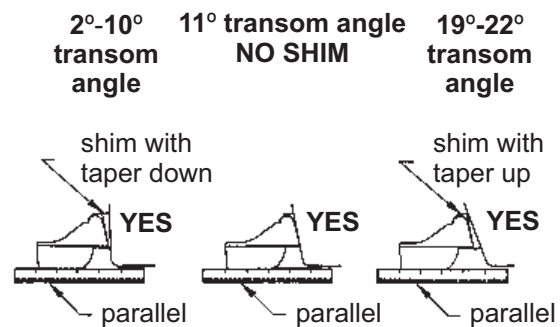
Note: Do not position the bow of the sensor lower than the stern because aeration will occur.

- 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.

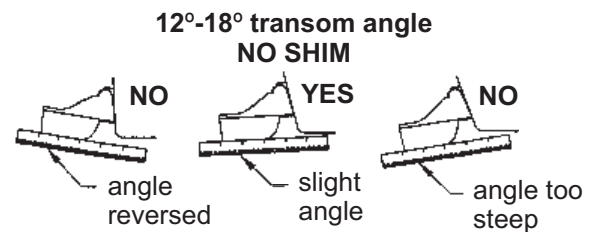
19°-22° transom angle (small aluminum and fiberglass boats): Position the shim with the tapered end up.

- 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.

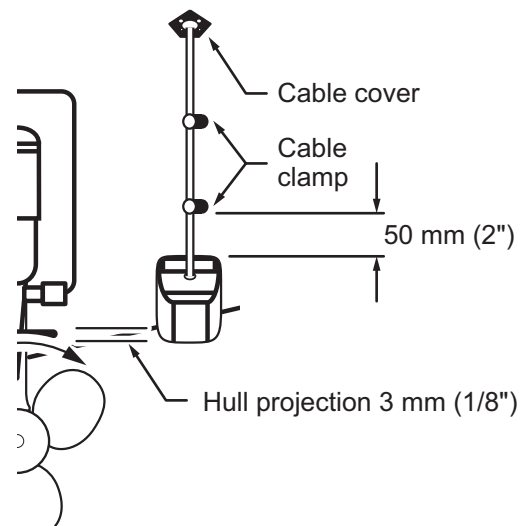


- Repeat step 1 to ensure that the angle of the sensor is correct.

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

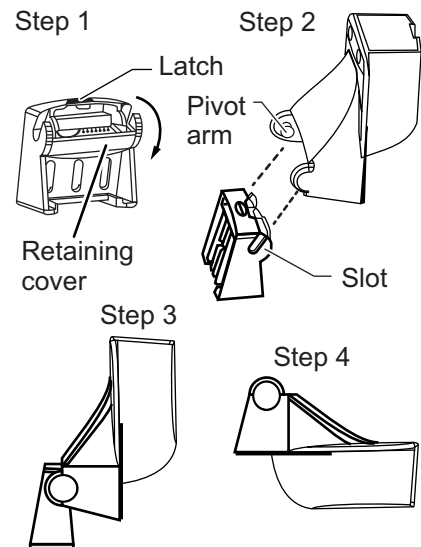


- Using the vertical adjustment space on the bracket slots, slide the sensor up or down to provide a projection of 3 mm (1/8"). Tighten the screws.



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. To 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 through 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.

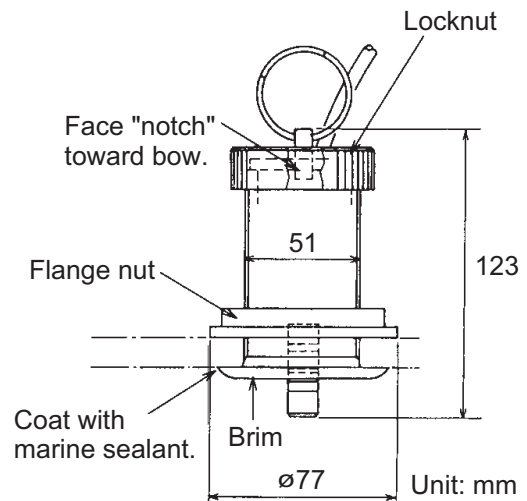
Mounting considerations

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.

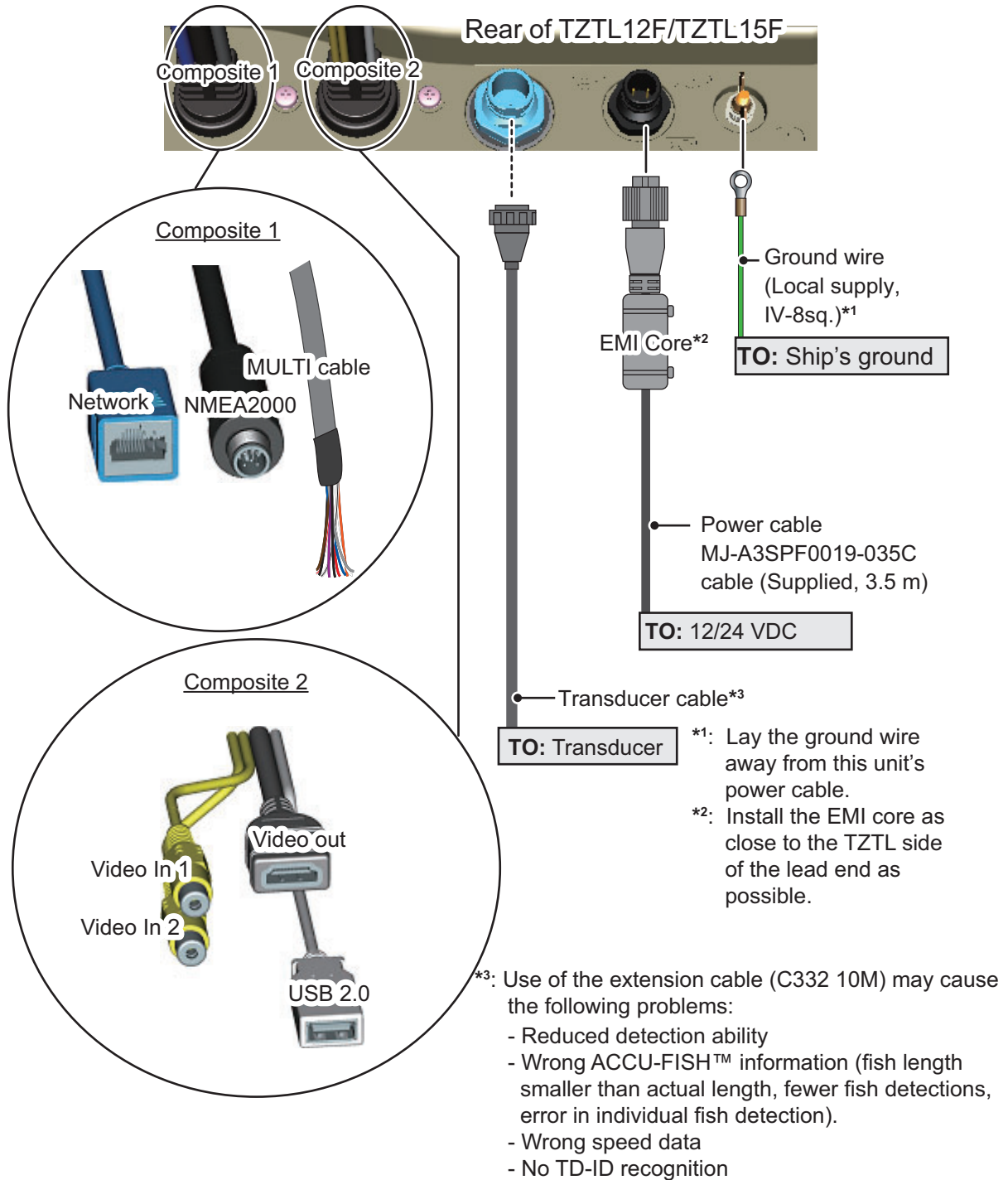


1.6.2 Temperature sensors T-04MSB and T-04MTB

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)



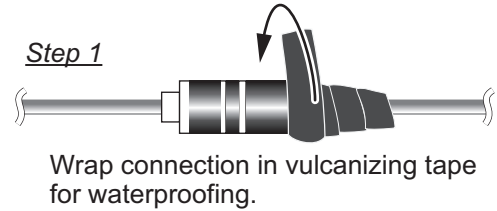
2.2 How to Secure and Waterproof Connections

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.

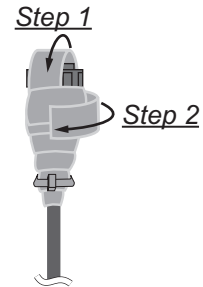
Securing and waterproofing connections

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.



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.



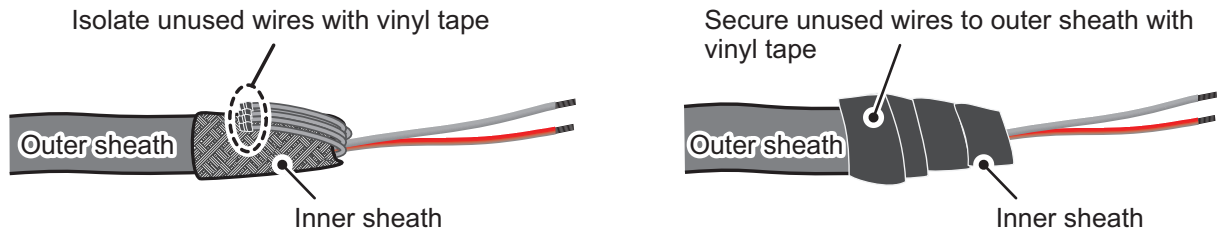
2.3 MULTI Cable

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

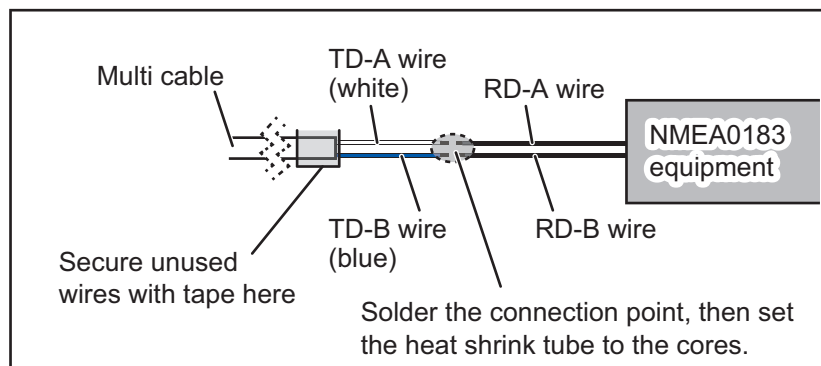
1. Cut the outer and inner sheaths lengthwise. Take care not to cut the wires.
2. Fold back the outer sheath, then fold back the inner sheath, covering the outer sheath.
3. Individually isolate unused wires using vinyl tape, then secure the unused wires as shown in the figure below.






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 2-10.

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.

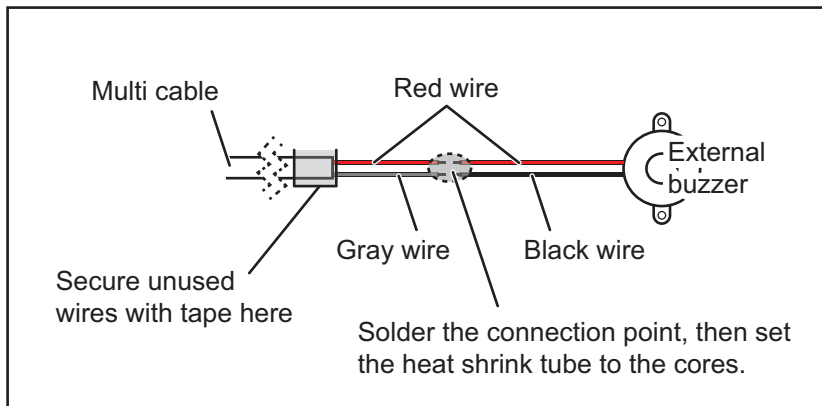
2.3.3 How to connect the external buzzer

Connect the optional external buzzer (OP03-136) following the procedure below.

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

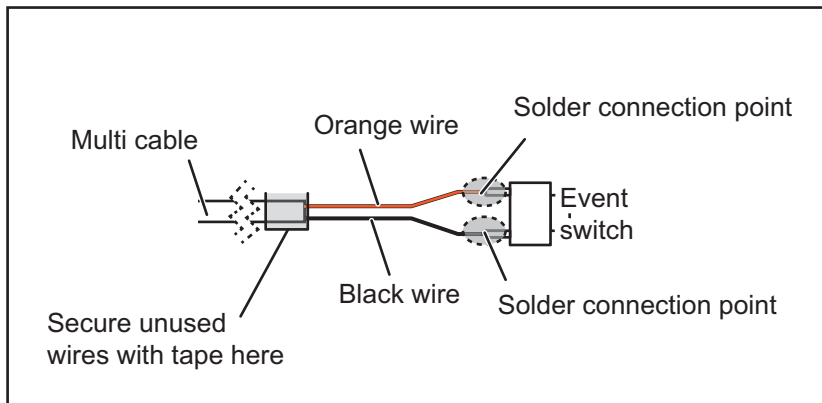


2.3.4 How to connect and set up the event switch

Note: The event switch does not require menu settings.

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.

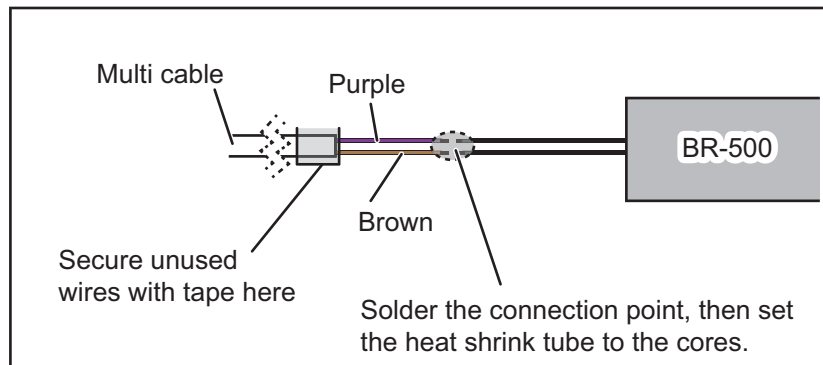
Event switch connection example



2.3.5 How to connect operator fitness to a BR-500

Note: Operator fitness does not require adjustments in the menu.

1. Referring to the figure below, place heat shrink tubes on the wires, then solder the connection point. (Refer to the BR-500 installer's manual for the appropriate wires at the BR-500.)
2. Move the heat shrink tubes to the soldered connection, then apply heat to the tubes.
3. Secure any unused wires, referring to "How to isolate and secure unused wires" on page 2-3.



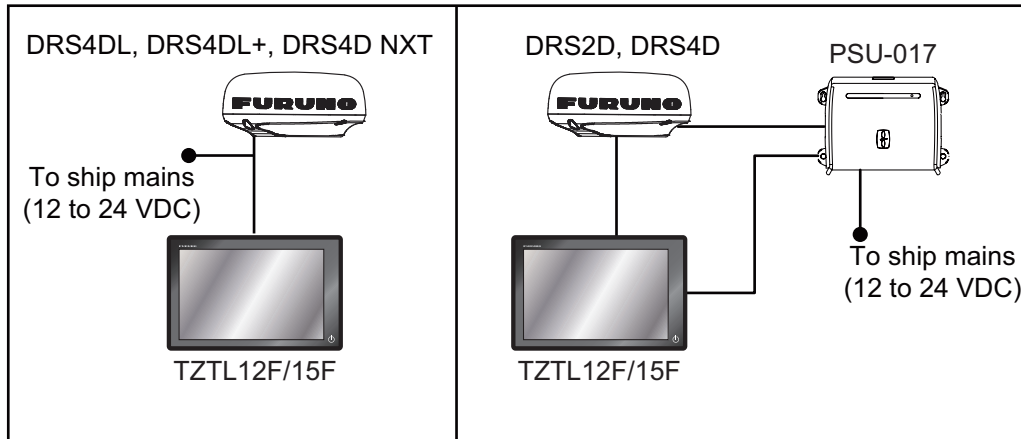
2.4 DRS Radar Sensor Connections

Depending on your configuration, a separate power supply may be required for your radar sensor.

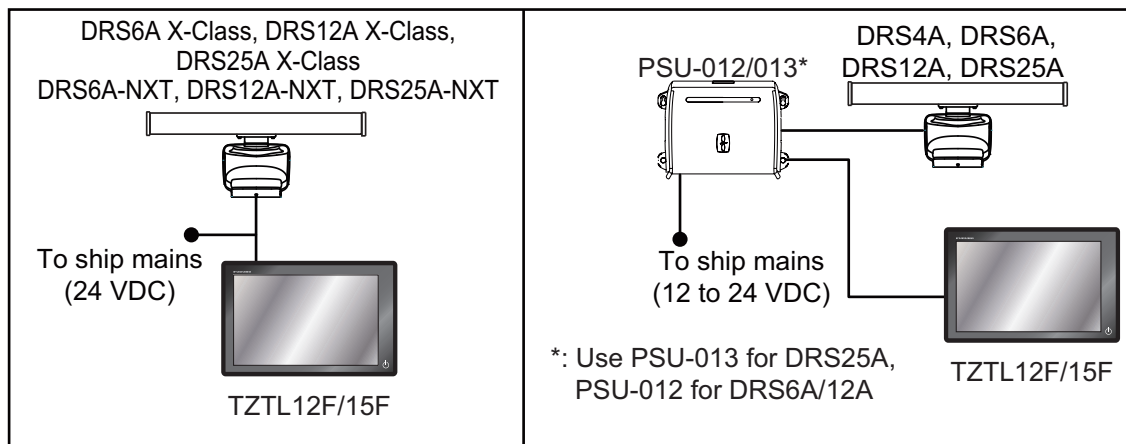
The figures below show connection examples with radar sensors which are compatible with the TZTL12F/TZTL15F.

For details regarding connection and cables required for connection with the radar sensor, see the radar sensor's installation manual.

Connection examples for radome sensors



Connection examples for open-array sensors



Note: The Ethernet hub HUB-101 (available as an optional extra) is required for configurations comprising DRS4DL, DRS4D NXT, DRS6A X-Class, DRS6A NXT, DRS12A X-Class or DRS25A X-Class, and networked with sensors via LAN.

2.5 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 six NavNet TZtouch2 units may be connected to the same network at one time. However, for configurations with one or more TZT2BBs included, the maximum number of networked NavNet TZtouch2 units is four. Both the TZTL12F and TZTL15F are equipped with a network connector (RJ45).

IP cameras are network devices that connect directly to a HUB or directly to the TZT2BB. The IP camera is should meet the following requirements.

Video Compression	Resolution	Compression Level
H.264/MPEG-4	800×600	30

Up to four IP cameras can be connected to one NavNet TZtouch2 network. At this time, only AXIS IP cameras that support MPEG4 video are functional in the network. For more details, see the operator's manual for AXIS models.

2.6 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 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)

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.

2.7 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 2.4).

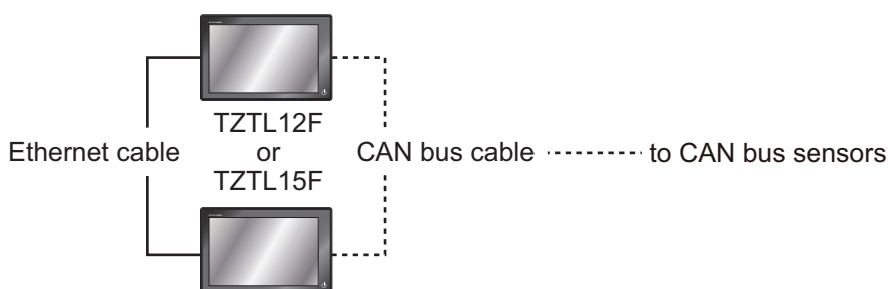
To power the NavNet TZtouch2 from the CAN bus port, the MULTI cable must be supplied with a 15 VDC power input.

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.

2.7.1 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.

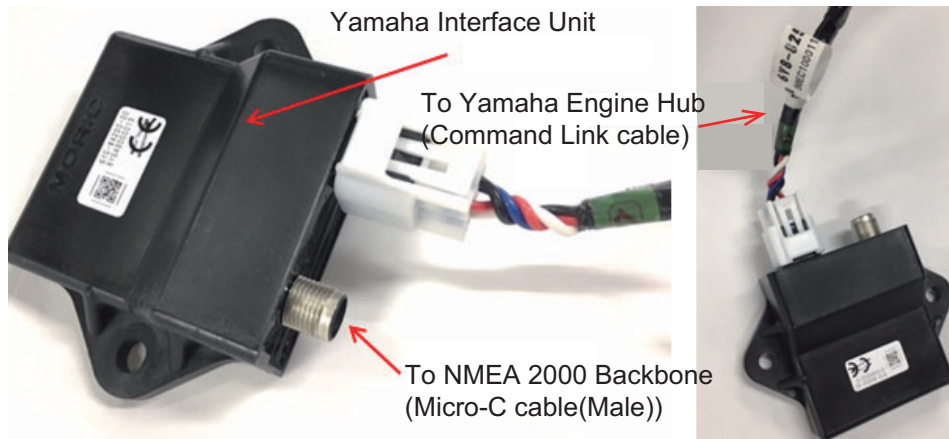


2.7.2 How to connect Yamaha engine(s)

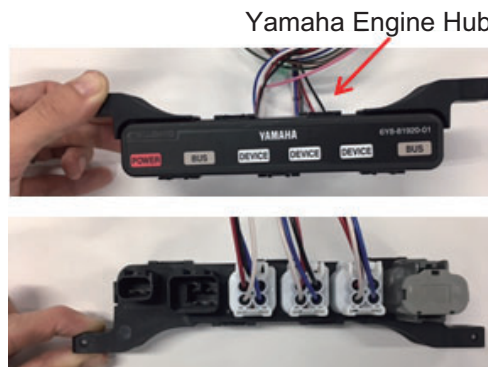
When interfaced with Yamaha outboard engine(s) compatible with Command Link[®], Command Link Plus[®] and Helm Master[®], the NavNet TZtouch2 can display engine information on a dedicated Yamaha engine status display.

How to connect the engine

The NavNet TZtouch2 connects to the Yamaha engine network via the Yamaha Interface Unit. Arrange the Yamaha Interface Unit through a local Yamaha representative.

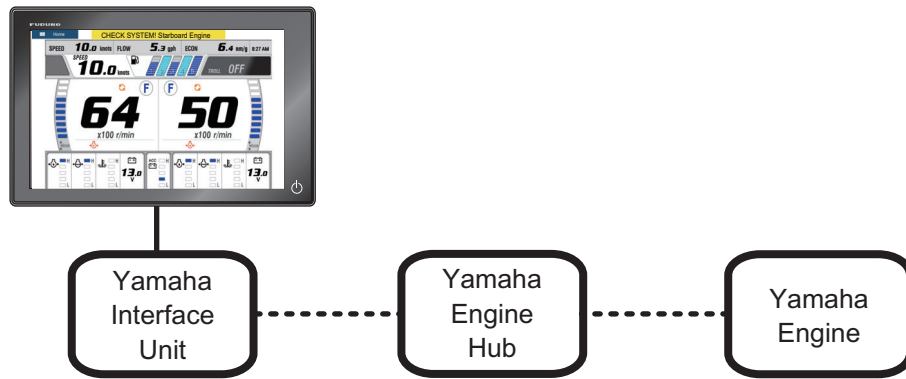


The Yamaha Engine Hub (Yamaha supply), which connects between the engine and the Yamaha Interface Unit, is also required.



Connection to TZTL12F, TZTL15F

Connect the Yamaha Interface Unit to the Yamaha Engine Hub.



— : NMEA 2000

----- : Command Link®/Command Link Plus®/Helm Master®

How to set up the engine display

Once the NavNet TZtouch2 detects the Yamaha engine network, the engine can be set up on [Settings]→[Initial Setup]→[YAMAHA ENGINE SETUP]. See section 3.3 for details.

2.7.3 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.

2.7.4 CAN bus (NMEA2000) input/output

Input PGN

PGN	Description
059392	Acknowledgment
059904	Request
060928	Address Claim
126208	NMEA-Request Group Function
	NMEA-Command Group Function
	NMEA-Acknowledge Group Function
126992	System Time
126996	Product Information
127237	Heading/Track Control
127245	Rudder
127250	Vessel Heading
127251	Rate of Turn
127257	Attitude
127258	Magnetic Variation
127488	Engine Parameters, Rapid Update
127489	Engine Parameters, Dynamic
127505	Fluid Level
128259	Speed
128267	Water Depth
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129033	Local Time Offset
129038	AIS Class A Position Report
129039	AIS Class B Position Report
129040	AIS Class B Extended Position Report
129041	AIS Aids to Navigation (AtoN) Report
129291	Set & Drift, Rapid Update
129538	GNSS Control Status
129540	GNSS Satellites in View
129793	AIS UTC and Date Report
129794	AIS Class A Static and Voyage Related Data
129798	AIS SAR Aircraft Position Report
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message
129808	DSC Call Information
129809	AIS Class B "CS" Static Data Report, Part A
129810	AIS Class B "CS" Static Data Report, Part B
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters
130312	Temperature
130313	Humidity
130314	Actual Pressure
130316	Temperature, Extended Range

2. WIRING

PGN	Description
130577	Direction Data
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.

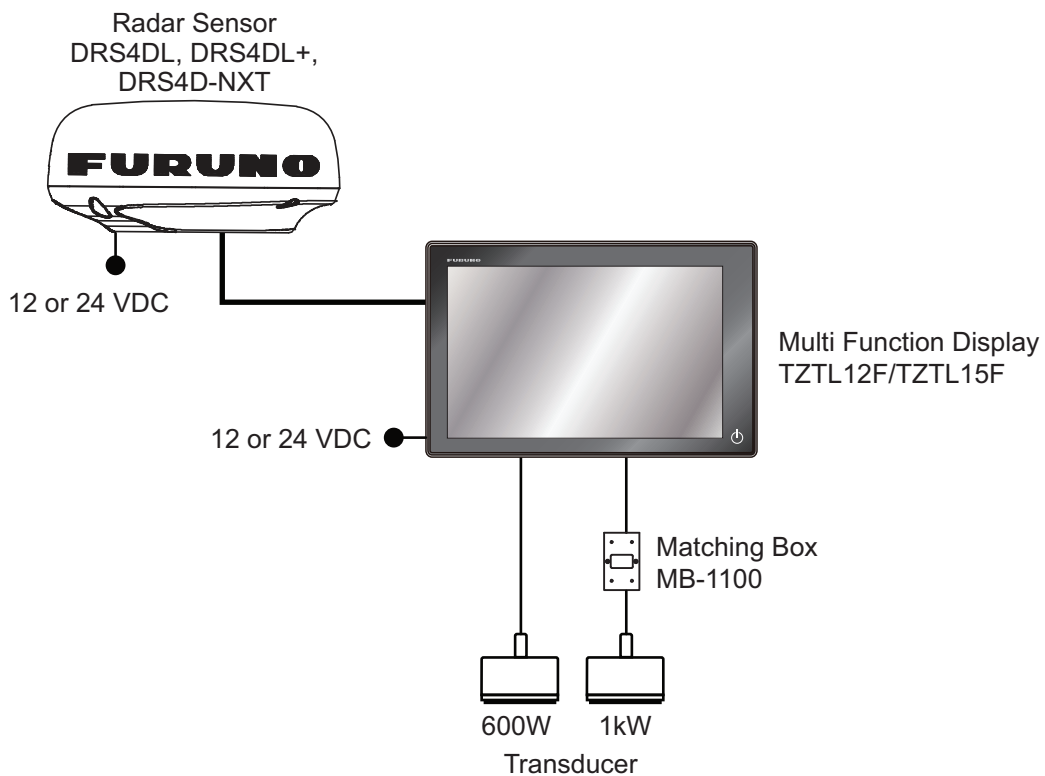
PGN	Description	Remarks	Output cycle (msec)
059392	Acknowledgment	For Certification Level A/B, Refusing output requirement	
059904	Request	For Certification Level A/B, Requiring output	
060928	Address Claim	For Certification Level A/B <ul style="list-style-type: none"> • Address autonomy • Receiving output requirement 	
126208	NMEA-Request group function	For Certification Level A/+ α <ul style="list-style-type: none"> • Address autonomy • Receiving output requirement 	
	NMEA-Command group function	For Certification Level A/+ α Changing the setting of other equipment	
	NMEA-Acknowledge group function	For Certification Level A/+ α 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/+ α Receiving output requirement	
	PGN List-Received PGN's group function	For Certification Level A/+ α 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"> • Outputs when waypoint is set/changed (own ship's position is required) • Outputs when receiving ISO request 	
130306	Wind Data		100
130310	Environmental Parameters		500
130312	Temperature		2000

PGN	Description	Remarks	Output cycle (msec)
130313	Humidity	Outputs when receiving the ISO request	
130314	Actual Pressure		2000
130316	Temp., Extended Range		2000

2.8 Example NavNet TZtouch2 System Configurations

Small vessels (Internal GPS, Internal Fish Finder, DRS4DL/DRS4DL+/DRS4D-NXT)

The example below shows a typical configuration for small vessels.



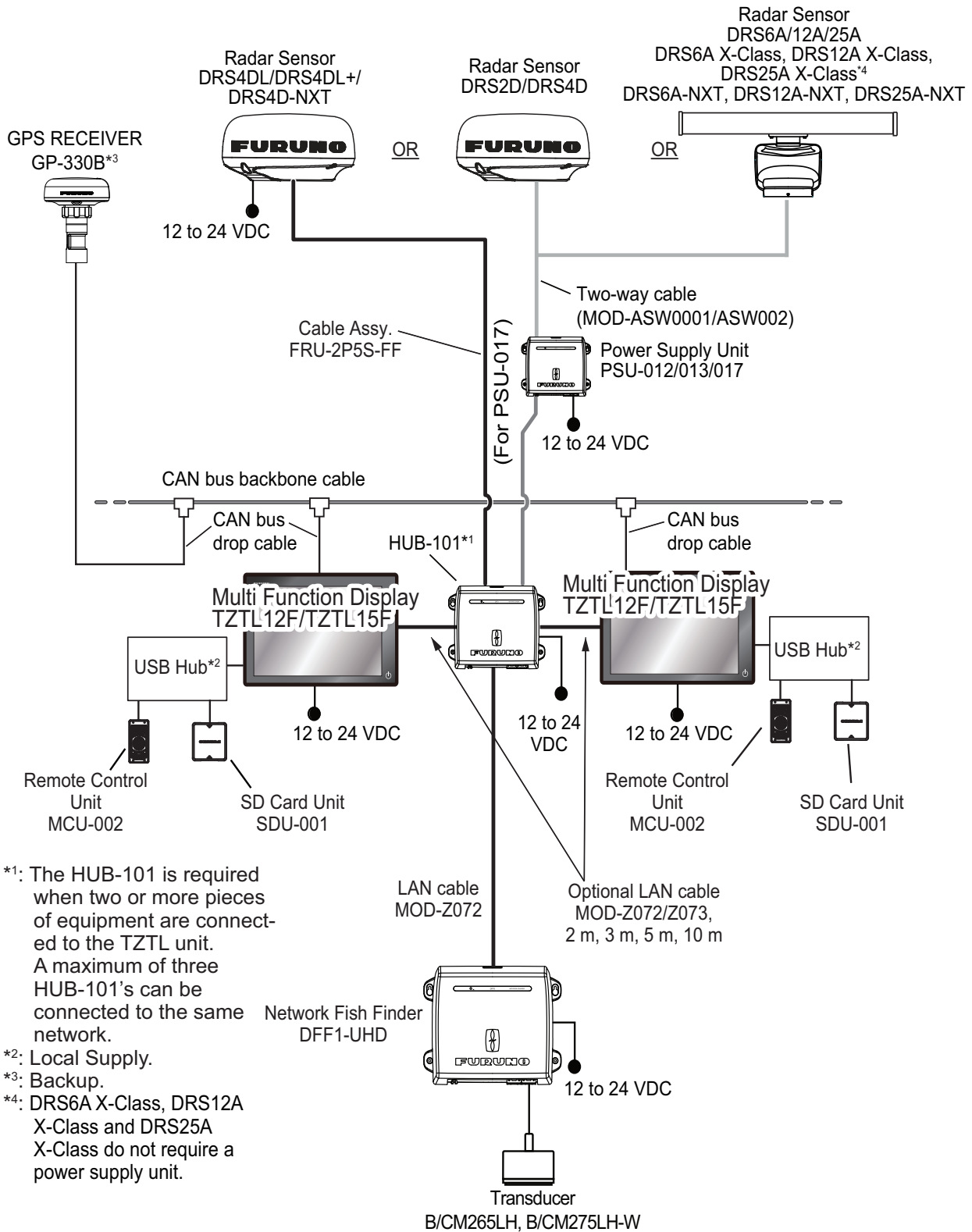
Note: Matching Box MB-1100 required for some FURUNO transducers. See the INTERCONNECTION DIAGRAM at the back of this manual.

2. WIRING

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

This is a single station plotter/radar/fish finder installation.

Refer to "SYSTEM CONFIGURATION" on page ii for more details.

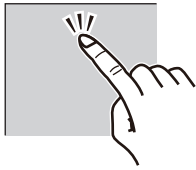

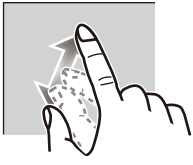



3. HOW TO SET UP THE EQUIPMENT

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

3. HOW TO SET UP THE EQUIPMENT

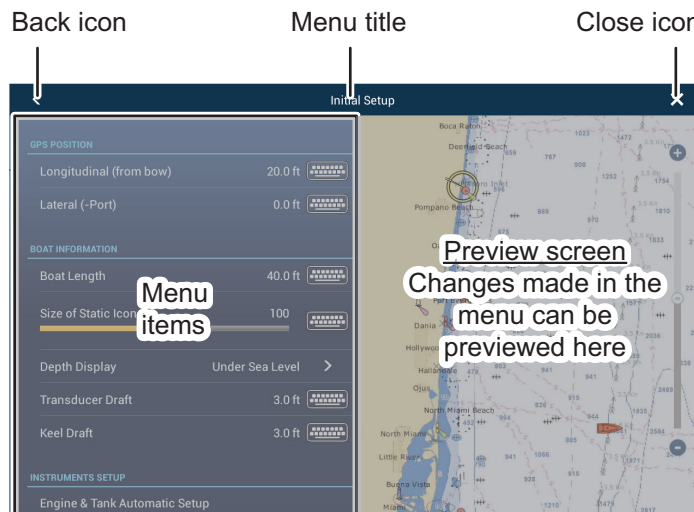
How to operate the menus

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 () 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].

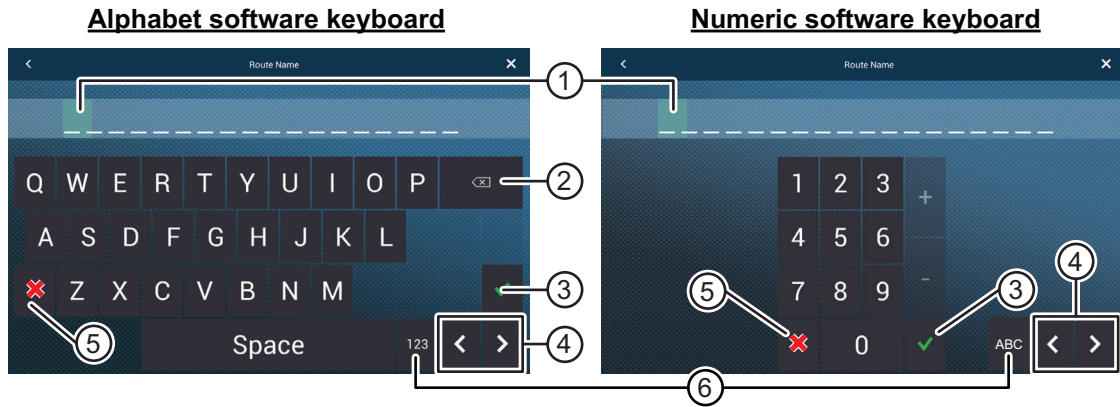


6. Depending on the menu item selected, the following operations are available:

- 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).

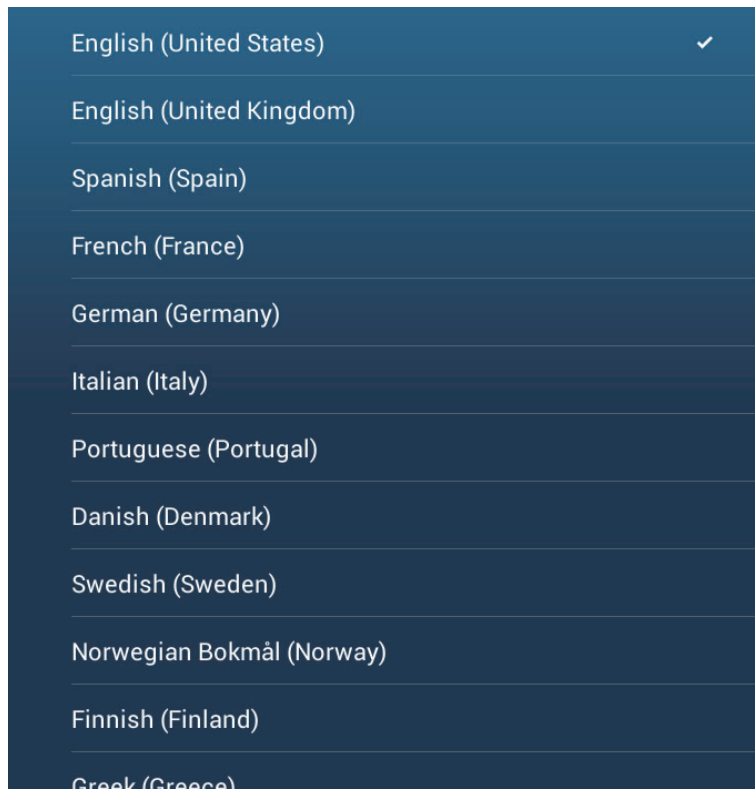
3.1 How to Set Time Zone, Time Format and Language

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 numerical keyboard.
5. Input the time difference (using 15-minute intervals), then tap [✓].
6. Drag the menu to show the [Time Format] menu item, then tap [Time Format] to show the option window.
7. Select how to display time, in 12 or 24 hour format. [Auto] automatically inserts AM, PM indication in 24 hour clock, when the language is English.
8. Tap the [<] at the top left of the screen to return to the [General] menu.

3. HOW TO SET UP THE EQUIPMENT

9. Drag the menu to display the [Language] menu item, then tap [Language] on the main menu to show the language options.



10. 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. This process takes approximately five minutes to optimize the system for the new language setting. When the process is complete, the power switch color changes to orange. Tap the power switch to start the system.

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°], [Loran-C], [MGRS]
[Loran C Station & GRI]	Available when [Position Format] is selected to [Loran-C].	Set Loran C station and GRI combination.
[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) Port-side is negative, Starboard-side is positive.



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]
[External Transducer Draft]	Set the draft external transducers other than internal fish finder, networked or multi-beam sonar. For internal/network transducers , set the draft from Home screen→[Settings]→[Sounder]→[Transducer Draft]. For multi-beam sonars , set the draft from Home screen→[Settings]→[Multi-beam Sonar]→[Initial Setup]→[External Transducer Draft].	0.0 (m) to 99.9 (m)
[Keel Draft]	Set the keel draft.	0.0 (m) to 99.9 (m)

Engine & Tank, Instruments Setup

Menu item	Description	Options (setting range)
[Engine & Tank Automatic Setup]	See "[Initial Setup] menu - [Engine & Tank Automatic Setup]" on page 3-11.	
[Engine & Tank Manual Setup]	See "[Initial Setup] menu - [Engine & Tank Automatic Setup]" on page 3-11.	
[Graphic Instruments Setup]	See "[Initial Setup] menu - [GRAPHIC INSTRUMENTS SETUP]" on page 3-10.	

Manual Fuel Management Setup

Menu item	Description	Options (setting range)
[Total Fuel Capacity]	Enter the total fuel capacity of your tank(s).	0 to 9,999(L).
[Manual Fuel Management]	Set to [ON] for manual fuel management. See the Operator's Manual.	[OFF], [ON].

[Initial Setup] menu - [YAMAHA ENGINE SETUP]

Menu item	Description	Options (setting range)
[Trip & Maintenance]	Reset fuel used, trip distance, engine trip and maintenance hours (trip hour, standard hour, optional hour, total hour).	[Trip Fuel & Distance]: [Fuel Used], [Trip Distance]. [Trip & Maintenance Hours]: [Port], [Starboard].
[Trim Level Calibration]	Trim all engines to fully down position (zero). If trim level is not zero, tap [SET] to set trim level to zero.	–
[Fuel Flow Calibration]	If the fuel flow indication (gph=gallons per hour) is wrong, you can calibrate the indication to show correct flow. Enter a negative value if the indication is higher than actual; a positive value if the indication is lower than actual.	-7 to +7
[Engine Interface Software Ver. & ID]	Display engine interface software version and ID.	–
[Reset Engine Interface]	Reset engine interface.	–
[Reset Engine Instance]	Reset engine instance.	–
[Reset Number of Engines]	Enter number of engines.	[1], [2], [3], [4], [4P], [4S]
[Trouble Codes]	Display trouble codes. See the operator's manual for the Yamaha engine for details.	–

[Initial Setup] menu - [IF-NMEAFI SETUP]

Menu item	Description	Options (setting range)
[Select IF]	Select [IF-NMEAFI] to set the analog data that is input from the IF-NMEAFI. The setting is made after restarting the IF-NMEAFI.	
[Category]	Select the use (category) for this sensor.	[Wind], [ST800_850], [Fuel], [FreshWater], [WasteWater], [LiveWell], [Oil], [BlackWater]
[Resistance Full]	The resistance, in Ohms, when the tank is full.	0 (ohm) to 500 (Ohm)
[Resistance Mid]	The resistance, in Ohms, when the tank is half full.	0 (ohm) to 500 (Ohm)
[Resistance Empty]	The resistance, in Ohms, when the tank is empty.	0 (ohm) to 500 (Ohm)
[Capacity]	The capacity of the tank.	0 (G) to 2650 (G)
[Self test]	Test results are displayed.	
[Set Hardware to Factory Default]	Resets the converter selected at [Select IF] to factory default.	[OK], [Cancel]

3. HOW TO SET UP THE EQUIPMENT

[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] Note: If the TTM sentence is received at the same time as another sentence, the constraints to communication bandwidth may cause a decrease in the number of TTM targets.	[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.	
[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 - [NETWORK SENSOR SETUP]

The [NETWORK SENSOR SETUP] section allows you to set up compatible FURUNO NMEA2000 sensors. Calibrations and offsets applied in this menu are also applied to the sensor itself.

Tap the sensor to access its menus and settings. For details regarding the menu structure and set up of each sensor, see the appropriate operator's manual, supplied with the sensor.

[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. Volume is adjusted according to vessel speed.	[ON], [OFF]
[Minimum Speed]	Set the minimum speed threshold. Exceeding this speed activates volume auto control.	0.0 (kn) to 98.9 (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 when the vessel reaches the [Maximum Speed] setting.	10% to 50%

[Initial Setup] menu - [BROWSER INSTALLATION]

Menu item	Description	Option (setting range)
[FAX30 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.	
[Certification Mark]	Displays relevant certification for this equipment.	
[ServiceMan]	Requires login password. For the service technician.	
[Update Network Equipments]	For the service technician.	
[Event Input Configuration]	Set the function for the event switch.	[OFF], [Event], [MOB]

3. HOW TO SET UP THE EQUIPMENT

Menu item	Description	Option (setting range)
[Remote Controller Configuration]	When there are multiple units in the NavNet network, the Remote Controller MCU-004 can select the display to show on the unit with MCU-004 connection. Further, the cycling order of displays can be set. See the Operator's Manual.	
[Sirius Radio Diagnostic]	Check the satellite radio of the FURUNO BBWX SiriusXM weather receiver for proper operation. See the Operator's Manual.	
[Sirius Weather Diagnostic]	Check the weather section of the FURUNO BBWX SiriusXM weather receiver for proper operation. See the Operator's Manual.	
[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 Sea Surface Temperature	Set the transducer's minimum detectable temperature.	0.00°C to 98.99°C
Maximum Sea Surface Temperature	Set the transducer's maximum detectable temperature.	0.01°C to 99.99°C

[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 143 (psi)
Max. Oil Pressure	Set the maximum oil pressure of your engine.	1 (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

Manual Fuel Management

Menu item	Description	Options (setting range)
[Total Fuel Capacity]	Enter the total fuel capacity of your tank(s).	0 to 9,999(L).
[Manual Fuel Management]	Set to [ON] for manual fuel management. See the Operator's Manual.	[OFF], [ON].

CZone

Menu item	Description
[Add Default CZone Pages]	Create, edit C-Zone pages.
[CZone DIP Switch Settings]	Set this unit's DIP switches. For the serviceman. Do not change the settings.

Menu item	Description
[Reset Instrument Pages]	Resets all instrument pages to default. [OK], [Cancel]
[Reset Default Settings]	Resets applicable settings to default. [OK], [Cancel]

[Initial Setup] menu - [Engine & Tank Automatic Setup]

The TZTL will automatically detect engines and tanks connected to the same network.

This is the recommended method for setting up engines and tanks.

[Initial Setup] menu - [Engine & Tank Manual Setup]

The manual set up method should only be used if the automatic setup did not correctly detect your engines or tanks.

The screenshot shows the 'Engine & Tank Setup' menu with a 'Reset' button and a close icon. It is divided into two sections: 'TANK SENSOR' and 'ENGINE SENSOR'. Each section has a table with columns for Instance, Data Source, NickName, Fluid Type, and Used For Propulsion. All 'Used For Propulsion' options are currently set to 'ON'.

TANK SENSOR				
Instance	Data Source	NickName	Fluid Type	Used For Propulsion
0	NMEA2000sim	Fuel	Fuel	ON
1	NMEA2000sim	Fuel2	Fuel	ON
2	NMEA2000sim	Fuel3	Fuel	ON
3	NMEA2000sim	Fuel4	Fuel	ON

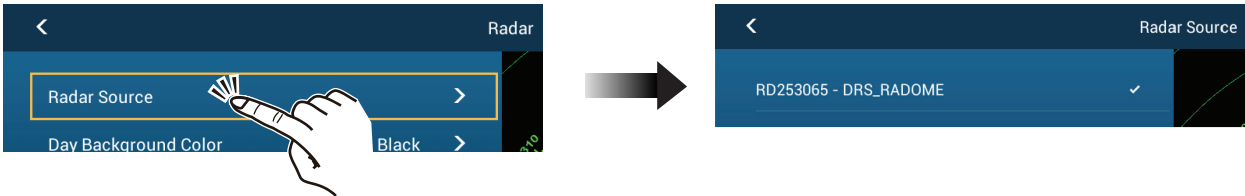
ENGINE SENSOR				
Instance	Data Source	NickName	Fluid Type	Used For Propulsion
0	NMEA2000sim	STBD	Engine	ON
1	NMEA2000sim	Engine 2	Engine	ON
2	NMEA2000sim	Engine 3	Engine	ON
3	NMEA2000sim	Engine 4	Engine	ON

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 on the following pages, 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 3-14.	[-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 Port-side is negative, Starboard-side is positive.



Menu item	Description	Options (setting range)
[Antenna Height]	Select the height of the antenna above the waterline. Not available (greyed out) with the radar sensor DRS4DL, DRS4DL+.	[Under 3m], [3m-10m], [Over 10m]
[Auto Tuning]	Enable/disable auto tuning for the connected radar. Not available (greyed out) with the radar sensor DRS4D-NXT.	[ON], [OFF]
[Tuning Source]	Select a display in the dual range display to manually tune. Not available (greyed out) with the radar sensor DRS4D-NXT, DRS4DL, DRS4DL+.	[Range1], [Range2]

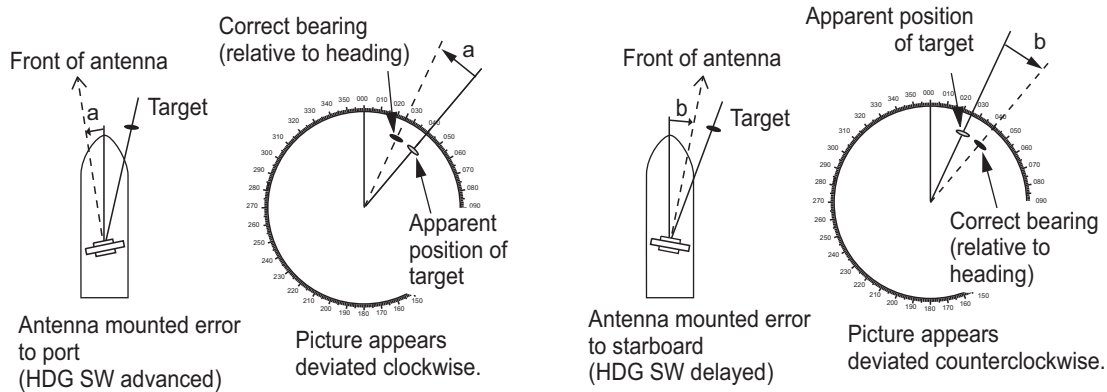
Menu item	Description	Options (setting range)
[Manual Tuning]	Manually tune the radar. Not available when [Auto Tuning] is enabled or the radar sensor DRS4D-NXT is used.	[-50] to [50]
[Radar Monitoring]	Display various information regarding the connected radar.	
[Radar Optimization]	Automatically adjust magnetron output and tuning for the connected radar. Available when the [TX/STBY] setting is [ON]. Do not change these settings. Not available (greyed out) with the radar sensor DRS4D-NXT. Note 1: For the service technician only. Note 2: Do this function whenever the magnetron is replaced.	
[ARPA Advanced Settings]	For service technician only. Do not change these settings. This item is available when [TX/STBY] is [ON]. Not available (greyed out) with the radar sensor DRS4DL, FAR-2xx7 series radar antenna.	
[TX Channel]	Select [1], [2] or [3], the channel where the interference is smallest. See the operator's manual for details. Not available (greyed out) with the radar sensor DRS4D-NXT.	[Auto], [1], [2], [3]
[Target Analyzer Mode]	You can emphasize rain clutter or target echoes when the target analyzer is active. Select [Rain] or [Target] as appropriate. See the operator's manual for details. Not available (greyed out) with the radar sensor DRS4D-NXT.	[Rain], [Target]
[Auto acquire by Doppler]	When selecting [ON], approaching targets (ships, rain clutter, etc.) within 3 NM from own ship are automatically acquired by the Doppler calculated from the radar echo. See the operator's manual for details. Available with the radar sensor DRS4D-NXT.	[ON], [OFF]
[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]

3. HOW TO SET UP THE EQUIPMENT

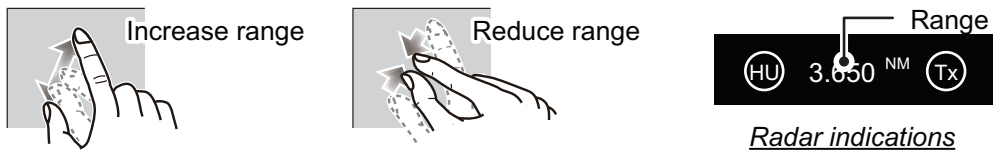
How to align the antenna heading

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. Tap [Antenna Heading Align].
6. Key in an offset value (setting range: $+179.9^\circ$ to -180°) that puts the target at the very top of the screen, then tap the icon.
+: rotate echo in clockwise direction
-: rotate echo in counterclockwise direction
7. 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 1: 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.

Note 2: For DFF-3D setup instructions, see the DFF-3D operator's manual.

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 Note: 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. Note: Where the TZTL12F or TZTL15F's nickname has been changed in [INITIAL SETUP] - [SENSOR LIST], the [Fish Finder Source] option reflects the name change.	[TZTL12F] / [TZTL15F], [DFF1/BBDS1], [DFF3], [DFF1-UHD]
[Transducer Setup]	Setup Transducer and Motion Sensor. See "Transducer Setup menu" on page 3-17.	
[Transmission Power]	Set the TX power level. See the operator's manual for details. Note: 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. Note: 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]

3. HOW TO SET UP THE EQUIPMENT

Menu item	Description	Options (setting range)
[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]
[Auto Gain Offset HF] [Auto Gain Offset LF]	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]
[STC HF] [STC LF]	Adjust the low (LF) or high (HF) STC frequency. See the operator's manual for details. Note: This menu item is available only for DFF3 and DFF1-UHD users.	[0] to [10]
[Frequency Adjust HF] [Frequency Adjust LF]	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. Note: This menu item is available only for DFF3 users.	[-50] to [50]
[TX Pulse HF] [TX Pulse LF]	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"> • [Short 1] improves the detection resolution, but the detection range is shorter than with [Std] (pulse length is 1/4 of [Std]). • [Short 2] raises the detection resolution, however detection range is shorter (pulse length is about 1/2 of [Std]) than [Std]. • [Std] is the standard pulse length, and is suitable for general use. • [Long] increases the detection range but lowers the resolution (about 1/2 compared to the [Std] pulse length) Note: This menu item is available only for DFF3 users.	[Short1], [Short2], [Standard], [Long]
[RX Band HF] [RX Band LF]	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]. Note: This menu item available only for DFF3 users.	[Narrow], [Standard], [Wide]
[Temperature Port]	Set the data source for water temperature. <ul style="list-style-type: none"> • [MJ Port]: Use the temperature/speed sensor for data. • [Low Frequency]: Use the LF sensor for data. • [High Frequency]: Use the HF sensor for data. Note: 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"> • [OFF]: Disable the demo mode. • [Shallow]: Enable shallow water demo mode. • [Deep]: Enable deep water demo mode. Note: 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"> • [Manual]: Manually set up the transducer. • [Model]: Select the appropriate transducer model (for FURUNO or AIRMAR transducers) • [TDID]: Select the TDID for the transducer (for AIRMAR transducers with a TDID) 	[Manual], [Model], [TDID]
[Model Number]	Select the appropriate model number from the list. Note: 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. Note 1: This menu item is available only for DFF1, DFF1-UHD, BBDS1 and internal fish finder users. Note 2: 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. Note: 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. Note 1: This menu item is available only for DFF1, DFF1-UHD, BBDS1 and internal fish finder users. Note 2: 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. Note: 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. Note: This item is displayed when the connected transducer has an unsupported TDID.	
[Transducer Power HF]	Set the transmission power for high frequency. Note 1: This item is only available for DFF1, DFF1-UHD, BBDS1 and internal fish finder users. Note 2: 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. Note: This item is displayed when the connected transducer has an unsupported TDID.	
[Transducer Power LF]	Set the transmission power for low frequency. Note 1: This item is only available for DFF1, DFF1-UHD, BBDS1 and internal fish finder users. Note 2: 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

Adjust these settings to view a clearer picture of the seabed, fish schools etc when in moderate to rough seas.

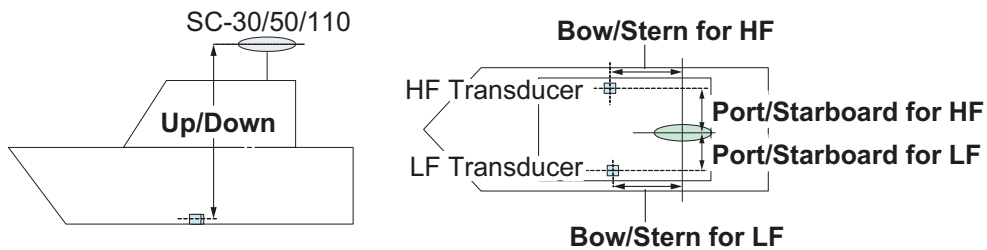
Note 1: For connection of NMEA 0183 equipment, ask your dealer to set up the equipment.

Note 2: Your NavNet TZtouch2 built-in Fish Finder does not support heaving correction. Motion sensor setup is not required if [Fish Finder Source] in the [Sounder] menu is set to [Internal].

Note 3: To use the heaving function, the following settings are required at the satellite compass. For the setting procedure, see the operator’s manual for your satellite compass. Settings for SC-30 are done from the [IF-NMEASC] menu, settings for SC-50/110 are done from the [DATA OUT] menu.

	NMEA0183	CANbus
Sentence	ATT, HVE	
Baud rate	38400BPS	
Cycle	25ms	
PGN		Heave: 65280 Attitude: 127257

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.



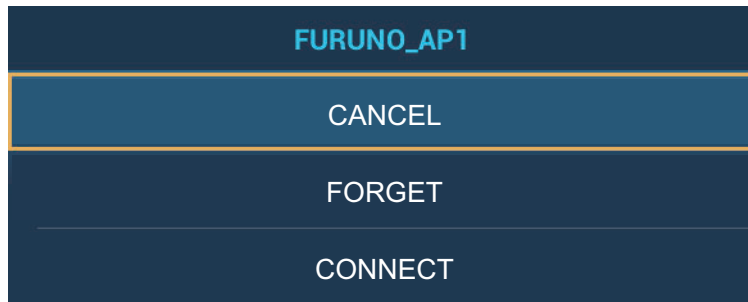
Menu item	Description	Options (setting range)
[Motion Sensor Type]	Select the sensor connected to your NavNet TZtouch2 unit. For all sensors other than SC-50/110, select [SC-30].	[SC30], [SC50_SC110]
[Antenna Position Bow/Stern HF (LF)]	Set the distance from the antenna unit to the transducer in the 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

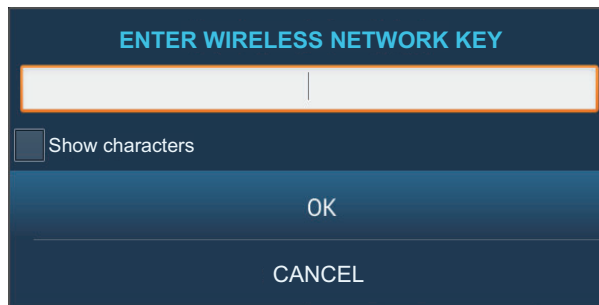
3.6.1 How to join an existing wireless network

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].
3. Tap [Wireless LAN Settings].
4. Tap [Wireless Mode].
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] to scan the vicinity for accessible WLAN networks. Available networks are listed. To delete all WLAN networks, select [Forget All Available Networks].
8. Tap the appropriate WLAN network to show the following display.






9. Tap [Connect], and the following display appears.



10. Use the software keyboard to enter the network key, then tap the [OK] button. To see what you have input, check [Show characters].
Note: If the network key is incorrect, an error message appears. Enter the correct key and tap [OK] again.
11. Tap [X] on the title bar to close the menu.

3.6.2 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. HOW TO SET UP THE EQUIPMENT

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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.

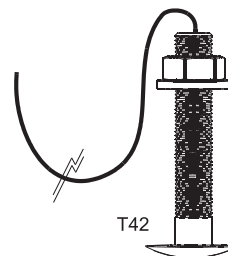
CAUTION: Never install a bronze sensor in a metal hull because electrolytic corrosion will occur.

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.

- 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.
- Using the appropriate drill bit, cut a hole perpendicular to the hull from outside the boat.
- 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.

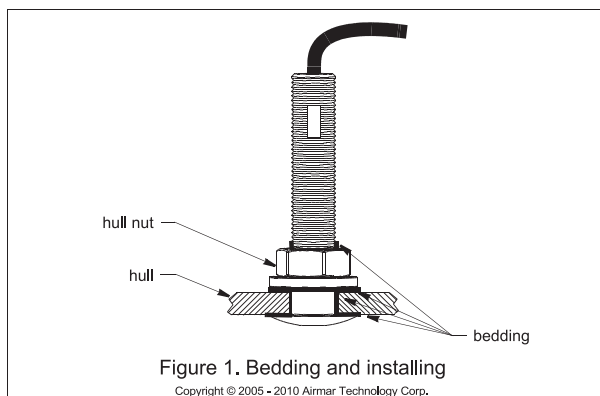
Applications

- 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

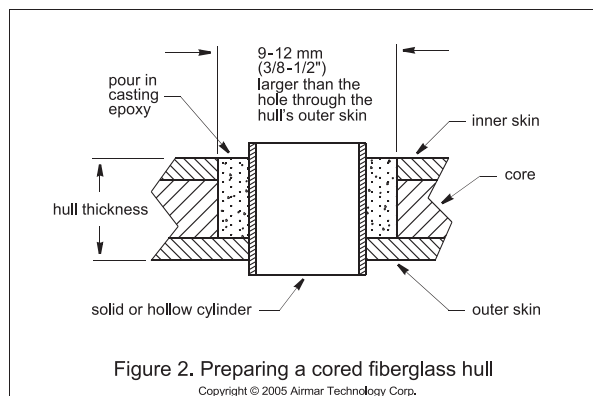
1. From outside the hull, thread the cable through the mounting hole.
2. Push the sensor into the mounting hole using a twisting motion to squeeze out excess marine sealant (see Figure 1).
3. From inside the hull, slide the hull nut onto the cable. Screw the hull nut in place. Tighten it with slip-joint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

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

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.

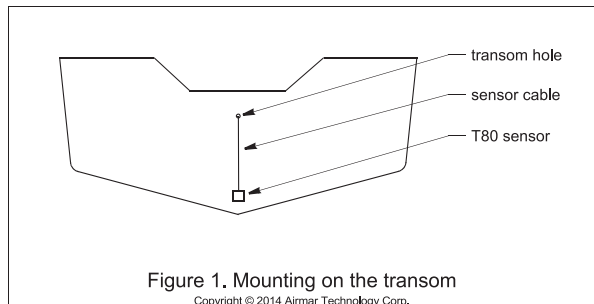
Applications

- 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

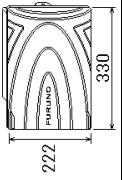








35 Meadowbrook Drive, Milford, New Hampshire 03055-4613, USA
• www.airmar.com

PACKING LIST TZTL12F

19BF-X-9851-7

1/1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
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
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP19-00601 001-023-040-00	1
付属品 ACCESSORIES			
付属品 ACCESSORIES		FP19-02001 001-337-380-00	1 (*1)
付属品 ACCESSORIES		FP19-02011 001-337-390-00	1 (*2)
工事材料 INSTALLATION MATERIALS			
ケーブル(ケミホン)MJ CABLE ASSEMBLY		MJ-A3SPF0019-035C 000-156-058-11	1
工事材料 INSTALLATION MATERIALS		CP19-01812 001-476-030-00	1
図書 DOCUMENT			
フラッシュマウント型紙 FLASH MOUNTING TEMPLATE		C42-01407-* 000-190-076-1*	1

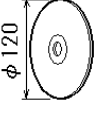



1.コード番号末尾の[**]は、選用品の代表コードを表します。

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.

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

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
取扱説明CD OPERATOR'S MANUAL CD		TZTLXXF 0/M *CD-ROM* 000-190-093-1*	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
埋め込み装備時の注意 NOTICE ON FLUSH MOUNTING		C42-01603-* 000-191-900-1*	1

3.(*2)の付属品は、英文仕様専用です。

3.(*2) MARKED ACCESSORIES ARE FOR ENGLISH SET ONLY.

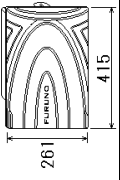





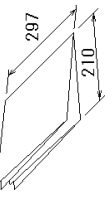
A-1

C4487-Z01-H

PACKING LIST TZTL15F

19BF-X-9852-7

1/1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
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
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP19-00601 001-023-040-00	1
付属品 ACCESSORIES			
付属品 ACCESSORIES		FP19-02001 001-337-380-00	1 (*1)
付属品 ACCESSORIES		FP19-02011 001-337-390-00	1 (*2)
工事材料 INSTALLATION MATERIALS			
ケーブル(ケミホン)MJ CABLE ASSEMBLY		MJ-A3SPF0019-035C 000-156-058-11	1
工事材料 INSTALLATION MATERIALS		CP19-01812 001-476-030-00	1
図書 DOCUMENT			
フラッシュマウント型紙 FLASH MOUNTING TEMPLATE		C42-01408-* 000-190-077-1*	1

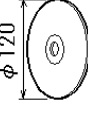



1.コード番号末尾の[**]は、選択品の代表コードを表します。

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.

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

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
取扱説明CD OPERATOR'S MANUAL CD		TZTLXXF 0/M *CD-ROM* 000-190-093-1*	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
埋め込み装備時の注意 NOTICE ON FLUSH MOUNTING		C42-01603-* 000-191-900-1*	1

3.(*2)の付属品は、英文仕様専用です。

3.(*1) MARKED ACCESSORIES ARE FOR ENGLISH SET ONLY.

CODE NO.	001-476-030-00	198F-X-9407-0
TYPE	CP19-01812	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	+皿ヘッド付 FLAT HEAD TAPPING SCREW		3X20 SUS 7MM-F CODE NO. 000-190-275-10	4	
2	埋め込み装備時の注意 NOTICE ON FLUSH MOUNTING		C42-01003-# CODE NO. 000-191-300-1#	1	
3	Fワット金具 FLUSH MOUNT FIXTURE		CP19-01813 CODE NO. 001-476-050-00	2	
4	EMIシ7 EMI CORE		GRFC-9 CODE NO. 000-190-381-10	1	

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

FURUNO ELECTRIC CO . . . LTD.

CODE NO.	001-327-390-00	198F-X-9502-6
TYPE	FP19-02011	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 LCD CLEANING CLOTH		19-0208-3125-F CODE NO. 100-300-677-10	1	
2	ケーブル付属品 CABLE ACCESSORIES		CAF6-BK-PE CODE NO. 000-190-329-10	1	

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

FURUNO ELECTRIC CO . . . LTD.

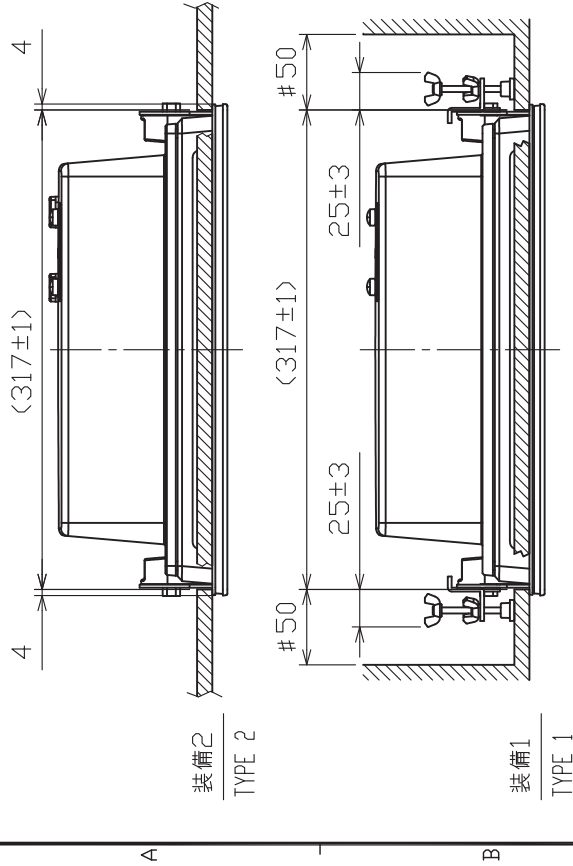
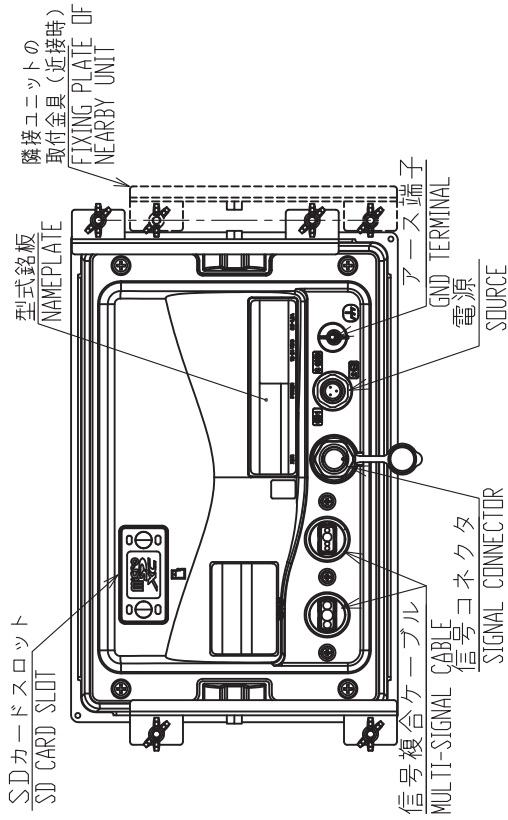
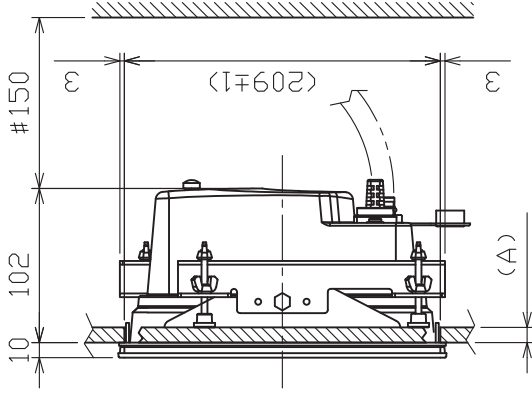
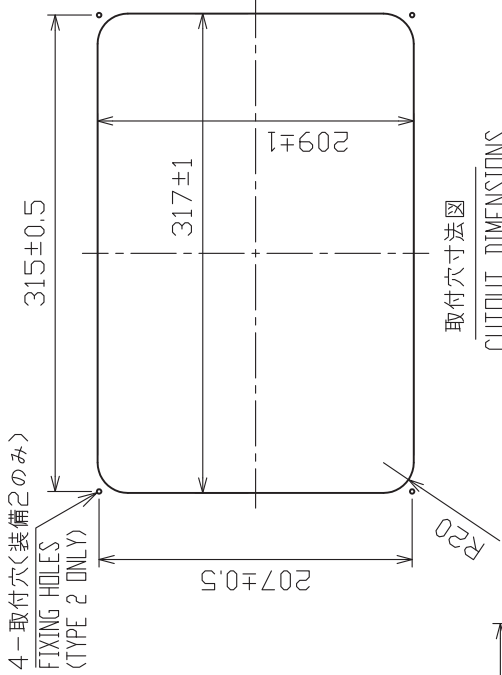


表1 TABLE 1

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



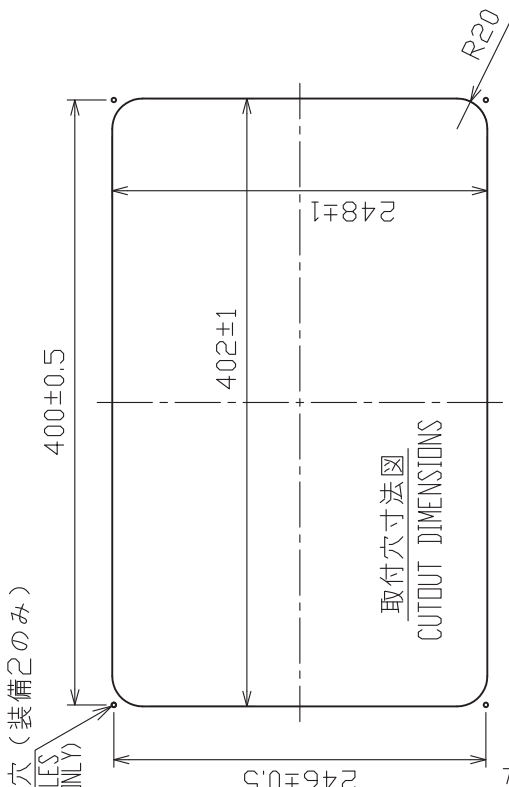
注記

- 1) 指定外の寸法公差は表1による。
- 2) #印寸法は最小サージスペース寸法とする。
- 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.

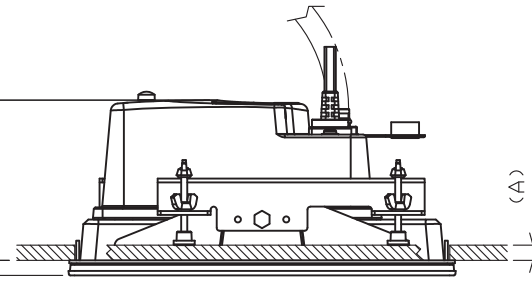
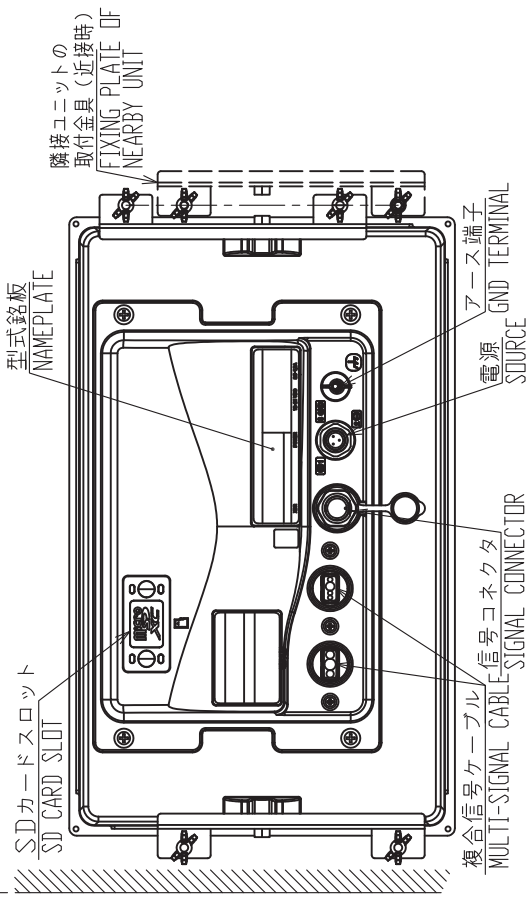
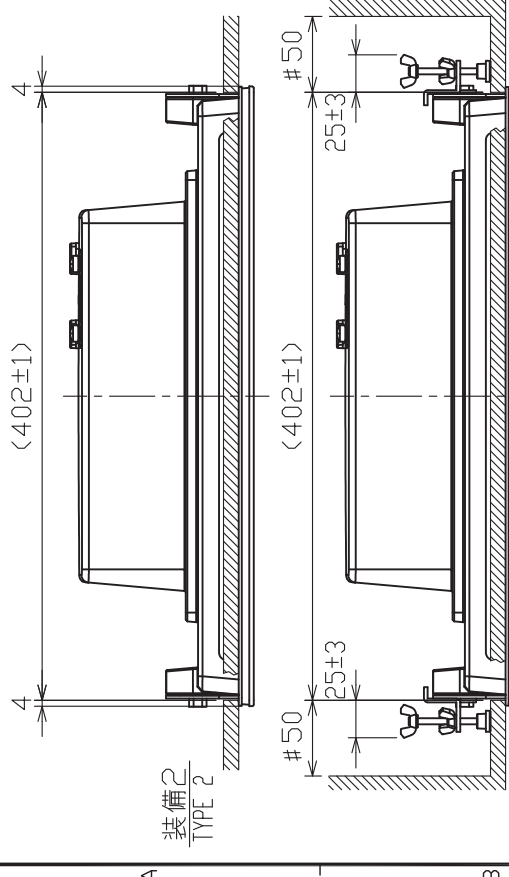
DRAWN	15/Dec/2016	I.YAMASAKI	TITLE	TZTL12F
CHECKED	15/Dec/2016	H.MAKI	名称	マルチファンクションディスプレイ (埋込装備S)
APPROVED	16/Dec/2016	H.MAKI	外寸図	
SCALE	1/5	質量 4.1 kg 寸法 1/5	質量は適合ケーブルを含む。 MASS INCLUDES MULTI-SIGNAL CABLE.	MME MULTI FUNCTION DISPLAY (FLUSH MOUNT S)
DWG.No.	C4487-601-E	REF.No.	19-032-100G-3	OUTLINE DRAWING



4-取付穴 (装備2のみ)
FIXING HOLES
(TYPE 2 ONLY)

表1 TABLE

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	16/Dec/2016	I.YAMASAKI	TITLE	TZTL15F	
CHECKED	16/Dec/2016	H.MAKI	名称	マルチファンクションディスプレイ (埋込装備S)	
APPROVED	16/Dec/2016	H.MAKI	外寸図		
SCALE	1/5	質量 5.2 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 S)
FIG.No.	C4489-601-E	REF.No.	19-032-200G-4	OUTLINE DRAWING	

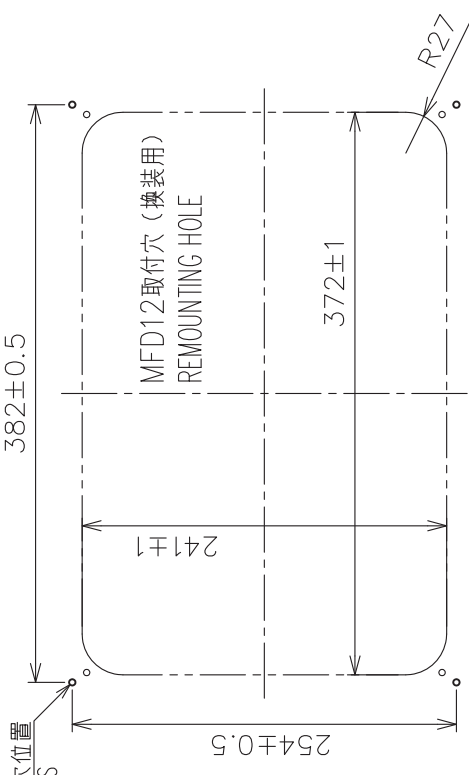
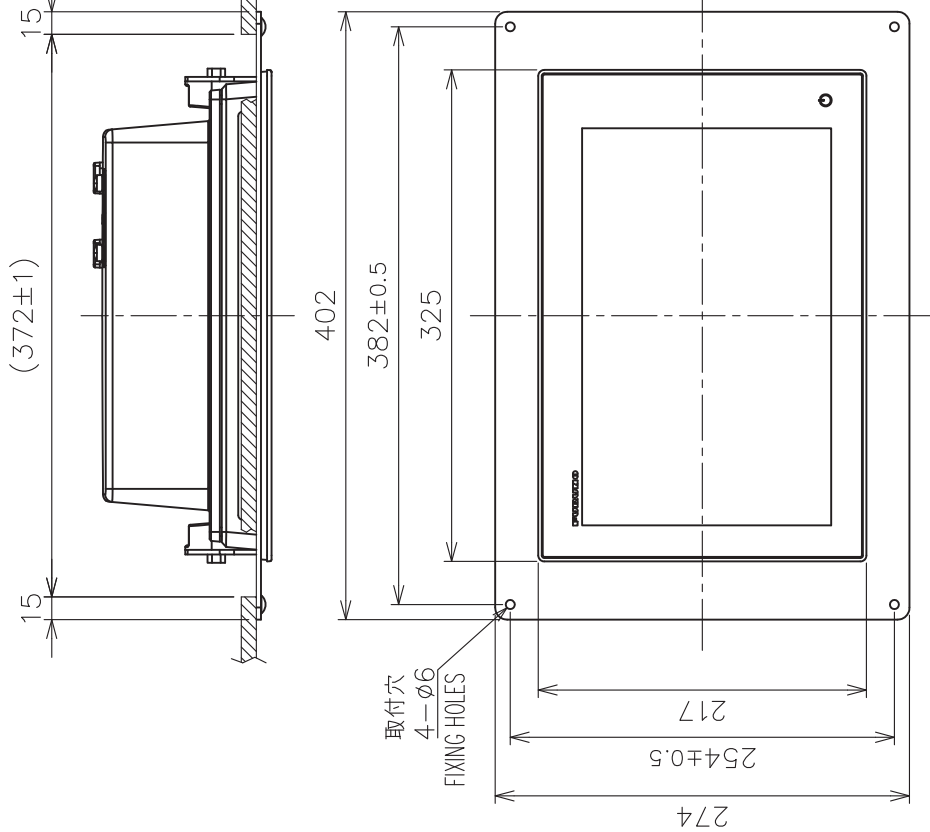
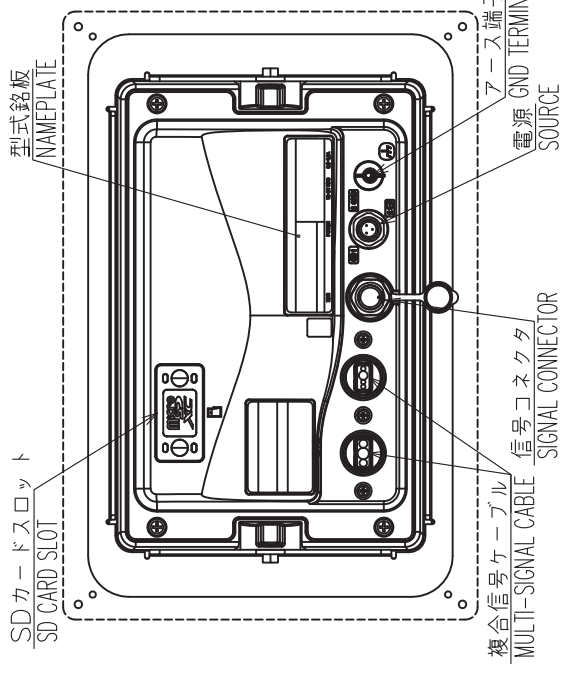
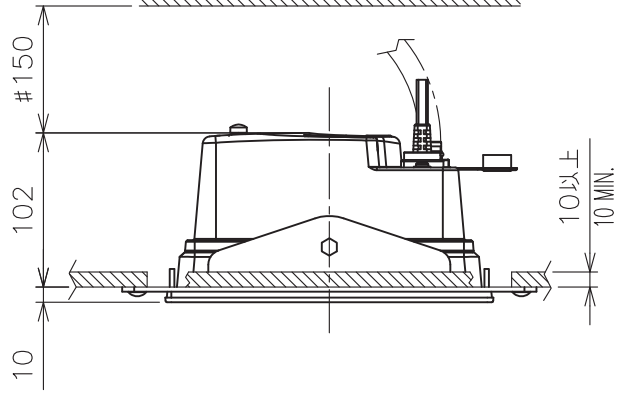
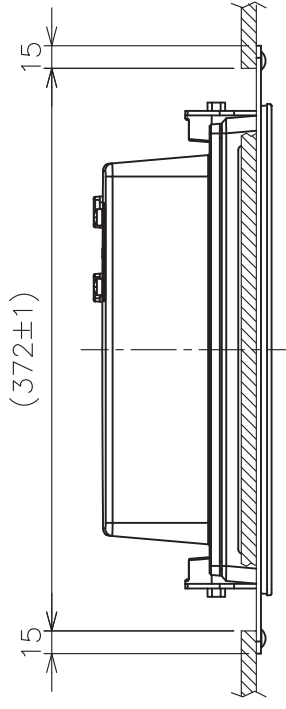


表1 TABLE 1

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ウントとする。
- 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 φ5x20 FOR FIXING UNIT.

DRAWN	21/Jan/2015	I.YAMASAKI	TITLE	TZTL12F	
CHECKED	21/Jan/2015	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	22/Jan/2015	H.MAKI	外寸図		
SCALE	1/5	質量 3.8 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 B)
DWG.No.	C4487-G04-B	REF.No.	19-032-130G-1	OUTLINE DRAWING	

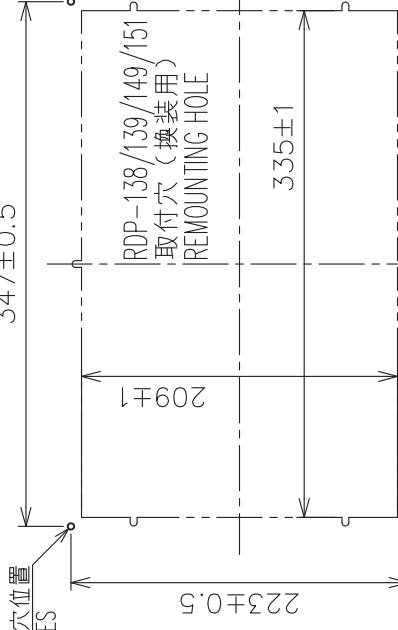
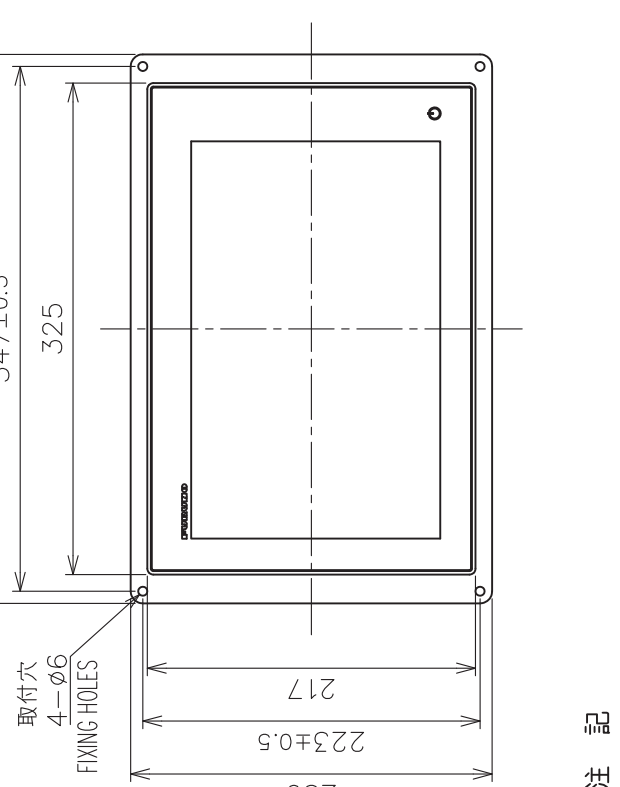
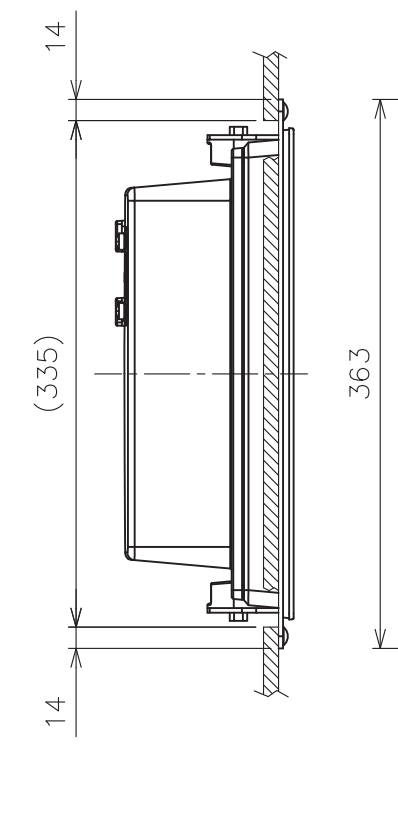
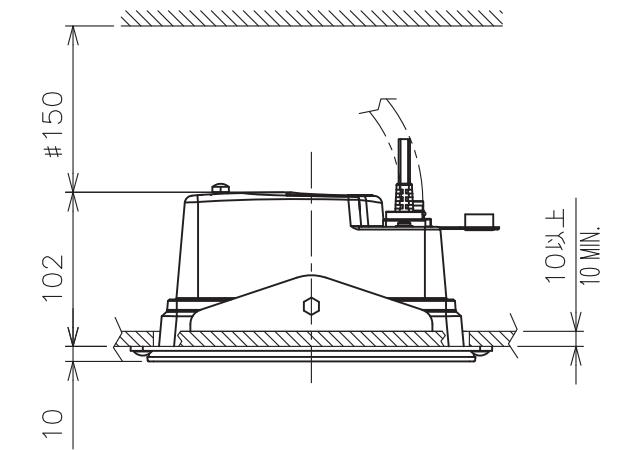
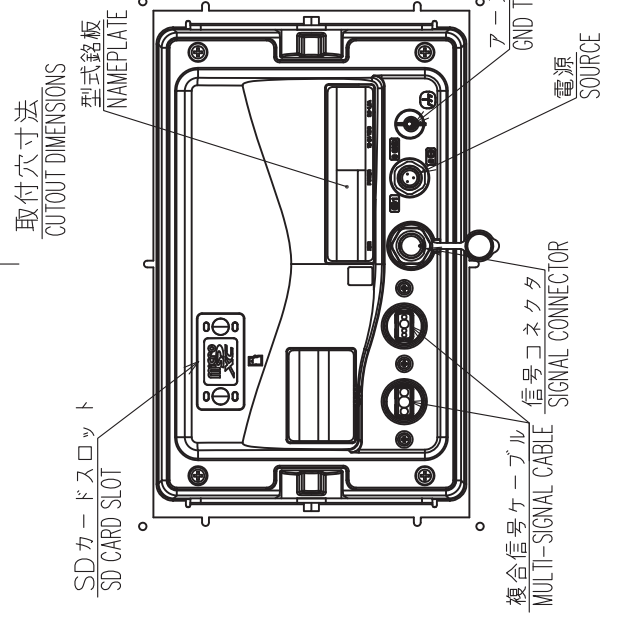


表1 TABLE 1

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



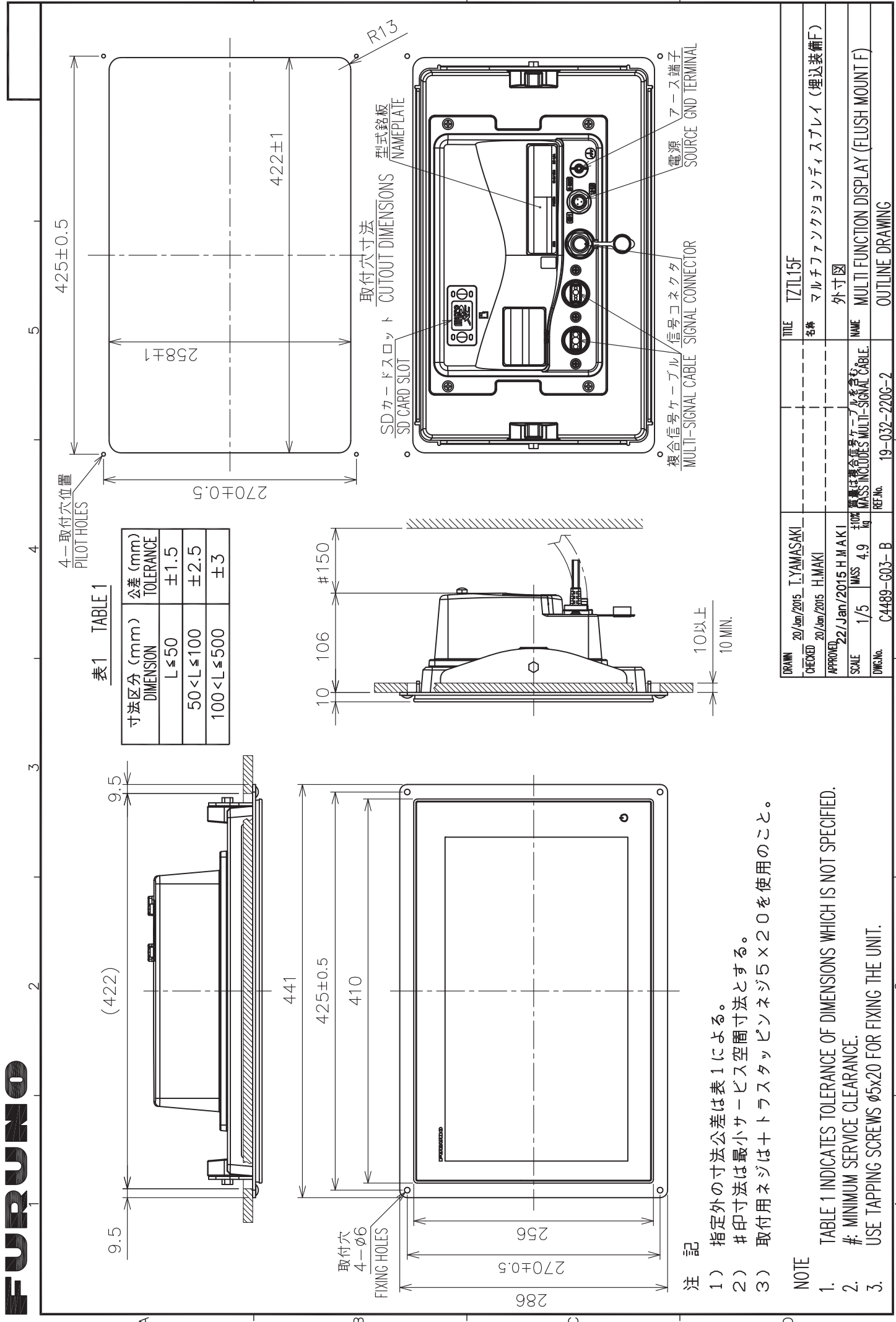
注 記

- 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スマン間寸法とする。
- 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 $\phi 5 \times 20$ 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.M.AKI	外図	
SCALE	1/5	100% 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

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 $\phi 5 \times 2.0$ FOR FIXING THE UNIT.

DRAWN	20/Jan/2015	T.YAMASAKI	TITLE	TZTL15F
CHECKED	20/Jan/2015	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	22/Jan/2015	H.MAKI	外図	外図
SCALE	1/5	質量は適合ケーブルを含む #104 MASS INCLUDES MULTI-SIGNAL CABLE.	NAME	MULTI FUNCTION DISPLAY (FLUSH MOUNT F)
DWG.No.	C4489-G03-B	REF.No.	19-032-220G-2	OUTLINE DRAWING

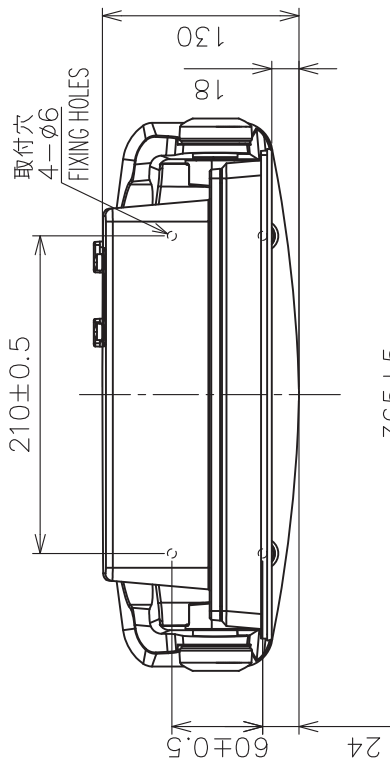
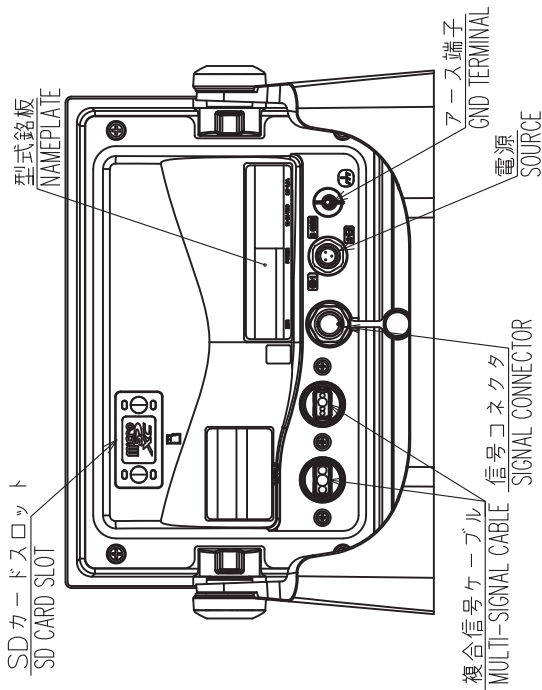
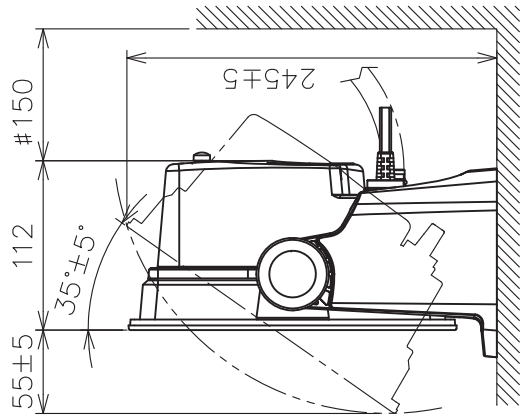
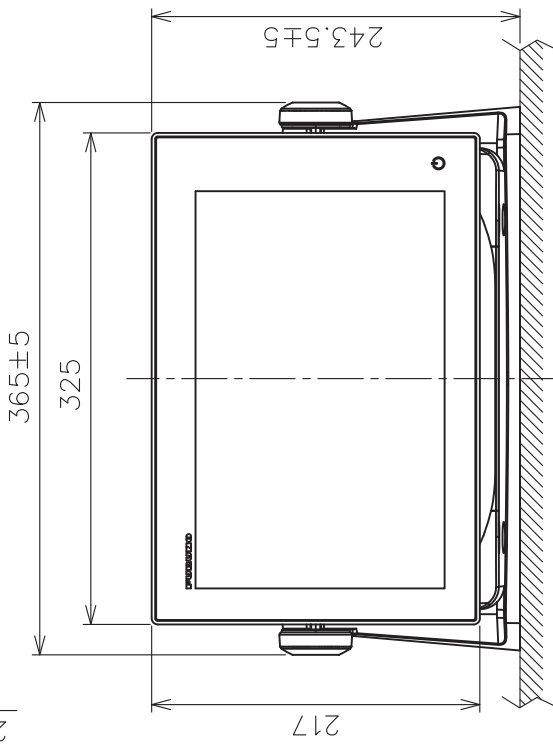


表1 TABLE 1

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) 取付用ネジは+トラスター呼び径5×20を使用のこと。

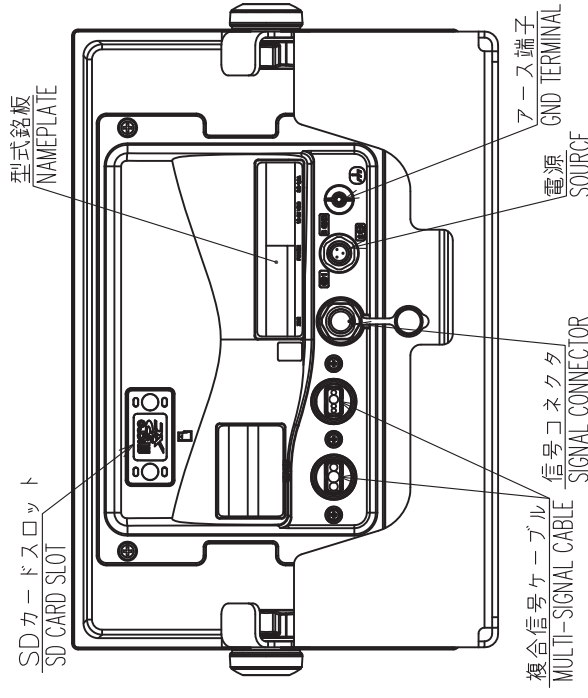
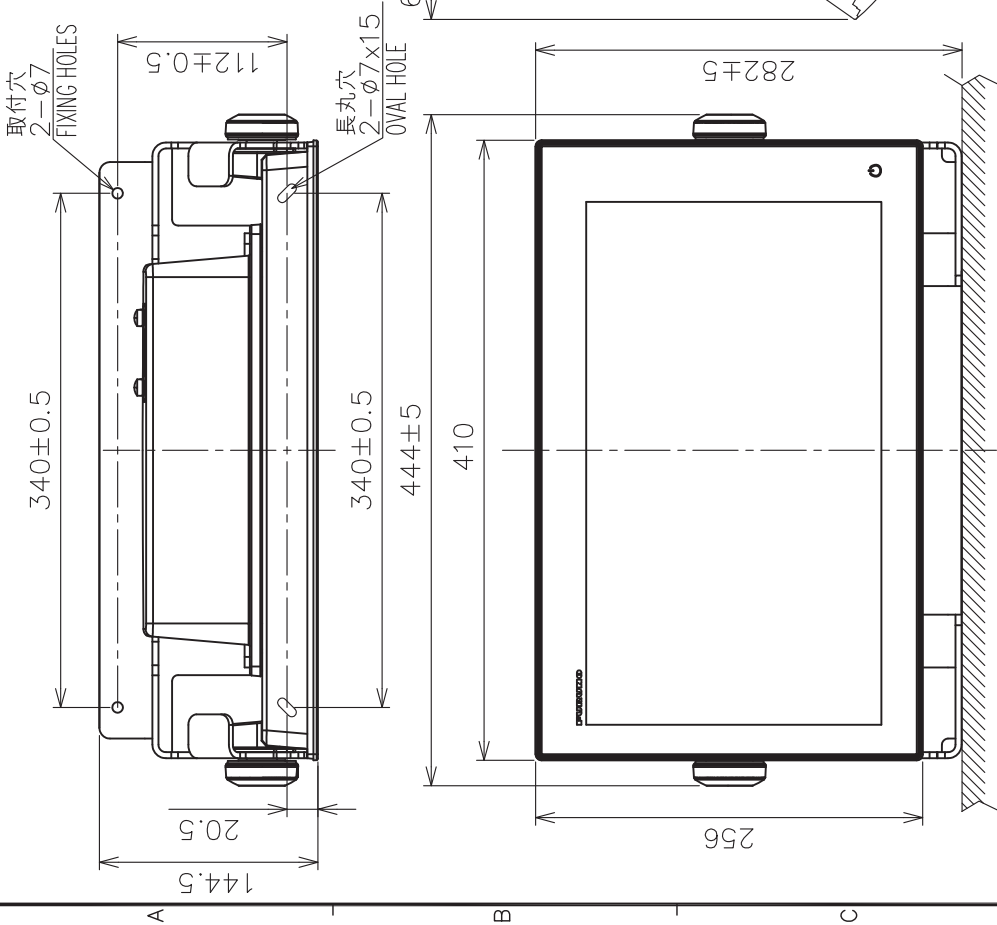
NOTE

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 THE UNIT.

DRAWN	21/Jan/2015	T.YAMASAKI	TITLE	TZLT12F	
CHECKED	21/Jan/2015	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	22/Jan/2015	H.MAKI	外図		
SCALE	1/5	質量 3.8 kg	質量は複合信号ケーブルを含む MASS INCLUDES MULTI-SIGNAL CABLE.	NAME	MULTI FUNCTION DISPLAY (TABLETOP MOUNT)
DWG.No.	C4487-G02-B	REF.No.	19-032-110G-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) # 印寸法は最小サージスペース寸法とする。
- 3) 取付用ネジは+トラスチックピンネジ呼び径5×20を使用のこと。

NOTE

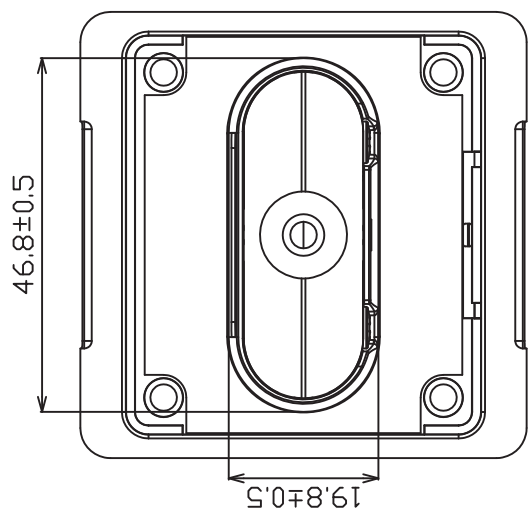
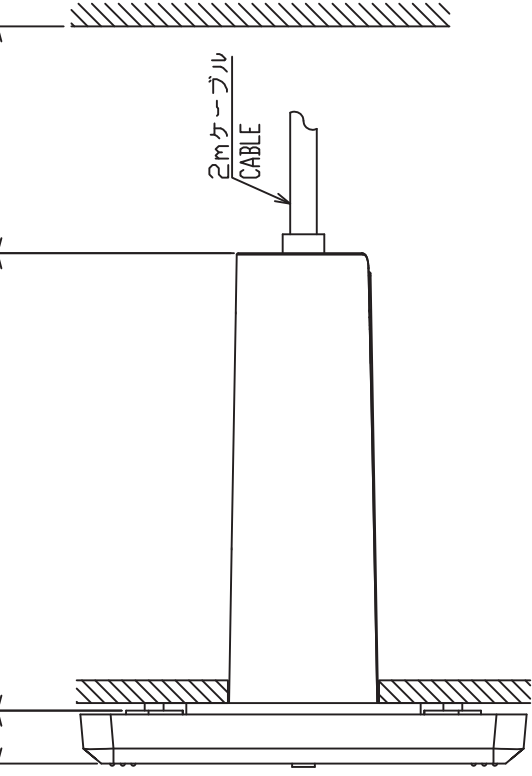
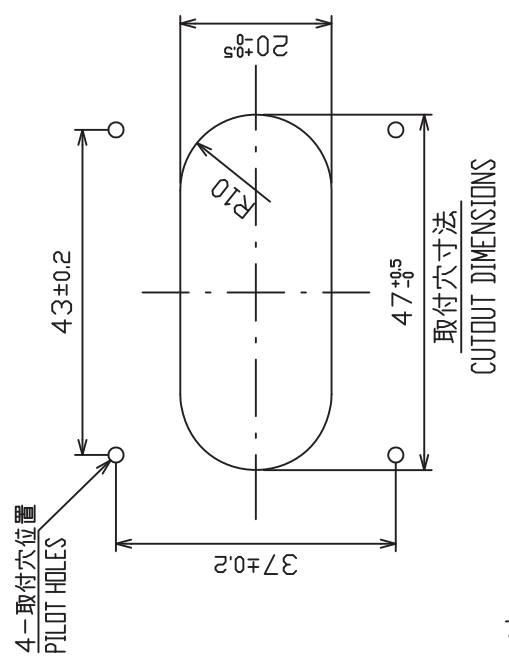
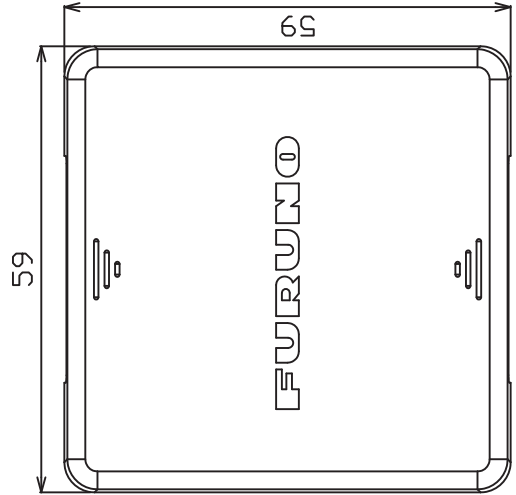
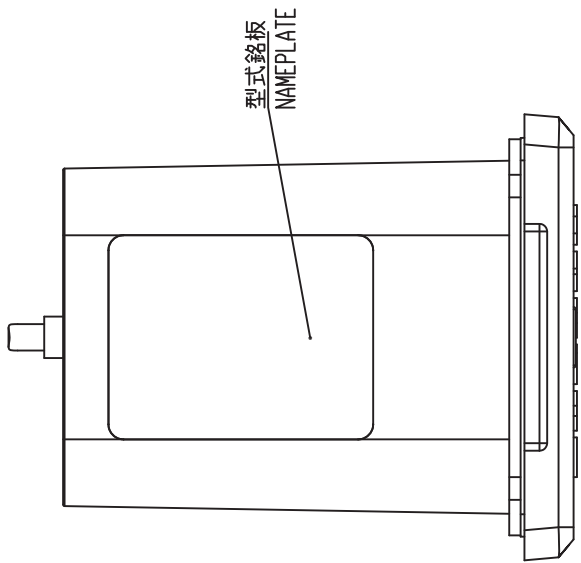
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ5x20 FOR FIXING THE UNIT.

DRAWN	20/Jan/2015	I.YAMASAKI	TITLE	TZTL15F
CHECKED	20/Jan/2015	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	22/Jan/2015	H.MAKI	外寸図	
SCALE	1/5	質量は適合ケーブルを含む MASS INCLUDES MULTI-SIGNAL CABLE.	NAME	MULTI FUNCTION DISPLAY (TABLETOP MOUNT)
DWG.No.	C4489-G02-C	REF.No.	19-032-210G-3	OUTLINE DRAWING

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



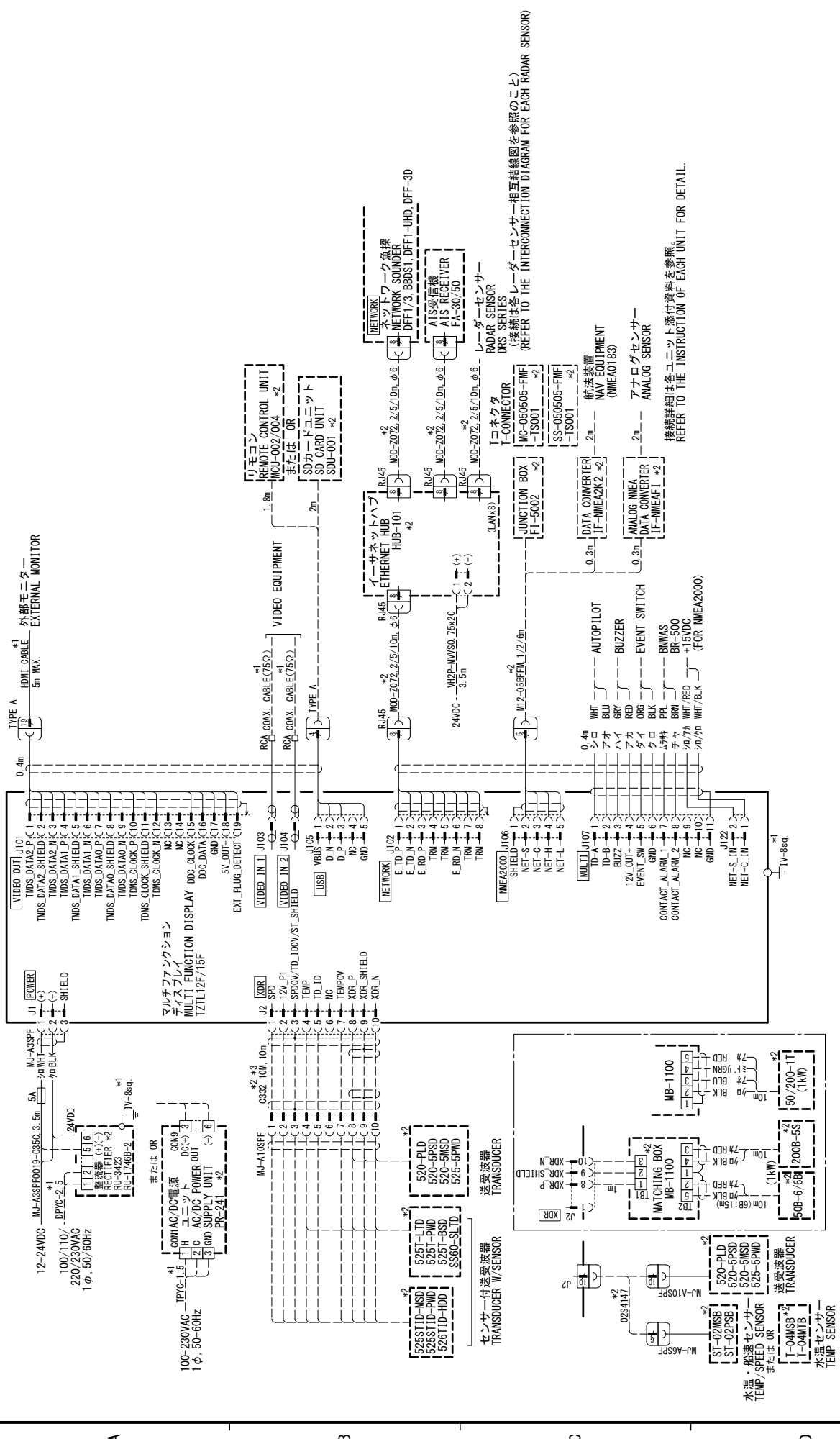
注記

- 1) 指定なき寸法公差は表 1 による。
- 2) 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 $\phi 3 \times 14$ 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



DRAWN	18/Jun/2021 U. PODDAR	TITLE	TZTL12F/15F
CHECKED	18/Jun/2021 T. YAMASAKI	名称	マルチファンクションディスプレイ
APPROVED	22/Jun/2021 H. MAKI	相互接続図	相互接続図
SCALE	1/MS	NAME	MULTI FUNCTION DISPLAY
DWG No.	C4487-C01- M	REF. No.	19-032-5001-0
		INTERCONNECTION DIAGRAM	

注記
 *1) 造船所手配。
 *2) オプション。
 *3) ケーブル延長の場合、ACCU-FISH性能低下の恐れあり。

NOTE
 *1: SHIPYARD SUPPLY.
 *2: OPTION.
 *3: ACCU-FISH PERFORMANCE MAY BE DECLINED BY CABLE EXTENSION.