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1. NavNet TZtouch2

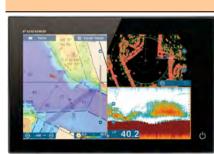
1-1 Model TZT12F and TZTL15F

NavNet TZtouch2, the second generation of NavNet TZtouch series, has two (2) models: TZTL12F (12.1"-diag) and TZTL15F (15.6"-diag). This document describes the overview of these new models.



1-2 Total Control, Simply Refined...

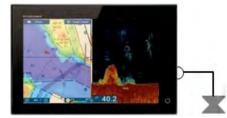
"Total Control, Simply Refined" describes the NavNet TZtouch2 User Interface Concept.



Streamlined GUI (Graphic User Interface)

Compared with NavNet TZtouch, the TZTL12F/15F consists of a keyless display with a larger screen area, providing one of the highest "Display to Bezel" ratios in the industry! By utilizing the basic GUI (graphic user interface) of TZT9/14, the TZTL12F/15F is further refined with innovative "Edge Swiping" functionality and multi touch control.

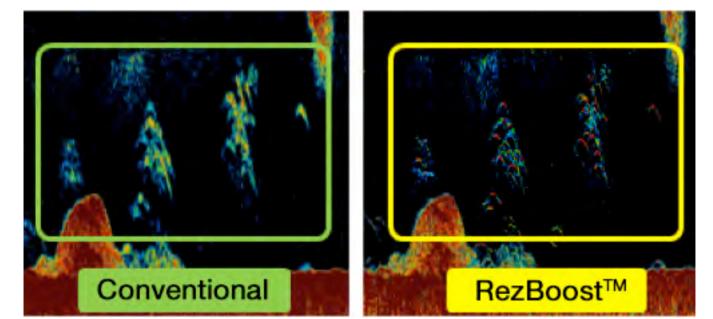
Built-in 56 Channel High Sensitivity GPS/WAAS and RezBoost Fish Finder



The TZTL12F/15F is equipped with a built-in 56 Channel GPS/WAAS and our unique RezBoost Fish Finder modules. NavNet TZT2 greatly refines and simplifies system installations and configurations, especially for vessels with limited space.



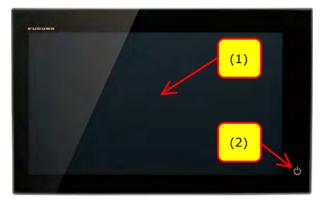
RezBoost[™] is a revolutionary new technology built-in to TZT2, to produce high-definition Fish Finder echo resolution and separation. By utilizing conventional narrowband transducers, echo images will be up to 8x sharper, thanks to advanced post signal processing. It also saves money by allowing customers to use their existing installed transducers to achieve enhanced clarity and sharper targets.

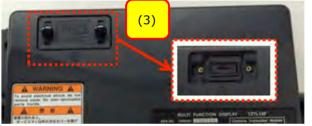


2. Product Overview

2-1 Appearance

The TZTL12F/15F MFDs provide a large screen for their bezel size, thanks to minimized hardware keys. The rear side is slimmer, lighter and much more water-resistant than any other Furuno MFD! The glass face is impervious to water!



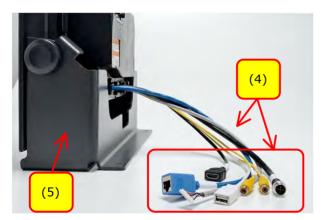


Front View

No	Items	Descriptions		
	Multi Touch Screen	User-friendly Edge Swipe		
1		functionality along with a bonded		
L T		touch screen provides very high		
		contrast even under direct sunlight.		
2	Power Key	Unique "Built-In Glass" power key.		

Rear View

N	10	Items	Descriptions						
	2	microCDVC Clat	MicroSDXC	slot	for	а	chart	card	is
3		microSDXC Slot	accessible fr	om th	ne re	ar s	side.		





Side View

No	Items	Descriptions
4	Distail Cables	Most connectors are available on pigtail
4	Pigtail Cables	cables. See Section 5-6 for more details.
5		The TZTL12F/15F can be mounted on a
	Bracket (Option)	console or overhead with optional
		brackets. See Section 5-1 for outline
		drawings.

SDU001 (Option) – microSD card reader

No	Items	Descriptions
6		The SDU001, has two (2) microSDXC card slots
6	USB Cable	and can be connected to the TZTL12F/15F USB
7		port. See Section 5-1 for outline drawings and
/	2 x Slots	Section 6-4 for interconnection drawings.

2-2 Specifications

(1) Options – New

No	FUSA P/N	Model	Descriptions/Remarks	
1	SDU001	SDU-001	MicroSD card reader	
2	001-337-410-00	OP19-13	Bracket for TZTL12F	
3	001-337-420-00	OP19-14	Bracket for TZTL15F	
1	4 001-337-430-00	OP19-15 *(1)	Adapter panel for retrofit from GD1920C to TZTL12F	
4			It can be used as a front mount panel of TZTL12F.	
5	001-337-440-00 OP19-16 *(1)		Adapter panel for retrofit from MFD12 to TZTL12F	
5	001-337-440-00	0019-16 *(1)	It can be used as a front mount panel of TZTL12F.	
6	001-337-450-00	OP19-17 *(1)	Front mount panel for TZTL15F	
7	OME-448-70Z	OME-44870-A	Hardcopy of Operator's Manual in English (OME)	

Note: (1) See Sections 5-2 to 5-4 for more information on adapter panels such as outline drawings.

(2) Specifications

General	TZTL12F	TZTL15F		
LCD Size	12.1"-wide	15.6"-wide		
Resolution	1280×800 (WXGA: Wide-XGA)	1366×768 (FWXGA: Full-WXGA)		
Brilliance	1300 cd/m ²	1100 cd/m ²		
Touch Screen	Multi touch			
Chart *(1)	Mapmedia mm3d format (same charts as Nav	Net 3D and NavNet TZtouch)		
Chart Storage *(1)	microSDXC (microSD/HC/XC) (128GB included), USB			
Wireless LAN	Built-in (for Internet and iOS/Android [™] apps)			
GPS	Built-in high sensitivity with internal patch antenna			
GPS	GPS: 56 channels / SBAS: 1 channel (WAAS, EGNOS, MSAS)			
Sounder	Built-in (600 W or 1 kW) (MB-1100 Combiner may be required for some transducer pairs)			
Qty of Network Display	Maximum 4 displays networked via Ethernet			
Network Sensors	Limitation: No Ethernet connection with FAR2	xx7/FCV1150		
Connector	Pigtail cable with multiple connectors			
Connector	Built-in connectors for power and transducer at the rear side			
	English (USA), English (UK), French, Spanish, Germany, Italian, Portuguese, Swedish,			
Language	Danish, Norwegian, Finish, Greek, Japanese			
Installation	Standard: Flush-mount, Option: Brackets for	Console or Over-head Mounting		
Environment	-15 to +55 $^\circ\!\!\!\mathrm{C}$			

Protection Level	IP56 (both front and rear sides)	
Power/Consumption	12-24 VDC (3.0-1.5 A), 36 W	12-24 VDC (3.6-1.8 A), 43.2 W

Notes: (1) The TZTL12F/15F reads Mapmedia charts in mm3d format copied to a microSD card or USB Memory. Unlocking procedures are the same as TZtouch via unlocking codes or automatically obtained with Internet Connection.

I/O	TZTL12F	TZTL15F		
LAN	1 port (100BASE-TX)	1 port (100BASE-TX)		
NMEA2000	1 port			
NMEA0183 (Output)	1 Output port (May be split and/or amplified	1 Output port (May be split and/or amplified if necessary)		
USB	1 port (USB2.0 with 0.5 Amp 5VDC power supply)			
Vido Input (Composite)	2 ports (NTSC/PAL, RCA)			
Video Output	1 port (HDMI clone output matches aspect ratio and resolution of MFD)			
Contact Closure Output	Operator fitness output (For connection with Bridge Navigation Watch Alarm Sys(BNWAS)			
Buzzer/Contact Closure	Ports for external buzzer and external CC Input for MOB/Event Mash Switch			
Power Output for DRS	No DRS Power Port (PSU-017/012/013 necessary except for DRS4DL) See Note			
microSD Slot (Rear)	1 slot at the rear side			
microSD Slots (Option)	2 slots with optional microSD reader SDU-001			

Notes: Radar power is supplied via an external power supply. The PSU-017 is necessary for DRS2D/4D, PSU-012 for DRS6A/12A, and PSU-013 for DRS25A.

Capacity	TZTL12F	TZTL15F	
Point	30,000 points, 20 characters for name per point, 64 characters for comment per point		
Route	00 routes w/500 points, 20 characters for name/point, 64 characters for comment/point		
Track	30,000 points		
ARPA	30 targets for display		
AIS	100 targets for display		
DSC	10 targets		

Network / Functions	TZTL12F	TZTL15F		
Oty of Notwork Display	Maximum 4 displays networked via Ethernet, Will network with TZtouch, but will not			
Qty of Network Display	network with NavNet 3D or vx2 (see section 6-8, 6-9, 6-10)			
Network Sensors Limitation: No Ethernet connection with FAR-2xx7/FCV1150		-2xx7/FCV1150		
Camera	Analog video input only (NO IP camera)			
Limited Functions	NO Radar echo trail/average			

Others	TZTL12F	TZTL15F
FUSION-Link	Ethernet, NMEA2000 (Future Update)	

Operator's Manual	User guide (eGuide) built-in (HTML)
Compatible Appe *(1)	NavNet Viewer
Compatible Apps *(1)	NavNet Controller

Note: (1) The TZTL12F/15F is **<u>NOT</u>** compatible with the NavNet Remote app.

2-3 Comparison with NavNet TZtouch

General	TZTL12F/15F	TZT9/14/BB	
LCD Size	12.1"-wide / 15.6"-wide	9"-wide / 14.1"-wide / BB	
Resolution	1280×800 (WXGA: Wide-XGA) /	800×480 (WVGA: Wide-VGA) /	
	1366×768 (FWXGA: Full-WXGA)	1280 $ imes$ 800 (WXGA: Wide-XGA)	
Touch Screen	Multi touch	Multi touch	
Chart	Mapmedia mm3d format	Mapmedia mm3d format	
Chart Storage	MicroSDXC card (microSD/HC/XC)	SDXC card (SD/HC/XC)	
Wireless LAN	Built-in	Built-in	
Built-in GPS	Available	N/A	
Built-in Sounder	Available (600 W or 1 kW)	N/A	
	English (USA), English (UK), French,	English (USA), English (UK), French,	
	Spanish, Germany, Italian, Portuguese,	Spanish, Germany, Italian, Portuguese,	
Language	Swedish, Danish, Norwegian, Finish, Greek,	Swedish, Danish, Norwegian, Finish, Greek,	
	Japanese	Chinese, Japanese	
To stallation	Standard: Flush-mount	Standard: Flush-mount	
Installation	Option: Bracket	Standard: Bracket	
F . (-15 $^{\circ}$ C to +55 $^{\circ}$ C	
Environment	-15℃ to +55℃	(Built-in Wireless LAN: 0 $^\circ\!\mathrm{C}$ to +55 $^\circ\!\mathrm{C}$)	
Ducho stiere la suel	IP56	IP56	
Protection Level	(both front and rear sides)	(Rear: IP22 with connector boot)	
	12-24 VDC (3.0-1.5 A), 36 W /	12-24 VDC (3.6-1.8 A), 43.2 W /	
Power/Consumption	12-24 VDC (3.6-1.8 A), 43.2 W	12-24 VDC (5.0-2.5 A), 60 W	

<u>I/O</u>	TZTL12F/15F	TZT9/14/BB
LAN	1 port (100BASE-TX)	1 port (100BASE-TX) – TZT9
		<u>3</u> ports (100BASE-TX) – TZT14/BB
NMEA2000	1 port	1 port
NMEA0183	1 output port	N/A
USB	1 port (USB2.0)	1 port (USB2.0)
Video Input (Composite)	2 ports (NTSC/PAL, RCA) *(1)	2 ports (NTSC/PAL, RCA)
Video Output	1 port (HDMI, clone)	1 port (DVI-D, clone)

Contact Closure	Operator fitness output	N/A
Buzzer Output	1 port for external buzzer	1 port for external buzzer
Power Output for DRS	No port (PSU-017/012/013 necessary)	No port (PSU-017/012/013 necessary)
Card Slot	1 slot at the rear side for microSDXC	2 slots for SDXC

*(1) Among two (2) video input sources, either one of the video images can be shown on the screen. See **Section 6-6** for details.

<u>Capacity</u>	TZTL12F/15F	TZT9/14/BB
	30,000 points	30,000 points
Point	20 characters for name per point	20 characters for name per point
	64 characters for comment per point	64 characters for comment per point
	200 routes w/500 points	200 routes w/500 points
Route	20 characters for name per point	20 characters for name per point
	64 characters for comment per point	64 characters for comment per point
Track	30,000 points	30,000 points
ARPA	30 targets for display	30 targets for display
AIS	100 targets for display	100 targets for display
DSC	10 targets	10 targets

Network/Functions	TZTL12F/15F	TZT9/14/BB	
Qty of Network Display	Maximum <u>4</u> displays networked via Ethernet	Maximum <u>6</u> displays networked via Ethernet	
Network Sensors	Limitation: No Ethernet connection with	Ethernet connection with	
	FAR2xx7/FCV1150	FAR2xx7/FCV1150 available	
Camera	Analog video input only (NO IP camera)	Both analog and IP camera	
Limited Functions	NO Radar echo trail/average	Radar echo trail/average available	

<u>Others</u>	TZTL12F/15F	TZT9/14/BB
FUSION-Link	Ethernet NMEA2000 (Future Update)	Ethernet
Operator's Manual	User guide (eGuide) built-in (HTML)	Not built-in
	(NavNet Remote NOT compatible)	NavNet Remote
Compatible Apps	NavNet Viewer	NavNet Viewer
	NavNet Controller	NavNet Controller

3. Operating NavNet TZtouch2

The TZTL12/15F User Interface is similar to the NavNet TZT9/14/BB but has refined operational features. This section provides an overview of the key operational differences.



3-1 Multi Touch Control



The TZTL12F/15F can be controlled by multi touch operation. In addition to smooth pinch-to-zoom, a generously sized "Slider Bar" is available on the screen for range adjustments. The TZtouch Dual-tap gesture feature is also available with NavNet TZT2.

3-2 Edge-Swipe for Display Layers



Unique Edge Swiping refines the TZT2 contextual menu selections. By swiping the screen from the bottom edge upwards, a **Layers** window is available for fast/easy display settings and selections. The sample screenshot at left is from the Plotter page. On the Layer window, settings such as overlay and target on/off is readily accessible.

3-3 Edge-Swipe for Quick Page Access



By swiping the screen from the top edge downwards, the **Quick Page** appears to quickly guide you to a required page without going back to the Home page.

3-4 Flexible Data Organizer – Customizable Instrument Page



The TZTL12F/15F is also a flexible "Touch, Select, and Drag" data organizer. Easily customize the contents, data, and screen layout in any Instrument

Page. Switch from one page to another by swiping the screen upwards or downwards. Custom create data pages depending on boat types and available sensors.



3-5 More Information by eGuide



A built-in Operation guide is available on the TZTL12F/15F screen to help answer questions on basic features and operation.

4. Utilizing Wireless Solution

The TZTL12F/15F with built-in wireless LAN offers multiple features and solutions.

4-1 NavNet Viewer and NavNet Controller Apps

The TZTL12F/15F supports the **NavNet Viewer** and **NavNet Controller** apps. Utilize your Android Mobile keypad with the NavNet Controller App for wireless remote operation.



Comparison Table

Арр	NavNet Remote	NavNet Viewer	NavNet Controller
Model	MANNet		MANnet
TZTL12F/15F	Not compatible	✓	1
TZT9/14/BB	1	1	1

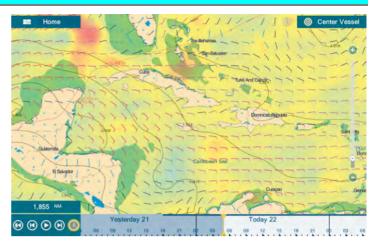
Note:

Connection via an external Ethernet router is not necessary or compatible with TZT2. iOS and Android[™] devices should always be linked directly to the TZT2 built-in wireless LAN.



4-2 Internet – Weather and Software Download

Connected to the Internet, TZT2 MFDs have unlimited free access to an incredible weather download service just like the TZT9/14/BB. Weather forecast up to 16 days is available from NavCenter and can be displayed on the dedicated Weather page of the TZTL12F/15F. Free Chlorophyll and Altimetry data are readily provided. Download procedures are exactly the same as the TZT9/14/BB: Connect the TZTL12F/15F to the Internet and download customized Weather and Sea condition information! (This service is freely available and not part of the SiriusXM Weather Service, which can also be used with TZT2 when connected to the BBWX3.)



4-3 Internet – POI and Point/Route Sharing (Future Update)

POI stands for **P**oint **o**f **I**nterest. POI information has been utilized in land applications such as Google Maps, which provides information on shops and restaurants. While there are multiple sources of POI for marine applications, the TZTL12F/15F will be compatible with **ActiveCaptain**. Active Captain's Database is mostly available for the US and Europe.

A **point/route sharing service** is also planned in the future for TimeZero[™] product users, which will allow

users to share their point and route information with each other.

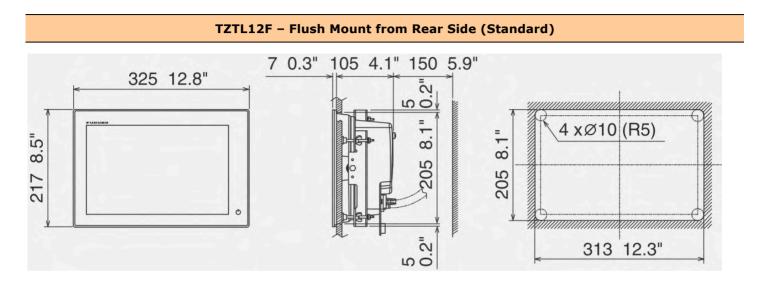
4-4 Internet – Others Planned for the Future

A Community Chart service is also planned for the future, which will allow users to upload a request for chart modification and receive a modification patch when available.

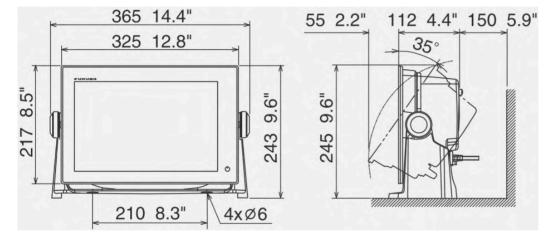


5. Installing NavNet TZtouch2

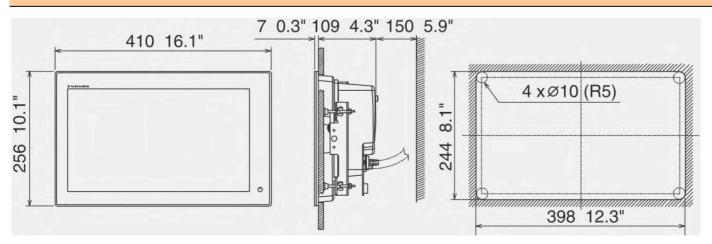
5-1 Dimensions

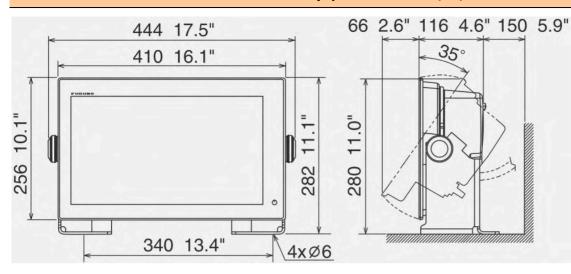


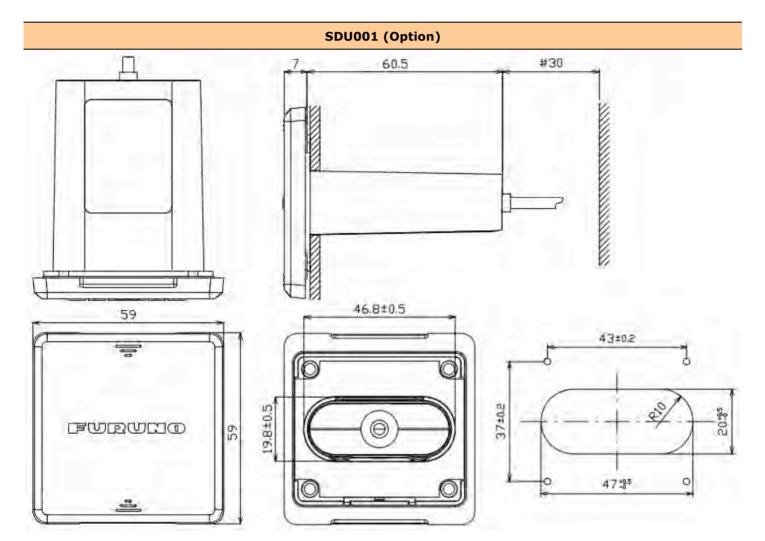
TZTL12F – Bracket Mount (Option: OP19-13 / P/N 001-337-410-00)



TZTL15F - Flush Mount from Rear Side (Standard)





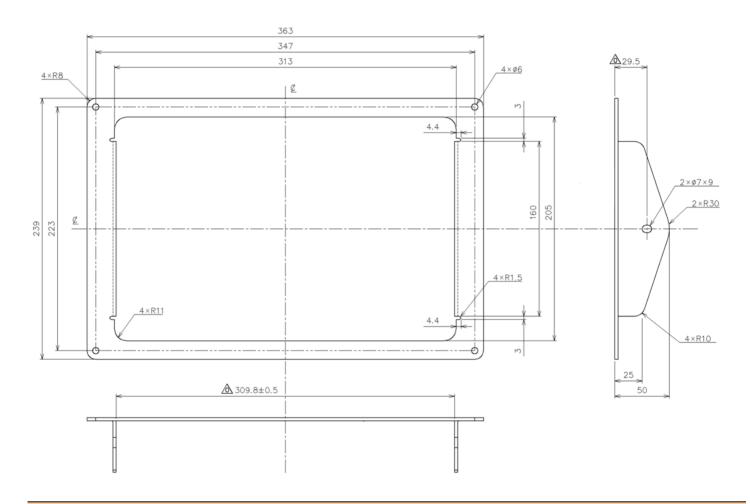


TZTL15F – Bracket Mount (Option: **OP19-14** / P/N 001-337-420-00)

5-2 Replacement from NavNet vx2 – Front Mounting for Model TZTL12F

10.4" NN1/VX2 display to TZTL12F with OP05-15 (001-337-430-00)

A 10.4" NN1/VX2 display has a larger cutout hole than a TZTL12F. The adapter panel **OP05-15** (Part # 001-337-430-00) helps to fill the hole and install the TZTL12F from the front side. While both OP05-15 (001-337-430-00) and OP-16 (001-337-440-00) in **Section 5-3** work as front mounting panels, the **OP05-15** (001-337-430-00) below is recommended due to its smaller size.



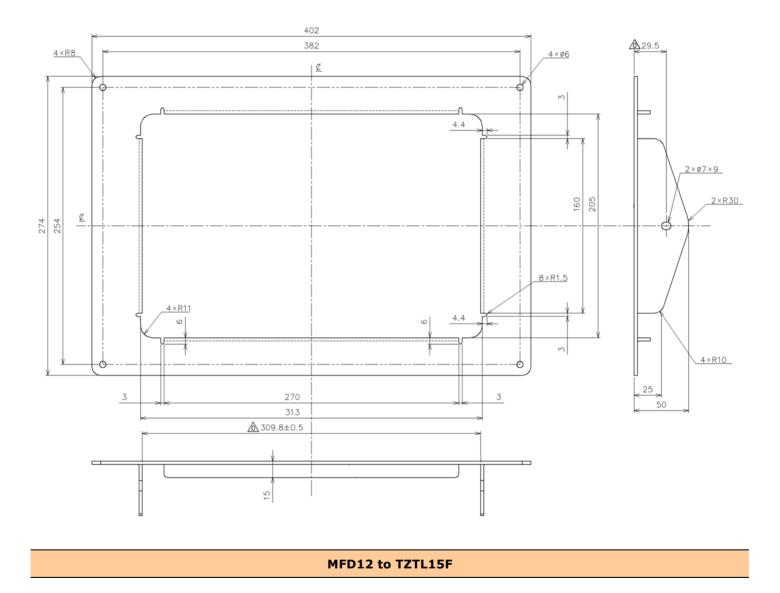
NN1/VX2 10.4' display to TZTL15F

The TZTL15F has a larger hole compared to a NN1/VX2 10.4" display. Enlarge the existing cutout when replacing the NN1/VX2 10.4" display with TZTL15F.

5-3 Replacing a NavNet 3D MFD12 – Front Mounting for Model TZTL12F

MFD12 to TZTL12F with OP05-16 (001-337-440-00)

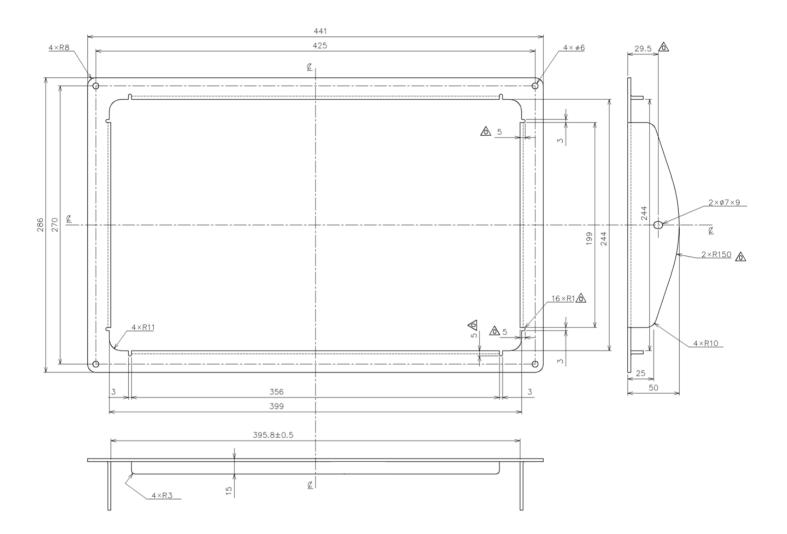
The MFD12 has a larger cutout hole than a TZTL12F. The adapter panel **OP05-16** (Part # 001-337-440-00) helps to fill the hole and install the TZTL12F from the front side. While both OP05-15 (001-337-430-00) in Section **5-2** and OP-16 (001-337-440-00) works as front mounting panels, the **OP05-15** (001-337-430-00) is recommended due to its smaller size.



The TZTL15F has a larger hole compared to a 10.4" NN1/VX2 display and MFD12. Enlarge the existing cutout when replacing the NN1/VX2 display and MFD12 with a TZTL15F.

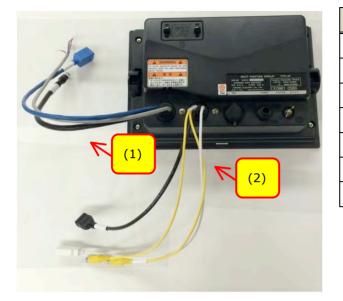
5-4 Front Mounting for Model TZTL15F

The **OP19-17 (Part number 001-337-450-00)** can be used to mount the TZTL15F from the front side.



5-5 Pigtail Cables

Pigtail 1 shown at left is packaged by most frequently used cables, while pigtail 2 is mainly for optional interconnections. Each cable is labeled with its port name. You can easily find an appropriate port on the pigtail cables.



No	Label	Remarks	
1	NETWORK	For Ethernet sensors	
1	NMEA2000	For NMEA2000 sensors	
1	(Nil.)	Multi ports for NMEA0183 output, etc.	
2	USB	USB port for SDU-001, MCU002, etc.	
2	VIDEO-IN 1	For analog video input	
2	VIDEO-IN 2	For analog video input	
2	VIDEO OUT	For video output (HDMI)	

5-6 Front Cover

The TZTL12F/15F comes with a silicone cover to protect the front glass.

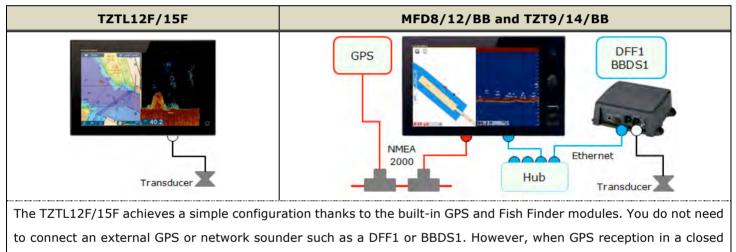


6. Networking NavNet TZtouch2

6-1 Compatible Sensors

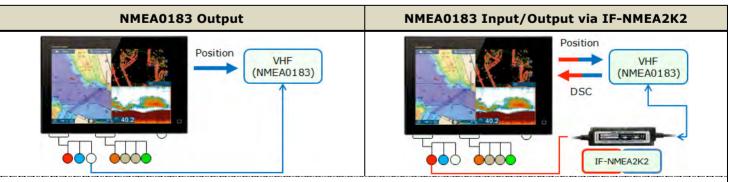
Network	Sensors	Remarks
Ethernet	DRS series, DFF1-UHD, DFF1/3, BBDS1,	Not compatible with BBFF1/BBFF3
Ethernet	FA30/50, FAX30	No Ethernet network with FAR2xx7/FCV1150
NMEA2000	(See Remarks)	Refer to input/output PGN specifications.
NMEA0183	(See Remarks)	Output: Refer to output sentence specifications.
		Input: Use a converter such as IF-NMEA2K2.
Camera	Analog cameras only	Not compatible with IP cameras

6-2 Compact Package – Plotter/Fish Finder



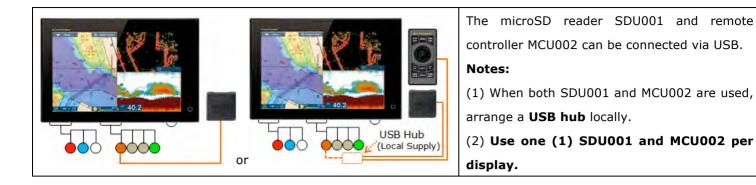
bridge is not good, use an external GPS device networked via NMEA2000.

6-3 Utilizing NMEA0183 Output

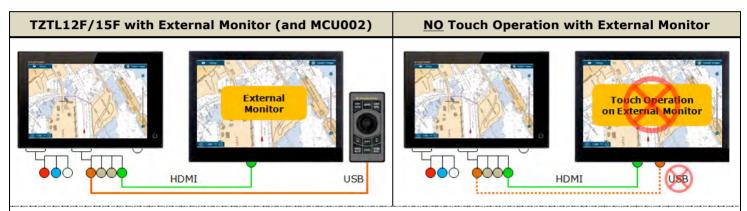


As an example, NMEA0183 output can be utilized to output own ship position to a NMEA0183-compatible VHF. However, when an NMEA0183 input such as DSC is necessary, the IF-NMEA2K2 is necessary to convert it from NMEA0183 to NMEA2000.

6-4 Utilizing Model SDU001 and MCU002 via the USB Port



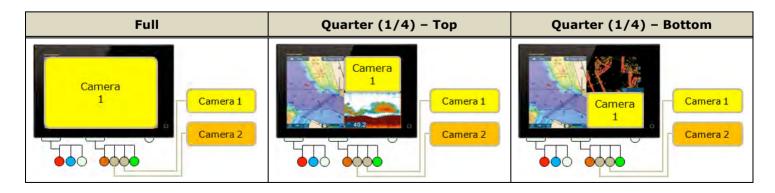
6-5 Utilizing an External Monitor



The TZTL12F/15F can output a clone image to an external monitor in HDMI format. If a monitor is not equipped with a HDMI port, use a HDMI/DVI adapter. Note that touch operation on an external touch monitor is **NOT** available even if a USB cable is connected. For operation with an external monitor, use the remote controller MCU002 or a USB mouse as shown in the example above.

6-6 Connecting Analog Cameras

The TZTL12F/15F has two (2) analog camera input ports. Camera images can be shown on full or quarter (1/4) screen modes as shown in the following examples.



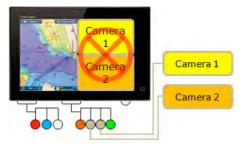
Note:

Among two (2) analog camera inputs, the TZTL12F/15F can assign one camera screen per display. Two (2)

camera images cannot be simultaneously shown on both quarter (1/4)



screens as shown at right.

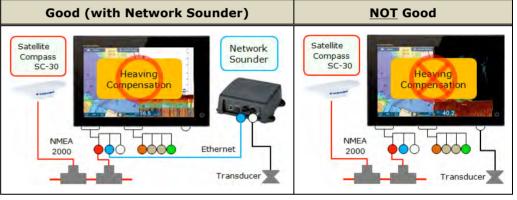


To see each camera image, switch sources between each source on one camera screen as shown at left.

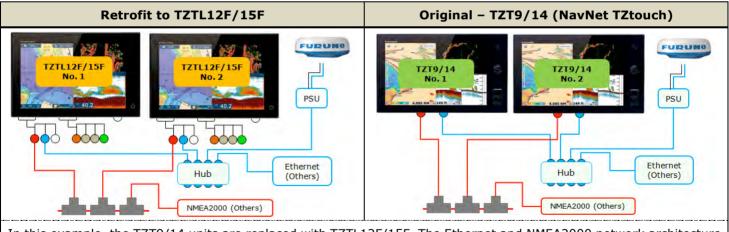
6-7 Heaving Compensation

Heaving compensation is <u>NOT</u> available with the built-in Fish Finder.

Use a network sounder in combination with a satellite compass, such as an SC30, to enable heaving compensation.



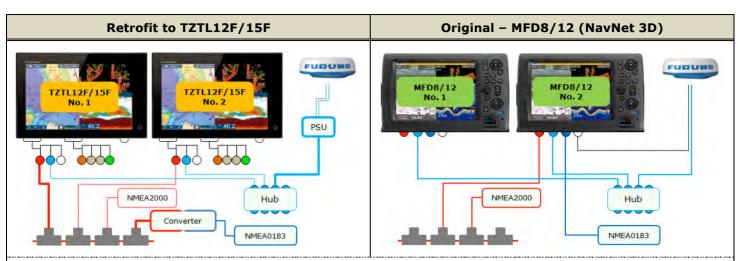
6-8 Retrofit from NavNet TZtouch



In this example, the TZT9/14 units are replaced with TZTL12F/15F. The Ethernet and NMEA2000 network architecture of TZTL12F/15F is same as TZT9/14/BB. You just need to replace the display unit(s). **Notes:** (1) The TZT14 has three (3) Ethernet ports, while the TZTL12F/15F has one (1) port only. If the existing network utilizes the TZT14 Ethernet ports, check in advance if an Ethernet hub should be added.

(2) The TZTL12F/15F is <u>NOT</u> compatible with Axis IP cameras. Use analog cameras.

6-9 Retrofit from NavNet 3D



In this example, the MFD8/12 units are replaced with TZTL12F/15F. While the TZTL12F/15F can use the same Ethernet sensors as the MFD8/12/BB, the following changes are necessary to cope with more redundant Ethernet and NMEA2000 network architecure.

(1) PSU-017/012/013 is added for DRS2D/4D/4A/6A/12A/25A. Another Ethernet cable is necessary between the PSU and hub.

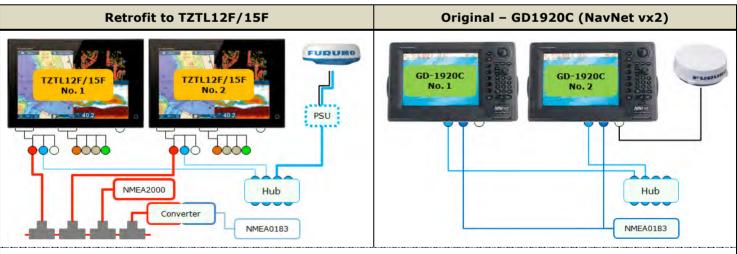
(2) All the TZTL12F/15F units have an NMEA2000 drop cable conneced to the NMEA2000 backbone.

(3) NMEA0183 sensors are input to the TZTL12F/15F via a converter or are replaced with NMEA2000 sensors.

(4) The TZTL12F/15F is NOT compatible with Axis IP cameras. Use analog cameras.

(5) Software of the DRS radar may have to be updated to version 1.16

6-10 Retrofit from NavNet vx2



In this example, the GD1920C units are replaced with TZTL12F/15F.

(1) Radar antenna is changed to DRS series. A PSU-017/012/013 is also necessary.

(2) NMEA network is changed to NMEA2000. NMEA0183 sensors should be input to the TZTL12F/15F via a converter or be replaced with NMEA2000 sensors.

6-11 Integrated Network with NavNet TZtouch

The Ethernet and NMEA2000 network architecture of TZTL12F/15F is the same as TZT9/14/BB. You will still need to network both displays via Ethernet and NMEA2000.

Notes:

(1) Points and routes are shared automatically on the network.

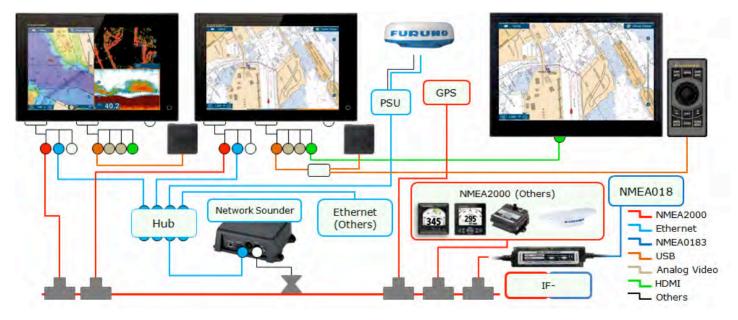
(2) Setting of TZTL12F/15F and TZT9/14/BB should be made individually.

6-12 No Network with NavNet 3D

Do \underline{NOT} mix the TZTL12F/15F with a MFD8/12/BB on the same network.

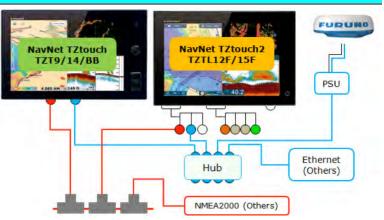


Referring to the descriptions on the previous sections, this example shows a larger package.



NavNet TZtouch

TZTL12F/15F



NavNet 3D

MFD8/12/BB

Hub

NMEA0183

NMEA2000

FURUNO