FURUNO

Marine Electronics Catalog

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For those who demand the best, Furuno offers *even more.*

For over 70 years, Furuno has been continuously imagining and creating new solutions, making new marine electronic equipment with the goal of offering both performance and simplicity for everyone. Not only for men and women who make a living on the seas, but also for those who simply want to enjoy the boating lifestyle. For them, Furuno has become synonymous with quality, performance, and reliability.

Furuno offers the ultimate response to all kinds of situations by providing a wide range of devices, making each operation more intuitive and each trip more enjoyable than the last. Backed by an unrivaled worldwide sales/service network spanning every corner of the globe, Furuno delivers unparalleled service and equipment maintenance. If that's not enough, Furuno guarantees the highest of quality in all of our products, offering a two-year parts and labor warranty program.

For Furuno, the best is not an option, it's a promise.

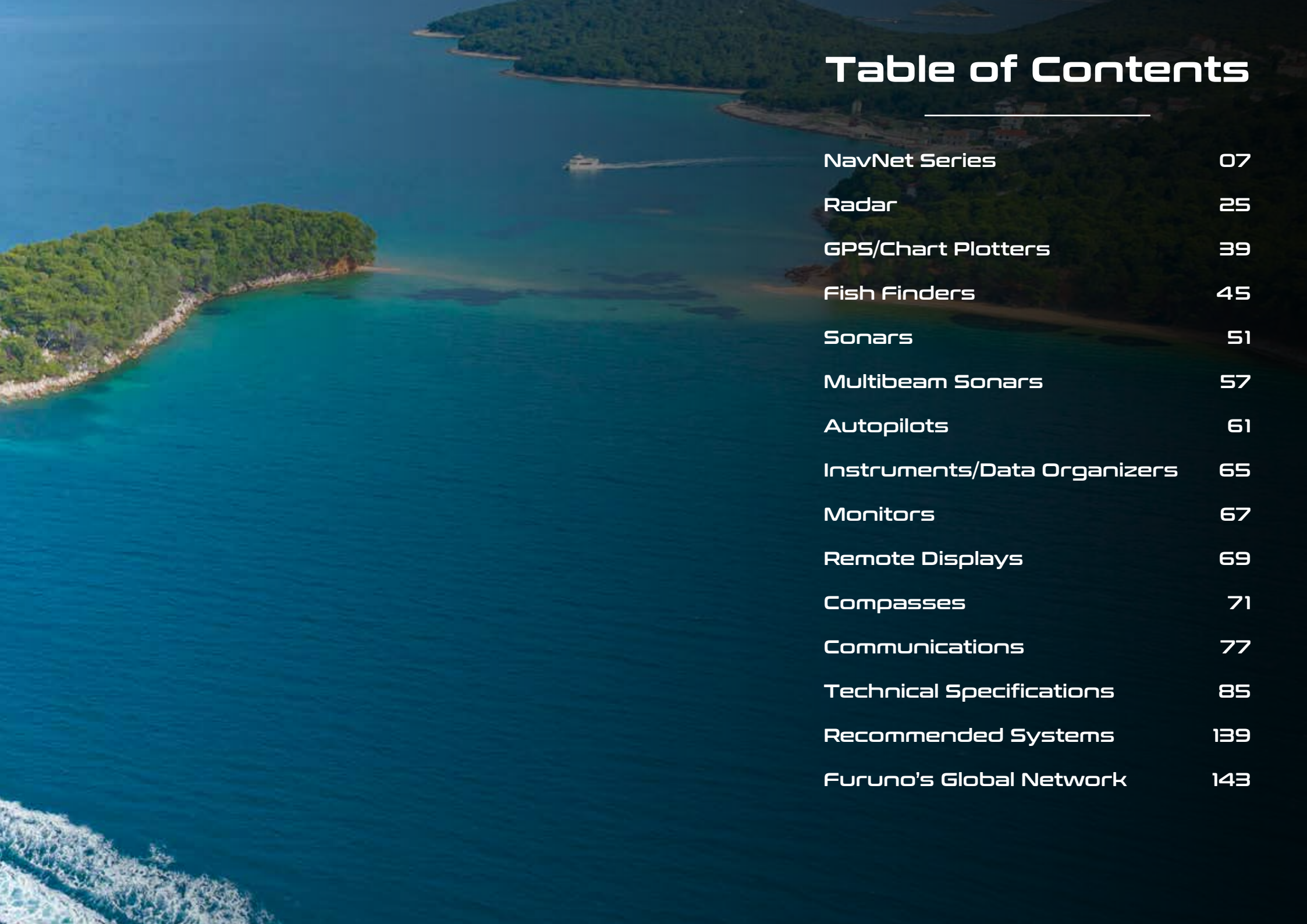
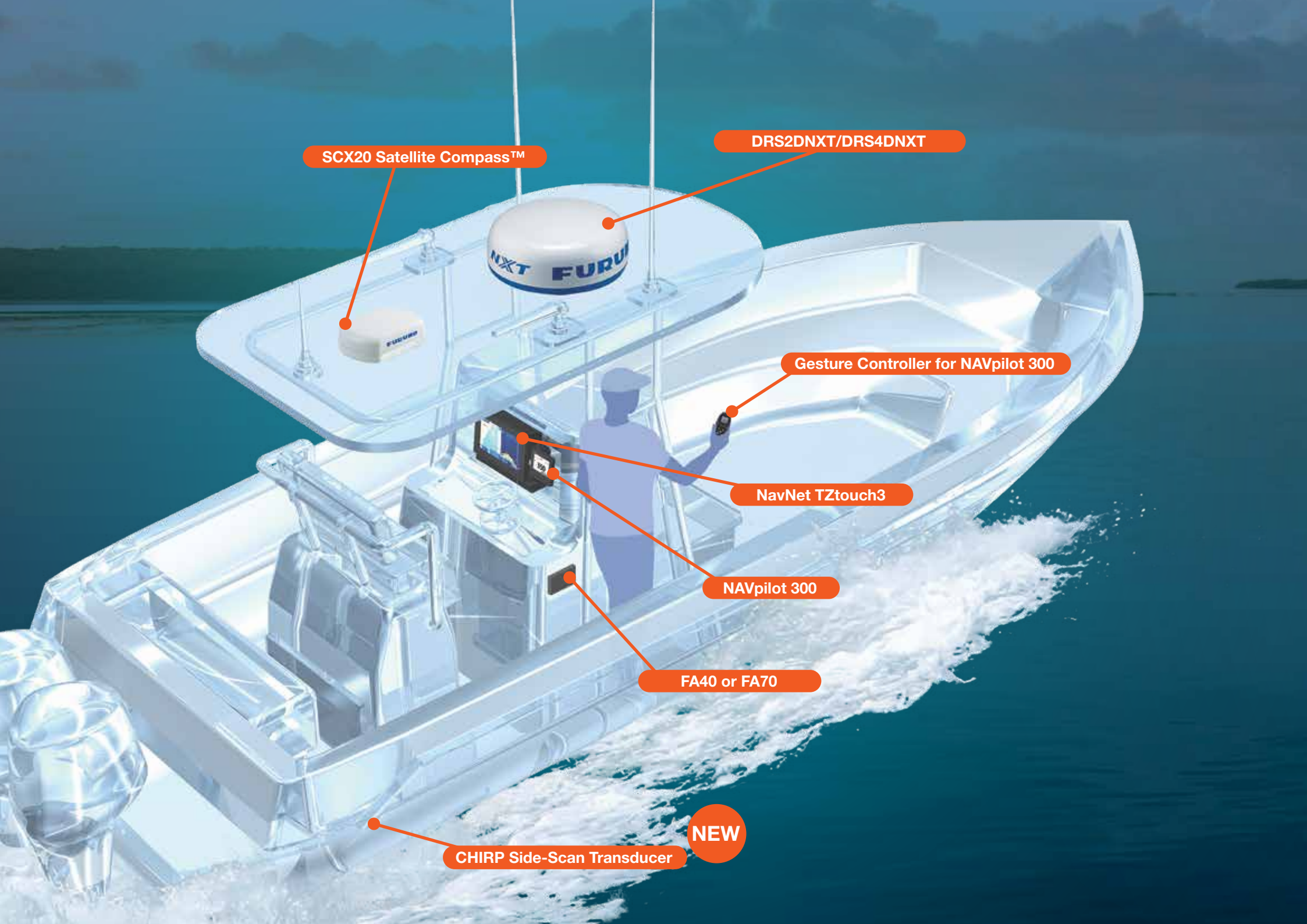


Table of Contents

NavNet Series	07
Radar	25
GPS/Chart Plotters	39
Fish Finders	45
Sonars	51
Multibeam Sonars	57
Autopilots	61
Instruments/Data Organizers	65
Monitors	67
Remote Displays	69
Compasses	71
Communications	77
Technical Specifications	85
Recommended Systems	139
Furuno's Global Network	143


SCX20 Satellite Compass™
DRS2DNXT/DRS4DNXT
Gesture Controller for NAVpilot 300
NavNet TZtouch3
NAVpilot 300
FA40 or FA70
NEW
CHIRP Side-Scan Transducer

Powerful Technology, *Compact Design*

- Automatic Identification System (AIS) Receiver and Class-B+ AIS Transceiver
- Revolutionary quad-antenna, solid-state Satellite Compass™ for NMEA2000
- Self-learning, adaptive Autopilot with Gesture Controller
- 9", 12", or 16" TZtouch3 with Built-in Dual Channel* 1 kW TruEcho CHIRP™ Fish Finder, CHIRP Side-Scan**, and GPS Receiver

*TZT9F Single Channel only **CHIRP SIde-Scan Transducer required, TZT9F connect via network to display

Satellite Compass™
Model **SCX20**

AIS Receiver
Model **FA40**

Class-B+ AIS Transceiver
Model **FA70**

NAVpilot
Model **NAVpilot 300**

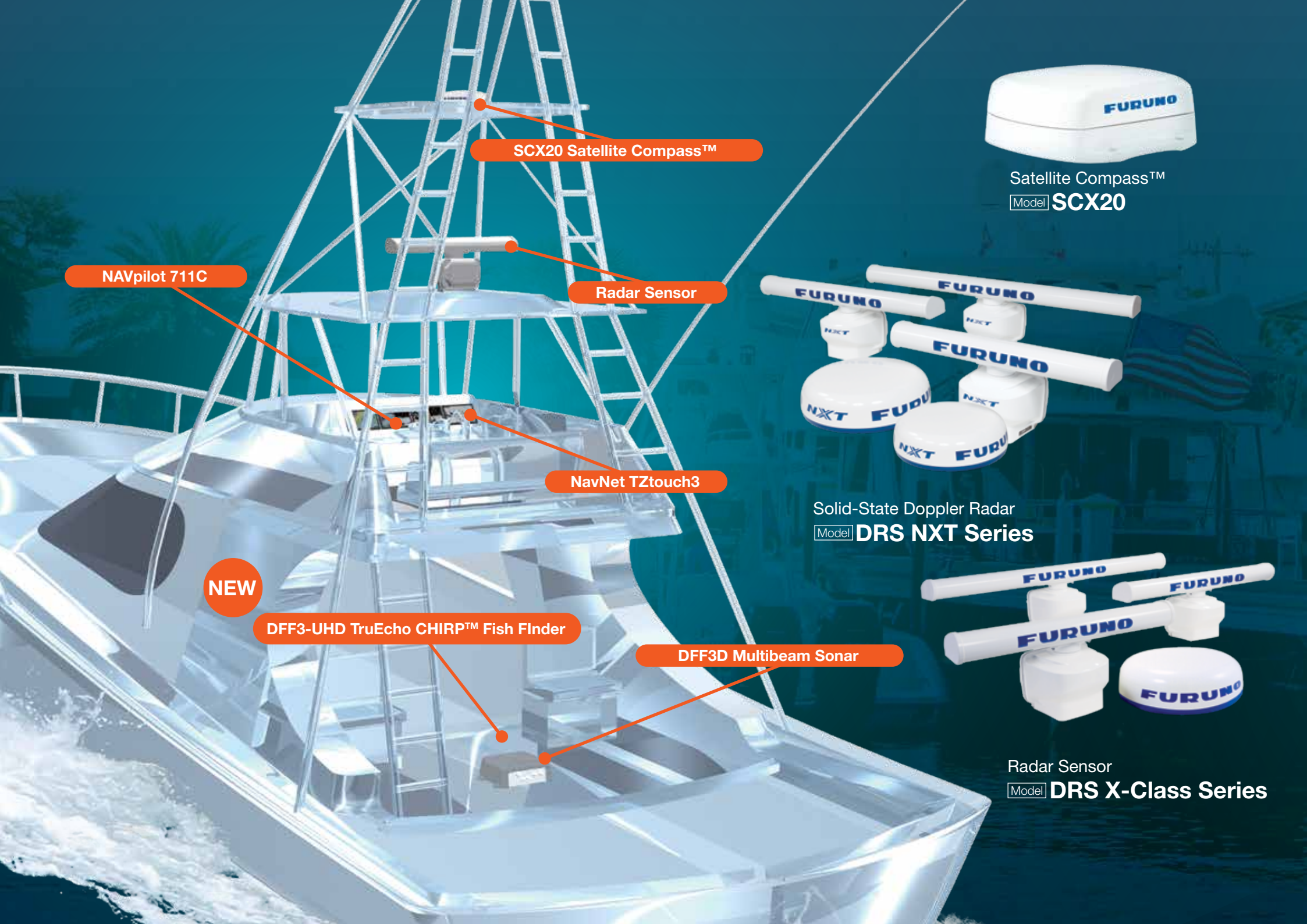
Gesture Controller

Solid-State Radome
Model **DRS2DNXT/ DRS4DNXT**

Multi-Touch MFD
with built-in
TruEcho CHIRP™
Fish Finder
Model **TZT16F**

Hybrid Control MFD
with built-in
TruEcho CHIRP™
Fish Finder
Model **TZT9F**

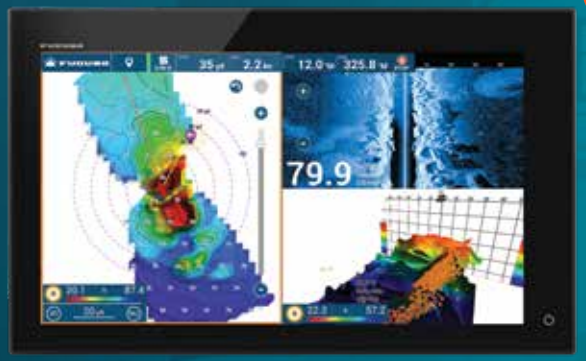
NAVnet TZ touch 3


SCX20 Satellite Compass™
NAVpilot 711C
Radar Sensor
NavNet TZtouch3
NEW
DFF3-UHD TruEcho CHIRP™ Fish FInder
DFF3D Multibeam Sonar
FURUNO
Satellite Compass™
Model SCX20
Solid-State Doppler Radar
Model DRS NXT Series
Radar Sensor
Model DRS X-Class Series

Powerful Tools for Powerful Boats

- Built-in Dual Channel 1 kW TruEcho CHIRP™ *
- New Xtra Large 22" and 24" Multi-Touch IPS MFDs
- High-power sensor options - 2/3 kW TruEcho CHIRP™ Network Fish Finder & 100 W or 200 W Solid-State Doppler Radars
- Built-in CHIRP Side-Scan feature, just add CHIRP Side-Scan transducer*

* (TZT19F)

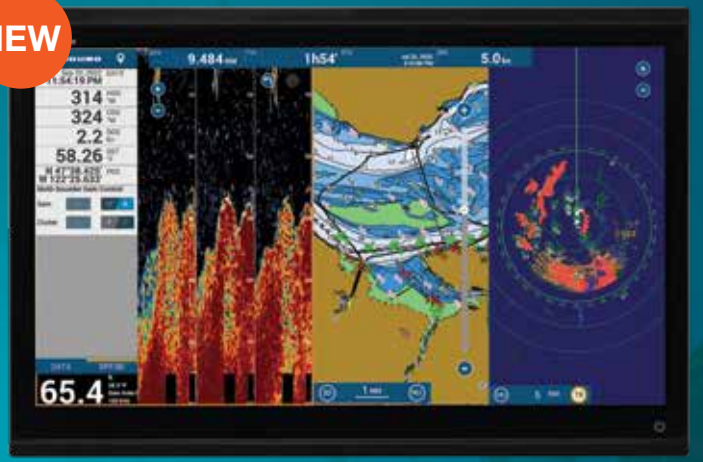


Multi-Touch IPS MFD with built-in
TruEcho CHIRP™ Fish Finder
Model **TZT19F**

NEW

Multi-Touch IPS MFD
22" Display Splits Up To Six Windows
Model **TZT22X**

NEW



Multi-Touch IPS MFD
24" Display Splits Up To Six Windows
Model **TZT24X**

NAVpilot
Model **NAVpilot 711C**

NEW

Black Box Network
TruEcho CHIRP™ Fish Finder
Model **DFF3-UHD**

Black Box Network
Multibeam Sonar
Model **DFF3D**

NavNet Series

NAVnet TZtouch3

Model TZT9F - 9"

9" Hybrid Control MFD 1280x720 (HD) with built-in TruEcho CHIRP™ Fish Finder

Model TZT12F - 12"

12" Hybrid Control MFD 1280x800 (WXGA) with built-in TruEcho CHIRP™ Fish Finder

Model TZT16F - 16"

16" Multi-Touch MFD 1920x1080 (FHD) with built-in TruEcho CHIRP™ Fish Finder

Model TZT19F - 19"

▸▸▸Spec P86

19" Multi-Touch MFD 1920x1080 (FHD) with built-in TruEcho CHIRP™ Fish Finder

The TZtouch3 MFDs keep growing with more size options and brand new features!

Deep Impact · CHIRP Side-Scan · Fish-It · Drift-It · BDS · TimeZero · RezBoost · Accu-Fish · MTC Multi Touch Control

AIS · AUTO · Bonded LCD · 3D CHART · Enhanced Sunlight Viewable · Ethernet Plug&Play · FISH FINDER Internal · GPS Internal Antenna · Polarized Friendly · Target Tracking · VIDEO IN OUT · NMEA2000 Certified

KEY FEATURES:

- NEW 22" and 24" TZtouch3 XL All-Glass In-Plane Switching (IPS) Multi-Touch MFD
- Available as 9" or 12" Hybrid Control, 16", 19", 22", or 24" All-Glass IPS Multi-Touch MFD
- NEW Built-In CHIRP Side-Scan allows you to see structure and fish up to 228 meters (750 ft) to each side
- NEW Follow-It feature leverages recorded PBG data to create a constant depth route for NAVpilot to follow
- NEW DFF3-UHD high-power 2/3 kW TruEcho CHIRP™ Fish Finder for NavNet TZtouch3; Transmits across low, med, & high CHIRP, and common CW frequencies. Max depth scales to over 4,500 meters (15,000 ft)
- NEW sunlight color palettes for Fish Finders and DFF3D display modes
- Game-changing Fish-It and Drift-It feature designed to save time, fuel, and increase fish catch
- Built-In True Dual-Channel 1kW TruEcho CHIRP™ Fish Finder* (*TZT12F/16F/19F only, TZT9F Single-Channel only)
- Internal GPS receiver* (*TZT19F, TZT22X, and TZT24X utilize an external GPS receiver)
- Quad-Core CPU powers TimeZero technology with lightning speed!
- NavNet Command Center integrates 3rd party apps using a built-in HTML browser* (*w/more future planned integrations)
- Video Converter Kits stream compatible Sonar and Radar video data directly to TZtouch3 MFDs
- Compatible with NavNet TZtouch2 networks* (*Requires TZtouch2 v8.01 or higher)
- PIN CODE Lock feature allows you to optionally require a four-digit password to be entered upon startup
- Add Autopilot, Instruments, Radar, AIS, Multibeam Sonar, and other sensors to your TZtouch3 network
- Autopilot control from MFD when connected to the NAVpilot 300/711C
- Compatible with CZone digital switching
- Tablet & Smartphone apps for your iOS and Android™ devices

NAVnet TZtouch XL

The Family Keeps Growing
NEW EXTRA LARGE MFDs

© 410 Films

Model TZT22X - 22"

22" Multi-Touch MFD 1920x1080 (FHD)

Model TZT24X - 24"

▸▸▸Spec P86

24" Multi-Touch MFD 1920x1080 (FHD)

Hybrid Control TZT9F/TZT12F

- Short Press / Long Press
- 1 Home/Settings
- 2 Event/MOB
- 3 RotoKey™
- 4 Shift Screen Control/Fullscreen
- 5 Cancel/Center
- 6 Cursor Pad
- 7 Function 1/Function 2
- 8 Power/Quick Access Page

TZT22X & TZT24X KEY FEATURES:

- New 22" and 24" TZtouch3 XL All-Glass IPS MFD
- Ultra-sharp full HD Multi-Touch MFDs
- 10 Screen layouts, including 6-way split screen
- Utilizes MapMedia mm3d charts, including Raster, Vector, Bathymetric Fishing, and more
- Easy-to-use Edge-Swipe Graphical User Interface
- Simple mounting options, including low flush-mount profile, or flat mount them edge-to-edge for a sleek all glass look
- Includes HDMI In/Out ports for added flexibility
- Camera support
- Easily connect with a variety of sensors through Ethernet or NMEA2000, including Radar, Fish Finder, Multibeam Sonar, Autopilot, Satellite Compass, and more
- Sync up any data with a tablet or smartphone
- Connect to a variety of remote controllers
- NavNet Command Center integrates 3rd party apps using a built-in HTML browser**

**with more future planned integrations

OPTIONAL REMOTES

Model MCU002

Remote Control Unit

Model MCU004

Remote Control Unit

Model MCU005

Control Unit

Model TEU001B/TEU001S

Touch Encoder Unit

NavNet Series

"The user interface is the simplest and best I have seen on the many iterations of Furuno hardware that I have owned over the years." Fred K., Panbo

MTC Multi Touch Control · TimeZero Designed by MAXSEA · RezBoost · BDS Bottom Discrimination Sounder · ACCU-FISH · FISH-IT DRIFT-IT

AIS · AUTO · Bonded LCD · CAN bus · Polarized Friendly · Target Tracking · VIDEO IN OUT

Enhanced Sunlight Viewable · Ethernet Plug&Play · FISH FINDER Internal · GPS Internal Antenna · NMEA2000 Certified · 3D CHART

Model TZTL12F - 12.1" ▸▸▸Spec P89

12.1" MFD 1280 x 800 (WXGA)

Model TZTL15F - 15.6" ▸▸▸Spec P89

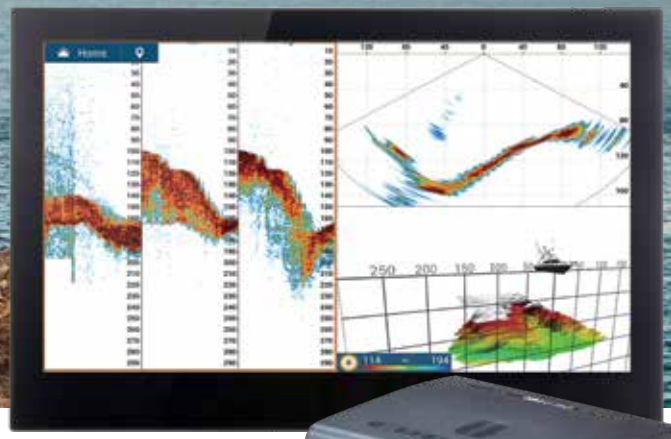
15.6" MFD 1366 x 768 (FWXGA)

KEY FEATURES:

- Enjoy new features like Fish-It/Drift-It, Fish Finder Marker Zooming, and more with latest software update
- Internal GPS Antenna
- Edge-to-edge glass front
- Internal RezBoost™ Fish Finder
- Compatible with CZone Digital Switching
- Seamless, smooth chart operation with TimeZero™ Technology
- Enhanced touch gestures like edge swiping for frequently used functions
- The graphical user interface has been renewed and refined, focusing on usability and ease of operation
- Add Autopilot, Instruments, Radar, AIS, and a wide variety of other sensors to your NavNet TZtouch2 network
- Connect up to 6 NavNet TZtouch3/TZtouch2 displays on one network (with v8.01 TZtouch2 software or higher)
- Video Converter Kits stream compatible Sonar and Radar video data directly to TZtouch2 MFD
- Manual Fuel Management enables visual evaluation of fuel levels and consumption
- With an Internet connection, NavNet TZtouch2 can wirelessly download up to two weeks of weather data
- Sunlight viewable multi touch display with impressive brightness, 1300 cd/m² for TZTL12F and 1000 cd/m² for TZTL15F
- Tablet & Smart phone apps: NavNet Remote, NavNet Viewer and NavNet Controller for your iOS and Android™ devices

Total Control,
Simply Refined

NEW!
OS Update v9.5



Model TZT2BB

▸▸▸Spec P89

Multi Touch Marine Display* with TZT2BB Processor Unit (Model MPU004) and Control Unit (Model MCU005)**
***Local supply **Option**

MFD Black Box
1920 x 1080 (16:9), 1280 x 1024 (5:4), 1024 x 768 (4:3)

KEY FEATURES:

- Internal RezBoost™ Fish Finder, with NEW Sunlight color palette
- NEW CHIRP Side-Scan, PBG (Personal Bathymetric Generator), Fish-It/Drift-It, Follow-It, Marker Zoom, and more!
- Full HD HDMI video input available
- Video Converter Kits stream compatible Sonar and Radar video data directly to TZtouch2 MFD
- Compatible with CZone Digital Switching
- Fast processor (CPU) for impressive performance
- Seamless, smooth chart operation with TimeZero™ Technology
- Enhanced touch gestures like edge swiping for frequently used functions
- The GUI has been renewed and refined, focusing on usability and ease of operation
- Independent display and operation of dual screens with built-in dual CPU
- Add Autopilot, Instruments, Radar, AIS, and other sensors to your NavNet TZtouch2 network
- Connect up to 5 NavNet TZtouch3/TZtouch2 displays on one network (with v8.01 TZtouch2 software or higher)
- Can wirelessly download up to two weeks of weather data with an Internet connection
- Tablet & smartphone apps: NavNet Remote, NavNet Viewer and NavNet Controller for your iOS and Android™ devices
- Manual Fuel Management enables visual evaluation of fuel levels and consumption
- NavNet Command Center for TZT2BB integrates 3rd Party Apps through a built-in browser

FISH-IT DRIFT-IT · PBG Personal Bathymetric Generator · CHIRP SIDE-SCAN · MTC Multi Touch Control · TimeZero Designed by MAXSEA · RotoKey

3D CHART · AUTO · AIS · BlackBox · CAN bus · Ethernet Plug&Play · Target Tracking · VIDEO IN OUT

Model PSD003

Switch Box for TZT2BB

Model MCU002

Remote Control Unit (option)

Model MCU004

Remote Control Unit (option)

Model MCU005

Control Unit (option)
TZTL12F/15F: Software version 8.01 or later

Model TEU001B/TEU001S

Touch Encoder Unit (option)

Plot Your Adventure With Confidence

TZ First Mate Keeps Track of Your Catch & Location

When you're out on the water, you want to be on top of your game. So, you train like the professionals. You prepare all of your equipment. And before you head out, you do your homework. The good news is TZtouch3 just made it all easier with TZ Cloud and the TZ First Mate App. See page 20 for more details.

MapMedia Vector & Raster Chart Library

Freely choose the charts that fit your individual needs. Easily select either raster, vector or fishing charts. MapMedia brings an authentic vector and raster chart library to your NavNet TZtouch3/TZtouch2. C-MAP vector cartography are optional world-wide charts that can be easily purchased and unlocked. MapMedia cartography integrates cutting edge algorithms with high resolution image processing techniques to deliver a fusion of digital navigation charts and satellite photography. Free NOAA raster and vector charts are available for the U.S. only.

Raster Charts

Vector Charts

TZ Cloud: Never Lose Waypoints, Routes, or Settings Again

Create your routes at home using TZ Navigator, a web browser*, or TZ iBoat iOS App. Then you can retrieve them from the cloud & download to your TZtouch3. Also, create events on your MFD and retrieve them at home because the data is synchronized automatically & securely to My TimeZero. TZ Cloud also stores marks, routes, boundaries, photos, and catch data! **(*cloud.mytimezero.com raster planning charts for US only)**

TZ iBoat iOS App **TZtouch3**

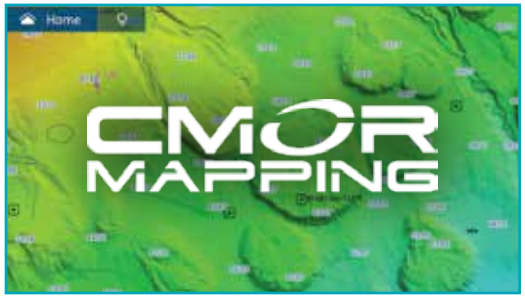
TZ PC Software/cloud.mytimezero.com

Satellite PhotoFusion™ & CMOR Charts (U.S. only)

Satellite photography is included in the MapMedia raster and vector charts, simply called Satellite PhotoFusion™. Land areas (zero depth) are completely opaque, displayed as satellite photos on the chart. As the depth increases, the satellite image is merged with the chart data to provide you with added detail on seabed areas in shallow water without losing vital chart information. Chart overlay is an optional feature designed to work exclusively with Furuno.

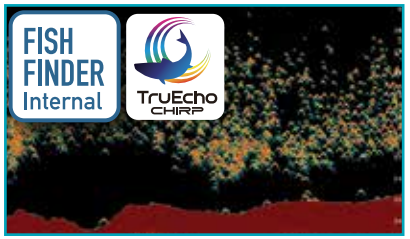
CMOR's high-resolution, shaded-relief bathymetric bottom images help navigators identify suitable locations for fishing and diving. (CMOR available in U.S. only)

Satellite PhotoFusion™



CMOR Charts

Powerful Additions To Boost Your Catch

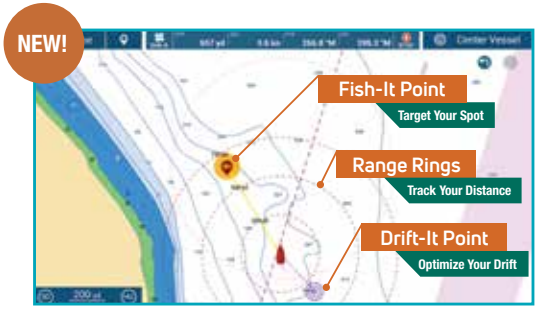


Find More Fish With TruEcho CHIRP™

TZtouch3's internal 1 kW TruEcho CHIRP™ Fish Finder is designed to operate across a wide range of frequencies utilizing a broadband transducer, delivering significant advantages to signal clarity & target definition. For deep water there are two options. The 2 kW/3 kW DFF3-UHD TruEcho CHIRP™ Fish Finder for TZT12F/16F/19F/22X/24X, or the DI-FFAMP for TZT12F/16F/19F. Both get you down to 3,000 meters.

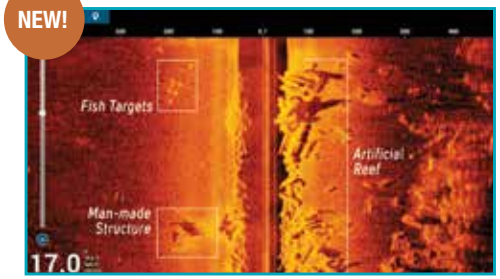
Drift-It, Fish-It... Catch-It!

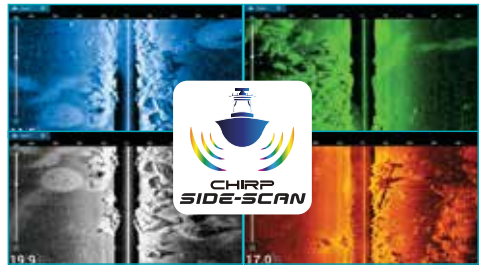
The Fish-It & Drift-It features help you locate the correct spot to start your drift so you'll pass right over your fishing point. Tapping on a location on the chart, Fish Finder, or DFF3D creates a temporary "fishing go-to point" with dynamic range rings, a course line between the point and the boat, and a temporary track line. Now activate Drift-It to automatically create a starting point for the vessel to drift directly over your Fish-It spot. Select a 3-minute, 5-minute, or even a 20-minute drift, navigate to the starting point, and drift to the Fish-It location in the time selected.



NEW CHIRP Side-Scan is built-in to TZtouch3

Furuno's CHIRP Side-Scan for NavNet TZtouch3 scans both port and starboard, allowing boaters to see the shape of bottom structure in high definition. CHIRP Side-Scan reveals the shape of fish targets and fish-hoarding structure up to 228 meters (750 ft) off each side of your vessel. It's ideal for fishing or simply showing hidden, uncharted bottom structure in rich detail in 1/4, 1/2, or full-screen presentations on NavNet TZtouch3 TZT12F, TZT16F, or TZT19F. Available with Thru-hull, Paired, or Transom Mount Transducer.

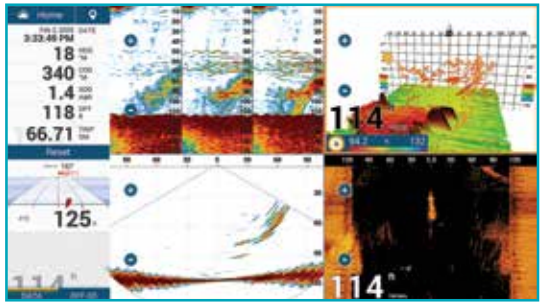


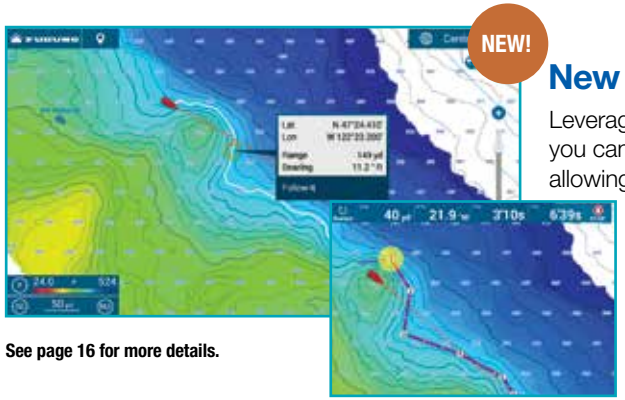


(Software ver. 3.50 or higher required for TZtouch3; ver. 9.50 or higher required for TZT2BB. CHIRP Side-Scan can be displayed on TZT2BB, TZT9F, TZT22X, and TZT24X when networked to a TZT12F, TZT16F, or TZT19F.)

Use DFF3D With Your Fish Finder

This powerful combination helps you get on the fish like never before. Use your standard Fish Finder on low-frequency to go deep. Then use the DFF3D for your high-frequency to see fish in the water column. With the 3D History and Triple Beam Modes, you can easily see which side of the boat the fish are located, so you know where to drop your line.





See page 16 for more details.

New Follow-It Feature

Leverage your recorded PBG data like never before. Now you can create a constant depth route from the PBG data, allowing you to select Follow-It from the menu and send it to your NAVpilot Autopilot. Then the NAVpilot will automatically follow the depth route all the way around a ridge or trough. This is particularly useful when you want to keep your bait at a certain depth while trolling without having to adjust your reel.

(Software ver. 3.5 or higher required for TZtouch3; ver. 9.5 or higher required for TZT2BB.)

NavNet Series

Model DRS2D/DRS4DNXT

Spec P93

NXT Radome

Model DRS6A/12A/25ANXT

Spec P93

NXT Radar Array

KEY FEATURES:

- Solid-State pulse compression Doppler Radar with no preheating time and low energy consumption (no use of a magnetron)
- Revolutionary Target Analyzer™ function instantly identifies hazardous targets
- Aquire up to 100 targets with Fast Target Tracking, Auto Target Acquire, and manual selections
- RezBoost™ beam sharpening to increase resolution
- Effective horizontal beam width* can reach 0.7° with DRS6A/12A/25ANXT (XN13A), 2.0° with DRS4DNXT, and 2.6° with DRS2DNXT
- Bird Mode to find the best fishing grounds by tracking birds
- Simple installation, external PSU is not required
- Smart-connector cable for retrofitting existing DRS cable installations (DRS2DNXT/DRS4DNXT only)

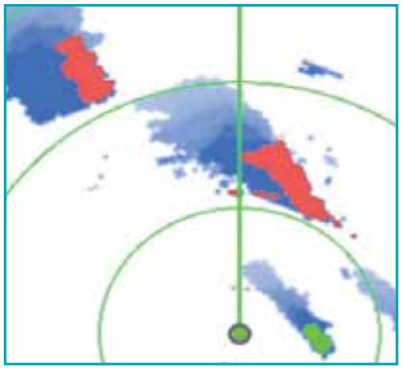
*** when using RezBoost™**

BIRD MODE · Doppler · RezBoost · TARGET ANALYZER · UHD Ultra High Definition · NMEA®

2008-2014, 2016, 2018-2022

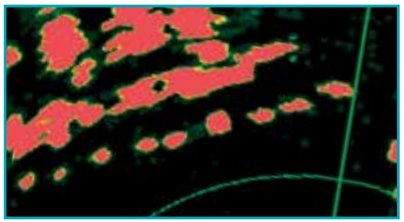
Spot Hazardous Targets Instantly

The NXT series are the first Radars in the world to use Furuno's exclusive Target Analyzer™ function. Targets approaching your vessel automatically change color to help you identify potentially dangerous targets. Green echoes are stationary targets or moving away from you, while red echoes are hazardous targets moving toward your vessel. Echoes dynamically change color as targets approach or get farther away from your vessel. Target Analyzer™ improves situational awareness and can increase safety by showing potentially threatening targets.



RezBoost™ Beam Sharpening

Furuno's exclusive RezBoost™ technology has been incorporated into our Radar units for enhanced resolution and impressive performance. With RezBoost™ set to MAX, the sharpness offers an incredibly detailed image with more targets and less clutter.



X-Class Radar

Model DRS25AX X-Class

Model DRS6AX X-Class

Model DRS12AX X-Class

Model DRS4DL+

Model DRS4DL+

▸▸▸Spec P95-P93

Compact Radome

Model DRS6AX/12AX/25AX

▸▸▸Spec P94

X-Class Radar Array

KEY FEATURES:

- Digital Signal Processing enhances short and long range detection
- Dual range scanning for two different Radar ranges
- Enhanced auto gain anti-clutter controls and auto tuning
- Bird Mode helps you identify birds, automatically adjusting the gain and sea for optimal detection
- Fast Target Tracking takes only seconds for a speed and course vector to be displayed
- Advanced side lobe reduction technology
- Spot-on Radar-Chart Overlay on both 2D and 3D chart presentations*
- AIS overlay “AIS-over-Radar” presentation for precise vessel tracking*
- Radar Guard Zone and Watchman features alert you to potential dangers
- VRM (Variable Range Marker) and EBL (Electronic Bearing Line) give distance and bearing indications
- Low noise gearbox that is 20% lighter than previous models
- No Power Supply Unit required for most installations

*** Appropriate sensor required.**

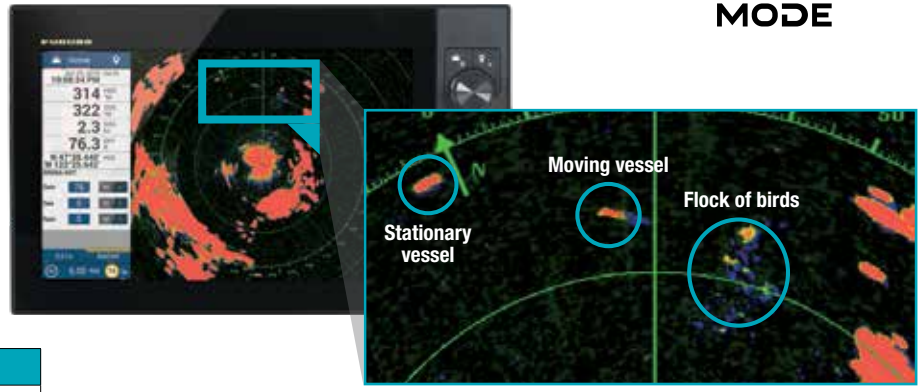
AIS · Target Tracking · BIRD MODE · UHD Ultra High Definition

DOME	OPEN ARRAYS - 3.5', 4', OR 6'		
DRS2DNXT/DRS4DNXT	DRS6ANXT	DRS12ANXT	DRS25ANXT
DRS4DL+ X-Class	DRS6AX X-Class	DRS12AX X-Class	DRS25AX X-Class

Bird Mode

The DRS X-Class and NXT Series feature a Bird Mode that helps you identify birds congregating around schools of fish near the sea surface. Bird Mode works by automatically adjusting the gain and sea settings for optimal visibility.

BIRD MODE



High Power TruEcho CHIRP™ for TZtouch3

Deep Impact - DI-FFAMP

DFF3-UHD

Model DI-FFAMP

▸▸▸Spec P92

Deep Impact TruEcho CHIRP™ Amp

Model DFF3-UHD

▸▸▸Spec P91

Black Box Network - High Power TruEcho CHIRP™ Fish Finder

KEY FEATURES:

Model	DI-FFAMP	DFF3-UHD
Frequency	26.6 to 242 kHz	25 to 242 kHz
Output Power (kW)	2 kW/3 kW	2 kW/3 kW
Range Scale (NM)	Up to 3,000 m	up to 3,000 m
ACCU-FISH™	N/A	N/A
Bottom Discrimination	N/A	N/A

FISH FINDER Internal

TruEcho CHIRP

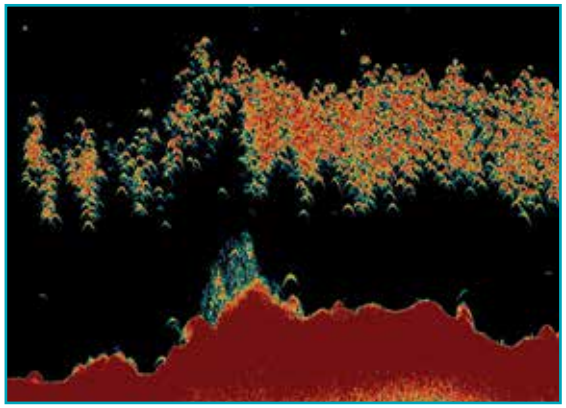
Deep IMPACT

Go Deeper With More Power Than Thought Possible

You spoke. We listened. And now we delivered! TZtouch3 incorporates a powerful internal 1 kW TruEcho CHIRP™ Fish Finder. For many, this is the perfect Fish Finder, but for some, they need more power. So, we proudly bring you two deep water, high-power Fish Finders for TZtouch3 and TZT2BB. The new DFF3-UHD* is a high-power 2 kW/3 kW TruEcho CHIRP™ Network Fish Finder that plugs directly into your Ethernet network, giving you the power you need to reach those deep water fish. Deep Impact** (DI-FFAMP), is a high-powered 2 kW/3 kW amplifier that connects to the internal TruEcho CHIRP™ Fish Finder. But if that's not enough, Deep Impact gives you 5 kW/10 kW with the right booster (BT-5 Booster). Go big or go home!

**DFF3-UHD can be connected to TZT3 & TZT2BB.*

***DI-FFAMP can be connected directly to TZT12F/16F/19F. To use a TZT9F with the DI-FFAMP, it must be connected to a network with one of the aforementioned MFDs.*



Multibeam Sonar

Model DFF3D

▸▸▸Spec P92

Black Box Network Multibeam Sonar

KEY FEATURES:

DFF3D Multibeam Sonar	
Frequency	165 kHz
Range Scale	Up to 1,200 m
Detection Range	200 m* (Side beam best performance) 300 m* (Main beam directly under boat)
ACCU-FISH	N/A
Bottom Discrimination	N/A
Transducer	800 W

*** Depending on bottom type and water conditions**

AUTO · BlackBox · Ethernet Plug&Play · NMEA® 2017/2018/2019 · MULTI BEAM · NAVnet Connect · PBG Personal Bathymetric Generator

Find the Fishing Spots Others Have Missed

The Multibeam Sonar gives you real-time 120° port-starboard view of the water column and seabed up to 200 m depth*. The DFF3D allows you to explore fishing spots and find fish in deep water far faster than conventional single beam sounders. The main beam penetrates right under the boat at a depth of approximately 300 m*. See page 59 for more details!

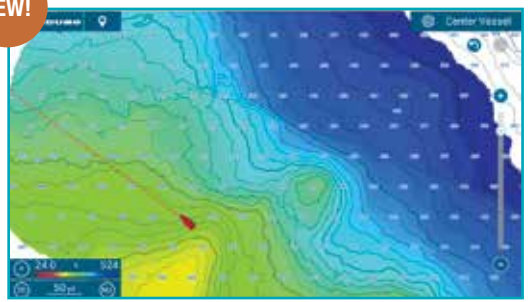
* Maximum depth depending on installation, bottom type and water conditions.

PBG (Personal Bathymetric Generator)

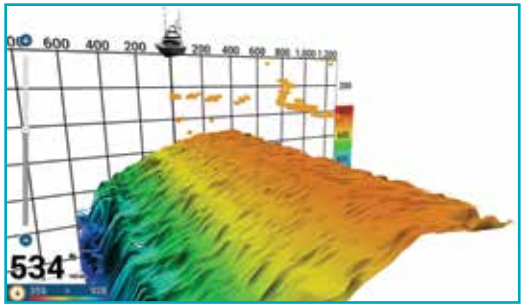
Discover new fishing hot spots and save them to the cloud so you can return again and again! Bottom images are drawn with shaded relief, depth contours, and variable colors, making it easy to identify hidden structure and ridges that hold fish in a simple, easy-to-interpret presentation. Multiple color palettes are available, including the ability to show contour lines only. The area each ping covers is approximately twice the depth at the time of recording, so at a depth of 100 meters, a 200 meter-wide area is displayed and recorded to your NavNet TZtouch3 MFD.

See page 57 for more details on the DFF3D.

NEW!



New PBG spot soundings clearly shows depth numbers



Digital Fish Finders

Model DFF1-UHD

▸▸▸Spec P91

Black Box Network
TruEcho CHIRP™ Fish Finder

KEY FEATURES:

DFF1-UHD	
Frequency	Dual Frequency 30-70 kHz and 175-225 kHz
Range Scale	Up to 1,200 m
Broadband	Available
ACCU-FISH™	Available
Bottom Discrimination*	Available
Transducer	1 kW

*** Bottom Discrimination transducer required**

AUTO, BlackBox, NAVnet Connect, TruEcho CHIRP, FDF FURUNO Digital Filter, NMEA® 2015

Model BBDS1

▸▸▸Spec P91

Black Box Network
Bottom Discrimination Fish Finder

KEY FEATURES:

BBDS1	
Frequency	Dual Frequency 50/200 kHz
Range Scale	Up to 1,200 m
ACCU-FISH™*	Available
Bottom Discrimination**	Available
Transducer	600 W/1 kW

*** For BBDS1 with 50/200-IT transducer only**
**** Bottom Discrimination transducer required**

AUTO, BlackBox, NAVnet Connect, FDF FURUNO Digital Filter, BDS Bottom Discrimination Sounder

Model DFF3

▸▸▸Spec P91

Black Box Network
High-Power Fish Finder

KEY FEATURES:

DFF3	
Frequency	Two Frequencies from 28 kHz to 200 kHz
Range Scale	Up to 3,000 m
ACCU-FISH™*	Available
Bottom Discrimination**	Available
Transducer	1/2/3 kW

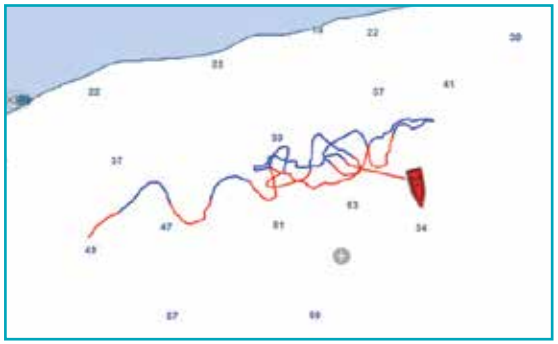
*** For DFF3 with 50/200-IT transducer only**
**** Bottom Discrimination transducer required**

AUTO, BlackBox, FFS, NAVnet Connect, FDF FURUNO Digital Filter, NMEA® 2008

Precision Features That Give You The Edge

Monitor Sea Surface Temperature

Sea Surface Temperature (SST) is one of the most important pieces of information for fishing in order to find the best spot or area.



Track Recording

Track recording by SST Variation draws a ship's track in variable colors, helping you find the best spot or area.

Shear Alarm

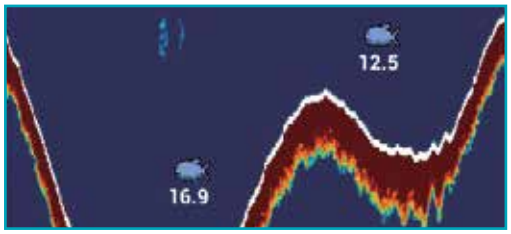
The Shear Alarm lets you know when there is a sudden change in sea surface temperature, often caused when two currents meet. This is usually a good indication of a great fishing spot.

SST Graph

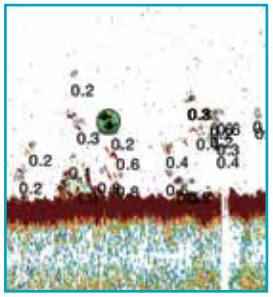
SST Graph on the Fish Finder display, instrument display or data box shows you the history of SST in the trip.

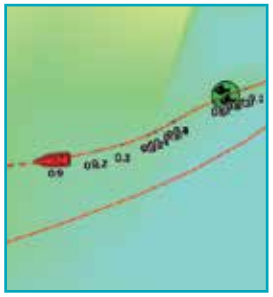
White Edge Helps Easily Identify Seabed

The top of the seabed is displayed in white to easily discern seabed structure from bottom fish returns. While conventional bottom discrimination function (i.e.: White Line) is applied to the strongest echoes, the White Edge function enhances the discrimination between bottom fish and the seabed.



Keep Track With Scroll-Back



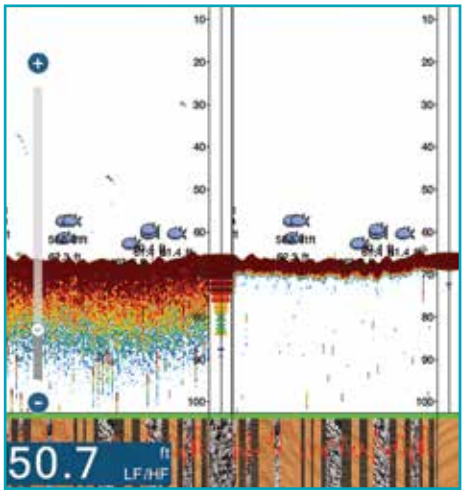


Found a fishing hot spot? Simply tap the screen and add a fish mark. With the scroll-back feature, you can look at past echoes simply by swiping the screen, adding new fish marks that will automatically show the captured location on your plotter screen.

Certain features may require appropriate sensors.

Bottom Discrimination Functionality*

The Bottom Discrimination function enables the Fish Finder to indicate whether the bottom is composed mainly of rocks, gravel, sand or mud.



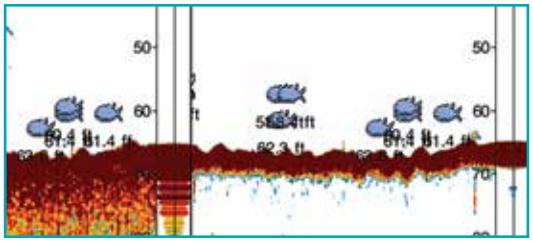
Probability Mode:
Rocks Gravel
Sand Mud

Graphic Mode:
Rocks Gravel
Sand Mud

BDS
Bottom Discrimination Sounder

ACCU-FISH™ (Fish Size Analyzer)*

ACCU-FISH™ is a fish size assessment function that is unique to Furuno. In order to assess individual fish size, echo returns are evaluated based on strength and turned into fish size display on screen. ACCU-FISH™ can detect fish size from 10 to 199 cm, in depths of 2 to 100 m.
In some instances, fish size indicated may differ from actual size. Please read the operator's manual carefully before using this feature.



ACCU-FISH

***Requires compatible transducer**

Onboard Systems Monitoring

CZone Digital Switching

www.czone.net

CZone digital switching by BEP simplifies the installation and operation of complex electrical systems. NavNet TZtouch2/ TZtouch3 is compatible with CZone controls, allowing you to operate CZone equipment. CZone, engine, navigation and various NMEA2000 data can displayed on the same screen.

My TIMEZERO™ Cloud Data

login.mytimezero.com

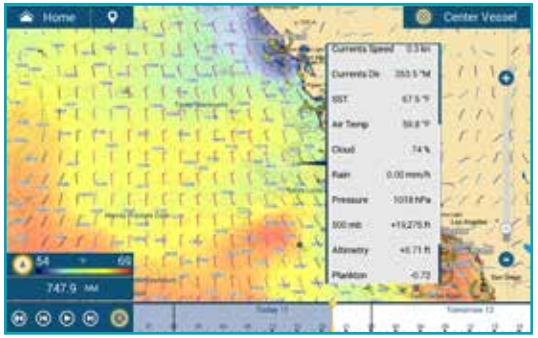
Connect your NavNet TZtouch2/TZtouch3 to the Internet and login to your My TIMEZERO™ account, and you will be able to back up or restore points, routes, tracks and settings to/from the cloud server. Plan routes on your tablet at home and transfer them to your TZtouch2/TZtouch3 onboard through the cloud.

TIMEZERO

Marine Weather Forecast*

***Internet connection is required**

The weather tool is ***completely free*** and easy to use, giving you unlimited access to weather forecasts, worldwide, 24 hours a day, provided by NavCenter. NavNet Series can display up to 16 days of downloaded weather forecasting.



SiriusXM Satellite Weather

Keep track of the weather, listen to your favorite tunes, and now track fish with Furuno's BBWX4 Fourth-Generation SiriusXM Satellite Weather Receiver for NavNet TZtouch3/TZtouch2.

(U.S. and Canada only, requires SiriusXM subscription)

Marine Audio FUSION-Link

https://www.fusionentertainment.com/fusion-link

Enjoy the ability to control all FUSION-Link enabled APOLLO and conventional 700/750/755 series marine entertainment system capabilities and functions directly from the NavNet TZtouch Series. FUSION-Link makes it easy for you to enjoy your onboard audio entertainment from the NavNet TZtouch Series.

View Info Wirelessly From Your Smart Device

For Apps and Smart Devices

GET IT ON Google Play

Download on the App Store

Compatible with NavNet TZtouch Series

NavNet TZtouch2 and TZtouch3 open the door to cutting edge Wireless LAN features, such as iOS and Android™ apps, real-time weather data, software updates, and much, much more.

NavNet Remote

Take full control of your NavNet series in a whole new way. The NavNet Remote app allows you to remotely operate and view your system with your smart devices when connected to the Wireless LAN network.

NavNet Controller

Wirelessly control NavNet series with touch controls just like the real thing. With a scroll pad, cursor pad and dedicated keys within the app, controlling NavNet is simple and straightforward.

NavNet Viewer

Conveniently view instruments of your NavNet series on your smart devices over the Wireless LAN network. Key navigational information such as Depth, Temp, Wind, COG as well as Engine information can all be accessed from the palm of your hand.

NavNet Remote

NavNet Viewer

NavNet Controller

TZ First Mate: Keep Track of Your Catch and Catch Location

You put in blood, sweat, and tears finding the perfect hot spot, and guess what, it paid off! Wouldn't it be nice to make a note of what you caught and how big it was? Now your TZtouch3 display can do that when you drop an event mark. Choose the species, enter length & weight, and even take a picture with your phone. View & edit the marks on your smart devices with the TZ First Mate App, TimeZero PC Software, or TZ iBoat.

View and edit from your smartphone or tablet.

Choose from a list of species and enter optional length and weight.

See your catches on the map.

TZ Cloud: Never Lose Waypoints, Routes, or Settings Again

Create your routes at home using TZ Navigator, a web browser*, or TZ iBoat iOS App. Then you can retrieve them from the cloud & download to your TZtouch3/TZtouch2. Also, create events on your MFD and retrieve them at home because the data is synchronized automatically & securely to My TimeZero. TZ Cloud also stores marks, routes, boundaries, photos, and catch data! **(*cloud.mytimezero.com raster planning charts for US only)**

TZ iBoat iOS App

TZtouch3

TZ PC Software/cloud.mytimezero.com

NavNet Series Network Product Lineup

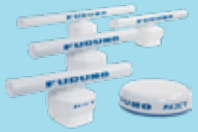
LEGEND:

NMEA2000 | Ethernet | NMEA0183 | CAN bus | Video

NMEA0183 to CAN bus converter available. The optional IF-NMEA2K2 converts NMEA0183 sentences to Furuno CAN bus and NMEA2000 PGNs, enabling conventional NMEA0183 devices to be incorporated into the NavNet TZtouch2/ TZtouch3 network.

NAVnet Connect

RADAR	FISH FINDERS	AIS	GPS	INSTRUMENT/ DATA ORGANIZERS



Radar Sensor
DRS4DL+
DRS NXT Series
DRS X-Class Series
ETHERNET

Marine Radar
FAR1513BB/1518BB* Series
ETHERNET

Marine Radar
FAR22x8BB Series
ETHERNET

*TZtouch2 v8.01 or later

Network Fish Finder Amp
DI-FFAMP*
ETHERNET

* Minimum 1 TZT12F/16F/19F required

Multibeam Sonar
DFF3D
ETHERNET

Network Fish Finder
DFF1-UHD/DFF3-UHD/DFF3
ETHERNET

Bottom Discrimination Fish Finder
BBDS1
ETHERNET

Depth/Speed/Temp Sensor
DT-810/DST-810
NMEA2000

AIS Receiver
FA40
NMEA0183 | NMEA2000

Class-B+ AIS Transceiver
FA70
NMEA0183 | NMEA2000

U-AIS Transponder
FA170
ETHERNET

GPS/WASS Receiver Antenna
GP330B
NMEA0183 | CAN BUS

Data Organizer
FI70
NMEA2000

Data Organizer
RD33
NMEA2000

AUTOPILOT

Autopilot
NAVpilot 300
NMEA2000

Autopilot
NAVpilot 711C
NMEA0183 NMEA2000

COMPASS

Compass
SC70
NMEA0183 NMEA2000

Satellite Compass™
SC33
NMEA2000

Satellite Compass™
SCX20/21
NMEA0183 NMEA2000

Integrated Heading Sensor
PG700
NMEA2000

Integrated Heading Sensor
PG500R
NMEA0183

VHF COMMUNICATION

Marine VHF Radiotelephone
FM4800
NMEA0183 NMEA2000

Marine VHF Radiotelephone
FM4850
NMEA0183 NMEA2000

Marine VHF Radiotelephone
FM8900S

WEATHER/ PC PLOTTER

TIMEZERO
Marine Software
ETHERNET

Network Weather Facsimile Receiver
FAX30
ETHERNET

Satellite Weather
BBWX4
(North America only)
ETHERNET

OTHER

Digital Switching System
CZONE
NMEA2000

HDMI IN
TZT2BB/TZT16F/TZT19F/ TZT22X/TZT24X only

Marine Entertainment System
Fusion APOLLO Series, etc.
ETHERNET NMEA2000

NavNet Command Center*
3rd Party App Integration
(more apps planned)
victron energy, LUMISHORE, QUICK, OSCAR, SEAKEEPER
etc.
ETHERNET

IP Camera
ETHERNET

Analog Camera
VIDEO

Thermal Camera
VIDEO ETHERNET

* NavNet TZtouch3 Series and TZT2BB only

FISH FINDER Internal

External Fish Finders can also be connected to TZtouch2/ TZtouch3. The internal and external Fish Finder cannot operate simultaneously. You can select which one to use from the settings menu.

GPS Internal Antenna

External GPS antennas and navigators can also be connected to NavNet TZtouch2/TZtouch3. You can select which one to use from the settings menu (internal not available for TZT2BB).

TIMEZERO Software

A Powerful Navigation Tool That Meets Your Demands

Today's captains expect a lot from their navigation systems. TIMEZERO Navigation Software is the ideal system for captains and crews that demand the best. TIMEZERO is the only navigation platform that combines intelligent weather with superior raster and vector charting support, hallmarks of superior engineering and expertise. TIMEZERO is a powerful navigational tool capable of blending and analyzing data from multiple sources in real-time. Features such as multi-screen support and full network compatibility make it, without a doubt, the most accurate and advanced onboard tool of its kind. TIMEZERO offers simple operation, increased productivity and the comfort of added confidence and safety.

TIMEZERO

For more information visit: mytimezero.com

Seamlessly Exchange Your User Objects with TZtouch2/TZtouch3 Series*

All your User Objects (Marks, Routes, Boundaries, Photos, Catches) are automatically synchronized between TIMEZERO PC Software and your MFD as soon as they are connected on the same local network (Ethernet LAN). In addition, if the computer has access to the Internet, TIMEZERO PC Software will be able to back up your data to the cloud using your My TIMEZERO account. A maximum of 100 boundaries can be imported to NavNet TZtouch3/TZtouch2.

* Software version 4.01 or later

TZ iBoat (iPad and iPhone App)

TZ iBoat is the best marine navigation app for coastal sailing, featuring easy-to-use functions and the fastest and smoothest chart display ever, as well as 3D data and weather information for an unparalleled experience. TZ iBoat is powered by the amazing TIMEZERO technology, featuring a 2D/3D chart display, PhotoFusion™ and the most accurate marine charts thanks to MapMedia's unique mm3d format.

TZ iBoat can connect to the Wireless Hotspot created by the NavNet TZtouch3/TZtouch2 Series and use the navigation data (Position, COG/SOG, Heading, Depth, Wind and AIS*) available on the NavNet network. In addition, TZ iBoat also has the capability to synchronize all your User Objects with the MFD (including the Active Route). If the iPad has access to the Internet, TZ iBoat Software will be able to back up your data to the cloud using your My TIMEZERO account.

*AIS module sold separately.

Download on the App Store

DRS4W Radar Overlay

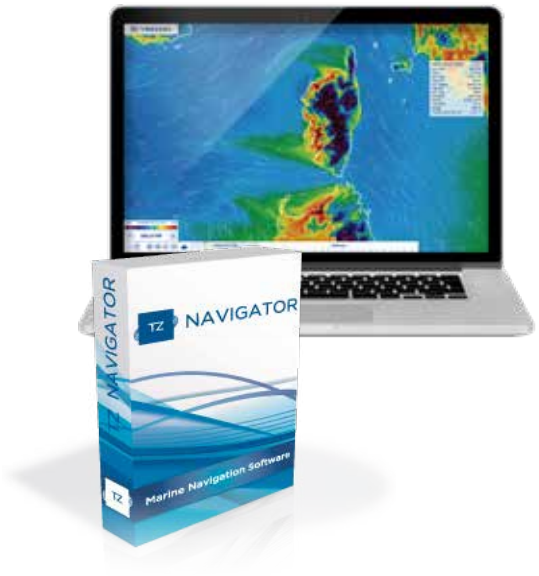
Furuno 1st Watch Wireless Radar DRS4W with TZ iBoat provides a Radar overlay image across the App's navigational chart on your iPhone or iPad in real-time.* Additional modules allow Radar overlay from DRS-series antennas.

* Radar Module (in-app purchase required).

Anchor Watch Alarm

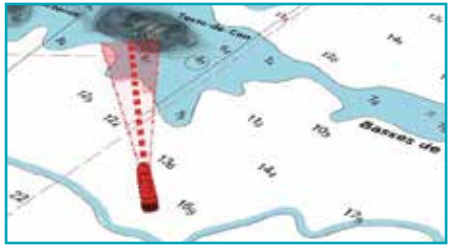
The NEW advanced anchor alarm features allow you to choose the anchor activation and positioning method to perform quick management, and gradual display of the alarm.

TZ Navigator V4 ▸▸▸Spec P95

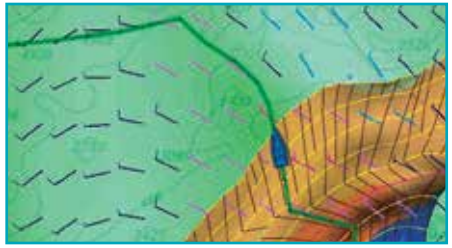


- Marine navigation software with a fast and smooth full 2D/3D chart engine: Our navigation software operates in a fully rendered 3D environment and delivers unparalleled speed and a seamless chart plotting experience
- Worldwide chart coverage: mm3d chart catalog with raster and vector charts (C-MAP)
- Connect your GPS and Autopilot (NMEA compatible serial ports or Ethernet by Furuno)
- Free worldwide weather forecast service: Download/overlay weather updates for free, allowing you to perform advanced planning
- Redesigned and user-friendly interface: The exclusive TIMEZERO interface combines functionality with ease of use, providing for a practical and personalized navigating experience
- Exclusive PhotoFusion™: Fuse satellite images to the marine chart
- AIS/TT function included: TIMEZERO can be connected to any AIS using NMEA0183 or via Ethernet
- Marine charts, 3D data, worldwide tide database (display tidal data on TIMEZERO to know about water depth in ports) and standard satellite photos
- Routes & Waypoints management
- New Route Planning Wizard/Security Cone/Odometer NavData
- New Furuno advanced compatibility
- Radar overlay module available (requires DRS series antenna)

Route Planning Safety



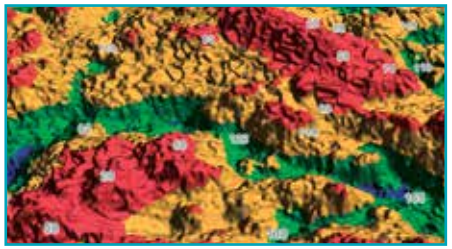
Security Cone



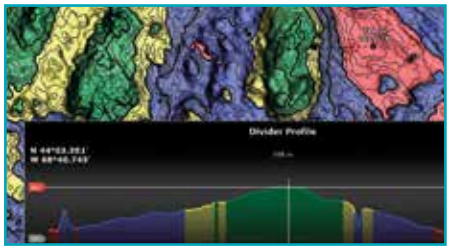
Weather Routing with the TZ Routing Module

TZ Professional V4 ▸▸▸Spec P95

- The latest version of the PBG module allows you to create clearer, more realistic charts of the seafloor. Connect to DFF3D Multibeam Sonar with optional module
- Instantaneously display a point-to-point depth profile window. This 2D view allows you to identify the depth variations with unequaled precision (rocks, shipwrecks, etc.)
- A workspace exclusively dedicated to professional fishermen allows for personalization of 2D/3D, so info that is most pertinent is shown first
- Keeping up-to-date charts is an essential element to ensure the safety of all those at sea
- Now compatible with the official S57/S63 formats
- Thanks to cutting-edge augmented reality technology, TZ professional allows you to display the active route and cross track distance directly on the camera video feed. Identify all boats equipped with AIS surrounding you and mitigate the risk of collision
- Up to three monitors can be used simultaneously working on independent workspaces
- TZ Professional introduces the new Premium Oceano-O service for pelagic fishing, providing higher resolution and a new type of multi-layer data. This service is geared toward commercial fishermen and advanced sport fishermen who want to target best possible fishing spots



Ultra Realistic Seafloor Bathymetry



Custom Profile Windows

AIS with Cartography Overlay

Radar

Big Radar features in a compact display designed for pleasure craft and small fishing boats!

AUTO

MODEL 1623

▸▸▸Spec P97

5.7" Silverbright LCD Marine Radar

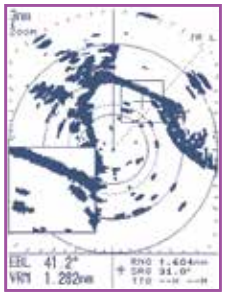
KEY FEATURES:

- Exceptional short-range target detection
- Automatic adjustment of antenna rotation speed according to selected range scale for optimum performance at all ranges
- Watchman mode with very low power consumption —only 8 W
- Display a “lollipop” indication of selected waypoint position (optional input required)
- Excellent screen clarity, day or night
- Reverse video feature for nighttime visibility
- Zoom window for close observation of a specific area
- Intuitive operation with simple key layout

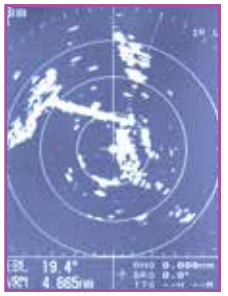
Radome Selection:

MODEL 1623	
Output Power (kW)	2.2
Size	15" Radome
Range Scale (NM)	0.125-16
Rotation Speed	24/31/41 rpm

15" 2.2kW Radome



Zoom



Reverse

NAV Data 1

NAV Data 2

With image quality comparable to that of a conventional 10" LCD wired Radar, the DRS4W offers impressive performance!

Model DRS4W

▸▸▸Spec P96

1st Watch Wireless Radar

KEY FEATURES:

- Powerful yet compact Wireless Radar antenna
- First Radar in the world accessible from your iOS devices
- Simple touch interface with familiar gestures
- User selectable range scale from 0.125 to 24 NM
- Two iOS devices – simultaneous operation
- Wirelessly connect to GP1871F or GP1971F and one iOS device
- TimeZero Marine Navigator (TZ iBoat) provides a Radar overlay image across the App's navigational chart on your iPad in real-time - Radar Module (in-app purchase) required

AUTO

Radome Selection:

Model DRS4W	
Output Power (kW)	4 kW
Size	19" Radome
Range Scale (NM)	0.125-24
Rotation Speed	24 rpm

Software Selection:

App	Radar	Simulator*
App version	2.0.0	2.0.2
Compatible iOS	iOS6.1 or later	
Language	English	

*** Simulator App will help you learn how to use the DRS4W in an offline environment before you navigate with the DRS4W onboard.**

Wirelessly Connect to Your Mobile Devices and GP1871F/1971F

The Furuno DRS4W Wireless Radar can be connected to the GP-1871F/GP-1971F GPS/WAAS Chart Plotter. Refer to pages 43-44 for details.

Radar

Model 1815

▸▸▸Spec P97

8.4" Color LCD Radar

KEY FEATURES:

- Compact radome antenna with 4 kW transmitter output power and low power consumption - 38 W max
- Easy installation and intuitive operation
- Advanced auto-adjust settings for Gain/Sea clutter and Rain clutter
- AIS/Fast Target Tracking*: Target speed and course vector are displayed seconds after target acquisition
- True Trail Mode: Moving objects will appear on the main screen with a colorful trail
- True View Mode: Based on the head-up mode, reduces the discrepancy between an observed target and what is displayed on the Radar
- Echoes in yellow, green, orange, or white colors
- User-programmable function keys
- Swivel mounting bracket to adjust the angle of the display unit

***Optional input required**

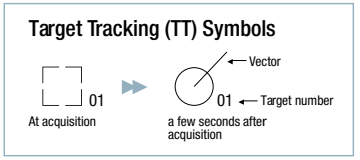
UHD Ultra High Definition | AUTO | Target Tracking | AIS

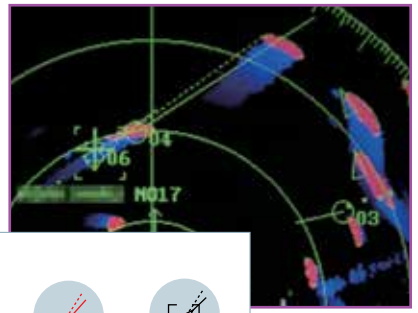
Antenna Selections:

MODEL 1815	
Output Power (kW)	4
Size	19" Radome
Range Scale (NM)	0.0625-36
Rotation Speed	24 rpm

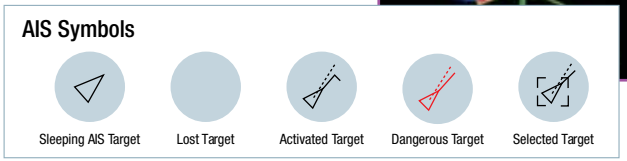
AIS/Target Tracking Up To Ten Targets*

Fast Target Tracking function manually or automatically acquires and tracks 10 targets. After selecting a target, it takes only a few seconds for a speed and course vector to be displayed. With accurate tracking information, estimation of other vessel's course and speed is made easier.





Targeted vessels with AIS information



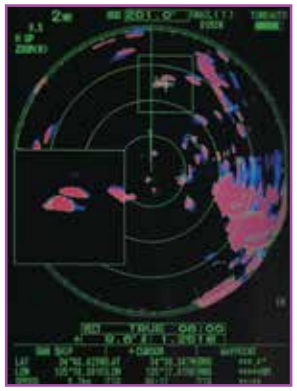
AIS Display with FA40/70 Units*

When connecting a Furuno FA40/70 AIS unit, up to 100 AIS targets can be tracked and displayed on the Radar screen. You can easily read detailed information about other AIS-equipped vessels nearby, such as speed and heading. Additionally, the FA70 AIS transponder improves safety during travel by sharing the status and position of your vessel with other AIS-equipped vessels nearby.

Tracking Information

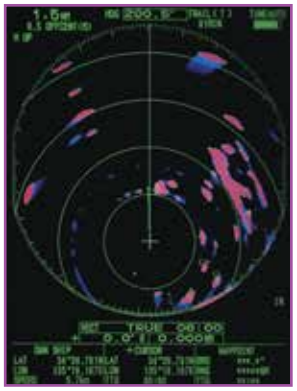
*** Heading sensor is required to display AIS**

Selectable Modes for Changing Situations



Zoom Mode

Expands the length and width of a selected target with the magnification of 2.0 in the zoom window.



Off Center Mode

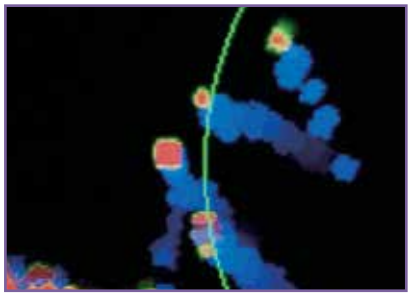
Focus on a specific area ahead of or around the vessel without losing track of the position.

Gain, Sea, & Rain Settings

By automatically adjusting the gain, the Radar eliminates unnecessary echoes and displays a clear image.

True Trail Mode*

Moving objects will show up on the main screen with a gradation trail. These trails make it possible to see the movement of nearby vessels in the blink of an eye.



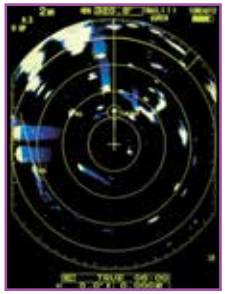
*** True Trail Mode: Heading sensor is required**

Multiple-Station Configurations

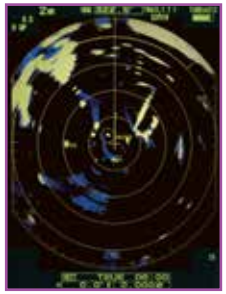
Multi-station configuration allows up to three RDP157 (1815 displays) to be connected to a single antenna via an Ethernet hub, without the need to install individual antenna units on each display. This configuration provides a cost saving and dynamic setup for situations requiring the ability to monitor the Radar from different locations on the vessel.

Adjustable Color Layouts

You can select the color scheme depending on your environment. From bright sunlight to the dark of night, displayed images can always be seen.

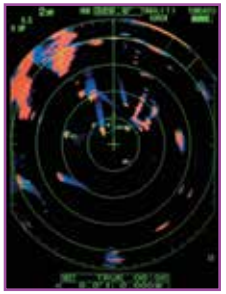


Yellow Echoes



Green Echoes

White Echoes



Orange Echoes

Radar

Model FR10

10.4" Color LCD Radar

Model FR12

▸▸▸Spec P98

12.1" Color LCD Radar
Optional Chart Overlay*

KEY FEATURES:

- Risk Visualizer - a unique visual representation of the risk of possible collision and close approach for all objects 360 degrees around the vessel
- DRS Radars include features such as Fast Target Tracking, immediately displaying a vector line for up to 100 targets indicating the target's speed and heading
- Connect to an NXT Radar to unlock solid-state features such as RezBoost™ Beam Sharpening and Target Analyzer, instantly identifying hazardous targets
- Custom AIS presentation, flexible Anti-Clutter controls, and Stern-Up presentation
- Display Radar echoes overlaid onto MapMedia mm3d charts* (*FR12 only - requires RP board kit OP03-266-E to be installed)
- Display marks and lines created on a networked GP3700/F GPS Chart Plotter (requires RP board FR12 only)
- Display boat and barge icons for towing applications

RISK VISUALIZER · UHD · RezBoost · TARGET ANALYZER

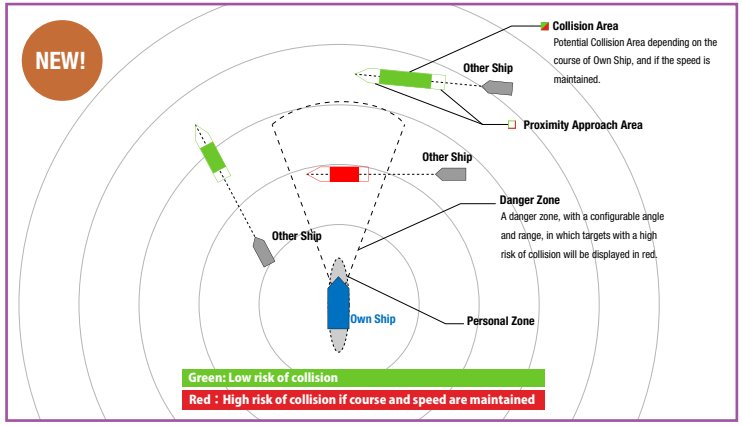
AUTO · Target Tracking · AIS · NMEA2000 Certified

Antenna Selections:

DOME	OPEN ARRAYS - 3.5', 4', OR 6'		
DRS2DNXT/DRS4DNXT	DRS6ANXT	DRS12ANXT	DRS25ANXT
DRS4DL+	DRS6AX X-Class	DRS12AX X-Class	DRS25AX X-Class

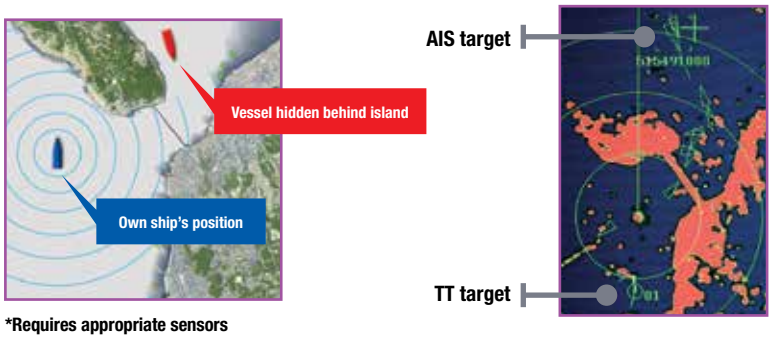
See Potential Collisions With Risk Visualizer™

Risk Visualizer™ is a technology that shows potential collision areas based on the current position and movement of all surrounding vessels. Thanks to the on-screen display, it is easy to get a quick and intuitive overview of the situation around your ship. A color-coded icon alerts you according to the threat of a collision, from green (normal) to red (hazardous). This shows where your own ship could collide with others, as well as the time to reach that dangerous area, allowing the captain to interpret the risk visually and proactively avoid it.



AIS Target Tracking Up To 100 Targets*

Utilizing the vessels VHF transceiver system, AIS tracks vessel movements and provides a variety of navigational information such as vessel name and speed of the selected targets in real time. AIS targets are visible even when located behind large ships or islands. AIS symbols can be customized with four color options of red, yellow, cyan and magenta, plus the standard color options of green, red, blue, white, and black. The color option is saved on the FR10/12, so when AIS targets with the same MMSI are received again, they will be shown in the registered colors.



*Requires appropriate sensors

Radar Options for ANY Vessel

The FR10 and FR12 are compatible with any of the DRS Series Antennas, allowing for a variety of configurations. By selecting the detection range (power output), screen size and antenna type/size based on what you want to accomplish, you can build the Radar that best meets your needs.

SOLID STATE DOPPLER RADAR
NXT SERIES

RADOME TYPE
DRS2DNXT
DRS4DNXT

OPEN ARRAY TYPE
DRS6ANXT
DRS12ANXT
DRS25ANXT

RADAR SENSOR
X-CLASS

RADOME TYPE
DRS4DL+

OPEN ARRAY TYPE
DRS6AX X-Class
DRS12AX X-Class
DRS25AX X-Class

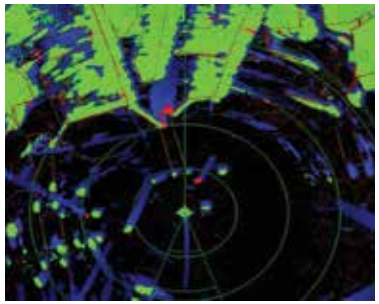
Built-In Fast Target Tracking™

Fast Target Tracking™ is a technology that instantaneously displays a vector indicating the speed and heading of the target. With this built-in feature, targets are automatically tracked when they first appear, making it possible to immediately calculate the target's trajectory and display the velocity vector. The FR10/12 is capable of tracking up to 100 targets. When connected to a second FR10/12 an additional 100 targets in manual mode can be activated.

Before After

Target acquired

Spot Hazardous Targets Instantly

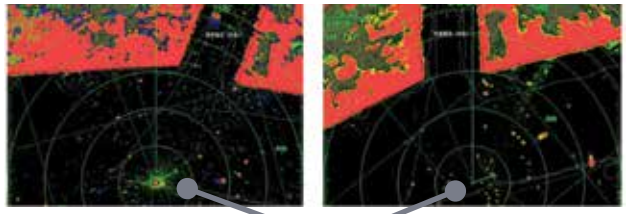


Target Analyzer™ is a technology that analyzes targets and identifies the dangerous ones that are likely to collide with your ship, using different colors. Targets that are approaching your vessel automatically change color to help you identify potentially dangerous targets. Green echoes are target that are stationary, or are moving away from you, while red echoes are hazardous targets that are moving towards your vessel. Echoes dynamically change color as targets approach, or get farther away from your vessel. The display of potentially dangerous targets in different colors allows an operator to understand threats to safe navigation at a glance.

*Works only when connected to NXT Radar

Take Sea Clutter Out Of The Equation

Echo Average is a feature that attenuates irregular echoes, such as reflections from the sea surface and precipitation, and stabilizes echoes from fishing gear and other vessels. This makes it easier to see what you want to see, even in poor weather conditions such as high waves, precipitation, or dense fog. The FR10/12 Echo Average feature identifies true target echoes from the sea clutter.



Before After

Clear Echo Attenuation

Radar

The monitor can be mounted in portrait or landscape orientation to easily fit your bridge space.

Being aware of your surroundings is paramount. Your primary line of defense is a Radar you can count on, from a company you can depend on.

TARGET ANALYZER

Target Tracking | AUTO | AIS | CAN bus

Antenna Selections:

Model	FAR1416		FAR1426	
Output Power (kW)	12		25	
Size	4' Open	6' Open	4' Open	6' Open
Range Scale (NM)	0.125-72		0.125-96	
Rotation Speed	24/48 rpm			

Model FAR1416/1426

▸▸▸Spec P99

15" Color LCD Radar with Chart Plotter

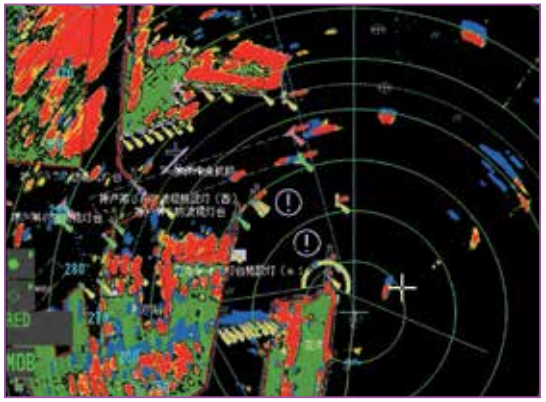
KEY FEATURES:

- Simple operation with “point-and-click” menu functionality
- Built-in chart overlay on Radar presentation*
- Use Target Analyzer™ to discern hazards simply by looking at the color of their echo*
- Instant speed vector display for tracked targets
  - A speed vector will be displayed after clicking on a selected target
- Improved sea and rain clutter removal function
  - Automatic Clutter Elimination (ACE) function provides clear echoes
- Space-saving and simplified installation with processor built into the display
- Straightforward operation using a trackball and wheel menu selector
- Overlay Radar presentation on MapMedia vector charts
- Record vessel's track points and waypoints to help memorize fishing spots
- Easily upgrade from Furuno's FR8002/8005 series

***Requires appropriate sensors**

Radar Chart Overlay

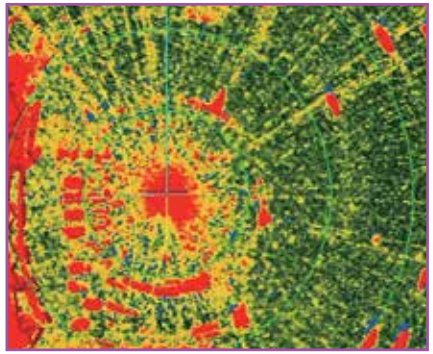
By overlaying Radar on the chart, you can easily recognize coastlines and buoys at a glance. Records of your vessel's track points and waypoints will help memorize fishing points. When the Radar presentation and chart are overlaid, North-Up, Course-Up, and Head-Up direction modes are available.



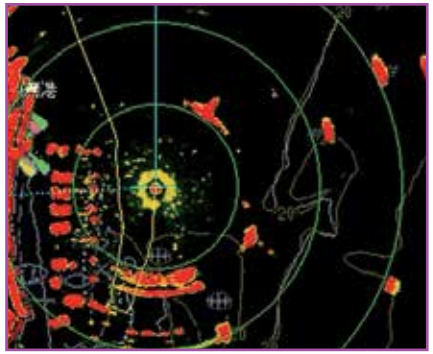
Automatic Clutter Elimination (ACE)

Quickly adjust the Radar image with the push of a single button. With ACE activated, the system automatically adjusts clutter reduction filters and gain control according to sea and weather conditions selected by the user (calm/rough sea/hard rain).

ACE OFF

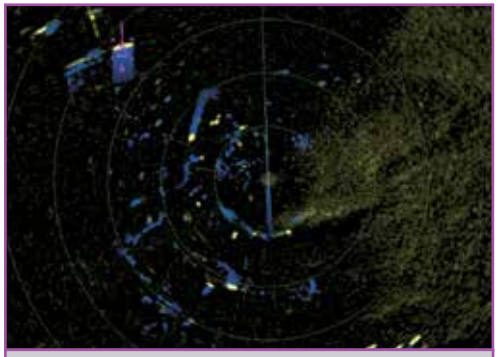


ACE ON

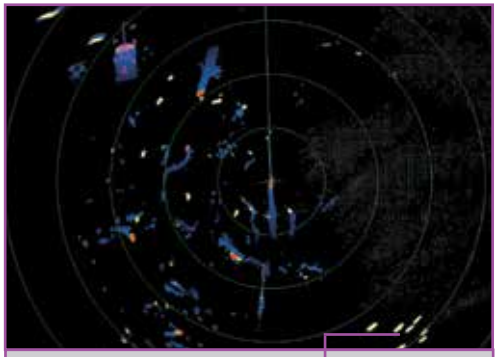


Target Analyzer™ Function* Spots Hazardous Targets Instantly

Target Analyzer™ function makes it possible to distinctly display targets closing in, while detecting and eliminating sea surface reflection and rain patches. With the Target Analyzer™ function turned on, each moving target, rain patches, and sea surface reflection are colored according to the degree of the hazard. This helps improve your safety and situational awareness by displaying different, easy to see colors.



Target Analyzer: OFF
Echo Average: OFF
Rain Echo Hatching: OFF

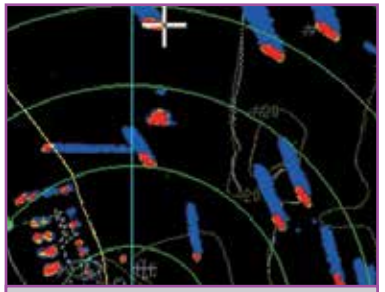


Target Analyzer: ON
Echo Average: ON
Rain Echo Hatching: ON

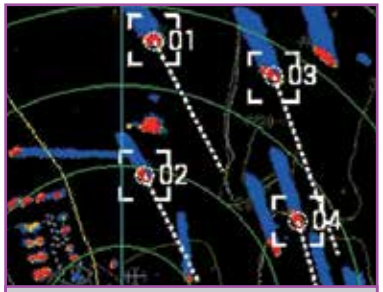
Other Echoes
(slowing ships, birds, buoys, etc.)

Fast Target Tracking*

After selecting a target, it takes only a few seconds for a speed and course vector to be displayed. With accurate tracking information, estimation of other vessels' course is made easier.



Before target selection



After target selection

Photo: 15" Marine Display
MU150HD (Optional supply)

Model FAR1513/1523BB

▸▸▸Spec P100

Black Box Radar

KEY FEATURES:

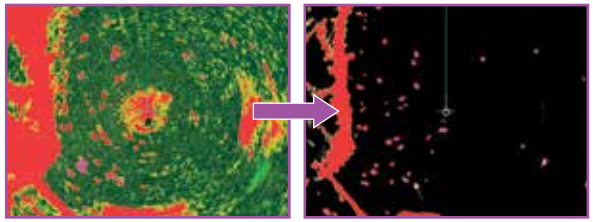
- FAR1513/1523BB Marine Radar features advanced functionality in a small and easy-to-use package
- Accurately track other vessels to avoid collisions with Furuno's innovative Fast Target Tracking
- Improved sea and rain clutter removal function:
  - Automatic Clutter Elimination (ACE) function provides clear echoes
- Instant speed vector display for tracked targets:
  - A speed vector will be displayed after clicking on a selected target
- AIS compatible out of the box (external AIS input required):
  - Targets are automatically acquired and information can easily be displayed on-screen

Antenna Selections:

Model	FAR1513BB		FAR1523BB	
Output Power (kW)	12		25	
Size	4' Open	6.5' Open	6.5' Open	8' Open
Range Scale (NM)	0.125-96			
Rotation Speed	26/48 rpm			

Automatic Clutter Elimination (ACE) Provides Unmatched Echo Clarity

Quickly adjust the Radar image with the push of a single button. With ACE activated, the system automatically adjusts clutter reduction filters and gain control according to sea and weather conditions selected by the user (calm/rough sea/hard rain).

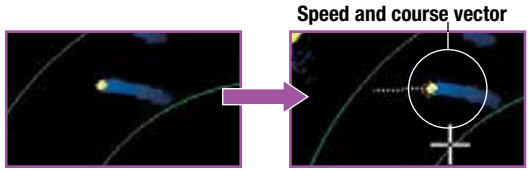


ACE OFF　　ACE ON

Fast Target Tracking*

After selecting a target, it takes only a few seconds for a speed and course vector to be displayed. With accurate tracking information, estimation of other vessels' course is made easier.

***Requires appropriate sensor**

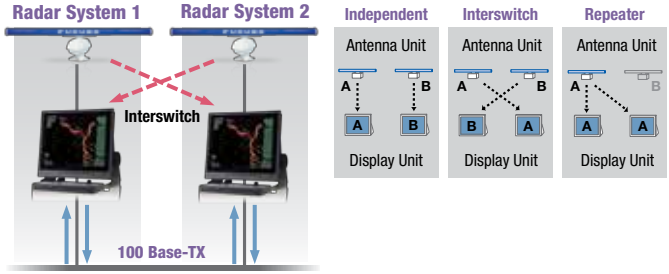


Before selecting a target　　After selecting a target

Photo: 15" Marine Display
MU150HD (Optional supply)

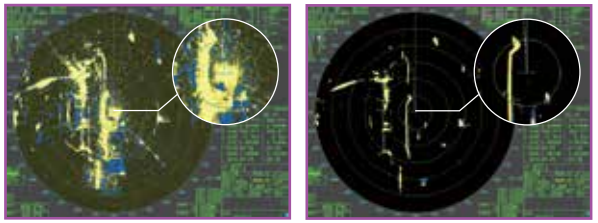
Scalable Ethernet Network System

FAR15x8 Series utilizes a 100 Base-TX Ethernet connection to network two Radars together. This Ethernet data link gives high-speed and stable navigational data sharing for interswitching as well as sharing data between ECDIS and GPS plotters.



Automatic Clutter Elimination (ACE) Provides Unmatched Echo Clarity

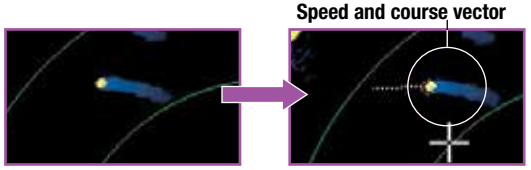
Quickly adjust the Radar image with the push of a single button. With ACE activated, the system automatically adjusts clutter reduction filters and gain control according to sea and weather conditions selected by the user (calm/rough sea/hard rain).



ACE OFF | ACE ON

Fast Target Tracking

After selecting a target, it takes only a few seconds for a speed and course vector to be displayed. With accurate tracking information, estimation of other vessels' course is made easier.



Before selecting a target | After selecting a target

Simplified Operation

Simple and efficient operation with individual knobs for gain/rain/sea clutter suppression, as well as a RotoKey™ and touchpad. An optional trackball as well as a regular USB mouse can also be used.

Model FAR1518BB / FAR1528BB

▸▸▸Spec P100

Black Box Radar

KEY FEATURES:

- FAR1518/1528 Radar meets the criteria for IMO certification for vessels < 500 GT
- Accurately track other vessels to avoid collisions with Fast Target Tracking*
- Instant speed vector display for tracked targets
- AIS compatible out of the box. Targets are automatically acquired and information is easily displayed (external AIS input required)
- Low noise, large dynamic range antenna unit
- FAR15x8 Series can overlay Radar echoes on external ECDIS and GPS plotter screens
- Improved sea and rain clutter removal function: Automatic Clutter Elimination (ACE) function provides clear echoes

Antenna Selections:

Model	FAR1518BB		FAR1528BB	
Output Power (kW)	12		25	
Size	4' Open	6.5' Open	6.5' Open	8' Open
Range Scale (NM)	0.125-96			
Rotation Speed	26/48 rpm			

***Requires appropriate sensor**

Radar

UHD Ultra High Definition
NAVnet Connect
AIS
AUTO
BlackBox
Ethernet Plug&Play
Target Tracking
VIDEO IN OUT

Model FAR22x8BB Series

▸▸▸Spec P102-103

Black Box Radar (X-Band or S-Band)

Model FAR22x8NXTBB Series

▸▸▸Spec P103

Black Box Solid-State Radar (X-Band or S-Band)

KEY FEATURES:

- Accurately track other vessels in order to avoid collisions with Furuno's innovative Fast Target Tracking functionality*
- Improved sea and rain clutter removal function - Automatic Clutter Elimination (ACE) function provides clear echoes
- Instant speed vector display for tracked targets - a speed vector will be displayed shortly after clicking on a selected target
- AIS compatible out-of-the-box: targets are automatically acquired and information can be displayed on-screen easily*
- Newly designed antenna with enhanced durability and reliability
- FAR22x8 Series can overlay Radar echoes on external ECDIS and GPS Plotter (also on own display with optional RP board)

***Requires appropriate sensor**

Antenna Selections:

Open Array	X-Band Radar			S-Band Radar		Solid-State Radar	
	FAR2218BB	FAR2228BB	FAR2258BB	FAR2238SBB	FAR2268DSBB	FAR2228NXTBB	FAR2238SNXTBB
Output Power	12 kW	25 kW	50 kW	30 kW	60 kW	Solid-State, 600 W	Solid-State, 250 W
Size	4/6.5/8' Open		8/10' Open	8/10/12' Open	10/12' Open	4/6.5/8' Open	8/10/12' Open
Range Scale (NM)	0.125-96						
Rotation Speed	24/42 rpm						

NXT Solid-State Radar Specializes In Target Detection and Maintainability

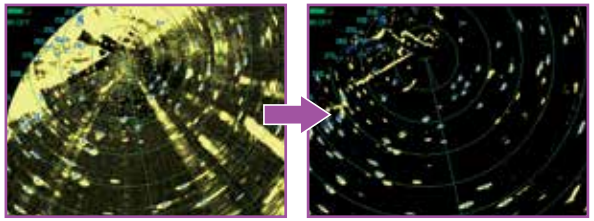
Furuno Solid-State Radar technology generates clear echo images, allowing the user to obtain a clear picture of the area around their vessel, including weaker echoes from small craft. Enjoy reduced maintenance and operating costs, as the Fan-less, Solid-State transceiver requires no magnetron.

Solid-State Radar provides nearly the same power capability as conventional magnetron Radars, emphasizing quality and reliability, while also meeting the rigorous demands of the marine environment.

Power Amplifier Module of the Solid-State transceiver

Automatic Clutter Elimination (ACE) Provides Unmatched Echo Clarity

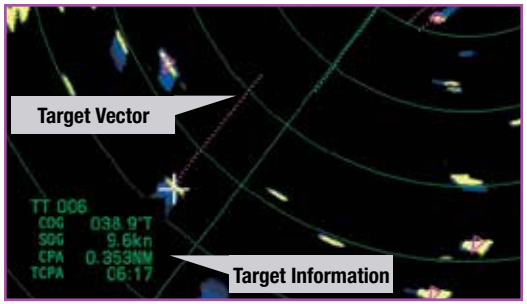
Quickly adjusts the Radar image with of a single button press. When the ACE function is activated, the system automatically adjusts clutter reduction filters and gain control according to sea and weather conditions.



(ACE) OFF **(ACE) ON**

Fast Target Tracking Function For Early Prevention of Collisions

With Fast Target Tracking, the FAR22x8 series provides accurate tracking information; speed and course vectors are displayed in mere seconds, allowing operators to take action and avoid incidents at a very early stage.

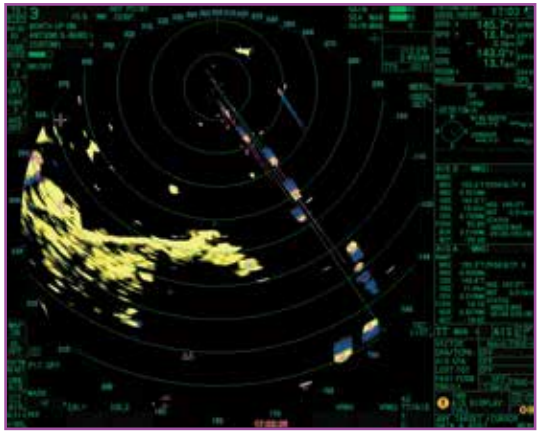


User Interface Designed For Intuitive Operation

InstantAccess Bar™ gives immediate access to the functions you need, containing shortcut menus of tasks, functions, and actions which operators frequently use. Quickly access necessary tasks without navigating cumbersome menus.

Radar Function Menu

Display Setting Menu



Model FAR3210BB/FAR3220BB/FAR3230SBB/FAR3220NXTBB/FAR3230SSSDBB

▸▸▸Spec P105

Black Box Chart Radar

KEY FEATURES:

- Available in X-Band (12/25 kW or 600 W Solid-State) or S-Band (30 kW or 250 W Solid-State)
- New Solid-State S-Band transceiver generates clear echo images, even from weak targets and small craft
- IMO-Approved Chart Radar
- Newly designed, aerodynamic antennas with enhanced durability
- Less maintenance using brushless DC motor
- Ethernet link between scanner unit and BDU eliminates loss of signal between antenna and processor
- Advanced Furuno technology with new features, such as Automatic Clutter Elimination (ACE)
- Improved Target Tracking function requires only seconds and tracks even high-speed and rapidly maneuvering vessels*
- Optional LAN Signal Converter allows cables to be extended between the antenna unit and processor unit or to utilize the existing cables when retrofitting
- Advanced Interference Reduction (IR) function
- Common sensor adapter makes installation and maintenance simple
- Complies with EC62388 Ed. 2.0, IEC61174 Ed. 3.0, IEC62288, IEC61162-1 Ed. 4.0, IEC61162-2

Antenna Selections:

Open Array	X-Band Radar		S-Band Radar	Solid-State Radar	
	FAR3210BB	FAR3220BB	FAR3230SBB	FAR3220NXTBB	FAR3230SSSDBB
Output Power	12 kW	25 kW	30 kW	Solid-State, 600 W	Solid-State, 250 W
Size	4/6.5/8' Open		12' Open	4/6.5/8' Open	12' Open
Range Scale (NM)	0.125-96				
Rotation Speed	24/42 rpm				

***Requires appropriate sensor**

Refined Antennas With High Signal Accuracy and Excellent Reliability

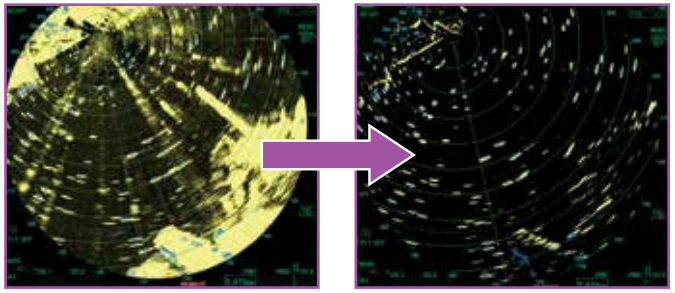
High image quality is achieved by the signal processor inside the new antenna unit, directly converting signals from analog to digital before sending them to the main processor unit. The new antenna shape minimizes aerodynamic drag and lightens the burden on the gear box. Installation and maintenance are now easier than ever. All components of the gearbox are integrated into one block that can easily be removed from the gearbox when maintenance is required.

X-Band Radar Sensor

S-Band Radar Sensor

Automatic Clutter Elimination (ACE) Provides Unmatched Echo Clarity

Quickly adjust the Radar image with the push of a single button. With ACE activated, the system automatically adjusts clutter reduction filters and gain control according to sea and weather conditions selected by the user (calm/rough sea/hard rain).

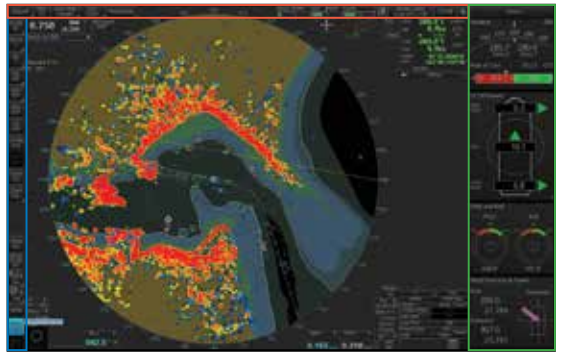


(ACE) OFF

(ACE) ON

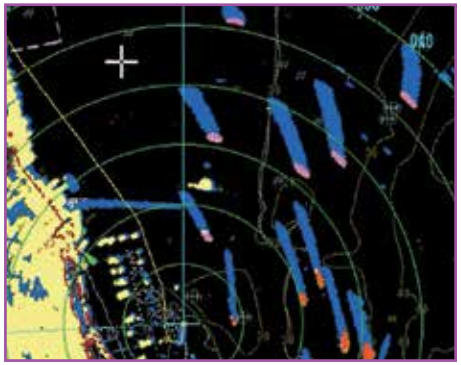
Advanced Tools For Simplified Navigation

The user interface of the Radar utilizes carefully organized operational tools: The Status Bar, InstantAccess Bar and Side Conning (when connectd to wide monitor). These operational tools deliver straightforward, task-based operation, allowing the operator to quickly view and perform tasks without having to navigate a complex menu tree.



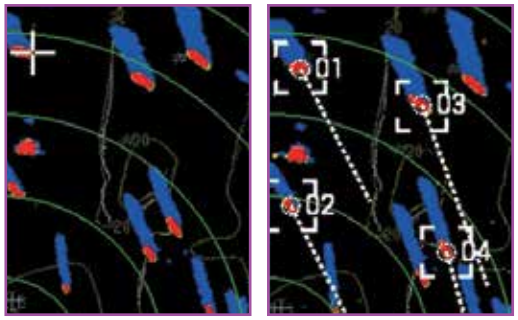
Target Analyzer™ Function

Target Analyzer function displays moving targets, stationary targets, rain, sea surface, and targets closing in on your vessel in different colors. Spot hazardous targets simply by the color they are displayed in. It can increase your safety as well as improve situational awareness.



Fast Target Tracking

After selecting a target, it takes only a few seconds for a speed and course vector to be displayed. With accurate tracking information, estimation of other vessels' course and speed is made easier.



Before selecting a target

Speed and course vector

Chart Overlay On Radar Presentation*

By overlaying Radar presentation and chart map, you can easily recognize coastlines and buoys at a glance. Records of your vessel's track points and waypoints will help memorize fishing points. When the Chart Radar presentation and chart map are overlaid, North-Up, Course-Up, and Head-Up direction modes will be available.

*Requires appropriate sensor

GPS/Chart Plotters

Model GP39

▸▸▸Spec P107

4.2" GPS Navigator

KEY FEATURES:

- Newly designed GPS core delivers enhanced position fixing accuracy
- Stores up to 10,000 waypoints, 100 routes and 3,000 track points
- Enhanced precision utilizing SBAS (Satellite-Based Augmentation System) for more accurate measurements, heading, position, etc.
- Share and display position information on networked equipment, such as a Fish Finder, Sonar, Radar, etc.
- Larger numbers for better viewing on display

Display Data On Connected Devices

Easy to mount on/off the bracket.

Import/Export Waypoints and Routes

Waypoint and route data can be exported/imported via a USB flash drive or signal converter.

1st GP39 — 2nd GP39

GP32 — Signal converter (Local supply) — GP39

Model GP170/GP170D

▸▸▸Spec P108

5.7" GNSS Navigator

KEY FEATURES:

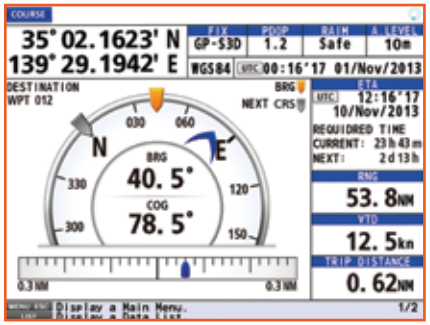
- Newly designed GPS chip and antenna unit deliver precise and stable position fix
- Enhanced precision utilizing SBAS (Satellite-Based Augmentation System), DGNSS (Differential Global Navigation Satellite System, and SLAS (Sub-meter Level Augmentation Service
- GP170D provides enhanced precision by utilizing DGPS (an optional DGPS radio beacon receiver as well antenna unit required)
- Simplified menu operation
- 10 Hz position update rate (every 0.1 sec) making own ship position tracking possible
- Bridge Alert Management (BAM) compliant
- IEC61162-450 Ethernet networking

Full compliance with IMO Performance Standards and IEC Testing Standards

FUNCTION	IMO PERF. STANDARD	IEC TEST STANDARD
GPS	MSC.112 (73)	IEC61108-1
GLONASS	MSC.113 (73)	IEC61108-2
DGNSS	MSC.114 (73)	IEC61108-4
MULTI *	MSC115 (73)	---
Alert Management	MSC.302 (87)	IEC62923-1/-2

Bridge Alert Management-Ready

The GP170 is BAM (Bridge Alert Management) ready and boasts a variety of display modes, including Plotter, Course, Highway, Data, and Integrity. The Integrity display mode delivers a highly-accurate Skyplot presentation of currently viewable satellites, status on GNSS/SBAS signal reception including strength and SNR, and elevation angles of available satellites, as well as detailed information about available beacon stations.



GPS/Chart Plotters

© 410 Films

"I have a pair of GP1971Fs and they BOTH worked flawlessly over the course of 2,000 nautical miles, with one performing dedicated Fish Finder duties and the other the Chart Plotter."

- Capt. John Raguso,
The Fisherman Magazine

TruEcho CHIRP
MTC Multi Touch Control
BDS Bottom Discrimination Sounder
ACCU-FISH
RezBoost
GPS Internal Antenna
FISH FINDER Internal
NMEA2000 Certified
AUTO
3D CHART
Enhanced Sunlight Viewable
Bonded LCD

Model GP1871F

▸▸▸Spec P109

7" WIDE GPS/WAAS Chart Plotter with built-in CHIRP Fish Finder

Model GP1971F

▸▸▸Spec P109

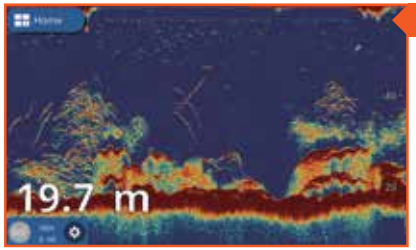
9" WIDE GPS/WAAS Chart Plotter with built-in CHIRP Fish Finder

KEY FEATURES:

- Easy and intuitive operation with multi-touch interface
- Daylight viewable multi-touch display with excellent readability, brightness of 1000 cd/m² (typical)
- Anti-reflective glass coating, strengthened glass filter
- Anti-fingerprint treatment on AR glass*
- Internal GPS/WAAS antenna for simplified installation
- Internal memory: 30,000 waypoints, 1,000 routes
- Autopilot (NAVpilot 300 and NAVpilot 711C) controls available on the display (sold separately)
- Built-in TruEcho CHIRP™ Fish Finder (single-band)
- Fish Finder's Post-processing Gain Control applied to all echoes displayed on the screen
- Detects fish lying near the bottom with White Edge function
- Compatible with DRS4W 1st Watch Wireless Radar
- Works with Navionics® or C-MAP 4D cartography

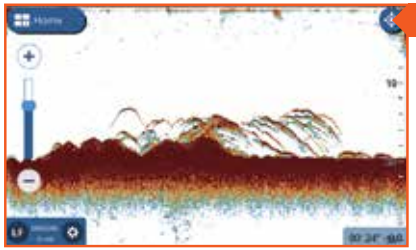
*** GP1971F only**

Powerful Built-in Features Maximize Your Catching Potential



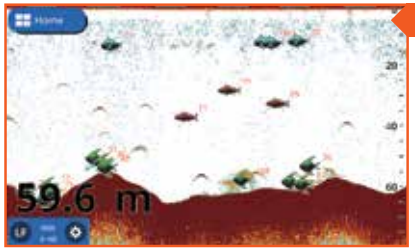
TruEcho CHIRP™ Fish Finder*

The high level of detail available with TruEcho CHIRP™ technology helps to distinguish fish schools, even when close to the seabed.



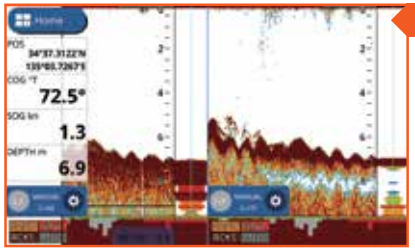
RezBoost™ Fish Finder**

Provides a higher resolution picture of fish schools from a standard 50/200 kHz dual frequency transducer.



ACCU-FISH™**

Individual fish size is calculated from echo strength. ACCU-FISH™ can detect fish sizes of 10 cm to 199 cm, at depths of 2 m to 100 m.



Bottom Discrimination Function**

The Bottom Discrimination feature enables the Fish Finder to indicate if a major component of the seabed is mud, sand, gravel or rocks.

***: TruEcho CHIRP™ transducer required.**
****: Must be connected to a compatible dual-frequency transducer.**

GUI Based On TZtouch2/TZtouch3

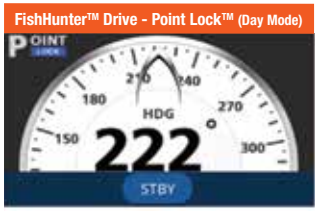
Tap the Home Button for instant access to the main menu and display modes. Save your favorite modes in the Quick Page list and easily switch between modes.

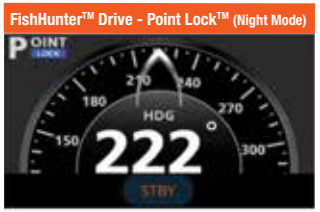
Home Menu

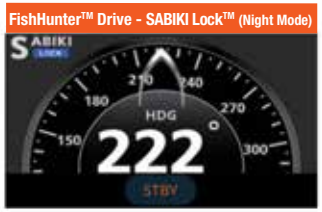
Close Up:
Quick Page List

New FishHunter™ Drive Mode Indication

FishHunter™ Drive offers unique boat control features achieved through joint development with FURUNO and Suzuki. In combination with the NAVpilot 300 and compatible Suzuki outboard engine models, unique features of Speed Control, Route Smoothing™, Auto Stop on Arrival, Point Lock™, and SABIKI Lock™ are available. The GP1871F/1971F v5.0 software supports mode and alert indications for FishHunter™ drive.







Optional Wireless Radar Connection to DRS4W

Radar can be overlayed onto the Chart Plotter display via wireless connection to the Furuno DRS4W 1st Watch Wireless Radar. The DRS4W's wireless configuration makes it a breeze to add the compact 19" Radar dome to any vessel. The DRS4W can also display the Radar presentation on a connected iOS smart phone or tablet, offering a major upgrade in safety and versatility.

1st Watch Wireless Radar Model DRS4W.
Refer to page 26 for details.

GPS/Chart Plotters

With a variety of innovative functions, shortcut control keys, and a 12.1-inch IPS screen that provides clear visibility, the GP3700 series gives you immediate situational awareness. Large storage capacity for track points, buoy points and marks/lines makes it a perfect solution for long-term fishing operations.

ACCU-FISH

BDS Bottom Discrimination Sounder

AUTO

Enhanced Sunlight Viewable

FISH FINDER Internal

CAN bus

Model GP3700

▸▸▸Spec P110

12.1" GPS/WAAS Chart Plotter

Model GP3700F

▸▸▸Spec P110

12.1" GPS/WAAS Chart Plotter with built-in Fish Finder

KEY FEATURES:

- Customizable keys allow you to create menu shortcuts before leaving the dock for a more intuitive operating experience
- Screenshot function allows you to look back at past data
- 12.1" large IPS LCD screen features a distinctively clearer and wider viewing angle with excellent readability
- Stores up to 30,000 own ship track points, 10,000 TT/AIS/GPS buoy points and 30,000 marks/lines
- Utilizes MapMedia Vector cartography
- Scroll Back function allows you to scroll backwards through the Fish Finder history to find fishing grounds or fish targets again, so you can drop a mark and plot a course back to that area
- A wide variety of display modes can be cycled through at the touch of a dedicated DISP key
- "UNDO" key lets you go back one operational step of deleting and drafting your marks and lines with a single press of a button
- Easy-access USB flash drive can be connected to the front panel

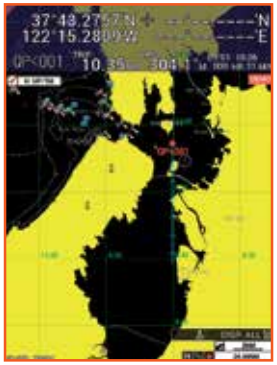
Smart Features For Ease-Of-Use

Both the GP3700/3700F incorporate an easy-to-use interface while adding new enhancements and features. With a variety of innovative functions, shortcut control keys, and a 12.1" IPS screen that provides clear visibility, the GP3700 series gives you immediate situational awareness. Large storage capacity for track points, buoy points and marks/lines makes it a perfect solution for long term fishing operations.

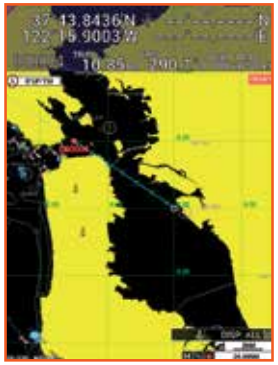
Variety Of Orientation Modes*

The GP3700 Series features Head Up, North Up, Auto Course Up, Course Up, Go To Up, and Specified Direction Up display modes. Specified Direction Up mode is a target-oriented navigation map, allowing the chart to remain vertical in the direction of the target. Select the desired display mode to suit your operational needs.

***Requires appropriate sensor**



Head Up Mode

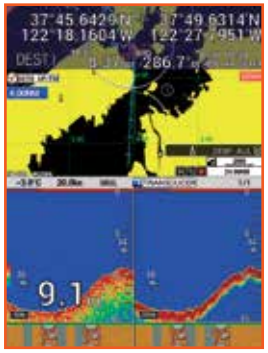


Specified Direction Up Mode

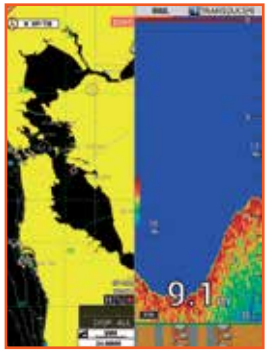
Versatile Display Modes

The GP3700 Series provides and displays navigation data in a variety of modes. All of the available display modes can be switched by pressing the DISP key. Plotter, Compass, Satellite information, and Fish Finder* can be selected and customized to match your preferences.

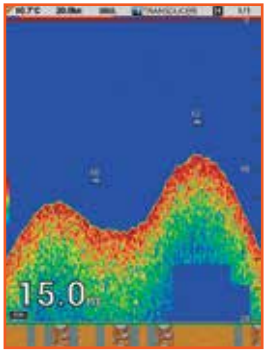
*GP3700F only



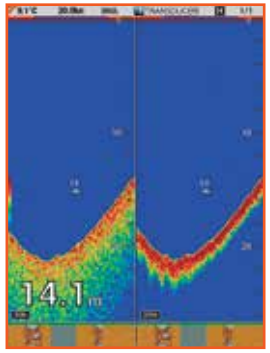
Plotter and Dual Frequency



Plotter and Single Frequency



Single Frequency Fish Finder



Dual Frequency Fish Finder

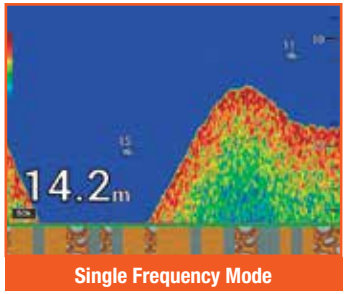
ACCU-FISH™ and Bottom Discrimination Modes*

Graphic Mode:

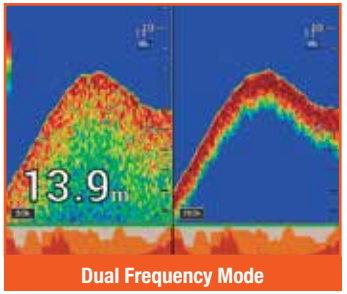
Rocks Gravel
Sand Mud

Probability Mode:

Rocks Gravel
Sand Mud



Single Frequency Mode



Dual Frequency Mode

***NOTES:**

Use at a depth of 5 m – 100 m. Use transducer in transom mount or thru-hull mount (Requires use of compatible dual-frequency transducer). To show a consistent display of the actual bottom, set the range display of the fish finder screen to “auto”. Enter the ship’s draft value. Use a ship speed of ≤ 10 kn. In some instances, bottom component indicated on the display may differ from its actual bottom structure.

Fish Finders

© Jean-Baptiste D'Enquin

RezBoost™ is a revolutionary signal processing technology that improves resolution and target separation when using conventional narrowband transducers.

RezBoost · ACCU-FISH · BDS Bottom Discrimination Sounder · AUTO · Bonded LCD · Enhanced Sunlight Viewable · Polarized Friendly

Model FCV588

▸▸▸Spec P113

8.4" Fish Finder

Model FCV628

▸▸▸Spec P113

5.7" Fish Finder

KEY FEATURES:

- Dual-frequency Fish Finder (50 kHz & 200 kHz) equipped with revolutionary RezBoost™ signal processing technology*:
  - Improved clarity and resolution that was previously impossible with conventional narrow-band transducers has been made possible thanks to Furuno's exclusive RezBoost™ technology
- ACCU-FISH™ – A unique fish size analyzer based on digital technology*
- Bottom Discrimination – Analyze bottom structure*
- White Line feature – Detect fish lying near the bottom
- Configurable Alarm function (depth, fish echoes, etc.)
- Post-processing Gain Control applied to all echoes displayed on the screen
- Share and display information with a connected Chart Plotter**
- Fast transmission rate of 3,000 PRR (Pulse Repetition Rate) per minute (at 5m depth range)

* Compatible thru-hull or transom mount transducer required
** Compatible Chart Plotter required

Boost Your Resolution with RezBoost™

RezBoost™ is a revolutionary signal processing technology developed by Furuno that improves resolution and target separation when using conventional narrow-band transducers.

Spot individual game fish surrounding bait balls as well as fish close to the seabed. With RezBoost™, not only can you expect higher resolution and crisper visuals, but also improvements in the ACCU-FISH™ function.

Compared to conventional signal processing techniques (FDF), a RezBoost™ Fish Finder produces an image that is up to 8 times*1 clearer. A TruEcho CHIRP™ Fish Finder (requires a special transducer) produces an image that is up to 10 times*1 clearer when compared with FDF. What can be done with a conventional narrow-band transducer, like the one you might have installed on your vessel, is truly impressive.*2

*1 RezBoost™ performance may vary depending on depth, range and signal frequency used.

*2 The Enhanced mode of RezBoost™ requires a RezBoost™ capable thru-hull or transom mount transducer.

Bottom Discrimination Functionality

The Bottom Discrimination function enables the Fish Finder to indicate whether the bottom is composed mainly of rocks, gravel, sand, or mud. This provides you with valuable information that helps you locate rich fishing grounds and boost your catch of the day. The probability display mode shows the most probable bottom composition in graph form, while the graphic display mode does the same graphically or using four colors.

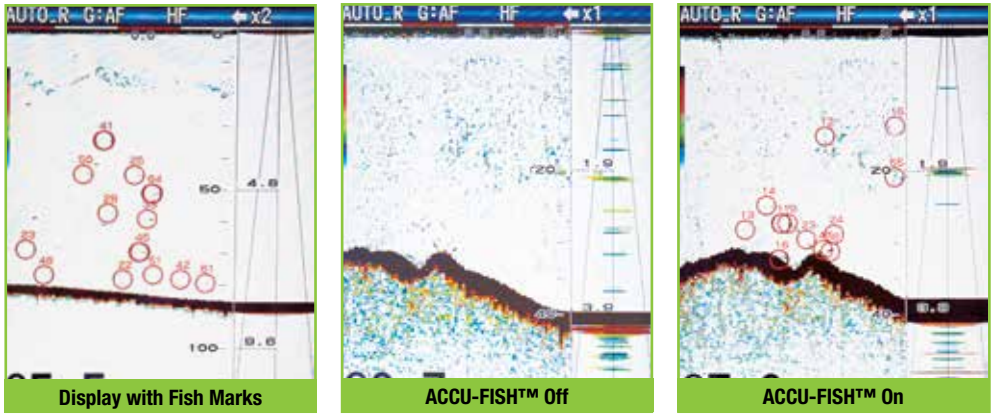
Probability Mode:
Rocks, Gravel, Sand, Mud

Graphic Mode:
Rocks, Gravel, Sand, Mud

Differentiate with ACCU-FISH™

ACCU-FISH™ is a fish size assessment function that is unique to Furuno. In order to assess individual fish size, echo returns are evaluated based on strength and turned into fish size display on screen. ACCU-FISH™ can detect fish size from 10 to 199 cm, in depths of 2 to 100 m. In some instances, fish size indicated may differ from actual size. Please read the operator's manual carefully before using this feature.

The fish mark can be utilized to display individual fish echoes when they are detected. It helps beginners identify fish echoes for a more engaging fishing experience. Fish marks are selectable from either a circle, square, or two fish symbols. The fish symbols are displayed in two different sizes (Large: over 50 cm; Small: 10 to 49 cm), and are a great help for anglers when identifying individual fish. The circle and square symbols help identify individual fish without hiding the underlying echo.



With RezBoost™ technology, the resolution is increased, leading to sharper and more defined echoes. Thanks to this increase in resolution, the accuracy of the ACCU-FISH™ function is also improved. ACCU-FISH™ is very useful when you need to determine fish size, but also has the added benefit of making fish echoes more visible when viewed from a distance. With ACCU-FISH™, you can spot individual fish echoes, even from the deck of your vessel.

Fish Finders

With Quick Gain control, changes you make to the gain setting are applied not only to new echoes, but also to all past echoes on the screen.

NAVnet Connect [2] | FDF Furuno Digital Filter | ACCU-FISH [2] | Bonded LCD | Enhanced Sunlight Viewable | AUTO | FFS | NMEA 2010/2011 [1]

[1] FCV295 only
[2] FCV1150 only

Model FCV295

▸▸▸Spec P113

10.4" Color LCD Fish Finder

Model FCV1150

▸▸▸Spec P113

12.1" Color Fish Finder

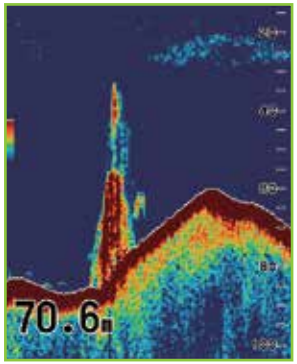
KEY FEATURES:

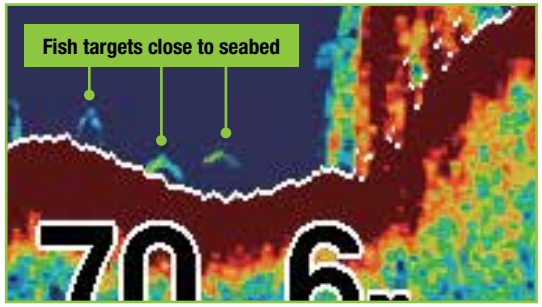
- Post-processing gain control applies changes to gain setting for all existing returns on the display
- White Edge feature for enhanced bottom discrimination
- Furuno Digital Filter delivers crystal clear target presentation
- Furuno Free Synthesizer (FFS) allows for adjustable operating frequency
- Available Heaving Compensation provides stable echo presentation even in rough seas (FCV1150 only)*
- Unique fish size analyzing function ACCU-FISH™ mode (available when FCV1150 is connected with CA50/200-1T transducer)
- Depth information can be output to TimeZero and PC navigation suites for 3D mapping

*Requires appropriate sensors

Optimized with Furuno Digital Filter (FDF)

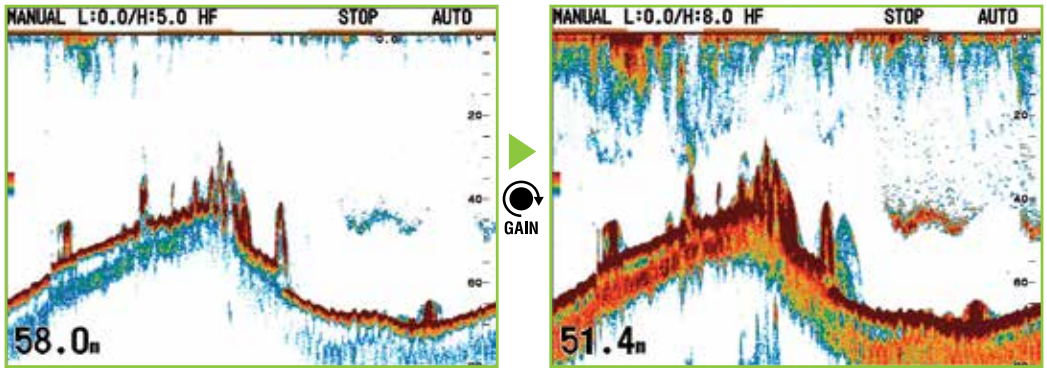
Furuno Digital Filter optimizes the gain to obtain highly defined images of underwater conditions. The FCV295 and FCV1150 can clearly show target fish close to the seabed. The digital filter also eliminates noise to deliver sharp and detailed echo presentation, achieving detection of fishing reefs and even individual fish with absolute clarity.





Post Processing Gain Control

With Quick Gain control, changes you make to the gain setting are applied not only to new echoes, but also to all past echoes on the screen. This lets you compare past and current echoes under the same gain setting. Because the changes are applied to both new and existing returns, you can quickly and easily determine the right Gain setting for your conditions.

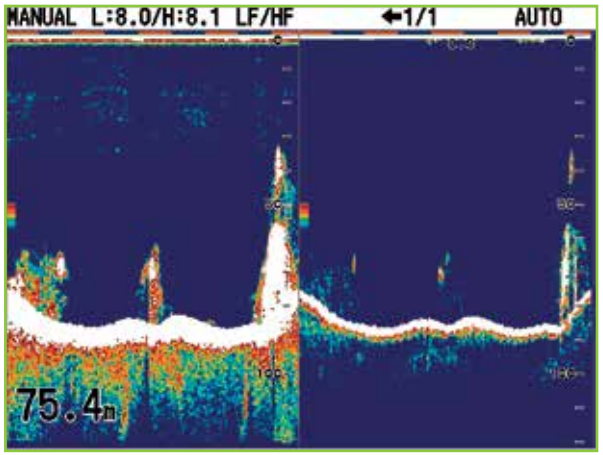


Gain: 5

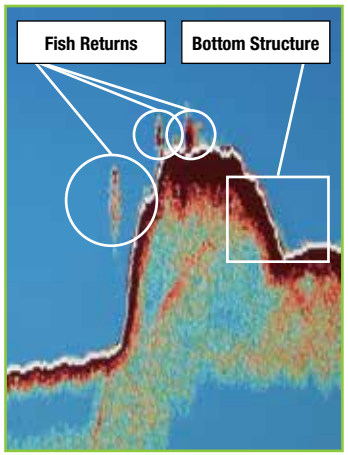
Gain: 8

Discern Between Structure and Fish Returns

The top of the seabed is displayed in white to easily discern seabed structure from bottom fish returns. While conventional bottom discrimination function (i.e.: White Line) is applied to the strongest echoes, the White Edge function enhances the separation between bottom fish and the seabed.



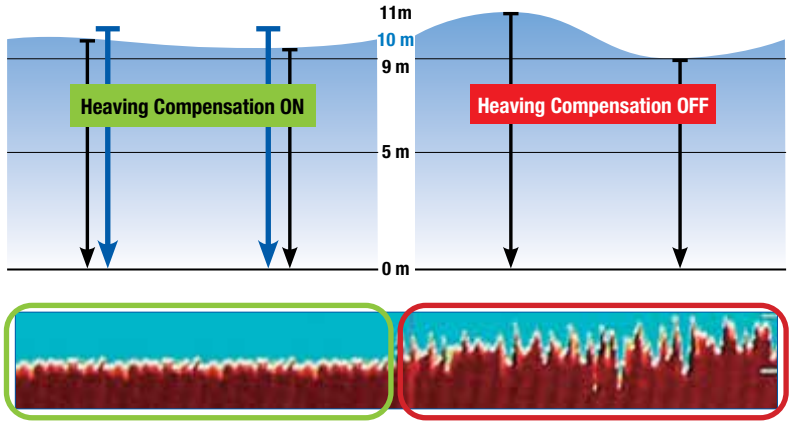
White line



White edge

Heaving Compensation (FCV1150 Only)

Even in rough sea conditions the FCV1150 compensates for heaving, presenting a display without undulations caused by the sea conditions. Furuno SCX20/21, SC33, SC70, or SC130 Satellite Compass™ required.



Fish Finders

Photo: 19" Marine Display
MU190HD (Optional supply)

The FCV1900 series ensures excellent target separation and clarity thanks to a very high Pulse Repetition Rate. You will be seeing individual targets and fish reefs like never before.

FDF
FURUNO Digital Filter

AUTO | BlackBox | FFS

Model FCV1900

▸▸▸Spec P115

Black Box Hi-Resolution Dual Frequency Fish Finder

KEY FEATURES:

- Bottom Discrimination display provides estimate of seabed composition*
- Post-processing gain control applies changes to gain setting for all existing returns on the display
- Capture and review videos and screenshots
- Furuno Free Synthesizer (FFS) transceiver design allows use of user-selectable operating frequencies (15kHz to 200kHz)

Feature		Model		
		FCV1900	FCV1900B	FCV1900G
Fish Size Histogram		NA	NA	✓
Transmission Mode**	TruEcho CHIRP™ Mode*	NA	✓	✓
	Standard Mode	✓	✓	✓

*** TruEcho CHIRP™ compatible transducer required**
**** The transmission mode is set by the installer**

Model FCV1900B

▸▸▸Spec P115

Black Box Hi-Resolution TruEcho CHIRP™ Fish Finder

KEY FEATURES:

- High resolution echoes from shallow to deep waters made possible with TruEcho CHIRP™ technology

Photo: 19" Marine Display MU190HD (Optional supply)

Model FCV1900G

▸▸▸Spec P115

Black Box TruEcho CHIRP™ Fish Finder With Unique Fish Size Indicator

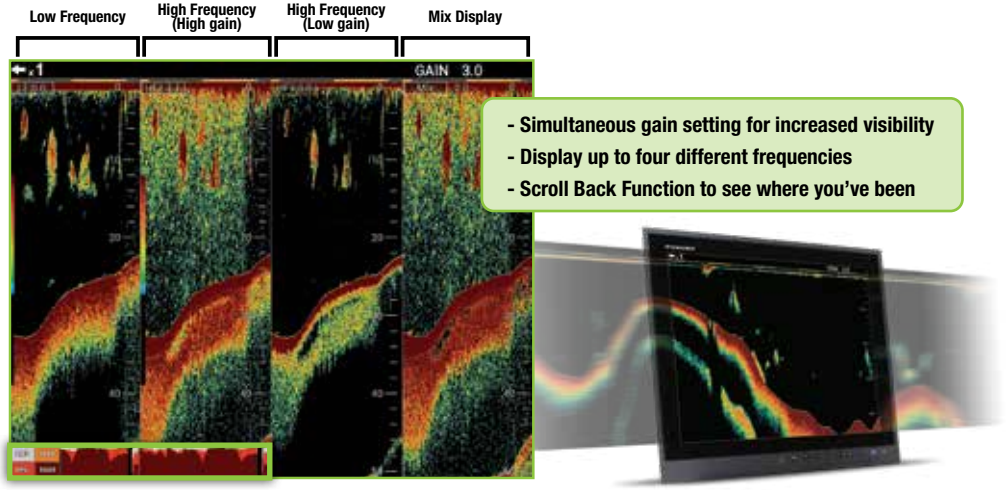
KEY FEATURES:

- High precision fish size feature provides approximate fish size in graph form, even in dense schools of fish
- TruEcho CHIRP™ technology delivers significant advancements in signal clarity and target definition
- Side Looking Mode, see targets and bottom structure below your vessel

Photo: 19" Marine Display MU190HD (Optional supply)

Multiple Functions For Improved Efficiency

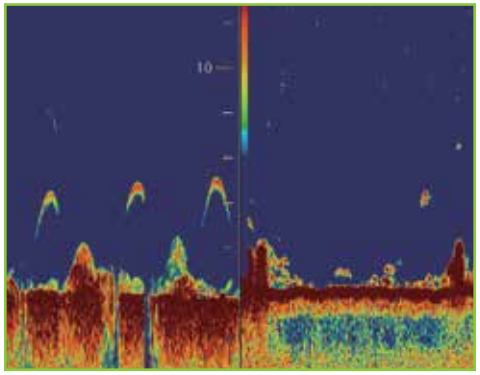
Display up to four different frequencies together in a compact and easy way by connecting a required network Fish Finder. Since there is no need to install additional displays, this function is especially useful for small vessels. Display two different gain settings simultaneously for increased visibility in changing water conditions and when changing vessel speed. With the press of a button you can activate the scroll back function to instantly review past echoes. Up to two previous screens can be viewed.



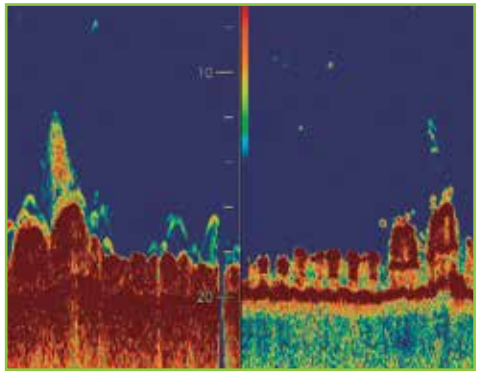
Connect a BBDS1 Network Fish Finder for Bottom Discrimination.

Increased Transmission Rate For More Detail

In low frequency, fish are displayed in a distinct boomerang shape. In high frequency, you can clearly see the amount of detail displayed. Fish reefs can also be seen in much greater detail.



Individual fish



Fish reef

Sonars

Find fish all around and under your vessel with CH500/600 Searchlight Sonar.

NMEA2000 Certified

CAN bus

VIDEO OUT

Model CH500

▸▸▸Spec P117

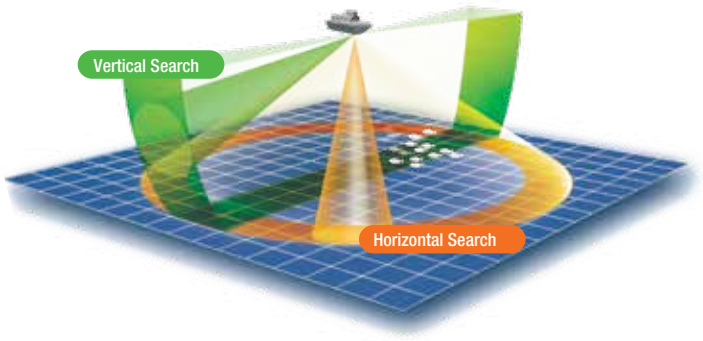
12.1" Searchlight Sonar

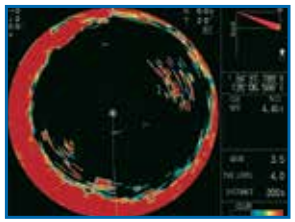
KEY FEATURES:

- Incredibly fast training speed, your best ally for finding fish 360° around your boat in only 3.1 seconds when set on 24° scanning step and at 20 m range
- 6 tilt angles for training speed adjustment according to user's needs:
- Display directly to TZtouch2/TZTouch3 MFDs with Video Converter Kit
- 11 display modes selectable for every situation
- HD LCD with 1024 x 768 XGA* resolution for detailed echo images and clear view
  * The display is optimized for this resolution
- Quick Gain Control allows instantaneous gain adjustment
- Built-in motion sensor provides a stabilized target presentation in rough sea conditions
- Audible target detection freeing the user from continuous watch of the display (Requires Loudspeaker option)
- Frequency: 60/88/150/180/240 kHz
- Also available in Black Box configurations

Horizontal and Vertical Scanning Modes

Searchlight Sonar gives you the ability to search both horizontally and vertically. With horizontal search, you can specify the tilt angle to an area around your boat. With vertical search, you can obtain detailed underwater conditions at any bearing. Combine the two to make your cruising safer and your fishing operation more productive.



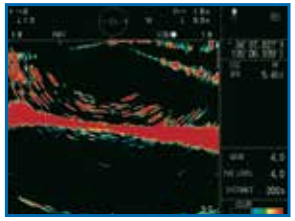


Horizontal

A full circle scan (360 degree), provided by a rotating transmitter, detects fish schools around the vessel (Horizontal scan zoom mode also available).

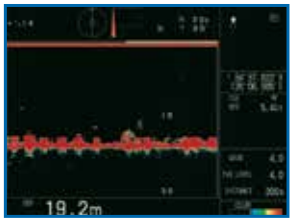
Vertical Full-Circle A-Scope

A-Scope mode shows the last detected echoes with one single color. The more opaque the color, the stronger the echo.



Vertical

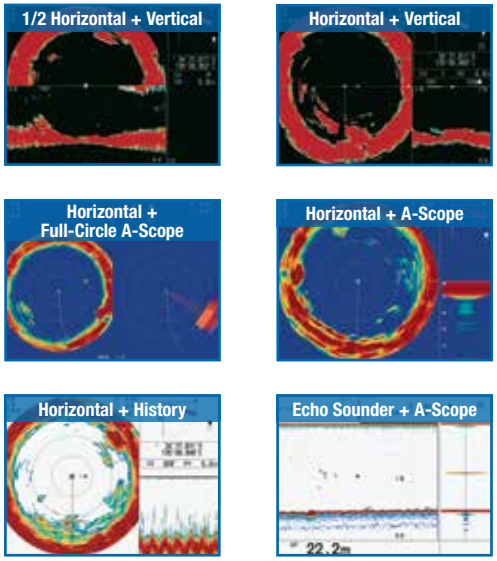
Vertical scan paints the bottom profile within a user-specified vertical plane in any direction.



Echo Sounder

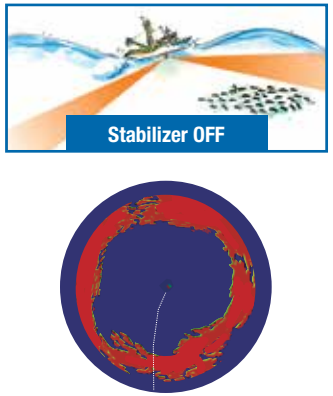
When fully retracted, the transducer tilted to 90 degrees can locate fish schools and seabed straight down at high speeds.

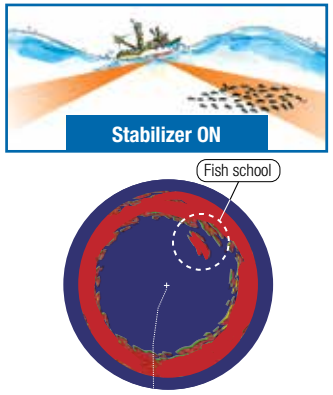
Different Display Combinations



Stabilized Target Presentation In Rough Sea Conditions

The CH Series is the first of its class to have an integrated stabilizer in its core. In rough seas, ships tend to move in every direction and its inclination can change, creating echo distortions which cause inaccurate data display. The role of the stabilizer is precisely to compensate for those negative effects and provide accurate data to the user. Thanks to the built-in stabilizer's compensation, the CH Series is able to detect fish that didn't appear originally with the non-stabilized echo.





Audible Target Detection*

The CH Series features fish and target audio signals depending on the nature and the size of the detected object. Whether there are air bubbles, big or small fish schools, and seabed, the emitted sound is different. This feature shows its usefulness during long sea trips, as it frees the user from continuously watching the screen. ***Requires Loudspeaker**

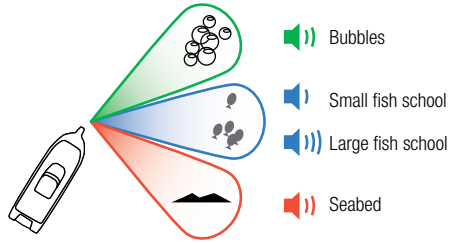


Figure out intuitively what is detected by differentiating their sound with the audible target detection

Sonars

Furuno Sonar technology delivers a more productive fishing operation.

NMEA2000 Certified | CAN bus | VIDEO OUT

Model CH600

▸▸▸Spec P117

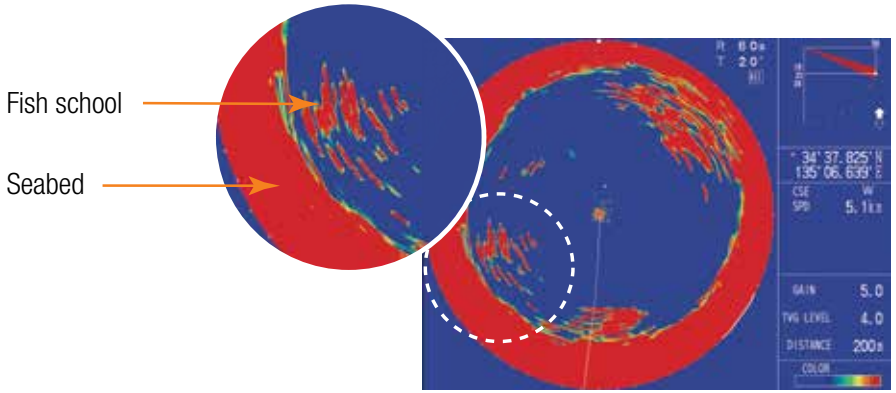
12.1" Dual Frequency Searchlight Sonar

KEY FEATURES:

- Two frequencies combined to increase your chances of finding fish (60/153 kHz or 85/215 kHz)
- Incredibly fast training speed, your best ally for finding fish 360° around your boat in only 3.1 seconds when set on 24° scanning step and at 20 m range
- HD LCD with 1024 x 768 XGA* resolution for detailed echo images and clear view
  * The display is optimized for this resolution.
- Quick Gain Control allows instantaneous gain adjustment
- Audible target detection freeing the user from continuous watch of the display (available with optional Loudspeaker)
- Also available in Black Box configurations
- Display directly to TZtouch2/TZTouch3 MFDs with Video Converter Kit

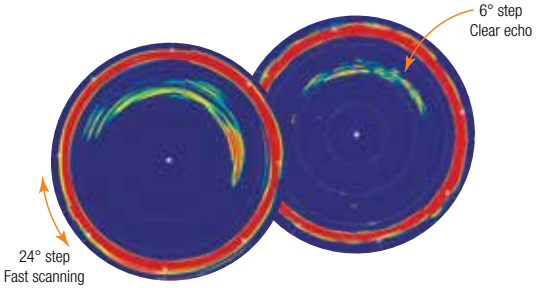
Advanced Signal Processing for High-Resolution Output

Powerful signal and image processing based on a unique interpolation technology provides high resolution images. Even if the fish are located near the seabed, different echoes are clearly shown and easy to understand. Additionally, the high resolution echo display gives crisp, clear echoes, which reduces eye strain.

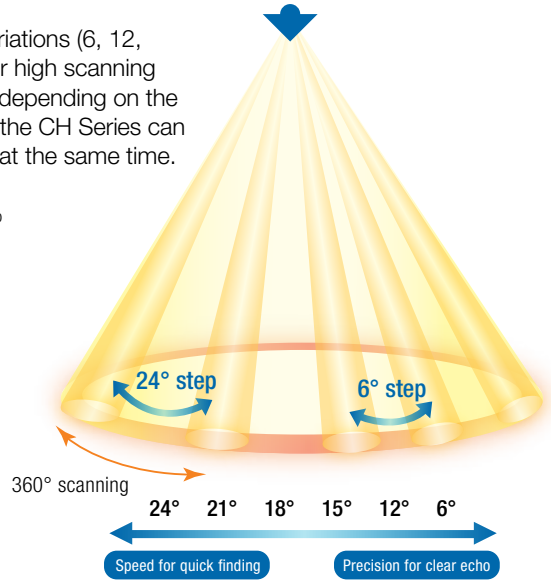


Ultra-Fast Scanning Speed

This Searchlight Sonar provides 6 scanning step variations (6, 12, 15,18, 21, 24) easily switchable for high-precision or high scanning speed that can cover 360° in a couple of seconds, depending on the distance of the echoes. Due to its scanning speed, the CH Series can be used at high speeds and still cover a large zone at the same time.

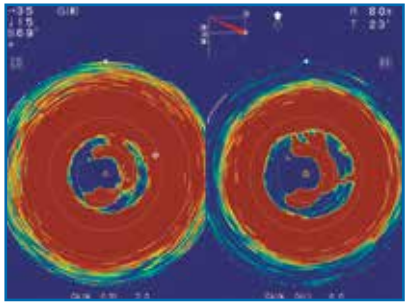


While moving fast, use the 24° step scan to get a glimpse of the surroundings. If you are detecting something interesting that might look like what you are targeting, slow down and switch to the 6° step scanning to have a clear echo.

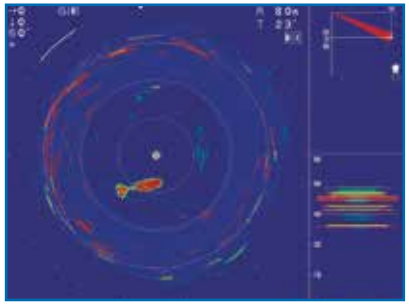


Dual-Frequencies Reveal Sardines and Other Baitfish

With the Horizontal Dual-Frequency mode in split view, both low and high frequency are used and displayed at the same time. By comparing echo shapes at low and high frequency, it becomes possible to ascertain the actual presence of the fish, even the small ones. Both low and high frequency echoes are overlaid to only show the echoes that matter to the fisherman. It then becomes easy to identify species regardless of their distance to the ship.

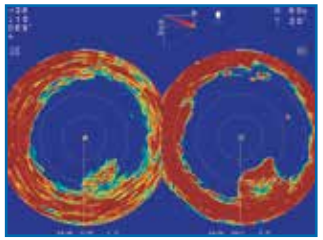


Horizontal Dual-Frequency Mode
Pictured: Echoes of Sardine Schools

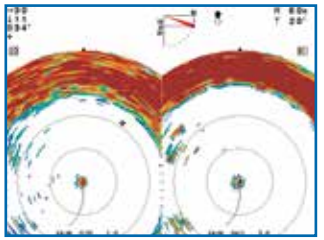


Horizontal Mix Display Mode
Pictured: Echoes of Baitfish

Horizontal Scan

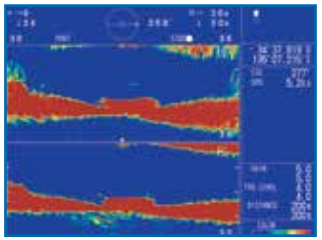


Horizontal (Zoomed)

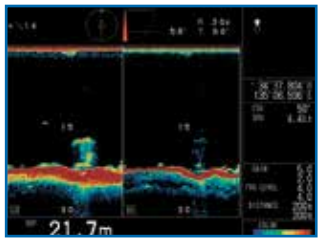


A full circle scan (360 degree), provided by a rotating transmitter, detects fish schools around the vessel. (Horizontal Scan Zoom mode also available)

Vertical



The Vertical scan paints the bottom profile within a user-specified vertical plane in any direction.



Echo Sounder

When fully retracted and with the transducer pointed straight down, the Sonar can be used as a fish finder for seabed and fish schools

Sonars

Optional remote controller provides armchair control of range and gain settings

Scan a full

360 degrees twice

in a second!

VIDEO OUT BlackBox

NMEA

Winner of the 2021 & 2022 NMEA Marine Specialty Award

Model CSH8L MARK-2

▸▸▸Spec P118

Black Box Omni Sonar

Model CSH5L MARK-2

▸▸▸Spec P118

Black Box Omni Sonar

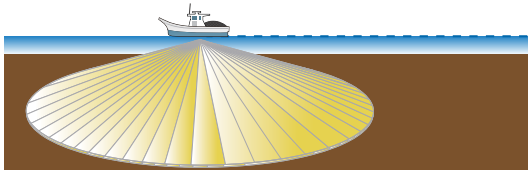
KEY FEATURES:

- Full-Circle Omni Sonar detects and instantaneously displays schools of fish and underwater conditions
- Black Box configuration allows for a space-saving, flexible installation
- Video converter kit provides networked video input to TZtouch2 and TZtouch3 MFD
- Variety of available monitors built to meet the needs of tournament vessels
- Vivid 16-color display assists in recognition of seabed structure, as well as concentration/distribution of fish schools
- CSH8L MARK-2 scans a full 360 degrees in half a second
- Various fishing and navigation data* keep the operator aware of fishing and navigation conditions *Requires appropriate sensors
- Four user-programmable function keys for quick set up according to fishing conditions or specific functions
- Second display and control unit can be easily connected for a remote second station
- High-power transmitter ensures reliable operation under any conditions
- Narrow beamwidth and enhanced target identification capability
- Transducer frequency:
  - CSH5L MARK-2: 55 kHz
  - CSH8L MARK-2: 85 kHz

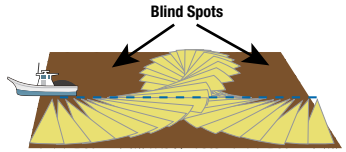
About Omni Sonar

The transducer arrangement of an Omni Sonar consists of layers of elements, each pointed in a slightly different direction, which allows the Sonar to transmit 360 degrees instantaneously. There is no need to rotate the transducer. On a 1,000 ft range, the CSH8L MARK-2 Sonar updates the display 360 degrees every 0.54 seconds, while the conventional PPI Sonar takes a full 32 seconds to train full circle under the same range/conditions. Because this Sonar scans so quickly, it greatly improves the fishing operation, especially when searching for or following fast swimming fish, and lessens the chance of missing important changes in underwater conditions.

Detection Image of Omni Sonar



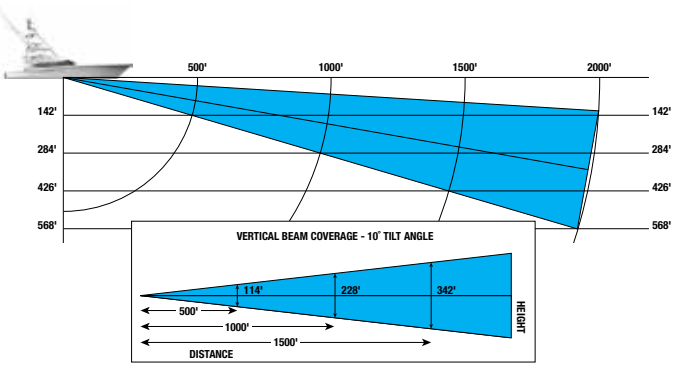
Detection Image of Conventional PPI Sonar



Omni Sonar shows the actual situation 360 degrees around your vessel, and gives all the necessary information as needed. No more blind areas to consider, allowing the operator to concentrate on the tilt, range, fishing area, etc.

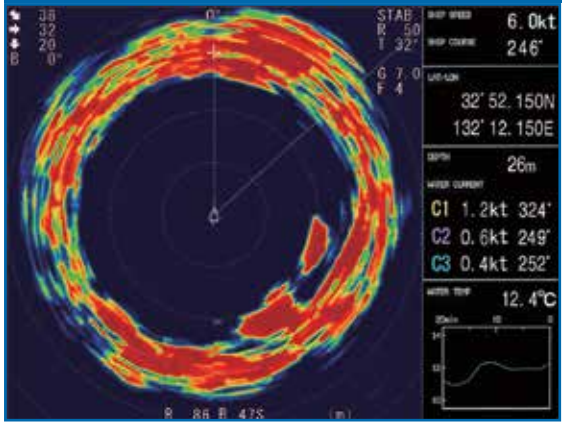
The Winning Fisherman's Secret Weapon!

The CSH5L MARK-2/CSH8L MARK-2 is a Full Circle Omni Sonar that rapidly detects and displays individual gamefish and schools of baitfish, showing your catch in real time before they're in the spread. A game changer for high-end tournament vessels, midwater trawlers, purse seiners, or anyone desiring more successful fishing expeditions. At 85 kHz, the CSH8L MARK-2 is a mid-frequency Sonar. Its narrow beamwidth coupled with its enhanced target identification capabilities make it ideal for searching near the vessel or in shallow waters.



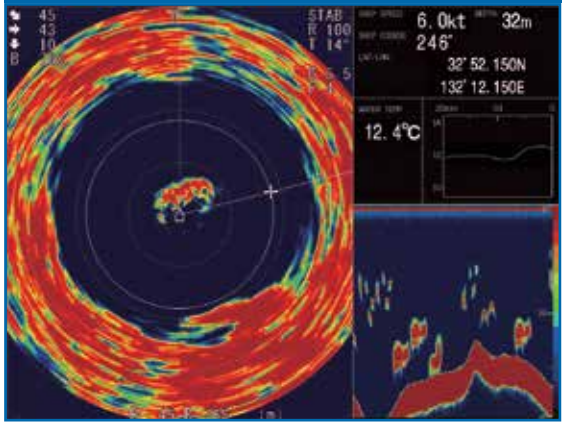
Selectable User-Friendly Operating Modes

Sonar Display



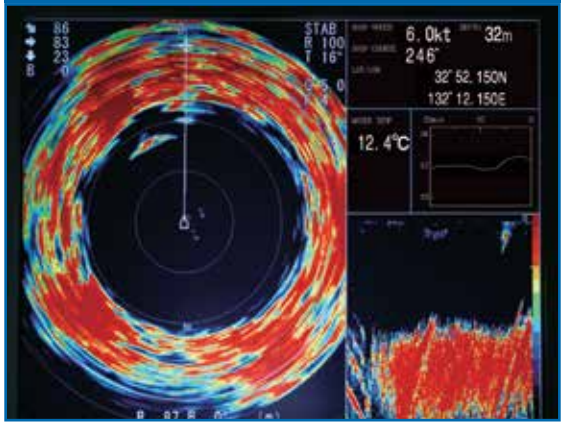
Navigation data can be displayed in the text window, with connection of appropriate sensors. This mode is useful for detecting and tracking schools of fish.

Sonar + Fish Finder*



The Sonar picture appears on the left and the signal fed from the Fish Finder at the lower right side of the screen. This mode is suitable for judging fish school concentration.
*** Interface with Fish Finder required.**

Sonar + Audio



Sonar picture appears on the left and the audio display at the lower right side of the screen. This mode is useful for analyzing echoes in a desired area.

Multibeam Sonars

Model DFF3D

▸▸▸ Spec P92

Network Multibeam Sonar

KEY FEATURES:

- Outer beam detection range is up to 200 m in a 120-degree swath port to starboard direction*
- Deep water, main beam penetration directly under the boat is approx. 300 m*
- Easy installation with a variety of transducer options
- Customize the display according to your needs:
  - Depending on the situation and preference, a combination of screen modes can be displayed
- Full control of all features using TZ Professional (Windows OS for PC)

DFF3D MULTIBEAM SONAR	
Frequency	165 kHz
Range Scale	Up to 1,200 m
Detection Range	200 m* (Side beam best performance) 300 m* (Main beam directly under boat)
Transducer	800 W

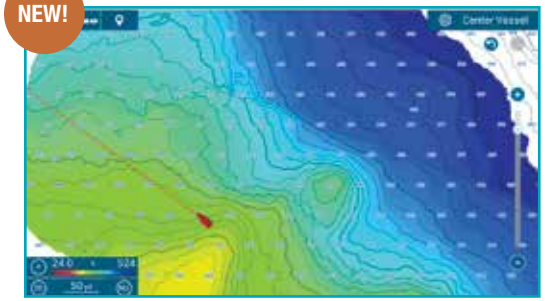
*** Depending on bottom type and water conditions.**

2018-2022

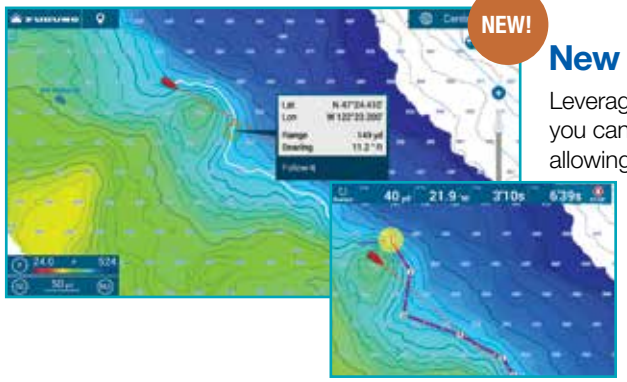
PBG (Personal Bathymetric Generator)

NEW!

Discover new fishing hot spots as you build your own realistic 3D bathymetric charts of the seafloor. Charts are automatically saved directly to your TZtouch3/TZT2BB so you can go back to your favorite new spots again and again. Highly accurate spot soundings are also generated directly from your PBG recordings. These spot soundings display measured depths at specific points in easy-to-read numbers, helping you identify the depths at a quick glance.



New PBG spot soundings clearly shows depth numbers



NEW!

New Follow-It Feature

Leverage your recorded PBG data like never before. Now you can create a constant depth route from the PBG data, allowing you to select Follow-It from the menu and send it to your NAVpilot Autopilot. Then the NAVpilot will follow the depth route all the way around a ridge or trough. This is particularly useful when you want to keep your bait at a certain depth while trolling without having to adjust your reel.

(Software ver. 3.5 or higher required for TZtouch3; ver. 9.5 or higher required for TZT2BB.)

A Transducer Option for EVERY Vessel

With the DFF3D, there is a transducer to meet the needs of any installation. Thru-Hull, Transom Mount, Cavity Mount, and Pocket Mount transducer options are available, so the DFF3D can be utilized on virtually any vessel, with built-in motion sensors to compensate for pitch and roll. There are even combo transducers that combine DFF3D with either CHIRP or dual-frequency 50/200 kHz elements, so your Multibeam Sonar can be used in conjunction with a TruEcho CHIRP™ Fish Finder or the built-in TZtouch Fish Finder, requiring only a single transducer!

Transducer* (with motion/temperature sensor)

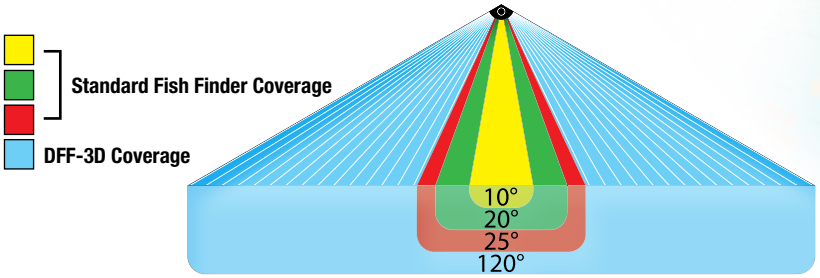
B54 Thru-Hull Mount Transducer

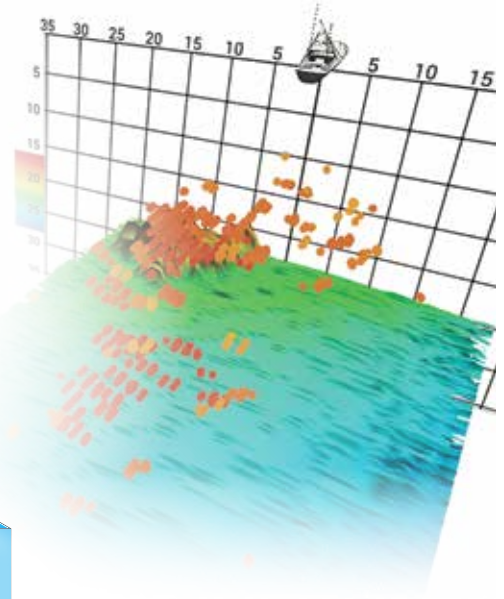
TM54 Transom Mount Transducer

* For a complete list of transducers, including combo transducers, see page 117.

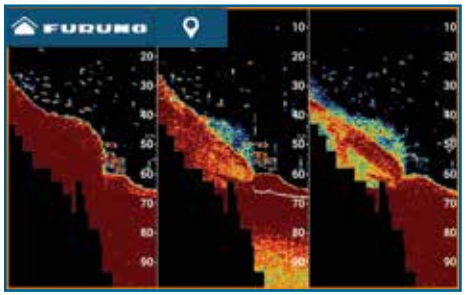
Understand Fish Distribution At A Glance

You may think you've seen 3D Multibeam Sonar in action, but many of those images begin disappearing as you approach 60 meters (200 feet). Furuno's DFF3D takes 3D Fish Finding to new depths of over 300 meters (980 feet), with Side Scanning over 200 meters (650 feet). See fish and bottom structure as you've never seen them before, at depths previously unfathomable. The DFF3D turns your NavNet TZtouch2 or TZtouch3 MFD into a Multibeam Sonar that can see 120-degrees port to starboard, allowing you to view the depth and direction fish schools are moving, while displaying the seabed condition in real time.



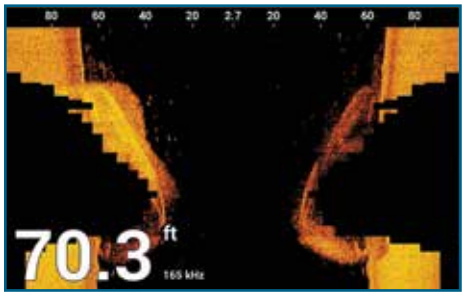


An Innovative Tool for Exploring the Water Column and Seabed:



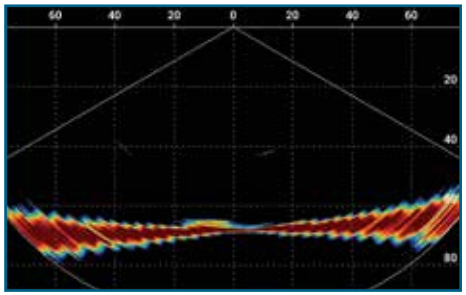
Triple Beam Sounder

A single beam (middle) or triple beam (middle, left and right) Fish Finder image are displayed simultaneously. The Triple Beam display helps to understand the depth of fish targets and seabed condition under the boat and to port and starboard, as well as distribution of fish under the boat and to each side. Each beam angle and beam width are selectable.



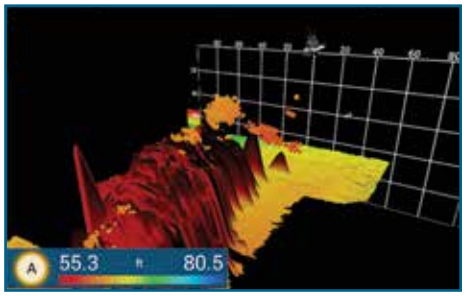
Side Scan

Side scan clearly displays the shape of structure as a high-definition image to both port and starboard. It is suitable for searching the seabed and understanding the sea floor structure. Outer beam detection range is 200 meters (over 650 feet) in a 120-degree swath port to starboard, a distance you've never seen before!



Cross Section

Cross section displays the real-time sea column echo in 120 degrees port to starboard. This mode aids in instantly understanding the distribution of bait fish and the water column condition, with a detection range of over 650 feet, depending on bottom, water, and installation conditions.



3D History

The 3D sounder history provides an intuitive and easy to understand 3D image of the seafloor, along with fish school icons. This mode is useful in a variety of situations, such as selecting a fishing hot spot and assessing the seabed condition.

Multibeam Sonars

wassp MULTIBEAM

SEE IT ALL

MULTI BEAM | TruEcho CHIRP | AUTO | BlackBox | Ethernet Plug&Play

Model S3/Sr3/F3/F3X/F3XL/W3/W3Pi

▸▸▸Spec P120

WASSP Series Multibeam Sonar

WASSP S3/Sr3/F3/F3X/F3XL/W3/W3Pi	
Frequency	S3, F3, and F3X: 160 kHz, 90-190 kHz F3XL: 80 kHz W3: 90-190 kHz
Range Scale	Up to 1,000 m*
Detection Range	Up to 850 m*

*** Depending on bottom type and water conditions.**

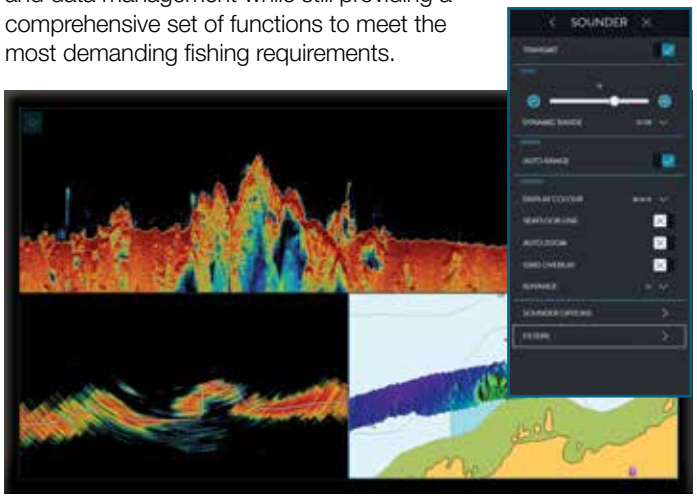
KEY FEATURES:

- Cost-effective solution for multiple applications
- Choose your own functions with new license options
- TimeZero compatible with optional license
- The 3rd generation WASSP F3 is designed for fishing and mapping operations, allowing you to maximize your catch while minimizing your time at sea
- The entry-level WASSP S3 for mapping and survey is now more sensitive, with a higher dynamic range and lower noise level
- Built for fishing and mapping, the WASSP F3X delivers mapping at over 500 meters, and sounding at over 550 meters depth
- Built for fishing operations, the WASSP F3XL shows fish targets at over 850 meters, with bottom detection at over 1,000 meters depth
- Built for surveying, the WASSP Sr3 is a mid-level MBES for professional ocean survey and mapping operations that includes a new RPM (real-time processing module)
- Built for wireless operations, the WASSP W3 is optimized for delivering real-time information from tenders to the mothership's bridge
- WASSP W3Pi All-In-One solution contains everything needed to begin mapping the seabed
- Save bathymetric recording data directly into standard CDX user interface software

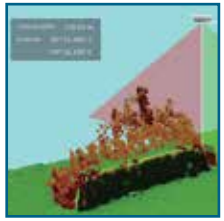
  - Visit www.wassp.com for complete details

New Easy-to-Use Interface

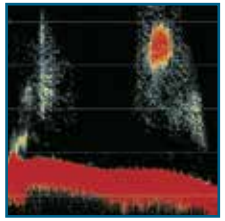
The F3 Series introduced the new simplified software “WASSP CDX” for control, visualization, and data management while still providing a comprehensive set of functions to meet the most demanding fishing requirements.



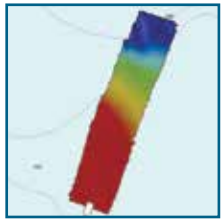
Various Presentation Modes



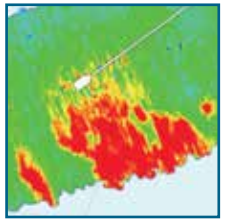
3D Fish Density Overlay



Fish Finder



2D Mapping to 500m



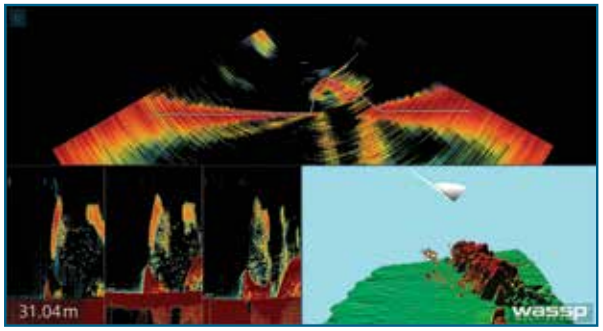
Backscatter (Bottom Hardness) at 200m

New Software Seamlessly Blends Data

Through pulse compression and advanced signal processing, WASSP delivers accurate, high-quality data in even the most demanding marine environments. Utilizing the new Version 4 CDX software, all new data gathered is seamlessly blended with previously recorded seabed information, resulting in beautiful, accurate mapping with no missing details or misaligned edges from multiple passes. Using the new CDX software algorithm, old and new data can be used to create an enhanced picture of current conditions.

Generate Your Own Personal Multibeam Chart

The WASSP F3/S3 and F3X series is set to revolutionize inshore fisheries and survey/mapping operations. With Wideband CHIRP technology scanning a 120-degree swath port to starboard using either 112 or 224 beams, WASSP delivers in the most demanding marine environments, each and every time.



All-in-One Versatile DRX Transceiver Is Ready for Future Advancements

This innovative all-in-one “Black Box” is not just a robust hardware platform but also introduces cutting-edge technical innovations and incredible versatility for finding your catch, opening up countless new possibilities for your fishing operations.

Wireless Link to Tender Provides Safe Passage In Poorly Charted Areas

WASSP’s next generation DRX based Multibeam Sonar has taken the important step of going wireless. This wireless link technology allows RHIBs or tenders to be deployed from larger surface vessels to map seafloor topography, assimilate sub-surface data, and provide a rapid area assessment that is wirelessly transmitted back to the “mothership” in a 3D animation. The result is real-time delivery of unparalleled underwater situational awareness to the ship’s bridge and its decision makers.

Autopilots

Kick back, relax, and let NAVpilot steer you to your destination!

NAVpilot remarkable self-learning, adaptive software is developed by collaborative works between FURUNO and FLSI.

Model NAVpilot 300

▸▸▸Spec P121

Self-Learning Autopilot with Gesture Controller

Model NAVpilot 711C

▸▸▸Spec P122

Self-Learning Autopilot

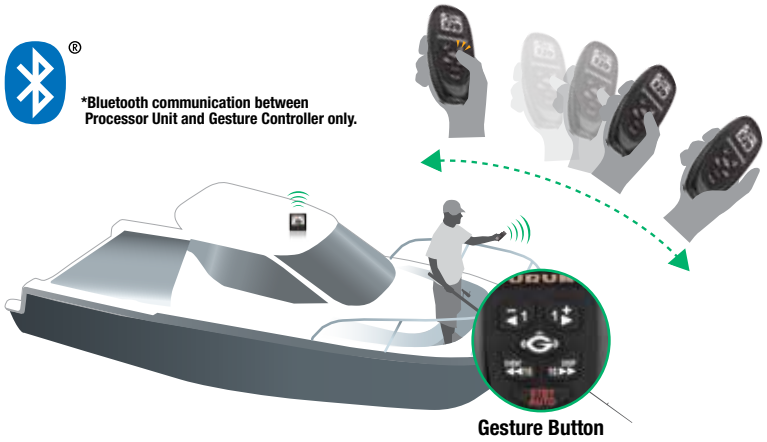
KEY FEATURES:

- Self-Learning and adaptive software; each time the boat goes to sea, the software learns about sea conditions and calculates the best adjustment for smooth steering
- Fantum Feedback™ offers simplified installation (no need for physical rudder feedback unit) while delivering enhanced steering control)
- Volvo Penta IPS, Yamaha Helm Master™, Yanmar, and Seastar VCS compatible
- Easy installation and smart network-based system configuration
- Waterproof Processing Unit (IP55) and Control Unit (IP56)
- NEW optional revolutionary SAFEHELM2 and POWER ASSIST brings unrivaled steering control and comfort at the helm
- Selectable “Economy” and “Precision” Navigation Modes combine adaptive technology, providing fuel and power savings of 2.5% or more*
- “Precision” provides for tighter course keeping, within 0.01 NM of the set course
- Perfect for inboard/outboard power boats (NAVpilot 300/711C) and sail boats (NAVpilot 711C only)
- Autopilot control available from NavNet TZtouch3/TZtouch2/GP1871F/1971F
- FishHunter™ Drive delivers new control features for boaters utilizing select Suzuki Outboards (NAVpilot 300 only)

*Based on Furuno testing and “Scenarios for a Clean Energy Future 2000” - U.S. Department of Energy (https://www.nrel.gov/docs/fy01osti/29379.pdf)

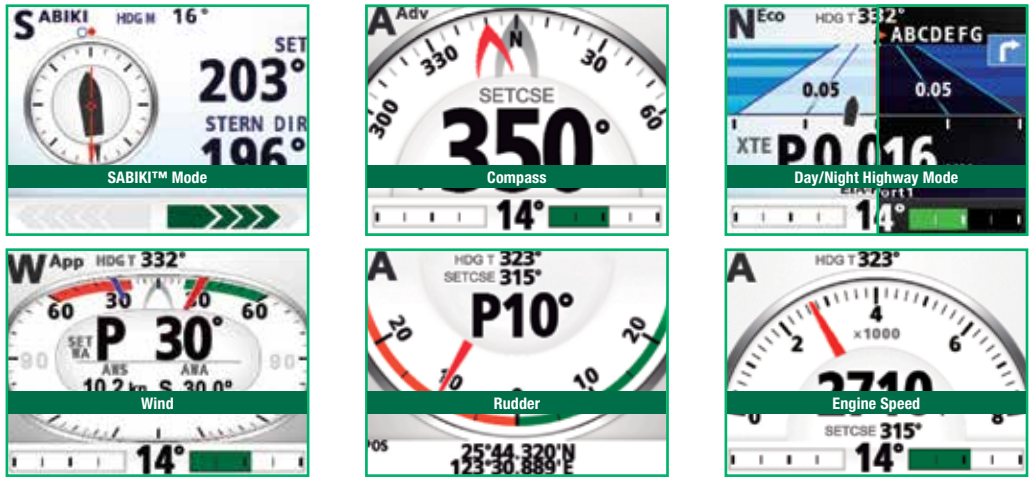
Just PUSH, POINT, & RELEASE (NAVpilot 300 only)

The Gesture Controller is a revolutionary and unique way to steer your boat remotely. By using Bluetooth signals, it is possible to control the Autopilot from anywhere on the boat within 10 meters. Just push, hold the button, point to the desired heading and release to let the Autopilot redirect the boat!



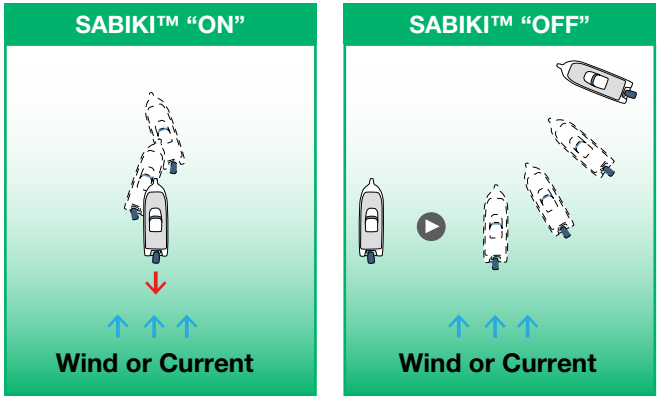
Several Types of Graphic Displays Available

Customize the data to suit your own preferences with digital or analog graphics. The NAVpilot 300 and NAVpilot 711C feature a color day/night graphic display, giving you much better sunlight visibility during the day, while not affecting your night vision when the sun goes down.



SABIKI™ Mode For NAVpilot 300 and NAVpilot 711C

With SABIKI™ mode your NAVpilot 300 or NAVpilot 711C have become even more capable than ever before. And the best thing is, there is no need to install additional hardware or sensors. SABIKI™ mode is only available on vessels with outboard engines.



SABIKI™ mode lets the Autopilot take control while you are drifting astern, so you can focus on fishing instead of steering. Moving astern at a slow pace, SABIKI™ mode is uniquely tailored for SABIKI fishing, jigging and bottom fishing. SABIKI fishing requires a bit of technique and whether you just started or have considerable experience, SABIKI™ mode will help you catch the bait fish needed for the big catch.

SABIKI™ mode is only user selectable if the current speed is below 5 knots. Once SABIKI™ mode is selected, the course can be set with the course knob and the arrow keys.

Autopilots

NAVpilot 300 + SUZUKI

A partnership between Furuno and Suzuki brings a new level of Autopilot control

Point Lock™ is an invaluable tool for anglers to maintain a fixed position while fishing a wreck or reef, and for boaters who occasionally must wait for a bridge to open so they can pass.

FishHunter™ Drive Autopilot Controls

FishHunter™ Drive delivers all-new control features for boaters utilizing select Suzuki outboard models driven by the Furuno NAVpilot 300 Autopilot. These new features offer enhanced Autopilot controls for precision navigation of routes and advanced fishing features for anglers while jigging, or trolling. These new FishHunter™ Drive features are in addition to Furuno's conventional FishHunter™ modes, which offer unique navigation features for fishing, regardless of engine type.

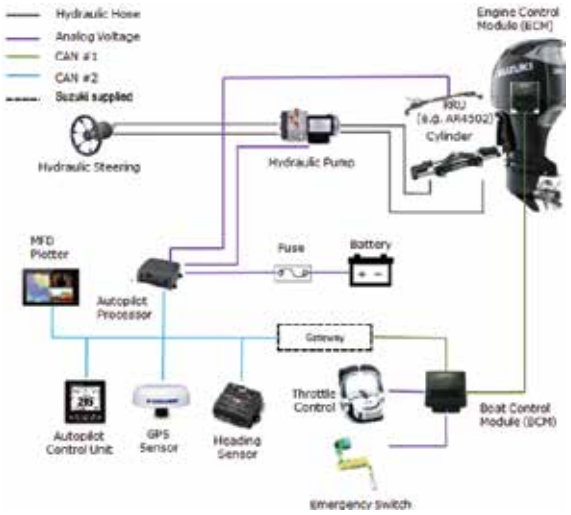
KEY FEATURES:

- **Speed Control** - The boat will maintain a constant speed, adjusting engine RPM as needed to account for changes in wind and tide.
- **Route Smoothing™** - Decreases the speed of turns at waypoints while navigating an active route. Reducing speed when executing a turn helps keep the vessel on course.
- **Point Lock™** - Allows the vessel to easily maintain a fixed position by controlling the rudder and throttle, countering the effects of wind and tide, which are constantly working to move the boat.
- **Auto Stop On Arrival** - The NAVpilot 300 automatically stops the vessel at the destination waypoint. When combined with the Point Lock™ feature, Auto Stop On Arrival allows the vessel to maintain a fixed position at the destination waypoint
- **SABIKI Lock™** - Expands upon the NAVpilot 300's SABIKI™ functionality by controlling both the rudder and throttle to maintain position, freeing the angler to focus 100% on jigging and other vertical fishing.

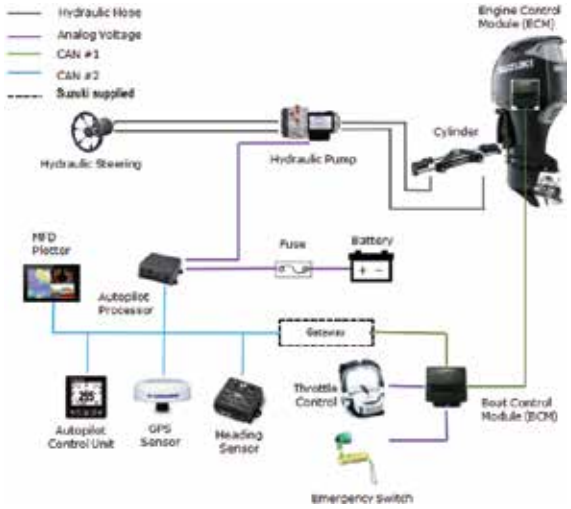
Compatible Suzuki Outboards:
DF140BG/115BG, DF150AP/DF200AP/175AP, DF300AP/250AP, DF350A/325A/300B

FishHunter™ Drive Interconnections

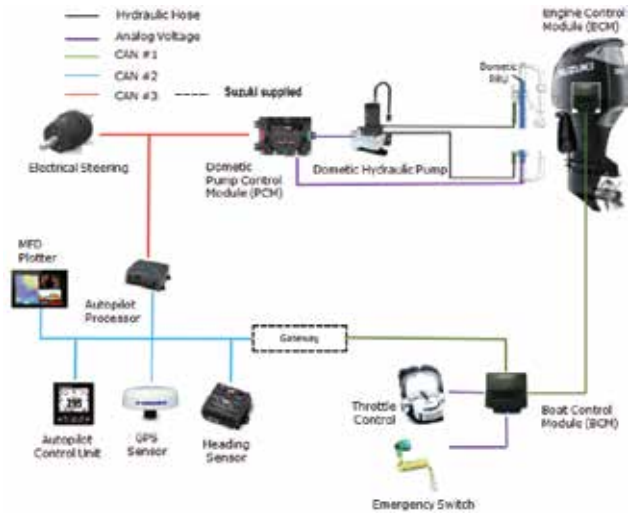
1. Reversing Pump Control for rudder (with Rudder Reference Unit)



2. Reversing Pump Control for rudder (without Rudder Reference Unit)



3. Dometic EVCS and Dometic Steering



FishHunter™ Drive Requirements

Item	Requirement	
Engine	Suzuki Outboards	DF140BG/115BG, DF200AP/175AP/150AP, DF300AP/250AP, DF350A/325A/300B
	Supported Qty.	Max. 4
Autopilot	**NAVpilot 300**	
Display Device	**NavNet TZtouch3 series** – TZT9F/12F/16F/19F/22X/24X v3.01 or 3.50 **NavNet TZtouch2 series** – TZTL12F/L15F v8.01 and TZT2BB v8.01 or v9.50 **GP1871F/1971F v5.0** For active route output to SUZUKI engines, Autopilot mode display, etc.	
Navigation Data	Heading, position, and vessel speed sensors for Autopilot control (MFD internal GPS does not meet all requirements, SCX20 recommended)	

Instruments / Data Organizers

Model FI70

Spec P123

4.1" Color LCD Instrument/Data Organizer

KEY FEATURES:

- Perfect cosmetic match for NavNet TZtouch2/TZtouch3 and NAVpilot 300/NAVpilot 711C
- Clear 4.1" screen that is viewable even under direct sunlight
- Simple and intuitive interface allows full customization
- Bonded color LCD ensuring condensation-free operation, as well as great visibility
- Use legacy wind sensors (FI5001/FI5001L) with the analog IF-NMEAFI Converter
- Low power consumption (0.15 A max)
- Simple AIS display through connected CAN bus devices
- Share language and brilliance settings between FI70s when grouping them together
- Easy installation with simple hole-saw cutout mounting

Bonded LCD | CAN bus | Enhanced Sunlight Viewable | NMEA2000 Certified | NAVnet Connect

For Powerboats and Sailboats Alike!

The FI70 Instrument/Data Organizer sports a vibrant 4.1" bonded color display that is visible even in the harshest sunlight conditions. Utilizing NMEA2000, external sensors can be easily connected for simple and reliable operation. The FI70 features an easy-to-operate user interface. You can customize almost every display property, allowing you to choose the information you want to be displayed, in the way you want to see it!

Whether you own a powerboat or sailboat, the FI70 will be equally useful with the proper sensors connected. For maximum performance and simple setup, the FI70 automatically asks you which type of vessel you have, helping to customize operation of the unit.

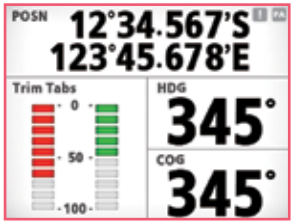
Various Display Options Are Available

Day and Night modes are also available for less eye strain. With Day and Night mode, losing your night vision is no longer an issue. Simply change between the two modes with a menu setting.

Heading

Wind (CH AWA/AH TWA)

Engine RPM (Single)

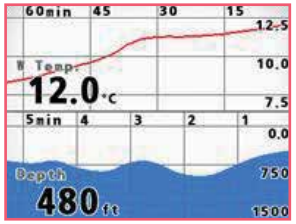


Data Box (Split)

Data box (Single)

Rudder

AIS



Graph

Timer

Roll & Pitch

Highway

Engine RPM (Triple)

Sensors and Accessory Options

Model FI5001/5001L

Wind Transducer (L: Long Shaft)
Angle Accuracy: > ± 10°
Speed Accuracy: > ± 5% (20 kt)
PSU: 12 VDC, < 40 mA
Transducer cable (option): 30/50 m
Short Shaft Length: 51.81 cm
Long Shaft Length: 86.61 cm

Wind transducer comes with a snap-lock fitting that holds the shaft securely, preventing the sensor from being damaged from excessive vibrations aboard the craft.

Model FI5002

Junction Box
CAN bus backbone x 2 ports
CAN bus x 6 ports
PSU: 12 VDC, < 2 A

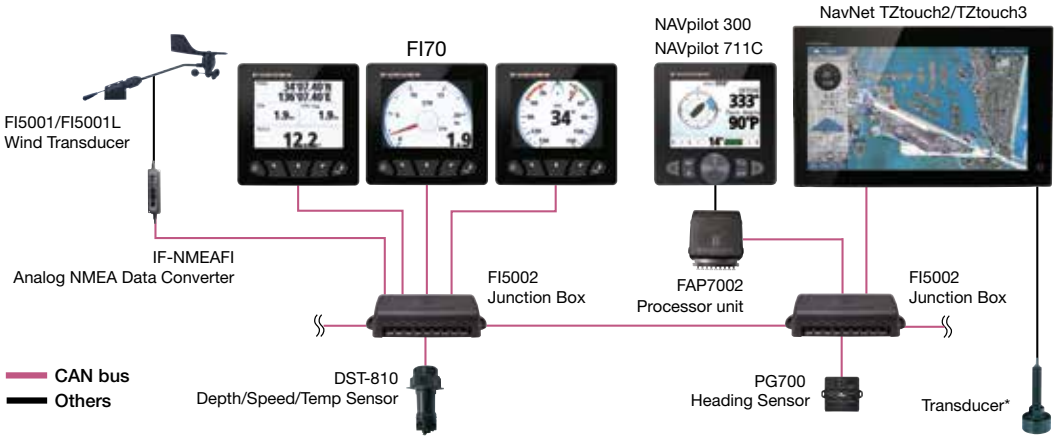
Model DST-810

Depth/Speed/Temp Sensor
Frequency: 235 kHz
Cable: 6 m

Model IF-NMEAFI

Analog NMEA Data Converter
CAN bus x 1 port
PSU: 15 VDC, < 200 mA

Diagram Setup Example



Monitors

Model MU150HD - 15"
XGA (1024 x 768) Monitor

Model MU152HD - 15"
XGA (1024 x 768) Monitor

Model MU190HD - 19"
SXGA (1280 x 1024) Monitor

Model MU192HD - 19"
SXGA (1280 x 1024) Monitor

Model MU190 - 19"
SXGA (1280 x 1024) Monitor

Model MU190V - 19"
SXGA (1280 x 1024) Monitor

Picture in Picture (PIP)

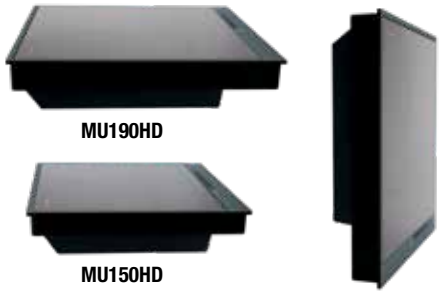
(MU150HD/152HD/152/190HD/192HD/190/270W)

Composite video (NTSC/PAL) input is available for displaying video images from an onboard TV/DVD player. For MU150HD/152HD/190HD/192HD with more than two composite video inputs, the images in the PIP window automatically switch alternately.

Slim, Lightweight and Compact

(MU150HD/152HD/190HD/192HD/190/270W)

The MU Display Series is slim in depth, light weight, and is so compact that it fits right into virtually any console. Its space-saving design makes optimum use of your dashboard.



MU190HD

MU150HD

Waterproof

(MU150HD/152HD/190HD/192HD)

The MU150HD/152HD/190HD/192HD has a waterproof display and is built to stand up to tough marine conditions when mounted at a flybridge console. The display can be rinsed in water for easy, worry-free cleaning.

Low Power Consumption

(MU150HD/152HD/190HD/192HD/190)

Utilizing the latest LED backlight, the MU Display Series delivers sharp, high quality images with bright colors and all at very low power consumption.

With the introduction of a variety of Black Box products, Marine Displays are becoming more of a necessity than a luxury.

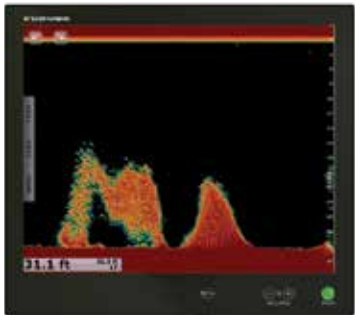
For crystal clear presentation for your Radar, Chart Plotter, NavNet, or other electronics, turn to the unmatched quality and reliability that you depend on from Furuno.

▶▶▶ Spec P125-126

Model MU175T - 17"

SXGA (1280 x 1024) Touch Monitor

Enhanced Sunlight Viewable · Bonded LCD · VIDEO IN · MTC Multi Touch Control



Model MU195T - 19"

SXGA (1280 x 1024) Touch Monitor

Enhanced Sunlight Viewable · Bonded LCD · VIDEO IN · MTC Multi Touch Control

Model MU245T- 24"

HD (1920 x 1080) Touch Monitor

Enhanced Sunlight Viewable · Bonded LCD · VIDEO IN · MTC Multi Touch Control

Model MU270W - 27"

WUXGA (1920 x 1200) Monitor

VIDEO IN

KEY FEATURES:	MU150HD	MU152HD	MU190HD	MU192HD	MU190	MU190V	MU270W	MU175T	MU195T	MU245T
Crystal clear marine grade monitors for use as main or remote display	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bonded LCD provides clear view in any weather conditions, eliminating concerns such as dew condensation	✓	✓	✓	✓	--	--	--	✓	✓	✓
Available in table top or flush mount (Mounting bracket is optional)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Automatic dimmer sensor adjusts the display brightness as lighting conditions change	✓	--	✓	--	✓	✓	--	✓	✓	✓
Customizable input names for easy on-the-fly identification and switching between onboard Radar, Sonar, Sounder, Camera, etc.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Any of the composite inputs are PIP (Picture-In-Picture) capable, with adjustable size and screen location	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Power ON/OFF automatically by DVI signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1,000 cd/m^2 brightness provides superior visibility, even in direct sunlight	✓	✓	✓	✓	--	--	--	✓	✓	✓
Built-in scaler allows various resolutions	VGA to SXGA	VGA to SXGA	VGA to SXGA	VGA to SXGA	VGA to UXGA	VGA to SXGA	SVGA to WUXGA	VGA to SXGA	VGA to SXGA	SVGA to HD
Selectable inputs include RGB analog, DVI (Digital Video Interface) and Composite	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multi-Touch Control - compatible with NavNet TZtouch/TZtouch2/TZtouch3	--	--	--	--	--	--	--	✓	✓	✓

Remote Displays

NAVnet Connect

CAN bus

Enhanced Sunlight Viewable

Model RD33

▸▸▸Spec P127

4.3" Remote Display

KEY FEATURES:

- 4.3" Sunlight Viewable color LCD
- Maximum visibility under various ambient conditions, at night, and under direct sunlight (brightness of LCD is 700 cd/m2)
- Enhanced data legibility thanks to large characters and high-resolution display
- Full-screen single box presentation down to six-way split screen presentation available
- Supports both CAN bus and NMEA0183 interfaces
- Two independent CAN bus input and output ports incorporated for daisy chain networking
- Internal NMEA0183/CAN bus conversion capability available
- Straightforward operation compatible with NavNet Series

See All Your Data - The Way YOU Want It

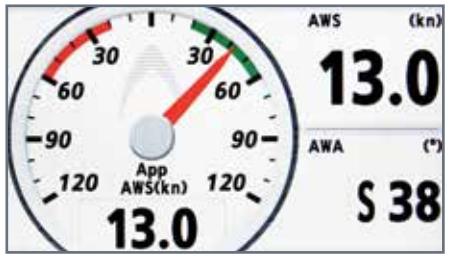
The RD33 is a navigational data organizer that allows the operator to select the perfect way to display data from interfaced equipment, such as GPS, Chart Plotter, Radar, Fish Finder, Autopilot, Instruments, and other sensors, including engine information. The high-contrast, color 4.3" LCD may be installed in a compact space, remote from its data sources. The screen is impressively bright, remarkably crisp, and easy to read. Various display modes are available including Speedometer, Highway, and Text. The Text mode presents up to six of the most necessary types of data. The display layout can be customized for your specific needs. This versatile product can also be added to a NavNet system, displaying a variety of navigation data from the CAN bus network.

New and Improved Look and Feel

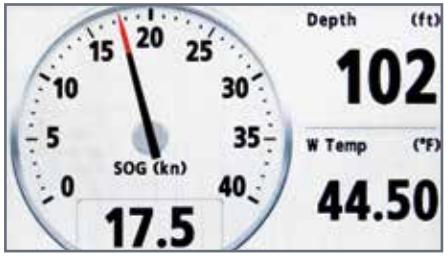
The RD33 features a visually appealing fresh new look, combining easy access with user functionality. Thanks to the bright, high-resolution LCD, the RD33 provides an easy-to-read display to monitor information from remote equipment, through an intuitive graphical user interface.

Display Options In Two Different Styles

Wind A



Wind B



SOG A

SOG B

Customizable Split-Screen Presentation

You can customize the view to display information in the format that works best for you. The RD33 allows you to split the screen in up to six separate segments and provides graphical or numerical representations of environmental changes to facilitate navigation.

Full Screen

6-Way Split

Model RD50

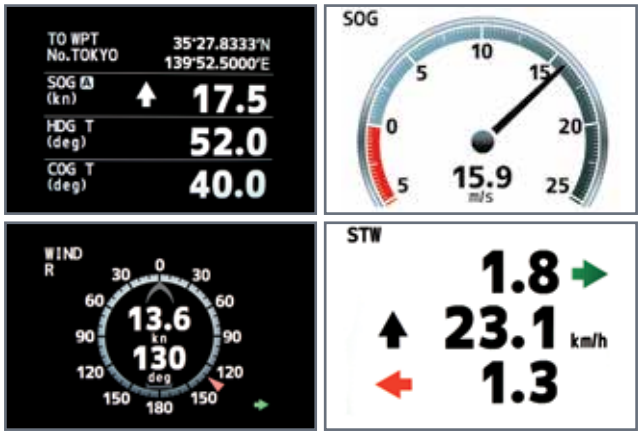
8.4" Remote Display

KEY FEATURES:

- 8.4" Sunlight Viewable color LCD, viewable under direct sunlight at wing console
- Digital/graph/analog displays available
- Display orientation of up to 4-way split screen
- Adjustable background color for both day and nighttime use
- Up to 10 displays can be connected with a daisy chain cable, with display brilliance able to be tuned from one dimmer controller
- NMEA0183 compatible

Versatile and Bright Data Display

The RD50 is an 8.4" Color LCD remote display unit that displays a wide variety of data from onboard sensors. The RD50 has 3 display modes: digital, analog, and graph. Up to 10 displays can be connected with a daisy chain cable. The display brilliance of all units connected in this way can be centrally controlled from 1 dimmer controller.



Satellite Compasses

The perfect heading solution for any vessel installation, even where the view of satellites may sometimes be obstructed!

Multi-GNSS | NMEA2000 Certified | NAVnet Connect

NMEA

Winner of the 2020-2022 NMEA Product of Excellence Award Best NMEA2000 Product

Model SCX20

▸▸▸Spec P128

NMEA2000 Satellite Compass™

Model SCX21

▸▸▸Spec P128

NMEA0183 Satellite Compass™

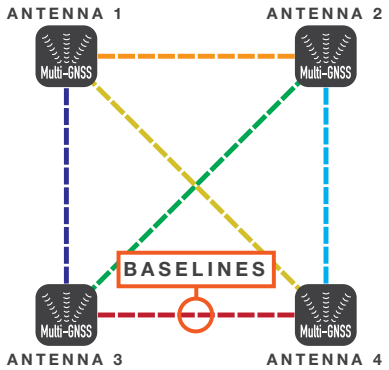
KEY FEATURES:

- Perfect for NavNet TZtouch2/TZtouch3, NAVpilot 300/711C, Fish Finder, Sonar, DFF3D, and WASSP installations
- Outputs accurate Time, Position, Heading, COG/SOG, ROT, Roll/Pitch/Heave, 3-Axis Speed, Air Temperature, and Air Pressure data
- Unprecedented heading accuracy for Radars, Sonars, and Navigation
- Utilizes four Multi GNSS (GPS, QZSS, GLONASS, Galileo) antennas
- 1.0 degree heading accuracy, 0.02 knot speed accuracy
- Lightweight antenna - only 1 kg!

MODEL	SCX20/SCX-21
Heading Accuracy	1.0˚ rms (static), 0.5˚ rms (dynamic)
GPS Fix	5 m approx. (2 drms, HDOP < 4)
MSAS Fix	4 m approx. (2 drms, HDOP < 4)
WAAS Fix	3 m approx. (2 drms, HDOP <4)
Follow-up Rate	45˚/sec
Setting Time	60 secs approx.

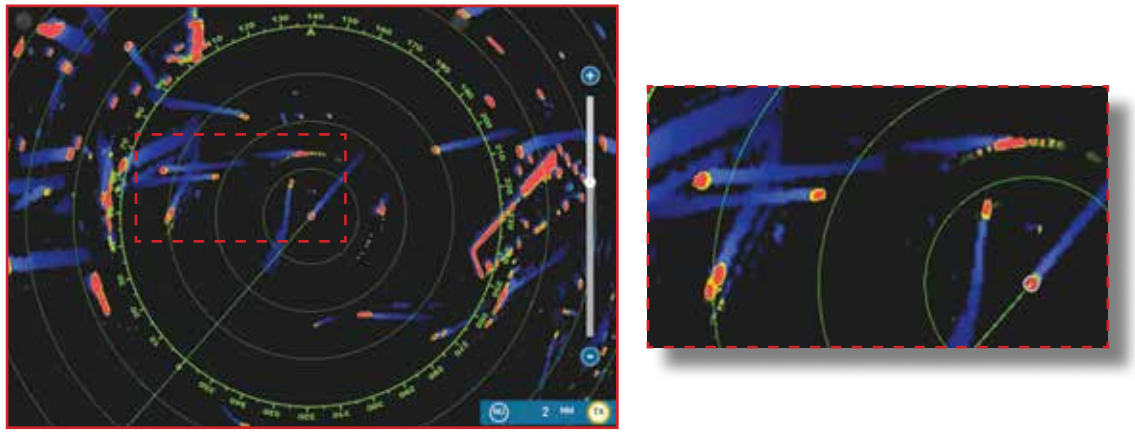
Revolutionary Baseline Architecture!

Utilizing four separate GNSS Antennas for the ultimate in responsiveness, the SCX20 and SCX21 set a new standard for reliable and accurate heading for all of your marine electronics. Traditionally, a Satellite Compass™ uses one baseline between two antennas to calculate heading. The SCX20/21's four antennas can calculate heading information using any one of the six baselines drawn between the four antennas. The unprecedented quad-antenna design of the SCX20 and SCX21 makes them capable of calculating extremely accurate heading, pitch, roll, and heave information. They are the perfect heading solution for complex vessel installations where the view of satellites may sometimes be obstructed.



True Motion Echo Trails for Radar/Chart Plotters

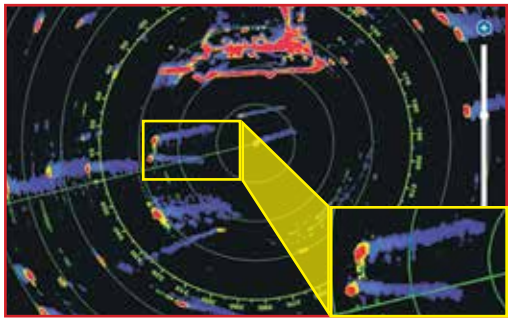
True echo trails are available when the SCX20 or SCX21 is connected to a capable Furuno Radar, helping to determine own ship's movement as well as the movement of other vessels. Accurate speed and heading data ensures that target trails are displayed smoothly and accurately, without the jagged, zig-zag appearance common to a Satellite Compass™ with a higher degree of deviation.



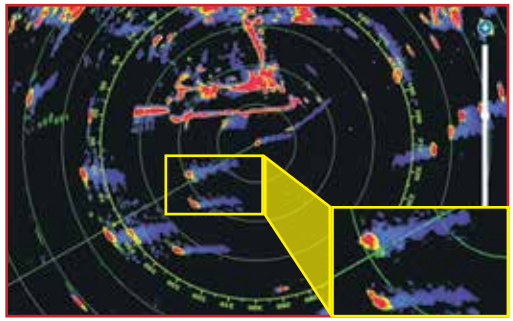
Radar Echo Trail Zig-Zag Domination

When connected to the SCX20/21, the Radar's echo trails hold steady and clearly depict an accurate echo trail thanks to the SCX20/21's amazing accuracy. Company A's Satellite Compass fails to uphold a steady heading, making echo trails virtually unintelligible. Company B's heading accuracy fluctuates by +/- 3˚ with a slower update, causing an echo trail that has a wide zig-zag pattern. Company C's heading accuracy fluctuates by +/- 5˚ with a faster update, causing an echo trail that is indistinguishable and confusing.

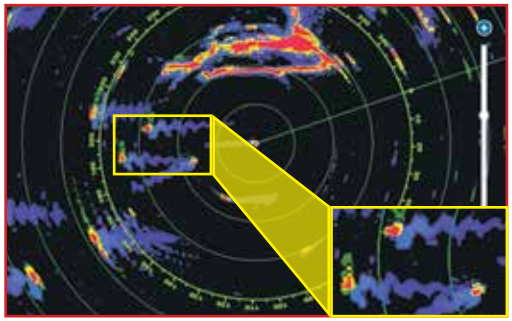
FURUNO SCX20/21



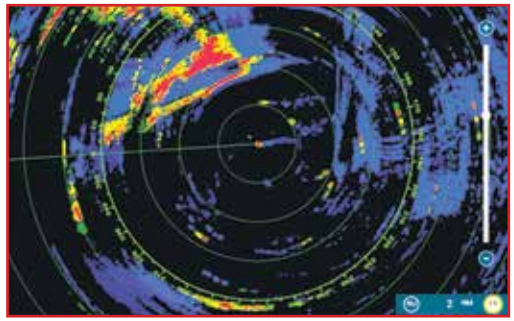
Company B



Company C



Company A



MORE ACCURATE SCX20/21 < COMPANY B < COMPANY C < COMPANY A **LESS ACCURATE**

Satellite Compasses

CAN bus | NMEA2000 Certified | NMEA 2018-2019 | NAVnet Connect

Model SC33

▸▸▸Spec P129

NMEA2000 Dome Satellite Compass™

KEY FEATURES:

- Heading accuracy of 0.4°
- 3-Axis speed monitoring
- NMEA2000 Certified
- NavNet TZtouch2/TZtouch3 Series compatibility
- Multi-GNSS with GPS, Galileo, GLONASS, QZSS satellite network
- Strong against multi-path offering high-reliability
- Works perfectly with TimeZero software
- Free from regular maintenance due to solid-state design

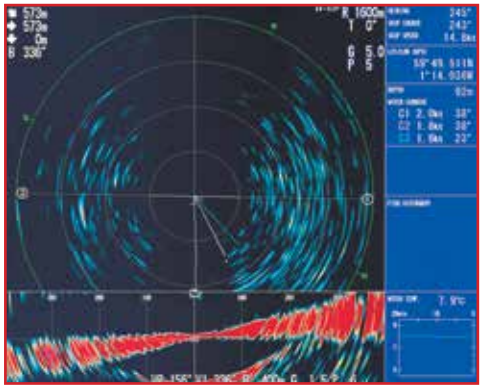
MODEL	SC33
Heading Accuracy	0.4˚
GPS Fix	10 m (95%)
GNSS Fix	3 m (95%)
Follow-up Rate	45˚/sec
Setting Time	1 min
Antenna Unit	Dome

Sleek, Fast, and Accurate!

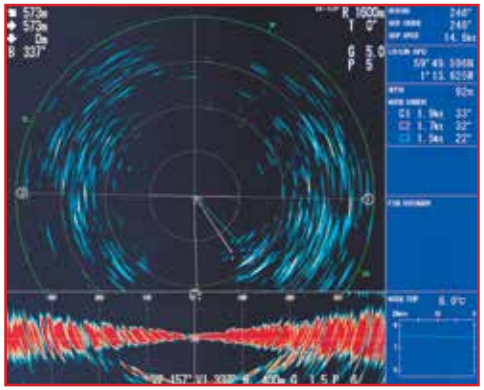
The SC33 Satellite Compass™ provides highly accurate heading information for navigation equipment such as Radar, Plotter, Autopilot, Fish Finder, and Sonar. With its compact GNSS antenna and built-in processor, it can be used for a wide variety of applications on any type of vessel. This all-in-one system delivers incredibly accurate heading, roll/pitch/heave, GPS position, SOG (Speed Over Ground), COG (Course Over Ground), and ROT (Rate of Turn) data.

Revolutionary 2-Antenna and Rate Sensor System

In order to calculate roll & pitch data, a Satellite Compass™ requires two vectors. The SC33 employs a dual GNSS antenna system that calculates a single vector while a 3-axis rate gyro and acceleration sensors add the second vector. This configuration enables the SC33 to calculate highly-accurate roll and pitch data without using a third sensor.



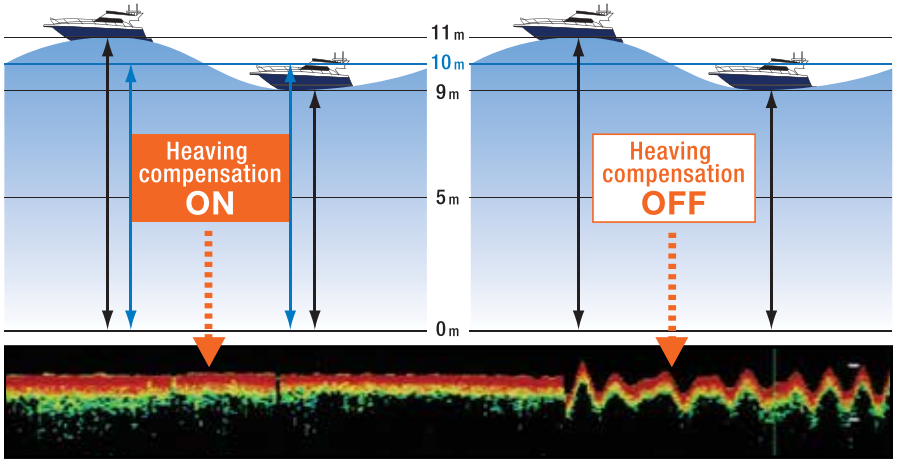
BEFORE Stabilization



AFTER Stabilization

Heaving Compensation for Fish Finders

Even in heavy seas, accurate heave compensation from the SC33 enables Fish Finders, such as the FCV1150 or NavNet TZtouch2/TZtouch3, to show you an unwavering presentation of the seabed, without the undulations caused by sea conditions.



Satellite Compasses

Model SC70

Spec P129

Satellite Compass™

Model SC130

Spec P129

Satellite Compass™

KEY FEATURES:

- Precision antenna that provides highly-accurate heading for all your vessel's navigation electronics: Autopilot, Radar, ARPA, Scanning Sonar, Current Indicator, Chart Plotter, ECDIS, Autopilot, and more
- Utilizes GNSS such as GPS, Galileo, and GLONASS for high precision
  - SBAS (Satellite Based Augmentation System) compatible (EGNOS, WAAS, MSAS)
- Provides precise data for SOG, COG, ROT, and L/L
- Speed on 3-axis (bow, stern, and longitudinal) for safe navigation and berthing
- IMO type-approved as THD, GPS, and ROTI compliant with IEC and ISO standards
- Rapid follow-up rate of 40°/s (twice the IMO high speed craft requirement of 20°/s)
- Maintenance free and no recurring costs, as there are no mechanical parts
- Super short attitude fixing time - 90 sec (dependent on equipment location)
- Easy to retrofit when using existing antenna cabling[1] (For SC50/55/60/110/120)
- Precision Pitch/Roll data in Analog[2] and Digital formats for Vessel Stabilization, Sonar, etc.
- Full screen ROT Swing Meter for easy readout

[1]: Requires the LAN_CNV kit, available as an optional extra
[2]: Requires the IF-NMEASC, available as an optional extra

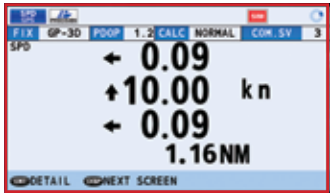
MODEL	SC70	SC130
Heading Accuracy	0.4˚ rms	0.25˚ rms
GPS Fix	10 m approx.	
DGPS Fix	5 m approx.	
WAAS Fix	3 m approx.	
Follow-up Rate	0.1˚/s, 0.01˚/s, or 0.001˚/s Rate-of-Turn (From Menu)	
Setting Time	3 mins	4 mins
Antenna Unit	Dome	Open

Bow & Stern Monitoring for Safe Berthing

The Satellite Compass™ provides a variety of data, including GPS Position, SOG (Speed Over Ground), COG (Course Over Ground), ROT (Rate Of Turn), and 3-axis speed (bow, stern, and longitudinal). All of this data assists with critical maneuvers, such as berthing. The Satellite Compass™ is maintenance-free - a great asset for any vessel - and connects easily into the existing shipboard network via Ethernet connection.

GPS Integrity Mode

Navigational Data



Speed Mode

Model PG700

Spec P127

Integrated Heading Sensor

KEY FEATURES:

- Provides highly-accurate heading data
- Black Box type fluxgate magnetic sensor
- CAN bus interface incorporated
- Can be mounted on either the bulkhead or the floor, thanks to the standard L-bracket

CAN bus

NAVnet Connect

Easy Mounting with L-Bracket

PG700 can be mounted on either a bulkhead or the deck using the standard L-bracket. Thanks to the versatility in design, facing the PG700 towards the bow is a breeze.

Model PG500R

Spec P127

Integrated Heading Sensor

KEY FEATURES:

- Inexpensive heading sensor with the highest accuracy and stability in this class of equipment
- Automatic correction for local magnetic variation with an appropriate GPS Navigator or manual correction with an optional Remote Display RD33
- High stability for a solid-state rate gyroscope
- Compact waterproof housing with visible status indicators for simple installation
- Three heading data output ports: two IEC/NMEA0183 ports, one AD-10 port incorporated

NAVnet Connect

Maintenance-Free Heading Solution

Furuno's PG500R is a rate compensated heading sensor that incorporates innovative electromagnetic compass technology for highly-accurate and stable readouts of your ship's heading. The sensor detects terrestrial magnetism and produces compass data that can be utilized in NMEA0183 and Furuno AD-10 formats. Typical applications include true Radar echo trail and true motion, Autopilots, Chart Plotters, scanning Sonars and more. These sophisticated components are contained within a rugged, compact case. Unique design elements make the PG500R virtually maintenance-free and easy to install.

© Jérome Kélagopian

Model FA40

▸▸▸Spec P130

AIS Receiver

KEY FEATURES:

- Enhances safe navigation by receiving critical navigation information from local AIS-equipped vessels
- NMEA2000 output to NavNet TZtouch MFDs and compatible devices
- Serial output for integration with various Radars, Chart Plotters, Radios, and PCs for added redundancy and installation flexibility
- Compatible with NavNet TZtouch2/TZtouch3

All-Condition Collision Avoidance

The FA40 Automatic Identification System (AIS) Receiver provides real-time information about AIS-equipped vessels to your NavNet, AIS-ready Chart Plotter, navigation software, or Radar. The information is graphically presented allowing you to monitor and avoid AIS-equipped vessels in your area. The information the FA40 receives includes the vessel name and call sign, position, course, speed over ground, and other useful information. Since AIS targets can be received even if they are not within line of sight, the FA40 enhances situational awareness in congested waterways, limited visibility, or heavy sea conditions, and gives the navigator much more information about AIS equipped vessels.

The FA40 has one NMEA2000 and one NMEA0183 port. This provides simple and easy connection to NavNet systems, AIS-capable Radar, Chart Plotters, and TimeZero. The FA40 will work with virtually any marine VHF antenna. An optional VHF signal splitter is offered to allow the FA40 to work with an existing VHF radio antenna installation.

Model FA70

▸▸▸Spec P130

Class B+ AIS Transceiver

KEY FEATURES:

- Fully satisfies the technical standards for Class-B AIS, IEC 62287-1
- Receives both Class-A and Class-B AIS information
- Outputs data to NavNet TZtouch2/TZtouch3
- Flexible integration with various AIS-compatible Radar and Chart Plotters
- Switchable, high-speed SO-TDMA and CS-TDMA
- Internal Antenna Splitter

NAVnet Connect · NMEA2000 Certified · NMEA 0183

Accurate Information Exchange

The FA70 is a Class-B+ AIS that transmits your vessel information at higher power & faster rates than typical Class B units for added awareness. SO-TDMA and CS-TDMA guarantees an AIS time slot allocation, making you visible in congested waters. It complies with IMO MSC.140(76) Annex 3, A.694, ITU-R M.1371-2 and DSC ITU-R M.825-3. It also complies with IEC 60945 (EMC and environmental conditions). The FA70 consists of a transponder unit with GPS antenna. A VHF antenna is required and should be supplied separately. The transponder contains a VHF transmitter, two TDMA receivers on two parallel VHF channels, interface, communication processor, and internal GPS receiver. The internal GPS is a 12-channel all-in-view receiver with differential capability. It also gives position, COG, and SOG.

Model FA170

▸▸▸Spec P130

Class A AIS Transponder

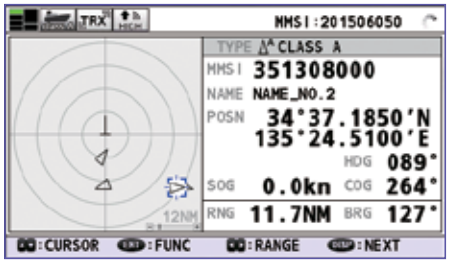
KEY FEATURES:

- Complies with IMO MSC.74(69) Annex 3, IMO MSC.302(87), A694, ITU-R M. 1371-5 and DSC ITU-R M.825; It also complies with IEC 61993-2 (Type testing standard) and IEC 60945 Ed. 4 (EMC and environmental conditions)
- Displays information about AIS-equipped ships, as well as coastal stations and Aids to Navigations within VHF coverage
- Outputs AIS data to NavNet TZtouch/TZtouch2/TZtouch3, Radar, and other navigational equipment for collision avoidance support

NAVnet Connect · NMEA 2018-2019

Collision Avoidance Made Easy!

Displays symbols for AIS-equipped ships, base stations, AIS-SART's and more. When you select a specific target, the information about the ship such, as MMSI (or name, when available), heading, SOG, COG, and more, are displayed.



- Own ship symbol
- Target
- Selected target
- Aid to Navigation (physical)
- Aid to Navigation (physical)
- Aid to Navigation (virtual)
- AIS-SART/AIS MOB/EPIRB-AIS
- SAR aircraft
- SAR vessel

Communications

*FM4800 only

Model FM4800

Spec P131

Marine VHF Radiotelephone with built-in AIS Receiver

Model FM4850

Spec P131

Black Box Marine VHF Radiotelephone with built-in AIS Receiver

KEY FEATURES:

- Built-in AIS Receiver for situational awareness and collision avoidance
- Built-in 72 channel GPS Receiver (FM4800)
- 25 W/1 W output power
- Class D DSC with Distress, Individual, and All Ship calls
- 30 W PA/Loud Hailer with automatic fog signals and listen back
- NMEA2000 and NMEA0183 networking
- ATIS mode available for inland waterways
- Pre-programmed frequency band for USA, Canada, and International marine channels, plus 10 weather channels where available
- Initiate DSC calls directly from NavNet TZtouch2/TZtouch3 Series MFDs when connected via NMEA2000
- Dual Station with optional handset
- Up to 3 Handsets/Speakers connectable (FM4850)
- Water protected (Transceiver, Microphone and Handset all IP67)

Built-In GPS (FM4800)

Built-in Hi-Sensitivity 72 channel GPS with internal antenna which eliminates the need for an external GPS antenna and its wiring requirements.

Built-In AIS Receiver

When connected to an MFD or chart plotter that can read and display AIS data, the built-in AIS Receiver will enhance your safety at sea by providing vital information for situational awareness and collision avoidance.

Optional Speaker SP-4800

Optional Handset 001-523-260-00

Loud Hailer/Fog Horn

15 W/30 W max. PA/Loud Hailer having 8 automatic fog/warning signals and a listen-back capability allowing for two-way communication.

Dual Station

The optional Handset (001-523-260-00) supports all the functionality of the FM4800 and works as a second station. Intercom function is also supported.

Model FM8900S

▸▸▸Spec P132

VHF Radiotelephone (simplex/semi-duplex)

KEY FEATURES:

- Semi-duplex 25 W VHF Radiotelephone with built-in Class A DSC and CH70 watchkeeping receiver
- Fully meets GMDSS Class A carriage requirements for SOLAS ships
- Meets the ITU recommendation on digital selective calling system for use in the Maritime Mobile Service, ITU-R M.493-14 or later
- Easy to read, high-contrast 4.3" bright color LCD
- Improved noise reduction and speaker for superb voice quality
- Quick access to CH16: Press the CH16 key on the keypad to switch to Radiotelephone display and select CH16 instantly
- Easy channel selection with rotary control or direct keypad input
- Automatic entry of own ship position and time through an interfaced GPS receiver
- ATIS signal transmission available for inland waterways
- Replay of the latest received voice call, which is automatically recorded, for 120 seconds
- Offers a wide variety of indoor and waterproof remote station options

GMDSS

Model FS1575/2575

▸▸▸Spec P133

MF/HF Radiotelephone

KEY FEATURES:

- FS1575 150 W MF/HF Radio
- FS2575 250 W MF/HF Radio
- MF/HF Radiotelephone with DSC facility
- Fully meets GMDSS carriage requirements for SOLAS ships operating in A3 and A4 sea areas
- Meets the new ITU recommendation on digital selective calling system for use in the Maritime Mobile Service, ITU-R M.493-14
- High-contrast 4.3" bright color LCD (480 x 272 pixels)
- Capable of distress, safety, and routine communication
- Instant selection of 256 user-specified channels with a rotary knob or direct keypad input
- Quick access to DSC message composition using dedicated keys on the control unit
- Quick access to dedicated functions in the menu operation using numeric keypad
- Offers a wide variety of indoor and waterproof remote station options

GMDSS

Communications

Optional Intercom

Model LH5000

▸▸▸Spec P134

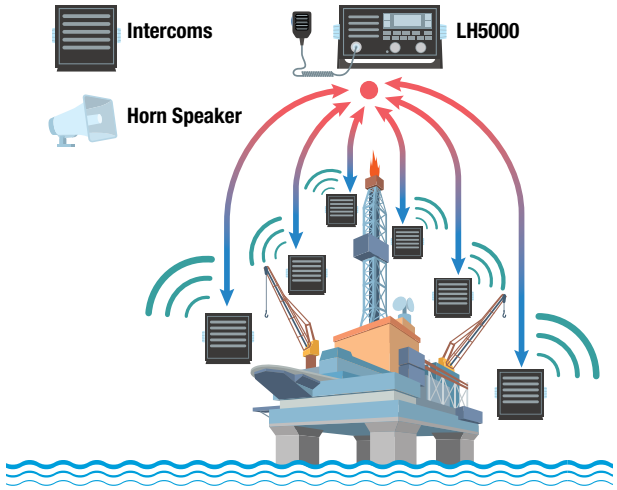
Loud Hailer

KEY FEATURES:

- Two powerful 30 W hailer outputs (1 forward/1 aft)
- Listen Back feature for two-way communication
- Eight automatic fog/warning signals
- Up to 6 intercoms for onboard communication and PA (5 W each)
- Built-in high-quality speaker
- Bright LCD for easy operation
- Flush mount capability
- Water protected main unit, microphone and intercoms speakers

8 Channel Public Announcement

With 2 hailers and 6 intercoms providing a total of 8 possible channels, you can now coordinate any action even on a big ship or facility.



Model NX300

Spec P134

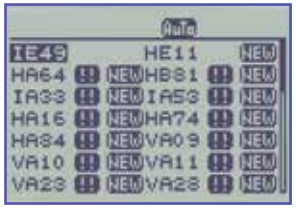
NAVTEX Receiver

KEY FEATURES:

- Paper-free Navtex Receiver
- Selectable frequency for both international and domestic/local Navtex messages
- Uninterrupted reception of Navtex messages
- Memory for up to 28,000 characters
- High contrast 4.5” Silver Bright LCD
- Nav data display when connected to external GPS
- Automatic selection of the Navtex station according to position when connected to external GPS
- Low power consumption
- Memory backup with long-life lithium battery

Maintain Situational Awareness

Monitor navigational warnings, meteorological warnings, search and rescue information, and other data for ships sailing within 200-400 N.M. of shore.



Message List

Nav Data

A	**Navigation warning**
B	**Meteorological warning**
C	**Ice report**
D	**Search/Rescue Info/Piracy & Armed Robbery**
E	**Meteorological forecast**
F	**Pilot message**
G	**AIS service message**
H	**Loran-C message**
I	**Reserved - presently not used**
J	**Differential omega message**
K	**Other electronic navigational aid and system message**
L	**Navigational warning (additional)**
M-Y	**Reserved – presently not used**
V	**Notice to Fishermen (US only)**
Z	**QRU (no message on hand)**

Model FAX30

Spec P135

Black Box Weather Facsimile Receiver

KEY FEATURES:

- Cost effective paperless weather fax and Navtex Receiver
- Connect directly to a NavNet display or through an Ethernet hub
- Connect to a PC equipped with Ethernet
- Selectable display colors: 8 gray tones, monochrome, blue shades, pink and black, red and blue
- Web browser navigation on PC, no proprietary software required
- Print images and messages from PC and printer
- Store a maximum of 12 weather fax images (depending on file size)
- Navtex messages can be retrieved in a table listing of up to 130 stored files
- Stored images/messages can be shown at any time
- 320 user programmed channels
- Noise rejection for clear image
- Thumbnail view for easy selection of stored images

BlackBox NAVnet Connect

Connect via PC or NavNet Display

Furuno’s FAX30 is a Black Box unit that connects directly to a NavNet display or an Ethernet hub with a single Ethernet cable. If it is connected to an Ethernet hub that has multiple NavNet displays attached, each of those displays will have access to the FAX30. On a PC, the images and information are displayed by simply using a web browser. There is no complicated proprietary software to install or learn. Combine the new FAX30 with NavNet’s true color Radar and you have the ultimate in weather tracking.

PC not supplied

Communications

Model FELCOM251

▸▸▸Spec P136

INMARSAT FleetBroadband

Model FELCOM501

▸▸▸Spec P136

INMARSAT FleetBroadband

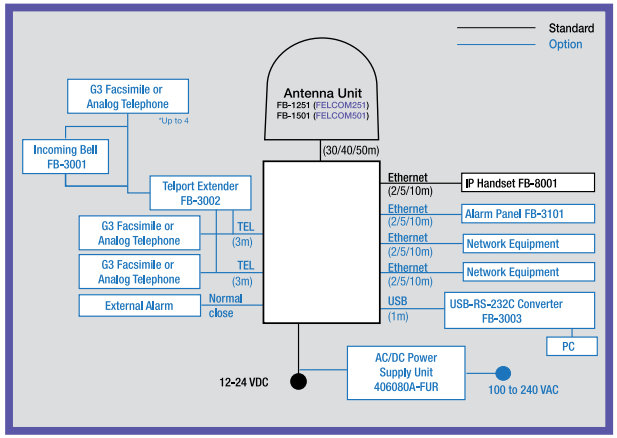
KEY FEATURES:

- IP handsets and Incoming Bell (FB3001 option) can be integrated through Ethernet; Multiple IP handsets can be incorporated into the network using the switching hub
- IP-PBX incorporated; Comprehensive selection of telephone exchange functions available, i.e., internal communication lines, incoming call routing, group call function, etc.
- Built-in NAT router facilitates smooth network integration to the Internet
- Wide variety of security settings available, i.e., firewall, IP filter, etc.
- No dedicated software required for configuration setup (web server function incorporated);
  Configuration setup can be done using a web browser
- Supports PPPoE to facilitate automatic dial-up connection/disconnection via applications

Equipment List:

MODEL	FELCOM251	FELCOM501
Standard		
1. Antenna Unit	FB1251	FB1501
2. Communication Unit	FB2001	
3. IP Handset	FB8001	
Option		
Incoming Bell	FB3001	
Analog Telephone	GEMINI 9333B4	
G3 FAX	FAX2840JP/2840	
AC/DC Power Supply Unit	406080A-FUR-001	

Fleet Broadband System Configuration



A vessel needs to notify Inmarsat Satellite of which spot beam area the vessel is located in. This way, the Inmarsat Satellite can transmit the spot beam to the vessel's location.

INMARSAT FleetBroadband	
Max. Communication Speed	up to 432 kbps (FELCOM501) up to 284 kbps (FELCOM251)
Voice	available
FAX	available (3.1 k audio)
SMS	available
Service area	Global coverage (with exception of extreme polar regions)
Billing	pay-as-you-go

Ku-Band	
Max. Communication Speed	Up to 4 Mbps*
Voice	Available (VoIP)
Service area	Regional coverage provided by multiple service providers (seamless roaming possible without any roaming surcharge)
Billing	Fixed Flat Fee

* For faster service, consult with your nearest distributors.

inmarsat

SafeComNet™
FURUNO Mobile Satellite Services

Stay connected through SafeComNet™
Seamless broadband communications for ocean-going fleets

LCR (Least Cost Routing)

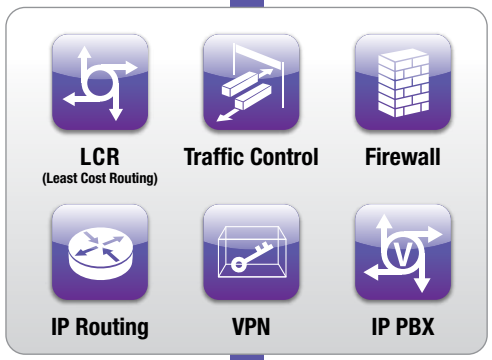
LCR is the process of selecting the path of communications traffic based on cost, allowing for automatic selection of the most cost-efficient communication line available. It is possible to set VSAT, which is charged by monthly fixed flat rate, as the default communication means, and switch over to "pay-as-you-go" FleetBroadband whenever the VSAT line is out. This way, total cost for communication can be reduced.

Traffic Control

Traffic control is the control of onboard network traffic to optimize performance of communication. This can be achieved by setting order of priority for data to be handled (Quality of Service: QoS), and restricting the volume of communication at a time, and applications to be used, as well as access to certain content.

Firewall

A firewall is designed to permit or deny network transmissions to protect networks against unauthorized access by malware from the public Internet, i.e., computer viruses and keyloggers, while permitting legitimate communications to pass.



Onboard LAN Network

IP Routing

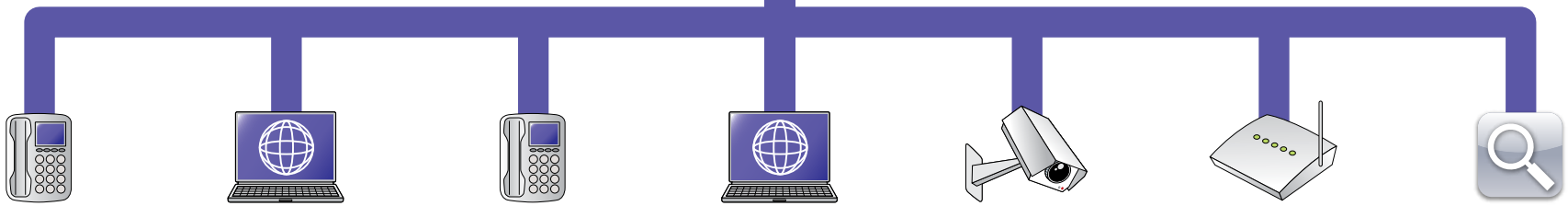
IP routing is a set of protocols to facilitate IP connection between onboard network and the public Internet.

VPN

VPN (Virtual Private Network) is a secure way of connecting to onshore office network from a remote location, using the Internet. Since encryption is applied to the communication, the network data packets can be transported privately, preventing unauthorized users from reading the private network packets. This way, the same network environment as onshore offices can be constructed onboard vessels. Compared with using exclusive circuit services to construct secure network between vessels and onshore offices, VPN has the advantage of reducing communication cost.

IP PBX

IP PBX is a PBX for IP telephones utilizing IP network, unlike PABX commonly used for analog telephone network. The system is designed to interoperate with the conventional PABX, onboard public addresser system as well as VoIP of Inmarsat and VSAT.



Specifications

Subject to change without notice.

NavNet Series 86
Radar 96
GPS/Chart Plotter 107
Fish Finder 113
Sonar 117
Multibeam Sonar 120
Autopilot 121
Instrument 123
Monitors 125
Remote Display 127
Compass 127
Communications 131

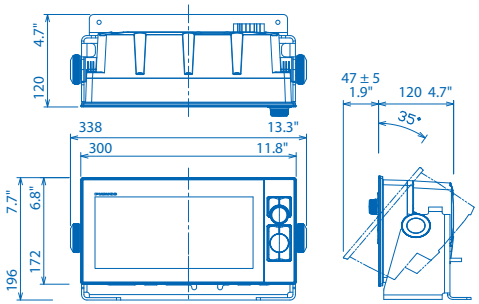
NavNet TZtouch3 MFDs						
MODEL	**TZT9F**	**TZT12F**	**TZT16F**	**TZT19F**	**TZT22X**	**TZT24X**
DISPLAY UNIT						
Type	Color TFT multi touch IPS LCD					
Screen Size	9" Wide	12.1" Wide	15.6" Wide	18.5" Wide	21.5" Wide	24" Wide
Screen Resolution	WXGA 1280 x 720	WXGA 1280 x 800	FHD 1920 x 1080	FHD 1920 x 1080	FHD 1920 x 1080	FHD 1920 x 1080
Screen Brightness	1000 cd/m2 (typical)	900 cd/m2 (typical)	1000 cd/m2 (typical)	900 cd/m2 (typical)	1000 cd/m2 (typical)	
Display Colors	16,770,000 colors (Chart Plotter), 64 colors (Radar/Fish Finder)					
Language	Bulgarian, Chinese, Danish, English (USA/UK), Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Russian, Spanish, Swedish					
GPS/WAAS						
Receiver Type	GPS: 72 channels, SBAS: 1 channel (C/A mode, WAAS)			-	-	-
Receiving Frequency	L1 (1575.42 MHz)			-	-	-
Time to First Fix	100 s (cold start)			-	-	-
Accuracy	10 m (GPS), 7 m (MSAS), 3 m (WAAS)			-	-	-
Position Update Interval	100 ms or 10 Hz			-	-	-
CHART PLOTTER						
Cartography	MapMedia mm3d chart (C-MAP/NOAA) and CMOR capable (U.S. only)					
Memory Capacity	30,000 user points, 100,000 points for ship's tracks, 200 planned routes (500 points per route)					
Alarms	Anchor Watch, XTE, Depth*, Speed, Sea Surface Temperature*, Trip Distance, Fuel Gauge* (*external data required)					
RADAR						
Display Modes	Head-up, North-up* *Heading input required.					
Echo Trails	Interval: 15 s, 30 s, 1 min, 3 mins, 6 mins, 15 mins, 30 mins and continuous (Heading input required)					
Target Tracking	100 ARPA Targets (Radar dependent) with fully automatic target acquisition (Heading input required)					
Radar Alarms	Guard Zone, CPA/TCPA, Trigger, Video, Azimuth, Heading Line					
FISH FINDER						
Transmit Frequency*	CW: 50/200 kHz, CHIRP: 40 kHz to 225 kHz *TZT9F Single-Channel CHIRP only				-	-
Transducer	300/600 W or 1 kW* *Matching box MB1100 required for some transducers.				-	-
Display Range	2 to 1,200 m; shift 0 to 1,200 m					
Extension Mode	ACCU-FISH™, A-Scope, Auto (Fishing/Cruising), RezBoost™, Bottom Discrimination, TruEcho CHIRP™ with compatible transducer					
Picture Advance	8 steps: x4, x2, x1, 1/2, 1/4, 1/8, 1/16, stop					
Fish Finder Alarms	School of fish, School of fish for bottom lock					
SIDE-SCAN						
Transmit Frequency*	-	CHIRP 220-240 kHz			-	
Transducer	-	150W each side - Thru Hull 225T-SS904, Transom Mount 225T-TM90, Paired Thur Hull 225T-PR904			-	
Display Range	750 feet to each side					
Display Colors	Green, Blue, Amber, White					
Display Screen Sizes	Full Screen, 1/2 Screen, 1/4 Screen				Full Screen, 1/2 Screen, 1/4 Screen, 1/6 Screen	
Direct Connect to MFD	Direct connect to TZT12F, TZT16F, TZT19F only; may be networked with TZT9F/TZT22X/TZT24X/TZT2BB					
INTERFACE						
NMEA2000	1 Port					
Input	065280, 126992/993/996, 127237/245/251/257/488/489/505, 128259/267, 129025/026/029/330/038/039/040/041/291/538/540, 129793/794/798/801/802/808/809/810, 130306/310/311/312/313/314/316/577/578, 130817/818/820/822/823/826/827/828/880					
Output	126992/993/996, 127250/251/257/258, 128259/267/275, 129025/026/029/033/283/284/285, 130306/310/311/312/313/314/316					
NMEA0183	1 Serial Output Port					
Output	AAM, APB, BOD, DBT, DPT, GGA, GLL, GNS, GSA, GSV, RMB, RMC, RTE, TTM, VDM, VTG, WPL, XTE, ZDA					
LAN	1 Port (100 BASE-TX)	2 Ports (100 BASE-TX)			1 Port (100 BASE-TX)	
USB	1 Port (USB 2.0) for control unit	1 Port (USB2.0) for touch monitor and control unit	1 Port (USB 2.0) for touch monitor and control unit: 1 Port USB output			
Video I/O	-	Input: 2 Ports (NTSC/PAL) Output: 1 Port (HDMI 720p)	Input: 2 ports (NTSC/PAL) and 1 port HDMI 1920 x 1080p or less (progressive only) Output: 1 port (HDMI 1080p)		Input: 1 port (NTSC/PAL) and 1 port HDMI 1920 x 1080p or less (progressive only) Output: 1 port (HDMI 1080p)	
AUX I/O	2 Ports (Event Switch and External Power Switch)					
SD Card Slot	1 Slot (Micro SDXC, rear)					
Wireless LAN	IEEE802.11b/g/n, Transmit frequency: 2.412 to 2,462 GHz, 11dBm max					
Transducer Connection	1 Port x MJ10 pin	1 Port x MJ12 pin for transducers, 1 Port x MJ7 pin for DI-FFAMP			-	-
ENVIRONMENT						
Temperature (IEC60945)	-15°C to +55° C					
Relative Humidity	93% or less at +40° C					
Waterproofing	IP56					
POWER						
	12-24 VDC					
	2.6 - 1.3 A	2.3 - 1.2 A	4.3 - 2.2 A	4.7 - 2.3 A	TBD	TBD

Drawings - NavNet TZtouch3

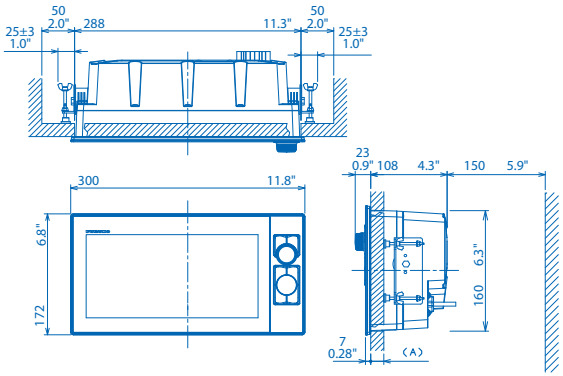
Refer to Online manual for more details. For illustration purposes only; not drawn to scale. *Bracket is optional

TZT9F

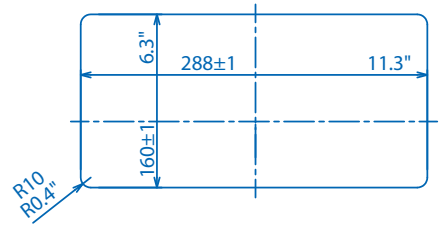
Multi Function Display (Tabletop Mount) TZT9F* 3.5 kg 7.7 lb



Multi Function Display (Flush Mount) TZT9F 3.3 kg 7.3 lb

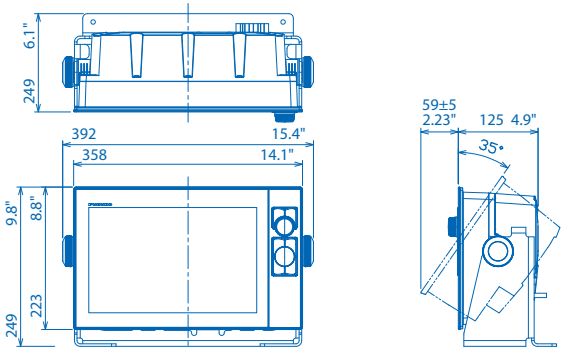


Multi Function Display Flush Mount TZT9F Cutout Dimension

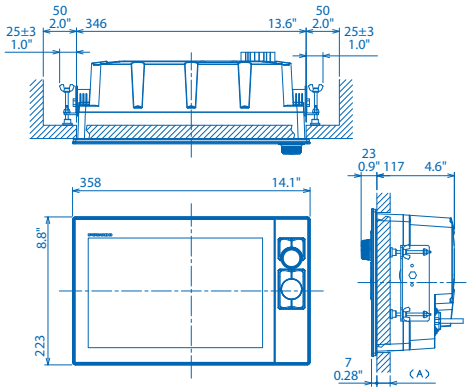


TZT12F

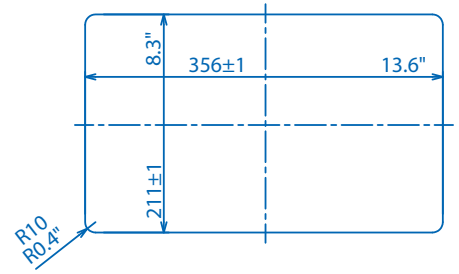
Multi Function Display (Tabletop Mount) TZT12F* 5.6 kg 12.3 lb



Multi Function Display (Flush Mount) TZT12F 5.1 kg 11.2 lb

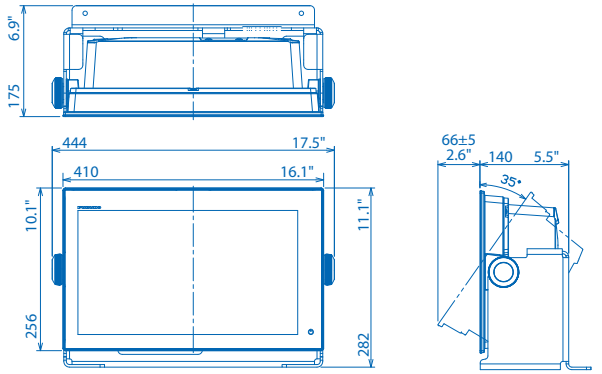


Multi Function Display Flush Mount TZT12F Cutout Dimension

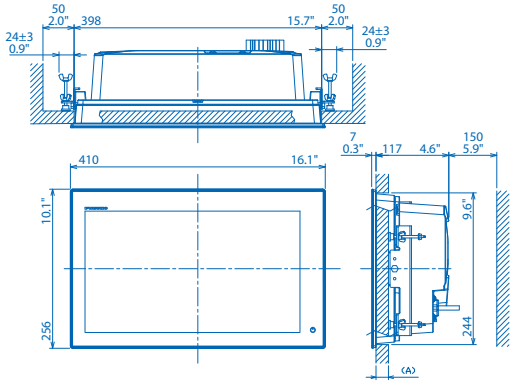


TZT16F

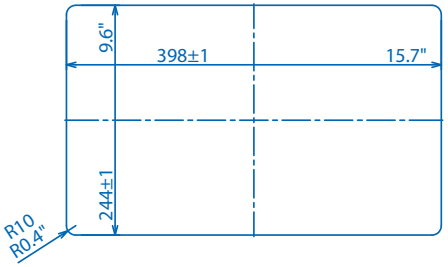
Multi Function Display (Tabletop Mount) TZT16F* 6.7 kg 14.7 lb



Multi Function Display (Flush Mount) TZT16F 5.9 kg 13.0 lb



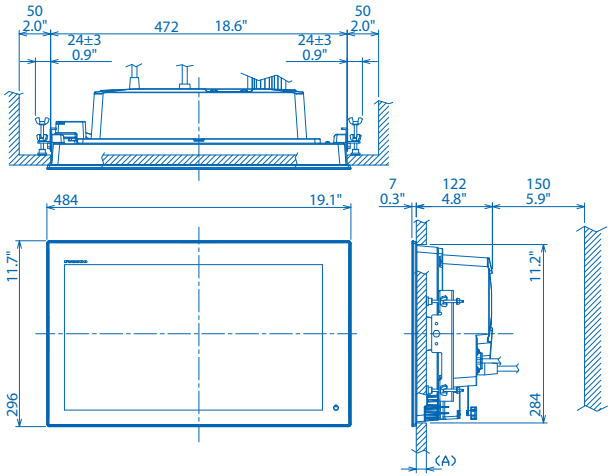
Multi Function Display Flush Mount TZT16F Cutout Dimension



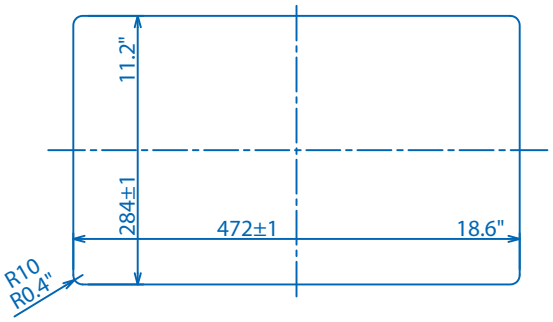
Drawings - NavNet TZtouch3 Continued

TZT19F

Multi Function Display (Flush Mount) TZT19F 7.8 kg 17.2 lb

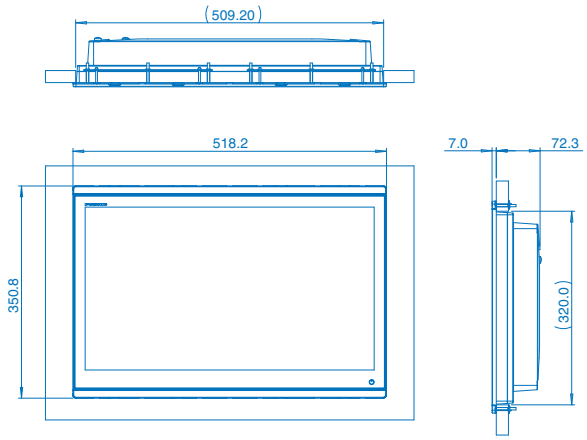


Multi Function Display Flush Mount TZT19F Cutout Dimension

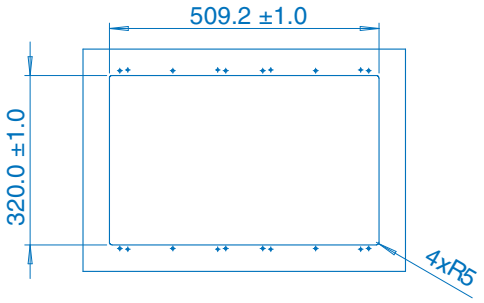


TZT22X

Multi Function Display (Flush Mount) TZT22X 5.9 kg 13.0 lb

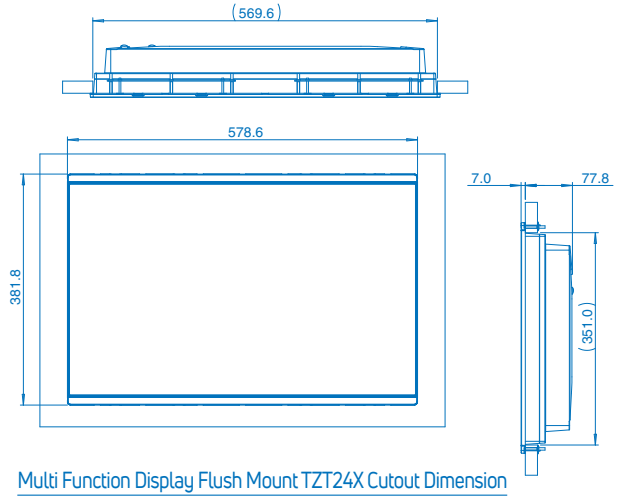


Multi Function Display Flush Mount TZT22X Cutout Dimension

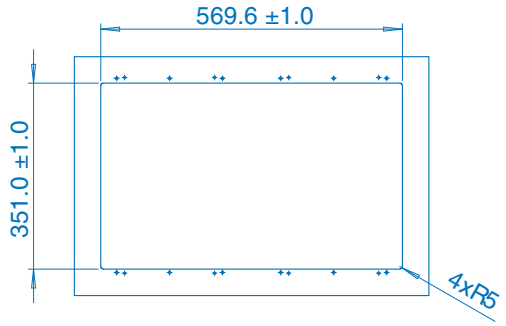


TZT24X

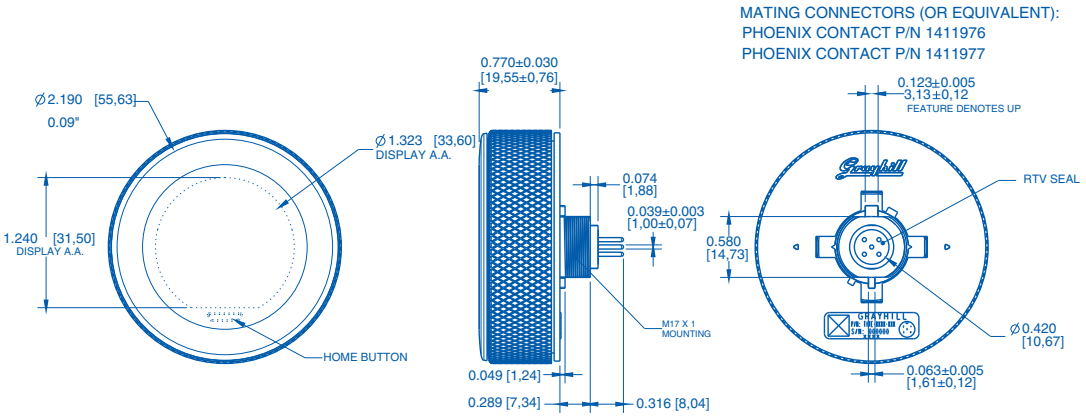
Multi Function Display (Flush Mount) TZT24X 8.35 kg 18.4 lb



Multi Function Display Flush Mount TZT24X Cutout Dimension



Touch Encoder Unit TEU001B/S (option, U.S. and Canada only) 0.12 kg 0.26 lb



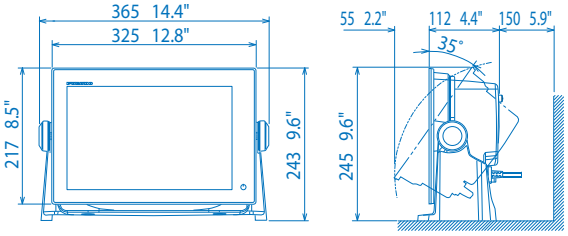
NavNet TZtouch2 MFDs			
MODEL	**TZTL12F**	**TZTL15F**	**TZT2BB**
DISPLAY UNIT			
Type	Color TFT multi touch LCD		Requires optional color LCD, Recommended color LCD with touch panel control
Screen Size	12.1" Wide	15.6" Wide	Dependent upon display selected
Screen Resolution	WXGA 1280 x 800	FWXGA 1366 x 768	FHD 1920 x 1080 (recommended), XGA 1024 x 768, SXGA 1280 x 1024
Screen Brightness	1300 cd/m2 (typical)	1000 cd/m2 (typical)	Dependent upon display selected
Signal Interface	-	-	Picture: HDMI, Extended HDCP Touch Panel: USB 2.0, Windows® 7 multi-touch
Language	Chinese, Danish, English (USA/UK), Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Russian, Spanish, Swedish		
GPS/WAAS			
Receiver Type	GPS: 56 channels, SBAS: 1 channel (C/A mode, WAAS)		-
Receiving Frequency	L1 (1575.42 MHz)		-
Time to First Fix	100 s (cold start)		-
Tracking Velocity	999 kn		-
SBAS	WAAS, EGNOS, MSAS		-
ACCURACY			
Internal Antenna	GPS: 10 m Max, WAAS: 3 m Max, MSAS: 7 m Max		-
CHART PLOTTER			
Cartography	MapMedia mm3d chart (C-MAP/NOAA) and CMOR capable (U.S. only)		
Memory Capacity	30,000 user points, 30,000 points for ship's tracks, 200 planned routes (500 points per route)		
Alarms	Anchor Watch, XTE, Proximity, Depth, Temperature, Speed, etc.		
RADAR			
Display Modes	Head-up, North-up* *Heading input required.		
Echo Trail	Interval: 15 s, 30 s, 1 min, 3 mins, 6 mins, 15 mins, 30 mins and continuous (heading input required)		
Target Tracking	30 Targets*, 100 Targets* (NXT or X-Class) *Heading input required.		
FISH FINDER			
Transmit Frequency	50/200 kHz		
Transducer	600 W or 1 kW* *Matching box MB1100 required for some FURUNO transducers.		
Display Range	2-1, 200 m, shift: 0-500 m		
Extension Mode	RezBoost™*, ACCU-FISH™*, Bottom Discrimination*, A-Scope, Auto (Fishing/Cruising), Bottom Zoom, Bottom Lock *Compatible transducer required		
Picture Advance	8 steps: x4, x2, x1, 1/2, 1/4, 1/8, 1/16, stop		
INTERFACE			
NMEA2000	1 Port		
Input	059392, 059904, 061184, 060928, 065280, 126208, 126720, 126992, 126996, 127237, 127245, 127250, 127251, 127257, 127258, 127488, 127489, 127505, 128259, 127267, 129025, 129026, 126029, 126033, 126038, 126039, 126040, 126041, 126291, 126538, 126540, 129793, 129794, 129798, 129801, 129802, 129808, 129809, 129810, 130306, 130310, 130311, 130312, 130313, 130314, 130316, 130577, 130578, 130817, 130818, 130820, 130822, 130823, 130826, 130827, 130828, 130880		
Output	059392, 059904, 061184, 060928, 126208, 126464, 126720, 126992, 126993, 126996, 127250, 127251, 127257, 127258, 128259, 128267, 128275, 129025, 129026, 129029, 129033, 129283, 129284, 129285, 130306, 130310, 130312, 130313, 130314, 130316, 130821, 130822, 130823, 130827		
NMEA0183	1 Integrated Output Port		
Output	AAM, APB, BOD, DPT, DBT, GGA, GLL, GNS, GSA, GSV, RMB, RMC, RTE, TTM, VTG, WPL, XTE, ZDA		CUR, DPT, GGA, GSV, HDG, HDT, MDA, MTW, MWV, RSA, ROT, VDM, VHW, VTG, XDR, ZDA
LAN	1 Port (100 BASE-TX)		3 Ports (100 BASE-TX)
USB	1 Port (USB2.0)		5 Ports (USB2.0)
Video I/O	Input: 2 Ports (NTSC/PAL), Output: 1 Port (HDMI 1280 x 720p)		Input: 2 Ports (PAL), 1 Port (HDMI, FHD 1920 x 1080p, SXGA 1280 x 1024p, XGA 1024 x 768p) Output: 2 Ports (HDMI, FHD 1920 x 1080p, SXGA 1280 x 1024p, XGA 1024 x 768p)
AUX I/O	1 Port (External Event/MOB Input/Operator Fitness/Alarm Output)		1 Port (External Event/MOB Input/Power switch/Alarm Output)
SD Card Slot	1 Slot (Micro SDXC, rear)		2 Internal Slots (SXDC card - supports up to 256 GB)
Wireless LAN	IEEE802.11b/g/n, Transmit frequency: 2.4 GHz band		
Transducer Connection	1 Port		
ENVIRONMENT			
Temperature (IEC60945)	-15°C to +55° C		
Waterproofing	IP56		Processor: IP22, Switch Box: IP56, Control Unit (optional): IP56
POWER			
	12-24 VDC		
	3.0-1.5 A	3.6-1.8 A	2.6-1.3 A

Drawings - NavNet TZtouch2

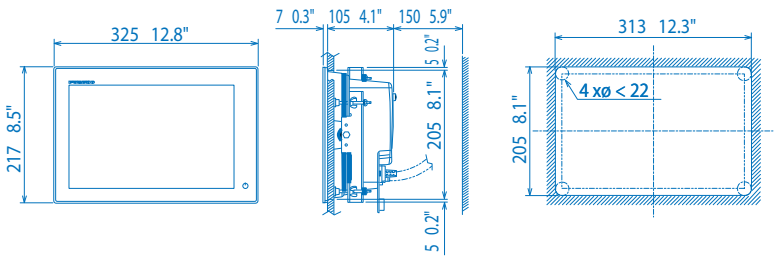
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

TZTL12F

Multi Function Display (Tabletop Mount) TZTL12F 3.8 kg 8.4 lb

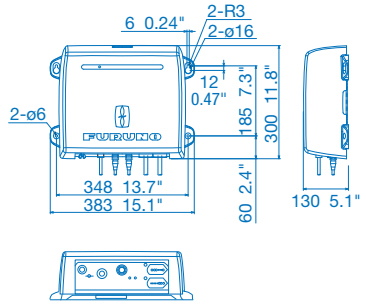


Multi Function Display (Flush Mount) TZTL12F 3.7 kg 8.2 lb



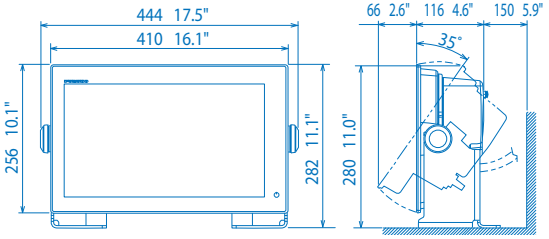
TZT2BB

Multi Function Display Black Box TZT2BB MPU004 3.9 kg 8.6 lb

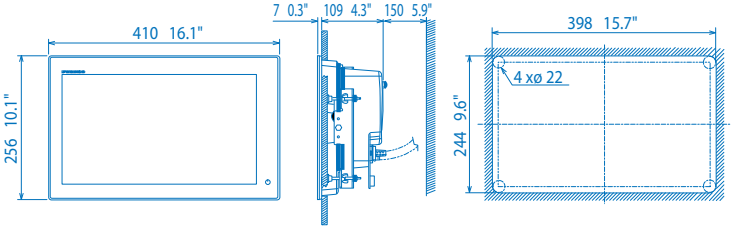


TZTL15F

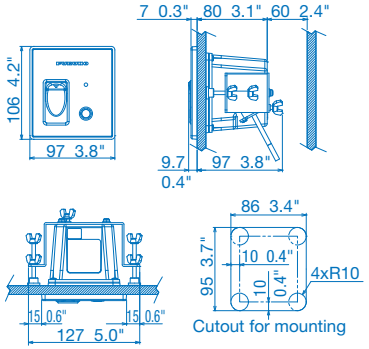
Multi Function Display (Tabletop Mount) TZTL15F 5.5 kg 12.1 lb



Multi Function Display (Flush Mount) TZTL15F 4.9 kg 10.8 lb

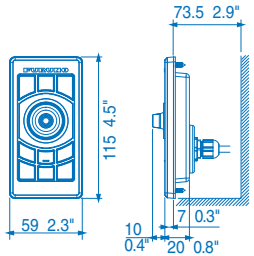


TZT2BB Switch Box PSD003 0.75 kg 1.7 lb

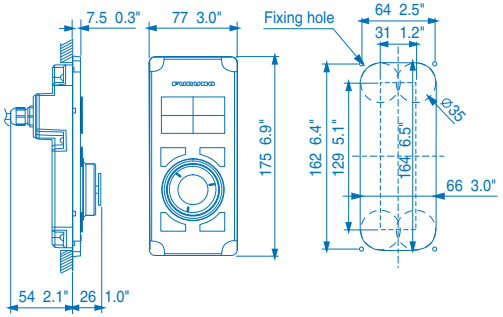


Controllers and Storage

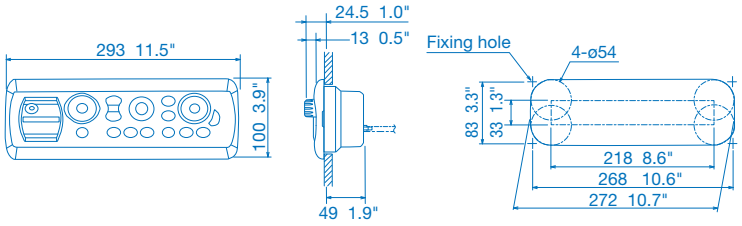
Remote Control Unit
MCU002 (option) 0.14 kg 0.3 lb



Remote Control Unit MCU004 (option) 0.4 kg 0.9 lb



Control Unit MCU005 (option) 1.0 kg 2.2 lb



NavNet Series Network Fish Finders				
MODEL	**BBDS1**	**DFF1-UHD**	**DFF3-UHD**	**DFF3**
TRANSCEIVER & DISPLAY				
Display Modes	Single (50 or 200 kHz), Dual (50 and 200 kHz), Bottom-lock, Bottom-Zoom, ACCU-FISH™*, Bottom Discrimination*, Marker Zoom, A-scope *Compatible transducer required	Single (High or Low frequency), Dual (Both High and Low frequencies), Bottom-lock, Bottom-Zoom, ACCU-FISH™*, Bottom Discrimination*, Marker Zoom, A-Scope *Compatible transducer required	Single (high or low), Dual, Bottom-lock, Bottom-Zoom, ACCU-FISH™*, Marker Zoom, A-scope *Compatible transducer required	Single (high or low), Dual (high and low), Bottom-lock, Bottom-Zoom, ACCU-FISH™*, Marker Zoom, A-scope *Compatible transducer required
Frequency	Dual frequency 50/200 kHz	Dual frequency 30-70 kHz and 175-225 kHz	The synthesized transducer works with dual frequencies between 28 and 200 kHz	The synthesized transducer works with dual frequencies between 28 and 200 kHz
Broadband (CHIRP)	N/A	Yes	Yes	N/A
Range Scale	Max. 1,200 m	Max. 1,200 m	Max. 12,000 m	Max. 3,000 m
ENVIRONMENT				
Temperature	-15°C to +55° C			
Waterproofing	IP20	IP55	IP20	
POWER SUPPLY				
	12-24 VDC			
	12 W, 1.1-0.4 A	30 W, 2.8-1.4 A	3.0-1.6 A (stand-by: 0.8-0.4 A)	
TRANSDUCERS				30 W, 2.8-1.4 A
SPECIFY WHEN ORDERING	**600 W** 50/200 kHz: 520-5PSD (Plastic, thru-hull), 520-5MSD (Bronze, thru-hull), 525-5PWD (Plastic, transom), 525STID-MSD (Bronze, thru-hull with speed/temp sensor), 525STID-PWD (Plastic, transom with speed/temp sensor) **1 kW** (Optional Matching Box, MB1100 may be required) 50/200 kHz: CA50/200-1T, CA50/200-12M	**1 kW** Broadband transducers by AIRMAR® 42-65 kHz (low), 130-210 kHz (high) CM265LH, B265LH (with temperature sensor) CM275LHW, B275LHW	**CHIRP 2/3 kW** 2kW/1kW: PM111LHW, R109LHW 2kW/2kW: PM111LH, PM411LWM, R109LH, R109LM, R111LH, R111LM, R409LWM, 165T-PM542LM 3kW/1kW: R509LHW 3kW/2kW: CM599LH, CM599LM, R509LM, R599LH, R599LM **CW 2/3/5/10 kW** 28 kHz: CA28BL-6HR, CA28BL-12HR, CA28F-38M, CA28F-72 38 kHz: CA38BL-9HR, CA38BL-15HR 50 kHz: CA50BL-12HR, CA50BL-24HR, CA50F-38, CA50F-70 68 kHz: CA68F-30H, CA82B-35R 82 kHz: CA82B-35R 88 kHz: CA82B-35R, CA88B-10, CA88F-126H 107 kHz: CA82B-35R, CA100B-10R 150 kHz: CA150B-12H 200 kHz: CA200B-8/8B, CA200B-12H	**1/2/3 kW** 28 kHz: CA28F-8, CA28BL-6HR, CA28BL-12HR 38 kHz: CA38BL-9HR, CA38BL-15HR 50 kHz: CA50B-6/6B, CA50B-9B, CA50BL-12HR, CA50BL-24HR 68 kHz: CA68F-8H, CA68F-30H 82 kHz: CA82B-35R 88 kHz: CA88B-8, CA88B-10, CA88F-126H 107 kHz: CA100B-10R 150 kHz: CA150B-12H 200 kHz: CA200B-5S, CA200B-8/8B, CA200B-12H 50/200 kHz: CA50/200-1T

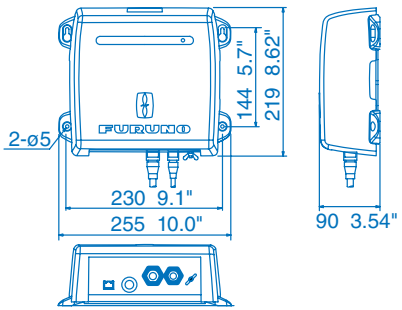
More Transducer options are available. Contact your Furuno dealer.

Drawings

Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

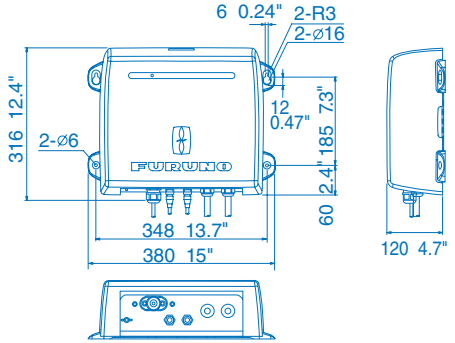
BBDS1

Network Fish Finder/Bottom Discrimination Sounder 1.3 kg 2.9 lb



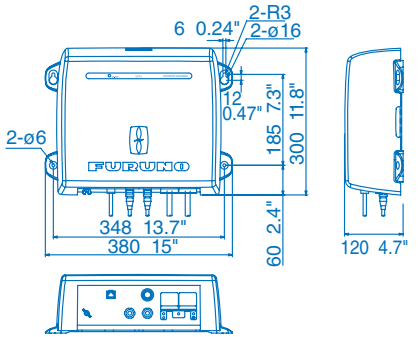
DFF1-UHD

Network Fish Finder 3.1 kg 6.8 lb



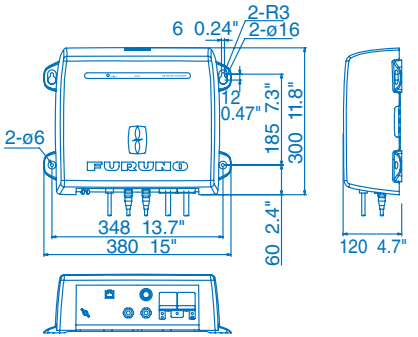
DFF3-UHD

Network Fish Finder 3.8 kg 8.4 lb



DFF3

Network Fish Finder 3.8 kg 8.4 lb



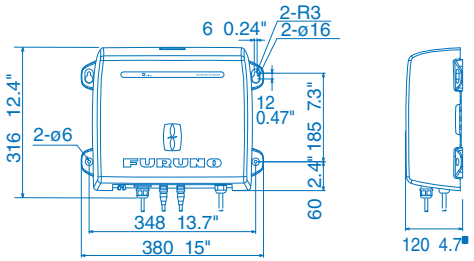
NavNet Series Multibeam Sonar	
MODEL	**DFF3D**
TRANSCEIVER & DISPLAY	
Display Mode	Cross Section, Triple/Single Beam Sounder, Side Scan, 3D Sounder History
Frequency	165 kHz
Beam Angle	60° Port/Stbd, 20°-50° from right under for Triple Beam Sounder
Detection Range	200 m* (Side beam best performance) 300 m* (Main beam directly under boat) * Depending on bottom type and water conditions.
Range Scale	5-1, 200 m
INTERFACE	
LAN	1 port, Ethernet 10/100Base-TX
External KP	1 port (optional external KP kit required)
ENVIRONMENT	
Temperature	-15°C to +55° C
Waterproofing	IP55
POWER SUPPLY	
	12-24 VDC, 1.4-0.7 A
TRANSDUCER	
SPECIFY WHEN ORDERING	165T-TM54 Transom Mount Transducer with Motion Sensor 165T-B54 Through Hull Transducer with Motion Sensor 165T-CM54 Pocket or Keel Mount Transducer with Motion Sensor 165T-SS54 Stainless Steel Through Hull Transducer with Motion Sensor 165T-50/200-TM260 Transom Mount Combo Transducer 165T-50/200-SS260 Stainless Steel Through Hull Combo Transducer 165T/265LH-PM488 Pocket Mount Combo Transducer 165T/275LHW Pocket Mount Combo Wide Beam Transducer 165T-PM542LM Pocket Mount Combo Transducer 165T-PM542LHW Pocket Mount Combo Transducer

NavNet TZtouch3 "Deep Impact" Power Amplifier	
MODEL	**DI-FFAMP**
TRANSCEIVER & DISPLAY	
Display Modes	Single (High or Low frequency), Dual (Both High and Low frequencies), Bottom-lock, Bottom-Zoom, A-Scope
Frequency	26.6 to 242 kHz
Broadband (CHIRP)	Available 2 ch
Range Scale	Max. 3,000 m
Output Power	2 kW/3 kW
ENVIRONMENT	
Temperature	-15° C to +55° C
Waterproofing	IP22
POWER SUPPLY	
	12-24 VDC, 43.1 W, 3.2-1.9 A
TRANSDUCER	
(SPECIFY WHEN ORDERING)	**2 kW Dual-Band CHIRP** PM111LH, PM111LHW, R109LH, R109LHW, R111LH **2/3 kW Dual-Band CHIRP** CM599LH, CM599LHW, CM599LM, R509LH, R509LHW, R509LM, R599LH, R599LM **2 kW Single-Band CW** 28BL-6HR, 38BL-9HR, 50BL-12HR, 82B-35R, 88B-10, 200B-8/8B **3 kW Single-Band CW** 28BL-12HR, 38BL-15HR, 50BL-24HR, 68F-30H, 100B-10R, 150B-12H **5 kW Single-Band CW*** 28F-38M**, 50F-38**, 88F-126H, 200B-12H **10 kW Single-Band CW*** 28F-72**, 50F-70** *Rated power of these transducer is 5/10 kW, but actual output power from DI-FFAMP is 3 kW. **Booster Box BT-5 is needed for these transducers.

NOTE: DI-FFAMP Requires connection to the TZT3 Internal Fish Finder.
**5 kW & 10 kW are CW and require BT-5 booster box.*

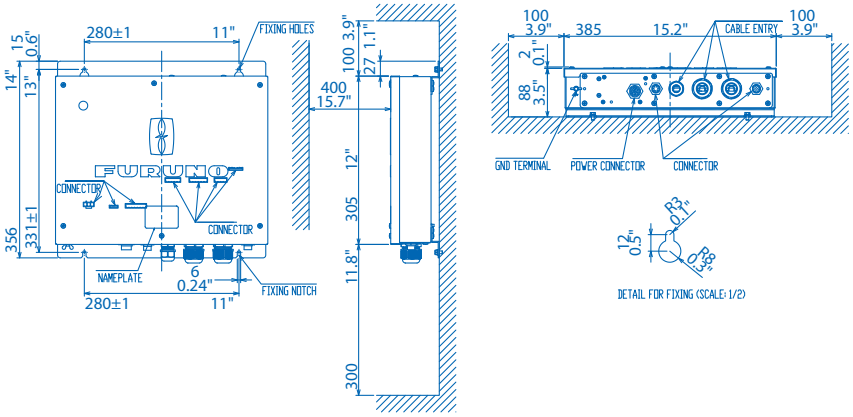
DFF3D

Network Multibeam Sonar 3.0 kg 6.6 lb



DI-FFAMP

Network Sounder Power Amplifier "Deep Impact" 7.0 kg 15.4 lb



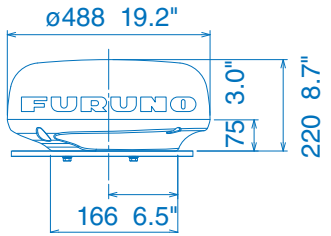
NavNet Series Radar							
MODEL		**DRS4DL+**	**DRS2DNXT**	**DRS4DNXT**	**DRS6ANXT**	**DRS12ANXT**	**DRS25ANXT**
ANTENNA							
Type		ø488 mm Radome (19")		ø610 mm Radome (24")	ø1036 mm Open (3.5') 1255 mm Open (4') 1795 mm Open (6')	1036 mm Open (3.5') 1255 mm Open (4') 1795 mm Open (6')	1036 mm Open (3.5') 1255 mm Open (4') 1795 mm Open (6')
Beam Width	Horizontal	5.2°	5.2° typical (-3 dB) Adjustable between 2.6° and 5.2° (effective with RezBoost™ control)	3.9° typical (-3 dB) Adjustable between 2° and 3.9° (effective with RezBoost™ control)	2.3°/1.9°/1.35° (effective with RezBoost™ control)	2.3°/1.9°/1.35° (effective with RezBoost™ control)	2.3°/1.9°/1.35° (effective with RezBoost™ control)
	Vertical	25°			22°/22°/22°		
Antenna Rotation Speed		24 rpm	24*/36/48 rpm range coupled or 24 rpm fixed * In dual range mode, speed is limited to 24 rpm				
RF TRANSCEIVER							
Frequency		9410 ± 30 MHz	CH1: 9380 MHz (P0N), 9400 MHz (Q0N) CH2: 9400 MHz (P0N), 9420 MHz (Q0N) CH3: 9420 MHz (P0N), 9440 MHz (Q0N)				
Pulselength & PRR		S: 0.08 µs/360 Hz (0.0625 to 0.5 NM) M: 0.3 µs/360 Hz (0.75 to 2 NM) L: 0.8 µs/360 Hz (3 to 36 NM)	P0N: 0.08 µs to 1.2 µs/1100 Hz Q0N: 5 µs to 18 µs/1100 Hz		P0N: 0.04 µs to1.2 µs/ 700 Hz to 2000 Hz Q0N: 5 µs to 48 µs/ 700 Hz to 2000 Hz		
Peak Output Power		4 kW	Solid-State, 25 W			Solid-State, 100 W	Solid-State, 200 W
Range Scales		0.0625 to 36* NM	0.0625 to 48* NM *In dual range mode, range is limited to 12 NM		0.0625 to 72* NM *In dual range mode, range is limited to 12 NM	0.0625 to 96* NM *In dual range mode, range is limited to 12 NM	0.0625 to 96* NM *In dual range mode, range is limited to 12 NM
ENVIRONMENT							
Temperature		-25° C to +55° C, Waterproofing: IPX6	-25° C to +55° C, Waterproofing: IP26		-25° C to +55° C, Waterproofing: IP56		
POWER SUPPLY							
		12-24 VDC, 2.1-1.0 A	12-24 VDC, 2.5-1.3 A		12/24 VDC, 9.5/5.0 A	24 VDC, 5.0 A	24 VDC, 5.6 A

Drawings

Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

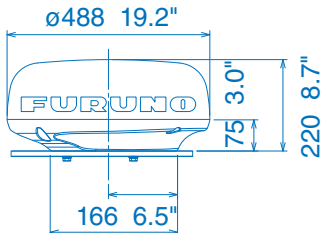
DRS4DL+

19" Radome Radar Sensor DRS4DL+ 5.7kg 12.7 lb



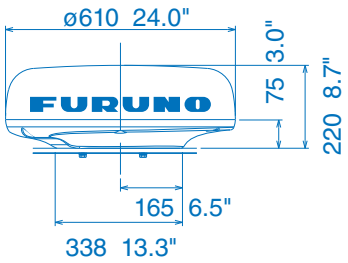
DRS2DNXT

19" Radome Radar Sensor DRS2DNXT 6.5kg 14.3 lb



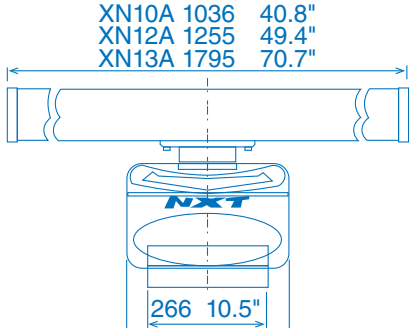
DRS4DNXT

24" Radome Radar Sensor DRS4DNXT 7.3kg 16.1 lb



DRS6A/12A/25ANXT

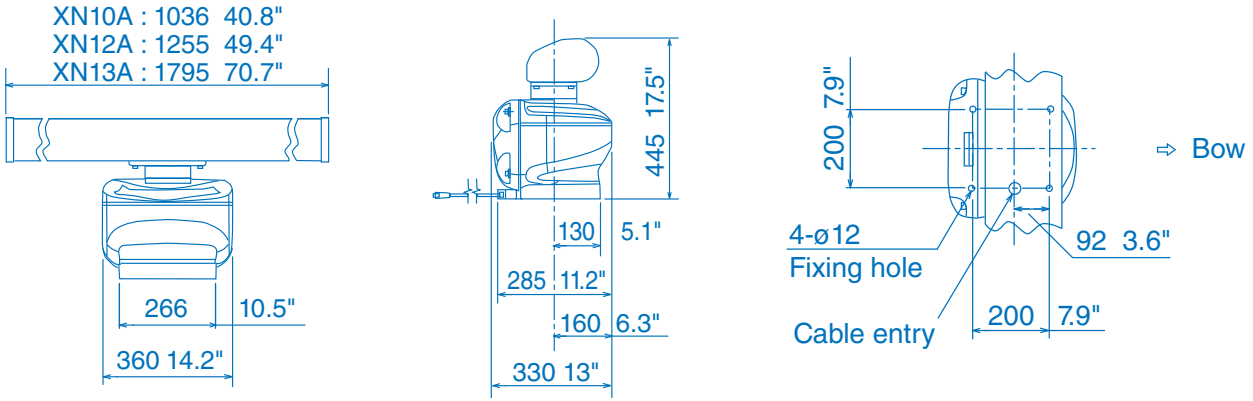
3.5 ft Open Antenna	22 kg 48.5 lb
4 ft Open Antenna	25 kg 55.1 lb
6 ft Open Antenna	27kg 59.5 lb



NavNet Series Radar Continued		
DRS6A X-Class	**DRS12A X-Class**	**DRS25A X-Class**
1036 mm Open (3.5') 1255 mm Open (4') 1795 mm Open (6')	1255 mm Open (4') 1795 mm Open (6')	
2.3°/1.9°/1.35°	1.9°/1.35°	
22°/22°/22°		
0.08 µs/3000 Hz (0.0625 to 0.75 NM) 0.15 µs/3000 Hz (1 to 1.5 NM) 0.3 µs/1500 Hz (2 NM) 0.5 µs/1000 Hz (3 to 4 NM) 0.8 µs/600 Hz (6 to 9 NM) 1.2 µs/600 Hz (12 to 64 NM) 1.2 µs/550 Hz (72 to 96 NM)		
6 kW	12 kW	25 kW
0.0625 to 96 NM		
Temperature: -25° C to +55° C, Waterproofing: IP56		
24 VDC, 4 A	24 VDC, 4.5 A	24 VDC, 5.6 A

DRS6AX/12AX/25AX X-Class

3.5 ft Open Radar Sensor DRS6AX X-Class	20.0 kg 44.1 lb
4 ft Open Radar Sensor DRS6AX X-Class	21.0 kg 46.3 lb
6 ft Open Radar Sensor DRS6AX X-Class	23.0 kg 50.7 lb
4 ft Open Radar Sensor DRS12AX X-Class	21.0 kg 46.3 lb
6 ft Open Radar Sensor DRS12AX X-Class	23.0 kg 50.7 lb
4 ft Open Radar Sensor DRS25AX X-Class	22.0 kg 48.5 lb
6 ft Open Radar Sensor DRS25AX X-Class	24.0 kg 53.0 lb



GPS/WAAS Receiver Antennas	
MODEL	**GP330B**
RECEIVER CHARACTERISTICS	
Receiver Type	65 channels, C/A code, all-in-view, WAAS, 10 Hz
Receiving Frequency	L1 (1575.42 MHz)
Time to First Fix	90 s (cold start)
Tracking Velocity	999.9 kn
Geodetic Systems	WGS-84, NAD-27 and others
Accuracy	10 m (GPS), 7 m (MSAS), 3 m (WAAS)
ENVIRONMENT (IEC 60945 test method)	
Temperature	-25° C to +55° C
Waterproofing	IEC 60529 IP56
POWER SUPPLY	
	12-24 VDC, LEN2
	1.4 W, 90-45 mA max.

Class B Digital Information Reciever	
MODEL	**BBWX4**
RECEIVER CHARACTERISTICS	
Receiver Type	SiriusXM approved Marine Antenna
Antenna Connection	SMA (SMA to SMB adapter included)
Network Connection	TCP/IP over Ethernet (10/100-Base-TX) Static IP: 172.22.225.252 Gateway: 172.22.251.1 Subnet Mask: 255.255.255.0
Audio Connection	Stereo Analog Out, 2v RMS
ENVIRONMENT (IEC 60945 test method)	
Temperature	-20° C to +70° C
Waterproofing	IPX 6/7
POWER SUPPLY	
	12-24 VDC
	Total Power Consumption < 3 W

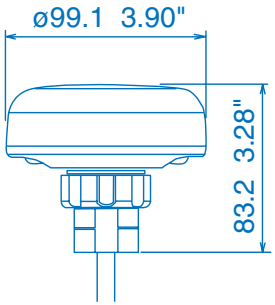
TimeZero PC Marine Software		
SOFTWARE VERSION	**TZ Navigator v4**	**TZ Professional v4**
Processor	CPU 1.5 GHz	CPU 2 GHz
Operating System	Windows 7 SP1 or Windows 8.1 or Windows 10	Windows 7 SP1, Windows 8.1 or Windows 10
RAM Memory	4 GB of RAM	4 GB of RAM
Graphics Card	Minimum: Integrated Intel Graphic Chipset Recommended: Dedicated Video Board with 1 GB VRAM or Intel HD 4th generation or above	Minimum: Integrated Intel Graphic Chipset (i5 4th generation with HD4400 or above) Recommended: (for PBG and Multi monitor) Dedicated Video Board with 1 GB VRAM
Screen Resolution	1024 x 600 (1280 x 800 or above recommended)	1024 x 600 or higher
HDD	30 GB of free memory	20 GB of free memory
Serial or USB port	For connecting instruments or 100 Base-T Network adapter for FURUNO ethernet sensors	For connecting instruments or 100 Base-T Network adapter for FURUNO ethernet sensors

Drawings

Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

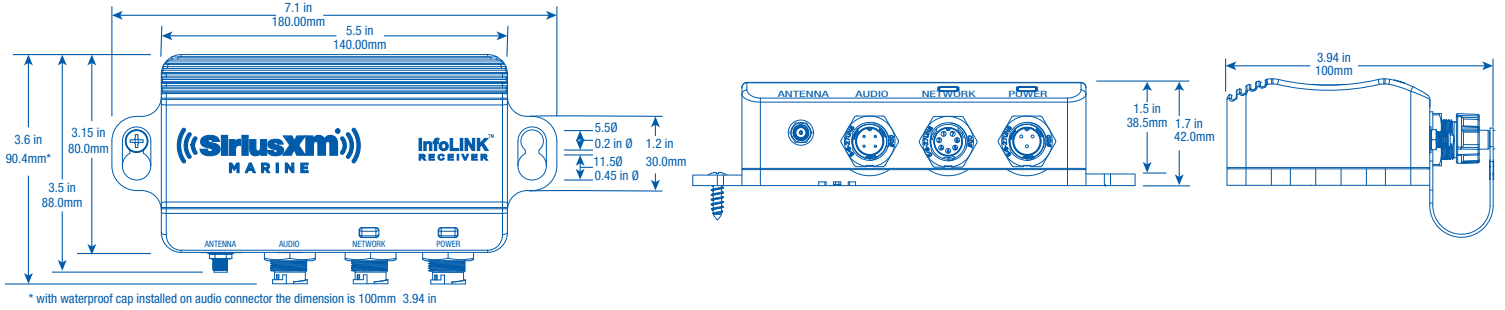
GP330B

GPS/WAAS Receiver Antenna 0.22 kg 0.49 lb



BBWX4

InfoLINK Receiver 0.273 kg 0.60 lb

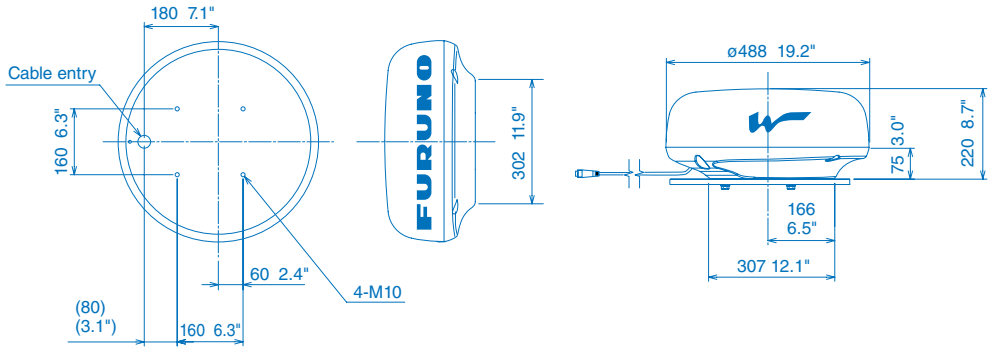


* with waterproof cap installed on audio connector the dimension is 100mm 3.94 in

1st Watch Wireless Radar		
MODEL		**DRS4W**
ANTENNA		
Type		ø488 mm Radome (19")
Beam Width	Horizontal	7.2°
	Vertical	25°
Antenna Rotation Speed		24 rpm
RF TRANSCEIVER		
Frequency		9410 ±30 MHz
Pulselength & PRR		0.125 to 0.5: 0.08 µs/360 Hz 0.75 to 2: 0.3 µs/360 Hz 3 to 24: 0.8 µs/360 Hz
Peak Output Power		4 kW
Range Scales		0.125 to 24 NM
WIRELESS LAN		
Number of connectable devices		2 units
Transmit frequency		2.4 GHz band
APPLICATION		
Name		"Marine Radar" from Apple App Store (Free of charge)
Display (customer supply)		iPad/iPad mini/iPhone, iOS 6.1 or later
Screen Orientation		Portrait/Landscape (iPad, iPad mini only)
Language		English
Mode		Full screen, Day/Night, Gain (auto), STC (auto), Rain, Auto Noise rejector, Guard Zone Off center, Cursor position* * iPad, iPad mini
ENVIRONMENT		
		Temperature: -25° C to +55° C, Waterproofing: IP26
POWER SUPPLY		
		12-24 VDC, 2.1-1.0 A max.

DRS4W

1st Watch Wireless Radar DRS4W 5.7 kg 12.5 lb



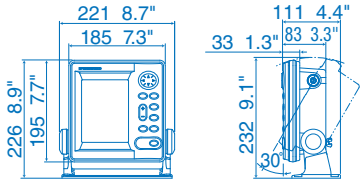
		6" Silver LCD Radar	8.4" Color LCD Radar
MODEL		**MODEL1623**	**MODEL1815**
ANTENNA			
Type		ø380 mm radome (15.0")	ø488 mm radome (19")
Beamwidth	Horizontal	6.2°	5.2°
	Vertical	25°	
Rotation speed		24/31/41 rpm (auto-select according to pulselength)	24 rpm
RF TRANSCEIVER			
Frequency		9410 ±30 MHz (X-Band)	
Pulselength & PRR		0.125-0.75 NM: 0.08 µs/3000 Hz 1-2 NM: 0.15 µs/1200 Hz 3-16 NM: 0.8 µs/600 Hz	0.0625-0.5 NM: 0.08 µs/360 Hz 0.75-2 NM:0.3 µs/360 Hz 3-36 NM:0.8 µs/360 Hz
Output power		2.2 kW	4 kW
IF frequency		60 MHz	
DISPLAY			
Display unit		6" monochrome LCD	8.4" color LCD
Effective Display Area		90 (W) x120 (H) mm	128.2 (W) x 170.9 (H) mm
Screen Resolution		240 x 320	640 x 480, VGA
Accuracy	Range	1.0% of range in use or 8 m, which is greater	1.0% of range in use or 0.01 NM, which is greater
	Bearing	±1°	
Range and range	Range	0.0625, 0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24*, 36* NM * MODEL1815 only	
Ring interval	Ring	0.03125, 0.0625, 0.125, 0.125, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 3, 4, 6*, 12* NM * MODEL1815 only	
Echo trail		Interval: 30 s, 1, 3, 6 min. or continuous	Interval: 15 s, 30 s, 1 min, 3 min, 6 min, 15 min, 30 min, or continuous
TT targets		-	Up to 10
AIS targets		-	Up to 100 (Data input from AIS is required.)
Interface (IEC61162, NMEA0183)	Input	GGA, RMC, RMA, RMB, GLL, VTG, VBW, VHW, HDT, HDG, HDM, BWR, BWC, GLC, GTD, DPT, DBK, DBS, DBT, MTW, ZDA, MWV, XTE	ALR, BWC, BWR, DBT, DPT, DTM, GGA, GLL, GNS, GSA, GSV, HDG, HDT, HDM, MTW, MWV, RMB, RMC, THS, TTM, VDM, VHW, VTG, VWR, VWT, XTE, ZDA
	Output	TLL* *external data required	ACK, RSD, TLL*, TTM* *external data required
ENVIRONMENT			
Temperature	Display unit	-15° C to +55° C	-15° C to +55° C
	Antenna unit	-25° C to +70° C	-25° C to +55° C
Waterproofing	Display unit	IPX5	IP56
	Antenna unit	IPX6	IPX6
POWER SUPPLY			
	Display unit	12-24 VDC: 3.5-1.6 A	12-24 VDC: 3.2-1.6 A

Drawings

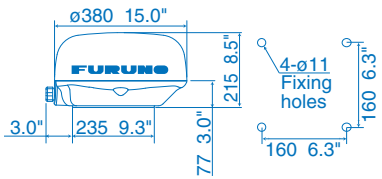
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

MODEL1623

Display Unit 1.3 kg 2.9 lb

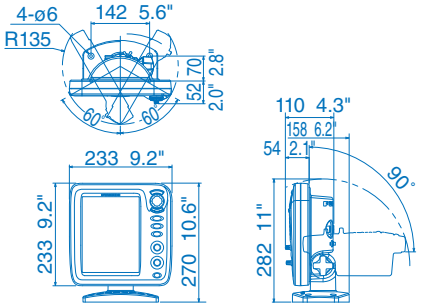


Antenna 4.6 kg 10.1 lb

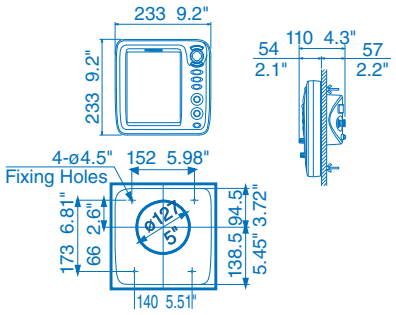


MODEL1815

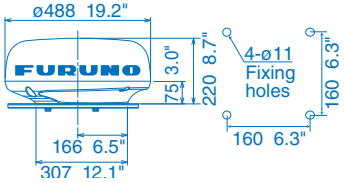
Display Unit (Bracket Mount) 2.2 kg 4.9 lb



Display Unit (Flush Mount) 1.6 kg 3.5 lb



Antenna 6.5 kg 14.3 lb



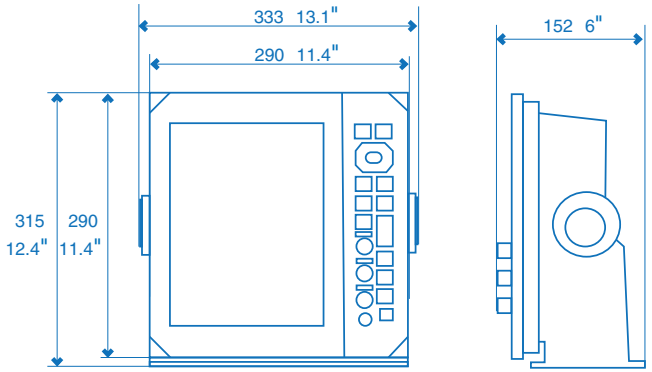
10.4" and 12.1" Color LCD Radar Displays		
MODEL	**FR10**	**FR12**
ANTENNA		
Model	DRS4DL+, DRS2D/4D/6A/12A/25A-NXT, DRS6A/12A/25A X-Class	
Output	Depending on the selected Antenna Unit	
DISPLAY UNIT		
Screen Size	10.4" Color LCD	12.1" Color LCD
Screen Resolution	800 x 600 (SVGA)	1024 x 768 (XGA)
Display Modes	Head-up, Course-up, North-up, True motion, Stern-up	
RADAR		
Range Scales	0.0625 to 36 NM (DRS4DL+) 0.0625 to 48 NM (DRS2D/4D-NXT) 0.0625 to 72 NM (DRS6A-NXT) 0.0625 to 96 NM (DRS6A/12A/25A X-Class, DRS12A/25A-NXT)	
Main Functionalities	Risk Visualizer™ Target Analyzer™ (Solid-State sensor only) Fast Target Tracking™ True Echo Trail Echo Average Sub Display Unit (2 units max) AIS Display Radar overlay on charts (FR-12 only, optional chart kit required)	
INTERFACE		
Available Ports	NMEA0183 (x3), NMEA2000 (x1), LAN (x1), HDMI Output (x1), USB (x1), Contact Closure (x1)	
ENVIRONMENT		
Temperature	-15° C to +55° C	
Waterproofing	Front Panel: IP55, Rear Panel: IP22	
POWER SUPPLY		
	12-24 VDC: 1.1-0.6 A	12-24 VDC : 1.7-0.9 A

Drawings

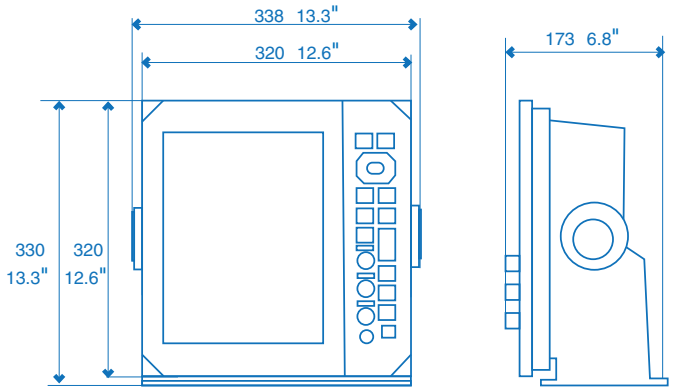
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FR10 / FR12

FR10 3.2 kg 7 lbs



FR12 3.9 kg 8.6 lbs



15" Multi-Color LCD Radar			
MODEL		**FAR1416**	**FAR1426**
ANTENNA			
Type		1255 mm Open (4')/1795 mm Open (6')	
Beamwidth	Horizontal	1.9˚ (XN12A), 1.35˚ (XN13A)	
	Vertical	22˚	
Rotation speed		24/48 rpm	
RF TRANSCEIVER			
Frequency		9410 ±30 MHz, P0N	
Pulselength & PRR		S: 2100 Hz (0.125 to 1.5 NM), M: 1200 Hz (1.5 to 3 NM), L: 600 Hz (3 to 72 NM)	S: 2100 Hz (0.125 to 1.5 NM), M: 1200 Hz (1.5 to 3 NM)
Output power		12 kW	25 kW
IF frequency		60 MHz	
DISPLAY UNIT			
Type		15" Color LCD	
Screen Size		304 (W) x 228 (H) mm, Portrait or landscape settings are available.	
Screen Resolution		1024 x 768 (XGA)	
Screen Brightness		400 cd/m2	
Language		English, Thai, Japanese	
Display Modes		Radar, Radar+Plotter, Plotter	
CHART PLOTTER			
Cartography		MapMedia mm3d chart	
Memory Capacity		30,000 points for ship's tracks, 10,000 points (50 ships) for TT, 10,000 points (100 ships) for AIS, 10,000 points (40 ships) for consort ships, 10,000 points (100 pcs) for GPS buoy, 200 planned routes (100 points per route)	
Mark/Line		30,000 pts	
RADAR			
Accuracy	Range	1% of range in use or 10 m whichever is the greater	
	Bearing	±1°	
Range and range ring interval	Range	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 72, 96* NM * FAR1426 only	
	Bearing	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 12, 16* NM * FAR1426 only	
Echo trail		Interval: 15 s, 30 s, 1-30 min. (30 s steps) or continuous	
TT targets		Up to 50 (manually) - Time of vector: OFF/30 s/1 to 60 min. (external data required)	
AIS targets		Up to 300 - Time of vector: OFF/30 s/1 to 60 min. (AIS, GPS and heading required)	
Radar Map		-	
INTERFACE			
Heading		1 Port: AD-10 format or IEC61162-1	
Serial		3 Ports: IEC61162-1	
Interface (IEC61162, NMEA0183)	Input	ALR, BWR, CUR, DBK, DBS, DBT, DPT, GGA, GLL, GNS, HDG, HDM, HDT, MTW, MWV, RMB, RMC, RTE, THS, TLL, TTM, VBW, VDM, VDO, VDR, VHW, VSD, VTG, VWR, VWT, WPL, ZDA	
	Output	Serial port: TLL, TTM: LAN port: BWC, BWR, CUR, DBK, DBS, DBT, DPT, DTM, GGA, GLL, GNS, HDG, HDM, HDT, MTW, MWV, RMC, THS, VBW, VTG, VWR, VWT, ZDA	
Interface (NMEA2000)	Input	059392/904, 060928, 061184, 126208/720/992/996, 127250/258/259, 128259/267, 129025/026/029/033/291, 130306/310/311/312/316/577/578	
	Output	129038/039/040/041/044/284/285/538/794/795/797/798, 12980/802/809/810	
Contact closure		3 ch: Alert output (Normal open: 2 ch, Normal close: 1 ch)	
Sub display		2 Ports (Signal: HD, BP, Trigger and Video)	
LAN		1 Port (100 BASE-TX)	
DVI-D		1 Port for main display	
RGB		1 Port	
ENVIRONMENT			
Temperature	Display unit	-15° C to +55° C	
	Antenna unit	-25° C to +55° C (storage: +70° C or less)	
Waterproofing	Display unit	IP20	
	Antenna unit	IP26	
	Control unit	IP22	
POWER SUPPLY			
		24 VDC, 5 A	24 VDC, 5.6 A

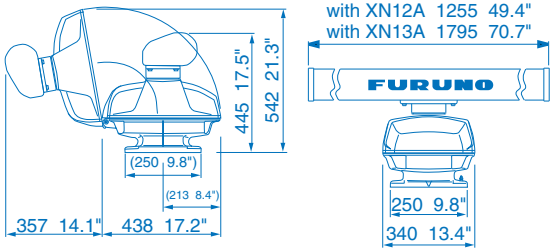
Marine Radar					
MODEL		**FAR1513**	**FAR1523**	**FAR1518**	**FAR1528**
ANTENNA					
Type		1255 mm Open (4') or 1795 mm Open (6')		1260 mm Open (4') or 2040 mm Open (6.5')	2040 mm Open (6.5') or 2550 mm Open (8')
Beamwidth	Horizontal	1.9° (XN12A), 1.35° (XN13A)		1.9° (XN12AF), 1.23° (XN20AF)	1.23° (XN20AF), 0.95° (XN24AF)
	Vertical	20°			
Rotation speed		24 rpm or 48 rpm			
RF TRANSCEIVER					
Frequency		9410 MHz ±30 MHz, P0N			
Pulselength & PRR		S: 2100 Hz (0.125 to 1.5 NM) M: 1200 Hz (1.5 to 3 NM) L: 600 Hz (3 to 96 NM)		3000 Hz (0.125 to 3 NM), 0.08 µs 2760 Hz (0.125 to 6 NM), 0.12 µs 1500 Hz (0.75 to 24 NM), 0.22 µs 1000 Hz (0.75 to 24 NM), 0.38 µs 1000 Hz (3 to 24 NM), 0.68 µs 600 Hz (6 to 96* NM), 1.2 µs * 500 Hz on 96 NM range.	
Output power		12 kW	25 kW	12 kW	25 kW
IF frequency		60 MHz			
DISPLAY					
Accuracy	Range	1% of range in use or 10 m whichever is the greater			
	Bearing	±1°			
Range and range	Range	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96 NM		0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96 NM	
Ring interval	Ring	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 16 NM		0.025, 0.05, 0.1, 0.25, 0.25, 0.5, 1, 2, 4, 8, 16 NM	
Echo trail		Interval: 15 s, 30 s, 1-30 min. (30 s steps) or continuous			
TT targets		Up to 50 in 0.2-32 NM (external data required) Tracking: 5/10 pts on all target Time of vector: 0 to 60 minutes			
AIS targets		Up to 300 (AIS, GPS and heading required) Tracking: 5/10 pts on all target Time of vector: 0 to 60 minutes			
Radar map		5,000 pts		-	-
INTERFACE (Processor unit)					
Heading		1 Port: AD-10 format or IEC61162-2			
Serial		IEC61162-2: 2 Ports (AIS/HDG), IEC61162-1: 4 Ports (GPS/LOG/AMS/ECDIS)			
Interface (IEC61162, NMEA0183)	Input	ABK, ACK, ACN, ALR, BWC, BWR, CUR, DBK, DBS, DBT, DPT, DTM, GBS, GGA, GLL, GNS, HBT, HDG, HDM, HDT, MTW, MWV, RMB, RMC, RTE, THS, VBW, VDM, VDO, VDR, VHW, VTG, VWR, VWT, WPL, ZDA		ABK, ACK, ACN, ALR, BWC, BWR, CUR, DBK, DBS, DBT, DPT, DTM, GBS, GGA, GLL, GNS, HBT, HDG, HDM, HDT, MTW, MWV, RMB, RMC, RTE, THS, VBW, VDM, VDO, VDR, VHW, VTG, VWR, VWT, WPL, ZDA	
	Output	ABM, ACK, ALC, ALF, ALR, ARC, BBM, EVE, HBT, OSD, RSD, TLB, TLL, TTD, TTM, VSD			
Contact closure		Alert output: 4 ch, Remote ACK input, System fail, power fail			
Remote display		2 Ports (Signal: HD, BP, Trigger and Video)			
LAN		1 Port (100 BASE-TX)			
DVI-D		1 Port for main display			
RGB		1 Port for VDR or RGB monitor			
ENVIRONMENT					
Temperature	Processor unit	-15° C to +55° C			
	Antenna unit	-25° C to +55° C (storage: +70° C or less)			
Waterproofing	Processor unit	IP20 (IP22: option)			
	Antenna unit	IP26		IP56	
	Control unit	IP22			
POWER SUPPLY					
Processor unit		24 VDC: 5.0 A max. (24 rpm), 5.6 A max. (48 rpm)	24 VDC: 6.4 A max. (24 rpm), 7.0 A max. (48 rpm)	100-115/220-230 VAC: 1.8/0.8 A (26 rpm), 2,2/1.0 A (48 rpm), or 24 VDC: 6.1 A max. (26 rpm), 7.2 A max. (48 rpm)	100-115/220-230 VAC: 2.3/1.0 A (26 rpm), 2.6/1.2 A (48 rpm), or 24 VDC: 7.5 A max. (26 rpm), 8.6 A max. (48 rpm)

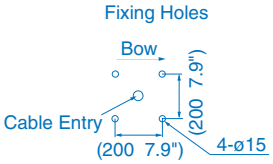
Drawings

Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

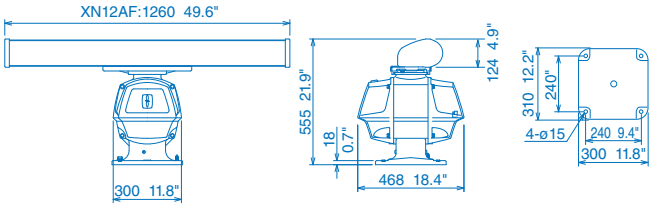
FAR1416/1426/1513/1523/1518/1528

4 ft Open Antenna 25 kg 55.1 lb
6 ft Open Antenna 27 kg 59.5 lb

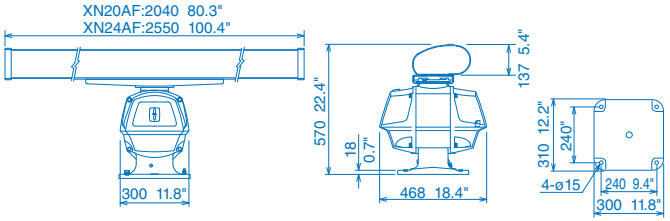




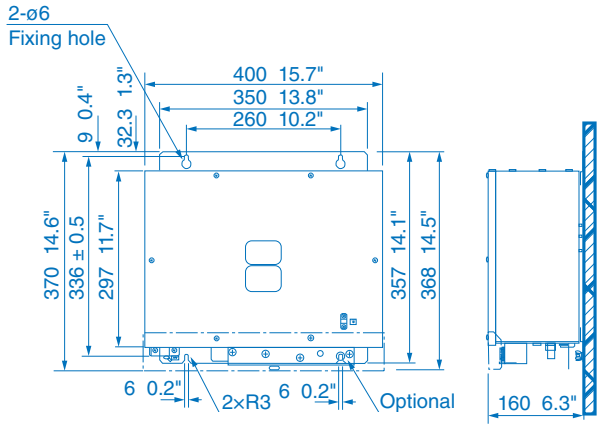
4 ft Open Antenna XN12AF 33 kg 73 lb



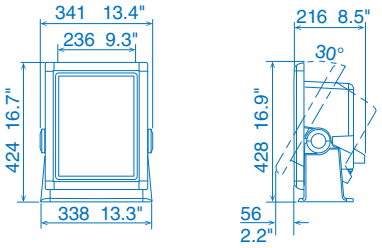
6.5 ft Open Antenna XN20AF 39 kg 86 lb
8 ft Open Antenna XN24AF 42 kg 92.6 lb



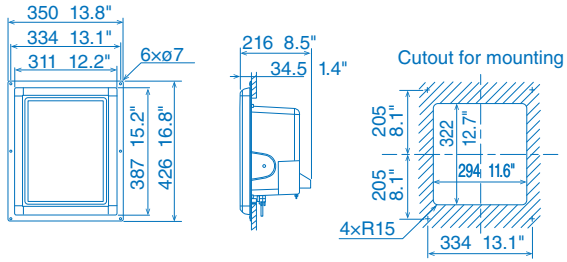
RPU024 DC: 6.2 kg 13.7 lb
Processor Unit AC: 6.8 kg 15.0 lb



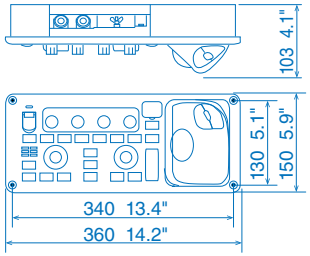
Display Unit (Portrait/Tabletop Mount) 8.5 kg 18.7 lb



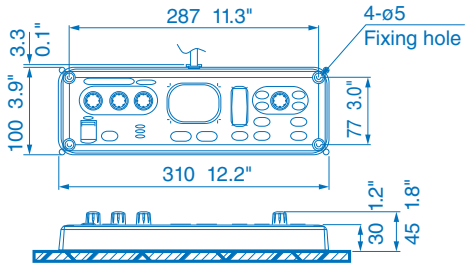
Display Unit (Portrait/Flush Mount) 8.1 kg 17.8 lb



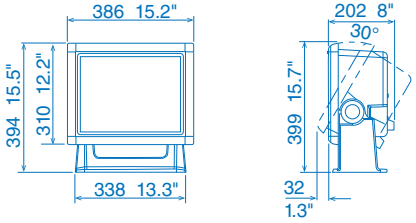
Control Unit 3.5 kg 7.7 lb



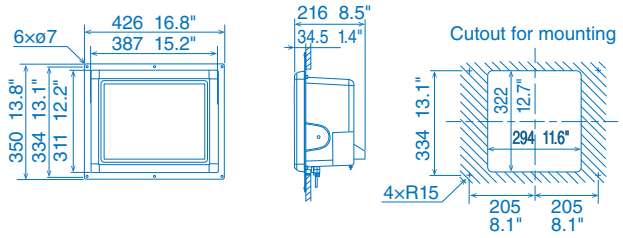
Control Unit RCU028 1.2 kg 2.6 lb



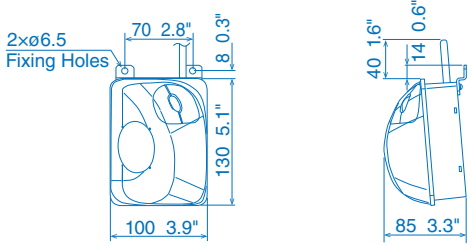
Display Unit (Horizontal/Tabletop Mount) 8.5 kg 18.7 lb



Display Unit (Horizontal/Flush Mount) 8.1 kg 17.8 lb



Trackball Control Unit 0.4 kg 0.9 lb



Black Box Marine Radar			
MODEL		**FAR2218BB**	**FAR2228BB**
ANTENNA			
Type		1297 mm Open (4') or 2097 mm Open (6.5') or 2597 mm Open (8')	
Beamwidth	Horizontal	1.9° (4' Open: XN12CF), 1.23° (6.5' Open: XN20CF) or 0.95 (8' Open: XN24CF)	
	Vertical	20°	
Rotation speed		24 rpm or 42 rpm	
RF TRANSCEIVER			
Frequency		9410 MHz ±30 MHz, P0N	
Pulselength & PRR		S1: 3000 Hz (0.125 to 2 NM), 0.07 µs S2: 3000 Hz (0.5 to 4 NM), 0.15 µs M1: 1500 Hz (0.75 to 12 NM), 0.3 µs M2: 1200 Hz (1.5 to 24 NM), 0.5 µs M3: 1000 Hz (3 to 24 NM), 0.7 µs L: 600 Hz (6 to 96 NM), 1.2 µs	
Output power		12 kW	25 kW
IF frequency		60 MHz	
DISPLAY			
Accuracy	Range	1 % of the maximum range of the scale in use or 10 m, whichever is the greater	
	Bearing	±1°	
Range and range Ring interval	Range	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96 NM	
	Ring	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 12, 16 NM	
Echo trail		Interval: 15 s, 30 s, 1, 3, 6, 15, 30 m or continuous	
TT targets		100 targets in 24/32 NM (external data required)	
AIS targets		350 targets (external data required)	
Radar Map		20,000 pts	
INTERFACE (Processor unit)			
Serial		8 ports (IEC61162-1/2: 2 ports, IEC61162-1: 4 ports, AD-10: 1 port) (1 port for sub-display unit from antenna sensor)	
Interface (IEC61162, NMEA0183)	Input	ABK, ACK, ACN, ALR, BWC, BWR, CUR, DBK*1, DBS*1, DBT, DDC, DPT, DTM, GGA, GLL, GNS, HBT, HDT*1, MTW, MWV, OSD, RQA, RMB, RMC, ROT, RTE, SRP, THS, VBW, VDM, VDO, VDR, VHW, VSD, VTG, VWR*1, VWT*1, WPL, ZDA *1 for retrofit	
	Output	ABM, ACK, AIQ, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT, OSD, RSD, SRP, TLB, TLL*2, TTD, TTM, VSD *2 for B-type radar	
Contact closure		Alert output: 6 ports: contact signal, load current 250 mA (Normal close/ open: 4, system fail: 1, Power fail: 1)	
LAN		2 ports (100 BASE-TX)	
DVI		2 ports: DVI-D, DVI-I or RGB picture data (VDR)	
RS-232C		1 port: brilliance control	
Sub display (for ECDIS)		2 ports (HD, BP, Trigger and Video signal)	
ENVIRONMENT			
Temperature	Processor unit	-15° C to +55° C (storage: -20° C to +70° C or less)	
	Antenna unit	-25° C to +55° C (storage: -25° C to +70° C or less)	
Waterproofing	Processor unit	IP22	
	Antenna unit	IP56	
POWER SUPPLY			
	Processor unit	100-230 VAC: 2.2-1.1 A (24 rpm), 2.8-1.4 A (42 rpm)	100-230 VAC: 2.6-1.3 A (24 rpm), 3.9-1.7 A (42 rpm)

Black Box Marine Radar Continued

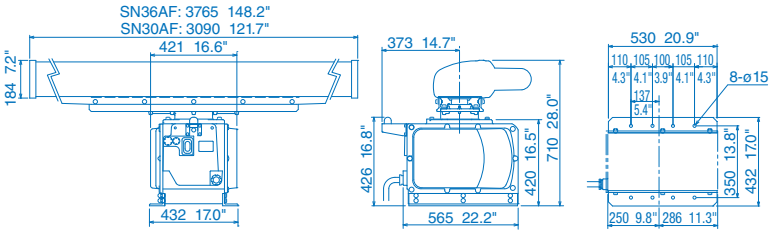
MODEL		FAR2238SBB	FAR2228NXTBB	FAR2238SNXTBB
ANTENNA				
Type		3822 mm Open (12')	1297 mm Open (4') or 2097 mm Open (6.5') or 2597 mm Open (8')	3822 mm Open (12')
Beamwidth	Horizontal	2.6° (8' open: SN24CF) or 2.3° (10' open: SN30CF) or 1.8° (12' open: SN36CF)	1.9° (4' Open: XN12CF), 1.23° (6.5' Open: XN20CF) or 0.95 (8' Open: XN24CF)	2.6° (8' open: SN24CF) or 2.3° (10' open: SN30CF) or 1.8° (12' open: SN36CF)
	Vertical	25°	20°	25°
Rotation speed		24 rpm or 42 rpm	24 rpm or 42 rpm	24 rpm or 42 rpm
RF TRANSCEIVER				
Frequency		3050 MHz ±30 MHz, P0N	9410 MHz ±30 MHz, P0N	CH1 P0N: 3043.75 MHz, Q0N: 3063.75 MHz +5 MHz or CH2 P0N: 3053.75 MHz, Q0N: 3073.75 MHz +5 MHz
Pulselength & PRR		S1: 3000 Hz (0.125 to 2 NM), 0.07 µs S2: 3000 Hz (0.5 to 4 NM), 0.15 µs M1: 1500 Hz (0.75 to 12 NM), 0.3 µs M2: 1200 Hz (1.5 to 24 NM), 0.5 µs M3: 1000 Hz (3 to 24 NM), 0.7 µs L: 600 Hz (6 to 96 NM), 1.2 µs	S1: 3000 Hz (0.125 to 2 NM), 0.07 µs S2: 3000 Hz (0.5 to 4 NM), 0.15 µs M1: 1500 Hz (0.75 to 12 NM), 0.3 µs M2: 1200 Hz (1.5 to 24 NM), 0.5 µs M3: 1000 Hz (3 to 24 NM), 0.7 µs L: 600 Hz (6 to 96 NM), 1.2 µs	P0N: 0.07 µs to1.2 µs/ 600Hz to 2400 Hz Q0N: 5.0 µs to 18.3 µs/ 600Hz to 2400 Hz
Output power		30 kW	Solid-state, 600 W	Solid-state, 250 W
IF frequency		60 MHz		
DISPLAY				
Accuracy	Range	1 % of the maximum range of the scale in use or 10 m, whichever is the greater		
	Bearing	±1°		
Range and range Ring interval	Range	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 72, 96 NM		
	Ring	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 12, 16 NM		
Echo trail		Interval: 15 s, 30 s, 1, 3, 6, 15, 30 m or continuous		
TT targets		100 targets in 24/32 NM (external data required)		
AIS targets		350 targets (external data required)		
Radar Map		20,000 pts		
INTERFACE (Processor Unit)				
Serial		7 ports (IEC61162-1/2: 2 ports, IEC61162-1: 4 ports, AD-10: 1 port)		
Interface (IEC61162, NMEA0183)	Input	ABK, ACK, ACN, ALR, BWC, BWR, CUR, DBK*1, DBS*1, DBT, DDC, DPT, DTM, GGA, GLL, GNS, HBT, HDT*1, MTW, MWV, OSD, RQA, RMB, RMC, ROT, RTE, SRP, THS, VBW, VDM, VDO, VDR, VHW, VSD, VTG, VWR*1, VWT*1, WPL, ZDA *1 for retrofit		
	Output	ABM, ACK, AIQ, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT, OSD, RSD, SRP, TLB, TLL*, TTD, TTM**, VSD *for B-type radar **external data required		
Contact closure		Alert output: 6 ports: contact signal, load current 250 mA (Normal close/ open: 4, system fail: 1, Power fail: 1)		
LAN		2 ports (100 BASE-TX)		
DVI		2 ports: DVI-D, DVI-I or RGB picture data (VDR)		
RS-232C		1 port: brilliance control		
Sub display (for ECDIS)		2 ports (HD, BP, Trigger and Video signal)		
ENVIRONMENT				
Temperature	Processor unit	-15° C to +55° C (storage: -20° C to +70° C or less)		
	Antenna unit	-25° C to +55° C (storage: -25° C to +70° C or less)		
Waterproofing	Processor unit	IP22		
	Antenna unit	IP56		
POWER SUPPLY				
	Processor unit	100-230 VAC: 3.2-1.5 A (24 rpm), 2.8-1.4 A (42 rpm)	100-230 VAC:2.1-1.1 A (24 rpm), 5.8-2.6 A (42 rpm)	100-230 VAC:3.0-1.5 A (24 rpm), 5.8-2.6 A (42 rpm)

Drawings

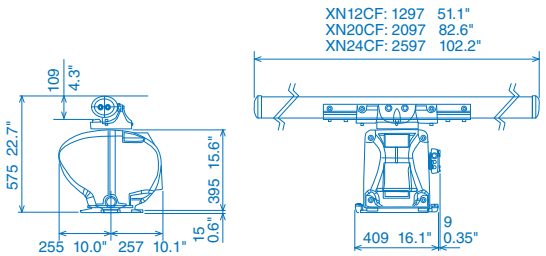
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FAR2218BB / FAR2228BB / FAR2238SBB / FAR2228NXTBB / FAR2238SNXTBB

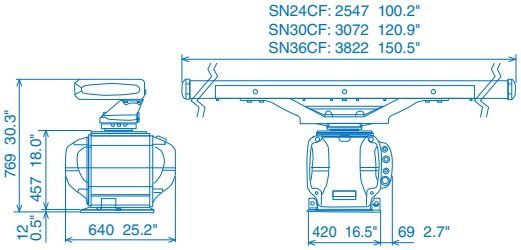
10 ft S-Band Antenna SN30AF 135 kg 297.6 lb
12 ft S-Band Antenna SN36AF 142 kg 313.1 lb



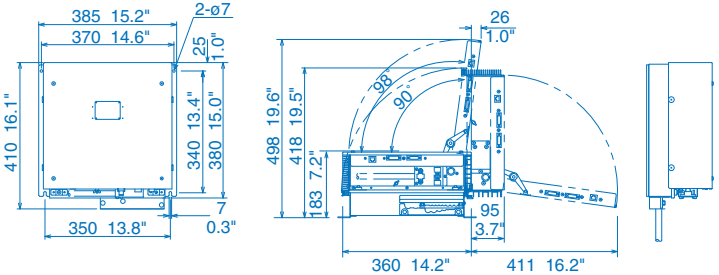
4 ft Open Antenna XN12CF 46.2 kg 101.9 lb
6.5 ft Open Antenna XN20CF 48.1 kg 106.1 lb
8 ft Open Antenna XN24CF 43.9 kg 108.7 lb



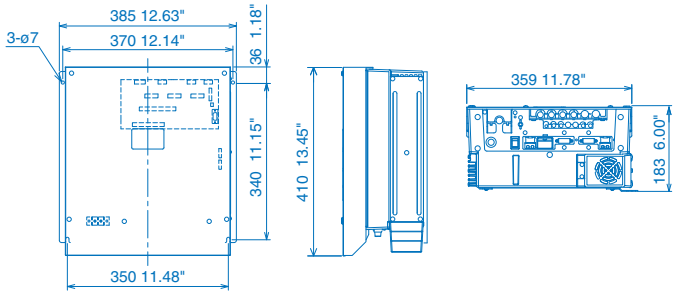
8 ft Open Antenna SN24CF 129 kg 284 lb
10 ft Open Antenna SN30CF 135 kg 297.6 lb
12 ft Open Antenna SN36CF 140 kg 308.6 lb



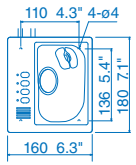
Processor Unit RPU025 10 kg 22 lb

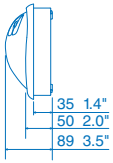


Processor Unit RPU025 for X-Band/S-band (24 rpm) 9.6 kg 21.2 lb (w/ Fan)
Processor Unit RPU025 for S-band (42 rpm) 11.5 kg 25.4 lb (w/ 2 Fans)

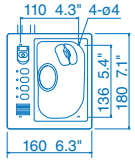


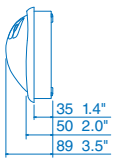
Trackball Control Unit RCU016 2.4 kg 5.3 lb





Trackball Control Unit RCU015 2.4 kg 5.3 lb





Keyboard Control Unit RCU014 3.7 kg 8.2 lb

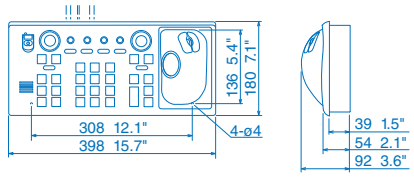


Chart Radar

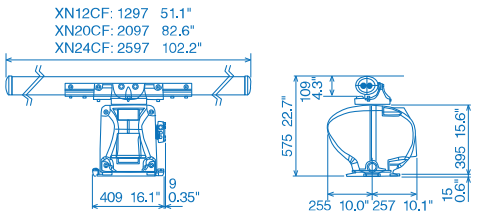
MODEL		FAR3000BB (X-Band Magnetron or Solid-State)	FAR3000BB (S-Band Magnetron or Solid State)
ANTENNA			
Type		1260 mm Open (4'), 2040 mm Open (6.5') or 2550 mm Open (8')	3765 mm S-Band (12')
Beamwidth	Horizontal	1.9˚(4' Open: XN12CF), 1.23˚(6.5' Open: XN20CF) or 0.95˚(8' Open: XN24CF)	1.8˚ (12' S-Band: SN36CF)
	Vertical	20˚	25˚
Rotation speed		24 rpm or 42 rpm	
RF TRANSCEIVER			
Frequency		9410 ±30 MHz	3050 ±30 MHz
Pulselength & PRR		0.125, 0.25 NM: 0.07 µs/3000 Hz 0.5 NM: 0.07, 0.15 µs/3000 Hz 0.75 NM: 0.07, 0.15, 0.3 µs/3000, 1500 Hz 1 NM: 0.07, 0.15, 0.3 µs/3000, 1500 Hz 1.5, 2 NM: 0.07, 0.15, 0.3, 0.5 µs/3000, 1500, 1200 Hz 3, 4 NM: 0.15, 0.3, 0.5, 0.7 µs/3000, 1500, ,200, 1000 Hz 6, 8, 12 NM: 0.3, 0.5, 0.7, 1.2 µs/1500, 1200, 1000, 600 Hz 16, 24 NM: 0.5, 0.7, 1.2 µs/1200, 1000, 600 Hz 32, 48, 96 NM: 1.2 µs/600 Hz	0.125, 0.25 NM: 0.07 Q0N/5.0, 2400 Hz 0.5 NM: P0N 0.07, 0.18, Q0N/5.0 7.5, 2400 2000 Hz 0.75, 1 NM: P0N 0.07 0.18 0.3, Q0N/5.0 7.5 12.5, 2400 2000 1500 Hz 1.5, 2 NM: P0N 0.07 0.18 0.3, Q0N/5.0 7.5 12.5, 2400 2000 1500 Hz 3, 4 NM: P0N 0.07 0.18 0.3, Q0N/5.0 7.5 12.5, 2400 2000 1500 Hz 6, 8 NM: P0N 0.3 0.5 0.7 1.2, Q0N/12.5 17.5 18.3, 1500 1060 1000 600 Hz 12, 16, 24 NM: P0N 0.5 0.7 1.2, Q0N/17.5 18.3,1060 1000 600 Hz 32, 48, 96 NM: P0N 1.2, Q0N/18.3,600 Hz
Output power		12/25 kW Magnetron, 600 W Solid State	30 kW Magnetron, 250 W Solid-State
DISPLAY			
Accuracy	Range	1% of the maximum range of the scale in use or 10 m, whichever is the greater	
	Bearing	±1˚	
Range and range Ring interval	Range	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12,16, 24, 32, 48, 72, 96 NM	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8,12, 16, 24, 32, 48, 72, 96 NM
	Ring	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 12, 16 NM	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 12,16 NM
Echo trail		Interval: 15, 30 s, 30 m or continuous	
TT targets		Up to 200	
AIS targets		Up to 1000 (Data input from AIS, GPS and heading is required)	
Interface (IEC61162, NMEA0183)	Input	ABK, ACN (ACM), ALC, ALF, ALR, ARC, CUR, DBT, DDC, DPT, DTM, GGA, GLL, GNS, HBT, HCR, HDT, MTW, MWD, MWV, NRM, NRX, NSR, RMC, RRT, SRP, THS, VBW, VDM, VDO, VDR, VHW, VLW, VSD, VTG, ZDA	
	Output	ABM, ACK, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT, OSD, RRT, RSD, RTE, SRP, TLB*, TTD*, TTM*, WPL, VSD (*external data required)	
ENVIRONMENT			
Temperature	Processor unit	-15° C to +55° C	
	Antenna unit	-25° C to +55° C	
Waterproofing	Processor unit	IP20	
	Antenna unit	IP56	
POWER SUPPLY			
	Processor unit	100-230 VAC, 1 phase, 50/60 Hz PSU014: 3.7 A PSU015: 6.4 A PSU016: 2.8 A PSU017: 5.6 A	
	Monitor unit	MU-190: 100-230 VAC, 0.7-0.4 A	MU-231: 100-230 VAC, 1.0-0.6 A MU-270W: 100-230 VAC, 0.7-0.4 A

Drawings

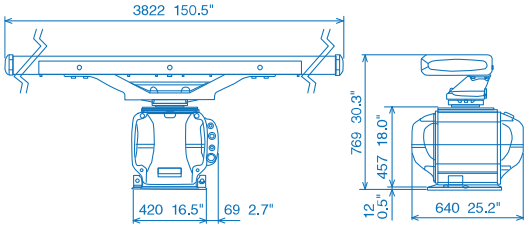
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FAR3000BB (S or X-Band, Solid-State or Magnetron)

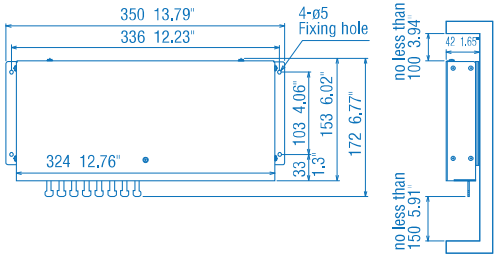
4 ft Open Antenna XN12CF 46.2 kg 101.9 lb
6.5 ft Open Antenna XN20CF 48.1 kg 106.1 lb
8 ft Open Antenna XN24CF 43.9 kg 108.7 lb



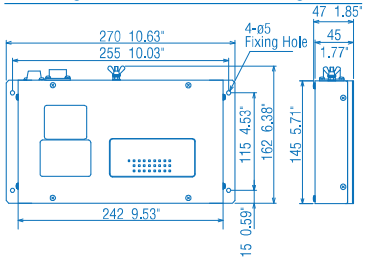
12 ft Open Antenna SN36CF 144 kg 317.5 lb



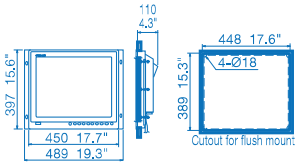
Intelligent Hub HUB3000 1.5 kg 3.31 lb



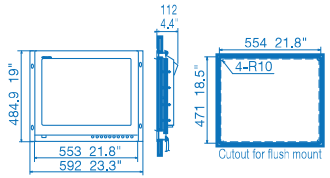
Switching Hub HUB100 1.5 kg 3.31 lb



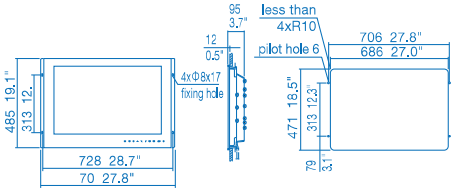
Monitor Unit MU190 8.8 kg 19.4 lb



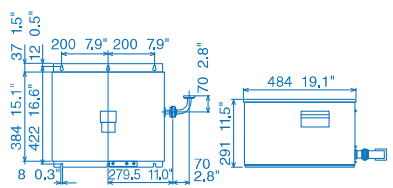
Monitor Unit MU231 12.8 kg 28.2 lb



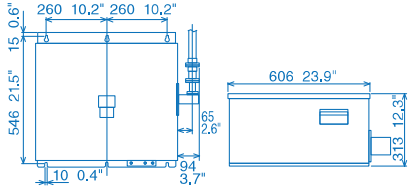
Monitor Unit MU270W 13 kg 28.7 lb



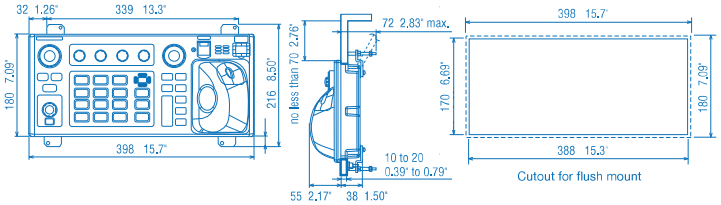
Transceiver Unit RTR108 17 kg 37.5 lb



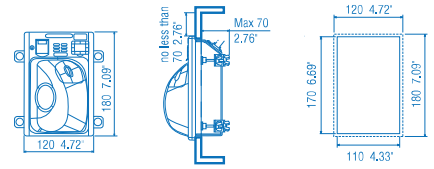
Transceiver Unit RTR109 22 kg 48.5 lb



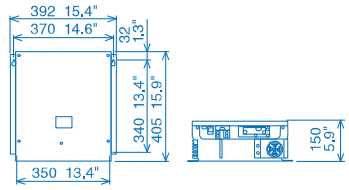
Control Unit RCU025 3.1 kg 6.84 lb



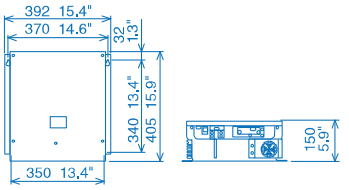
Trackball Control Unit RCU026 1.5 kg 3.31 lb



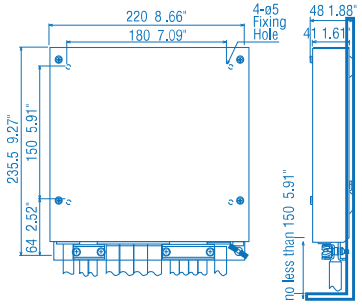
Power Supply Unit PSU014/016 8.5 kg 18.7 lb



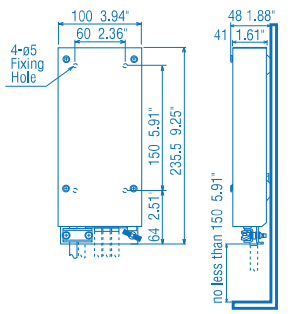
Power Supply Unit PSU015/018 10 kg 22 lb



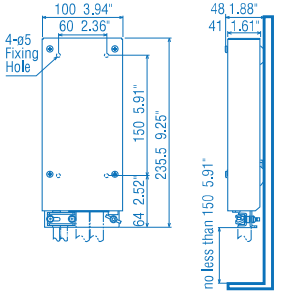
Sensor Adapter (Serial) MC3000S 1.5 kg 3.3 lb



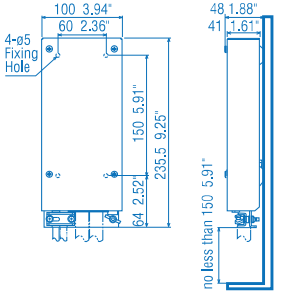
Sensor Adapter (Analog) MC3010A 0.8 kg 1.8 lb



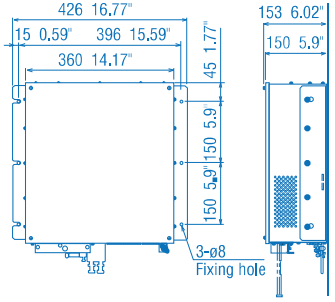
Sensor Adapter (Digital IN) MC3020D 0.8 kg 1.8 lb



Sensor Adapter (Digital OUT) MC3030D 0.8 kg 1.8 lb



Processor Unit EC3000 14 kg 30.9 lb



4.2" GPS Navigator		
MODEL		**GP39**
GPS/WAAS		
Receive Type	GPS	Twelve discrete channels, C/A code, all-in-view
	WAAS/SBAS	Two channels
Receive Frequency		L1 (1575.42 MHz)
Time to First FIX		90 s approx. (cold start)
Tracking Velocity		1,000 kn
Geodetic Systems		WGS-84 (and others)
ACCURACY		
GPS		10 m (2 drms)
WAAS		3 m (2 drms)
MSAS		7 m (2 drms)
DISPLAY		
Type		4.2" Color LCD
Effective Display Area		92 (W) x 52 (H) mm
Screen Resolution		480 x 272
Display Modes		Plotter, Steering, Highway, NAV data, User display, Satellite monitor (Digital, Speedometer, COG)
Memory Capacity		3,000 ship's track points; 10,000 waypoints with comments; 100 routes, 30 waypoints/route
Alarms		Arrival, Anchor watch, Cross track error, Speed, WAAS (SBAS), Time, Trip
INTERFACE		
Ports		NMEA0183: 1, USB: 1
Interface	Output	(NMEA0183) AAM, APB, BOD, BWC, BWR, DTM, GGA, GLL, GSA, GSV, RMB, RMC, VTG, XTE, ZDA
	Input	(NMEA0183) RTE, TLL
ENVIRONMENT		
Temperature	Display Unit	-15° C to +55° C
	Antenna Unit	-25° C to +70° C
Waterproofing	Display Unit	IP55
	Antenna Unit	IP56
POWER SUPPLY		
	Non NMEA2000	12-24 VDC: 0.7-0.3 A
	NMEA2000	-

5.7" GPS DGPS Navigator		
MODEL		**GP170/GP170D**
GPS/WAAS		
Receive Type	GPS	Twelve discrete channels, C/A code, all-in-view
	WAAS	Two channels
Receive Frequency		L1 (1575.42 MHz)
Time to First FIX		90 s approx. (cold start)
Tracking Velocity		1,000 kn
Geodetic Systems		WGS-84 (and others)
ACCURACY		
	GPS	10 m (2 drms, HDOP<4)
	DGPS	5 m (2 drms, HDOP<4)
	WAAS	3 m (2 drms, HDOP<4)
	MSAS	7 m (2 drms, HDOP<4)
DISPLAY		
Type		5.7" color LCD
Effective Display Area		116.2 (W) x 87.1 (H) mm
Screen Resolution		640 x 480
Display Modes		Plotter, Highway, Course, Data, Integrity
Memory Capacity		Track: 1,000 points, Mark: 2,000 points; Waypoints: 1,000 points with 20 characters comment each; Route: 100 routes (containing 1,000 waypoints each)
Alarms		Notice: Arrival, Anchor watch, XTE, Speed, Trip
INTERFACE		
Serial (IEC 61162-1, -2)		4 ports (1 port IEC 61162-2 In/Out; 2 ports IEC 61162-1 In/Out; 1 port IEC 61162-1 Out)
Data port 1, 2	Input	ACK, ACN, CRQ, DBT, DPT, HBT, HDG, HDM**, HDT**, MSK, MSS, MTW, THS, TLL, VBW, VHW ** not used for SOLAS ships
	Output	AAM, ALC, ALF, ALR, APB, ARC, BOD, BWC, BWR, BWW, DTM, GBS, GGA, GLL, GNS, GRS, GSA, GST, GSV, HBT, POS, RMB, RMC, RTE, VDR, VTG, WCV, WNC, WNR, WPL, XTE, ZDA
Data port 3	Input	MOB from external device (contact closure)
	Output	AAM, ALC, ALF, ALR, APA, APB, ARC, BOD, BWC, BWR, BWW, DTM, GBS, GGA, GLL, GNS, GRS, GSA, GST, GSV, HBT, MSK*, MSS**, POS, RMB, RMC, RNN, RTE, VDR, VTG, WCV, WNC, WNR, WPL, XTE, ZDA, RTCM sc104 *when either internal/external beacon receiver is used ** when internal beacon receiver is used
Data port 4, IEC/NMEA Mode		Same as Data port 1, 2
Ethernet (IEC 61162-450)		1 port
	Input	ACK, ACN, DBT, DPT, HBT, HDG, HDM**, HDT**, MTW, THS, TLL, VBW, VHW ** not used for SOLAS ships
	Output	AAM, ALC, ALF, ALR, APB, ARC, BOD, BWC, BWR, BWW, DTM, GBS, GGA, GLL, GNS, GRS, GSA, GST, GSV, HBT, POS, RMB, RMC, RTE, VDR, VTG, WCV, WNC, WPL XTE, ZDA *when either internal/external beacon receiver is used ** when internal beacon receiver is used
ENVIRONMENT		
Temperature	Display Unit	-15˚ C to +55˚ C
	Antenna Unit	-25˚ C to +70˚ C
Waterproofing	Display Unit	IP25
	Antenna Unit	IP56
POWER SUPPLY		
		12-24 VDC
		0.8 - 0.4 A (w/internal beacon receiver)

		7" Wide Chart Plotter/Fish Finder	9" Wide Chart Plotter/Fish Finder
MODEL		**GP1871F**	**GP1971F**
GPS/WAAS			
Receive Type	GPS	72 channels	
	WAAS	1 channel	
Receiving Frequency		L1 (1575.42 MHz)	
Time to First FIX		80 s approx. (cold start)	
Tracking Velocity		999 kn	
SBAS (Satellite-Based Augmentation System)		WAAS, EGNOS, MSAS	
Electronic Chart		C-MAP 4D (optional), Navionics (optional)	
ACCURACY			
Internal Antenna		GPS:10 m Max, WAAS: 5 m Max, MSAS: 7.5 m Max	
DISPLAY			
Type		7" Wide Color TFT LCD	9" Wide Color TFT LCD
Screen Size		154 x 85 mm	199 x 113 mm
Screen Resolution		WVGA 800 x 480 pixels	WVGA 800 x 480 pixels
Screen Brightness		1000 cd/m2 (typical)	1000 cd/m2 (typical)
Language		English (US & UK), French, Spanish, German, Italian, Portuguese, Danish, Swedish, Norwegian, Finnish, Greek, Japanese, Chinese	
Display Modes		Chart Plotter, Fish Finder, Radar*1, AIS*2, Instruments*3 (Nav Data, Engine, Wind, Fuel tank, Autopilot*4, etc.), GPS status *1: Connected to the 1st Watch Wireless Radar DRS4W required; *2: Connected to AIS sensor required; *3: Connected to external sensors required; *4: Connected to the FURUNO NAVpilot-300 or 700 series require	
Memory Capacity		30,000 points for ship's track and waypoints, 1,000 planned routes (Max. 50 points per route) 5,000 quickpoints	
FISH FINDER			
Transmit Frequency		CW: 50/200 kHz, Single-Channel CHIRP: 40 to 225 kHz	
Transducer		300 W or 600 W or 1 kW* (Transducer dependent) * Matching box MB-1100 required for some FURUNO transducers.	
Display Range		5-1,200 m, shift: 0-500 m	
Extension Mode		CHIRP*, RezBoost™**, ACCU-FISH™**, Bottom Discrimination**, Auto gain (Fishing/Cruising), Manual gain, A-Scope, Marker Zoom, Bottom Zoom, Bottom Lock *: Chirp dedicated transducer required; **: Dual frequency compatible transducer required	
Picture Advance		8 steps: x4, x2, 1/1, 1/2, 1/4, 1/8, 1/16, stop	
WIRELESS LAN			
Transmit Frequency		2.4 to 2.472 GHz (1 o 13 channels), IEEE802.11b/g/n	
Security		WAPI, IEEE802.11i advanced security	
INTERFACE			
NMEA0183		1 Port	
Interface (NMEA0183)	Input	DBT, DPT, DSC, DSE, GGA, GLL, GNS, HDG, HDT, MTW, MWV, RMA, RMC, ROT, RSA, THS, TLL, VHW, VTG, ZDA, PFEC (GPatt/SDmrk/SDtbd/SDtfl/pireq)	
	Output	AAM, APB, BOD, BWR, DBT, DPT, GGA, GLL, GNS, GSA, GSV, GTD, HDG, HDT, MTW, MWV, RMA, RMB, RMC, RTE, THS, TLL, VHW, VTG, WPL, XTE, ZDA, PFEC (SDmrk/SDtbd/SDtfl/pidat)	
NMEA2000		1 Port	
Interface (NMEA2000)	Input	126992, 127245, 127250, 127251, 127258, 127488, 127489, 127493, 127497, 127505, 128259, 128267, 128275, 129025, 129026, 129029, 129038, 129039, 129040, 129041, 129284, 129285, 129538, 129540, 129793, 129794, 129798, 129808, 129809, 129810, 130306, 130310, 130311, 130312, 130313, 130314, 130316, 130577, 130830, 130831, 130832, 130880	
	Output	126992, 127245, 127250, 127251, 127257, 127258, 127505, 128259, 128267, 128275, 129025, 129026, 129029, 129033, 129283, 129284, 129285, 130306, 130310, 130312, 130316, 130830, 130831, 130832	
Micro SD Cart Slot		2 Slots (SD, SDHC Acceptable)	
ENVIRONMENT			
Temperature		-15° C to +55° C (Storage -20° C to +70° C)	
Waterproofing		IP56	
POWER SUPPLY			
		12-24 VDC, 1.0-0.5 A	12-24 VDC, 1.0-0.5 A

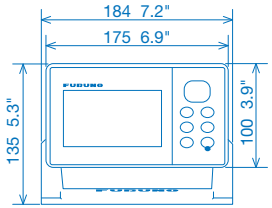
		12.1" Chart Plotter	12.1" Chart Plotter/Fish Finder
MODEL		**GP3700**	**GP3700F**
GPS/WAAS			
Receive Type	GPS	12 channels	
	WAAS/SBAS	2 channels	
Receiving Frequency		L1 (1575.42 MHz)	
Time to First Fix		90 s approx. (cold start)	
Tracking Velocity		999 kn	
SBAS (Satellite-Based Augmentation System)		WAAS, EGNOS, MSAS	
Electronic Chart		MapMedia VECTOR	
ACCURACY			
Internal Antenna		GPS:10 m Max, DGPS: 5 m Max, SBAS: 7 m Max	
DISPLAY			
Type		12.1" Color IPS LCD	12.1" Color IPS LCD
Screen Size		246 x 184.5 mm	246 x 184.5 mm
Screen Resolution		600 x 800 pixels	600 x 800 pixels
Language		English, Chinese, Thai	
Display Modes		GP-3700: Head Up, North Up, Auto Course Up, Course Up, Go To Up, Specified Direction Up. GP-3700F: As GP-3700, plus Plotter+Dual Frequency, Plotter+Single Frequency, Dual Frequency, Single Frequency	
Memory Capacity		30,000 points for ship's track, 3,500 waypoints with comments (35 QP), 200 planned routes (Max. 100 points per route),	
FISH FINDER			
Transmit Frequency		50/200 kHz	
Transducer		600 W or 1 kW* (Transducer dependent) * Matching box MB-1100 required for some FURUNO transducers.	
Display Range		5-1,200 m, shift: 0-1,200 m	
Extension Mode		ACCU-FISH™*, Marker Zoom, Bottom Zoom, Bottom Lock, Bottom Discrimination* *Dual frequency compatible transducer required.	
Picture Advance		6 steps: x2, 1/1, 1/2, 1/4, 1/8, 1/16	
INTERFACE			
NMEA0183		3 Ports	
Interface (NMEA0183)	Input	ALR, BLV, CRQ, CUR, DBK, DBS, DBT, DPT, GGA, GLL, GNS, HDG, HDM, HDT, MSK, MTW, MWV, RMA, RMB, RMC, TLL, TTM, VDM, VDR, VHW, VTG, VWR, VWT, THS, ZDA	
	Output	AAM, APB, BOD, BWC, BWR, DBT, DPT, DTM, GGA, GLL, GNS, GSA, GSV, GTD, HDG, HDT, MSK, MSS, MTW, MWV, RMA, RMB, RMC, RTE, THS, TLL, TTM, VHW, VTG, WPL, XTE, ZDA	
NMEA2000/NMEA		1 Port	
Interface (NMEA2000)	Input	059392/904, 060928, 126208/464/996, 127237/250, 129538, 130577	
	Output	059392/904, 060928, 126208/464/992/993/996, 127258, 128267/275, 129025/026/029/033/283/284/285/538/539	
USB Port		1 Port	
ENVIRONMENT			
Temperature		-15° C to +55° C	
Waterproofing	Display	IPX2	
	Antenna	IP56	
POWER SUPPLY			
		12-24 VDC, 2.5-1.3 A	12-24 VDC, 2.8-1.5 A

Drawings

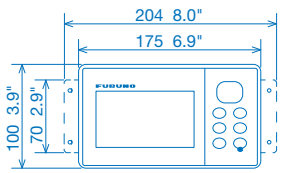
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

GP39

Display Unit (Bracket Mount) 0.39 kg 0.86 lb

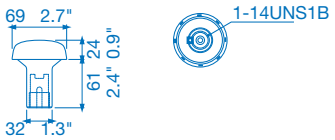


Display Unit (Flush Mount) 0.36 kg 0.79 lb

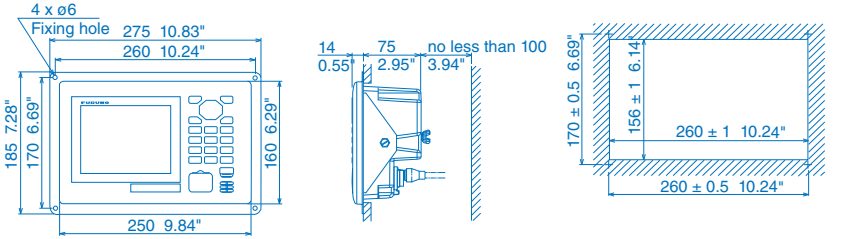


GP170/GP170D

GPS Antenna GPA017S 0.6 kg 1.3 lb

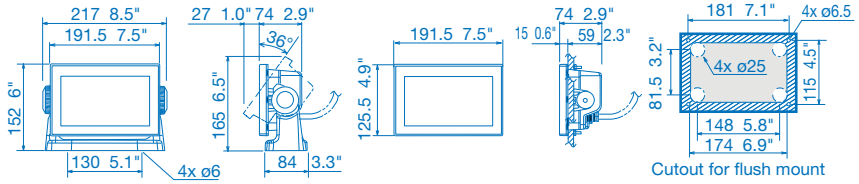


Display Unit (with optional flush mount kit) 2.2 kg 4.9 lb (without DGPS beacon receiver)
2.4 kg 5.29 lb (with DGPS beacon receiver)



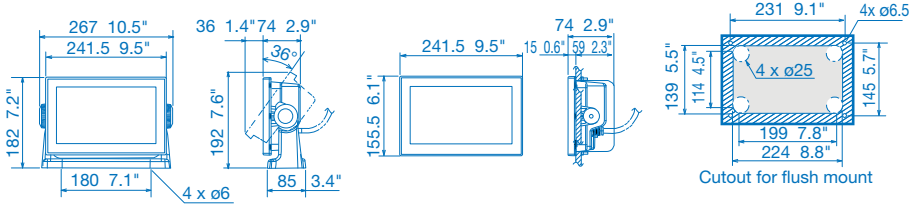
GP1871F

Display Unit (Bracket Mount) 1.1 kg 2.4 lb
Display Unit (Flush mount) 0.9 kg 2.0 lb



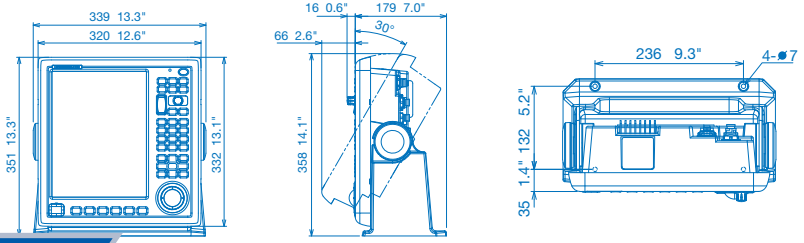
GP1971F

Display Unit (Bracket Mount) 1.5 kg 3.3 lb
Display Unit (Flush mount) 1.3 kg 2.9 lb



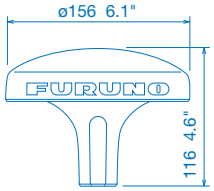
GP3700/3700F

Display Unit (Bracket Mount) 4.8 kg 10.6 lb



DGPS Antenna

GPA021S 0.52 kg 1.15 lb



NOTES

		5.7" Fish Finder	8.4" Fish Finder	10.4" LCD Fish Finder	12.1" LCD Fish Finder
MODEL		**FCV628**	**FCV588**	**FCV295**	**FCV1150**
GENERAL					
Frequency		50 and 200 kHz		The synthesized transducer works with frequencies in 28 to 200 kHz	
Transducer		600 W	600 W/1 kW*	1, 2 or 3 kW	
DISPLAY					
Type		5.7" TFT color LCD	8.4" TFT color LCD	10.4" TFT color LCD	12.1" TFT color LCD
Screen Resolution		VGA 480 x 640 pixels		640 x 480	800 × 600
Display Mode		Single frequency (50 or 200 kHz), Dual-frequency, Zoom, Nav data, A-scope, Marker zoom, Bottom zoom, Bottom-lock, Bottom Discrimination, ACCU-FISH™, RezBoost™		Single mode (high/low frequency), Dual-frequency, Zoom, Mix, A-scope, Marker zoom, Bottom zoom, Bottom-lock expansion	
Display Range *m, ft, fa, p/b can be selectable in the menu		2-1200 m		5-3000 m	
Range Shift		up to 1200 m		0-2000 m	
Zoom Range	Bottom-lock expansion	2-10 m		5-200 m	
	Bottom & Marker Zoom	2-1200 m			
Picture Advance Speed		8 steps: stop, 1/16, 1/8, 1/4, 1/2, x1, x2, x4		6 steps: stop, 1/16, 1/8, 1/4, 1/2, x1, x2, x4	
Pulselength & TX rate		0.04-3.0 ms, Max 3,000 pulse/min		0.1-5.0 ms, 20-3000 pulse/min	
Interface (IEC61162-1, NMEA 0183 Ver 1.0/2.0/3.0)	Input	BWC, GGA, GLL, GNS, HDG, HDT, MDA, MTW, MWV, RMA, RMB, RMC, VHW, VTG, XTE, ZDA		BWC, GGA, GLC, GLL, GNS, GTD, HDG, HDT, MDA, MTW, MWW, RMA, RMB, RMC, VHW, VTG, XTE	BWC, GGA, GLC, GLL, GNS, GTD, HDG, HDT, MDA, MTW, MWW, RMA, RMB, RMC, VHW, VTG, XTE, HVE, att, hve, req
	Output	DBS, DBT, DPT, MTW*, RMB*, VHW*, TLL* by key operation * External data required.		DBS, DBT, DPT, MTW*, TLL**, BHR***, SDmrk, VHW, RMB, dat *Optional sensor required **External data required ***requires CA50/200-1T or CA50/200-12M transducer	
ENVIRONMENT					
Temperature		-15° C to +55° C			
Waterproofing		IP56		IP55 (When flush mounted)	
POWER SUPPLY					
		12-24 VDC: 1.1-0.5 A	12-24 VDC: 1.3-0.6 A	12-24 VDC: 2.6-1.3 A, 100/110/220/230 VAC, optional rectifier required	12-24 VDC: 3.3-1.7 A, 100/110/220/230 VAC, optional rectifier required

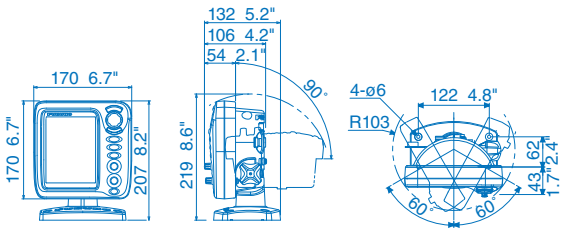
* The FCV588 can be connected with the transducers of 1 kW output power, when interfaced with the Matching Box MB1100 for some Furuno transducers.

Drawings

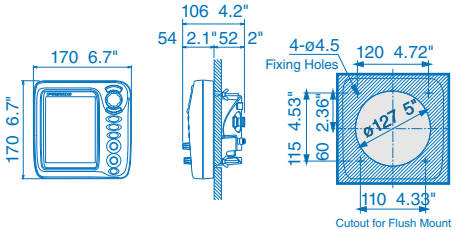
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FCV628

Display Unit
(Bracket Mount) 1.3 kg 2.9 lb

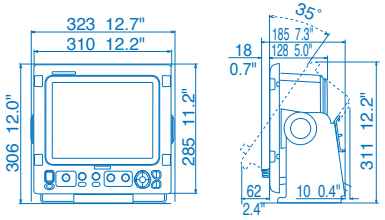


Display Unit
(Flush Mount) 0.9 kg 2.0 lb



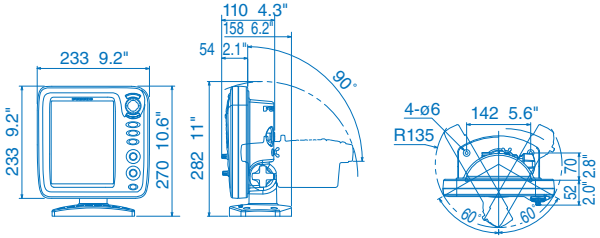
FCV295

Display Unit
Flush Mount) 7.0 kg 15.4 lb

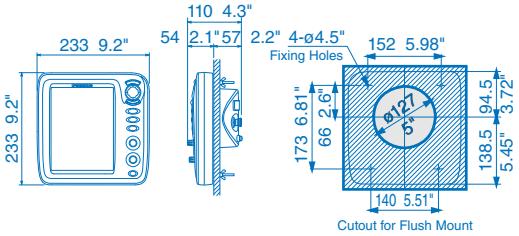


FCV588

Display Unit
(Bracket Mount) 2.3 kg 5.1 lb

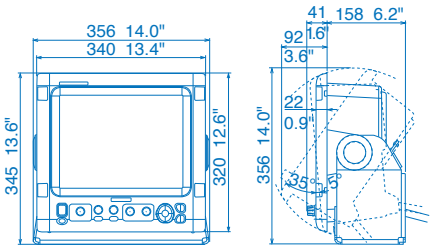


Display Unit
(Flush Mount) 1.6 kg 3.5 lb

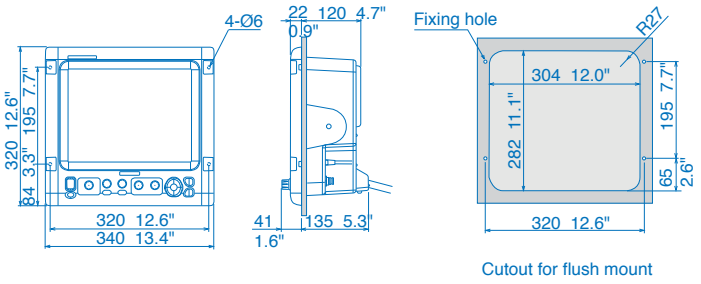


FCV1150

Display Unit
(Bracket Mount) 8.2 kg 18.1 lb



Display Unit
(Flush Mount) 6.8 kg 15 lb



Cutout for flush mount

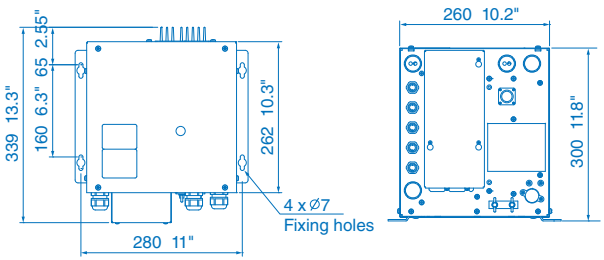
		Fish Finder	Hi-Resolution TruEcho CHIRP™ Fish Finder	TruEcho CHIRP™ with unique Fish Size Indicator
MODEL		**FCV1900**	**FCV1900B**	**FCV1900G**
GENERAL				
Frequency		The synthesized transducer works with frequencies in 15 to 200 kHz		
Transducer		1, 2 or 3 kW		
DISPLAY (Processor unit)				
Display mode		Single frequency high/low), Dual-frequency, Zoom, User 1/2 (available to use mixture, multi-gain, telesounder and external sounder display), Bottom-lock expansion, Bottom zoom, Marker zoom, Discrimination zoom		
Display Range *m, ft, fa, p/b can be selectable in the menu		5 to 3000 m		
Range Shift		up to 2000 m		
Zoom Range		2 to 200 m		
Fish size histogram		-	-	2 m depth or more, specified transducer required
Picture Advance Speed		6 steps: stop, 1/4, 1/2, 1/1, 2/1, 4/1		
Data recording		Echo display and measured data can be recorded to internal memory		
Language		English, Danish, French, Spanish, Norwegian, Russian, Chinese, Korean, Japanese		
INTERFACE				
NMEA0183		3 Ports for Input/Output		
Interface	Input	GGA, GLL, GNS, MTW, VHW, VTG, ZDA		
(NMEA 0183 Ver 1.5/2.0/3.0)	Output	DBS, DBT, DPT, MTW, TLL		
LAN		1 port*, Ethernet 100Base-TX *Hub required		
CIF		1 port		
Net sonde		1 port (sonde marker/sonde KP)		
Video		1 port, HDMI type-D		
External KP		1 port		
Temperature sensor		1 port		
USB		1 port (USB2.0)		
ENVIRONMENT				
Temperature		-15° C to +55° C		
Waterproofing		IP22		
POWER SUPPLY				
		12-24 VDC: 8.3-3.9 A		

Drawings

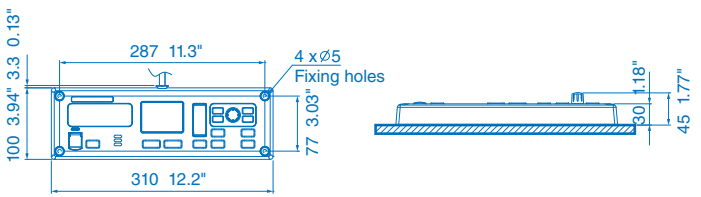
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FCV1900

Processor Unit FCV1901 — 10.2 kg 22.5 lb



Control Unit FCV1902 — 1.1 kg 2.4 lb



TRANSDUCERS for FCV295/FCV1150/FCV1900/DFF3/DFF3-UHD			
Output	**1 kW**	**2 kW**	**3 kW**
28 kHz	CA28F-8	CA28BL-6HR	CA28BL-12HR
38 kHz	—	CA38BL-9HR	CA38BL-15HR
50 kHz	CA50B-6/6B, CA50B-9B	CA50B-12, CA50BL-12HR	CA50BL-24H, CA50BL-24HR
68 kHz	CA68F-8H	—	CA68F-30H
82 kHz	—	CA82B-35R	—
88 kHz	CA88B-8	CA88B-10	CA88F-126H
107 kHz	—	—	CA100B-10R
150 kHz	—	—	CA150B-12H
200 kHz	CA200B-5S	CA200B-8/8B	CA200B-12H
50/200 kHz	CA50/200-1T*, CA50/200-1ST**	—	—
* ACCU-FISH™ compatible for FCV-1900/DFF3 ** Except for FCV-1900			

TRANSDUCERS for FCV1900B/1900G (CHIRP)			
Output	**1 kW**	**2 kW**	**2 kW/3 kW**
42 to 65 kHz (low)/130 to 210 kHz (high)	CM265LH *	—	—
42 to 65 kHz (low)/85 to 135 kHz (high)	CM265LM	—	—
42 to 65 kHz (low)/150 to 250 kHz (high)	CM275LHW **	—	—
38 to 75 kHz (low)/130 to 210 kHz (high)	—	PM111LH *	—
38 to 75 kHz (low)/80 to 130 kHz (high)	—	PM111LM	—
28 to 60 kHz (low)/130 to 210 kHz (high)	—	—	CM599LH *
28 to 60 kHz (low)/80 to 130 kHz (high)	—	—	CM599LM
* ACCU-FISH™ and fish size histogram compatible. ** Wide beam type transducer with high frequency beam width of 25°			

TRANSDUCERS for DFF1-UHD (CHIRP)	
Output	**1 kW**
42 to 65 kHz (low)/130 to 210 kHz (high)	CM265LH, CM275LHW, B265LH, B275LHW (Airmar®)

TRANSDUCER for DFF3D (Multibeam)	
Output	**800 W**
165 kHz	165T-B54 Through Hull with Motion Sensor
165 kHz	165T-TM54 Transom Mount with Motion Sensor
165 kHz	165T-CM54 Pocket or Keel Mount with Motion Sensor
165 kHz	165T-SS54 Stainless Steel Through Hull with Motion Sensor
165 kHz,	165T-50/200-TM260 Transom Mount Combo
165 kHz,	165T-50/200-SS260 Stainless Steel Through Hull Combo
165 kHz,	165T/265LH-PM488 Pocket Mount Combo
165 kHz,	165T/275LHW Pocket Mount Combo Wide Beam
165 kHz,	165T-PM542LM Pocket Mount Combo
165 kHz,	165T-PM542LHW Pocket Mount Combo

TRANSDUCERS for DFF3D & BBDS1/DFF3D & DFF1-UHD (COMBINATION)	
Output	**1 kW**
165 kHz and 50/200 kHz Multibeam and Conventional	165T-50/200-SS260 (Thru-hull)
	165T-50/200-TM260 (Transom)
165 kHz and 42 to 65 kHz (low)/130 to 210 kHz (high) Multibeam and CHIRP	165T/265LHPM488 (Pocket)

TRANSDUCERS for GP1871F/1971F (CHIRP)			
Output	**300 W**	**600 W**	**1 kW**
40 to 60 kHz (Low)	—	—	B175L
40 to 75 kHz (Low)	B75L/SS75L	—	—
80 to 130 kHz (Medium)	—	B75M/SS75M	—
95 to 155 kHz (Medium)	B150M/TM150M	—	—
130 to 210 kHz (High)	—	B75H/SS75H	B175H
150 to 250 kHz (High)	—	—	B175HW

TRANSDUCER LIST						STAND ALONE			
Sensor Type	**Frequency**	**Type**	**Matching Box Required**	**Mount**	**Power Rating**	**FCV628**	**FVC588**	**GP1871F/1971F**	**BBDS1**
TRANSDUCER	50/200 kHz	520-5PSD	-	Thru-hull	600 W	☐ ■	☐ ■	☐ ■	☐ ■
		525-5PWD	-	Transom		☐ ■	☐ ■	☐ ■	☐ ■
		520-5MSD	-	Thru-hull		☐ ■	☐ ■	☐ ■	☐ ■
		520-PLD (P319*)	-	Thru-hull		☐ ■	☐ ■	☐ ■	-
		525T-BSD (B45*)	-	Thru-hull		☐ ■	☐ ■	☐ ■	☐ ■
		525T-PWD (P66* without speed sensor)	-	Transom		☐ ■	☐ ■	☐ ■	☐ ■
		525T-LTD/12 (B60-12*)	-	Thru-hull		☐ ■	☐ ■	☐ ■	-
		525T-LTD/20 (B60-20*)	-	Thru-hull		☐ ■	☐ ■	☐ ■	-
		SS60-SLTD/12 (SS60-12*)	-	Thru-hull		☐ ■	☐ ■	☐ ■	-
		SS60-SLTD/20 (SS6-20*)	-	Thru-hull		☐ ■	☐ ■	☐ ■	-
		CA50/200-1T	▣	Thru-hull	1 kW	-	☐ ■	☐ ■	☐ ■
		526T(ID)-HDD (B260*)	-	Thru-hull		-	☐ ■	☐ ■	☐ ■
	50 kHz	CA50B-6	▣	Thru-hull	1 kW	-	▣	▣	-
		CA50B-6B	▣	Thru-hull		-	▣	▣	-
		CA50B-9B	▣	Thru-hull		-	-	-	-
	200 kHz	CA200B-5	▣	Thru-hull	1 kW	-	-	-	-
		CA200B-5S	▣	Thru-hull		-	▣	▣	-
TRIDUCER	50/200 kHz	525ST(ID)-MSD (B744V*)	-	Thru-hull	600 W	☐ ■	☐ ■	☐ ■	☐ ■
		525ST(ID)-PWD (P66*)	-	Transom		☐ ■	☐ ■	☐ ■	☐ ■

LEGEND: ▣ Matching Box Required ☐ ACCU-FISH™ ■ Bottom Discrimination Mode

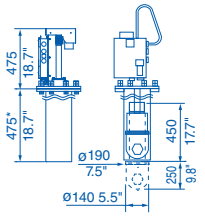
*Airmar® Model Name

		12.1" Searchlight Sonar	12.1" Dual Frequency Searchlight Sonar
MODEL		**CH500**	**CH600**
GENERAL			
Frequency		60/88/150/180/240 kHz, 1 frequency selectable	60/153 kHz or 85/215 kHz (dual frequency) selectable
Output Power		0.8-1.5 kW (depending on frequency), power reduction function available	1 kW
DISPLAY			
Type		12.1" color LCD, User-Supply (BB version)	
Screen Resolution		XGA 1024 x 768	
Brightness		0.5 to 950 cd/m2 selectable	
Display Mode		Horizontal (Normal/Zoomed/Vertical or History combined/Split horizontal + Vertical/A-Scope combined), Vertical Scan, Echo Sounder (Normal/A-Scope combined), Full-circle A-Scope (Normal/Horizontal dual)	Horizontal (Normal/Zoomed/Vertical or History combined/Split horizontal + Vertical/A-Scope combined), Vertical Scan, Echo Sounder (Normal/A-Scope combined), Full-circle A-Scope (Normal/Horizontal dual), Dual horizontal (Normal/Zoomed)/Vertical/Echo sounder, High low or mixed frequency mode selected from control unit
Display Range	Horizontal mode	10 to 2400 m, 15 steps selectable	
	Vertical mode	10 to 600 m, 15 steps selectable	
Pulselength		0.2 to 20 ms (depending on range scale)	
Audio Monitor	Output	2 W (8 ohms)	
	Frequency	Frequency 0.9 to 1.2 kHz (external speaker required)	
Language		English, Thai, Vietnamese, Chinese, Spanish, Indonesian, Malay, Burmese, French, Norwegian, Italian, Japanese	
INTERFACE			
NMEA0183		2 Ports, v1.5/2.0/3.0/4.0/4.1, 4800/9600/19200/38400 bps	
Interface	Input	CUR, DBS, DBT, DPT, GGA, GLL, GNS, HDG, HDM, HDT, MDA, MTW, RMC, VHW, VTG, ZDA	
	Output	TLL	
NMEA2000		1 Port	
Interface	Input	059392/904, 060160/416/928, 061184, 065240, 126208/720/992/996, 127250, 128259/267, 129025/026/029/033/291, 130310/311/312/316/577/821	
	Output	059392/904, 060928, 061184, 126208/464/720, 126993/996/998, 130822/823/828	
Video Signal Output		1 port, HDMI, XGA	
External KP		1 port, I/O	
Output proprietary sentence		PFEC: pidat	
HULL UNIT			
Transducer travel		400 mm or 250 mm	
Raising/Lowering Time		400 mm: 30 s, 250 mm: 20 s	
Allowable Ship's Speed		20 kn or less (15 kn during raise/lower operation)	
Horizontal Mode Control	Scanning Angle	6° to 360°, 24° step (6°, 12°, 15°, 18°, 21°, 24°)	
	Tilt Angle	5° to +90° (vertical), 1° step	
Vertical Fan Mode Control	Scanning Angle	6° to 180°, 12° step (Normal: 3°, High speed: 6°)	
Transceiver Beam Width	Horizontal (-3 dB/-6 dB)	60 kHz: 15°/20°, 88 kHz: 12°/16°, 150 kHz: 7°/9° 180 kHz: 7°/9°, 240 kHz: 6°/8°	60 kHz: 16°/22°, 153 kHz: 7°/9° 85 kHz: 11°/15°, 215 kHz: 5°/6°
	Vertical (-3 dB/-6 dB)	60 kHz: 12°/17°, 88 kHz: 10°/13°, 150 kHz: 7°/9° 180 kHz: 8°/10°, 240 kHz: 6°/8°	60 kHz: 14°/20°, 153 kHz: 5°/8° 85 kHz: 10°/14°, 215 kHz: 4°/6°
Stabilizer		Built-in motion sensor	
ENVIRONMENT			
Temperature	Display/Control/ Transceiver unit	-15° C to +55° C	
	Hull unit	0° C to +55° C (Transducer: 0° C to +35° C)	
Waterproofing	Display/Control unit	IP55	
	Transceiver/Hull unit	IP22 (Raise/lower control unit: IP55)	
POWER SUPPLY			
Display/Control/Transceiver Unit		12-24 VDC: 4.5-2.2 A	
Hull Unit		12/24 VDC: 2.2/1.1 A (7.2/3.6 A: during raising)	

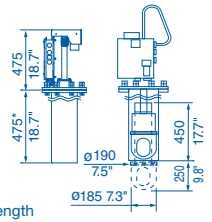
Full-Circle Scanning Sonar			
MODEL		**CSH5L MARK-2**	**CSH8L MARK-2**
GENERAL			
Frequency		55 kHz	85 kHz
DISPLAY			
Display Mode		Single scan, Fish Finder combination* (single and Fish Finder), Audio combination (single and audio pictures) * Fish Finder or Echo Sounder required	
Colors		Scan/Echo: 16 colors, Mark: 1 color	
Mark		Own ship's track, Heading line, Direction/distance, Fish school, Event, Target lock	
Range Scale		50, 85, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 800, 1000, 1200, 1600 m	
Pulselength		0.5 to 20 ms (depending on range scales)	
Ship Speed		18 kn max (raise/lower operation up to 16 kn)	
Tilt		Manual control: 0° to 55° in 1° steps Automatic tilt scan: 4° to 52°	
Audio Search (By external loudspeaker)	Frequency	800 Hz	1 kHz
	Sector	20°, 40°, 80°, and 120° selectable	
Language		English, Spanish, Danish, Dutch, French, Italian, Norwegian, Thai, Vietnamese, Burmese, Indonesian, Japanese	
INTERFACE			
NMEA0183 (Ver1.5/2.0/2.2)		2 ports	
Interface	Input	CUR, DBS, DBT, DPT, GGA*, GLC, GLL*, GTD, HDG, HDM, HDT, MTW, RMA, RMC, VDR, VHW, VTG * disabled for NMEA0183 Ver.1.5	
	Output	TLL (external data required)	
Log, E/S, KP		Speed log pulse (contact signal): 200/400 pulse/NM Sonde, E/S signal: VI-1100A applicable External KP: Current loop, 0 to 12 V	
Video Signal Output	Method	RGB analog, separated synchronization, XGA (VESA)	
	Resolution	1024 x 768 pixels, 65 MHz clock	
CIF data input		Location, Ship's speed, Bearing, Current data (1 layer), Water depth, Water temperature, Multiple layer current data	
HULL UNIT			
Transducer travel		400 mm or 600 mm	
Raising/lowering Time		400 mm: 14 s, 600 mm: 20 s	
Allowable Ship's Speed		18 kn max. (16 kn during raise/lower operation)	
Driving system		Remote electric control	
ENVIRONMENT			
Temperature		0° C to +55° C	
Waterproofing		IPX2 (w/o connector panel of processor unit)	
POWER SUPPLY			
Processor unit		100-240 VAC: 4.0-2.0 A, 1 phase, 50-60 Hz	100-240 VAC: 4.5-2.2 A, 1 phase, 50-60 Hz

CH500/CH600

6" Type Hull Unit (250mm travel)
CH505 (180 kHz) 33 kg 73 lb

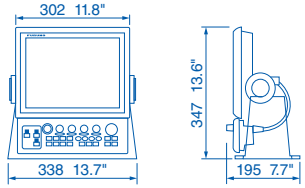


8" Type Hull Unit (250mm travel)
CH505 40 kg 88 lb



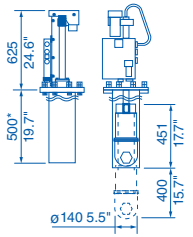
*Minimum Length

Display/Control Unit 4.0 kg 9.0 lb

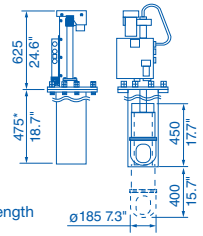


Control Unit CH502/602 1.0 kg 2.2 lb

6" Type Hull Unit (400mm travel)
CH504 34 kg 75 lb

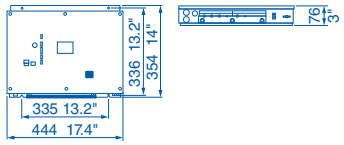


8" Type Hull Unit (400mm travel)
CH504 41 kg 90 lb



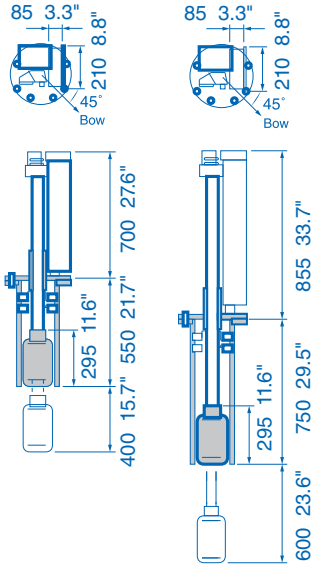
*Minimum Length

Transceiver Unit CH503 3.3 kg 7.2 lb

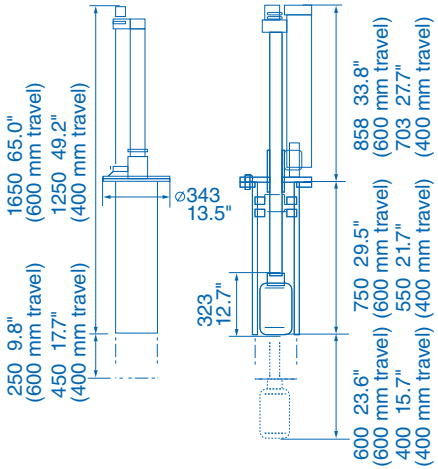


CSH5L MARK-2/CSH8L MARK-2

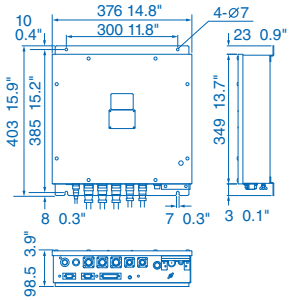
Hull Unit (400mm travel) CSH5041A 70 kg 154 lb
Hull Unit (600 mm travel) CSH5040A 75 kg 165 lb



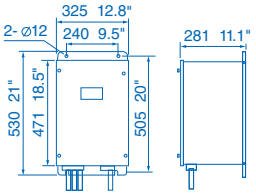
Hull Unit (400mm travel) CSH8041A 81 kg 178 lb
Hull Unit (600 mm travel) CSH8040A 82 kg 180.8 lb



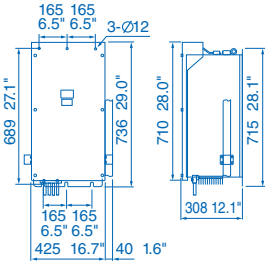
Processor Unit
CSH5210A 3.4 kg 7.5 lb



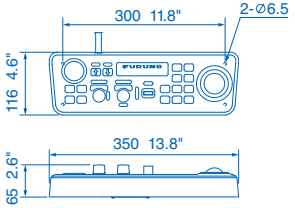
Transceiver Unit
CSH5130A-5L 20 kg 44.1 lb



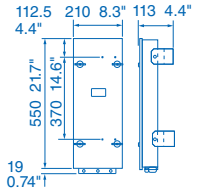
Transceiver Unit
CSH8030A-8L 37 kg 81.6 lb



Control Unit
CSH5211A 3.5 kg 7.7 lb



Preamplifier
CSH5020A 6.5 kg 14.3 lb



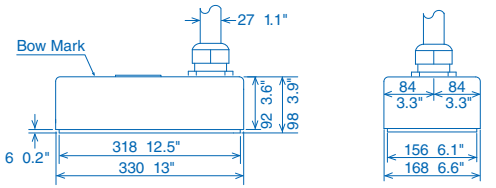
WASSP Multibeam Sonar	
MODEL	**S3/Sr3/F3/F3X/F3XL/W3/W3Pi**
GENERAL	
Transmission Frequency	S3, F3, and F3X: 160 kHz, 90-190 kHz/F3XL: 80 kHz/W3: 90-190 kHz
Effective Beam Width	F3/F3X: 200 m, F3XL: 450 m
Beam Spacing	FA: 3.2°
Beam Width	120° x 4° (Athwartships x Fore-aft), PS: 4.4°
Maximum Depth* (best performance)	F3/F3X: 200 m (Side Beam), 400 m (Main Beam directly under boat) F3XL: 450 m (Side Beam), 900 m (Main Beam directly under boat) * Depth capability subject to a variety of external factors
Max Range Resolution	2 cm
Tide Correction	Fully Geo Referenced
DISPLAY	
Display Mode	Bathymetry, Sonar polar view, Sounder (single, triple & quint beam) (Licensing options) Backscatter, Open Client Support, Water Column Targets, Uncorrected Data, XYZ export, Sidescan, RTK tides, other export formats
MINIMUM PC SPECS	
OS	Windows 8.1, 10
CPU	2 Ghz, 4 Cores/4 Threads
Memory	8 GB (Min. 4 GB)
Graphics	Direct X11
Screen Resolution	Full HD 1920 x 1080 (Min. XGA 1024 x 768)
SSD	2 TB (Min. 250 GB)
Network	Ethernet - GbE, WiFI802.11ac
Dual Screen Support	YES
INTERFACE (Transceiver Unit)	
NMEA0183/RS422/RS232	GGA, GGK, GLL, HDG, HDM, HDT, HVE, PASHR, PTNL PFEC, RMC, RCD, TSS1, ZDA
Ethernet	GbE
Other Interfaces	PPS, KP, Remote Power
ENVIRONMENT	
Temperature	0° C to +50° C (storage: -200° C to +85° C)
Waterproofing	IP56, Bulkhead mounted (IP67 option available)
POWER SUPPLY	
	9-32 VDC

Drawings

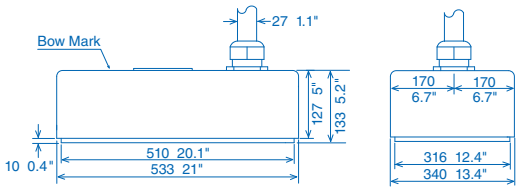
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

S3/Sr3/F3/F3X/F3XL/W3/W3Pi

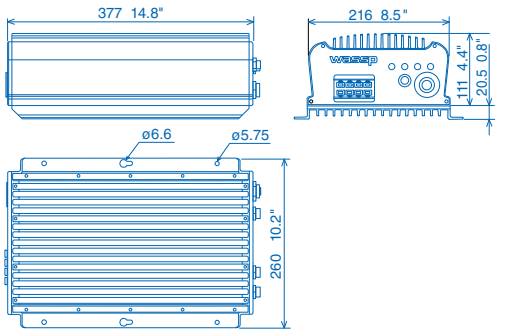
Transducer
(G3: 160 kHz) WMB-160 15 kg 33.1 lb (cable dependent)



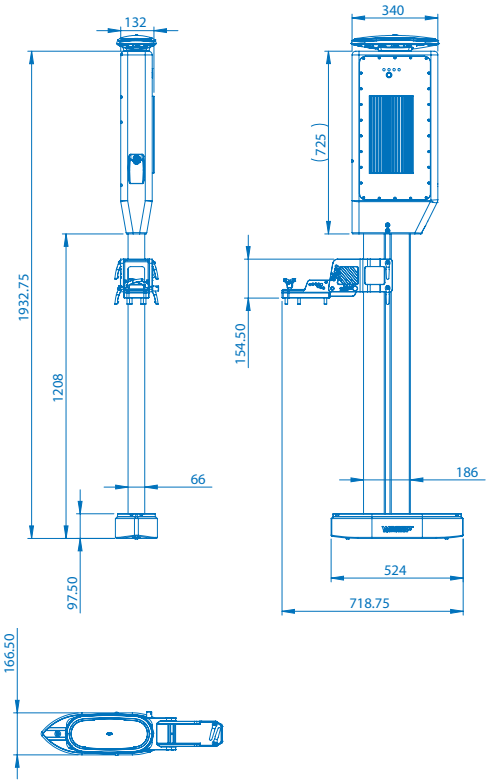
Transducer
(G3: 80 kHz) WMB-80 39 kg 86.0 lb (cable dependent)



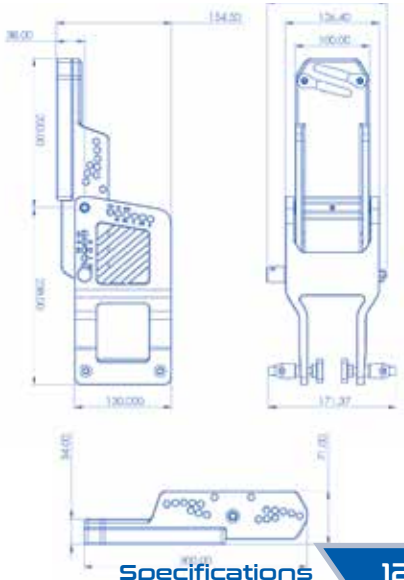
Transceiver Unit DRS (F3 DRX) 8.3 kg 18.3 lb



W3Pi Assembly



W3Pi Bracket



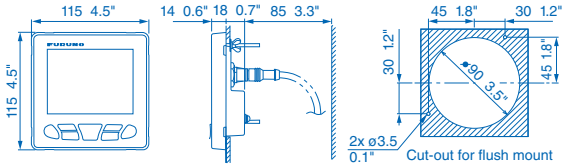
Autopilot		
MODEL		**NAVpilot 300**
CONTROL UNIT		
Type		Color LCD
Screen Size		4.1"
Effective Display Area		82.6 (W) x 61.9 (H) mm
Screen Resolution		320 x 240 dots (QVGA)
Screen Brightness		700 cd/m2 typical
Screen Contrast		8 steps
PROCESSOR UNIT		
Steering Mode		STBY, Auto, Dodge, NFU (Non-follow up), Turn, Advanced auto*, SABIKI™, Navigation*, Fish Hunter™, Override * external data required
Rudder Gain/Counter Rudder Settings		Auto / 1-20 (Manual)
Trim Adjustment		-5°(port) to +5°(stbd)
Course Change Speed		1 to 20 deg/s
Alarm		Deviation alarm, Watch alarm
Motor		10 A continuous, 20 A for 5 seconds
GESTURE CONTROLLER		
Screen Type		1.28" monochrome TFT LCD, 128 x 128
Communication Distance		10 m wide view (depending on environmental conditions) - Bluetooth
Source		3 VDC, Dry cell battery (AAA, 2 pcs)
INTERFACE		
NMEA2000		1 Port
Input		059392, 059904, 060160, 060416, 060928, 061184, 065240, 065283, 065284, 126208, 126464, 126720, 126992, 126996, 127250, 127258, 128259, 129025, 129026, 129029, 129283, 129284, 129285, 129538, 130577, 130818, 130821, 130827, 130841
Output		059392, 059904, 060928, 061184, 126208, 126464, 126720, 126993, 126996, 126998, 127237, 127245, 130816, 130821, 130822, 130823, 130827, 130841
Control		1 Port, DBW control
Contact Signal		3 Ports
ENVIRONMENT		
Temperature		-15° C to +55° C
Waterproofing	Processor Unit	IP55
	Control Unit	IP56
	Gesture Controller	IP67
POWER SUPPLY		
	Processor Unit	12-24 VDC, 0.22 A max. (LEN 2)
	Control Unit	15 VDC, 0.29 A max. (LEN 6)
FISHHUNTER™ DRIVE		
Engine	Suzuki Outboards	DF140BG/115BG, DF200AP/175AP/DF150AP, DF300AP/250AP, DF350A/325A*/300B *Not Available in US
Autopilot	Supported Qty.	Max. 4 Units
Display Device		NavNet TZtouch3 series – TZT9F/12F/16F/19F/22X/24X ver. 1.08, NavNet TZtouch2 series – TZTL12F/L15F/2BB ver. 6.21, GP-1871F/1971F – ver. 1.0, SMD series – SMD7/9 ver. 1.0, SMD12/16 ver. 5.15 For active route output to SUZUKI engines, autopilot mode display, etc.
Navigation Data		Heading, position, and vessel speed sensors for autopilot control (MFD internal GPS does not meet all requirements, SCX-20 recommended)

Drawings

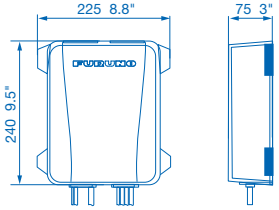
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

NAVpilot 300

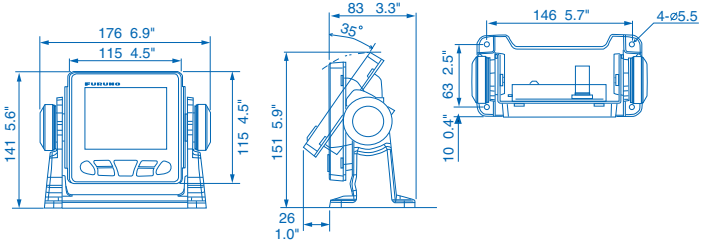
Control Unit FAP3011 (Flush Mount) 0.22 kg 0.48 lb



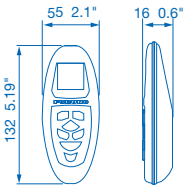
Processor Unit FAP7002 1.5 kg 3.3 lb



Control Unit FAP3011 (Bracket Mount) 0.43 kg 0.95 lb



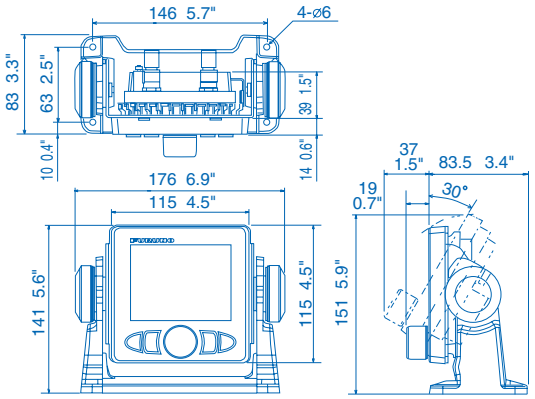
Gesture Controller GC001 0.12 kg 0.26 lb



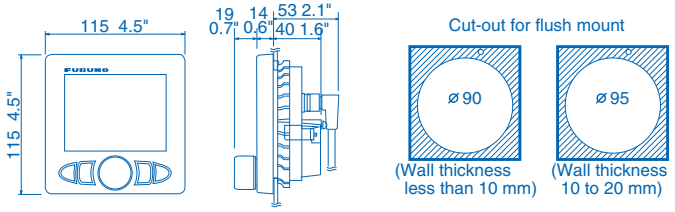
Autopilot		
MODEL		**NAVpilot 711C**
CONTROL UNIT		
Type		Color LCD
Screen Size		4.1"
Effective Display Area		82.6 (W) x 61.9 (H) mm
Screen Resolution		320 x 240 dots
Screen Backlight		8 steps
PROCESSOR UNIT		
Steering mode		STBY, Auto, Dodge (FU, NFU, Course), Turn, Remote, Advanced auto*, SABIKI™**, Navigation*, Wind*, Fish Hunter™* * external data required. ** NAVpilot-711C only.
Sea Condition Adjustment		Auto/Manual-Calm/Moderate/Rough
Rudder Angle Settings		10 - 45 deg
Alarm		Heading deviation, Cross-track error*, Ship's speed*, Depth*, Water temperature*, Wind*, Watch, Log trip* * external data required
INTERFACE		
Ports		NMEA2000: 1, NMEA0183: 2
Input	NMEA0183	AAM, APB, BOD, BWC, BWR, DBT, DPT, GGA, GLL, GNS, HDG, HDM, HDT, MTW, MWV, ROT, RMB, RMC, THS, TLL, VHW, VTG, VWR, VWT, XTE, ZDA
	NMEA2000	059392/904, 060928, 061184, 126208/720/992/996, 127250/251/258/488/489, 128259/267, 129025/026/029/033/283/284/285, 130306/310/311/312/313/314/577/818/821/827/8 80
Output	NMEA0183	DBT, DPT, GGA, GLL, GNS, HDG, HDM, HDT, MTW, MWV, RMB, RMC, ROT, RSA, VHW, VTG, VWR, VWT, ZDA
	NMEA2000	059392/904, 060928, 061184, 126208/464/720/992/996, 127237/245/250/251/258, 128259/267, 129025/026/029/033/283/284/285, 130306/310/311/312/822/823/827
ENVIRONMENT		
Temperature		-15° C to +55° C
Waterproofing	Processor unit	IP20
	Other unit	IP56
POWER SUPPLY		
		12-24 VDC: 4.0 - 2.0 A (excluding pump)

NAVpilot 711C

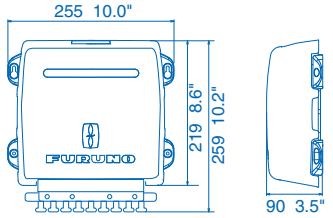
Control Unit FAP7011C (Table Mount) 0.39 kg 0.9 lb



Control Unit FAP7011C (Surface Mount) 0.33 kg 0.7 lb



Processor Unit FAP7002 1.9 kg 4.2 lb



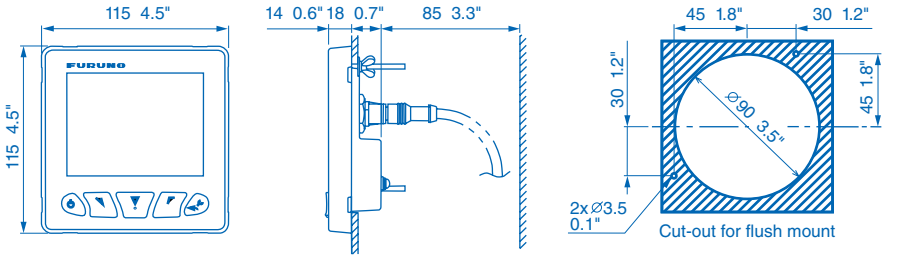
Instrument/Data Organizers	
MODEL	**FI70**
GENERAL	
Type	4.1" Color LCD
Screen Resolution	QVGA (320 x 240)
Brightness	Typical 700 cd/m2
Display Mode	Analog meter, Graph, Highway, Race timer, Simple AIS, Data box
Language	English, French, Spanish, German, Italian, Portuguese, Swedish, Danish, Norwegian, Finnish
DISPLAY DATA	
Speed	STW, Max STW, Average STW, SOG, Max SOG, Average SOG, Velocity made good (VMG)
Wind	AWS, TWS, Max TWS, AWA, TWA, Beaufort wind GWD
Heading	HDG, Average HDG, Heading on next tack, ROT
Course	COG
Timer	Count down timer 1, Count down timer 2, Count up timer
Navigation	Bearing, RNG, WPT, XTE, Position, ETA time, ETA date, Trip, Odometer
Boat	Rudder angle, Trim tabs, Roll/Pitch
Engine	Engine RPM, Trip fuel used, Fuel rate, Engine trim/tilt, Boost pressure, Engine temperature, Engine hour, Oil pressure, Oil temperature, Coolant pressure, Engine load, Transmission oil temperature, Transmission oil pressure
Tank	Tank level 1-6
Depth	Depth
AIS	AIS
Voltage	Supply voltage
Environment	Date, Time, Water temperature, Air temperature, Atmospheric pressure, Humidity, Wind chill temperature, Dew point
INTERFACE	
NMEA2000	1 port
Input	059904, 165280, 060928, 061184, 126208/720/992/996, 127237/245/250/251/257/258/488/489/493/497/505, 128259/267, 129025/026/029/033/038/039/040/283/284/285/538/794/809/810, 130306/310/311/312/313/314/316/576/577, 130816/818/821/822/825/880/841
Output	059392/904, 060928, 061184, 126208/464/720/993/996, 816/821/8 22/823/825/841
ENVIRONMENT	
Temperature	-15° C to +55° C
Waterproofing	IP56
POWER SUPPLY	
	15 VDC through NMEA2000 0.15 A max., LEN4

Drawings

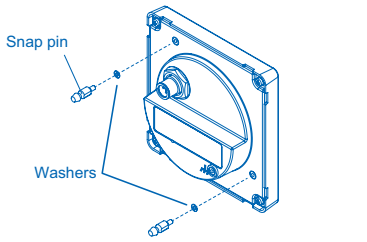
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FI70

Control Unit 0.22 kg 0.48 lb



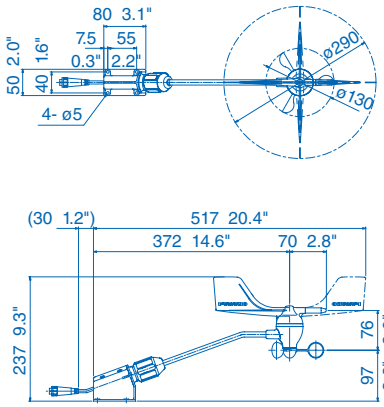
Front Mount (optional installation kit required)



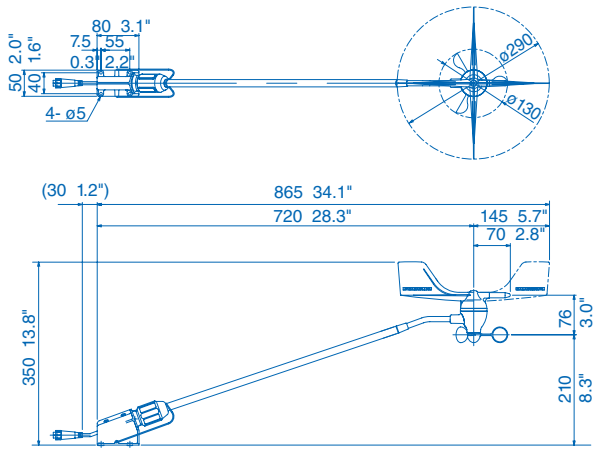
Electronic Navigation Instruments					
	FI5001 Wind Transducer	**FI5001L (Long Shaft) Wind Transducer**	**DST-810 Depth/Speed/Temp sensor**	**FI5002 Junction Box**	**IF-NMEAFI Analog NMEA Data Converter**
GENERAL					
Info:	Power supply: 12 VDC, less than 40 mA Transducer cable: 30/50 m		Frequency: 235 kHz Cable: 6 m	NMEA2000 backbone x 2 ports NMEA2000 x 6 ports Power supply: 12 VDC, less than 2 A	NMEA2000: 1 port External Sensor: Tank gauge, Wind transducer (FI5001or FI5001L) Speed/Temperature sensor (ST-02PSB or ST-02MSB) Power supply: 15 VDC, less than 200 mA

FI5001

Wind Transducer FI5001 (option) 0.3 kg 0.7 lb

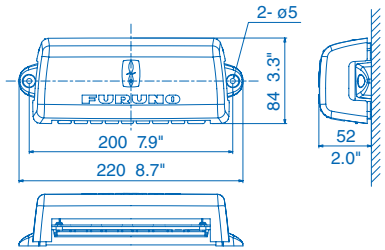


Wind Transducer FI5001L Long Shaft (option) 0.4 kg 0.9 lb



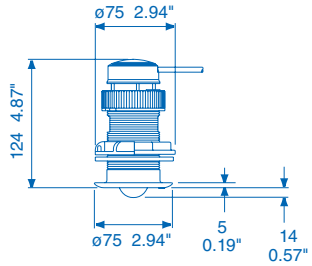
FI5002

Junction Box FI5002 (option) 0.3 kg 0.7 lb



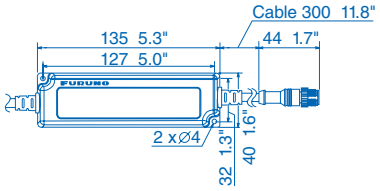
DST-810

Depth/Speed/Temp Sensor (option) 0.9 kg 2.0 lb



IF-NMEAFI

Analog NMEA Data Converter (option) 0.3 kg 0.7 lb



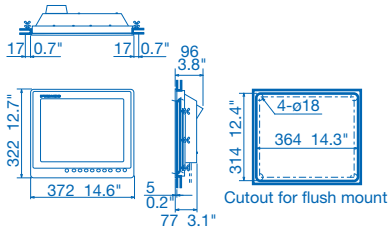
	15" Marine Display	15" Marine Display	19" Marine Display	19" Marine Display
MODEL	**MU150HD**	**MU152HD**	**MU190HD**	**MU192HD**
DISPLAY CHARACTERISTICS				
Type	15 inches, landscape		19 inches, landscape	19 inches, landscape
Screen Resolution	XGA (1024 x 768)		SXGA (1280 x 1024)	SXGA (1280 x 1024)
Contrast Ratio (typical)	600: 1	900: 1		900: 1
Viewing Angle (typical)	left/right and up/down: 80° or more			
Max Brightness (typical)	1000 cd/m2	400 cd/m2	1000 cd/m2	1,000 cd/m2
Min Brightness (typical)	0.2 cd/m2 or less			0.2 cd/m2 or less
INTERFACE				
Analog RGB (D-SUB/15 pins)	1 port			
DVI (DVI-D)	2 ports			1 port
Composite Video (NTSC/PAL)	3 ports			1 port
Built-in Scaler	VGA to SXGA			1 port (for dimmer control)
POWER SUPPLY				
	12-24 VDC, 2.8-1.4 A	12-24 VDC, 1.9-0.9 A	12-24 VDC, 8.4-3.9 A	12-24 VDC (10.8-31.2 V): 4.9-2.3 A
ENVIRONMENT (IEC 60945 test method)				
Temperature	-15° C to +55° C			
Waterproofing	IP56 (CFR46, front panel), IP22 (rear panel)			
EQUIPMENT LIST				
Standard	1. Display Unit 2. Installation Materials, Accessories and Spare Parts		1. Display Unit 2. Installation Materials, Accessories and Spare Parts	
Option	1. Cable Assembly 2. Bracket Assembly (w/knobs) 3. Hood Assembly 4. Flush Mount Kit (for fixing at front)		1. Cable Assembly 2. Bracket Assembly (w/knobs for MU190) 3. Hood Assembly 4. Dust Cover 5. Flush Mount Kit (for fixing at rear)	

Drawings

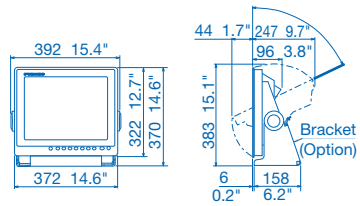
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

MU150HD

Flush Mount 5.4 kg 11.9 lb

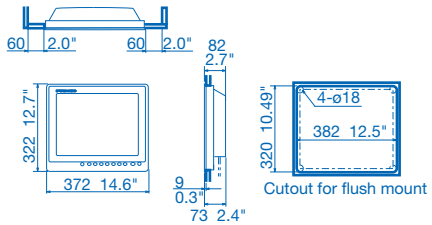


Bracket Mount 7.4 kg 16.3 lb

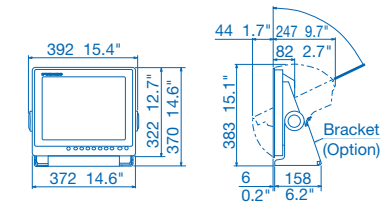


MU152HD

Flush Mount 4.9 kg 10.8 lb

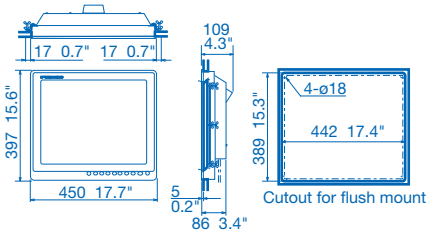


Bracket Mount 6.9 kg 15.2 lb

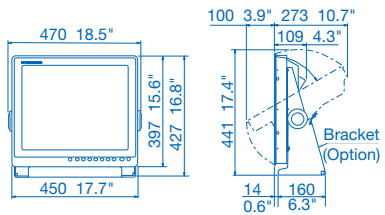


MU190HD

Flush Mount 8.2 kg 18.1 lb

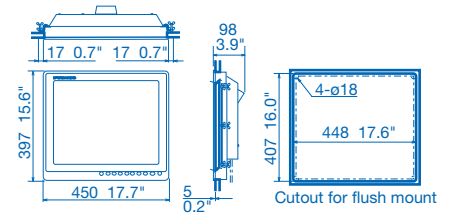


Bracket Mount 11.0 kg 24.3 lb

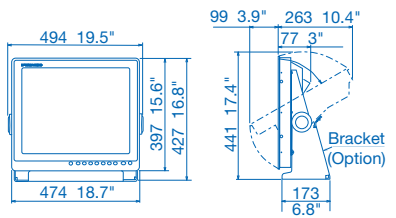


MU192HD

Flush Mount 12.8 kg 28.2 lb



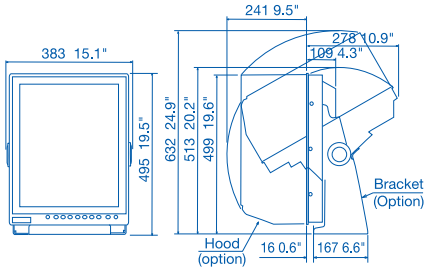
Bracket Mount 18.9 kg 41.7 lb



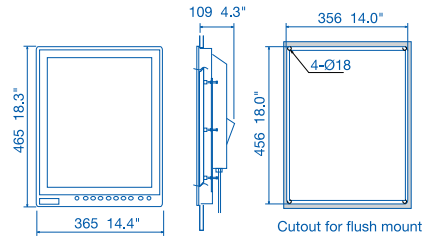
	19" Marine Display	19" Marine Display	27" Marine Display
MODEL	**MU190V**	**MU190**	**MU270W**
DISPLAY CHARACTERISTICS			
Type	19 inches, portrait	19 inches, landscape	27 inches, landscape
Screen Resolution	SXGA (1280 x1024)	SXGA (1280 x 1024)	WUXGA (1920 x 1200)
Contrast Ratio (typical)	900: 1	900: 1	1,500: 1
Viewing Angle (typical)	left/right and up/down: 80° or more		left/right and up/down: 85°
Max Brightness (typical)	450 cd/m2		400 cd/m2
Min Brightness (typical)	0.2 cd/m2 or less		
INTERFACE			
Analog RGB (D-SUB/15 pins)	1 port	1 port	1 port
DVI (DVI-D)	1 port	2 ports	1 port
Composite Video (NTSC/PAL)	1 port	1 port	1 port
USB	-	1 port (for dimmer control)	-
Built-in Scaler	VGA to SXGA		SVGA to WUXGA
POWER SUPPLY			
	100-230 VAC, 0.7-0.4 A		
ENVIRONMENT (IEC 60945 test method)			
Temperature	-15° C to +55° C		
Waterproofing	IP22		
EQUIPMENT LIST			
Standard	1. Display Unit 2. Installation Materials, Accessories and Spare Parts		
Option	1. Cable Assembly 2. Bracket Assembly (w/knobs) 3. Hood Assembly 4. Dust Cover 5. Flush Mount Kit (for fixing at rear)	1. Cable Assembly 2. Bracket Assembly (w/knobs) 3. Hood Assembly 4. Dust Cover 5. Flush Mount Kit (for fixing at rear)	1. Cable Assembly and Bracket Assembly 2. Hood Assembly (front/rear) 3. Flush Mount Assembly (rear) 4. Dust Cover 5. Handgrip and Crimping Tool Assembly

MU190V

Bracket Mount 11.0 kg 24. lb

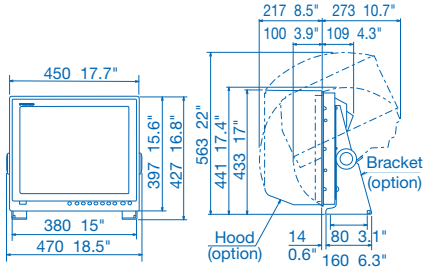


Flush Mount 8.0 kg 17.6 lb

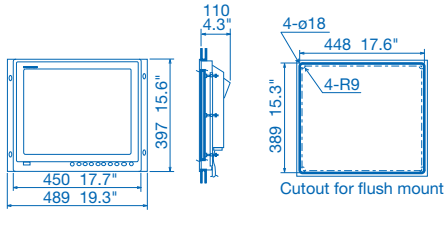


MU190

Bracket Mount 11.0 kg 24.3 lb

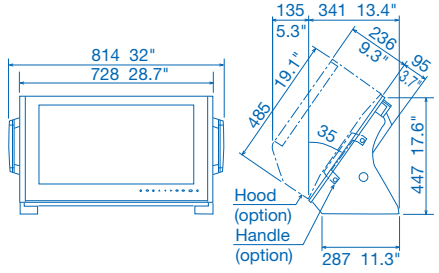


Flush Mount 8.8 kg 19.4 lb

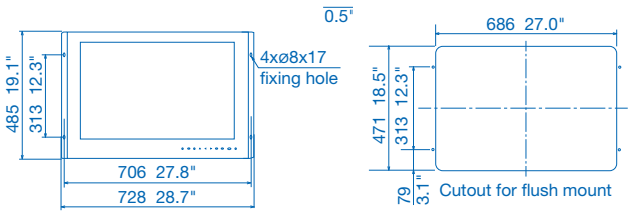


MU270W

Bracket Mount 21.0 kg 46.3 lb



Flush Mount 13.0 kg 28.7 lb



Remote Display

MODEL	RD33
GENERAL	
Type	4.3" color LCD
Effective Display Area	95.04 (W) x 53.85 (H) mm
Screen Resolution	480 x 272
Display style	1/2/3/4 data, Highway, Graph, Alphanumeric, 6-way split
Display mode	Nav data, Highway, Heading, Speed, Depth Graph, Graph, Layline, STW, SOG, RPM, Rudder, Wind angle, Air temp, Humidity, Roll pitch, ROT, Battery, Engine temp, Oil pressure, Oil temperature, Coolant pressure, Trim, Watch
INTERFACE	
Ports	NMEA0183 (ver. 2.0, 3.0): 1, NMEA2000: 2 (male/female)
Input	(NMEA0183): APB, BWR, BWC, CUR, DBT, DPT, DBS, DBK, GLL, GGA, GNS, GTD, GLC, HDT, HDG, HDM, MTW, MDA, MWV, RSA, RMA, RMB, RMC, ROT, VHW, VBW, VTG, VWT, VWR, VDR, XTE, ZTG, ZDA, PFEC, Gpatt (Pitch & Roll) (NMEA2000): 059904, 060928, 126208, 126992, 127245, 127250, 127257, 127258, 127488, 127489, 127497, 128259, 128267, 128275, 129025, 129029, 129033, 130306, 130310, 130311, 130577
Output	(NMEA0183): DPT, VHW, RMC, MWV, HDT, HDG, XTE, MTW, RSA, VTG (NMEA2000): 059392, 059904, 060928, 126208, 126464, 126996, 126992, 127245, 127250, 128259, 128267, 129026, 129029, 129283, 129284, 130306, 130311
ENVIRONMENT	
Temperature	-15° C to +55° C
Waterproofing	IP56
POWER SUPPLY	
	15 VDC: LEN6 (NMEA2000)
	12-24 VDC: 0.2-0.1 A (Non NMEA2000)

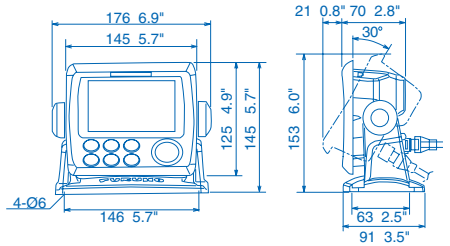
Integrated Heading Sensor

MODEL		PG500R	PG700
GENERAL			
Heading Accuracy		±1.0° (horizontal)	
Heading Resolution		0.1°	
Follow-up		25°/s rate-of-turn	45°/s rate-of-turn
Correction	Deviation	Automatic by swinging the boat	
	Variation	Automatic through GPS navigator or manually with RD30.	Automatic by swinging the boat
INTERFACE			
I/O Port	Input	1 port	NMEA2000: 1
	Output	2 ports (one port drives 3 outputs)	NMEA2000: 1
Output		FURUNO AD-10 format, IEC 61162-1 (NMEA0183 Ver2.0) HDG, HDT, HDM	065284, 127250
Input		IEC 61162-1 (NMEA0183 Ver1.5/2.0) RMC, VTG	059904, 060928, 061184, 126720, 126208, 130818, 165283
Data Update	AD-10 formatted	25 ms	----
	IEC 61162-1 (NMEA0183)	100 ms, 200 ms or 1 s selected	----
ENVIRONMENT			
Temperature		-15° C to 55° C	
Waterproofing		IPX5 (IEC 60529), CFR46 (USCG standard)	IP55
POWER SUPPLY			
		12-24 VDC: 120-30 mA	12 VDC: 0.1 A (LEN: 3)

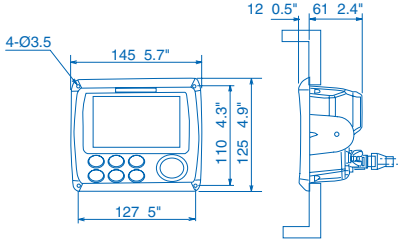
Drawings - RD33/PG500R/PG700

Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

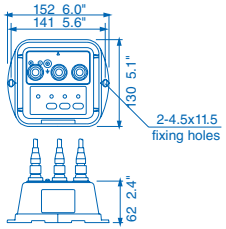
RD33 Display Unit (Bracket Mount) 0.7 kg 1.54 lb



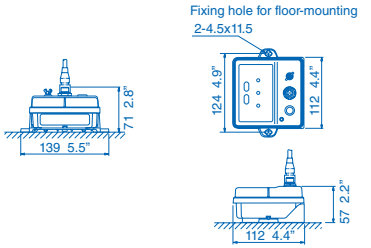
RD33 Display Unit (Flush Mount) 0.59 kg 1.3 lb



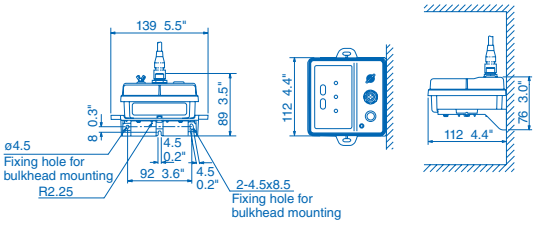
PG500R 0.3 kg 0.7 lb



PG700 Main Unit (Floor Mount) 0.3 kg 0.7 lb



PG700 Main Unit (Bulkhead Mount) 0.35 kg 0.77 lb



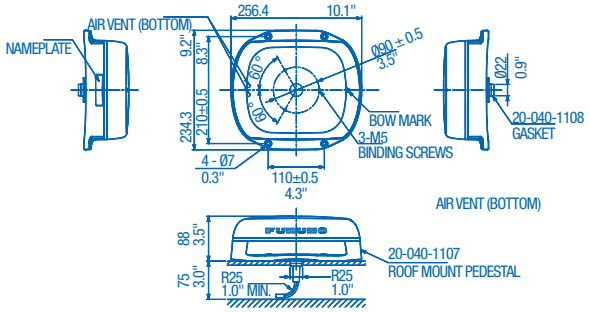
Satellite Compass™			
		SCX20	SCX21
GENERAL			
Frequency		1575.42 MHz (GPS/Galileo/QZSS/SBAS), 1602.5625 MHz (GLONASS)	
Tracking Code		C/A (GPS/QZSS/SBAS), E1B (Galileo), 1OF (GLONASS)	
Heading/Roll/Pitch Accuracy		1.0° static, 0.5° dynamic	
Heave Accuracy		5 cm (1σ)	
Follow-up		45°/s rate-of-turn	
Position fixing time		50 sec typical	
Position Accuracy		GPS: 5 m approx. (2 drms, HDOP<4), MSAS: 4 m approx. (2 drms, HDOP<4), WAAS 3 m approx. (2 drms, HDOP<4)	
INTERFACE			
NMEA2000		1 Port	-
Interface (NMEA2000)	Input	059362/904,060160/416/928, 061184, 065240, 126208	-
	Output	059932,060928, 061184, 065280,126208/464/992/993/996/998,127250/251/252/257/258,129025/026/029/033/538/539/540/547,130310/312/314/316/577/578/816/817/818/819/820/822/823/826,130833/834/842/843/845/846/847	-
NMEA0183		-	3 Ports NMEA0183, Tx 3 Ch, Rx 2 Ch, PPS 1 Ch RS-485: 1 channel, PPS, rising edge detecting
Interface (NMEA0183)	Input	-	AAM*, APB*, BOD*, BWC*, BWR*, RMB*, TLL*, XTE* (*GP-39 required)
	Output	-	AAM*, APB*, BOD*, BWC*, BWR*, DTM, GGA, GLL, GNS, GSA, GSV, HDG, HDT, HRM, POS, RMB*, RMC, ROT, THS, TLL*, VBW, VTG, XTE*, ZDA (*GP-39 required) P Sentences: GPatt, GPhve, GPimu, pidat, SDmrk, GPmsv, hdcom
ENVIRONMENT			
Temperature		-25° C to +55° C	
Waterproofing		IP56	
POWER SUPPLY			
		12-24 VDC: 0.2-0.1 A (4 LEN @ 9 VDC)	

Drawings

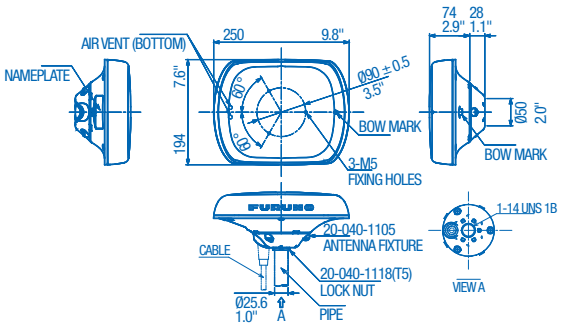
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

SCX20/21

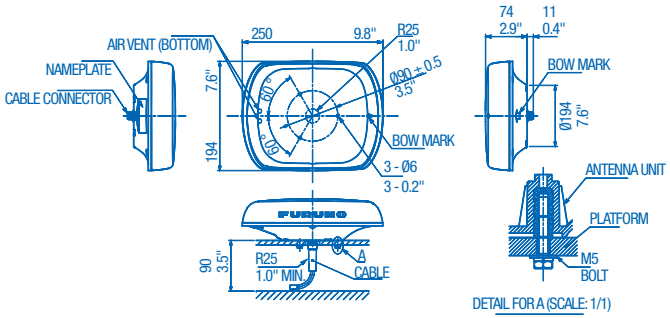
SCX20 Sensor Unit (Roof Mount) 2.2 kg 4.9 lb



SCX20/21 Sensor Unit (Pole Mount) 1.2 kg 2.64 lb



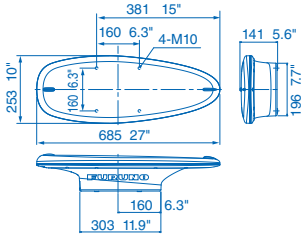
SCX20 Sensor Unit (No Mount) 1.0 kg 2.2 lb



Satellite Compass™				
MODEL		**SC33**	**SC70**	**SC130**
GENERAL				
Heading Accuracy		0.4° rms	0.4° rms	0.25° rms
Heading Resolution		0.1°	0.1°, 0.01° or 0.001° (select from menu)	
Follow-up		45°/s rate-of-turn	45°/s rate-of-turn	
Position fixing time		60 sec typical	60 sec typical	
Position Accuracy		GNSS: 5 m approx., SBAS: 4 m approx., WAAS: 3 m approx. (2 drms, HDOP<4)	GPS: 5 m approx., DGPS: 4 m approx., WAAS: 3 m approx., MSAS: 4 m approx. (2 drms, HDOP<4)	
INTERFACE (Junction box)				
NMEA2000		1 Port	1 Port	
Interface (NMEA2000)	Input	059392/904, 060160/416/928, 061184, 065240, 126208	059392, 059904, 060928, 061184, 126208, 126720, 126996	
	Output	059392, 060928, 061184, 065280, 126208/464/992/993/996/998, 127250/251/252/257/258,129025/026/029/033/538/539/540/547,130310/312/314/316/577/578/816/817/818/819/820/822/823/826,130833/834/842/843/845/846/847	059392, 059904, 060928, 061184, 065280, 126208, 126464, 126720, 126992, 126996, 127250, 127251, 127252, 127257, 127258, 129025, 129026, 129029, 129033, 129044, 129291, 129539, 129540, 129545, 129547, 130310, 130312, 130314, 130316, 130577, 130578, 130822, 130823, 130842, 130843, 130845, 130846	
NMEA0183		--	8 Ports (I/O: 4, O: 4)	
Interface (NMEA0183)	Input	--	ACK, ACM, ACN, HBT, HDT*1, MSK, MSS, THS, VBW*2, VDR*2, ACK, ACM, ACN, HBT	
	Output	--	ALC, ALF, ALR, ARC, DTM, GBS, GGA, GLL, GNS, GRS, GSA, GST, GSV, HBT, HDG*2, HDM*2, HDT*1, HRM*2, MSK, POS, RMC, ROT, THS, VBW*2, VDR*2, VHW*2, VLW*2, VTG, XDR*2, ZDA, PFEC (GPatt, GPhve, GPimu, llalr, pidat)	
LAN		--	2 Ports (100 BASE-TX), RJ45 connector (for IEC61162-450 and maintenance)	
Analog		--	--	
AD-10		--	4 Ports (for heading output)	
USB		--	1 Port (for maintenance)	
DISPLAY UNIT				
Type		--	4.3" Color LCD	
Effective Display Area		--	95.04 (W) x 87.12 (H) mm	
Screen Resolution		--	WQVGA 480 x 272	
Brilliance		--	600 cd/m2 typical	
Contrast		--	17 levels	
Display Mode		--	Heading, Nav data, Rate of turn and Speed (Non-IMO mode only)	
Visible Distance		--	0.65 m nominal	
ENVIRONMENT				
Temperature	Display/Junction Box	--	-15° C to +55° C	
	Antenna Unit	-25° C to +55° C (storage: -25° C to +70° C)	-25°C to +55°C (storage: -25° C to +70° C)	
Waterproofing	Junction Box	--	IP20 (IP22: bulkhead mount)	
	Display Unit	--	IP22 (IP35: option)	
	Antenna Unit	IP56	IP56	
POWER SUPPLY				
		12-24 VDC: 0.4-0.2 A (LEN: 11 @9 VDC)	Junction Box: 12-24 VDC, 2.1-1.1 A (included Antenna Unit and Display Unit)	

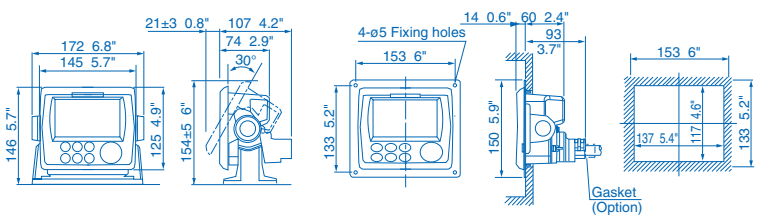
SC33

Sensor Unit 2.5 kg 5.5 lb

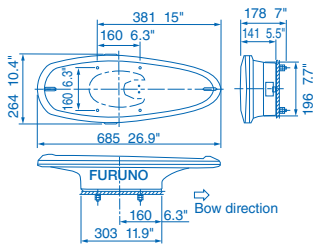


SC70/130

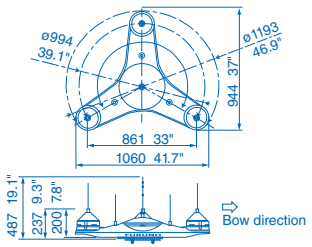
SC70/130 Display Unit 0.7 kg 1.5 lb



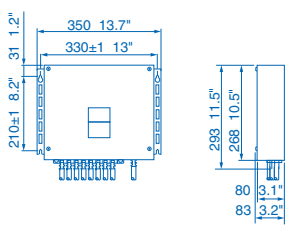
SC70 Sensor Unit 2.8 kg 6.17 lb



SC130 Sensor Unit 7.1 kg 15.6 lb



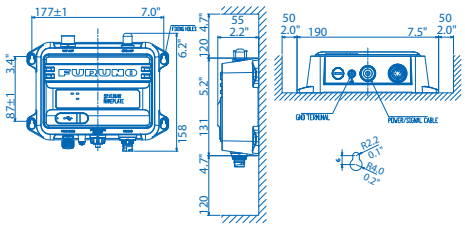
SC70/130 Junction Box 2.9 kg 6.39 lb



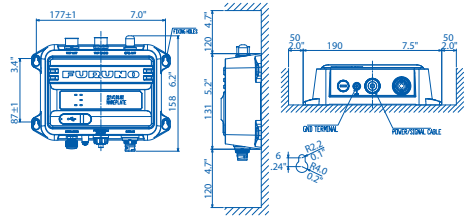
		AIS Receiver	Class-B+ AIS Transceiver	U-AIS Transponder
MODEL		**FA40**	**FA70**	**FA170**
STANDARDS				
		IEC 60945 Ed.4 IMO MSC.140 (76) ITU-R M.1371-5, EN 303 413 V1.1.1 EN 301 843-1 V2.2.1 IEC 60945 Ed.4+CORR.1, IEC 62368-1 Ed.3	IMO MSC.140 (76) ITU-R M.1371-5, DSC: ITU-R M.825-3 IEC 62287-1 Ed.3.0, IEC 62287-2 Ed.2.0, EN 303 413 V1.1.1, EN 301 843-1 V2.2.1 IEC 60945 Ed.4+CORR.1, IEC 62368-1 Ed.3, IEC 62311 Ed.1+Ed.2	IMO MSC.74(69) ANNEX 3, IMO MSC.302(87), IMO A.694(17), IMO MSC.191(79), ITU-R M.1371-5, DSC ITU-R M.825-3, IEC61993-2 Ed. 2, IEC60945 Ed. 4 CORRIGENDUM 1, IEC 62288 Ed. 2, IEC 61162-1 Ed. 4, IEC 61162-2 Ed. 1, IEC61162-450 Ed. 1
TRANSPONDER UNIT				
TX/RX Frequency (FA40: RX Frequency)		156.025 to 162.025 MHz		
Output Power		----	5 W or 1 W(SOTDMA), 2 W(CSTDMA)	1 W / 12.5 W
Channel Spacing		25 kHz	25 kHz	25 kHz
MONITOR UNIT				
Type		----	----	4.3" Color LCD
Effective Viewing Area		----	----	95.04 (W) x 53.8 (H) mm
Screen Resolution		----	----	480 x 272 dots
GPS RECEIVER				
Receiving Channels		----	12 channels, SBAS 2 channels, 14 satellites tracking	12 channels parallel, 12 satellites tracking
Rx Frequency		----	1575.42 MHz	
Rx Code		----	C/A code	
Position Accuracy		----	13 m (2 drms, HDOP <= 4)	GPS: less than 13 m (2 drms, HDOP < 4) DGPS: less than 5 m (2 drms, HDOP < 4)
INTERFACE				
NMEA0183	Input	ACA, ACK, AIQ, DTM, GBS, GGA, GLL, GNS, HDT, OSD, RMC, SSD, THS, VBW, VSD, VTG	ACK, AIQ, BBM, HDT, SSD, THS, VSD (ABM, BBM: SOTDMA only)	ABM, ACA, ACK, ACM, ACN, AIQ, AIR, BBM, DTM, EPV, GBS, GGA, GLL, GNS, HBT, HDT, LRF, LRI, OSD, PIWWIVD, PIWWSPW, PIWWSSD, PIWWVSD, RMC, ROT, SPW, SSD, THS, VBW, VSD, VTG
	Output	ABK, ACA, ACS, ALR, GGA, GLL, RMC, SSD, TXT, VDM, VDO, VER, VSD, VTG	ABK, ACA, ACS, ALR, GGA, GLL, RMC, SSD, TXT, VDM, VDO, VER, VSD, VTG	ABK, ACA, ACS, ALC, ALF, ALR, ARC, EPV, HBT, LR1, LR2, LR3, LRF, LRI, NAK, PIWWIVD, PIWWSPR, PIWWSSD, PIWWVSD, SSD, TRL, TXT, VER, VDM, VDO, VSD
NMEA2000	Input	059392, 059904, 060160, 060416, 060928, 065240, 126208, 127250	059392, 059904, 060160, 060416, 060928, 065240, 126208, 127250	----
	Output	059392, 059904, 060928, 126208, 126464, 126992, 126993, 126996, 126998, 127258, 129025, 129026,129029, 129038, 129039, 129040, 129041, 129540, 129792, 129793, 129794, 129795, 129796, 129797, 129798, 129800, 129801, 129802, 129803, 129804, 129805, 129806, 129807, 129809, 129810, 129811, 129812, 129813	059392, 059904, 060928, 126208, 126464, 126992, 126993, 126996, 126998, 127258, 129025, 129026,129029, 129038, 129039, 129040, 129041, 129540, 129792, 129793, 129794, 129795*, 129796, 129797, 129798, 129800, 129801, 129802, 129803, 129804*, 129805, 129806, 129807, 129809, 129810, 129811, 129812*, 129813* (*SOTDMA mode only)	----
Ethernet		----	----	100Base-TX, RJ45 connector, Auto MDI/MDIX
ENVIRONMENT				
Temperature	Antenna Unit	----	-25° C to +70° C	-30° C to +70° C
	Other Units	-15° C to +55° C		
Waterproofing	Antenna Unit	----	IP56	
	Other Units	IP55		Transponder unit: IP22 at bulkhead mount, IP20 at floor Monitor unit: IP22, IP35 with optional waterproofing kit Pilot plug unit: IP22 (front panel), Power supply unit: IP22
POWER SUPPLY				
Transponder Unit (FA30: Receiver Unit)		12-24 VDC, 0.3-0.2 A	12-24 VDC, 1.8-0.9 A	12-24 VDC, 6-3 A
Display Unit:		----	----	12 VDC, 0.3 A max.

FA40/70

Receiver Unit
FA40 — 0.45 kg 1.0 lb

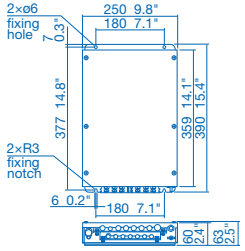


Transceiver Unit
FA70 — 0.5 kg 1.1 lb

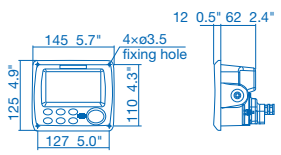


FA170

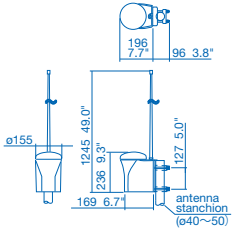
Transponder Unit
FA1701 — 3.0 kg 6.6 lb



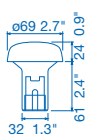
Display Unit
FA1701 — 0.6 kg 1.3 lb



GPS/VHF Combined Antenna
VA-100-T — 3.3 kg 7.3 lb



GPS Antenna
GPA017S — 0.15 kg 0.3 lb

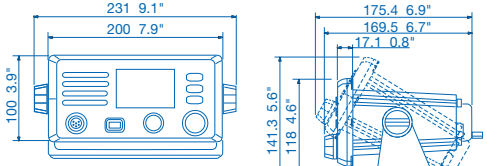


Marine VHF Radiotelephone		
MODEL		**FM4800/4850**
GENERAL CHARACTERISTICS		
Frequency Range		TX: 156.025 to 162.000 MHz, RX: 155.500 to 163.275 MHz
Communication System		Simplex/Semi-duplex
Modulation		16K0G3E (F3E) Voice, 16K0G2B (F2B) DSC
Display		Monochrome, 192 x 128 dot (FM-4800 / HS-4800 only)
TRANSMITTER		
Output Power		25 W max, 1 W at power reduction
Max. Frequency Deviation		±5 kHz max
Spurious Emission	Standby/Transmit	less than 2 nW / less than 0.25 uW
RECEIVER		
Sensitivity		+6 dBuV (e.m.f) or less (SINAD 20 dB)
Adjacent Channel Selectivity		70 dB or more
Spurious Response		70 dB or more
DSC RECEIVER		
Protocol		Class D DSC
Sensitivity		0 dBuV (e.m.f) or less (BER < 1%)
Adjacent Channel Selectivity		70 dB or more
Spurious Response		70 dB or more
AIS RECEIVER		
Receiving Frequency (CH)		161.975 MHZ (AIS1), 162.025 MHz (AIS2)
Sensitivity		-107 dBm or less (PER < 20%)
Adjacent Channel Selectivity		70 dB or more
Spurious Response		70 dB or more
GPS RECEIVER (FM-4800 only)		
Receiving Frequency		1575.42 MHz
Number of Channel		72 channels
Horizontal Accuracy		10 m
Position Fixing Time		Cold start: 120 sec typical
Position Update Interval		1 sec
LOUD HAILER/FOG HORN		
Output Power		30 W Max. (4 ohm)
INTERFACE		
NMEA2000		1 port, LEN: 3
Interface	Input	059392, 059904, 060160, 060416, 060928, 065240, 126208, 127258, 129026, 129029, 129044
	Output	059392, 060928, 126208, 126464, 126993, 126996, 126998, 129025, 129026, 129029, 129038, 129039, 129040, 129041, 129540, 129793, 129794, 129795, 129797, 129798, 129801, 129802, 129808, 129809, 129810
NMEA0183		1 port
NMEA0183	Input	DTM, GGA, GLL, GNS, RMA, RMC
	Output	DSC, DSE, GLL, RMC, VDM
ENVIRONMENT		
Temperature		-15° C to +55° C
Waterproofing		IP67
POWER SUPPLY		
		12 VDC (-10% to +30%), 5.0 A max.

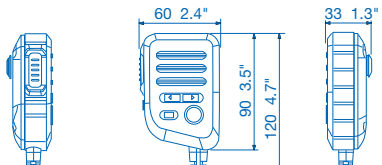
Drawings - FM4800/4850

Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

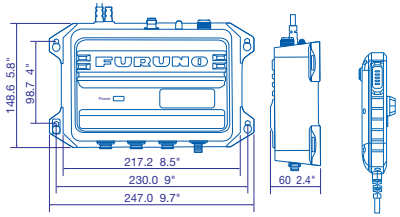
Transcribe(Transceiver Unit FM4800 1.7 kg 3.8 lb)



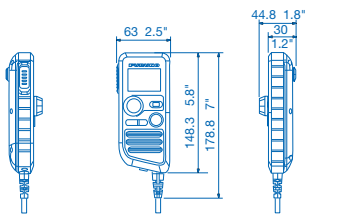
Transcribe(Microphone 001-535-610-00 (FM4800 only) 0.25 kg 0.56 lb)



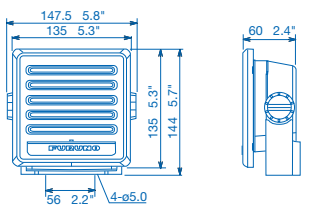
Transcribe(Transceiver Unit FM4850 1.75 kg 3.85 lb)



Transcribe(Handset 001-523-260-00 (option) 0.3 kg 0.66 lb)



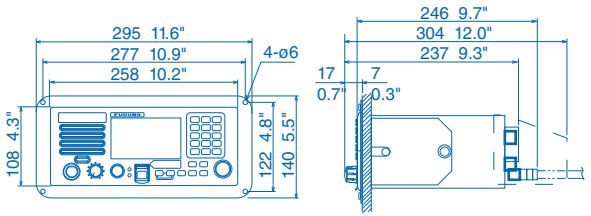
Transcribe(Speaker 001-593-520-00 (option) 0.76 kg 1.69 lb)



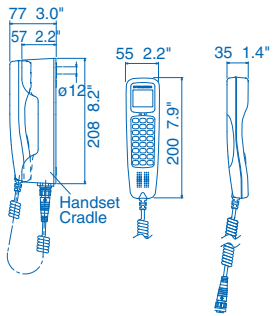
VHF Radiotelephone		
MODEL		**FM8900S**
GENERAL CHARACTERISTICS		
Class of Emission		G3E (Radiotelephone), G2B (DSC)
Communication System		Simplex/Semi-duplex
Channels		All VHF channels according to ITU-R Radio Regulations Appendix 18, All channels in FCC Part 80, Max 20 Private channels where permitted by Administrations (preset by the service agent), 10 weather channels (USA and Canada, receive only)
Rules and Regulations		VHF Radiotelephone: EN 301 925 V1.4.1 (2013.5) VHF ATIS: EN 300 698-1 V1.4.1 (2009.12), EN 301 925 V1.5.1(2017) DSC: Rec. ITU-R M.541-10, M.493-14 (class A), M.689-2, M.821-1
Display		4.3 inches WQVGA (480 x 272 dots), color dot matrix LCD
TRANSMITTER		
Frequency Range		155.00 - 161.600 MHz
RF Output Power		High: Max 25 W, Low: Not exceed 1 W US version: Manual override for 25 W available on CH13, CH67 and CH77 (usually not exceed 1 W)
Frequency Stability		less than ±1.5 kHz
RECEIVER		
Frequency Range	Simplex	155.000 - 161.600 MHz
	Semi-duplex	159.600 - 164.200 MHz
Receiving System		Double-conversion super-heterodyne 1st IF : 51.1375 MHz, 2nd IF: 62.5 kHz
AF Output Power		3 W (4 Ω loud speaker), 2 mW (150 Ω handset)
Audio Response		De-emphasis of 6 dB/oct +1/-3 dB
Sensitivity		less than 6 dBμV at SINAD 20 dB
Adjacent Channel Selectivity		70 dB or more
DSC SECTION		
Message Log	Receive	50 distress messages plus 50 non-distress messages
	Transmit	50 messages
Interface	Nav data	IEC61162-1 Ed.4
	Printer	Centronics-compatible
Alarm		Audible and visual on receipt of a DSC call
Receiver Characteristics	DSC frequency	156.525 MHz (CH70)
	Calling sensitivity	Symbol error rate: less than 1% (at 0 dBμV)
ENVIRONMENT		
Temperature		-15° C to +55° C
Waterproofing		FM8900S: IP20 (IP22 with option), HS-2003: IP24, RB-8900: IP22
POWER SUPPLY		
VDC		24 VDC
RX		2.3 A (max.), 1.3 A (standby)
TX		4.7 A (max.)

FM8900S

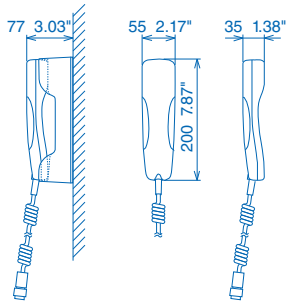
Transceiver Unit (Flush Mount) 4.2 kg 9.3 lb



Remote Station RB8900 0.7 kg 1.5 lb



Handset HS-2003 0.2 kg 0.4 lb



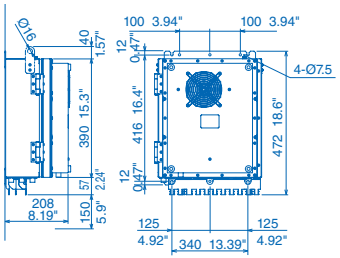
MF/HF Radiotelephone			
MODEL		**FS1575**	**FS2575**
GENERAL			
Frequency Range	TX	1.6 to 27.5 MHz (100Hz Steps)	
	RX	0.1 to 29.9 MHz (10Hz Steps)	
Channels		256 user-specified channels plus ITU, SSB/TELEX channels	
Rules and Regulations		ITU-R M. 1082-1, ITU-R M. 1173-1, ITU-R M. 476-5, ITU-R M. 490, ITU-R M. 491-1, ITU-R M. 492-6, ITU-R M. 493-14, ITU-R M. 541-10, ITU-R M.625-4, ITU-R M.821-1, IMO Res. A. 694 (17), IMO Res. A. 806 (19), IMO Res. MSC36 (63), IMO Res. MSC68 (68), IMO Res. MSC302 (87), MSC/Circ. 862, IEC 61162-1 Ed. 5, IEC 60945 Ed. 4, ETS 300 067 ed. 1, EN 300 338-1 V1.4.2, EN 300 338-2 V1.4.1, EN 301 033 V1.3.1, EN 300 033 V1.41 EN 300 373-1 V1.41	
Communication System		Simplex/semi-duplex	
Class of Emission		J3E, H3E, A1A, J2B	
TRANSCEIVER			
RF Output Power		150 W pep	250 W pep
Antenna		10-18 m whip or wire	
Tuning Speed		within 15 sec.	
Receiver Sensitivity		less than +7 dBµV (4.0-29.99999 MHz, J3E) / less than +13 dBµV (1.6-4 MHz, J3E)	
DSC			
Receiving	General	All DSC frequencies in MF/HF	
Frequency	Distress and safety	DSC distress/safety frequencies: 2187.5 kHz, 4207.5 kHz, 6312.0 kHz, 8414.5 kHz, 12577 kHz, 16804.5 kHz	
Message Storage	TX:	50 distress messages, plus 50 non-distress messages	
	RX:	50 messages, telephone no., frequencies, etc.	
POWER SUPPLY			
		24 VDC, 20 A (TX), 5.0 A (RX)	24 VDC, 40 A (TX), 5.0 A (RX)
		100/110/200/220 VAC Power Supply PR-300	100/110/120/200/220/240 VAC with optional AC/DC Power Supply PR-850A

Drawings

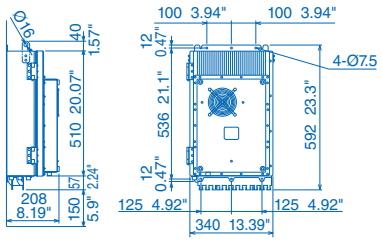
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FS1575/2575

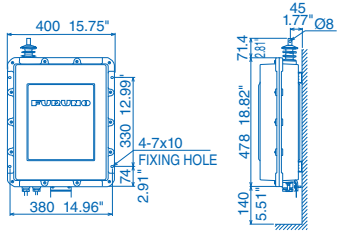
Transceiver Unit
FS1575T 16 kg 35.2 lb



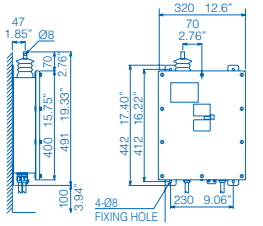
Transceiver Unit
FS2575T 20 kg 44.1 lb



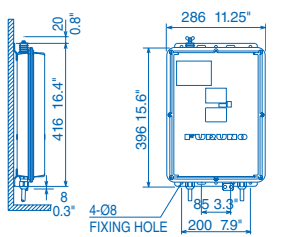
Antenna Coupler
AT5075 9.2 kg 20.1 lb



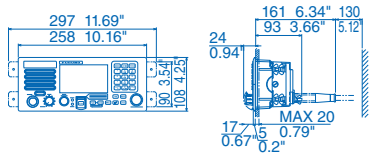
Antenna Coupler
AT1575-SUS 8.8 kg 19.4 lb



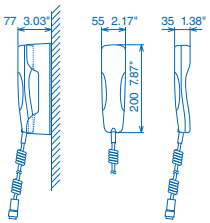
Antenna Coupler
AT1575-AES 2.6 kg 5.7 lb



Controller Unit
FS2575C 1.8 kg 4.0 lb



Headset
HS-2003 0.5 kg 1.2 lb

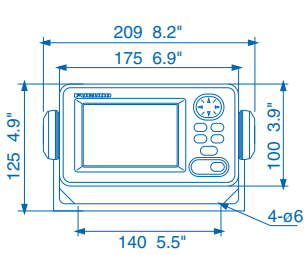


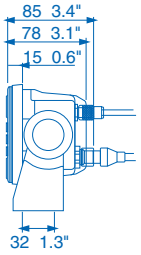
NAVTEX Receiver		
MODEL		**NX300**
NAVTEX RECEIVER		
Receiving Frequency		518 kHz or 490 kHz
Mode of Reception		F1B
Sensitivity		2μ V e.m.f. (50 ohms), 4% error rate
Message Category		A: Navigational warning B: Meteorological warning C: Ice report D: Search and rescue information/piracy and armed robbery E: Meteorological forecast F: Pilot message G: AIS Service message H: Loran-C message I: Reserve-presently not used J: Differential omega message K: Other electronic navigational aid and system message L: Navigational warning (additional) M to Y: Reserve _ presently not used V: Notice to Fishermen (US only) Z: QRU (no message on hand)
DISPLAY		
Display		4.5" Monochrome LCD
Effective display area		95 (W) X 60 (H) mm
Pixel number		120 x 64
Display Modes		Message Selection, NAV Data, Message Display
Message Storage		28,000 Characters
Languages		English, Spanish, German, French, Italian, Danish, Dutch, Portuguese
INTERFACE		
Input		0183 Ver.1.5/2.0, RS-232C, 4800 bps GGA, GLL, RMB, ZDA
Output		Message data for personal computer, RS-232C, 4800 bps
ENVIRONMENT		
Temperature	Antenna unit	-25° C to +70° C
	Display unit	-15° C to +55° C
Waterproofing	Antenna unit	IPX6
	Display unit	IPX5
POWER SUPPLY		
		12-24 VDC: 180-90 mA

Loud Hailer with Intercom	
MODEL	**LH5000**
AUDIO OUTPUT	
Hail	30 W, 8 Ω (at 1 kHz, 10 % distortion)
Intercom speaker	5.0 W, 8 Ω (at 1 kHz, 10 % distortion)
Internal speaker	2.5 W, 8 Ω (at 1 kHz, 10 % distortion)
External speaker	5.0 W, 8 Ω
INPUT IMPEDANCE	
Microphone	600 Ω
Auxiliary Input	5 kΩ
ENVIRONMENT	
Temperature	-15°C to +55°C (IEC60945)
Waterproofing	IP67 (IEC60529)
POWER SUPPLY	
Full Load	12 VDC, 11 A
Standard	12 VDC, 5 A
Standby	12 VDC, 280 mA

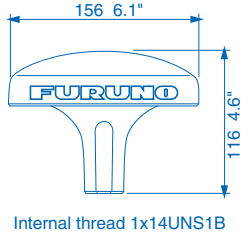
NX300

Display Unit NX300 0.68 kg 1.5 lb





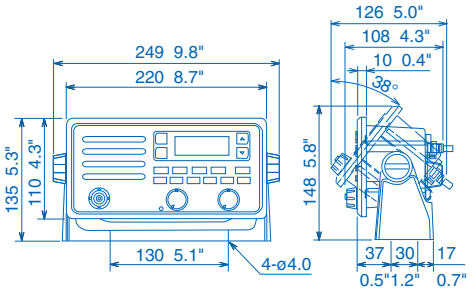
Antenna Unit NX3H-D 0.9 kg 2.0 lb



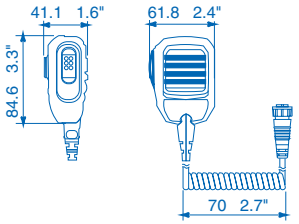
Internal thread 1x14UNS1B

LH5000

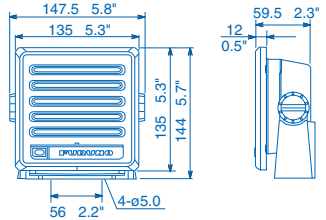
Loud Hailer 1.61 kg 3.5 lb



Microphone MIC-5000 1.61 kg 3.5 lb



Intercom Speaker (option) 0.76 kg 1.7 lb



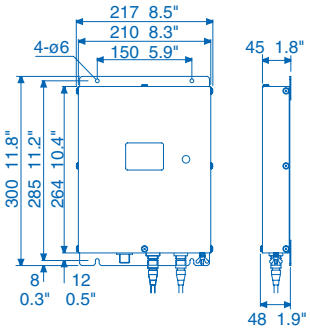
Facsimile Receiver		
MODEL		**FAX30**
GENERAL		
Frequency Range		80 kHz to 160 kHz, 2 MHz to 25 MHz, 490 kHz, 518 kHz (NAVTEX)
Class of Emission		F3C, J3C, F1B (NAVTEX)
Receiving System		Double superheterodyne
Number of Channel		1000 channels
Storage	Fax	12 pictures
	NAVTEX	130 messages
Scanning Speed		60, 90, 120, 180 or 240 rpm, automatic or manual selection
I.O.C.		576 or 288, automatic or manual selection
Display Color		Monochrome, 8 shades of gray, Blue shades, Pink and black, Red and blue
Networking Standard		Ethernet 10Base-T TCP/IP
ENVIRONMENT		
Temperature		-15° C to +55° C
Waterproofing		IPX2
POWER SUPPLY		
		12-24 VDC: 1.0-0.5 A
MINIMUM SYSTEM REQUIREMENTS FOR PC		
OS		Windows 98, 2000, ME, XP, Vista, 7, 8(32 bit/64 bit)
CPU		600 MHz or faster
RAM		128 MB or more
Resolution		1024 x 768 pixels
Browser		Internet Explorer Ver.5.01 5.5 6.0 7.0 8.0 10.0 11.0 Netscape Communicator Ver. 4.78/6.2/7.0

Drawings

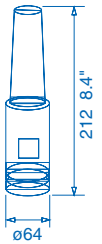
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FAX30

Receiver Unit 2.0 kg 4.4 lb



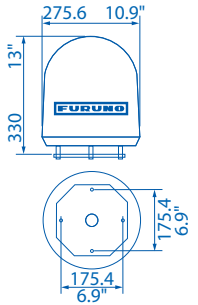
Preamp FAX5 2.0 kg 4.4 lb



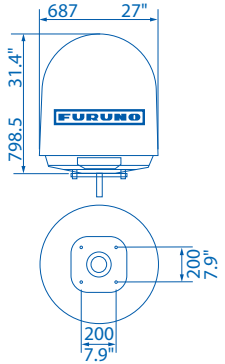
		INMARSAT FleetBroadband	
		FELCOM251	FELCOM501
GENERAL			
Transmitting Frequency		1626.5 - 1660.5, 1668.0 - 1675.0 MHz	
Receiving Frequency		1518.0 - 1559.0 MHz	
INTERFACE			
Ethernet	RJ45	4 ports	
2-wire analog telephone	RJ11	2 ports (4 ports with optional adapter)	
USB		1 port USB 2.0 (RS-232C with optional adapter)	
Alarm output		1 port Contact Closure (normal close), external relay	
SIM Card		1 slot	
COMMUNICATION SERVICES			
Voice		4 kbps AMBE+2 or ISDN 3.1 kHz Audio	
Data	ISDN UDI/RDI	-	64 kbps
	Standard IP(Best Effort Delivery)	Up to 284 kbps	Up to 432 kbps
	Streaming IP(Guaranteed Service Rate)	32, 64, 128 kbps	32, 64, 128, 256 kbps
SMS (Short Message Service)		Up to 1,120 characters	
FAX		G3 Fax through 3.1 kHz audio	
ENVIRONMENT			
Temperature	Antenna Unit (operative temperature)	-25° C to +55° C	
	Antenna Unit (storage temperature)	-40° C to +70° C	
	Below Deck Unit (operative temperature)	-25° C to +55° C	
Waterproofing		Antenna: IPX6, Below Deck Unit: IP31, Handset: IP56 (Cradle: IP22)	
POWER SUPPLY			
Communication Unit		12-24 VDC: 14/5.5 A	
Power Supply Unit		100-240 VDC, 1 Phase, 50-60 Hz	

FELCOM251/501

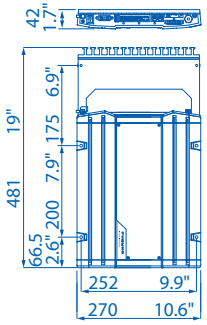
Antenna
FB1251 3.9 kg 8.6 lb



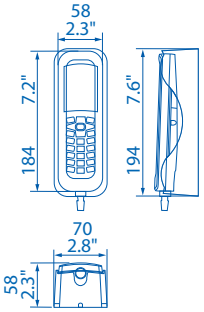
Antenna
FB1501 23 kg 50.7 lb



FELCOM251/501 Communication Kit
FB2001 2.5 kg 5.5 lb



Handset
FB8001 0.63 kg 1.4 lb



NOTES

NOTES

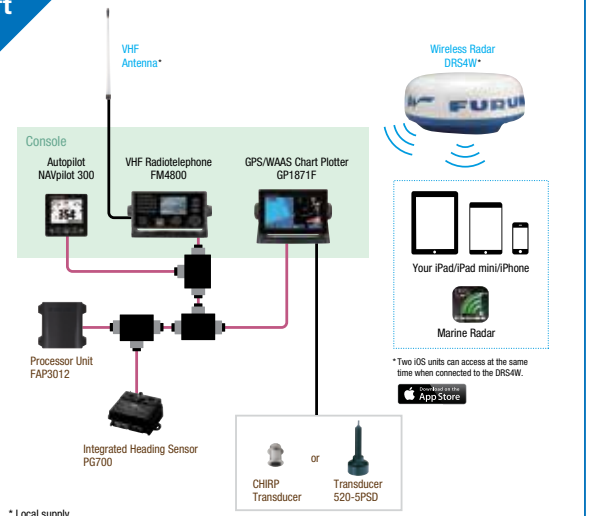
Recommendations

Common Runabout Product Recommendations

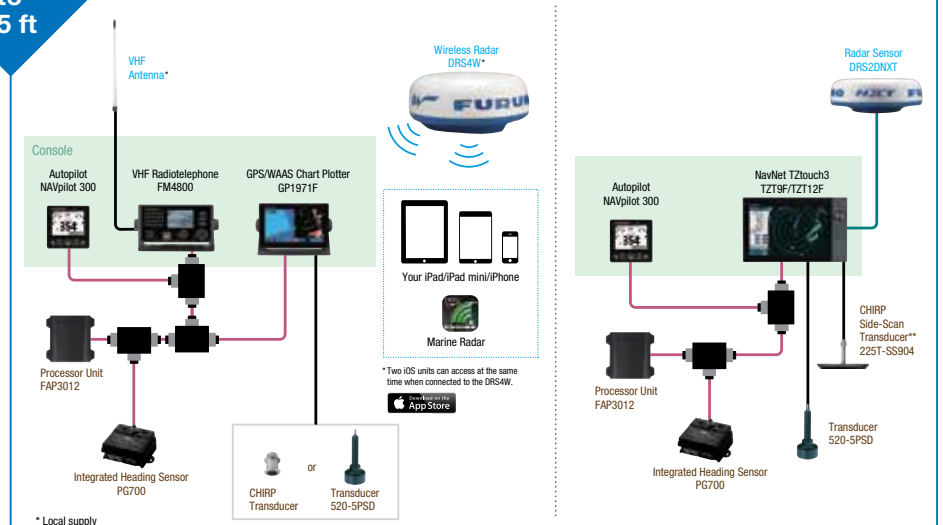
- NMEA2000
- Ethernet
- Other
- NMEA2000 T Connector

Product suggestions only - not an installation diagram

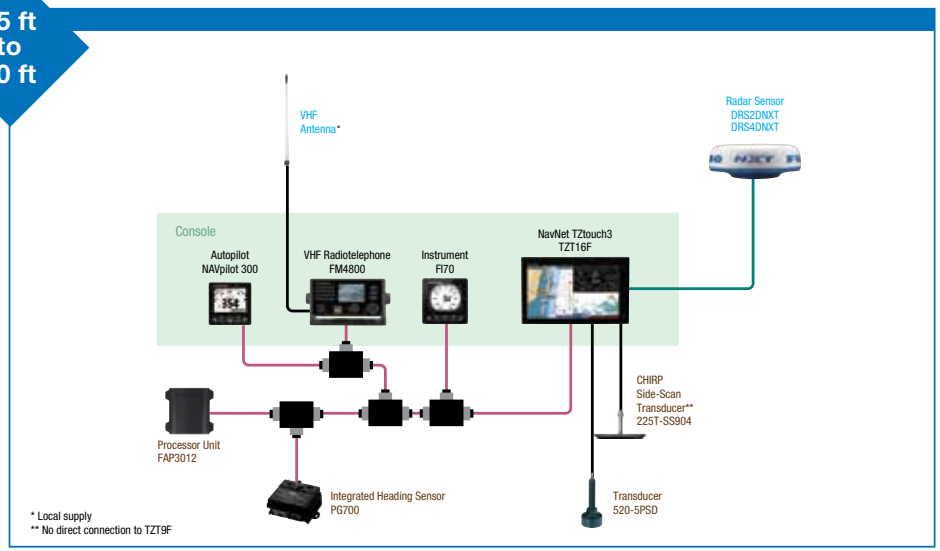
Under 20 ft



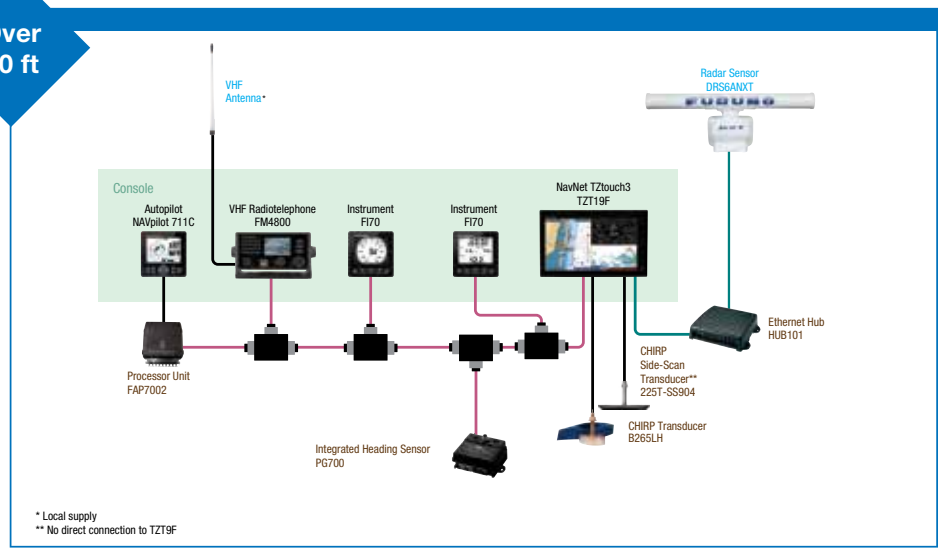
20 ft to 25 ft

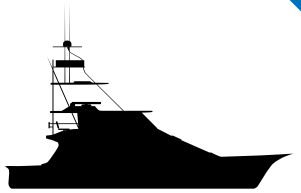


25 ft to 30 ft



Over 30 ft



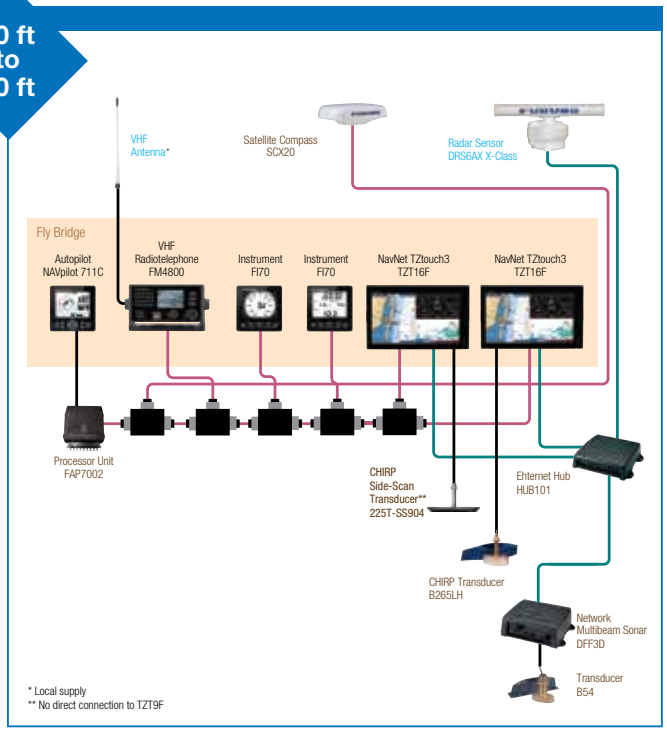


Common Sport Fishing Product Recommendations

- NMEA2000
- Ethernet
- Other
- NMEA2000 T Connector

Product suggestions only - not an installation diagram

30 ft to 50 ft



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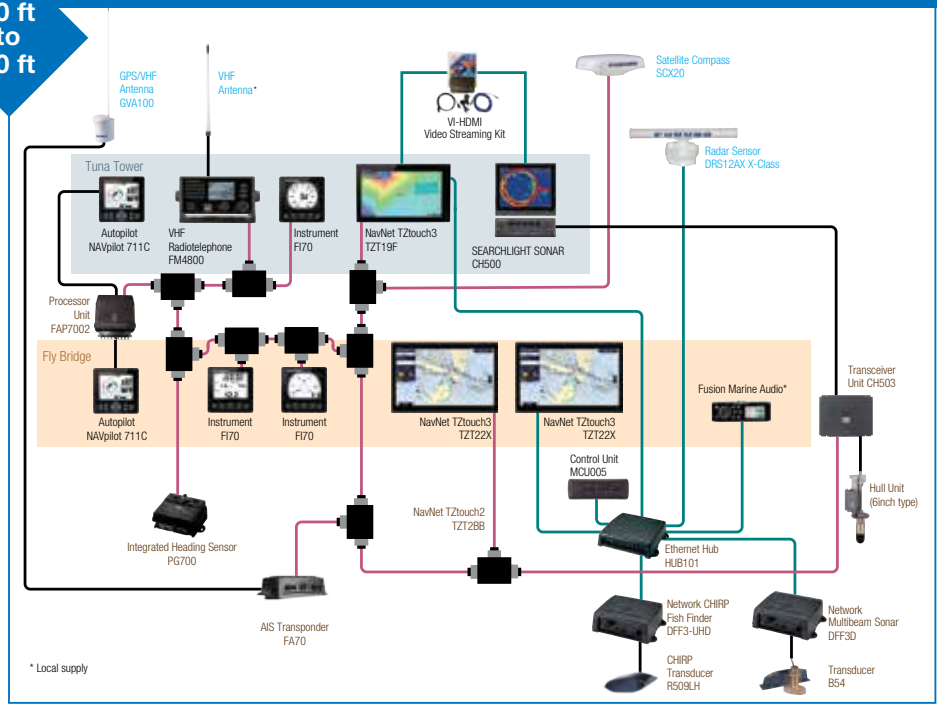

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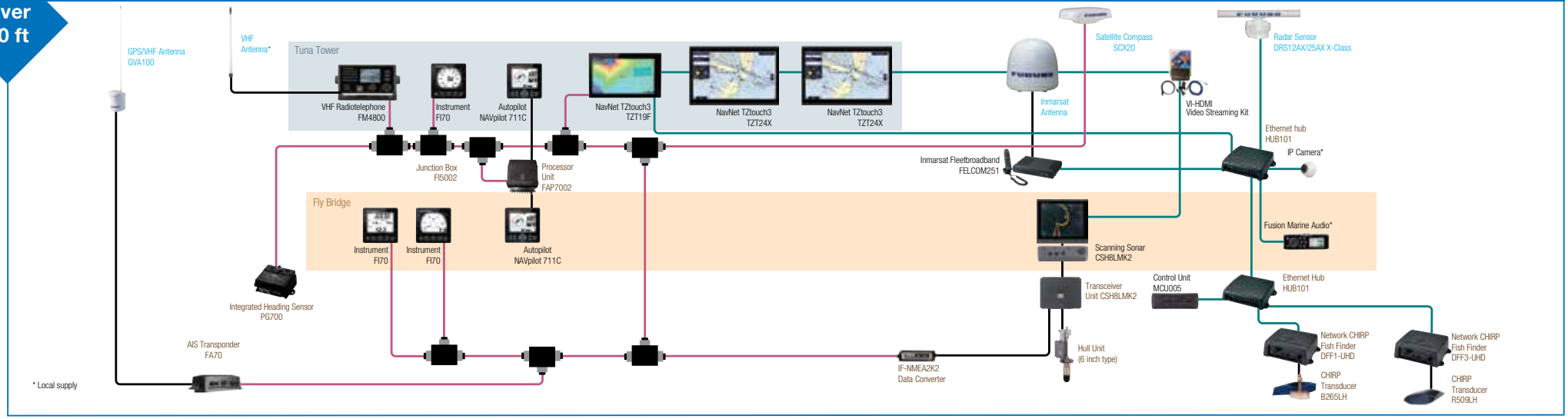


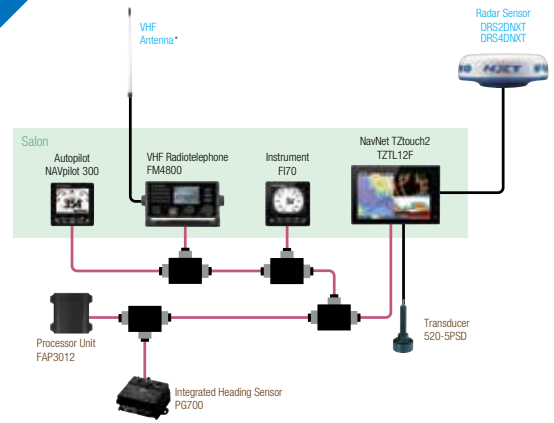
Recommendations

Common Sport Cruiser Product Recommendations

- NMEA2000
- Ethernet
- Other
- NMEA2000 T Connector

Product suggestions only - not an installation diagram

Under 30 ft



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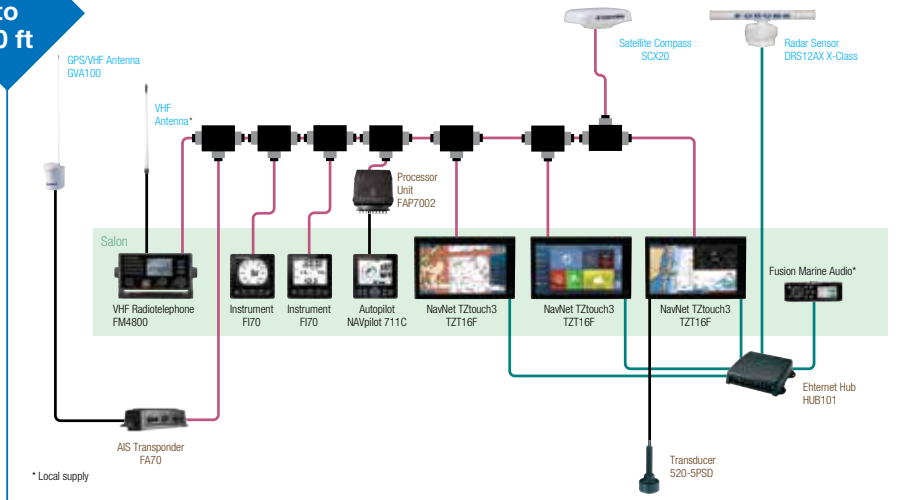

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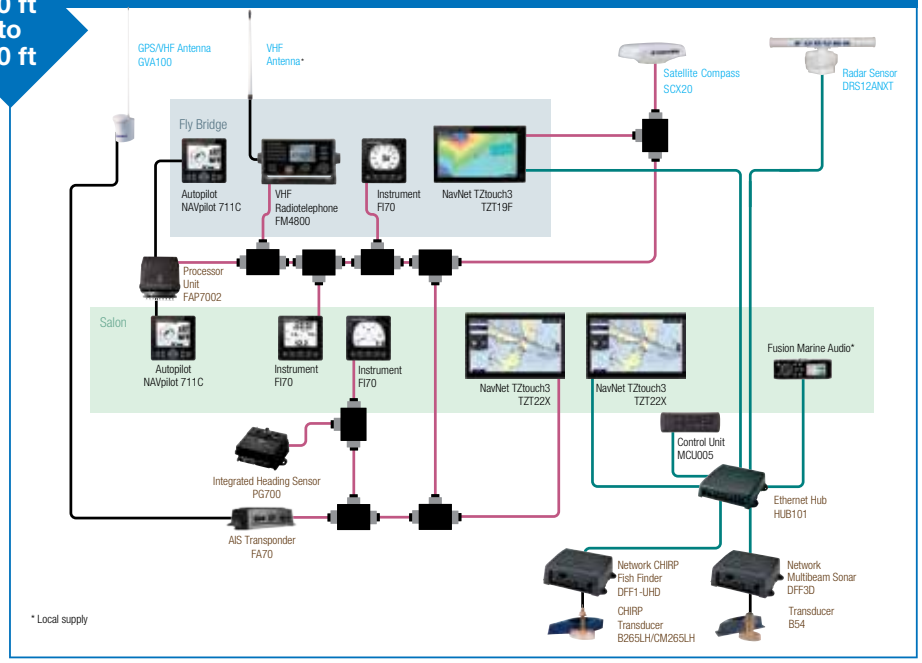

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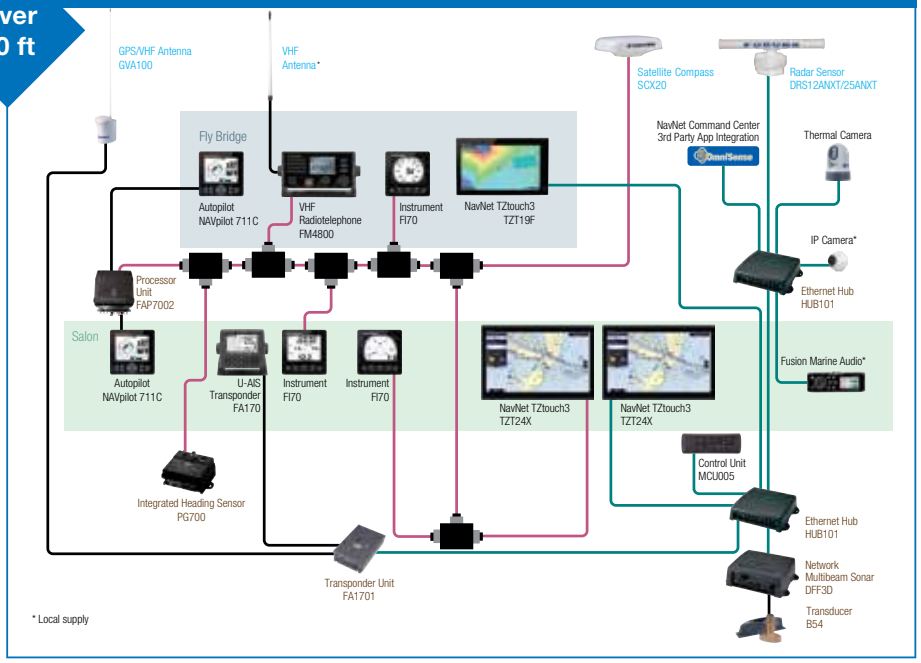
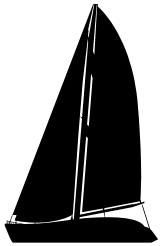


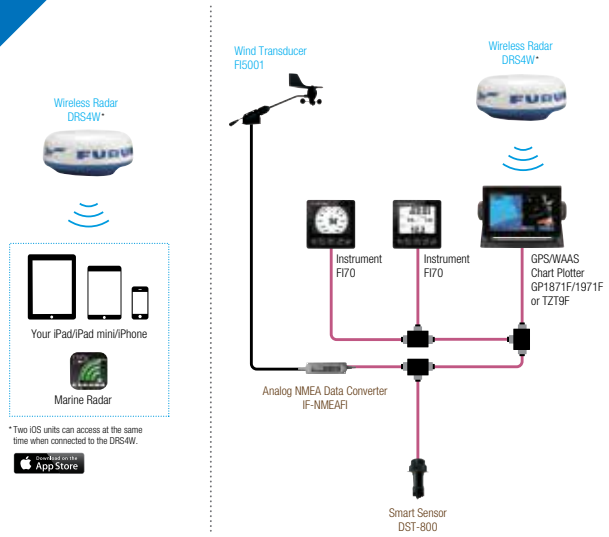


Common Sailboat Product Recommendations

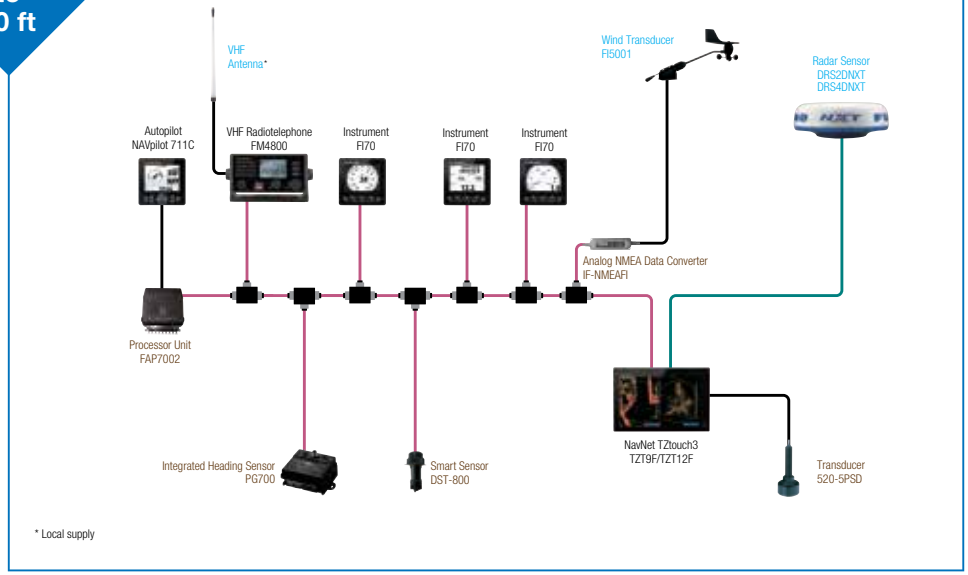
- NMEA2000
- Ethernet
- Other
- NMEA2000 T Connector

Product suggestions only - not an installation diagram

Under 30 ft



30 ft to 50 ft



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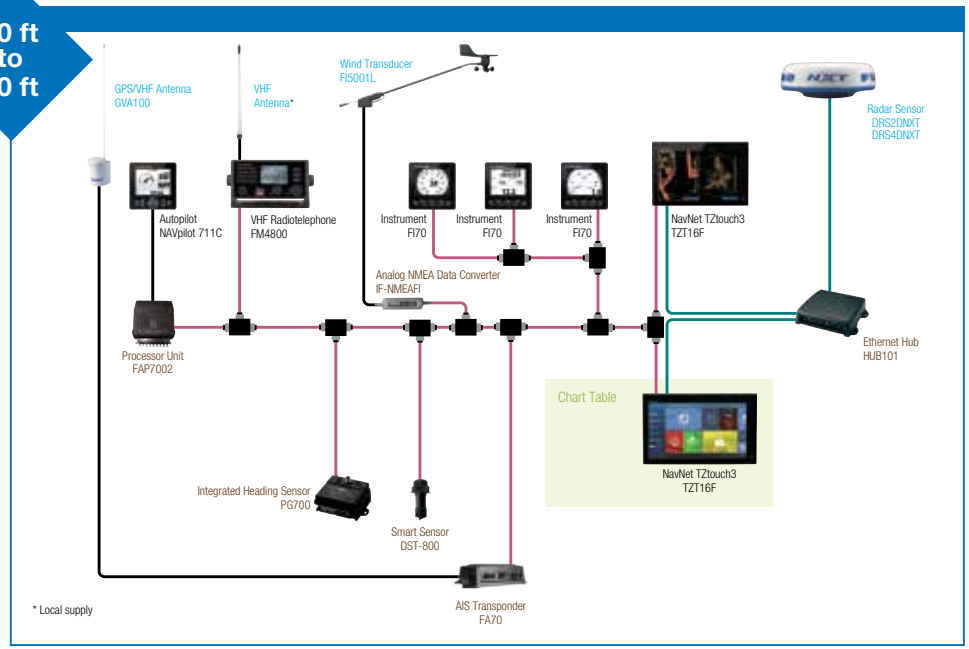

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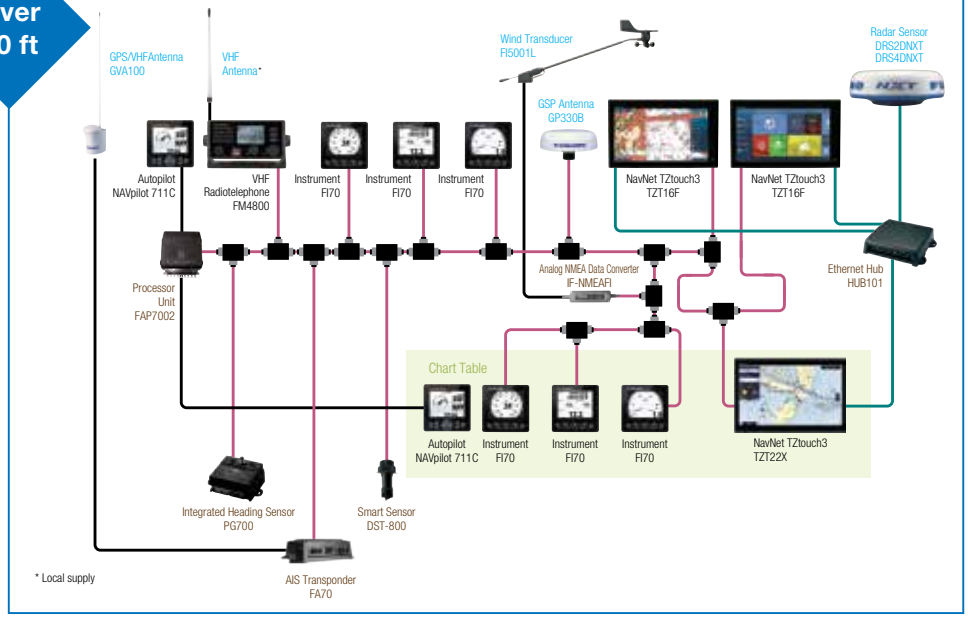

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Founded in 1938 as FURUNO ELECTRIC SHOKAI LTD., FURUNO ELECTRIC CO., LTD. is recognized as the world leader in Marine Electronics. Our founder's principle goal of modernizing fisheries led to the world's first practical commercial Fish Finder in 1948.

In 1972, Furuno was awarded the NMEA (National Marine Electronics Association) Best Product Award in the Fish Finder category in the US. Since then, Furuno has won 230 NMEA Awards, more than any other two manufacturers combined.

Furuno established its first overseas subsidiary in Norway in 1974, which was followed by the establishment of subsidiaries in the US (1978) and the UK (1979), foreshadowing its full-scale entry into the international business arena.

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