FURUNO

Marine Electronics Catalog

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Those who demand the best recognize Furuno as the ultimate provider of quality marine electronics.

For nearly 80 years, Furuno has continuously reimagined marine electronics, creating innovative solutions with new equipment that delivers exceptional performance and unrivaled simplicity. Whether you're earning your living on the water or simply enjoying the boating lifestyle, you can trust that Furuno is synonymous with quality, performance, and reliability.

Furuno provides the ultimate in navigation ease and safety on the water by manufacturing every piece of equipment to rigorous commercial standards, making each operation more intuitive and every trip more enjoyable than the last. Backed by an unrivaled worldwide network spanning every corner of the globe, Furuno delivers unparalleled service and equipment maintenance wherever you navigate. Our guarantee to provide the highest quality in all our products includes a two-year parts and labor warranty program.

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

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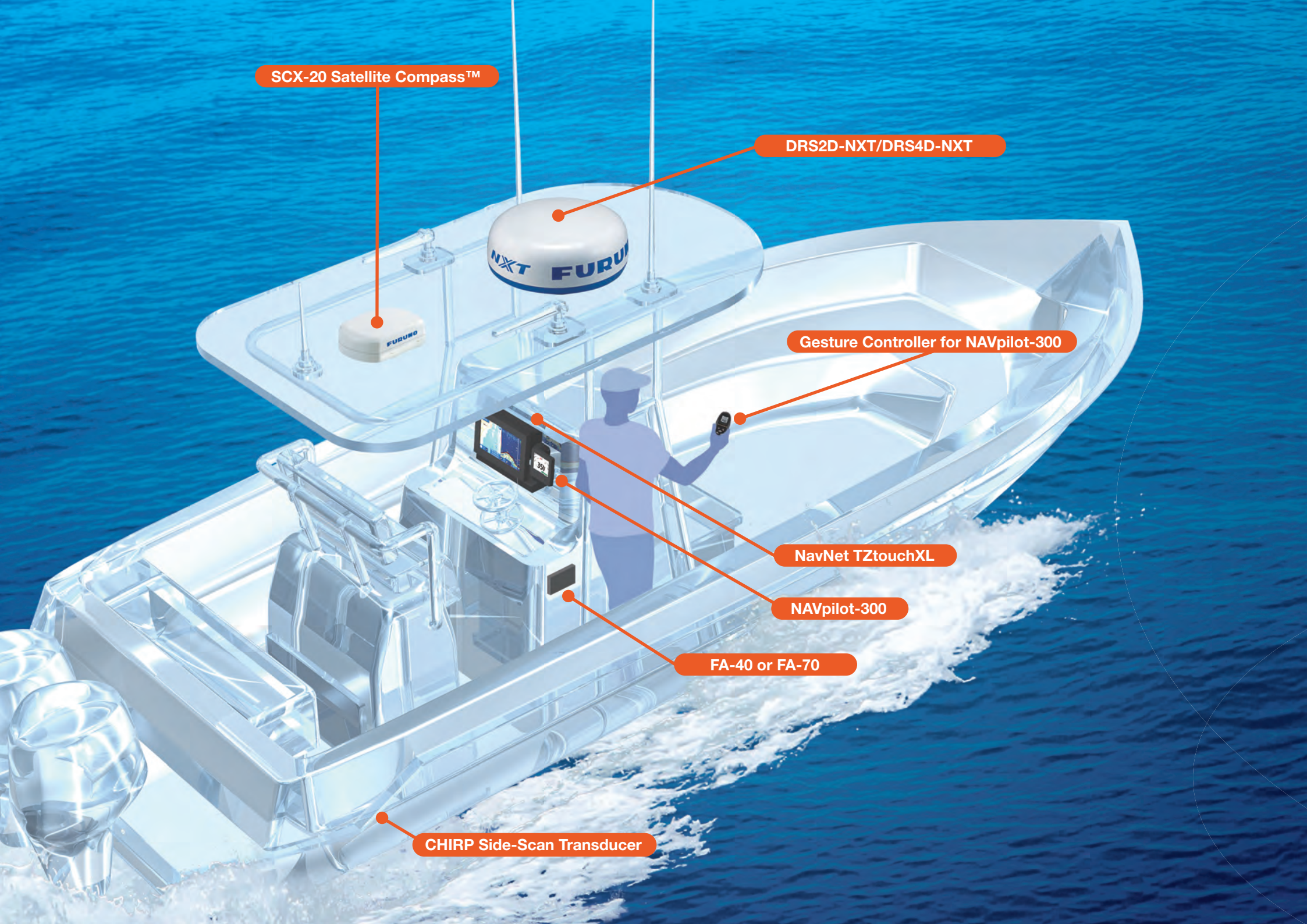

SCX-20 Satellite Compass™
DRS2D-NXT/DRS4D-NXT
Gesture Controller for NAVpilot-300
NavNet TZtouchXL
NAVpilot-300
FA-40 or FA-70
CHIRP Side-Scan Transducer

Powerful Technology, *Compact Design*

- Automatic Identification System (AIS) Receiver and Class-B+ AIS Transceiver
- Revolutionary quad-antenna, Satellite Compass™ for NMEA2000
- Self-learning, adaptive Autopilot with Gesture Controller
- 10", 13", or 16" TZtouchXL with Built-in Dual Channel* 1 kW TruEcho CHIRP™ Fish Finder, CHIRP Side-Scan, and GPS Receiver

*TZT10X Dual Channel CHIRP except when CHIRP Side-Scan is used, then it is Single Channel CHIRP

Satellite Compass™
Model **SCX-20**

AIS Receiver
Model **FA-40**

Class-B+ AIS Transceiver
Model **FA-70**

Autopilot
Model **NAVpilot-300**

Gesture Controller
NAVpilot

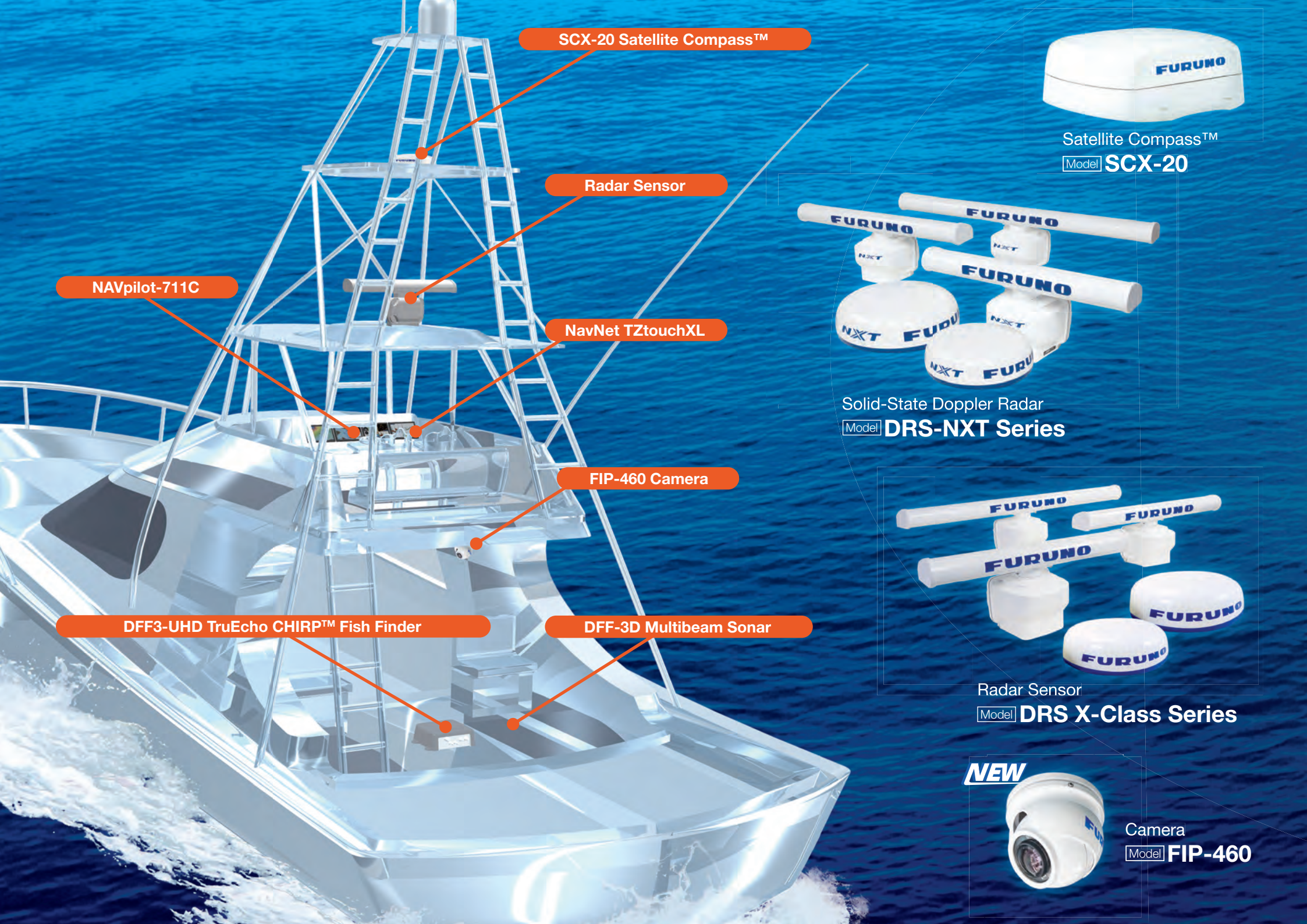
Solid-State Radome
DRS2D-NXT/
Model **DRS4D-NXT**

Hybrid Control MFD
with built-in
TruEcho CHIRP™
Fish Finder
Model **TZT13X**

Multi-Touch MFD
with built-in
TruEcho CHIRP™
Fish Finder
Model **TZT16X**

Hybrid Control MFD
with built-in
TruEcho CHIRP™
Fish Finder
Model **TZT10X**

NAVnet
TZtouchXL



Satellite Compass™
Model **SCX-20**

Solid-State Doppler Radar
Model **DRS-NXT Series**

Radar Sensor
Model **DRS X-Class Series**

NEW

Camera
Model **FIP-460**

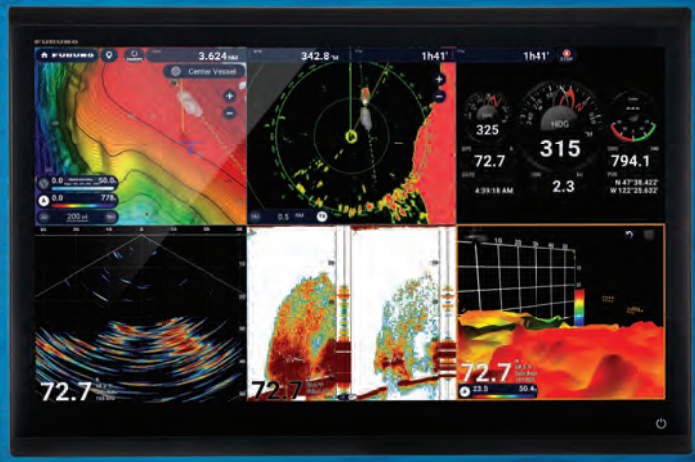
Powerful Tools for Powerful Boats

- New Xtra Large 16", 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
- Powerful TZTBBX Black Box option drives a variety of multi-touch display sizes

NEW

MFD BLACK BOX SYSTEM
Model **TZTBBX**

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



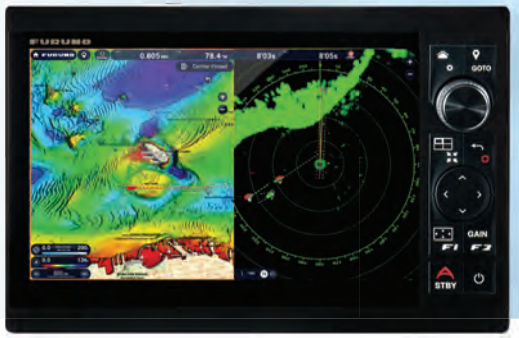
Multi-Touch IPS MFD
24" Display Splits Up To Six Windows
Model **TZT24X**

NAVpilot
Model **NAVpilot-711C**

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

Black Box Network
Multibeam Sonar
Model **DFF-3D**

NAVnet TZtouchXL



Model TZT10X - 10"

10" Hybrid Control MFD 1920x1200 (WUXGA)
with built-in TruEcho CHIRP™ Fish Finder / Side-Scan

Model TZT13X - 13"

13" Hybrid Control MFD 1920x1080 (FHD)
with built-in TruEcho CHIRP™ Fish Finder / Side-Scan

Model TZT16X - 16"

▸▸▸Spec P92

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

TZtouchXL Multi Function Displays

Explore the future of navigation with NavNet TZtouchXL Multi Function Displays. Extra-large, super-wide 16", 22", and 24" all-glass MFDs with exceptional clarity from all angles that enhance the functionality and style of your helm. Or go with the hybrid controls of the 10" & 13" options that make navigating intuitive and easy under any sea conditions, no matter the size of your vessel. Rest your hand on the RotoKey™ as you crash through the waves and navigate to your charted destination. For those that want a larger screen, the TZTBBX lets you choose virtually any size display.

The FURUNO flagship series offers new features that help you discover more and make smarter navigation decisions. The redesigned TZ MAPS chart engine provides you with the highest quality maps created from official hydrographic charts worldwide. Plus, they incorporate new BathyVision depth contours and terrain shading with details as fine as 7.5 cm (3 inches). Automatically plot your routes with Furuno's intelligent AI Routing. Additionally, get brand-new technologies called Risk Visualizer™ and AI Avoidance Route when you connect an NXT Radar to not only tell you when a target is dangerous but it also automatically draws a route you can take to avoid a collision.

With the blazing fast hexa-core processor in TZtouchXL, you'll have the confidence to scroll, pan, and zoom completely seamlessly. Navigating in a native 3D environment gives you a realistic perspective and an expanded view of the area around your boat, and the all-new TZ MAPS are perfect for planning and navigating routes.

3rd-Party Devices Compatible With NavNet Command Center

Whisper Power – Enjoy Green Energy
JL AUDIO
IRIS
High Pressure Watermakers
victron energy
DOMETIC
GROCO
TECNOSEAL
Omnisense systems
shadow-caster LED LIGHTING
HEFRING MARINE
LUMISHORE
LUMITEC
SEAKEEPER
EmpirBus
Maretron
Onyx Marine Automation
mc2 QUICK GYRO
BÖNING SHIP AUTOMATION
OceanLED

Over 30 partners, for complete list visit NavNet.com/TZtouchXL

Model TZT22X - 22"

22" Multi Touch MFD 1920x1080 (FHD)

MCU-006 Remote (option)
See page 12 for more remote options

Model TZT24X - 24"

▸▸▸Spec P92

24" Multi Touch MFD 1920x1080 (FHD)

Model TZTBBX

MFD Black Box
1920x1080 (16:9)
1280x1024 (5:4)
1024x768 (4:3)

TZtouchXL KEY FEATURES

- 10" and 13" Hybrid-Control MFDs
- 16", 22", and 24" All-Glass IPS MFDs
- NEW powerful TZTBBX Black Box option drives a variety of multi touch display sizes
- Ultra-sharp full HD Multi Touch with simplified yet powerful User Interface
- 10 Screen layouts, including 6-way split screen
- AI Routing™ utilizes chart info such as water depth,own boat information, and channels to create a suggested route
- Risk Visualizer™ shows potential collision based on the current position and movement of surrounding vessels*
- New AI Avoidance Route automatically calculates a safe route based on the current position and movement of surrounding vessels to avoid a collision*
- Built-in TruEcho CHIRP™ or CW Fish Finder (TZT10X/13X/16X)
- Built-in CHIRP Side-Scan (TZT10X/13X/16X)
- Improved 230kHz or 455kHz CHIRP Side-Scan auto gain optimizes performance at all ranges
- All-new TZ MAPS cartography with a modern yet familiar feel
- Simple mounting options include low profile flush-mount, or edge-to-edge flat mount for a sophisticated, all-glass appearance (TZT16X/TZT22X/TZT24X only)
- Easily connect a variety of sensors through Ethernet or NMEA2000, including Radar, Fish Finder, Multibeam Sonar, Autopilot, Satellite Compass™, and more
- Sync up a variety of data with smartphone or tablet
- Connect a wide range of remote controllers
- NavNet Command Center integrates 30+ 3rd-party devices using a built-in HTML browser

NMEA2000 Certified

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

RISK VISUALIZER · AI ROUTING · AI AVOIDANCE ROUTE · BATHYVISION · CHIRP SIDE-SCAN · TimeZero Designed by MAXSEA · FISH-IT DRIFT-IT · MTC Multi Touch Control · TruEcho CHIRP · BDS Bottom Discrimination Sounder · PBG Personal Bathymetric Generator · ACCU-FISH · RotoKey

* Requires connection to DRS-NXT Radar

NavNet Series

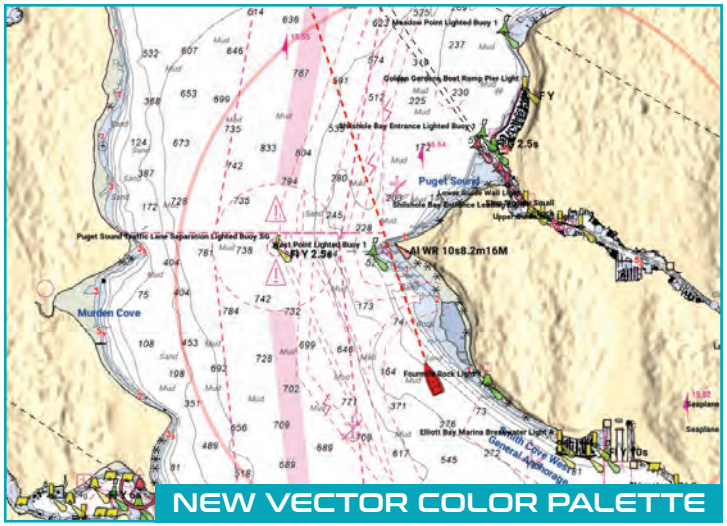
After several years of intense work, we are excited to announce the official launch of our new charts...

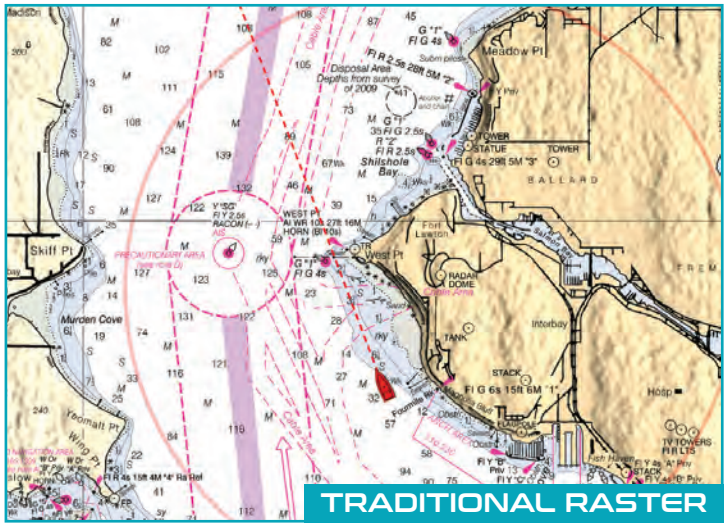
Maps That Get Better Everyday: Vector or Raster?

Thanks to our agreements with many hydrographic offices around the world, TZ MAPS offers coverage for Europe, North America, the Caribbean, & the Pacific. Each zone includes both vector data and raster maps (scanned and georeferenced paper maps). Plus, with our new color palettes, you can now make your vector charts look like traditional raster charts as seen below.

- Make vector charts look identical to raster paper charts
- Free 1-year chart updates
- Detailed land information
- Community Edit & POI

- 8 different color palettes
- Subscription updates available after first year
- Use your TZ MAPS across multiple MFDs, TIMEZERO software, or TZ iBoat app
- High-resolution satellite photos





TIMEZERO iBoat

Dynamic Fishing Maps

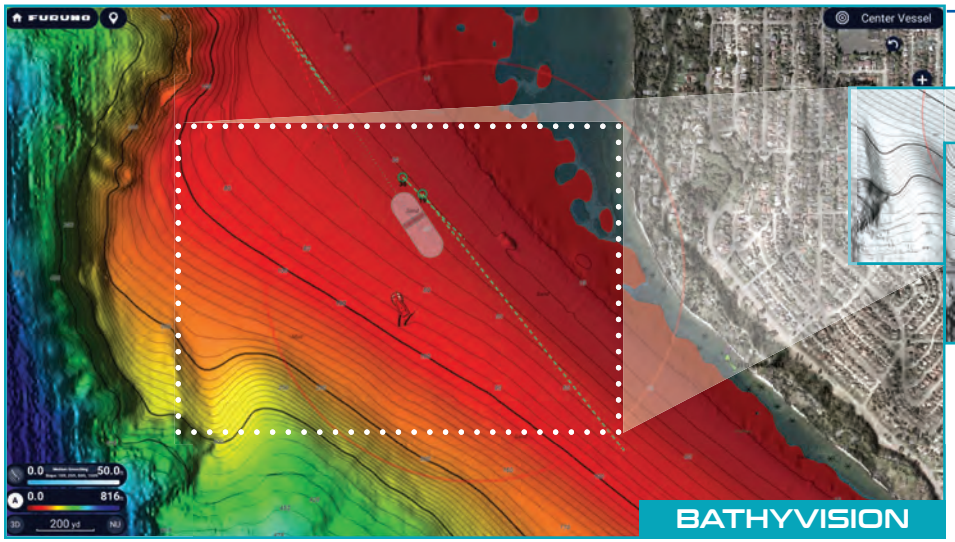
- Choose the amount of contour lines with a single tap
- 5 levels of contours down to within 7.5 cm (3")
- Add dynamic color shading based on your custom settings
- Adjust terrain shading to add as much topography as desired for high resolution depth shading
- Combined depth shading plus fishing charts

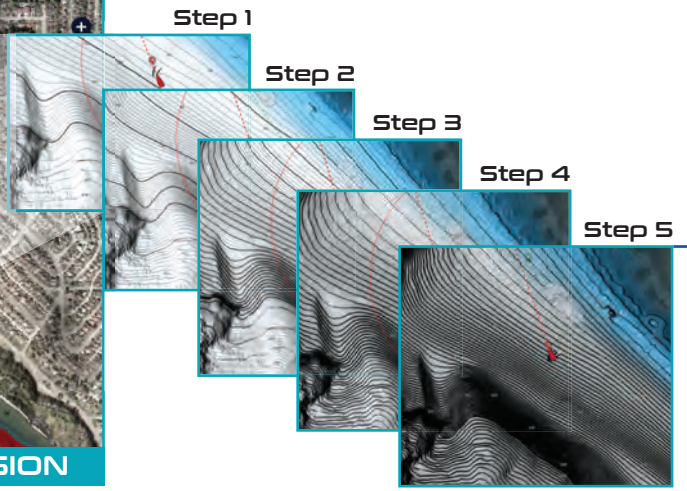
BathyVision... Reveal The Secrets Of The Seabed Like Never Before

The seabed holds many secrets! However, thanks to the advanced functionality and highly detailed information provided by our all-new BathyVision, those secrets of the seabed will be revealed!

TZ MAPS offer the best bottom data available and BathyVision lets you display dynamic & intuitive high-resolution relief shading in color and/or with contour lines. It is possible to configure the density of contour lines to about 7.5cm (3 in) & associated shading to focus precisely on high-potential fishing areas.

BATHYVISION





TZ MAPS: An All-New Chart Engine Providing Game-Changing Safety Technology —


Standard

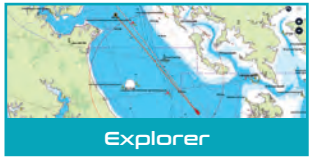

International (S-52 std)

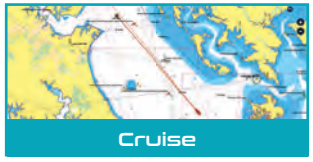

Sunlight


French HO (SHOM)


Canadian HO (CHS)


NOAA


Explorer


Cruise

Community Maps

- Users create or edit vector chart objects
- Works online or offline (cached)
- Upload photos, comments, and ratings

AI Routing

- AI algorithm analyzes nautical chart elements: water depths, channels, and the recommended routes to ensure seamless & secure navigation
- Swift & precise solution for planning your next voyage
- Calculate the optimal route in seconds

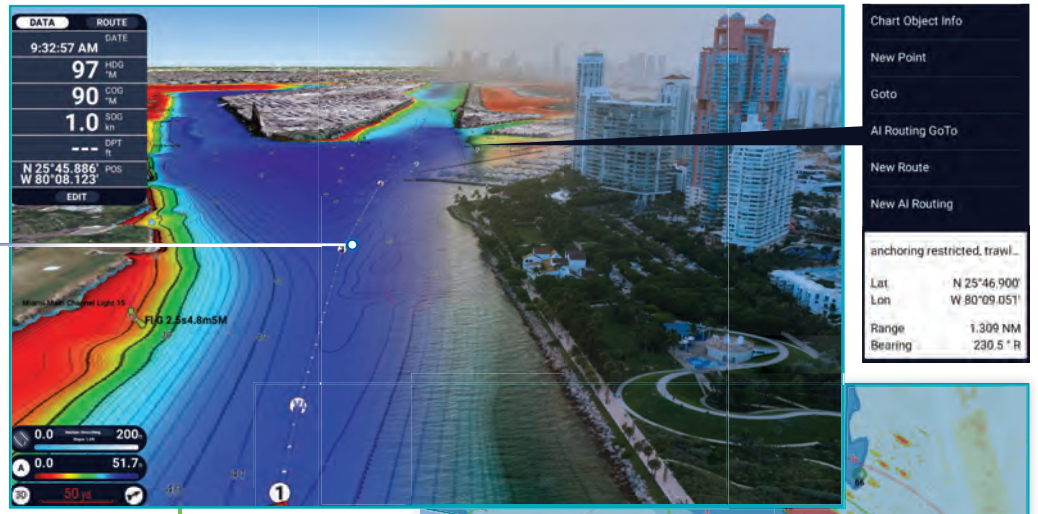
Risk Visualizer

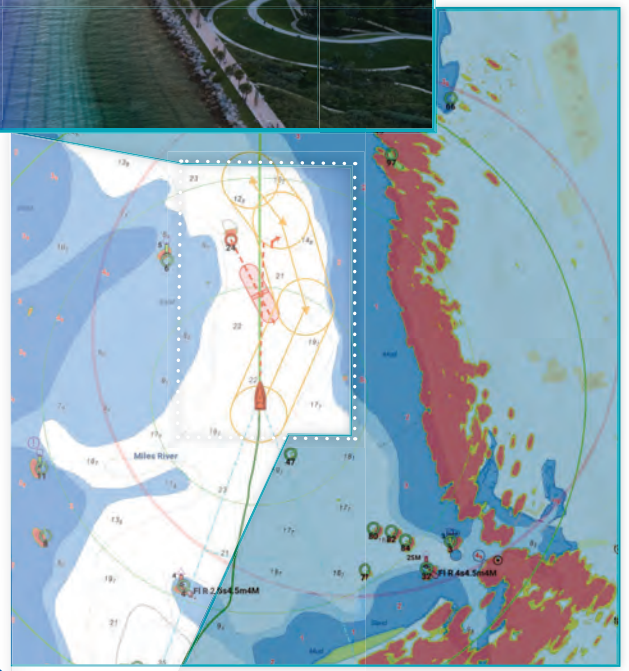
- The Risk Visualizer™ shows potential collision areas based on the current position and movement of all surrounding vessels
- Quick and intuitive read on potentially dangerous targets
- Color-coded alerts for collision
  Green = Normal / Red = Hazardous

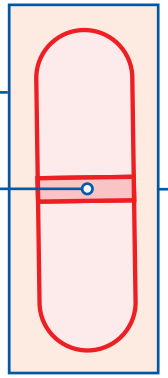
AI Avoidance Route*

- Uses a proprietary AI Routing algorithm to automatically calculate the best routes for safety

* Requires DRS-NXT Radar Sensor



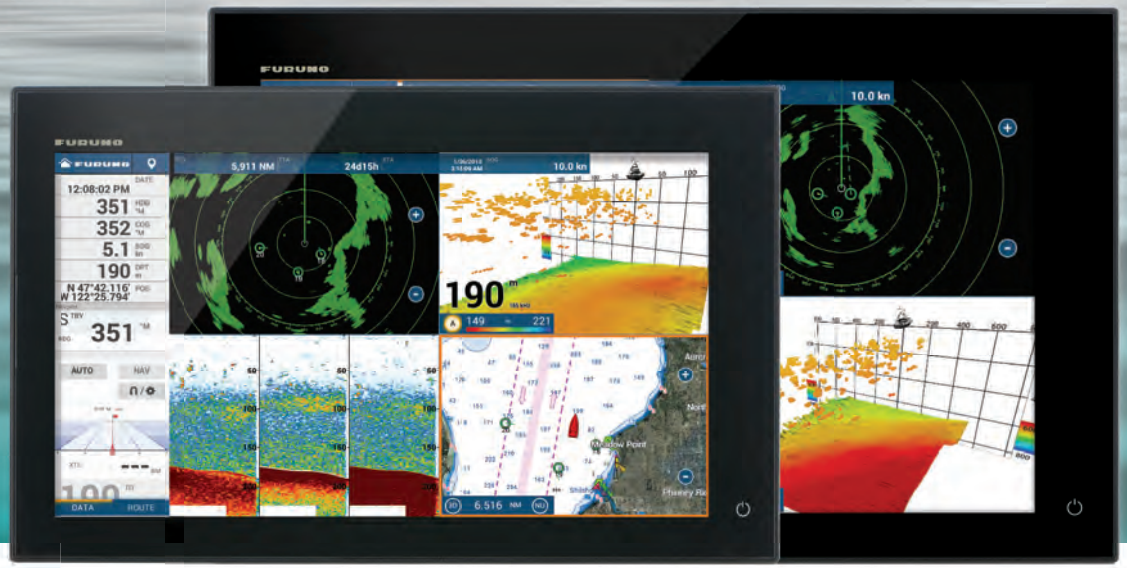




Collision w/ Target

High Collision Risk

Recommended AI Avoidance Route to avoid a collision



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 P95

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

TZtouch3 KEY FEATURES

- CHIRP Side-Scan: see up to 228 m (750 ft) to each side (230 kHz only)
- Follow-It: Uses PBG data to create a constant depth route for NAVpilot to follow*
  (*Requires contour data from DFF-3D)
- DFF3-UHD high-power 2/3 kW TruEcho CHIRP™ / Max depth scales to over 4,500 meters (15,000 ft)
- Fish-It and Drift-It: save time, fuel, and increase fish catch
- True Dual-Channel 1kW TruEcho CHIRP™ Fish Finder**
  (**TZT12F/16F/19F only, TZT9F Single-Channel only)
- Internal GPS receiver* (*TZT19F utilizes an external GPS receiver)
- Quad-Core CPU
- Compatible with CZone digital switching
- NavNet Command Center integrates 3rd-Party devices using a built-in HTML browser
- Can wirelessly download up to two weeks of weather data with an Internet connection

AIS · 3D CHART · Bonded LCD · Enhanced Sunlight Viewable · Ethernet Plug&Play · FISH FINDER Internal · GPS Internal Antenna · Target Tracking · VIDEO IN/OUT · AUTO · NMEA2000 Certified · NMEA 2021 Technology Award

CHIRP SIDE-SCAN · FISH-IT DRIFT-IT · ACCU-FISH · TimeZero · BDS · RezBoost · PBG · MTC · TruEcho CHIRP · RotoKey

REMOTE OPTIONS

TZtouchXL, TZtouch3, & TZT2BB

Model TZT2BB

▸▸▸Spec P95

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

Multi Touch Marine Display* with TZT2BB Processor Unit (Model MPU-004) and Control Unit (Model MCU-005)**
***Local supply** ****Option**

Model MCU-002
Remote Control Unit

Model MCU-004
Remote Control Unit

Model MCU-006
Control Unit

Model MCU-006H
Control Unit

- Available in vertical (MCU006) & horizontal (MCU006H) configurations
- 10 dual-purpose keys + a large RotoKey joystick
- Edge Swipe control
- Control of every NavNet TZtouchXL, or TZtouch3 in the network

Model MCU-005
Control Unit (option)

Model TEU001B / TEU001S
Touch Encoder Unit (option)

Black Design

Silver Design

TZT2BB KEY FEATURES

- Internal RezBoost™ Fish Finder, with Sunlight color palette
- 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 video data directly to TZT2BB
- 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

* Optional sensors required

- 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, & other sensors to your NavNet network
- Connect up to 5 NavNet TZT3/TZT2 displays on one network (with v8.01 TZT2 software or higher)
- Wirelessly download up to two weeks of weather data with an Internet connection
- Tablet & smartphone apps: NavNet Remote, NavNet Viewer & 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

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 TZtouchXL & TZtouch3 just made it all easier with TZ Cloud and the TZ First Mate App.

See page 22 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. "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 or Routes Again

Create your routes at home using TZ Navigator, a web browser*, or TZ iBoat iOS App, then retrieve them from the cloud & download to your TZtouchXL & 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

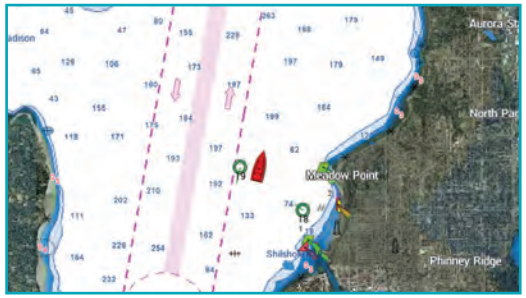
TZtouchXL/TZtouch3

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. Satellite PhotoFusion™ is an optional feature designed to work exclusively with Furuno.

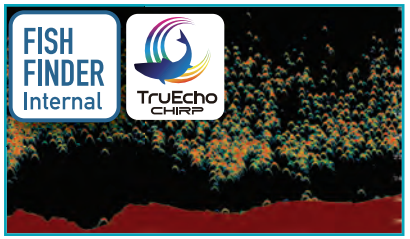
CMOR's high-resolution, shaded-relief bathymetric bottom images help navigators identify suitable locations for fishing and diving. (CMOR available in U.S. only)



Satellite PhotoFusion™

CMOR Charts

Powerful Additions To Boost Your Catch

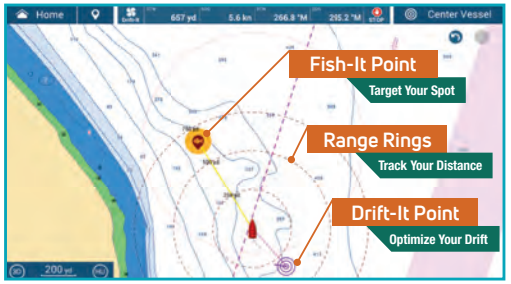


Find More Fish With TruEcho CHIRP™

TZtouchXL & 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 entire TZtouchXL & TZtouch3 lines gets you down to 3,000 meters while improved auto gain optimizes performance at all ranges.

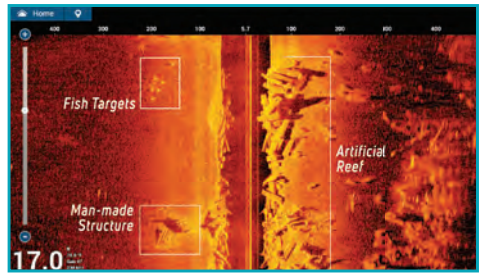
Drift-It, Fish-It... Catch-It!

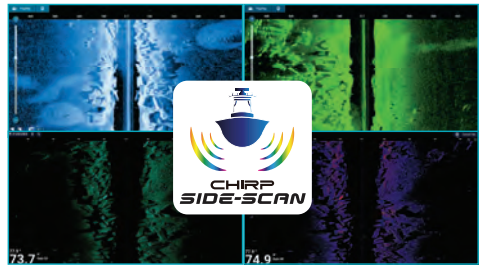
The Fish-It & Drift-It features help you locate the correct spot to start your drift so you'll pass right over your fishing point. Tapping on a location on the chart, Fish Finder, or DFF-3D creates a temporary "fishing go-to point" with dynamic range rings, a course line between the point and the boat, 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.



CHIRP Side-Scan is built-in to TZtouchXL & TZtouch3

Furuno's CHIRP Side-Scan for NavNet TZtouchXL & 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 274 meters (900 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 TZtouchXL & TZtouch3 with internal Fish Finders (excludes TZT9F). Available with Thru-hull, Paired, or Transom Mount Transducer. (Available in 230 kHz, or 455 kHz on TZTXL, only 230 kHz on TZT3)

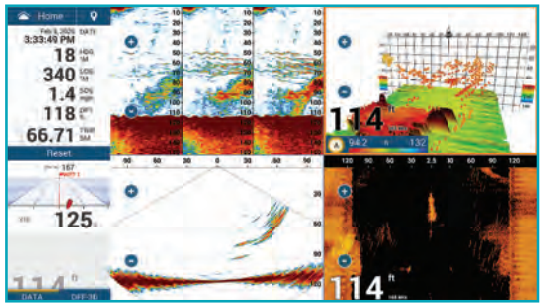


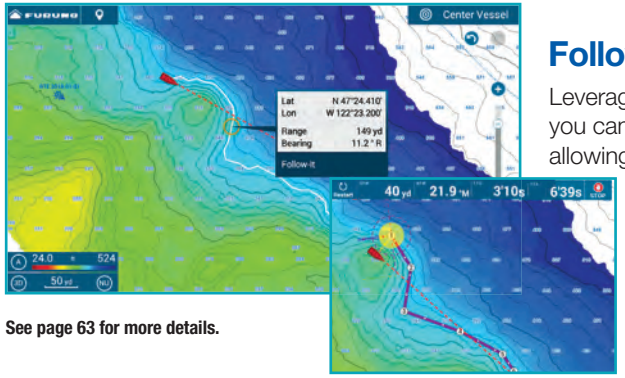


(Software ver. 3.50 or higher required for TZtouch3; ver. 9.50 or higher required for TZT2BB. CHIRP Side-Scan can be displayed on TZT2BB, TZT9F, TZT22X, and TZT24X when networked to a TZT10X, TZT13X, TZT16X, TZT12F, TZT16F, or TZT19F.)

Use DFF-3D 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 DFF-3D 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 63 for more details.

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

Solid-State Radar

UHD Ultra High Definition · TARGET ANALYZER · RezBoost · Doppler

KEY FEATURES

- Solid-State pulse compression Doppler Radar with no preheating time and low energy consumption (no magnetron)
- Revolutionary Target Analyzer™ function instantly identifies hazardous targets
- Acquire 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/25A-NXT (XN13A), 2.0° with DRS4D-NXT, and 2.6° with DRS2D-NXT
- Bird Mode to find the best fishing grounds by tracking birds
- Simple installation, external PSU is not required
- Smart-connector cable for simplified cable installations

* when using RezBoost™

DOME	OPEN ARRAYS - 3.5', 4', OR 6'		
DRS2D-NXT/DRS4D-NXT	DRS6A-NXT	DRS12A-NXT	DRS25A-NXT

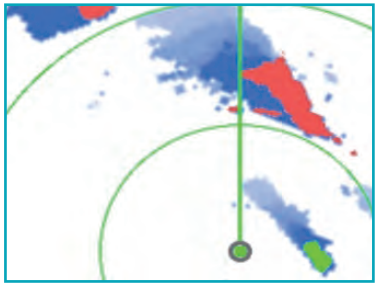
NMEA® 2008-2014, 2016, 2018-2024

Model DRS2D/4D-NXT
NXT Radome ▸▸▸Spec P100

Model DRS6A/12A/25A-NXT
NXT Radar Array

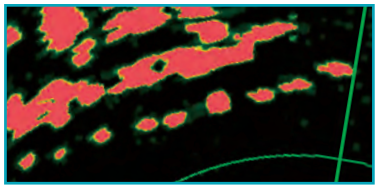
Spot Hazardous Targets Instantly

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.



RezBoost™ Beam Sharpening

Furuno's exclusive RezBoost™ technology has been incorporated into our Radar units for enhanced resolution and impressive performance.



Model DRS4DL+/DRS4DX

Compact Radome ▸▸▸Spec P100

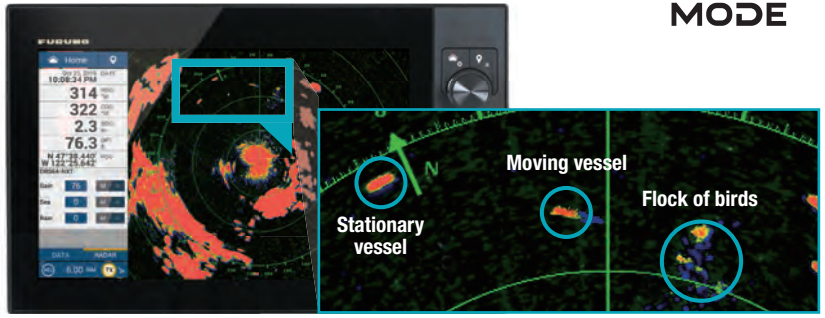
Model DRS6AX/12AX/25AX

X-Class Radar Array ▸▸▸Spec P101

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



X-Class (Magnetron) Radar

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 & 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) & EBL (Electronic Bearing Line) give distance & bearing indications

* Appropriate sensor required

DOME	OPEN ARRAYS - 3.5', 4', OR 6'		
DRS4DL+/DRS4D X-Class	DRS6A X-Class	DRS12A X-Class	DRS25A X-Class

High Power TruEcho CHIRP™

DFF3-UHD

Model DFF3-UHD

▸▸▸Spec P98

Black Box Network - High Power TruEcho CHIRP™ Fish Finder

SPECIFICATIONS:

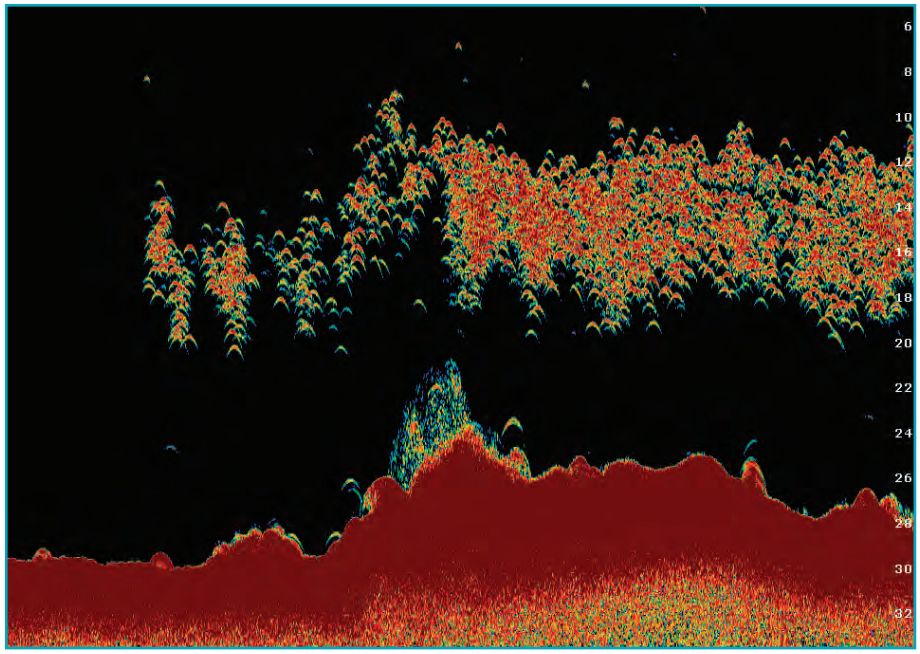
Model	DFF3-UHD
Frequency	25 to 242 kHz
Output Power (kW)	2 kW/3 kW
Range Scale (Nm)	up to 3,000 m
ACCU-FISH™	N/A
Bottom Discrimination	N/A

TruEcho CHIRP

Go Deeper With More Power Than Thought Possible

You spoke. We listened. And now we delivered! TZtouchXL & 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 a deep water, high-power Fish Finder for TZtouchXL, TZtouch3, and TZT2BB. The 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. Go big or go home!

** DFF3-UHD can be connected to TZTXL, TZT3 & TZT2BB*



Multibeam Sonar

Model DFF-3D ▸▸▸Spec P99

Black Box Network Multibeam Sonar

KEY FEATURES:

DFF-3D Multibeam Sonar	
Frequency	165 kHz
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® 2018-2024 · MULTI BEAM · NAVnet Connect · PBG Personal Bathymetric Generator

Find The Fishing Spots Others Have Missed

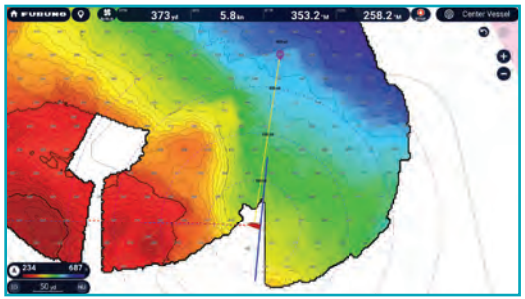
The Multibeam Sonar gives you real-time 120° port-starboard view of the water column and seabed up to 200 m depth*. The DFF-3D allows you to explore fishing spots and find fish in deep water far faster than conventional single beam sounders. The main beam penetrates right under the boat at a depth of approximately 300 m*. See page 63 for more details!

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

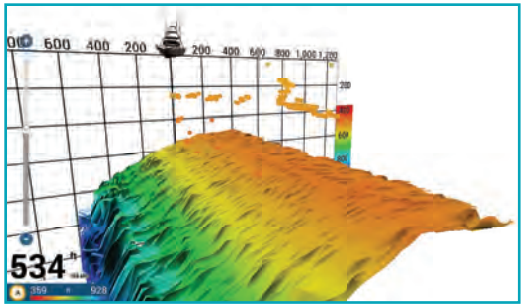
PBG (Personal Bathymetric Generator)

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 TZtouchXL & TZtouch3 MFD.

See page 63 for more details on the DFF-3D.



PBG spot soundings clearly shows depth numbers



Digital Fish Finders

Model DFF1-UHD

▸▸▸Spec P98

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

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

*** Bottom Discrimination transducer required**

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

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

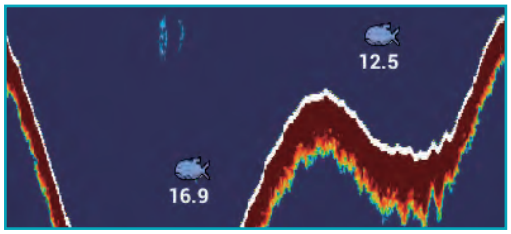
The Shear Alarm lets you know when there is a sudden change in sea surface temperature, often caused when two currents meet. This is usually a good indication of a great fishing spot.

SST Graph

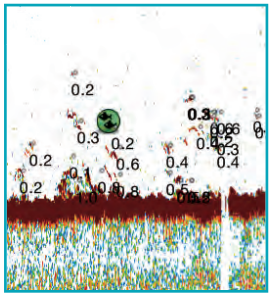
SST Graph on the Fish Finder display, instrument display or data box shows you the history of SST in the trip.

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

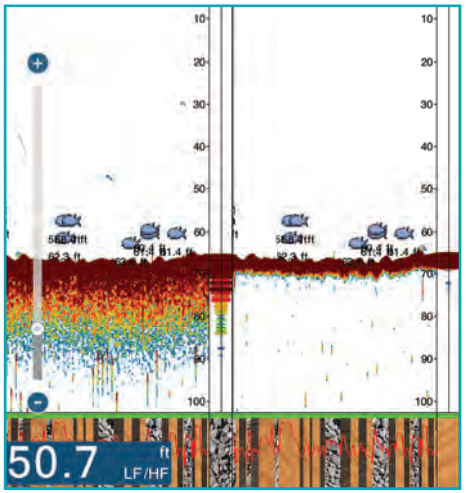


Found a fishing hot spot? Simply tap the screen and add a fish mark. With the scroll-back feature, you can look at past echoes simply by swiping the screen, adding new fish marks that will automatically show the captured location on your plotter screen.

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.



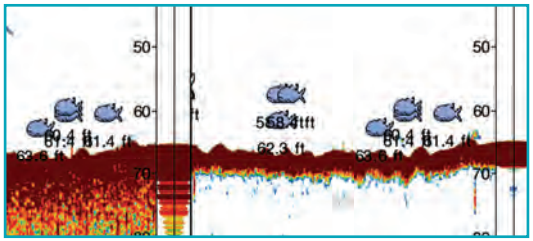
Probability Mode:
Rocks Gravel
Sand Mud

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

FIP-460 ▸▸▸Spec P99

Marine IP Camera

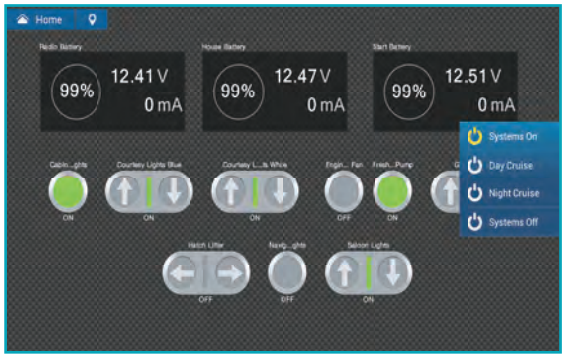
KEY FEATURES

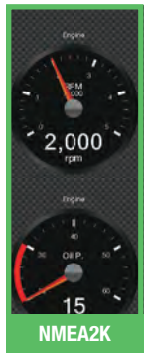
- Up to 3MP resolution (2304x1296)
- High-performance LED - 10 meter range
- Mechanical IR Cutout Filter for True Day / Night Operation
- Fully rotatable for a variety of mounting configurations
- Compatible with TZtouchXL, TIMEZERO software v4.1+, and ONVIF-compliant devices
- Connect up to 8 FIP-460 Cameras to the TZtouchXL network

CZone Digital Switching

www.czone.net

CZone digital switching by BEP simplifies the installation and operation of complex electrical systems. NavNet TZtouchXL/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.

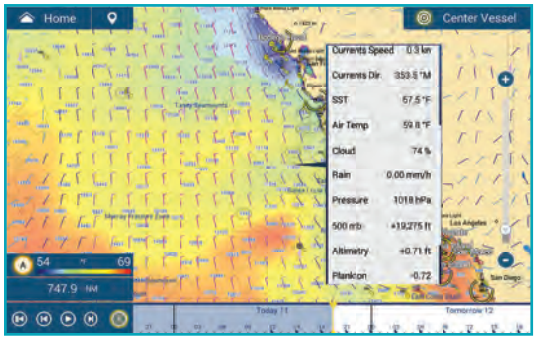




Marine Weather Forecast*

***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 TZtouchXL/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 TZtouchXL 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

My TIMEZERO™ Cloud Data

TZ TIMEZERO

login.mytimezero.com

Connect your NavNet TZtouchXL/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 tracks at home and transfer them to your TZtouchXL/TZtouch3 onboard through the cloud.

TZ Log In

Don't have a My TIMEZERO account yet? Create an account

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 TZtouchXL & TZtouch3 displays 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 or Routes 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 TZtouchXL/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 TZtouchXL/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 TZtouchXL/ TZtouch3 network.

RADAR

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

Marine Radar
FAR-1513BB/1518BB Series
ETHERNET

Marine Radar
FAR-2xx8 Series
ETHERNET

FISH FINDERS

Multibeam Sonar
DFF-3D
ETHERNET

Network Fish Finder
DFF1-UHD/DFF3-UHD
ETHERNET

Bottom Discrimination Fish Finder
BBDS1
ETHERNET

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

AIS

AIS Receiver
FA-40
NMEA0183 | NMEA2000

Class-B+ AIS Transceiver
FA-70
NMEA0183 | NMEA2000

U-AIS Transponder
FA-170
ETHERNET

GPS

GPS/WASS Receiver Antenna
GP-340
NMEA0183 | CAN BUS

Satellite Compass™
SCX-20/21
NMEA2000 | NMEA0183

INSTRUMENT/ DATA ORGANIZERS

Data Organizer
FI-70
NMEA2000

Data Organizer
RD-33
NMEA2000

AUTOPILOT

Autopilot
NAVpilot-1000
NMEA2000

Autopilot
NAVpilot-300
NMEA2000

Autopilot
NAVpilot-711C
NMEA0183 NMEA2000

COMPASS

Compass
SC-70
NMEA0183 NMEA2000

Satellite Compass™
SC-33
NMEA2000

Satellite Compass™
SCX-20/21
NMEA2000 NMEA0183

Integrated Heading Sensor
PG-700
NMEA2000

VHF COMMUNICATION

Marine VHF Radiotelephone
FM-4800
NMEA0183 NMEA2000

Marine VHF Radiotelephone
FM-4850
NMEA0183 NMEA2000

Marine VHF Radiotelephone
FM-8900S

WEATHER/ PC PLOTTER

TIMEZERO
Marine Software
ETHERNET

Network Weather Facsimile Receiver
FAX-30
ETHERNET

Satellite Weather
BBWX4
(North America only)
ETHERNET

OTHER

Digital Switching System
CZONE
NMEA2000

YAMAHA
NMEA2000

HDMI IN
TZT2BB/TZT16F/TZT19F/ TZT16X/TZT22X/TZT24X only

Marine Entertainment System
Fusion APOLLO Series, etc.
ETHERNET NMEA2000

NavNet Command Center*
3rd Party Device Integration
(over 30 devices compatible)

victron energy · LUMISHORE · QUICK · shadow-caster LED LIGHTING · OSCAR · SEAKEEPER · etc.

ETHERNET

IP Camera
ETHERNET

FIP-460 Camera
ETHERNET

Analog Camera
VIDEO

Thermal Camera
VIDEO ETHERNET

* NavNet TZtouchXL, TZtouch3 Series and TZT2BB only

FISH FINDER Internal

External Fish Finders can also be connected to TZtouchXL/ TZtouch3. The internal and external Fish Finder cannot operate simultaneously. You can select which one to use from the settings menu (internal Fish Finder not available for select TZTXL/TZT3 and TZT2BB).

GPS Internal Antenna

External GPS antennas and navigators can also be connected to NavNet TZtouchXL/TZtouch3. You can select which one to use from the settings menu (internal GPS antenna not available for select TZTXL/TZT3 and 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 TZtouchXL/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 TZtouchXL/TZtouch3.

* 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 TZ MAPS.

TZ iBoat can connect to the Wireless Hotspot created by the NavNet TZtouchXL/TZtouch3 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 and/or iPhone 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.*

* Radar Module (in-app purchase required).

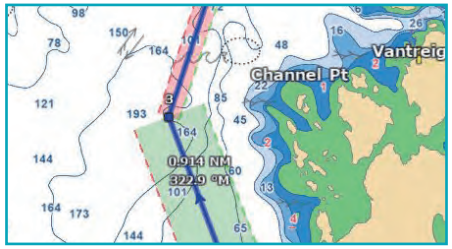
Anchor Watch Alarm

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

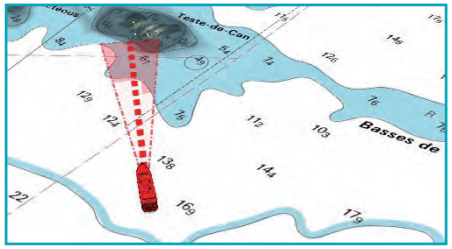
TZ Navigator V5 ▸▸▸Spec P102

TZ Navigator V5 proudly utilizes TZ MAPS for an exceptional charting experience. TZ MAPS combines several types of nautical chart data: Raster, Vector, detailed land information, high resolution satellite photos, and high-resolution Bathymetry. But that's not all, it also gives you access to innovative features such as BathyVision, Dynamic Moorings, Community Maps, Dynamic Lights, Smart Search, Smart Zones, and Route Assist.

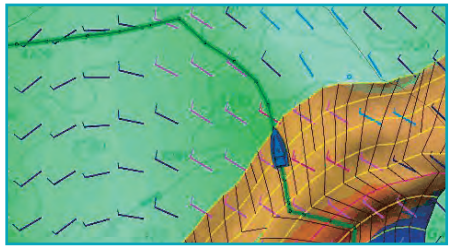
- Marine navigation software with a fast and smooth full 2D/3D chart engine: Our navigation software operates in a fully rendered 3D environment and delivers unparalleled speed and a seamless chart plotting experience
- Connect your GPS and Autopilot (NMEA compatible serial ports or Ethernet by Furuno)
- Advanced worldwide weather forecast service and features: Download/overlay GFS and ww3 weather updates for free or subscribe to Premium weather (Including 6 additional HR models in addition to Rain Radar and Marine Forecast features)
- 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



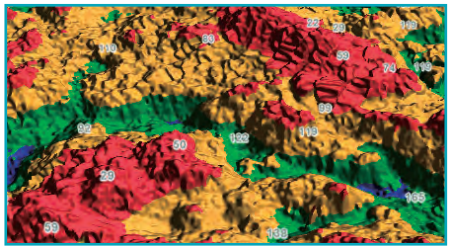
Security Cone



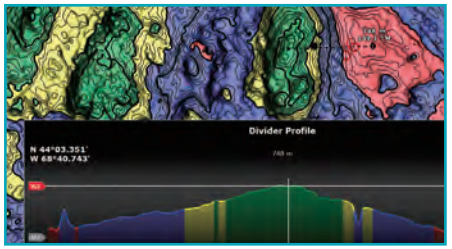
Weather Routing with the TZ Routing Module

TZ Professional V5 ▸▸▸Spec P102

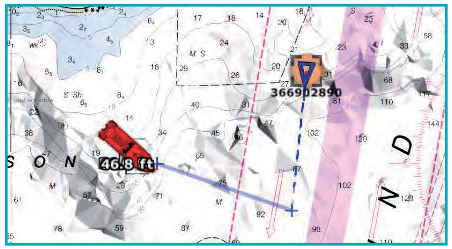
- The latest version of the PBG module allows you to create clearer, more realistic charts of the seafloor. Connect to DFF-3D Multibeam Sonar with optional module
- Instantaneously display a point-to-point depth profile window. This 2D view allows you to identify the depth variations with unequaled precision (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. TZ MAPS allows for continuous chart update. Community maps feature can also help access to additional local knowledge
- Now compatible with the official S57/S63 formats
- Thanks to cutting-edge augmented reality technology, TZ Professional V5 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 V5 introduces the new Premium Ocean-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

Radar Options for ANY Vessel

RADOME
DRS2D-NXT
DRS4D-NXT

OPEN ARRAY
DRS6A-NXT
DRS12A-NXT
DRS25A-NXT

SOLID STATE DOPPLER RADAR
NXT SERIES

RADOME
DRS4DL+
DRS4D X-Class

OPEN ARRAY
DRS6A X-Class
DRS12A X-Class
DRS25A X-Class

DOME	OPEN ARRAYS - 3.5', 4', OR 6'		
DRS2D-NXT/DRS4D-NXT	DRS6A-NXT	DRS12A-NXT	DRS25A-NXT
DRS4DL+/DRS4D X-Class	DRS6A X-Class	DRS12A X-Class	DRS25A X-Class

RADAR SENSOR
X-CLASS

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

Model DRS4W

▸▸▸Spec P103

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
- Simultaneous operation on up to two iOS devices
- Wirelessly connect to GP-1871F or GP-1971F 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 GP-1871F/1971F

The Furuno DRS4W Wireless Radar can be connected to the GP-1871F/GP-1971F GPS/WAAS Chart Plotter. Refer to pages 45-46 for details.

Model 1815

▸▸▸Spec P104

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, 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**

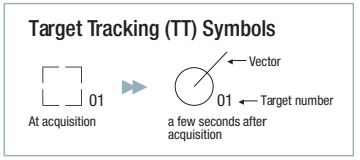
UHD Ultra High Definition | AUTO | Target Tracking | AIS

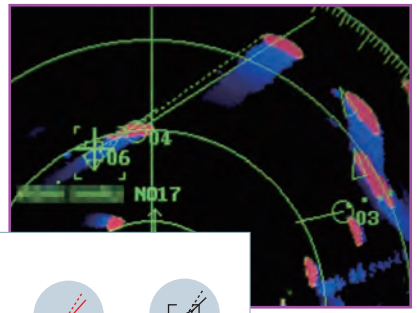
Antenna Selections:

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

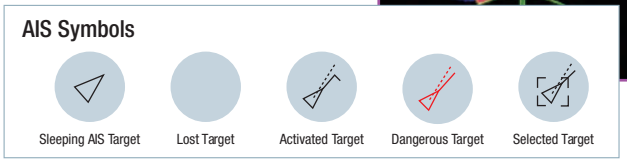
AIS/Target Tracking Up To Ten Targets*

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



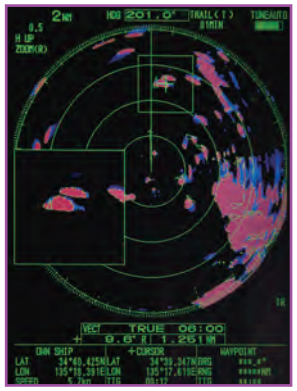
AIS Display with FA-40/70 Units*

When connecting a Furuno FA-40/70 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 FA-70 AIS transponder improves safety during travel by sharing the status and position of your vessel with other AIS-equipped vessels nearby.

Tracking Information

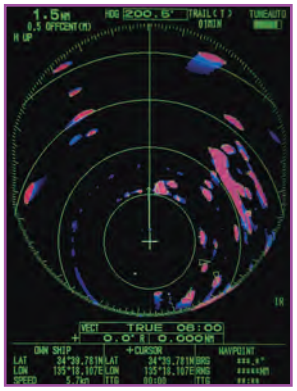
*** Heading sensor is required to display AIS**

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

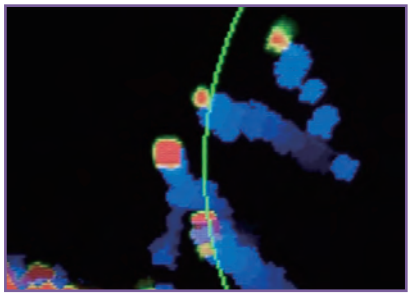
Focus on a specific area ahead of or around the vessel without losing track of the position.

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.



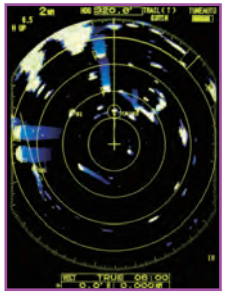
*** True Trail Mode: Heading sensor is required**

Multi-Station Configuration

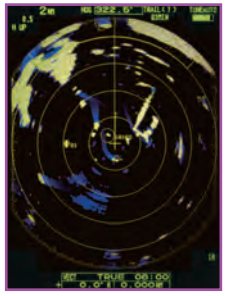
Multi-station configuration allows up to three RDP157 (1815 displays) to be connected to a single antenna via an Ethernet hub, without the need to install individual antenna units on each display. This configuration provides a cost saving and dynamic setup for situations requiring the ability to monitor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

Adjustable Color Layouts

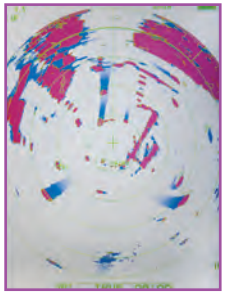
Select the color scheme depending on your environment. From bright sunlight to the dark of night, displayed images can always be seen.



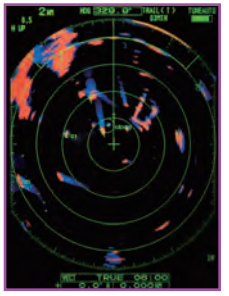
Yellow Echoes



Green Echoes



White Echoes



Orange Echoes

Radar

Model FR-10

10.4" Color LCD Radar

Model FR-12

▸▸▸Spec P105

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 (FR-12 only - optional RP board required)
- Display marks and lines created on a networked GP-3700/F GPS Chart Plotter (FR-12 only - optional RP board required)
- Display boat and barge icons for towing applications

AUTO | Target Tracking | AIS

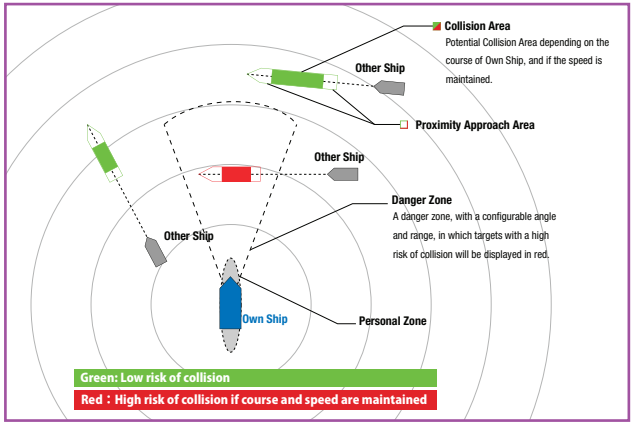
Antenna Selections:

DOME	OPEN ARRAYS - 3.5', 4', OR 6'		
DRS2D-NXT/DRS4D-NXT	DRS6A-NXT	DRS12A-NXT	DRS25A-NXT
DRS4DL+/DRS4D X-Class	DRS6A X-Class	DRS12A X-Class	DRS25A X-Class

See Potential Collisions With Risk Visualizer™

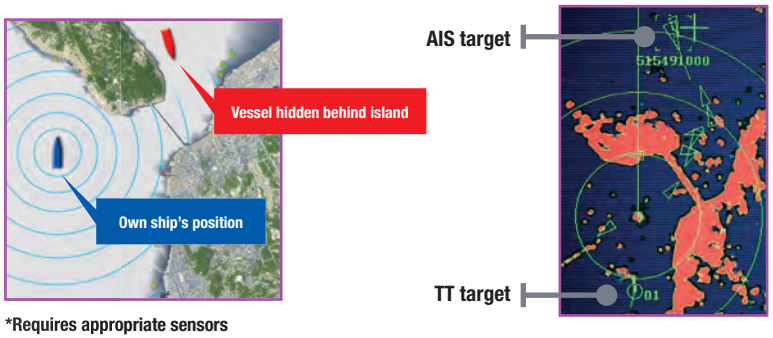
Risk Visualizer™ is a technology that shows potential collision areas based on the current position and movement of all surrounding vessels. Thanks to the on-screen display, it is easy to get a quick and intuitive overview of the situation around your ship. A color-coded icon alerts you according to 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.

RISK VISUALIZER



AIS Target Tracking Up To 100 Targets*

Utilizing the vessel's 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 FR-10/12, so when AIS targets with the same MMSI are received again, they will be shown in the registered colors.



*Requires appropriate sensors

Radar Options

The FR-10 and FR-12 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
DRS2D-NXT
DRS4D-NXT

OPEN ARRAY
DRS6A-NXT
DRS12A-NXT
DRS25A-NXT

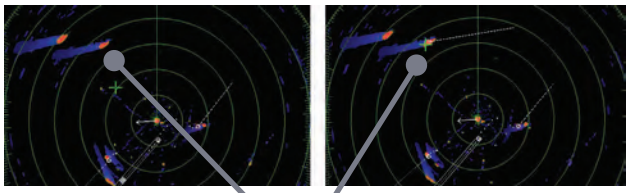
RADAR SENSOR
X-CLASS

RADOME
DRS4DL+
DRS4D X-Class

OPEN ARRAY
DRS6A X-Class
DRS12A X-Class
DRS25A X-Class

Built-In Fast Target Tracking™

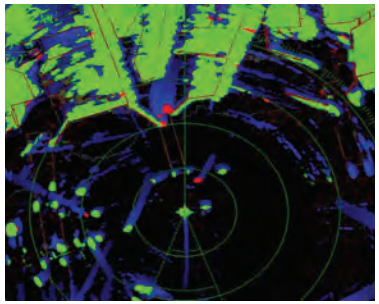
Fast Target Tracking™ is a technology that instantaneously displays a vector indicating the speed and heading of the target. With this built-in feature, targets are automatically tracked when they first appear, making it possible to immediately calculate the target's trajectory and display the velocity vector. The FR-10/12 is capable of tracking up to 100 targets. When connected to a second FR-10/12, an additional 100 targets in manual mode can be activated.



Before After

Target acquired

Spot Hazardous Targets Instantly

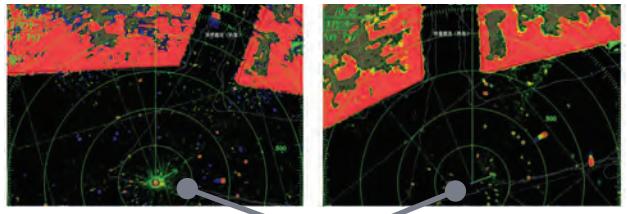


Target Analyzer™ identifies dangerous objects and displays those that are likely to collide with your ship in different colors. Targets approaching your vessel automatically change color to help you identify potential danger. Green echoes are stationary targets, or are moving away from you, while red 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 an NXT Radar)

Take Sea Clutter Out Of The Equation

Echo Averaging deemphasizes 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 FR-10/12 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	FAR-1416		FAR-1426	
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 FAR-1416/1426

▸▸▸Spec P106

15" Color LCD Radar with Chart Plotter

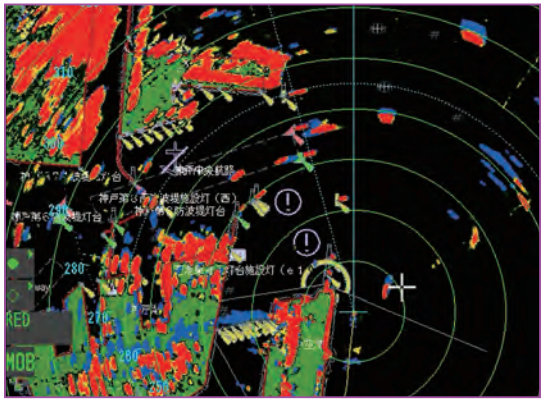
KEY FEATURES:

- 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 is 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 FR-8002/8005 series

***Requires appropriate sensors**

Radar Chart Overlay

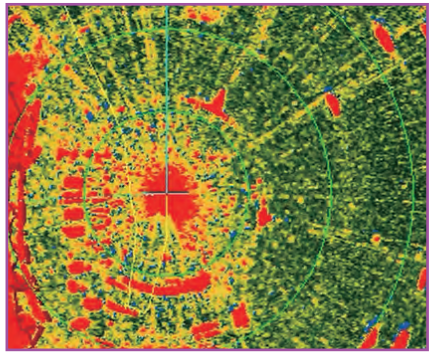
By overlaying Radar on the chart, you can easily recognize coastlines and buoys at a glance. Records of your vessel's track points and waypoints will help memorize fishing points. When the Radar presentation and chart are overlaid, North-Up, Course-Up, and Head-Up direction modes are available.



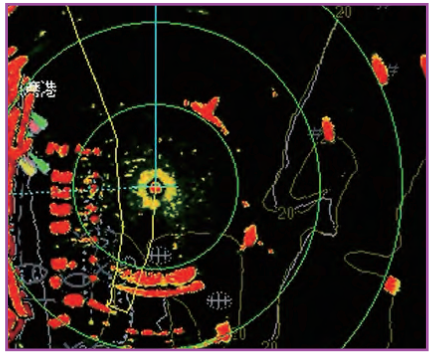
Automatic Clutter Elimination (ACE)

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

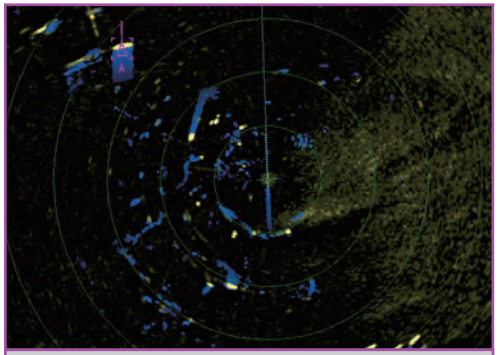


ACE ON

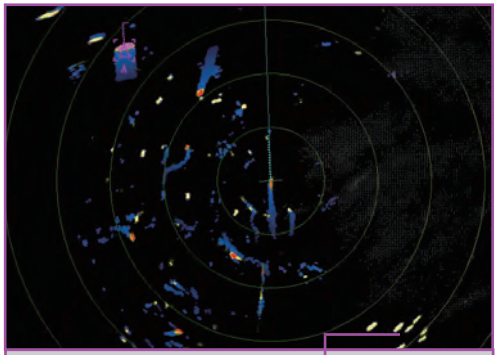


Target Analyzer™ Function* Spots Hazardous Targets Instantly

Target Analyzer™ directly displays targets closing in, while detecting and eliminating sea surface reflection and rain squall. 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



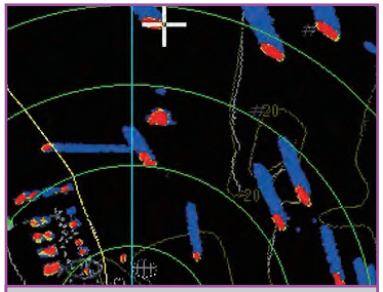
Target Analyzer: ON
Echo Average: ON
Rain Echo Hatching: ON

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

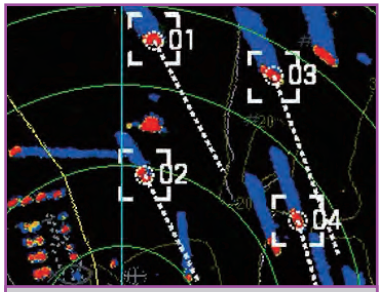
***Heading and position data required**

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
MU-152HD (Optional supply)

Model FAR-1513/1523-BB

▸▸▸Spec P107

Black Box Radar

KEY FEATURES:

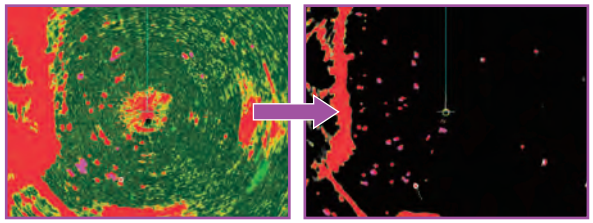
- FAR-1513/1523-BB Marine Radar features advanced functionality in a small and easy-to-use package
- Accurately track other vessels to avoid collisions with Furuno's innovative Fast Target Tracking™
- Improved sea and rain clutter removal function:
  - Automatic Clutter Elimination (ACE) function provides 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	FAR-1513-BB	FAR-1523-BB
Output Power (kW)	12	25
Size	4' Open and 6' Open	
Range Scale (NM)	0.125-96	
Rotation Speed	24/48 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).

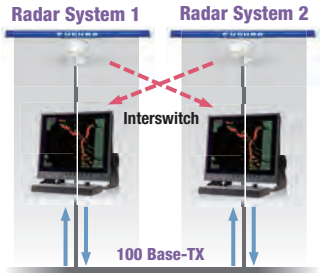


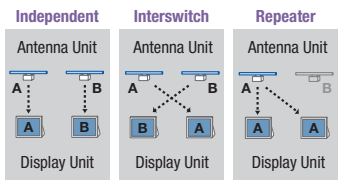
ACE OFF　　ACE ON

Photo: 15" Marine Display
MU-152HD (Optional supply)

Scalable Ethernet Network System

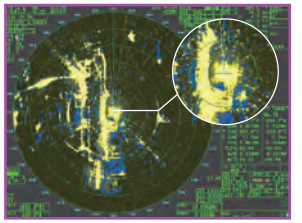
FAR-15x8 Series utilizes a 100 Base-TX Ethernet connection to network two Radars together. This Ethernet data link gives high-speed and stable navigational data sharing for interswitching as well as sharing data between ECDIS and GPS plotters.



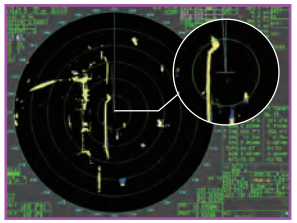


Automatic Clutter Elimination (ACE) Provides Unmatched Echo Clarity

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

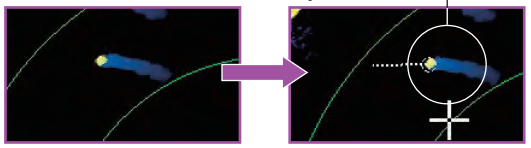


ACE ON

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.

Speed and course vector



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 FAR-1518-BB / FAR-1528-BB

▸▸▸Spec P107

Black Box Radar

KEY FEATURES:

- FAR-1518/1528 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
- FAR-15x8 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	FAR-1518-BB	FAR-1528-BB
Output Power (kW)	12	25
Size	4' Open, 6.5' Open, and 8' Open	
Range Scale (NM)	0.125-96	
Rotation Speed	26/48 rpm	

***Requires appropriate sensor**

Radar

Photos: 19" Marine Display
MU-192HD (Optional supply)

NMEA 2021 - 2024

Winner of the 2021 - 2024 NMEA Commercial Product of Excellence Award

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

Model FAR-2xx8 Series

▸▸▸Spec P109-110

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

KEY FEATURES:

- Accurately track other vessels in order 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 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
- FAR-2xx8 Series can overlay Radar echoes on external ECDIS and GPS Plotter, and on Radar display with optional RP board

*Requires appropriate sensor

Model FAR-22x8NXT-BB Series

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

Antenna Selections:

Open Array	X-Band Radar			S-Band Radar		Solid-State Radar	
	FAR-2018-MK2	FAR-2028-MK2	FAR-2258-BB	FAR-2238S-BB	FAR-2268DS-BB	FAR-2228-NXT-BB	FAR-2238S-SSD-BB
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 (Except for XN24CF)						

NXT Solid-State Radar Specializes In Target Detection and Maintainability

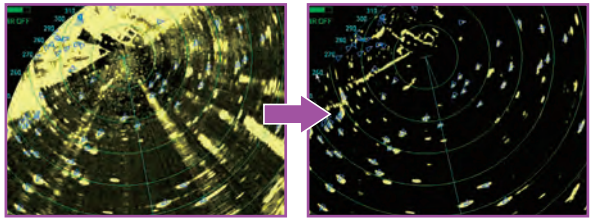
Furuno Solid-State Radar technology generates clear echo images, allowing the user to obtain a clear picture of the area around their vessel, including weaker echoes from small craft. Enjoy reduced maintenance and operating costs, as the fan-less, Solid-State transceiver requires no magnetron.

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

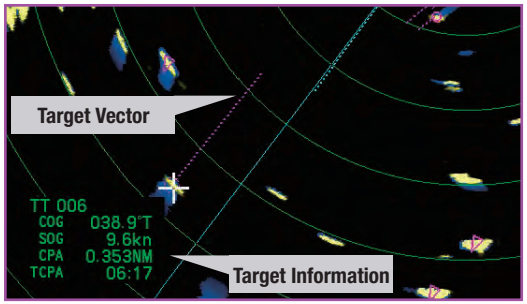
Quickly adjusts the Radar image with of a single button press. When the ACE function is activated, the system automatically adjusts clutter reduction filters and gain control according to user selectable sea and weather presets.



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

Fast Target Tracking™ Function For Early Prevention of Collisions

With Fast Target Tracking™, the FAR-2xx8 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.

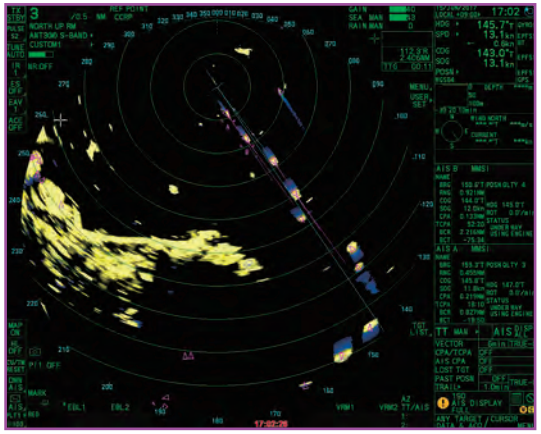


User Interface Designed For Intuitive Operation

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



Photos: 19" Marine Display
MU-192HD (Optional supply)

Model FAR-3015 / FAR-3025 / FAR-3035S / FAR-3025-NXT / FAR-3035S-NXT

▸▸▸Spec P112

Black Box Chart Radar

UHD Ultra High Definition · TARGET ANALYZER · AUTO · BlackBox · Target Tracking · Ethernet Plug&Play · AIS · VIDEO IN OUT

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 processor eliminates signal loss
- Advanced Furuno technology with 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 all major performance and fitting requirements

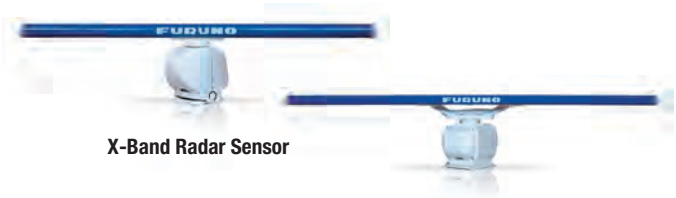
Antenna Selections:

Open Array	X-Band Radar		S-Band Radar	Solid-State Radar	
	FAR-3015	FAR-3025	FAR-3035S	FAR-3025-NXT	FAR-3035S-NXT
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 utilizing the signal processor of this sensor array by processing and converting Radar returns from analog to digital and sending finished data to the main processor. 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.

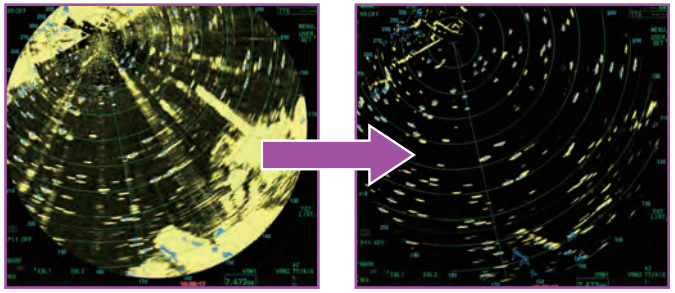


X-Band Radar Sensor

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).

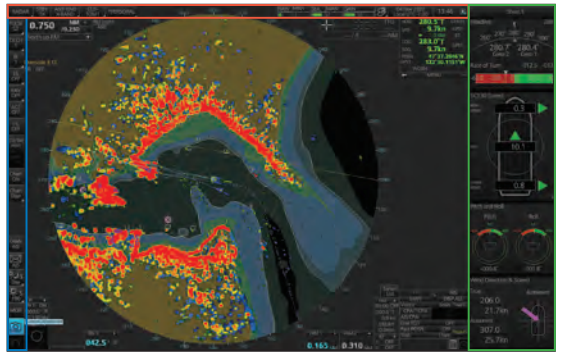


(ACE) OFF

(ACE) ON

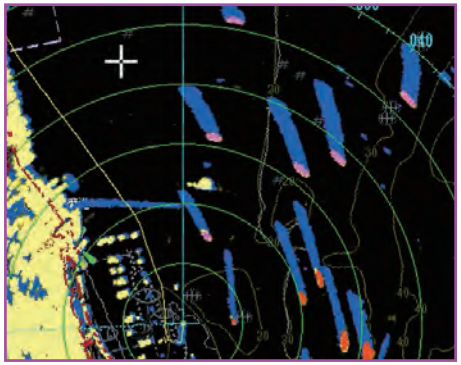
Advanced Tools For Simplified Navigation

The user interface of the Radar utilizes carefully organized operational tools: The Status Bar, InstantAccess Bar™ and Side Conning (when connected 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.



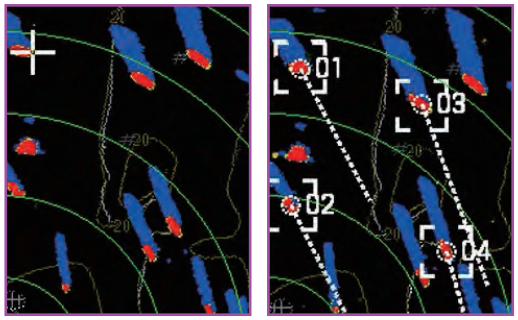
Target Analyzer™ Function

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.

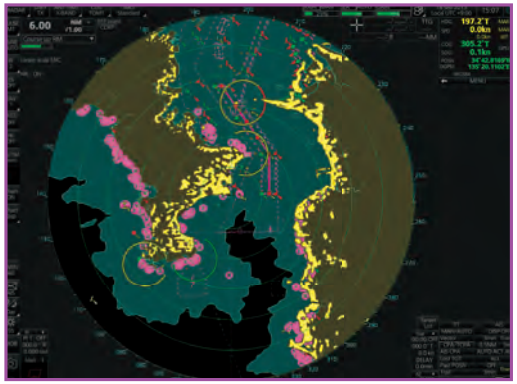


Before selecting a target

Speed and course vector

Chart Overlay On Radar Presentation*

Easily recognize coastlines and nav markers by overlaying the Radar image on electronic charts. 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 mode will be available.



*Requires appropriate sensor

FLEX Function Display

Choose your favorite sensor and display orientation with these highly flexible units!

Model SFD-1010 ▸▸▸Spec P114

10.4" XGA (1024x768) Display

Model SFD-1012

12.1" XGA (1024x768) Display

KEY FEATURES:

- Works with popular sensors such as Radar, Fish Finder, and DFF-3D
- Each unit is able to display one mode depending on sensor configuration
- Flexible control capabilities include multi-touch, control keys, and optional mouse
- Flex Function Display works in landscape or portrait orientation
- Plug-and-Play Radar with compact 19" DRS4DL+ Radome
- Connect two SFD displays to one DRS4DL+ for multi-station capability**
- Enjoy Furuno Fish Finder technology by connecting BBDS1, DFF1-UHD, or DFF3 Network Sounders**
- Connect the DFF-3D Multibeam Sonar for 120° swath port to starboard with outer beam detection range up to 200 m and directly under the boat approx. 300 m*
- DFF-3D/SFD Combo features sea current overlay & virtual net mark
- Flexible configurations with multi-station capability**

*Depending on bottom type and water conditions

**Requires network hub

Radome Selection:

DRS4DL+	
Output Power (kW)	4kW
Size	19" Radome
Range Scale (NM)	0.0625-36
Rotation Speed	24 rpm

Flexible Orientation For Different Display Modes

Freely and quickly adjust the orientation of your display without the need for tools.

Multi-Touch Control + Control Keys

The SFD is flexible in its control capabilities, ranging from multi-touch to control keys, as well as operation with an optional mouse

Adjustable bracket to fit your preferred display orientation.

Flexible Multi-Station Configuration

Connect two SFD-1010/1012 display units with two sensors at the same time or two display units with one sensor through an optional Hub unit* to view your desired modes at the same time with only one setup.

Hub

Available Configurations:

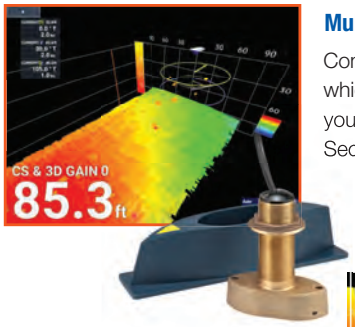
2 Sensors with 2 Displays
1 Sensor with 2 Displays
1 Sensor with 1 Display

***2 Display units max**
***1 Radar unit max for each configuration**

* Optional HUB-101 or local supply

Works With Furuno Award-Winning Sensors

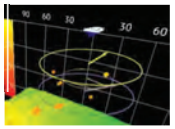
The SFD-1010/1012 has been designed to work with our most popular sensors such as Radar, Fish Finders, and the DFF-3D Multibeam Sonar. Each display unit is able to display and operate the desired mode when configured with the sensor.



Multibeam Sonar

Connect our popular DFF-3D Multibeam Sonar which displays echoes in high-resolution, giving you access to several useful modes such as Cross Section, 3D History, Triple Beam, and Side-Scan.

New DFF-3D to unlock Sea Current Overlay and Virtual Net Mark

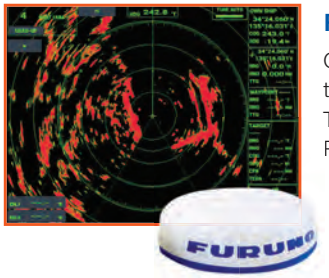


Thanks to a virtual fishing net, you will be able to determine the position of the net's mouth in relation to the targeted school of fish, thus increasing the efficiency of your catch. In addition, you can overlay sea current information as shown in the picture.

Fish Finder

Connect our most powerful Fish Finders to enjoy our Furuno-only features like TruEcho CHIRP™ and ACCU-FISH™.

- Choose Network Fish Finder - BBDS1, DFF1-UHD, DFF3
- High-Res Fish Finders provide better bottom contours & clearer presentation that separates bottom structure from bottom fish



Radar

Connect our extremely compact 19" DRS4DL+ Radar to ensure your safety at sea. It features Fast Target Tracking™ and requires only one LAN cable and one Power Supply cable for installation.

- The Multi-Station feature allows you to connect two SFD displays to one Radar sensor for a dual Radar display.

GPS/Chart Plotters

Model GP-39

▸▸▸Spec P115

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.
- Display 3-Axis Speed/Pitch, Roll, Heave/ROT/Heading data from SCX-20/21
- 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 GP-39 — 2nd GP-39

GP-32 — Signal converter (Local supply) — GP-39

Model GP-170/GP-170D ▸▸▸Spec P116

5.7" GNSS Navigator

KEY FEATURES:

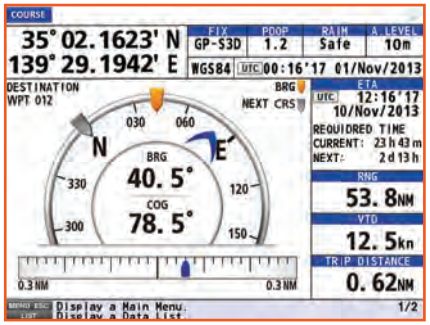
- Newly designed GPS chip and antenna unit deliver precise and stable position fix
- Enhanced precision utilizing SBAS (Satellite-Based Augmentation System), DGNSS (Differential Global Navigation Satellite System), and SLAS (Sub-meter Level Augmentation Service)
- GP-170D provides enhanced precision by utilizing DGPS 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 GP-170 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

"I have a pair of GP-1971Fs 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 GP-1871F

▸▸▸Spec P117

7" Wide GPS/WAAS Chart Plotter with built-in TruEcho CHIRP™ Fish Finder

Model GP-1971F

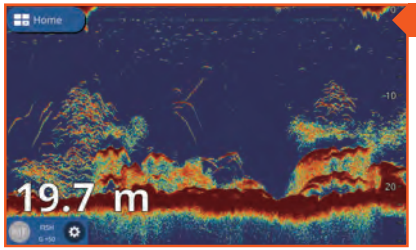
9" Wide GPS/WAAS Chart Plotter with built-in TruEcho CHIRP™ Fish Finder

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

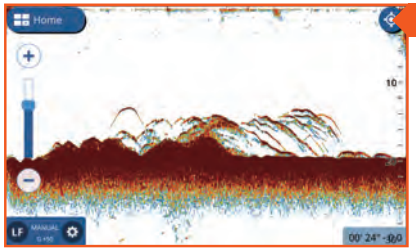
*** GP-1971F only**

Powerful Built-in Features Maximize Your Catching Potential



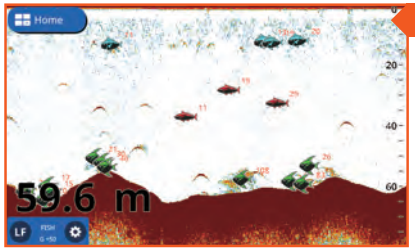
TruEcho CHIRP™ Fish Finder*

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



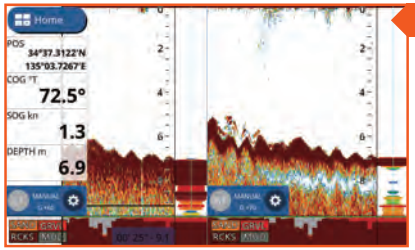
RezBoost™ Fish Finder**

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 NavNet 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

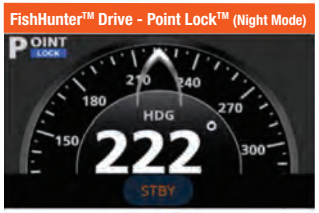
FishHunter™ Drive Mode Indication

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 GP-1871F/1971F v5.0 software supports mode and alert indications for FishHunter™ drive.

FishHunter™ Drive - Point Lock™ (Day Mode)

FishHunter™ Drive - SABIKI Lock™ (Day Mode)

FishHunter™ Drive - Point Lock™ (Night Mode)



FishHunter™ Drive - SABIKI Lock™ (Night Mode)

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" Radome 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 28 for details.

*Requires heading sensor

GPS/Chart Plotters

With a variety of innovative functions, shortcut control keys, and a 12.1-inch IPS screen that provides clear visibility, the GP-3700 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 GP-3700

▸▸▸Spec P118

12.1" GPS/WAAS Chart Plotter

Model GP-3700F

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" IPS LCD features a distinctively clear screen and super-wide viewing angles for 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 on front panel for fast and simple data backup and retrieval

Smart Features For Ease-Of-Use

Both the GP-3700/3700F 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 GP-3700 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.

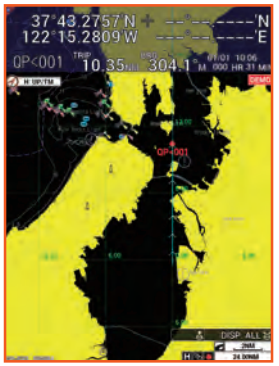
Colorful keys allows for mark lines and points on the display.

Trackball can be used to quickly move the cursor, while the arrow keys can be used for more precise cursor manipulation.

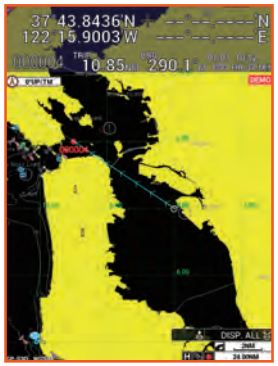
Variety Of Orientation Modes*

The GP-3700 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

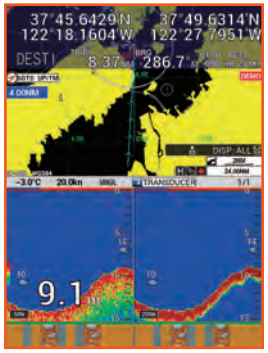


Specified Direction Up Mode

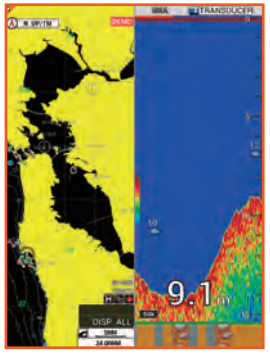
Versatile Display Modes

The GP-3700 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 preference.

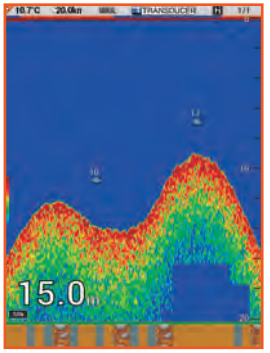
***GP-3700F only**



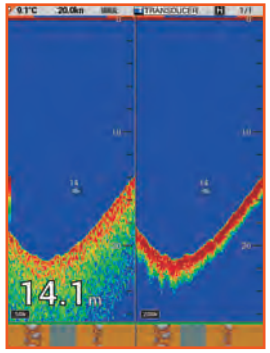
Plotter and Dual Frequency



Plotter and Single Frequency



Single Frequency Fish Finder



Dual Frequency Fish Finder

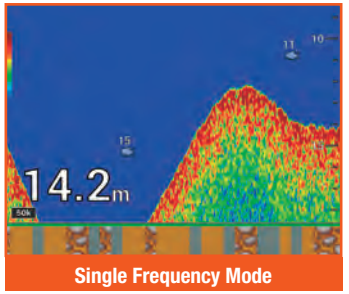
ACCU-FISH™ and Bottom Discrimination Modes*

Graphic Mode:

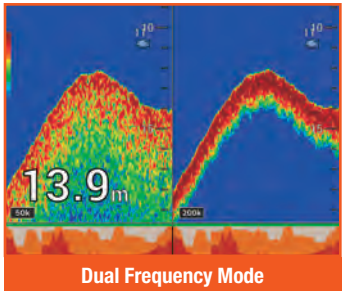
Rocks Gravel
Sand Mud

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 the actual bottom structure.

Fish Finders

Dual transducer ports drive both CHIRP and CW channels, giving you the best of both worlds!

AUTO · Bonded LCD · Enhanced Sunlight Viewable · Polarized Friendly · NMEA2000 Certified · RezBoost · ACCU-FISH · BDS Bottom Discrimination Sounder · TruEcho CHIRP

Model FCV-600

▸▸▸Spec P120

5.7" Fish Finder with TruEcho CHIRP™

Model FCV-800

▸▸▸Spec P120

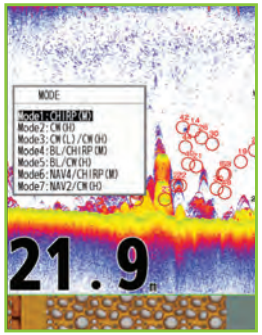
8.4" Fish Finder with TruEcho CHIRP™

KEY FEATURES:

- 5.7" (FCV-600) or 8.4" (FCV-800) Color LCD Display
- Drives either a TruEcho CHIRP™ or CW transducer
- Drive a CHIRP and CW Transducer simultaneously (FCV-800 only)
- Sunlight and Yellow color palettes offer unbeatable daylight visibility - particularly useful for those with color blindness
- Color Range Expansion displays returns from more discreet signal frequencies for unbeatable target separation
- RezBoost™ signal processing produces a picture up to 8 times clearer
- Greater detail of baitfish, gamefish, and structure
- Wireless connection of second display
- Heave correction with Satellite Compass
- Preset frequency modes – 3 settings
- User-adjustable window size
- TLL Output (FCV-800 only)
- Bottom Hardness output (FCV800 only) for TZ Professional or OLEX units when using CW transducers
- Mode combining both TruEcho CHIRP™ returns with CW-only features such as Bottom Discrimination and ACCU-Fish when using two appropriate transducers (FCV-800 only)

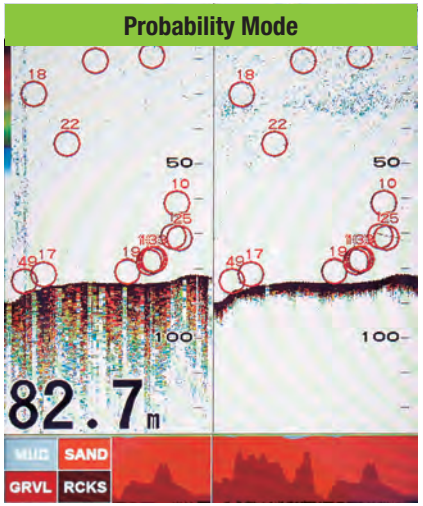
CHIRP and CW - The Best of Both Worlds!

The FCV600 can drive a CHIRP or dual-frequency CW (Continuous Wave) transducer, allowing you to configure the Fish Finder to suit your specific needs. This cutting-edge technology changes the game for anglers of all levels, making locating and catching fish easier than ever. The dual transducer ports of the FCV800 offer the best of both worlds. Desirable CW-only features such as Bottom Discrimination and Furuno's ACCU-FISH™ fish size assessment tool can be combined with TruEcho CHIRP's frequency-modulated signal to deliver those Furuno features while providing better resolution for targets on the screen.



Bottom Discrimination Functionality

The Bottom Discrimination function indicates 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.



BDS
Bottom Discrimination Sounder

Probability Mode:

- Rocks
- Sand
- Gravel
- Mud

Graphic Mode:

- Rocks
- Sand
- Gravel
- Mud

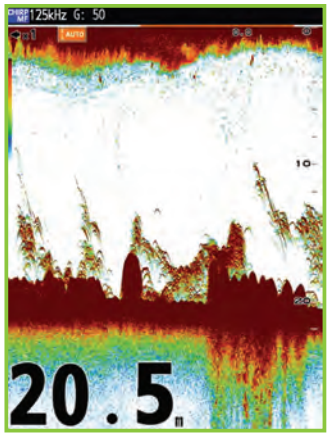
Bottom Hardness Export (FCV800 only)

The FCV800 can output bottom hardness data to external plotters, such as TZ Professional, making this model ideal for fishing operations that rely on the accumulated bottom hardness information that helps determine the best areas to locate their target species.

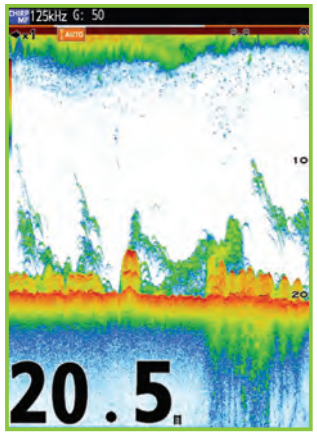
Color Range Expansion

Color Range Expansion broadens the range of discrete signals detected and paints them in different colors. With conventional color ranges, echoes from the seabed and fish may be shown in a similar color, making it a challenge to distinguish fish from the bottom. With Color Range Expansion, the range of identifiable echoes is expanded so you can intuitively identify bottom fish from the seabed. Reefs, structure, and fish near the seabed are shown in slightly separated colors, making it easy to tell structure from fish at a glance and spot elusive fish targets you otherwise may have missed.

Color Expand Off



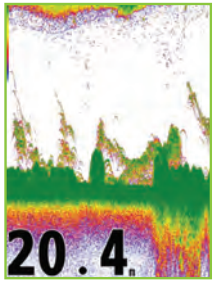
Color Expand On



Daylight-Friendly Color Palettes

Two new color palettes, Sunlight and Yellow, offer greatly improved visibility in bright daylight.

Sunlight



Yellow

Wireless Connectivity

A second display can be installed to show the echoes and nav data from the FCV-600 and FCV-800 via wireless network, so you can monitor the underwater situation from the stern or bow while fishing.

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 [1] 2010/2011

[1] FCV-295 only
[2] FCV-1150 only

Model FCV-295

▸▸▸Spec P120

10.4" Color LCD Fish Finder

Model FCV-1150

12.1" Color Fish Finder

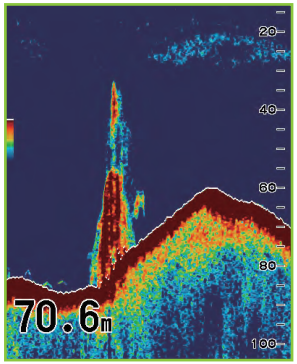
KEY FEATURES:

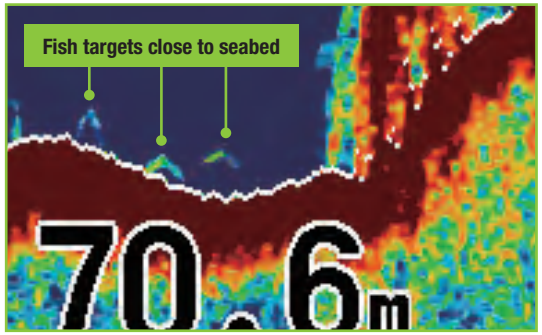
- Post-processing gain control applies changes to gain setting for all existing returns on the display
- White Edge feature for enhanced bottom discrimination
- Furuno Digital Filter delivers crystal clear target presentation
- Furuno Free Synthesizer (FFS) allows for adjustable operating frequency
- Available Heaving Compensation provides stable echo presentation even in rough seas (FCV-1150 only)*
- Unique fish size analyzing function ACCU-FISH™ mode (available when FCV-1150 is connected with CA50/200-1T transducer)
- Output bottom hardness to OLEX and TIMEZERO (requires CA50/200-12M or 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)

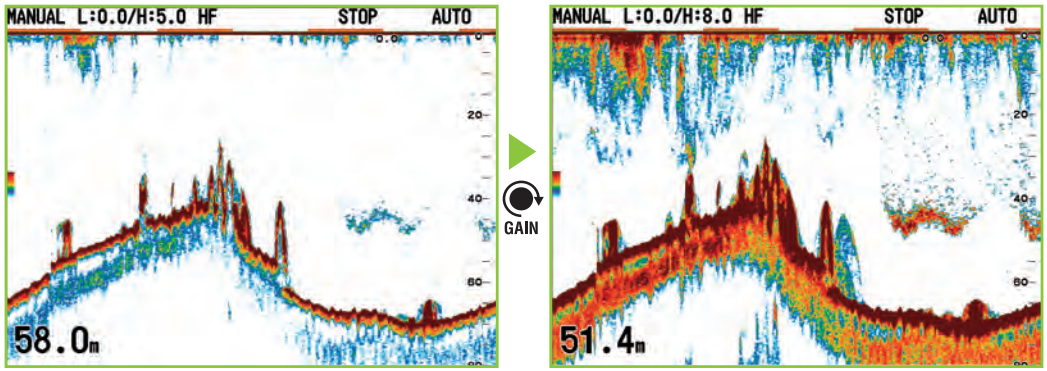
Furuno Digital Filter optimizes the gain to obtain highly defined images of underwater conditions. The FCV-295 and FCV-1150 can clearly show target fish close to the seabed. The digital filter also eliminates noise to deliver sharp and detailed echo presentation, achieving detection of fishing reefs and even individual fish with absolute clarity.





Post Processing Gain Control

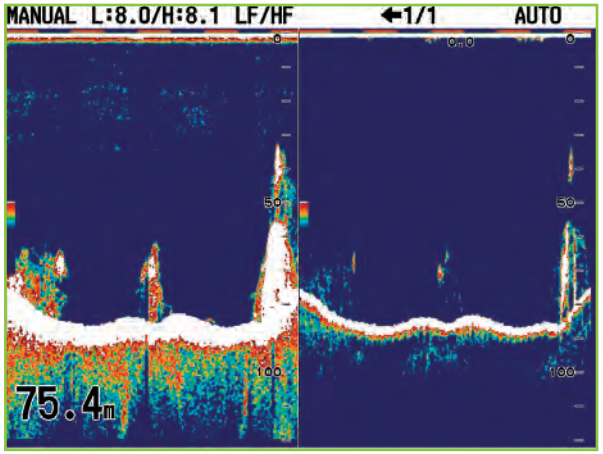
With Quick Gain control, changes you make to the gain setting are applied not only to new echoes, but also to all past echoes on the screen. This lets you compare past and current echoes under the same gain setting. Because the changes are applied to both new and existing returns, you can quickly and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



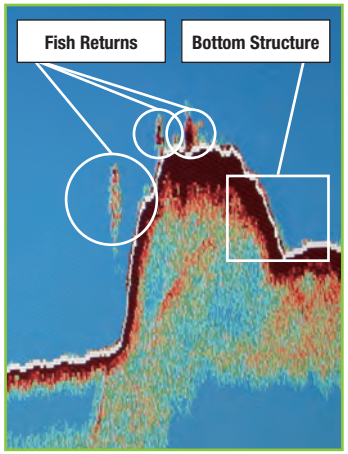
Gain: 5 | Gain: 8

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.



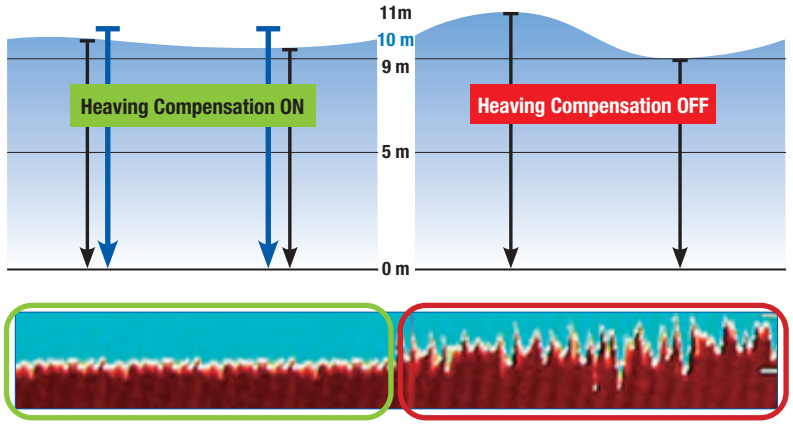
White line



White edge

Heaving Compensation (FCV-1150 Only)

Even in rough sea conditions the FCV-1150 compensates for heaving, presenting a display without undulations caused by the sea conditions. Furuno SCX-20/21, SC-33, SC-70, or SC-130 Satellite Compass™ required.



Fish Finders

Photo: 19" Marine Display
MU-192HD (Optional supply)

The FCV-1900 series ensures excellent target separation and clarity thanks to a high Pulse Repetition Rate. You will see individual targets and fish reefs like never before.

FDF
FURUNO Digital Filter

AUTO | BlackBox | FFS

Model FCV-1900

▸▸▸Spec P122

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		
		FCV-1900	FCV-1900B	FCV-1900G
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**

Photo: 19" Marine Display
MU-192HD (Optional supply)

Model FCV-1900B

▸▸▸Spec P122

Black Box Hi-Resolution TruEcho CHIRP™ Fish Finder

KEY FEATURES:

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

TruEcho CHIRP FDF FURUNO Digital Filter

AUTO BlackBox FFS

Photo: 19" Marine Display
MU-192HD (Optional supply)

Model FCV-1900G

▸▸▸Spec P122

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

KEY FEATURES:

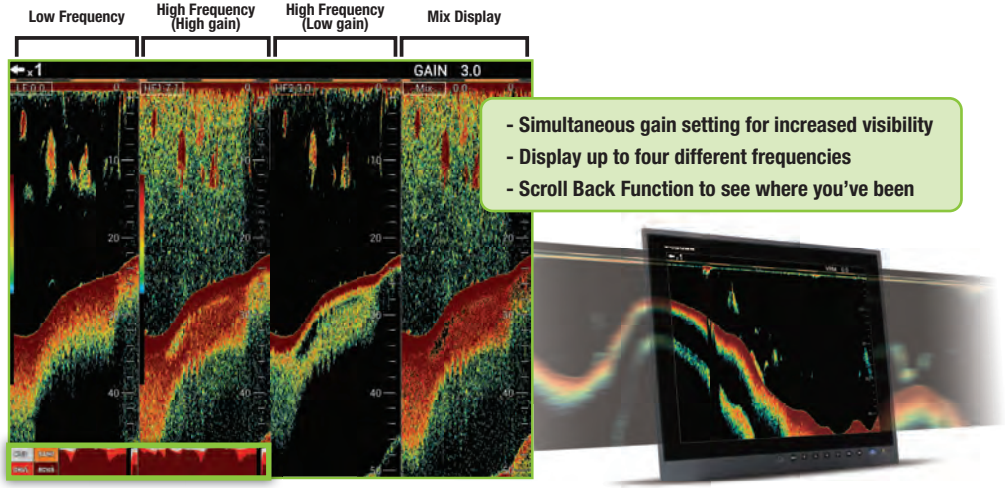
- High precision fish size feature provides approximate fish size in graph form, even in dense schools of fish
- TruEcho CHIRP™ technology delivers significant advancements in signal clarity and target definition
- Side Looking Mode, see targets and bottom structure below your vessel

TruEcho CHIRP FDF FURUNO Digital Filter

AUTO BlackBox FFS

Multiple Functions For Improved Efficiency

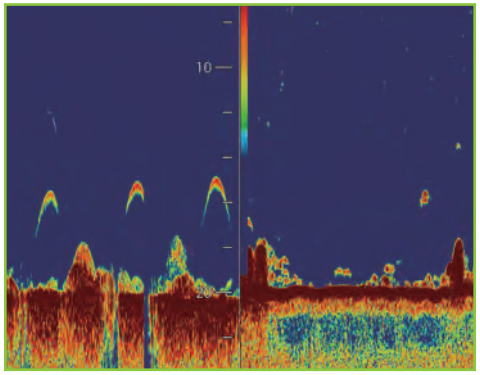
Display up to four different frequencies together in a compact and easy way by connecting a required network Fish Finder. Since there is no need to install additional displays, this function is especially useful for small vessels. Display two different gain settings simultaneously for increased visibility 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.



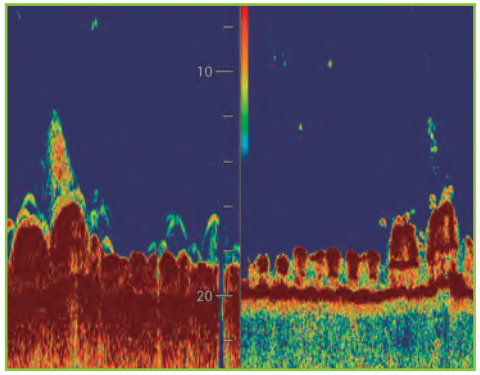
Connect a BBDS1 Network Fish Finder for Bottom Discrimination.

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

Find fish all around and under your vessel with CH-500/600 Searchlight Sonar.

NMEA2000 Certified

CAN bus

VIDEO OUT

Model CH-500

▸▸▸Spec P124

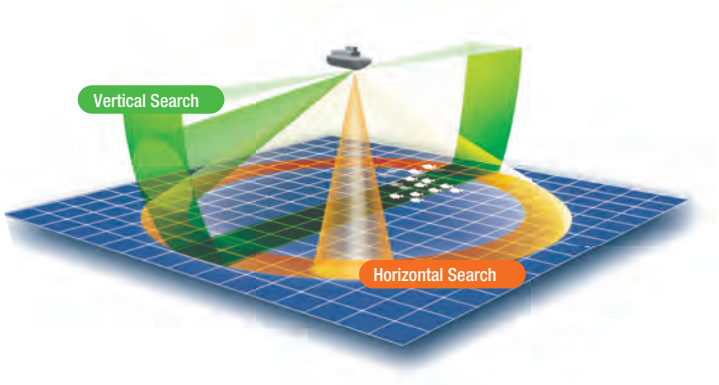
12.1" Searchlight Sonar

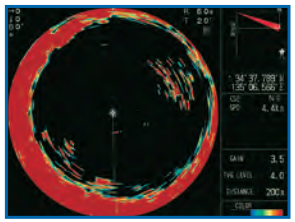
KEY FEATURES:

- 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 on TZtouchXL/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)
- Available Frequencies: 60, 88, 150, 180, or 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.



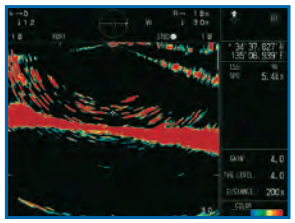


Horizontal

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.



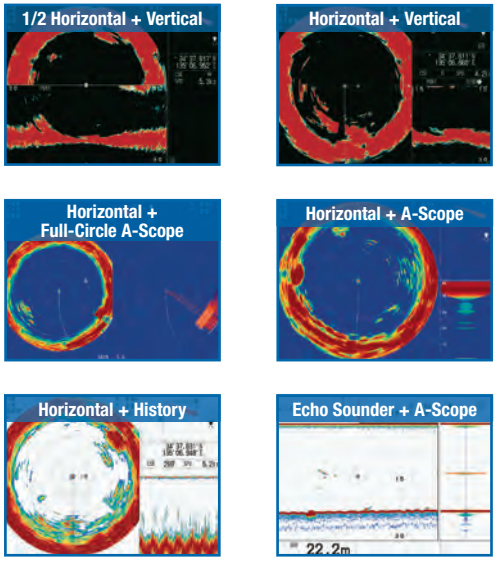
Vertical

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

Echo Sounder

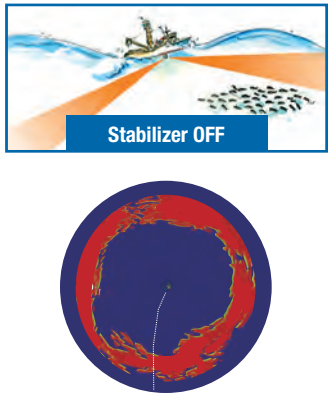
When fully retracted, the transducer tilted to 90 degrees can locate fish schools and seabed straight down at high speeds.

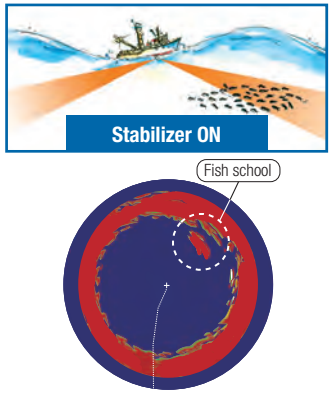
Different Display Combinations



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**

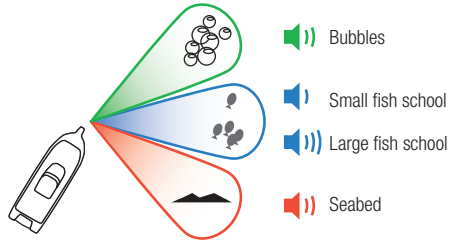


Figure out intuitively what is detected by differentiating their sound with the audible target detection

Sonars

Furuno Sonar technology delivers a more productive fishing operation.

NMEA2000 Certified | CAN bus | VIDEO OUT

Model CH-600

▸▸▸Spec P124

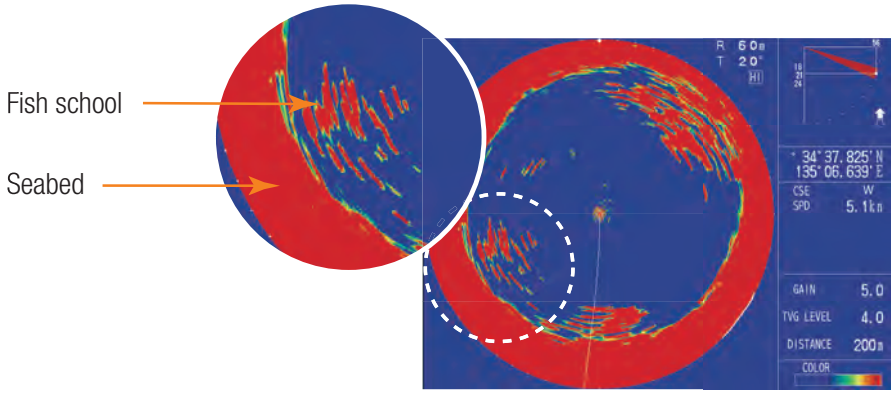
12.1" Dual Frequency Searchlight Sonar

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 on TZtouchXL/TZTouch3 MFDs with Video Converter Kit

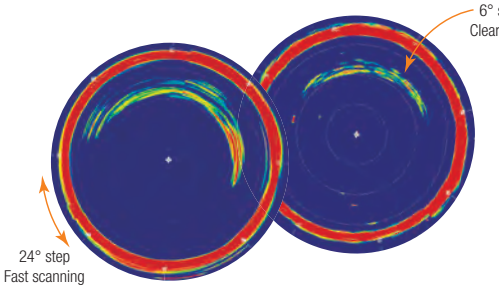
Advanced Signal Processing for High-Resolution Output

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.

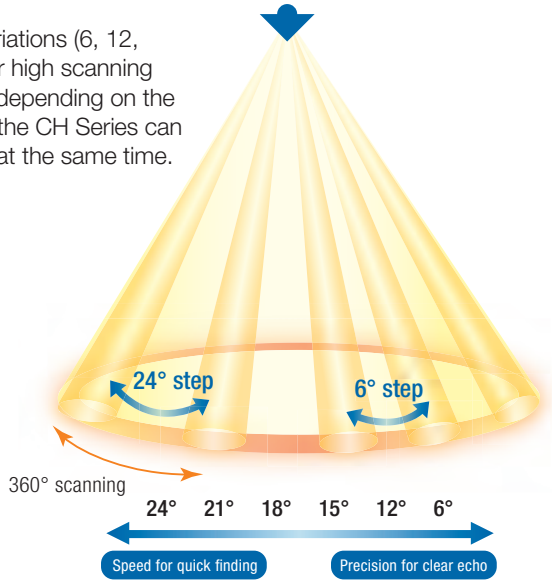


Ultra-Fast Scanning Speed

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.

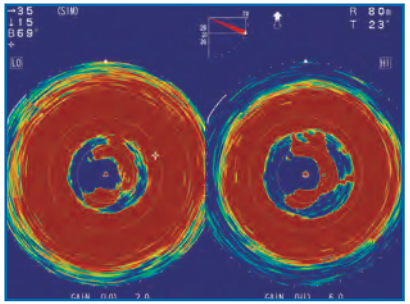


While moving fast, use the 24° step scan to get a glimpse of the surroundings. If you are detecting something interesting that might look like what you are targeting, slow down and switch to the 6° step scanning to have a clear echo.

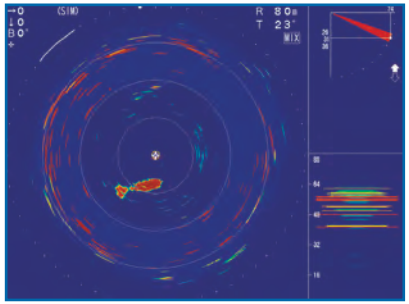


Dual-Frequencies Reveal Sardines and Other Baitfish

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 fish, even the small ones. Both low and high frequency echoes are overlaid to only show the echoes that matter to the fisherman, making it easy to identify species regardless of their distance from the ship.

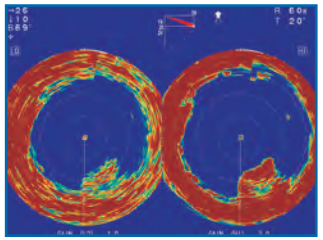


Horizontal Dual-Frequency Mode
Pictured: Echoes of Sardine Schools

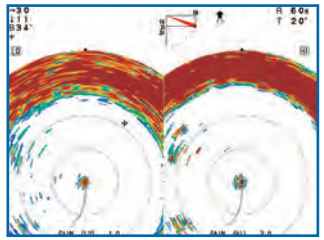


Horizontal Mix Display Mode
Pictured: Echoes of Baitfish

Horizontal Scan

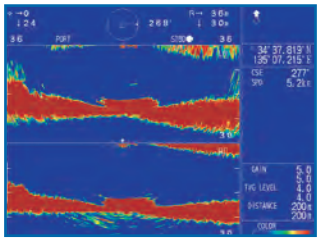


Horizontal (Zoomed)

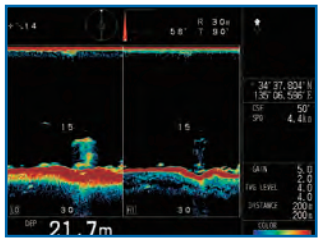


A full circle scan (360 degree), provided by a rotating transmitter, detects fish schools around the vessel. (Horizontal Scan Zoom mode also available)

Vertical



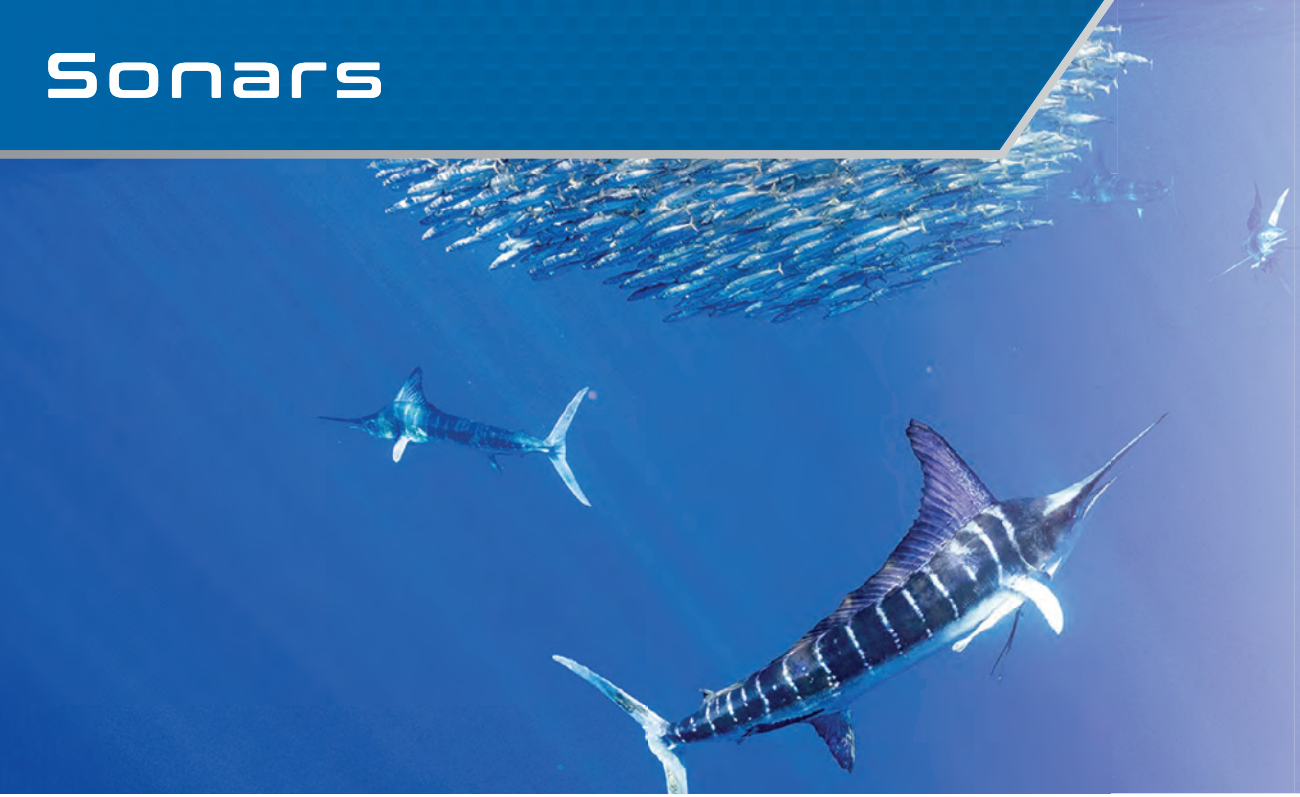
The Vertical scan paints the bottom profile within a user-specified vertical plane in any direction.

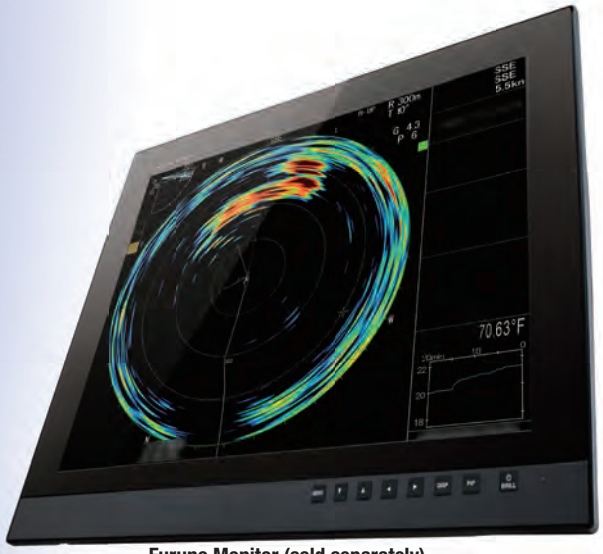


Echo Sounder

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





Furuno Monitor (sold separately)

RotoKey

SCU-002 Control Unit (required)

Model CSH-10

▸▸▸Spec P125

360-Degree Omni Scanning Sonar

KEY FEATURES:

- Scan 360° around your boat - Real-time, 360 degree target detection delivers immediate recognition of trophy fish, bait balls, and underwater structure, ensuring you're always on top of the action!
- Beam stabilization - Furuno's unique technology delivers clear and stable images in rough seas, giving you confidence that your Sonar will deliver accurate information no matter the conditions
- Target Lock function - Lock onto fast-moving schools or fixed targets
- Improved image clarity & range - The CSH-10 features upgraded display colors and clearer resolution, making it easier to distinguish between fish and underwater terrain
- Detection ranges up to an incredible 900 meters (over 2,900 feet) - You'll have a clear & immediate picture of what's happening below the surface in all directions for over half a mile!
- Compact and intuitive control unit - With a user-friendly RotoKey™ and trackball for smooth and responsive operation
- Optional wireless remote control - Adjust your Sonar settings from anywhere on the boat, so you can focus on the catch
- New! Data recording and playback - Save images and videos for future viewing

REMOTE OPTIONS

With a remote control unit, you can easily set the range, tilt angle, and sensitivity from a distance. The multifunctional programmable wireless remote control can be used with up to four units via Bluetooth connection.

Model SCU-003
Small Switch Box

Model SCU-001
Remote Control (wireless)

Model FSV-854-MK2
Remote Control (wired)

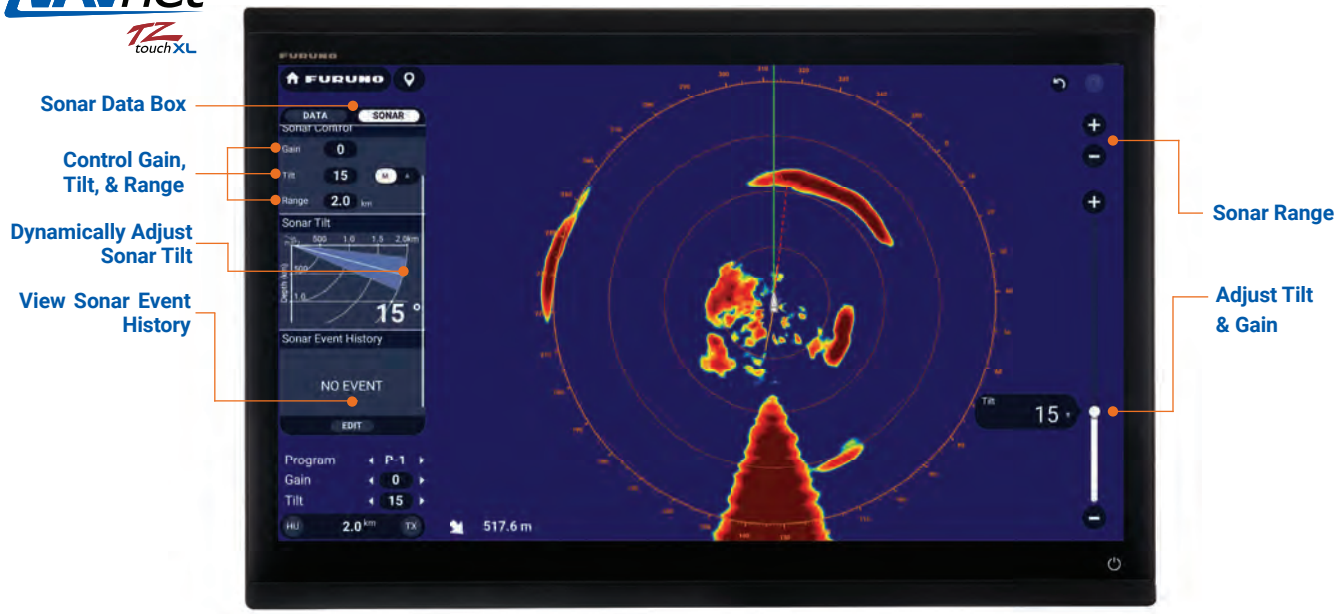
Total Control Directly From Your TZtouchXL MFD

Connect the CSH-10 directly to your TZtouch MFD* to display the Sonar screen in either a full, half, or quarter display. Take things a step further with the world's first Sonar Chart Overlay, allowing you to track game fish as they work the contour lines that you see directly on the BathyVision TZ MAPS.

Connect the CSH-10 through Ethernet network to:

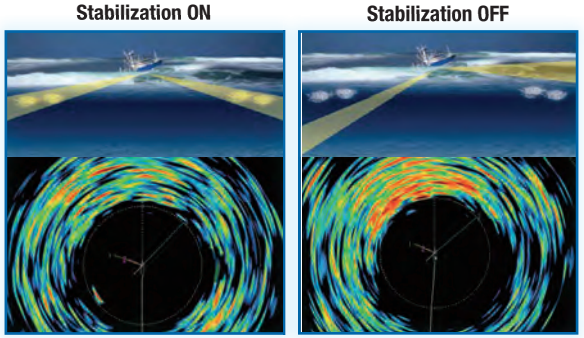
TZT10X, TZT13X, TZT16X, TZT22X, TZT24X, and TZTBBX

*** Requires software version 25.11 or higher**

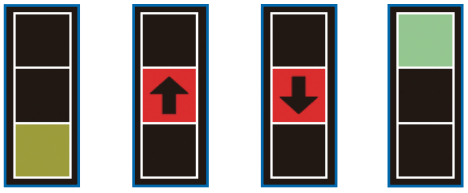


New Beam Stabilization Function

Furuno's unique beam stabilization technology automatically adjusts the beam to the specified angle, correcting for ship's motion in heavy seas; providing clearer images than ever. Plus it helps you identify schools of fish as well as underwater topography and structure.

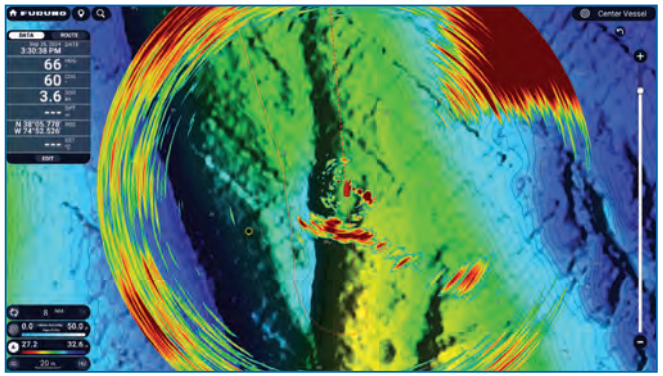


Transmitter Position Indicator

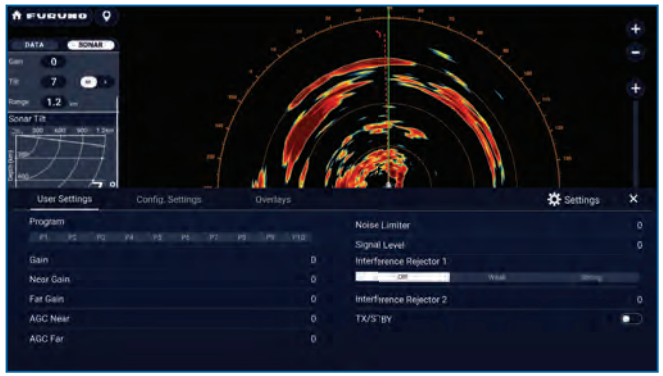


Lets you see the transducer position at a glance!

Easily change CSH-10 User Settings, Configuration Settings, and Overlay on your TZtouchXL with a simple Edge-Swipe up.



Overlay Sonar targets on top of your chart to enhance your situational awareness and track game fish as they travel along depth contours.



Create up to 10 custom Programs for different fish species to easily adjust the Sonar for your target species.

Sonars

Photo: 15" Marine Display
MU-152HD (Optional supply)

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, 2023 & 2024 NMEA Marine Specialty Award

Model CSH-8L MARK-2

▸▸▸Spec P125

Black Box Omni Sonar

Model CSH-5L MARK-2

Black Box Omni Sonar

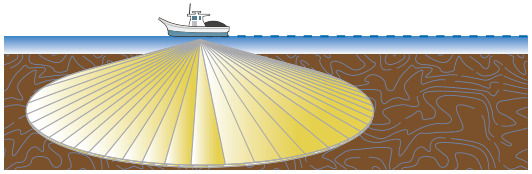
KEY FEATURES:

- 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 output to TZtouchXL & 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
- CSH-8L 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:
  - CSH-5L MARK-2: 55 kHz or 68 kHz
  - CSH-8L MARK-2: 85 kHz

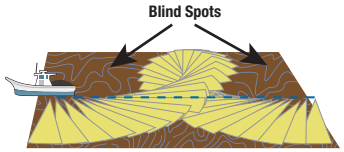
About Omni Sonar

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 CSH-8L 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



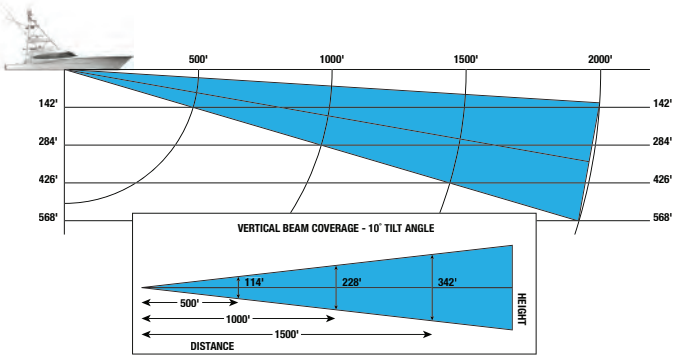
Detection Image of Conventional PPI Sonar



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.

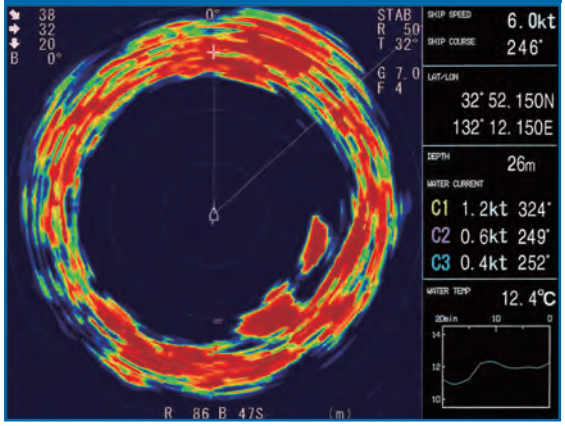
The Winning Fisherman's Secret Weapon!

The CSH-5L MARK-2/CSH-8L 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 CSH-8L 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.



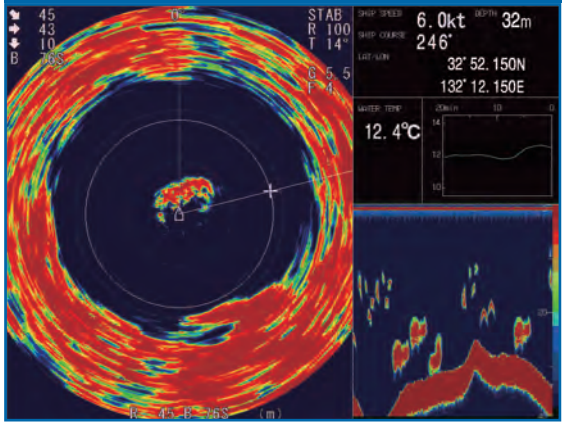
Selectable User-Friendly Operating Modes

Sonar Display



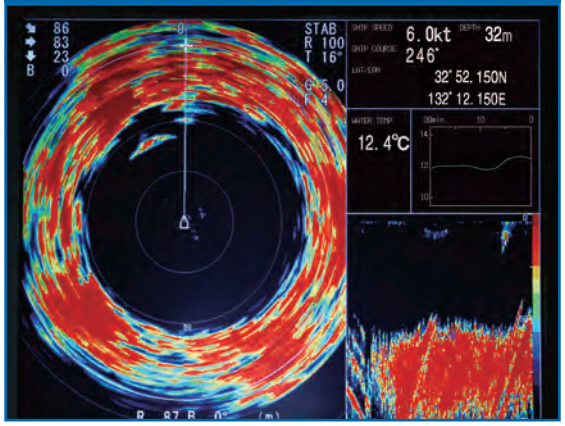
Navigation data can be displayed in the text window, with connection of appropriate sensors. This mode is useful for detecting and tracking schools of fish.

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 DFF-3D

▸▸▸ Spec P99

Network Multibeam Sonar

KEY FEATURES:

- Outer beam detection range is up to 200 m in a 120-degree swath port to starboard*
- Main beam deep water 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)

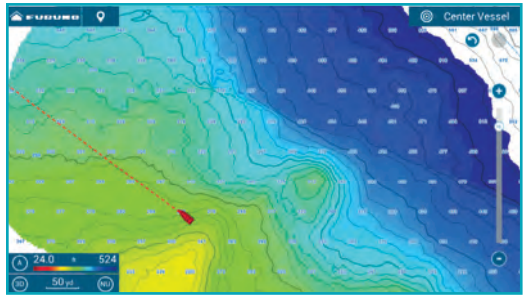
DFF-3D MULTIBEAM SONAR	
Frequency	165 kHz
Detection Range	200 m* (Side beam best performance) 300 m* (Main beam directly under boat)
Transducer	800 W

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

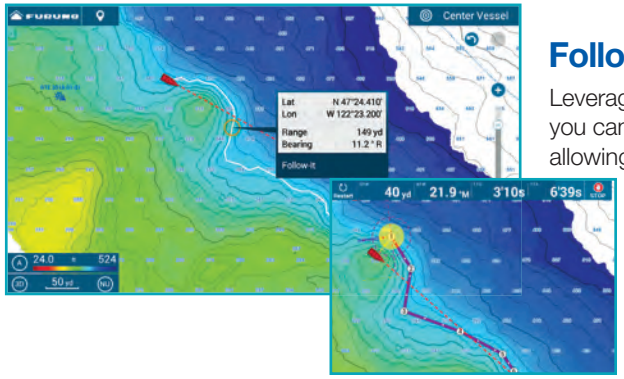
2018-2024

PBG (Personal Bathymetric Generator)

Discover new fishing hot spots as you build your own realistic 3D bathymetric charts of the seafloor. Charts are automatically saved directly to your TZtouchXL/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.



PBG spot soundings clearly shows depth numbers



Follow-It Feature

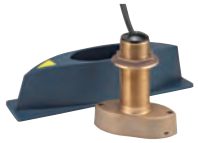
Leverage your recorded PBG data like never before. Now you can create a constant depth route from the PBG data, allowing you to select Follow-It from the menu and send it to your NAVpilot Autopilot. Then the NAVpilot will follow the depth route all the way around a ridge or trough. This is particularly 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 DFF-3D, 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 DFF-3D 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 DFF-3D 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)



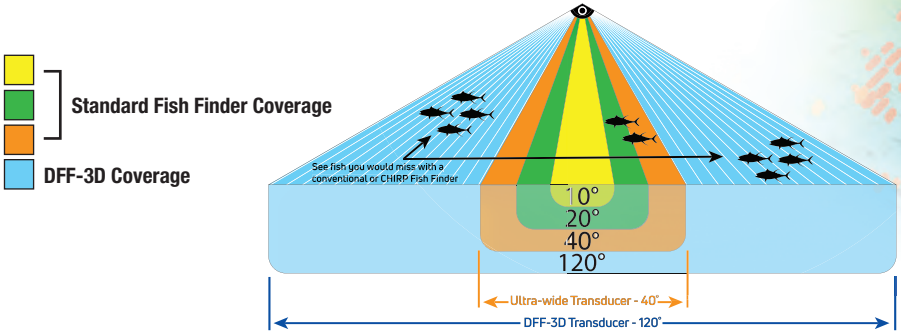
B54 Thru-Hull Mount Transducer

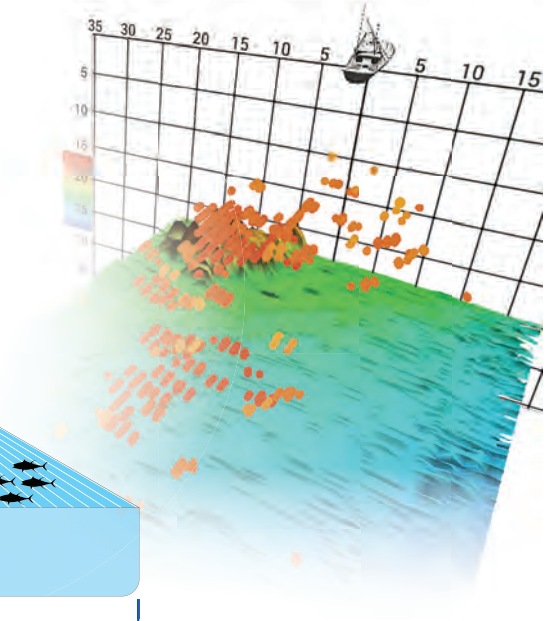
TM54 Transom Mount Transducer

* For a complete list of transducers, including combo transducers, see page 123.

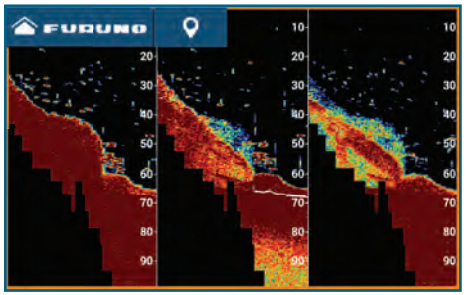
Understand Fish Distribution At A Glance

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 DFF-3D 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 DFF-3D turns your NavNet TZtouchXL 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.



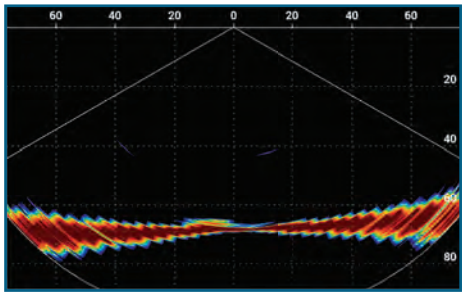


An Innovative Tool for Exploring the Water Column and Seabed:



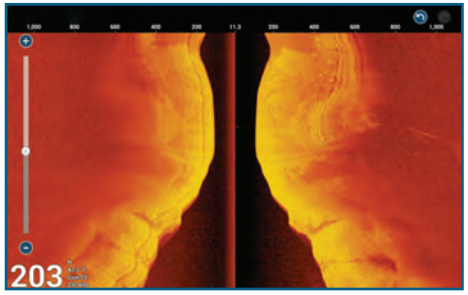
Triple Beam Sounder

A single beam (middle) or triple beam (middle, Port and Starboard) 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.



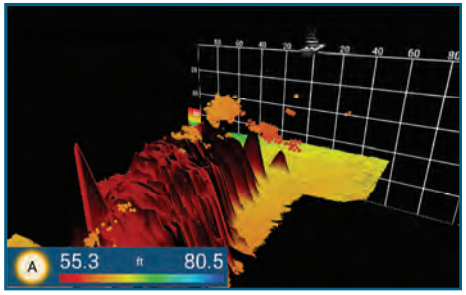
Cross Section

Cross section displays the real-time water 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.



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!



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/WMBW3P-160E

▸▸▸Spec P126

WASSP Series Multibeam Sonar

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
- Built for fishing operations, the WASSP F3XL shows fish targets at over 850 meters, with bottom detection at over 1,000 meters
- 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 WMBW3P-160E 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

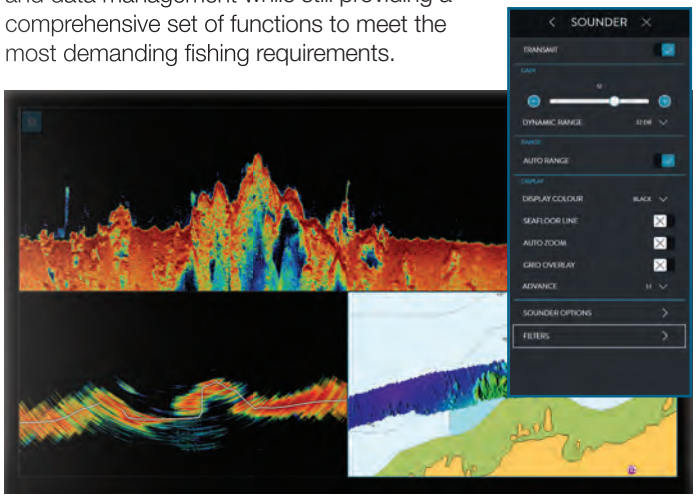
WASSP S3/Sr3/F3/F3X/F3XL/W3/WMBW3P-160E	
Frequency	S3, F3, and F3X: 160 kHz, 90-190 kHz F3XL: 80 kHz W3: 90-190 kHz
Range Scale	Up to 1,000 m*
Detection Range	Up to 850 m*

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

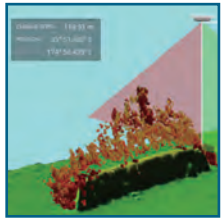
**NEW LICENSE OPTIONS
TZ Pro Interface
OLEX Interface
Backscatter/Bottom Hardness
Side-Scan
Water Column Analysis
XYZ Position
Hypack, BeamWorx and other 3rd-party plugins

New Easy-to-Use Interface

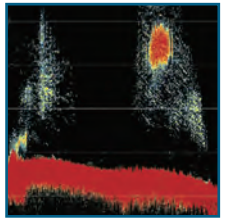
The F3 Series introduced the new simplified software “WASSP CDX” for control, visualization, and data management while still providing a comprehensive set of functions to meet the most demanding fishing requirements.



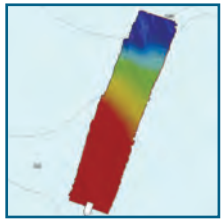
Useful Presentation Modes



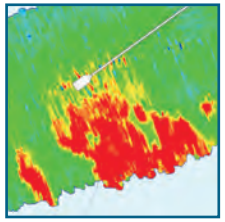
3D Fish Density Overlay



Fish Finder



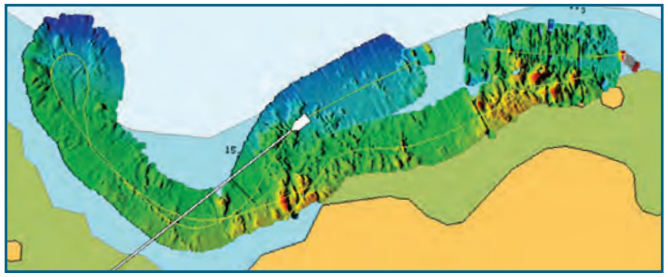
2D Mapping to 500m



Backscatter (Bottom Hardness) at 200m

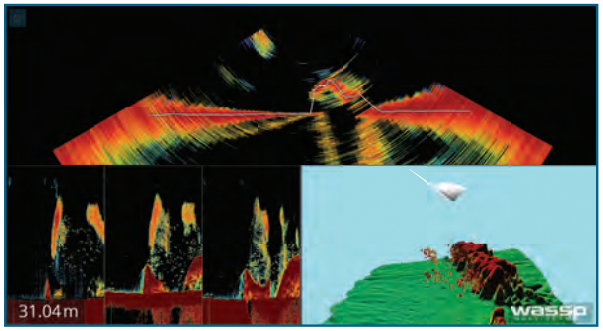
New Software Seamlessly Blends Data

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

Model NAVpilot-1000

▸▸▸Spec P129

Self-Learning Autopilot
HCS Type-approved

Model NAVpilot-300

▸▸▸Spec P128

Self-Learning Autopilot
with Gesture Controller

Model NAVpilot-711C

▸▸▸Spec P129

Self-Learning Autopilot

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

NAVpilot

FLSI

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

NAVnet Connect

SABIKI MODE

FANTUM FEEDBACK

Bonded LCD

Enhanced Sunlight Viewable

NMEA2000 Certified

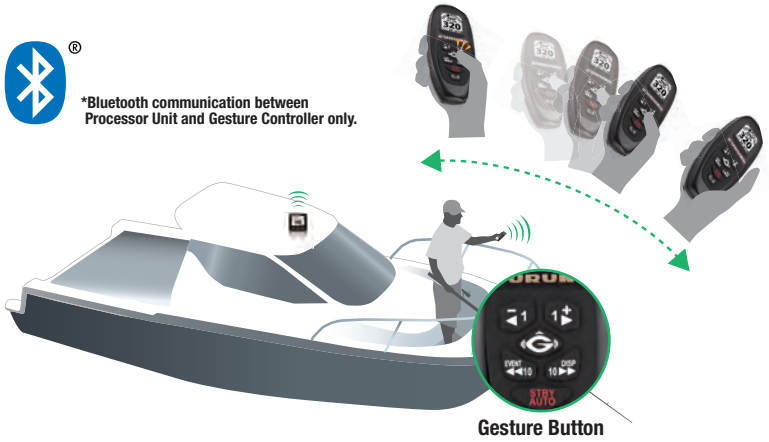
KEY FEATURES:

- NEW NAVpilot-1000 is ideal for larger yachts and commercial vessels
- 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)
- Yanmar and Dometic Seastar EVCS compatible
- Easy installation and smart network-based system configuration
- NAVpilot-300/711C Waterproof Processor Unit (IP55) & Control Unit (IP56), NAVpilot-1000 Processor & Control Unit (IP22)
- 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 sailboats (NAVpilot-711C only)
- NAVpilot-1000 is HCS type approved with both IMO and Non-IMO modes perfect for larger vessels
- Autopilot control available from NavNet TZtouchXL/TZtouch3/GP-1871F/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)
**NAVpilot-300/711C control only for GP-1871F/GP-1971F

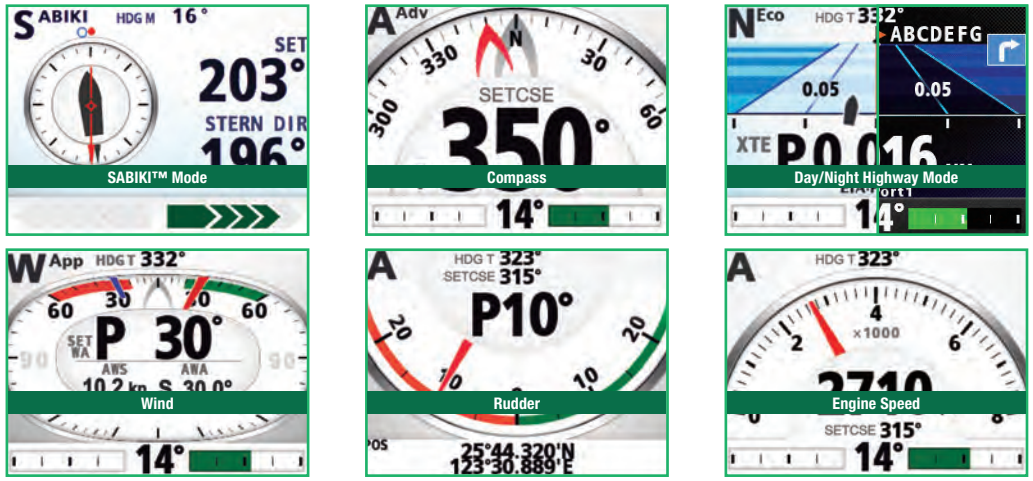
Just PUSH, POINT, & RELEASE (NAVpilot-300 only)

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!



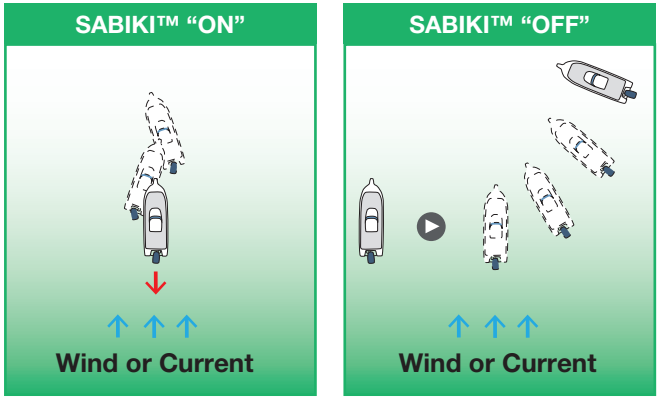
Wide Variety of Graphic Displays Available

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.

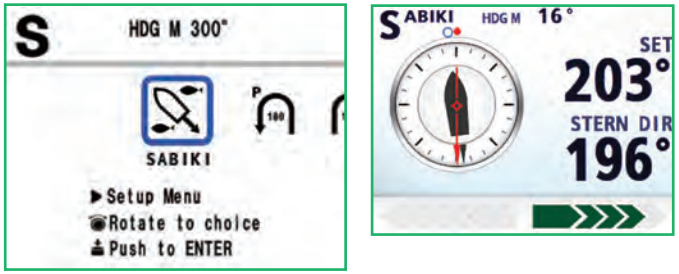


SABIKI™ Mode For NAVpilot-300 and NAVpilot-711C

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 available only 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.

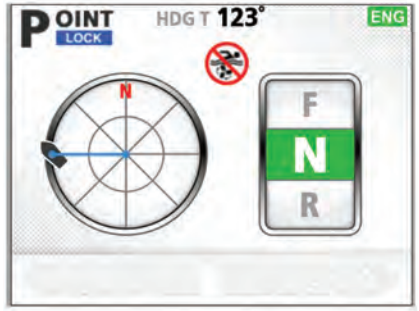
NAVpilot-1000

The NAVpilot-1000 is an HCS (Heading Control System) type-approved Autopilot that can be connected to an analog steering system or solenoid steering system, which are often used for relatively large boats from luxury yachts to commercial vessels. It features a 14.5 cm (5.7") color display with large, high-contrast characters that are easy to read. The robust RotoKey™ and buttons are comfortable to use even in rough sea conditions.

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:

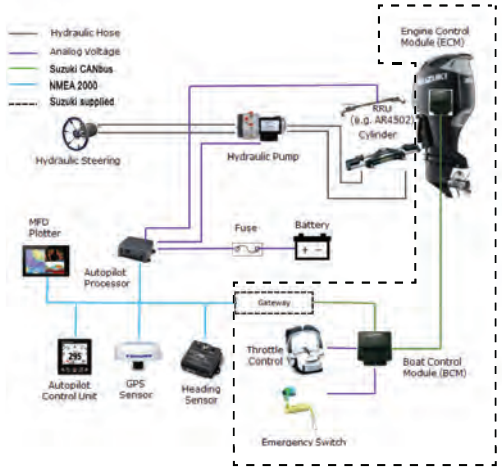
- **Speed Control** - The boat will maintain a constant speed, adjusting engine RPM as needed to account for changes in wind and tide.
- **Route Smoothing™** - Decreases the speed of turns at waypoints while navigating an active route. Reducing speed when executing a turn helps keep the vessel on course.
- **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.

***Rudder Reference Unit required**

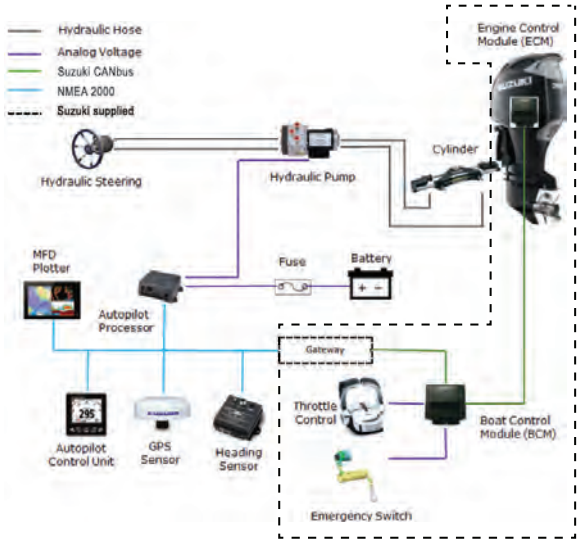
Compatible 2024 Suzuki Outboards: DF140BG/115BG, DF150AP/DF200AP/175AP, DF300AP/250AP, DF350A/325A/30

FishHunter™ Drive Interconnections

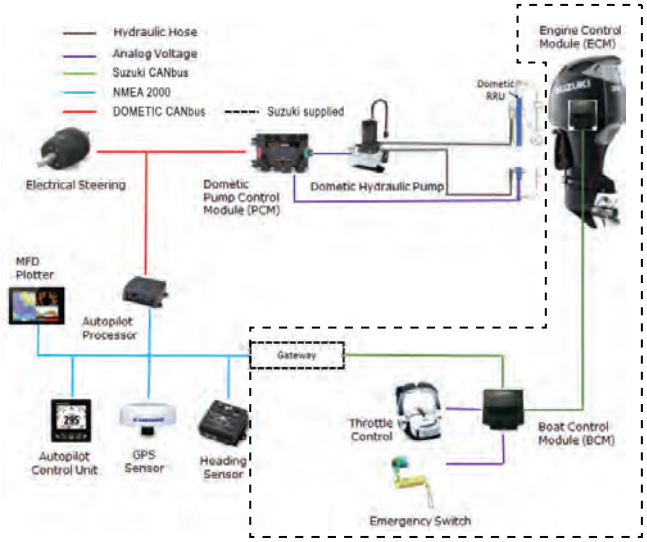
1. Reversing Pump Control for rudder (with Rudder Reference Unit)



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



3. Dometic EVCS



FishHunter™ Drive Requirements

Item	Requirement	
Engine	Suzuki Outboards	DF140BG/115BG, DF200AP/175AP/150AP, DF300AP/250AP, DF350A/325A/300B (2023 Models)
	Supported Qty.	Max. 4
Autopilot	**NAVpilot-300**	
Display Device	**NavNet TZtouchXL series –** TZT10X/TZT13X/TZT16X/TZT22X/TZT24X/TZTBBX **NavNet TZtouch3 series** – TZT9F/12F/16F/19F v3.01 or higher **NavNet TZtouch2 series** – TZTL12F/15F v8.01 and TZT2BB v8.01 or higher **GP-1871F/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, SCX-20 recommended)	

Instruments / Data Organizers

Model FI-70

▸▸▸Spec P130

4.1" Color LCD Instrument/Data Organizer

KEY FEATURES:

- Perfect cosmetic match with NavNet TZtouchXL/TZtouch3 and NAVpilot-300/NAVpilot-711C
- Clear 4.1" screen that is viewable under direct sunlight
- Simple and intuitive interface allows full customization
- Bonded color LCD ensures condensation-free operation, as well as great visibility
- Use legacy wind sensors (FI-5001/FI-5001L) with the analog IF-NMEAFI Converter
- Low power consumption (15 VDC 0.25 A max, LEN3)
- Simple AIS display through connected NMEA2000 devices
- Networked F170 share language and common brilliance settings
- 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 FI-70 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 FI-70 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 FI-70 will be equally useful with the proper sensors connected. For maximum performance and simple setup, the FI-70 automatically asks you which type of vessel you have, helping to customize operation of the unit.

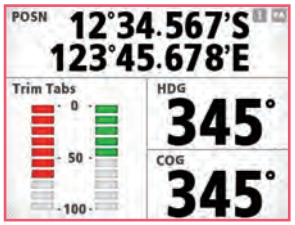
Various Display Options Are Available

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)

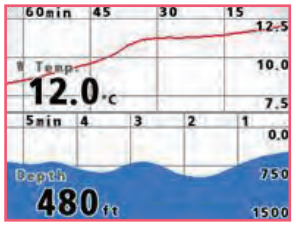


Data Box (Split)

Data box (Single)

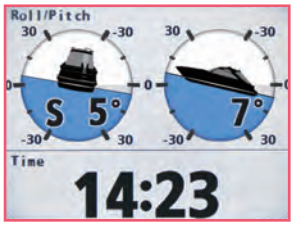
Rudder


AIS

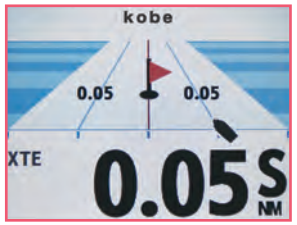


Graph

Timer



Roll & Pitch



Highway

Engine RPM (Triple)

Sensors and Accessory Options

Model FI-5001/5001L

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

Model FI-5002

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

Model DST-810

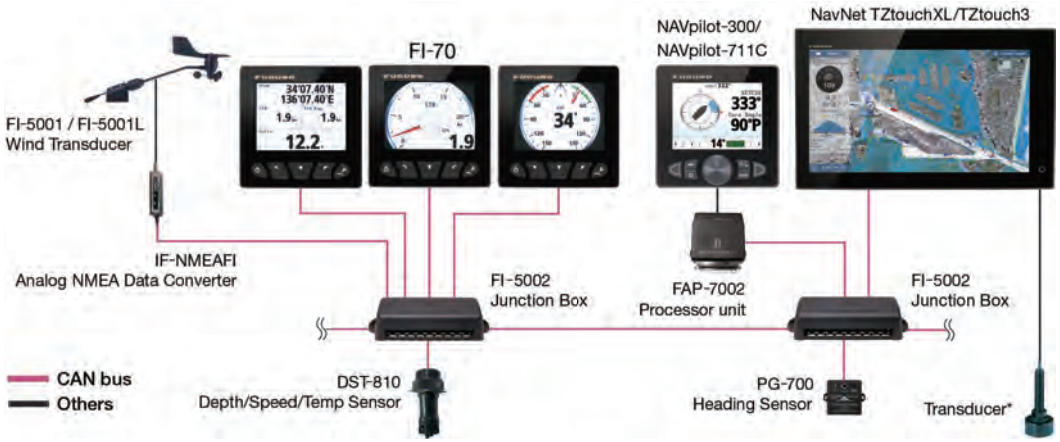
Depth/Speed/Temp Sensor
Frequency: 235 kHz
Cable: 6 m

Model IF-NMEAFI

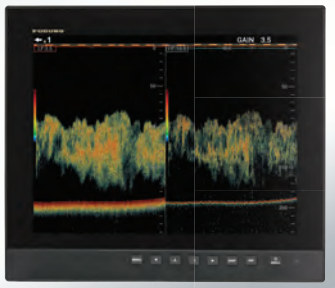
Analog NMEA Data Converter
CAN bus x 1 port
PSU: 15 VDC, < 200 mA

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.

Installation Example



Monitors



Model MU-152HD - 15"

XGA (1024 x 768) Monitor

Enhanced Sunlight Viewable · Bonded LCD · VIDEO IN

Model MU-192HD - 19"

SXGA (1280 x 1024) Monitor

Enhanced Sunlight Viewable · Bonded LCD · VIDEO IN

Model MU-270W - 27"

WUXGA (1920 x 1200) Monitor

VIDEO IN

Picture in Picture (PIP)

(MU-152HD/MU-192HD/MU-270W)

Composite video (NTSC/PAL) input is available for displaying video images from an onboard TV/DVD player. For MU-150HD/152HD/190HD/192HD with more than two composite video inputs, the images in the PIP window automatically switch alternately.

Slim, Lightweight and Compact

(MU-152HD/MU-192HD/MU-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.

MU-192HD

MU-152HD

Waterproof

(MU-152HD/MU-192HD)

The MU-150HD/152HD/190HD/192HD are waterproof and 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

(MU-152HD)

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

Black Box navigation electronics make high-resolution Marine Displays more a of a necessity than ever!

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.

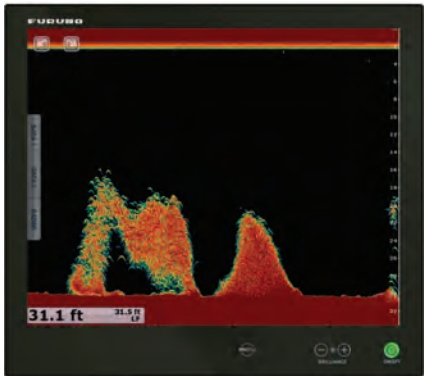
▶▶▶ Spec P132

! Not available in the E.U.

Model MU-175T - 17"

SXGA (1280 x 1024) Touch Monitor

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



Model MU-195T - 19"

SXGA (1280 x 1024) Touch Monitor

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

Model MU-245T- 24"

HD (1920 x 1080) Touch Monitor

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

KEY FEATURES:	MU-152HD	MU-192HD	MU-270W	MU-175T	MU-195T	MU-245T
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 using 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	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 TZtouchXL/TZtouch3/TZtouch2/TZtouch	--	--	--	✓	✓	✓

Remote Displays

NAVnet Connect

CAN bus

Enhanced Sunlight Viewable

Model RD-33

▸▸▸Spec P133

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

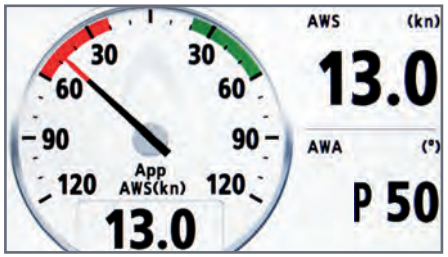
See All Your Data - The Way YOU Want It

The RD-33 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, 4.3" color 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.

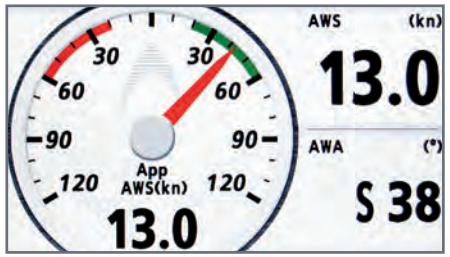
New and Improved Look and Feel

The RD-33 features a visually appealing fresh new look, combining easy access with user functionality. Thanks to the bright, high-resolution LCD, the RD-33 provides an easy-to-read display to monitor information from remote equipment, through an intuitive graphical user interface.

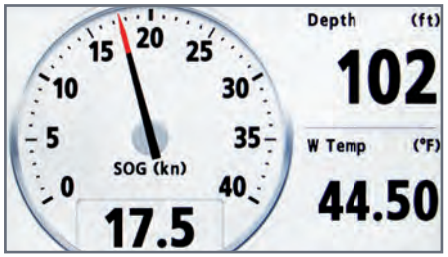
Display Options In Two Different Styles



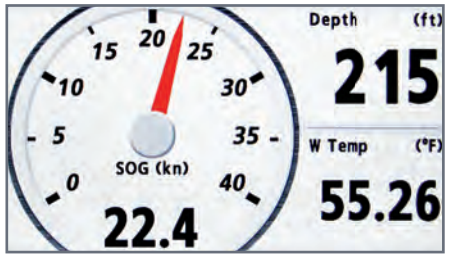
Wind A



Wind B



SOG A

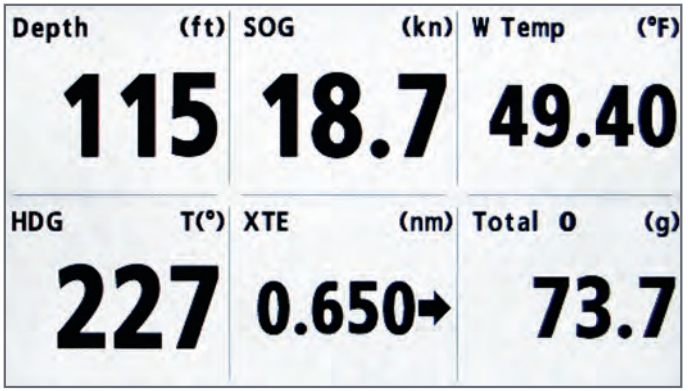


SOG B

Customizable Split-Screen Presentation

You can customize the view to display information in the format that works best for you. The RD-33 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 RD-50

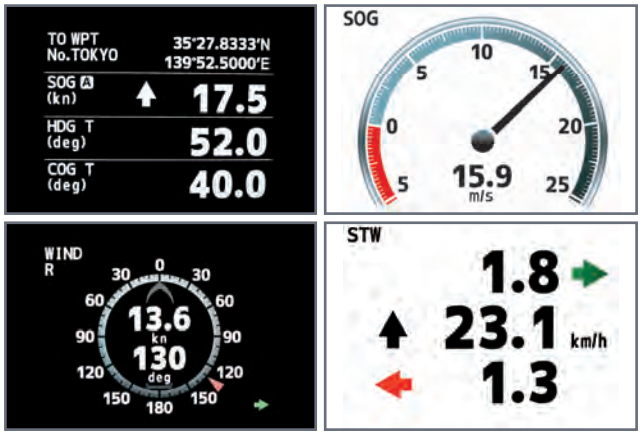
8.4" Remote Display

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 ten RD50 displays can be connected in series, with common brilliance/dimming adjustment from one or more remote controllers
- NMEA0183 compatible

Versatile and Bright Data Display

The RD-50 is an 8.4" Color LCD remote display that displays a wide variety of data from onboard sensors. The RD-50 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 2020-2024 NMEA Product of Excellence Award Best NMEA2000 Product

Model SCX-20

▸▸▸Spec P134

NMEA2000 Satellite Compass™

Model SCX-21

NMEA0183 Satellite Compass™

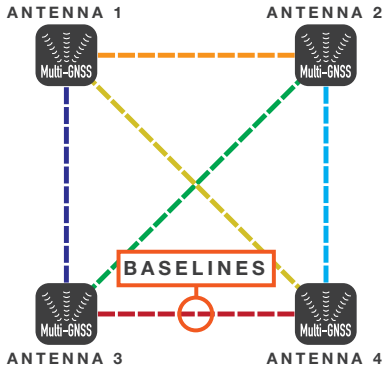
KEY FEATURES:

- Perfect for NavNet TZtouchXL/TZtouch3, NAVpilot-300/711C/1000, Fish Finder, Sonar, DFF-3D, 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	SCX-20/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.

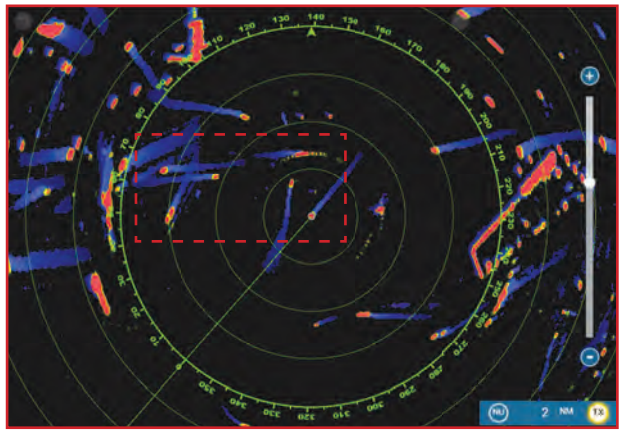
Revolutionary Baseline Architecture!

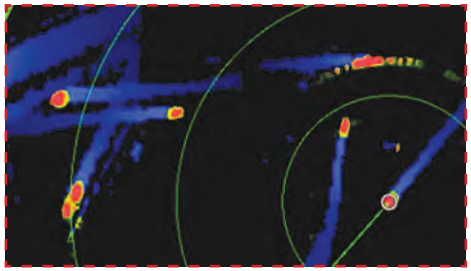
Utilizing four separate GNSS Antennas for the ultimate in responsiveness, the SCX-20 and SCX-21 set a new standard for reliable and accurate heading for all of your marine electronics. Traditionally, a Satellite Compass™ uses one baseline between two antennas to calculate heading. The SCX-20/21's four antennas can calculate heading information using any one of the six baselines drawn between the four antennas. The unprecedented quad-antenna design of the SCX-20 and SCX-21 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 SCX-20 or SCX-21 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.

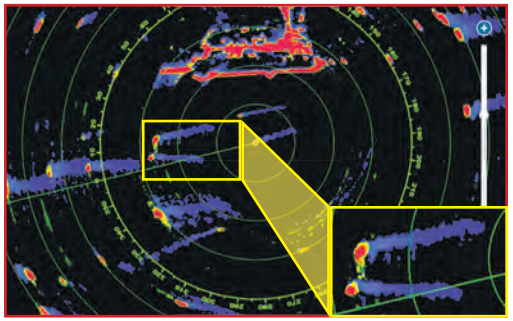




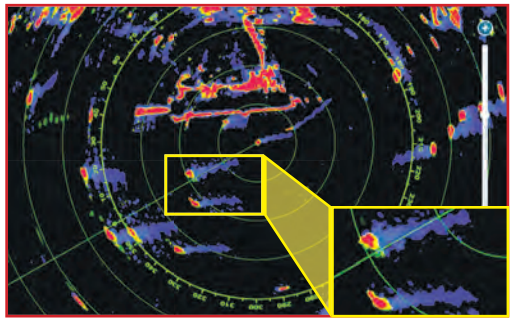
Radar Echo Trail Zig-Zag Domination

When connected to the SCX-20/21, the Radar's echo trails hold steady and clearly depict an accurate echo trail thanks to the SCX-20/21'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.

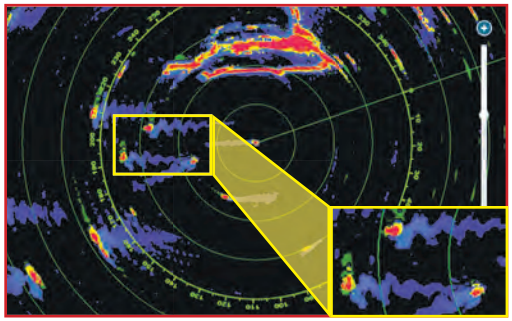
FURUNO SCX-20/21



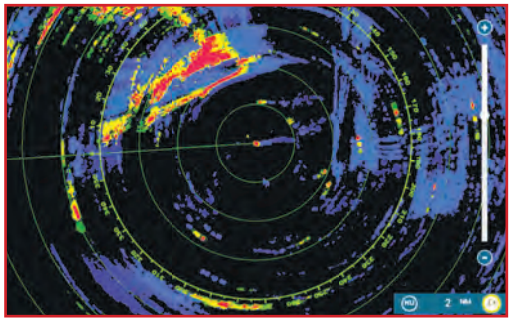
Company B



Company C



Company A



MORE ACCURATE SCX-20/21 < COMPANY B < COMPANY C < COMPANY A **LESS ACCURATE**

Satellite Compasses

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

Model SC-33

▸▸▸Spec P135

NMEA2000 Dome Satellite Compass™

KEY FEATURES:

- Heading accuracy of 0.4°
- Perfect for Radar Target Tracking and True Echo Trails
- NMEA2000 Certified
- NavNet TZtouchXL/TZtouch3 Series compatibility
- Multi-GNSS with GPS, Galileo, GLONASS, QZSS satellite networks
- Strong against multi-path offering high-reliability
- Works perfectly with TIMEZERO software
- Free from regular maintenance due to solid-state design

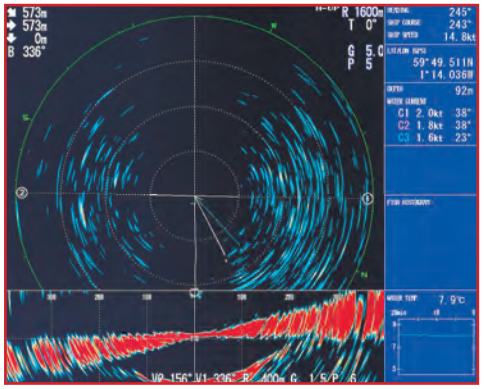
MODEL	SC-33
Heading Accuracy	0.4˚
GPS Fix	10 m (95%)
GNSS Fix	3 m (95%)
Follow-up Rate	45˚/sec
Settling Time	1 min
Antenna Unit	Dome

Sleek, Fast, and Accurate!

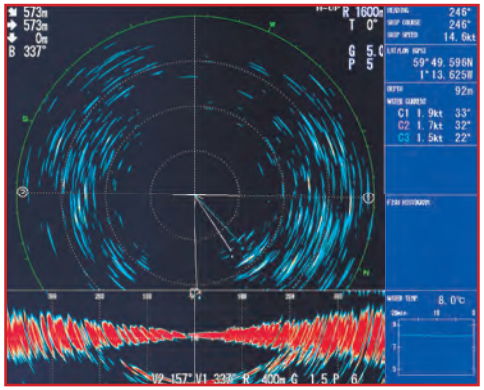
The SC-33 Satellite Compass™ provides highly accurate heading information for navigation equipment such as Radar, Plotter, Autopilot, Fish Finder, and Sonar. With its compact GNSS antenna and built-in processor, it can be used for a wide variety of applications on any type of vessel. This all-in-one 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 SC-33 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 SC-33 to calculate highly-accurate roll and pitch data without using a third sensor.



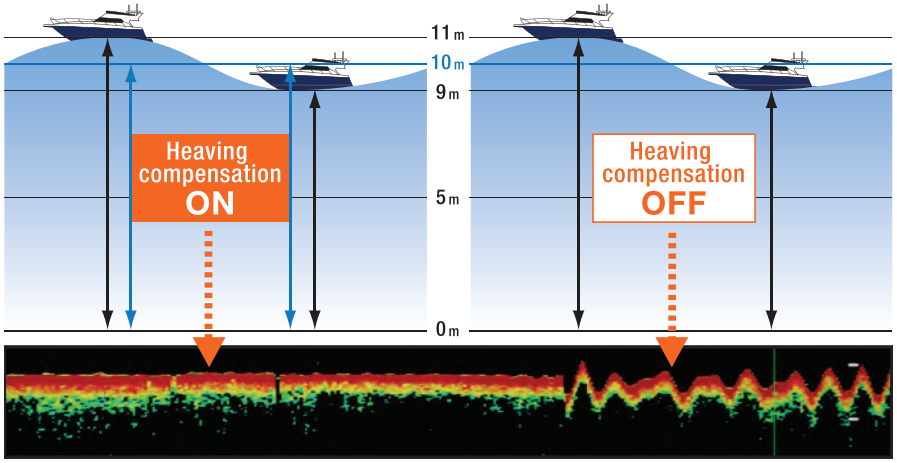
BEFORE Stabilization



AFTER Stabilization

Heaving Compensation for Fish Finders

Even in heavy seas, accurate heave compensation from the SC-33 enables Fish Finders, such as the FCV-1150 or NavNet TZtouchXL/TZtouch3, to show you an unwavering presentation of the seabed, without the undulations caused by sea conditions.



Satellite Compasses

SC-703 for SC-70

SC-1303 for SC-130

CAN bus | Multi-GNSS | NAVnet Connect

Model SC-70

▸▸▸Spec P135

Satellite Compass™

Model SC-130

Satellite Compass™

KEY FEATURES:

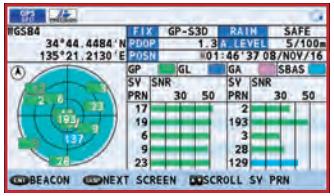
- Precision antenna that provides highly-accurate heading for all your vessel's navigation electronics: Autopilot, Radar, ARPA, Scanning Sonar, Current Indicator, Chart Plotter, ECDIS, Autopilot, and more
- Utilizes GNSS such as GPS, Galileo, and GLONASS for high precision
  - SBAS (Satellite Based Augmentation 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 SC-50/55/60/110/120)
- 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	SC-70	SC-130
Heading Accuracy	0.4˚ rms	0.25˚ rms
GPS Fix	10 m approx.	
DGPS Fix	4 m approx.	
WAAS Fix	4 m approx.	
Follow-up Rate	0.1˚/s, 0.01˚/s, or 0.001˚/s Rate-of-Turn (From Menu)	
Setting Time	90 Sec	90 Sec
Antenna Unit	Dome	Open Array

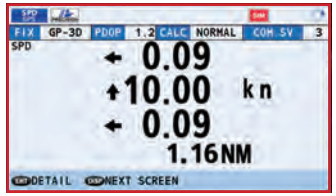
Bow & Stern Monitoring for Safe Berthing

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 PG-700

Spec P133

Magnetic Fluxgate 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, using standard L-bracket

CAN bus NAVnet Connect

Easy Mounting with L-Bracket

PG-700 can be mounted on either a bulkhead or the deck using the standard L-bracket. Thanks to the versatility in design, facing the PG-700 towards the bow is a breeze.

Model PG-500

Spec P133

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 RD-33
- 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

Maintenance-Free Heading Solution

Furuno's PG-500 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 PG-500 virtually maintenance-free and easy to install.

Communications

Model FA-40

▸▸▸Spec P136

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 TZtouchXL/TZtouch3

All-Condition Collision Avoidance

The FA-40 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 FA-40 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 FA-40 enhances situational awareness in congested waterways, limited visibility, or heavy sea conditions, and gives the navigator much more information about AIS equipped vessels.

The FA-40 has one NMEA2000 and one NMEA0183 port. This provides simple and easy connection to NavNet systems, AIS-capable Radar, Chart Plotters, and TIMEZERO. The FA-40 will work with virtually any marine VHF antenna. An optional VHF signal splitter is offered to allow the FA-40 to work with an existing VHF radio antenna installation.

Model FA-70

▸▸▸Spec P136

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 TZtouchXL/TZtouch3
- Flexible integration with various AIS-compatible Radars and Chart Plotters
- Switchable, high-speed SO-TDMA and CS-TDMA
- Internal Antenna Splitter

NAVnet Connect | NMEA2000 Certified | NMEA 0183

Accurate Information Exchange

The FA-70 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 FA-70 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 FA-170

▸▸▸Spec P136

Class A AIS Transponder

KEY FEATURES:

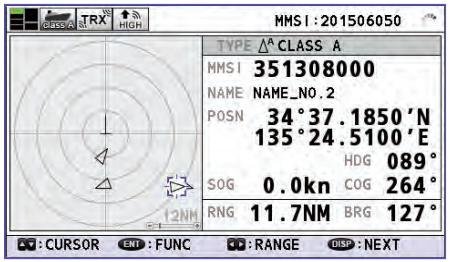
- Complies with IMO MSC.74(69) Annex 3, IMO MSC.302(87), A694, ITU-R M. 1371-5 and DSC ITU-R M.825; It also complies with IEC 61993-2 (Type testing standard) and IEC 60945 Ed. 4 (EMC and environmental conditions)
- Displays information about AIS-equipped ships, as well as coastal stations and Aids to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

NAVnet Connect | NMEA

2018-2019, 2021

Collision Avoidance Made Easy!

Displays symbols for AIS-equipped ships, base stations, AIS-SARTs 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

Model FM-4800

▸▸▸Spec P137

Marine VHF Radiotelephone with built-in AIS Receiver

Model FM-4850

▸▸▸Spec P137

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 (FM-4800)
- 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 capability
- 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/TZtouchXL Series MFDs when connected via NMEA2000
- Dual Station with optional handset
- Up to 3 Handsets/Speakers connectible (FM-4850)
- Water protected (Transceiver, Microphone, and Handset all IP67)

Built-In GPS (FM-4800)

Built-in High-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 HS-4800

Loud Hailer/Fog Horn

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

Dual Station

The optional Handset HS-4800 supports all the functionality of the FM-4800 and works as a second station. Intercom function is also supported.

Model FM-8900S

▸▸▸Spec P138

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 FS-1575/2575

▸▸▸Spec P139

MF/HF Radiotelephone

KEY FEATURES:

- FS-1575 150 W MF/HF Radio
- FS-2575 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 LH-5000

▸▸▸Spec P140

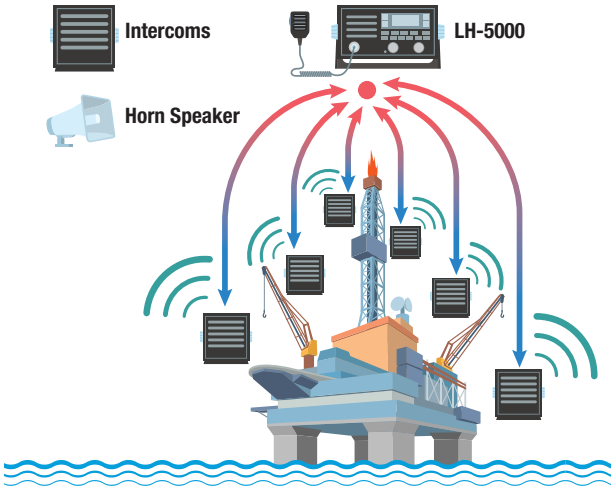
Loud Hailer

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.



U.S. Only

Non-CEMarking

Not available in the E.U.

Model NX-300

▸▸▸Spec P140

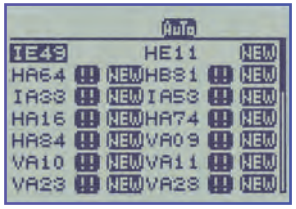
NAVTEX Receiver

KEY FEATURES:

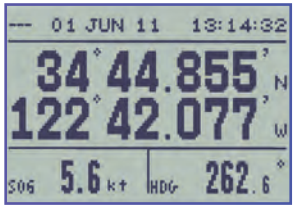
- Paper-free Navtex Receiver
- Selectable frequency for both international and domestic/local Navtex messages
- Uninterrupted reception of Navtex messages
- Memory for up to 28,000 characters
- High-contrast 4.5” Silver Bright LCD
- Nav data display when connected to external GPS
- Automatic selection 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 FAX-30

▸▸▸Spec P141

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 any Internet-connected PC
- 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 FAX-30 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 FAX-30. 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 FAX-30 with NavNet’s true color Radar and you have the ultimate in weather tracking.

PC not supplied

Communications

Model FELCOM251

▸▸▸Spec P142

INMARSAT FleetBroadband

Model FELCOM501

INMARSAT FleetBroadband

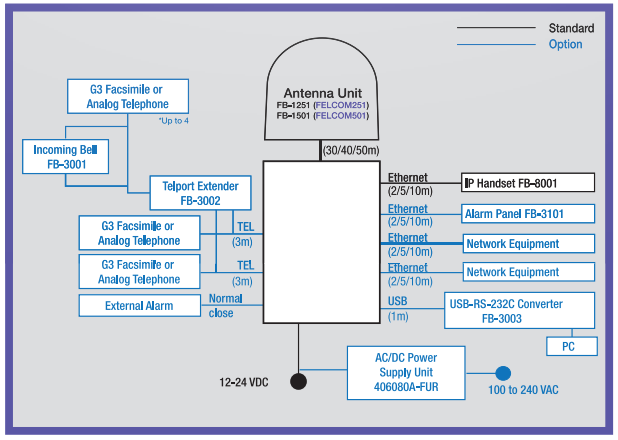
KEY FEATURES:

- IP handsets and Incoming Bell (FB-3001 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	FB-1251	FB-1501
2. Communication Unit	FB-2001	
3. IP Handset	FB-8001	
Option		
Incoming Bell	FB-3001	
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

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Seamless broadband communications for ocean-going fleets

LCR (Least Cost Routing)

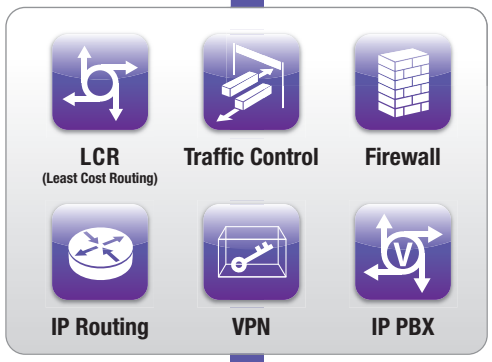
LCR is the process of selecting the path of communications traffic based on cost, allowing for automatic selection of the most cost-efficient communication line available. It is possible to set VSAT, which is charged by monthly fixed flat rate, as the default communication means, and switch over to "pay-as-you-go"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

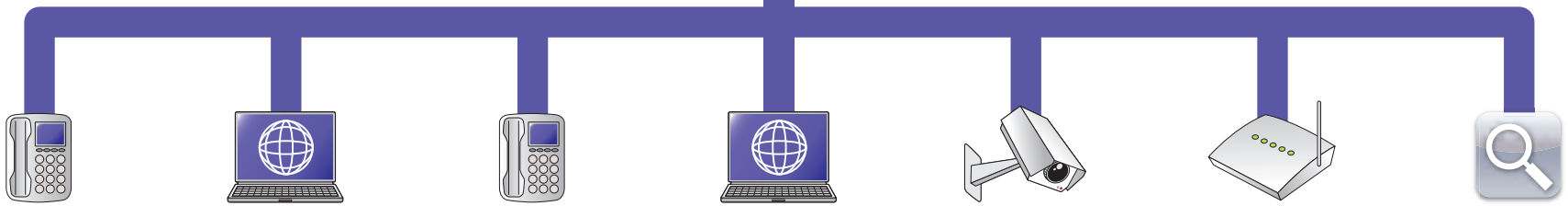
IP routing is a set of protocols to facilitate IP connection between onboard network and the public Internet.

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 and onboard public addresser system as well as VoIP of Inmarsat and VSAT.



Specifications

Subject to change without notice.

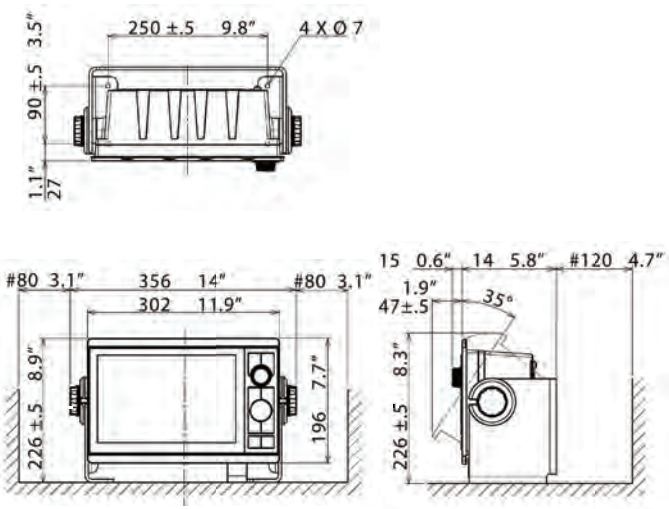
NavNet TZtouchXL MFDs						
MODEL	**TZT10X**	**TZT13X**	**TZT16X**	**TZT22X**	**TZT24X**	**TZTBBX**
DISPLAY UNIT						
Type	Color TFT multi touch IPS LCD					Owner Supplied
Screen Size	10.1" Wide	13.3" Wide	15.6" Wide	22" Wide	24" Wide	Owner Supplied
Screen Resolution	WUXGA 1920 x 1200	FHD 1920 x 1080	FHD 1920 x 1080	FHD 1920 x 1080	FHD 1920 x 1080	1024 x 768, 1280 x 1024, 1920 x 1080
Screen Brightness	900 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, Turkish, Polish					
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	TZ MAPS, MM3 Vector, 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, Video, Azimuth, Heading Line					
FISH FINDER						
Transmit Frequency*	CW: 50/200 kHz, CHIRP: 40 kHz to 240 kHz			-	-	-
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), 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	Fish alarm, Fish alarm for bottom lock			-	-	-
SIDE-SCAN						
Transmit Frequency*	CHIRP: 220-240KHz/445-465KHz			Side-Scan with networked TZT10X,TZT13X, TZT16X Only		
Transducer	225kHz: 225T-PR904, 225T-SS904. 225T-TM904 / 455kHz: 455T-PR903, 455T-SS903. 455T-TM903			Side-Scan with networked TZT10X,TZT13X, TZT16X Only		
Display Range	750 feet to each side					
Display Colors	Green, Blue, Amber, White, Aquamarine, Volcano, Fury, Tuna Hunter					
Display Screen Sizes	Full Screen, 1/2 Screen, 1/4 Screen, 1/6 Screen			-	-	-
Direct Connect to MFD	Direct connect to TZ10X, TZT13X, TZT16X only; may be networked with TZT22X/TZT24X/TZTBBX					
INTERFACE						
NMEA2000	1 Port					
Input	065280, 126992/993/996, 127237/245/250/251/257/488/489/505, 128259/267, 129025/026/029/330/038/039/040/041/291/538/540, 129793/794/798/801/802/808/809/810, 130306/310/311/312/313/314/316/576/577/578, 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 (1000 BASE-T)					
USB	1 Port (USB 3.0) for control unit		1 Port (USB 3.0) for touch monitor and control unit: 1 Port USB touch output for HDMI device			
Video I/O	Input: 1 port (NTSC/PAL*) * Requires optional multi-cable purchase		Input: 1 port (NTSC/PAL*) and 1 port HDMI 1920 x 1080p or less (progressive only) * Requires optional multi-cable purchase			Output: 1 port (HDMI 1080p)
AUX I/O	2 Ports (Event Switch and External Power Switch*) * Requires optional multi-cable purchase					
SD Card Slot	1 Slot (Micro SDXC, rear)					1 Slot (Micro SDXC, front)
Wireless LAN	IEEE802.11b/g/n, Transmit frequency: 2.412 to 2,462 GHz, 11dBm max					
Transducer Connection	1 Port 12 pin for CHIRP/CW, 1 Port 12 pin for Side-Scan			-	-	-
Bluetooth	Bluetooth Included					
ENVIRONMENT						
Temperature (IEC60945)	-15°C to +55° C					
Relative Humidity	93% or less at +40° C					
Waterproofing	IP56					
POWER						
	12-24 VDC					
	3.8-1.9A	3.9-1.9A	4.0-2.0A	5.1-2.5A	6.7-3.2A	2.1-1.1A

Drawings - NavNet TZtouchXL

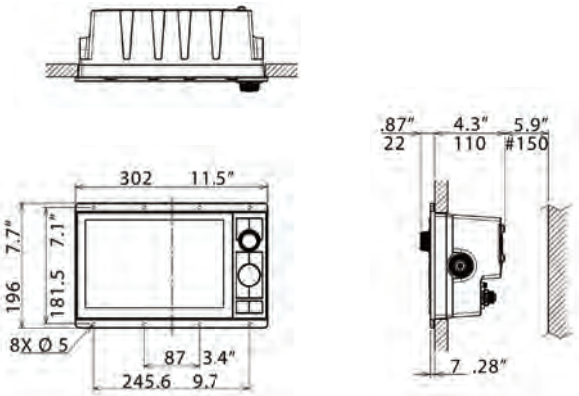
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

TZT10X (Bracket Included)

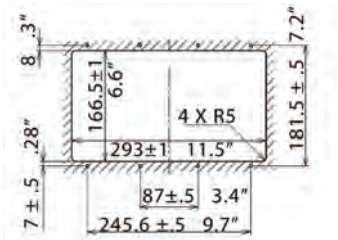
TZT10X (Tabletop Mount) 3.9 kg 8.6 lb



TZT10X (Flush Mount) 2.9 kg 6.4 lb

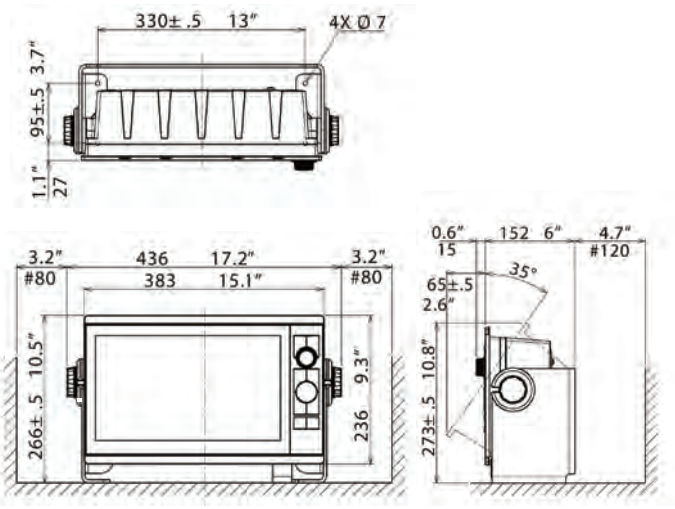


TZT10X (Flush Mount) Cutout Dimension

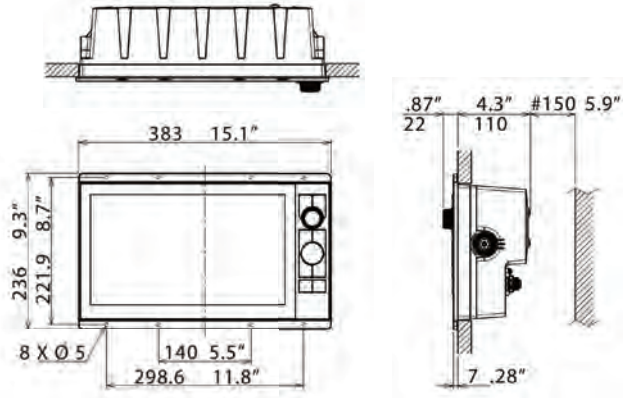


TZT13X (Bracket Included)

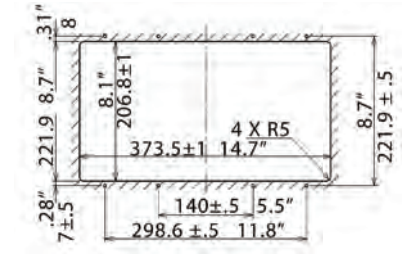
TZT13X (Tabletop Mount) 5.4 kg 11.9 lb



TZT13X (Flush Mount) 4.1 kg 9.0 lb

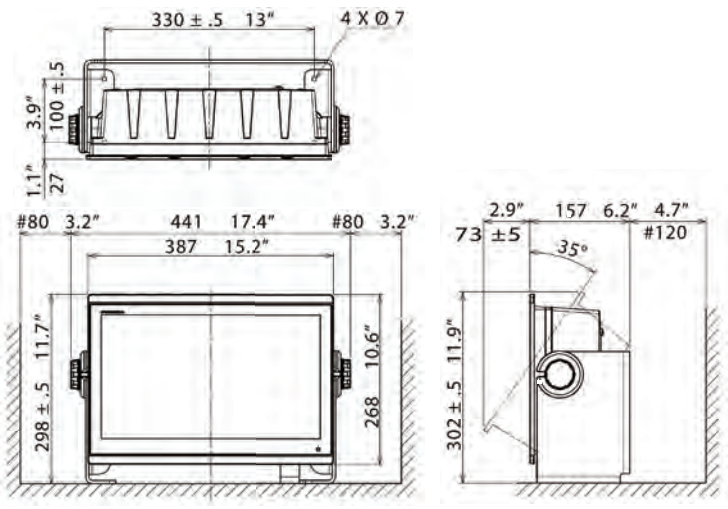


TZT13X (Flush Mount) Cutout Dimension

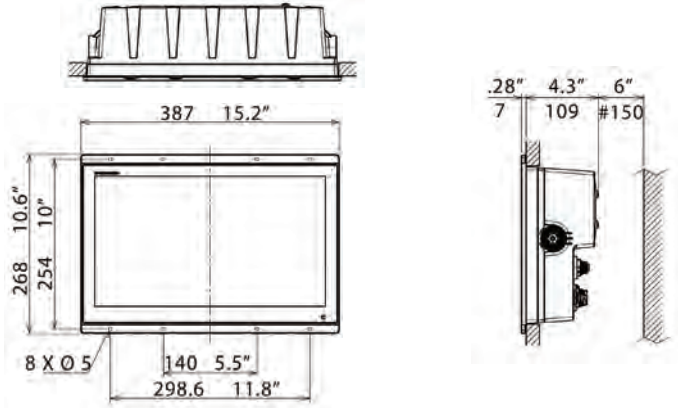


TZT16X (Bracket Not Included)

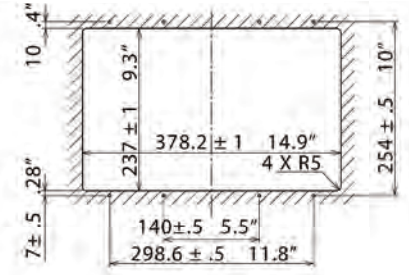
TXT16X (Tabletop Mount) 5.9 kg 13.0 lb



TZT16X (Flush Mount) 4.4 kg 9.7 lb



TZT16X (Flush Mount) Cutout Dimension

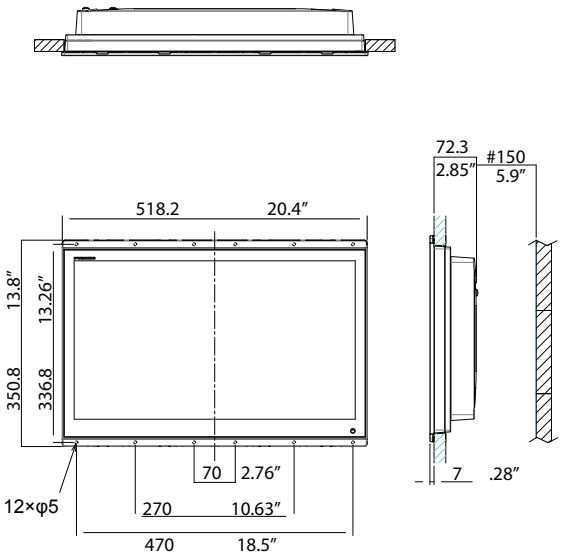


Drawings - NavNet TZtouchXL

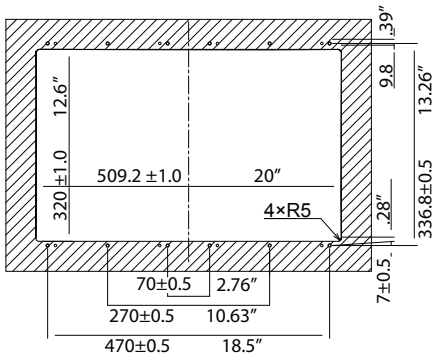
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

TZT22X

TZT22X (Flush Mount) 5.7 kg 12.6 lb

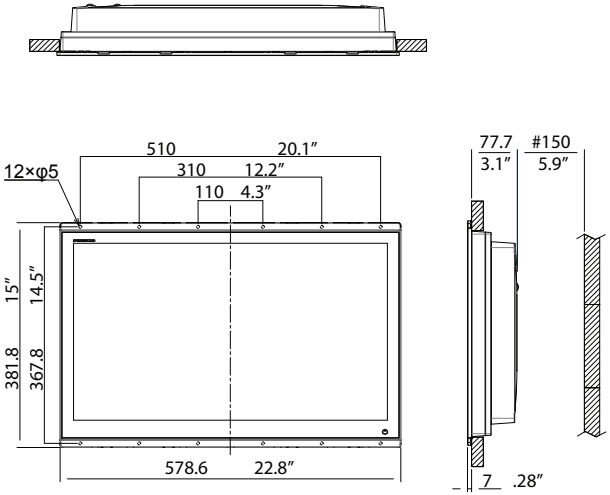


TZT22X (Flush Mount) Cutout Dimension

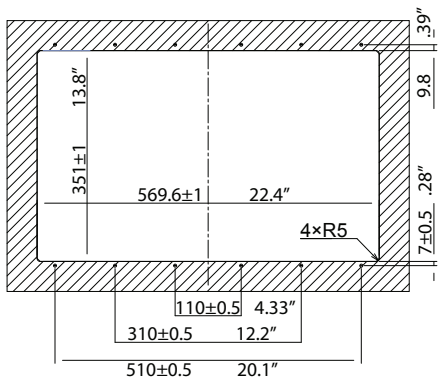


TZT24X

TZT24X (Flush Mount) 8.1 kg 17.9 lb

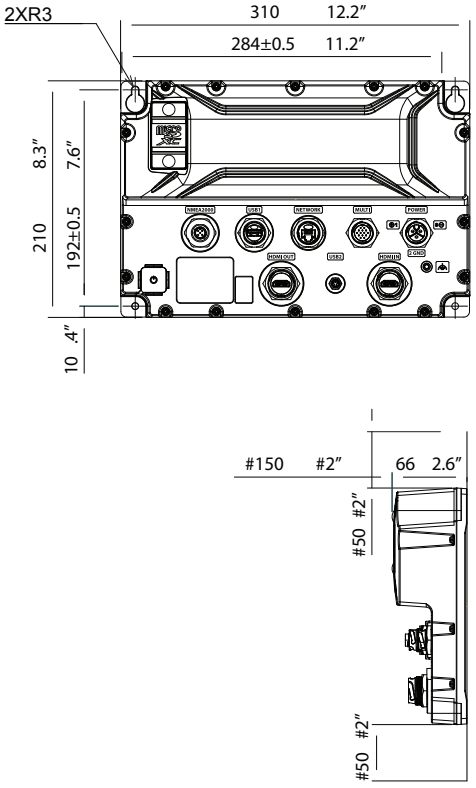


TZT24X (Flush Mount) Cutout Dimension



TZTBBX

TZTBBX Black Box MFD 1.3 kg 2.87 lb



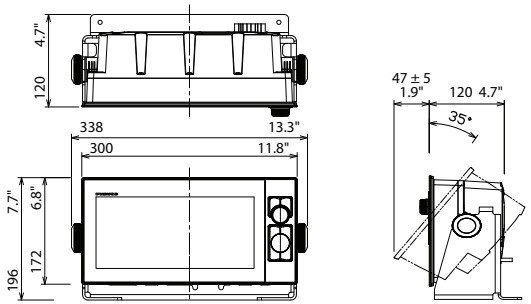
NavNet TZtouch3 MFDs					
MODEL	**TZT9F**	**TZT12F**	**TZT16F**	**TZT19F**	**TZT2BB**
DISPLAY UNIT					
Type	Color TFT multi touch IPS LCD				Requires optional color LCD, Recommended color LCD with touch panel control
Screen Size	9" Wide	12.1" Wide	15.6" Wide	18.5" Wide	Dependent upon display selected
Screen Resolution / Brightness	WXGA 1280 x 720 / 1000 cd/m2 (typical)	WXGA 1280 x 800 / 900 cd/m2 (typical)	FHD 1920 x 1080 / 1000 cd/m2 (typical)	FHD 1920 x 1080 / 900 cd/m2 (typical)	FHD 1920 x 1080 (recommended), XGA 1024 x 768, SXGA 1280 x 1024
Display Colors	16,770,000 colors (Chart Plotter), 64 colors (Radar/Fish Finder)				Dependent upon display selected
Language	Bulgarian, Chinese, Danish, English (USA/UK), Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Russian, Spanish, Swedish				
GPS/WAAS					
Receiver Type / Frequency	GPS: 72 channels, SBAS: 1 channel (C/A mode, WAAS) / L1 (1575.42MHz)			-	-
Time to First Fix / Accuracy	100 s (cold start) / 10 m (GPS), 7 m (MSAS), 3 m (WAAS)			-	-
Position Update Interval	100 ms or 10 Hz			-	-
CHART PLOTTER					
Cartography / Memory Capacity	MapMedia mm3d chart (C-MAP/NOAA) and CMOR capable (U.S. only) / 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 / Echo Trails	Head-up, North-up* (* Heading input required) / 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				
FISH FINDER					
Transmit Frequency*	CW: 50/200 kHz, CHIRP: 40 kHz to 240 kHz * TZT9F Single-Channel CHIRP only				50/200 kHz
Transducer	300/600 W or 1 kW* *Matching box MB1100 required for some transducers.				600 W or 1 kW* * Matching box MB1100 required for some FURUNO transducers
Display Range	2 to 1,200 m; shift 0 to 1,200 m				2-1, 200 m, shift: 0-500 m
Extension Mode	ACCU-FISH™, A-Scope, Auto (Fishing/Cruising), RezBoost™, Bottom Discrimination, TruEcho CHIRP™ with compatible transducer				
Picture Advance / FF Alarms	8 steps: x4, x2, x1, 1/2, 1/4, 1/8, 1/16, stop / 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 / Screen Sizes	Green, Blue, Amber, White / Full Screen, 1/2 Screen, 1/4 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, 127237/245/250/251/257/488/489/505, 128259/267, 129025/026/029/330/038/039/040/041/291/538/540, 129793/794/798/801/802/808/809/810, 130306/310/311/312/313/314/316/576/577/578, 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)			3 Ports (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		5 Ports (USB2.0)
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: 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	2 Ports (Event Switch and External Power Switch)				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: 2.412 to 2,462 GHz, 11dBm max				IEEE802.11b/g/n, Transmit frequency: 2.4 GHz band
Transducer Connection	1 Port x MJ10 pin	1 Port x MJ12 pin for transducers, 1 Port x MJ7 pin for DI-FFAMP			1 Port x MJ10 pin
ENVIRONMENT					
Temperature (IEC60945)	-15°C to +55° C				
Relative Humidity	93% or less at +40° C				
Waterproofing	IP56				Processor: IP22, Switch Box: IP56, Control Unit (optional): 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	2.6 - 1.3A

Drawings - NavNet TZtouch3

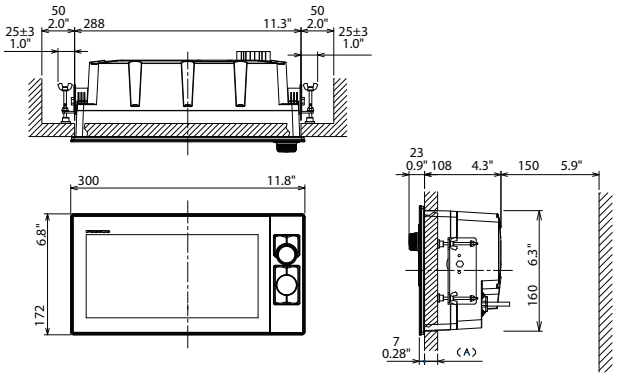
Refer to Online manual for more details. For illustration purposes only; not drawn to scale. * Bracket is optional

TZT9F

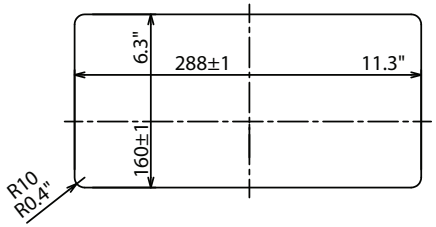
Multi Function Display (Tabletop Mount) TZT9F* 3.5 kg 7.7 lb



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

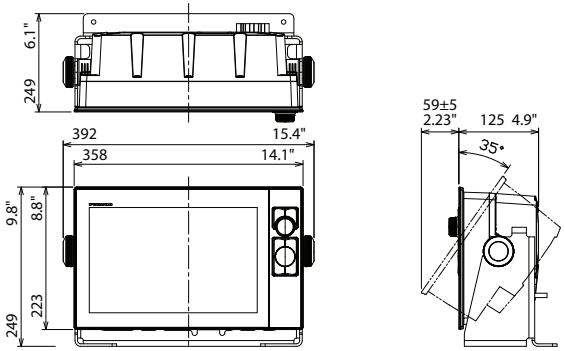


Multi Function Display Flush Mount TZT9F Cutout Dimension

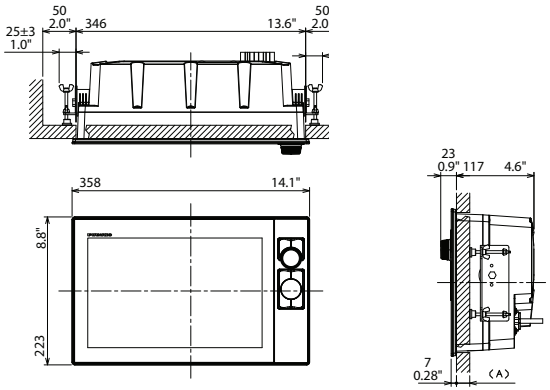


TZT12F

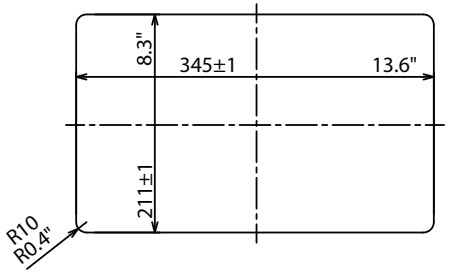
Multi Function Display (Tabletop Mount) TZT12F* 5.6 kg 12.3 lb



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

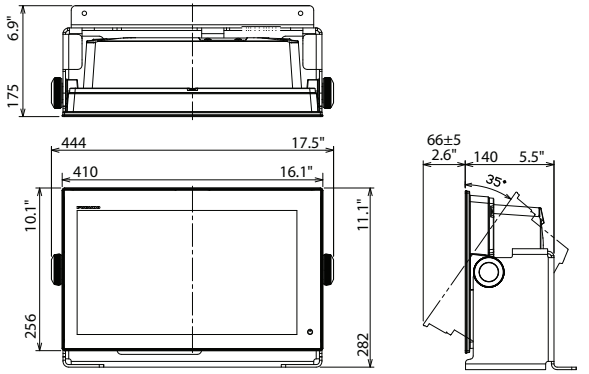


Multi Function Display Flush Mount TZT12F Cutout Dimension

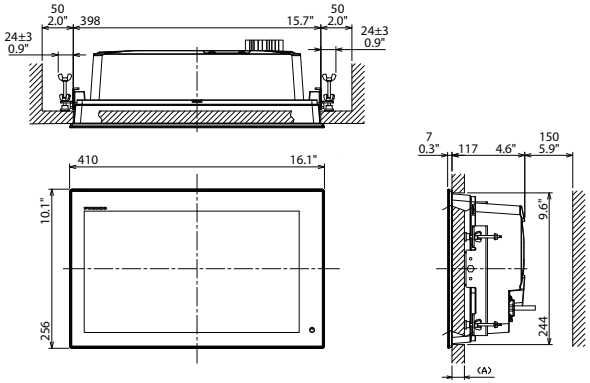


TZT16F

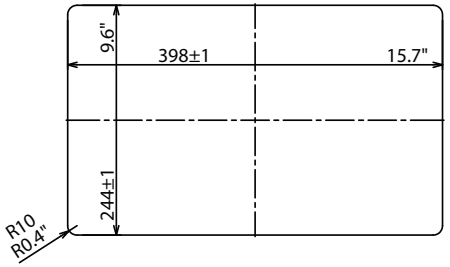
Multi Function Display (Tabletop Mount) TZT16F* 6.7 kg 14.7 lb



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



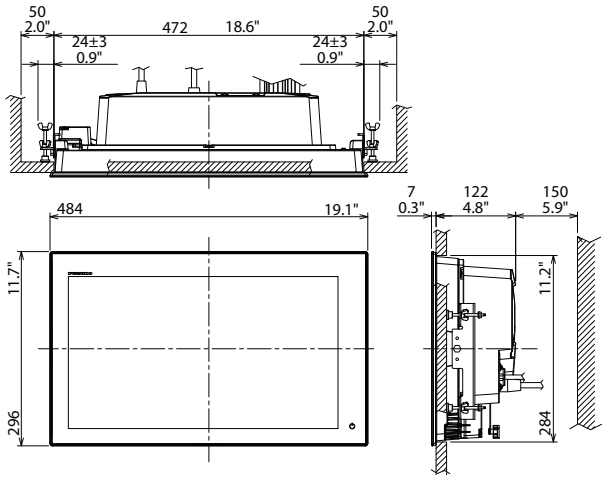
Multi Function Display Flush Mount TZT16F Cutout Dimension



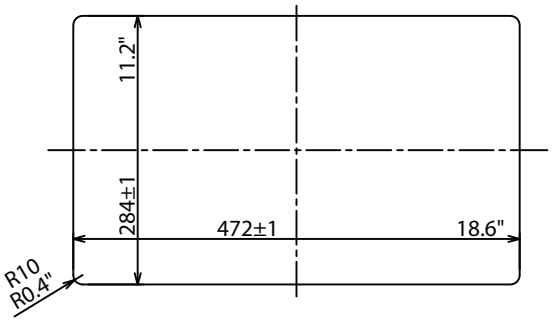
Drawings - NavNet TZtouch3 Continued

TZT19F

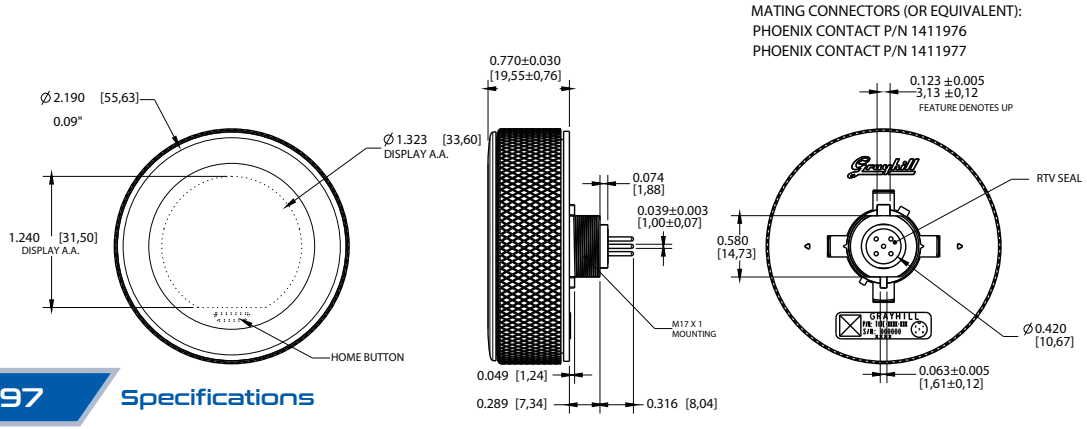
Multi Function Display (Flush Mount) TZT19F 7.8 kg 17.2 lb



Multi Function Display Flush Mount TZT19F Cutout Dimension

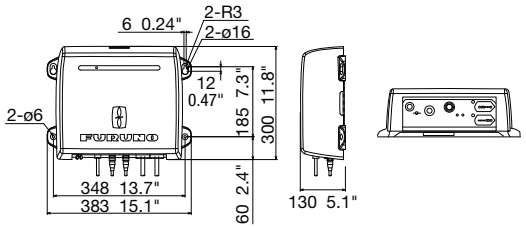


Touch Encoder Unit TEU001B/S (option, U.S. and Canada only) 0.12 kg 0.26 lb

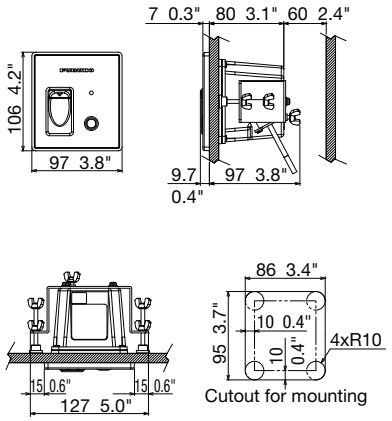


TZT2BB

Multi Function Display Black Box TZT2BB MPU-004 3.9 kg 8.6 lb

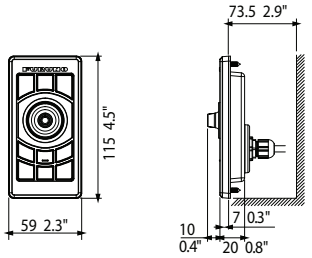


TZT2BB Switch Box PSD-003 0.75 kg 1.7 lb

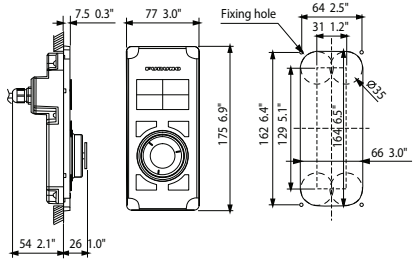


Controllers and Storage

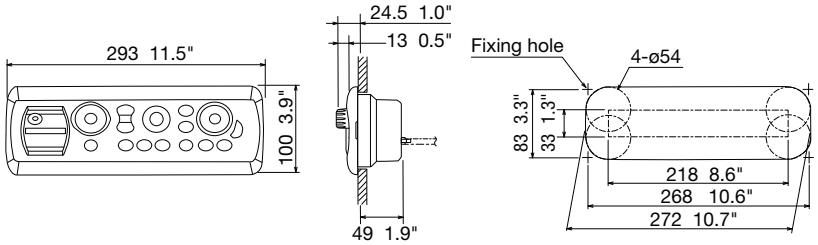
Remote Control Unit MCU-002 (option) 0.14 kg 0.3 lb



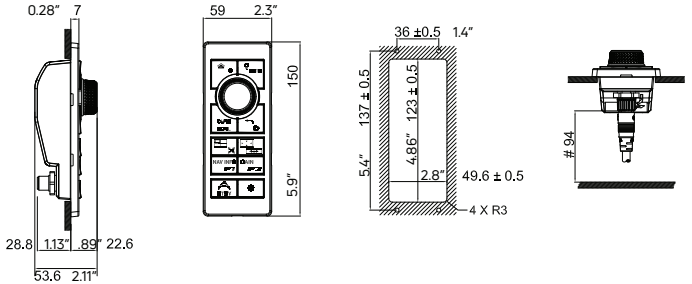
Remote Control Unit MCU-004 (option) 0.4 kg 0.9 lb



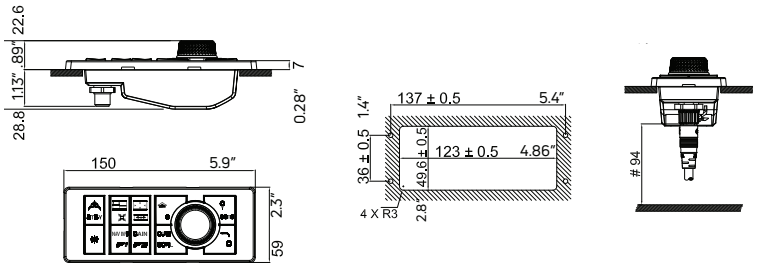
Control Unit MCU-005 (option) 1.0 kg 2.2 lb



Control Unit MCU-006 (option) 0.2 kg 0.44 lb



Control Unit MCU-006H (option) 0.2 kg 0.44 lb



NavNet Series Network Fish Finders			
MODEL	**BBDS1**	**DFF1-UHD**	**DFF3-UHD**
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
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
Broadband (CHIRP)	N/A	Yes	Yes
Range Scale	Max. 1,200 m	Max. 1,200 m	Max. 12,000 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			
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

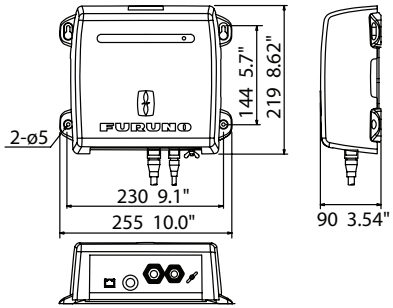
More Transducer options are available. Contact your Furuno dealer.

Drawings

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

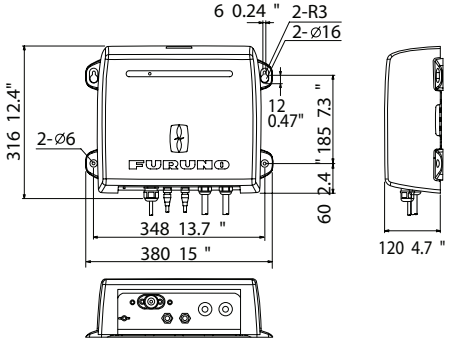
BBDS1

Network Fish Finder/Bottom Discrimination Sounder 1.3 kg 2.9 lb



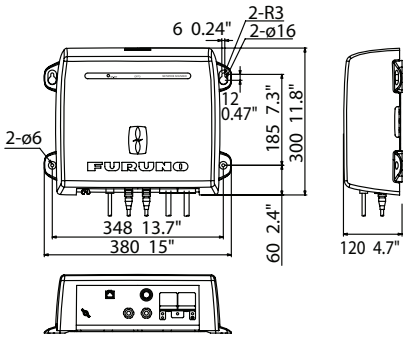
DFF1-UHD

Network Fish Finder 3.1 kg 6.8 lb



DFF3-UHD

Network Fish Finder 3.8 kg 8.4 lb

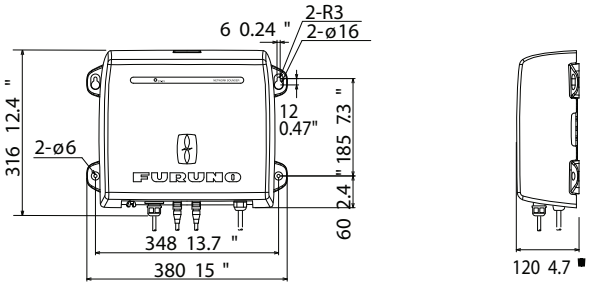


NavNet Series Multibeam Sonar	
MODEL	**DFF-3D**
TRANSCEIVER & DISPLAY	
Display Mode	Cross Section, Triple/Single Beam Sounder, Side Scan, 3D Sounder History
Frequency	165 kHz
Beam Angle	60° Port/Stbd, 20°-50° from right under for Triple Beam Sounder
Detection Range	200 m* (Side beam best performance) 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

Waterproof Network IP Camera	
MODEL	**FIP-460**
Sensor	1/4" CMOS Sensor
Resolution	Variable - 2304 x 1296 (3MP) Max
Interface	RJ45 10/100 Base T Ethernet
Video Processing	H.264 Codec / Dual Stream
Protocols / Video Format	TCP/UDP/HTTP/Multicast/UPnP/NTP/RTSP/ONVIF
ONVIF	Profile S v2.4
Bitrate	VBR / CBR 32kbps ~ 8Mbps
Illumination	6 x 850nm Infra-Red - 10-meter Range
Lens / Field of View	HFOV / 1.8mm (154° HFOV)
Automatic Gain Control	Supported / Multiple Levels
Operating Temperature	-30° C ~ +65° C
Connections	Water Resistant RJ45 Socket / Non PoE with DC Power Socket
Material	316 Stainless Steel
Operating Voltage	12 VDC (10V to 15V)
Power Consumption	1W Nominal @ 12VDC (1.8W MAX (LEDS ON))
Power over Ethernet (PoE)	IEEE802.3af
Weight & Dimensions	0.420Kg/59.5mm ø x 52.93mm H
Environmental	IP66
Vibration	EN60945: 2002 Section 8.7
EMC	EN55032:2015/A11:2020 & EN55035:2017/A11:2020 EN60945:2002 Sections 9 & 10 / PoE with Compliant PoE Injector
RoHS	EN6300:2018 / EU 2015/83

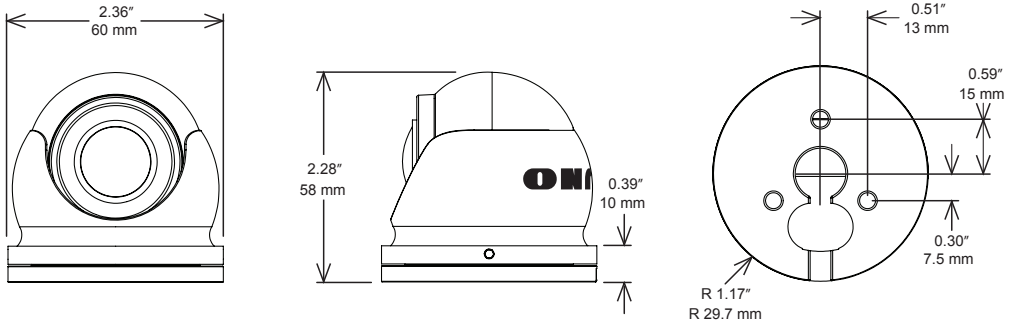
DFF-3D

Network Multibeam Sonar 3.0 kg 6.6 lb



FIP-460

Marine IP Camera 0.42 kg 0.93 lb



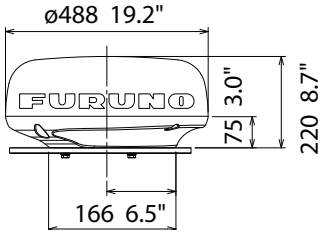
NavNet Series Radar							
MODEL		**DRS4DL+**	**DRS2D-NXT**	**DRS4D-NXT**	**DRS6A-NXT**	**DRS12A-NXT**	**DRS25A-NXT**
ANTENNA							
Type		ø488 mm Radome (19")		ø610 mm Radome (24")	ø1036 mm Open (3.5') 1255 mm Open (4') 1795 mm Open (6')	1036 mm Open (3.5') 1255 mm Open (4') 1795 mm Open (6')	1036 mm 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)				
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.

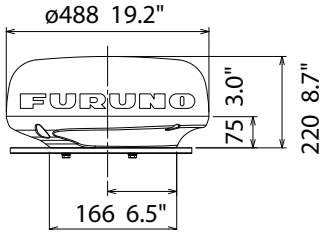
DRS4DL+

19" Radome Radar Sensor DRS4DL+ 5.7kg 12.7 lb



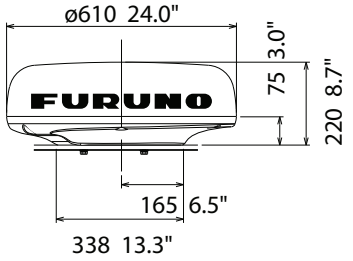
DRS2D-NXT

19" Radome Radar Sensor DRS2D-NXT 6.5kg 14.3 lb



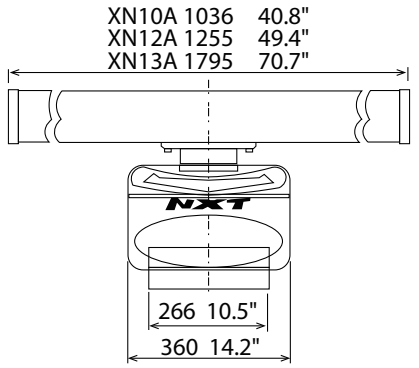
DRS4D-NXT

24" Radome Radar Sensor DRS4D-NXT 7.3kg 16.1 lb



DRS6A/12A/25A-NXT

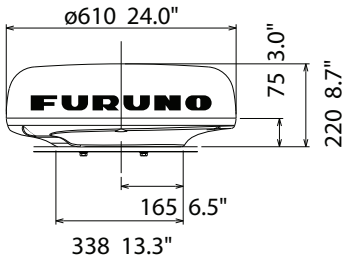
3.5 ft Open Antenna	22 kg 48.5 lb
4 ft Open Antenna	25 kg 55.1 lb
6 ft Open Antenna	27kg 59.5 lb



MODEL		DRS4D X-Class	DRS6A X-Class	DRS12A X-Class	DRS25A X-Class
ANTENNA					
Type		ø610 mm Radome (24")	1036 mm Open (3.5') 1255 mm Open (4') 1795 mm Open (6')		
Beam Width	Horizontal	4°	2.3°/1.9°/1.35°	1.9°/1.35°	
	Vertical	25°	22°/22°/22°		
Antenna Rotation Speed		Limited to 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		CH1: 9380 MHz (P0N), 9400 MHz (Q0N) CH2: 9400 MHz (P0N), 9420 MHz (Q0N) CH3: 9420 MHz (P0N), 9440 MHz (Q0N)			
Peak Output Power		4 kW	6 kW	12 kW	25 kW
Range Scales		0.0625 to 48 NM	0.0625 to 96 NM		
ENVIRONMENT					
Temperature		Temperature: -25° C to +55° C, Waterproofing: IP26	Temperature: -25° C to +55° C, Waterproofing: IP56		
POWER SUPPLY					
		DC12-24 V, 2.5 A - 1.3 A	24 VDC, 4 A	24 VDC, 4.5 A	24 VDC, 5.6 A

DRS4D X-Class

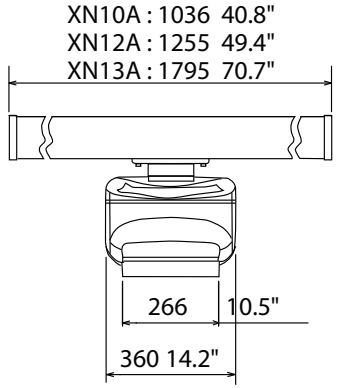
24" Radome Radar Sensor DRS4D X-Class 7.2kg 15.9 lb

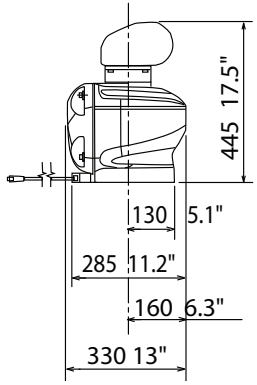


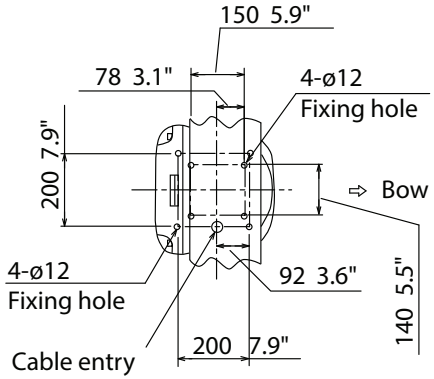
DRS6A/12A/25A X-Class

3.5 ft Open Radar Sensor DRS6A X-Class 20.0 kg 44.1 lb
4 ft Open Radar Sensor DRS6A X-Class 21.0 kg 46.3 lb
6 ft Open Radar Sensor DRS6A X-Class 23.0 kg 50.7 lb

3.5 ft Open Radar Sensor DRS12A X-Class 20.0 kg 44.1 lb
4 ft Open Radar Sensor DRS12A X-Class 21.0 kg 46.3 lb
6 ft Open Radar Sensor DRS12A X-Class 23.0 kg 50.7 lb
3.5 ft Open Radar Sensor DRS25A X-Class 20.0 kg 44.1 lb
4 ft Open Radar Sensor DRS25A X-Class 22.0 kg 48.5 lb
6 ft Open Radar Sensor DRS25A X-Class 24.0 kg 53.0 lb







GPS/WAAS Receiver Antennas	
MODEL	**GP-330B**
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.

TIMEZERO PC Marine Software		
SOFTWARE VERSION	**TZ Navigator V5**	**TZ Professional V5**
Processor	CPU Intel® Core™ i5 4th generation or equivalent	CPU Intel® Core™ i5 6th generation or equivalent
Operating System	Microsoft® Windows® 10/11 (64-bit operating system)	
RAM Memory	4 GB of RAM	8 GB of RAM (16 GB recommended)
Graphics Card	Intel HD4400 Graphic Chipset or equivalent	Minimum: Intel HD Graphic 510 (i5 6th generation or above) Recommended: (for PBG and Multi monitor) - Dedicated Video Board or Intel Iris Plus Graphics
Screen Resolution	1280 x 800	1024 x 768 or higher (1280 x 800 or above highly recommended)
HDD	40 GB of free space (Solid State recommended)	Solid State with 60 GB of free space
Serial or USB port	For connecting instruments via NMEA0183, Actisense USB NGT-1 for connecting instruments via NMEA2000, or 100 Base-T Network Adapter for Furuno Ethernet Sensors	

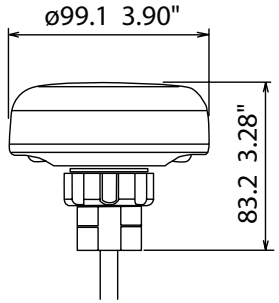
* Windows Arm-based PCs are not supported. TIMEZERO only supports x86 processor (Intel recommended)

Drawings

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

GP-330B

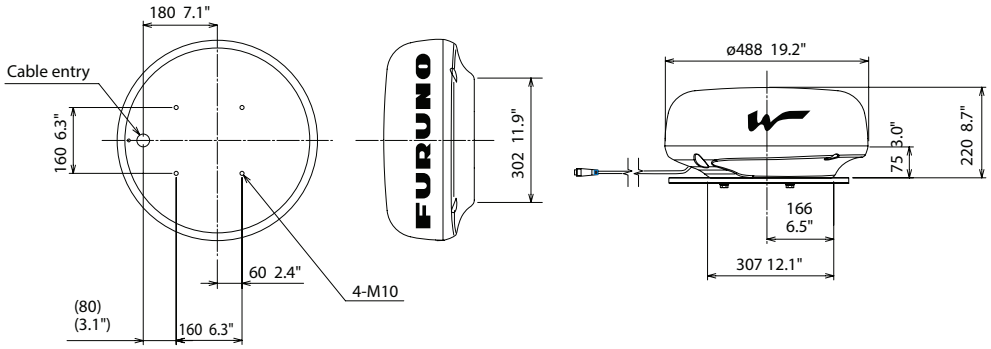
GPS/WAAS Receiver Antenna 0.22 kg 0.49 lb



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
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



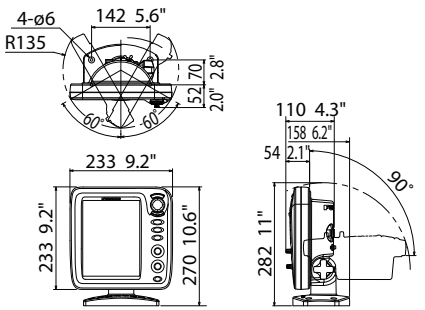
		8.4" Color LCD Radar
MODEL		**MODEL1815**
ANTENNA		
Type		ø488 mm radome (19")
Beamwidth	Horizontal	5.2°
	Vertical	25°
Rotation speed		24 rpm
RF TRANSCEIVER		
Frequency		9410 ± 30 MHz
Output power		4 kW
IF frequency		IF: 60 MHz BW: 20MHz (0.625 to 0.5 NM), 4.5 MHz (0.75 to 36 NM)
DISPLAY		
Display unit		8.4" color LCD
Effective Display Area		128.2 (W) x 170.9 (H) mm
Screen Resolution		640 x 480, VGA
Accuracy	Range	1.0% of range in use or 0.01 NM, which is greater
	Bearing	EBL Accuracy ± 1°
Range and Range Ring interval	Range	0.625, 0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 36 NM
	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
Echo trail		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	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	ACK, RSD, TLL*, TTM* * external data required
ENVIRONMENT		
Temperature	Display unit	-15° C to +55° C
	Antenna unit	-25° C to +55° C
Waterproofing	Display unit	IP56
	Antenna unit	IPX6
POWER SUPPLY		
	Display unit	12-24 VDC: 3.2-1.6 A

Drawings

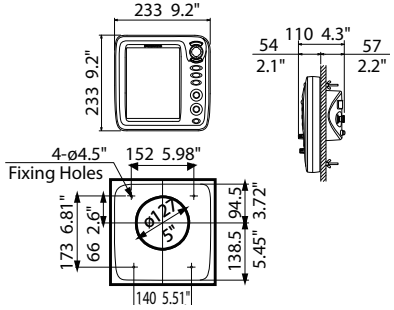
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

MODEL1815

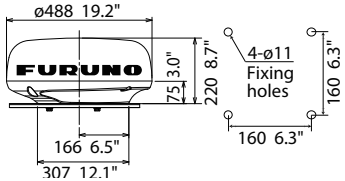
Display Unit (Bracket Mount) 2.2 kg 4.9 lb



Display Unit (Flush Mount) 1.6 kg 3.5 lb



Antenna 6.5 kg 14.3 lb



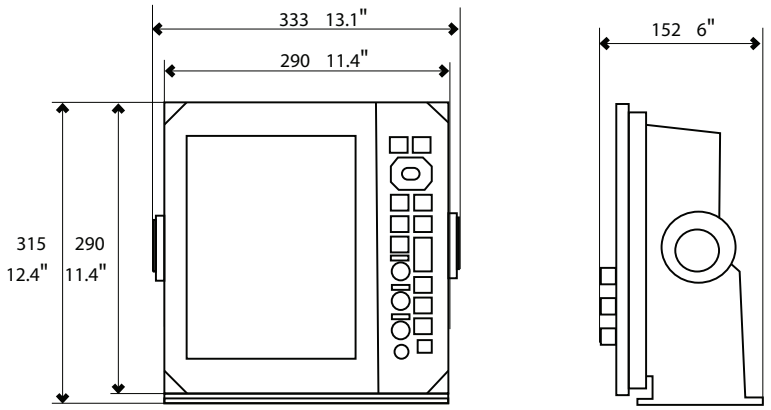
10.4" and 12.1" Color LCD Radar Displays		
MODEL	**FR-10**	**FR-12**
ANTENNA		
Model	DRS4DL+, DRS2D/4D/6A/12A/25A-NXT, DRS6A/12A/25A X-Class	
Output	Depending on the selected Antenna Unit	
DISPLAY UNIT		
Screen Size	10.4" Color LCD	12.1" Color LCD
Screen Resolution	800 x 600 (SVGA)	1024 x 768 (XGA)
Display 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

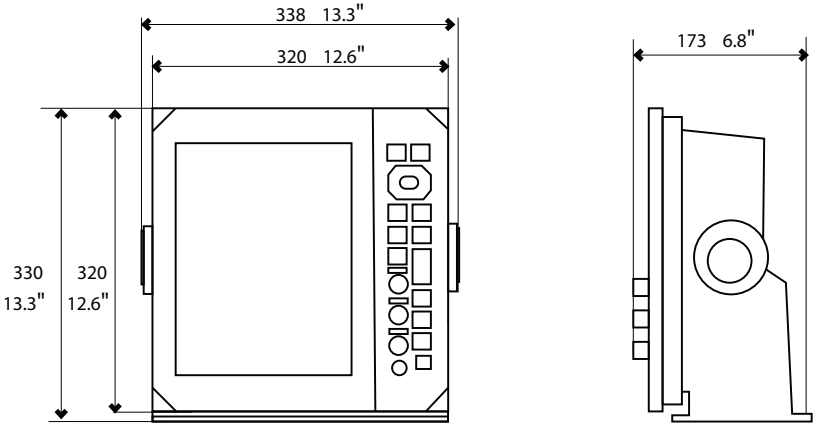
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FR-10 / FR-12

FR-10 3.2 kg 7 lbs



FR-12 3.9 kg 8.6 lbs



15" Multi-Color LCD Radar			
MODEL		**FAR-1416**	**FAR-1426**
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, PON	
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

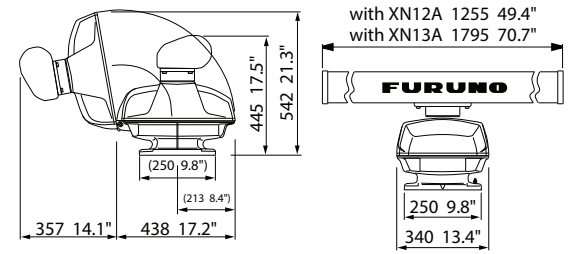
Marine Radar					
MODEL		**FAR-1513**	**FAR-1523**	**FAR-1518**	**FAR-1528**
ANTENNA					
Type		1255 mm Open (4') or 1795 mm Open (6')		1260 mm Open (4'), 2040 mm Open (6.5'), or 2550 mm Open (8')	
Beamwidth	Horizontal	1.9˚ (XN12A), 1.35˚ (XN13A)		1.9˚ (XN12AF), 1.23˚ (XN20AF)	1.23˚ (XN20AF), 0.95˚ (XN24AF)
	Vertical	20˚			
Rotation speed		24 rpm or 48 rpm			
RF TRANSCEIVER					
Frequency		9410 MHz ±30 MHz, P0N			
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)

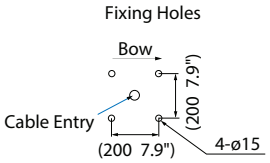
Drawings

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

FAR-1416/1426/1513/1523

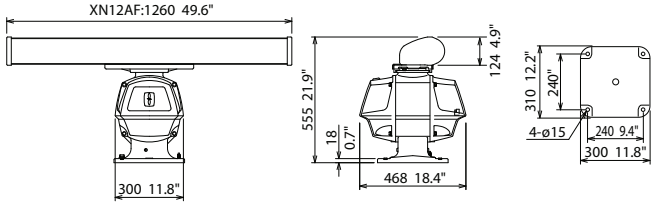
4 ft Open Antenna 25 kg 55.1 lb
6 ft Open Antenna 27 kg 59.5 lb



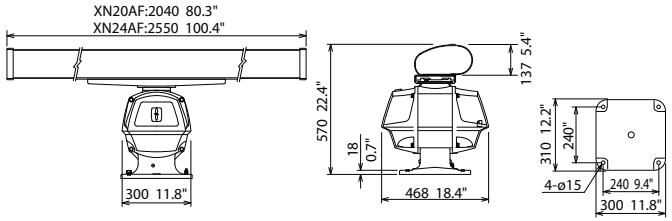


FAR-1518/1528

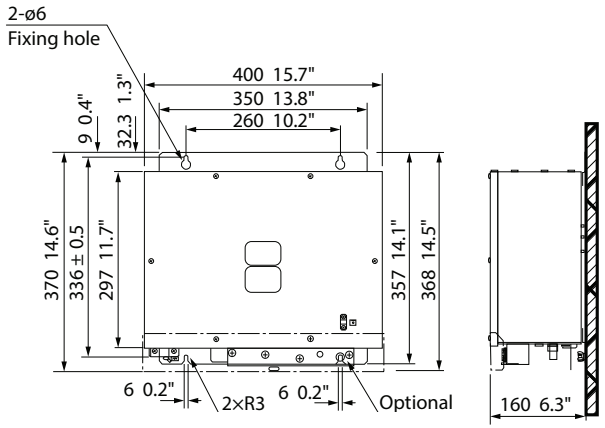
4 ft Open Antenna XN12AF 33 kg 73 lb



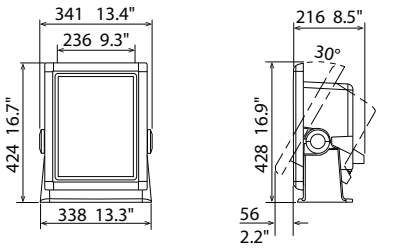
6.5 ft Open Antenna XN20AF 39 kg 86 lb
8 ft Open Antenna XN24AF 42 kg 92.6 lb



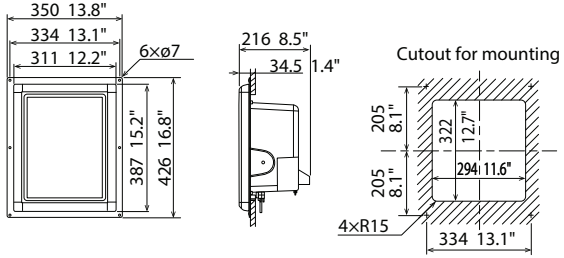
RPU-024 DC: 6.2 kg 13.7 lb
Processor Unit AC: 6.8 kg 15.0 lb



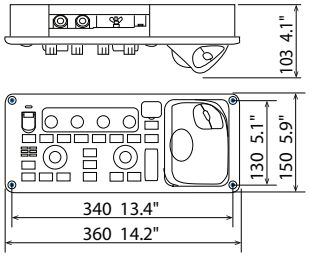
Display Unit (Portrait/Tabletop Mount) 8.5 kg 18.7 lb



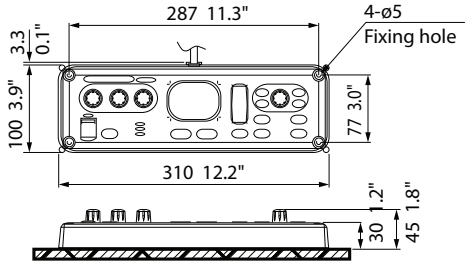
Display Unit (Portrait/Flush Mount) 8.1 kg 17.8 lb



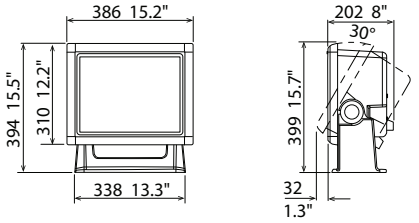
Control Unit 3.5 kg 7.7 lb



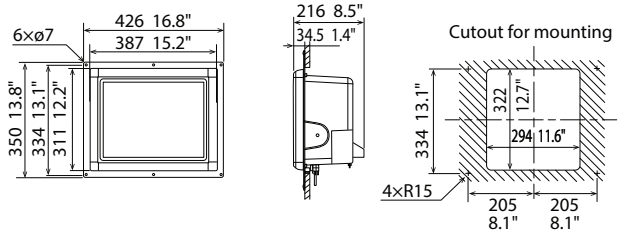
Control Unit RCU-028 1.2 kg 2.6 lb



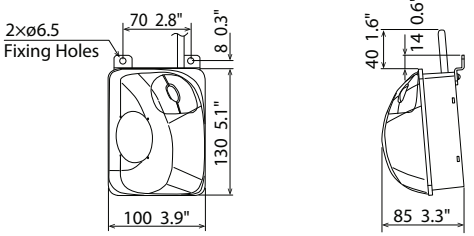
Display Unit (Horizontal/Tabletop Mount) 8.5 kg 18.7 lb



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		**FAR-2218-BB**	**FAR-2228-BB**
ANTENNA			
Type		130 cm Open (4') or 210 cm Open (6.5') or 260 cm 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	
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, 1.5, 3, 6, 12, 24, 48, 96 NM	
	Ring	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, 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, RAQ, RMB, RMC, ROT, RTE, THS, VBW, VDM, VDO, VDR, VHW, VSD, VTG, VWR*1, VWT*1, VPL, ZDA * 1 for retrofit	
	Output	ABM, ACK, AIQ, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT, OSD, RSD, 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		100 BASE-TX, IPv4, 8P8C connector	
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: 2.1-1.0 (2.8-1.2)A, 1 phase, 50-60 Hz	100-230 VAC: 2.2-1.0 (2.8-1.3)A, 1phase, 50-60 Hz

Black Box Marine Radar Continued

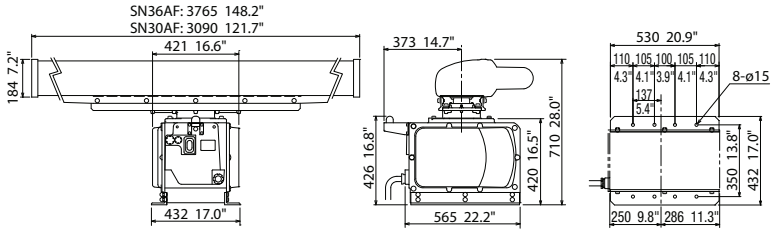
MODEL		FAR-2238S-BB	FAR-2228-NXT-BB	FAR-2238SNXT-BB
ANTENNA				
Type		3822 mm Open (12')	1297 mm Open (4') or 2097 mm Open (6.5') or 2597 mm Open (8')	3822 mm Open (12')
Beamwidth	Horizontal	2.6° (8' open: SN24CF) or 2.3° (10' open: SN30CF) or 1.8° (12' open: SN36CF)	1.9° (4' Open: XN12CF), 1.23° (6.5' 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 (Except for XN24CF)	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
Output power		30 kW	Solid-state, 600 W	Solid-state, 250 W
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

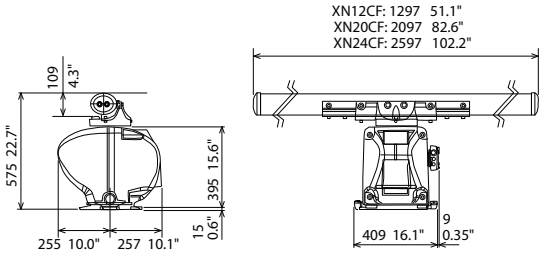
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FAR-2018-MK2 / FAR-2028-MK2 / FAR-2238S-BB / FAR-2228-NXT-BB / FAR-2238S-SSD-BB

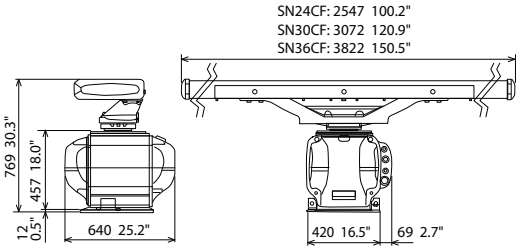
10 ft S-Band Antenna SN30AF 135 kg 297.6 lb
12 ft S-Band Antenna SN36AF 142 kg 313.1 lb



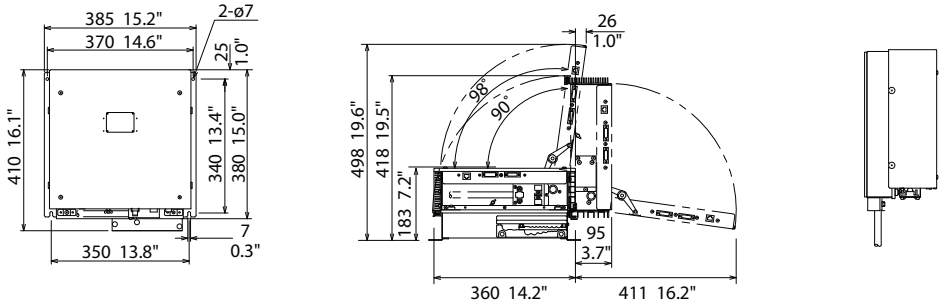
4 ft Open Antenna XN12CF 46.2 kg 101.9 lb
6.5 ft Open Antenna XN20CF 48.1 kg 106.1 lb
8 ft Open Antenna XN24CF 43.9 kg 108.7 lb



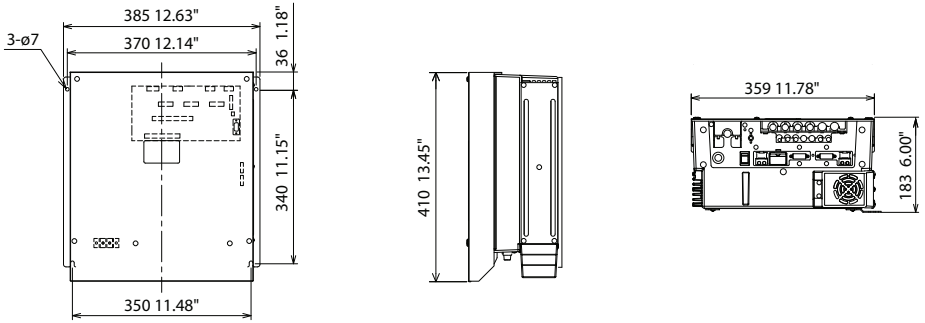
8 ft Open Antenna SN24CF 129 kg 284 lb
10 ft Open Antenna SN30CF 135 kg 297.6 lb
12 ft Open Antenna SN36CF 140 kg 308.6 lb



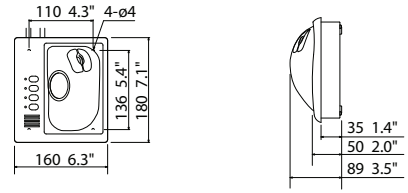
Processor Unit RPU-025 10 kg 22 lb



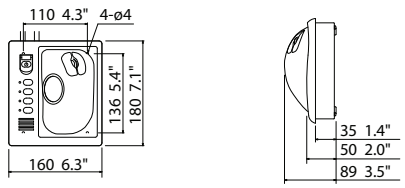
Processor Unit RPU-025 for X-Band/S-band (24 rpm) 9.6 kg 21.2 lb (w/ Fan)
Processor Unit RPU-025 for S-band (42 rpm) 11.5 kg 25.4 lb (w/ 2 Fans)



Trackball Control Unit RCU-016 2.4 kg 5.3 lb



Trackball Control Unit RCU-015 2.4 kg 5.3 lb



Keyboard Control Unit RCU-014 3.7 kg 8.2 lb

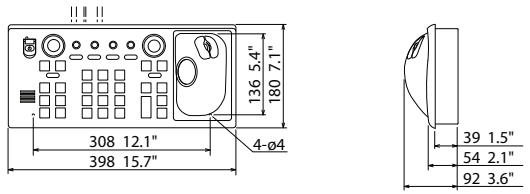


Chart Radar

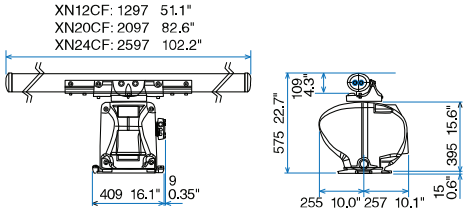
MODEL		FAR-3005 (X-Band Magnetron or Solid-State)		FAR-3005S (S-band Magnetron or Solid State)
ANTENNA				
Type		130 cm Open (4.2' XN12CF), 210 cm Open (7' XN20CF), or 260 cm Open (8.5' XN24CF) 126 cm Open (4' XN12AF), 204 cm Open (6.7' XN20AF), 255 cm Open (8.3' XN24AF)		383 cm S-band (12')
Beamwidth	Horizontal	1.9˚(4' Open: XN-12CF), 1.23˚(6.5' Open: XN-20CF) or 0.95˚(8' Open: XN-24CF)		1.8˚ (12' S-band: SN-36CF)
	Vertical	20˚		25˚
Rotation speed		24 rpm or 42 rpm (Except for XN24CF)		
RF TRANSCEIVER				
Frequency		9410 ±30 MHz		3050 ±30 MHz
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, 1.5, 3, 6, 12, 24, 48, 96 NM		0.125, 0.25, 0.5, 0.75, 1.5, 3, 6,12, 24, 48, 96 NM
	Ring	0.025, 0.05, 0.1, 0.25, 0.25, 0.5, 1, 2, 4, 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, 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, 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

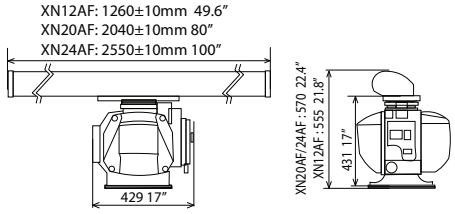
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FAR30x5 (S or X-Band, Solid-State or Magnetron)

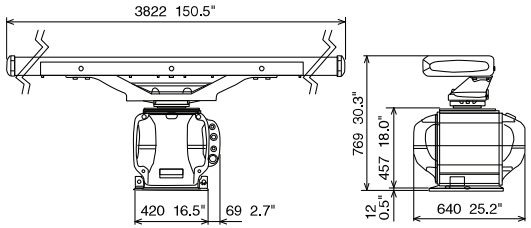
4.2 ft Open Antenna XN12CF 46.2 kg 101.9 lb
7 ft Open Antenna XN20CF 48.1 kg 106.1 lb
8.5 ft Open Antenna XN24CF 43.9 kg 108.7 lb



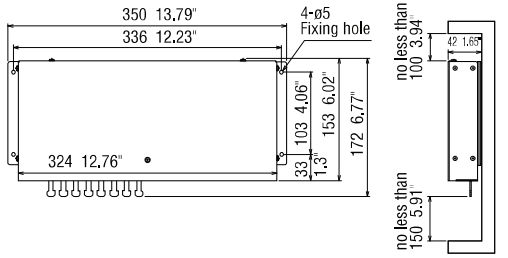
4 ft Open Antenna XN12AF 39 kg 86 lb
6.7 ft Open Antenna XN20AF 44 kg 97 lb
8.3 ft Open Antenna XN24CAF 46 kg 101 lb



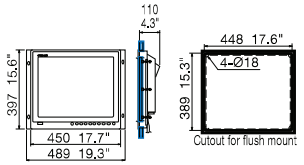
12 ft Open Antenna SN36CF 144 kg 317.5 lb



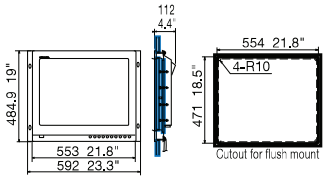
Intelligent Hub HUB-3000 1.5 kg 3.31 lb



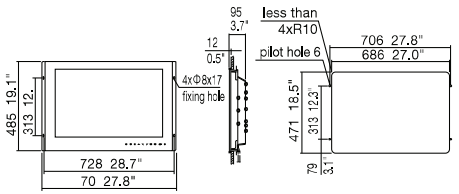
Monitor Unit MU-190 8.8 kg 19.4 lb



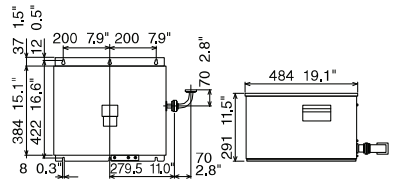
Monitor Unit MU-231 12.8 kg 28.2 lb



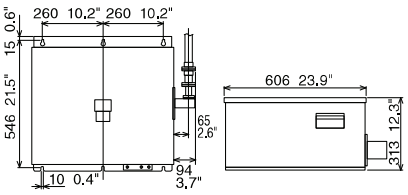
Monitor Unit MU-270W 13 kg 28.7 lb



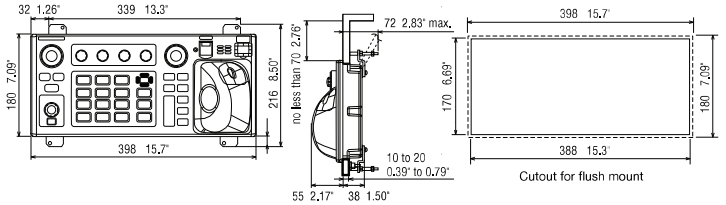
Transceiver Unit RTR-108 17 kg 37.5 lb



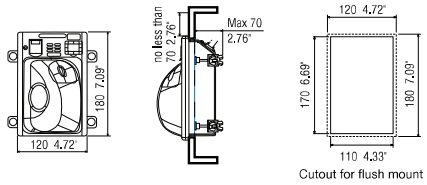
Transceiver Unit RTR-109 22 kg 48.5 lb



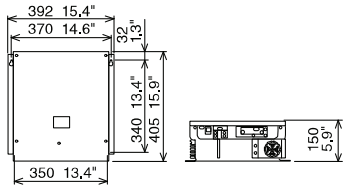
Control Unit RCU-025 3.1 kg 6.84 lb



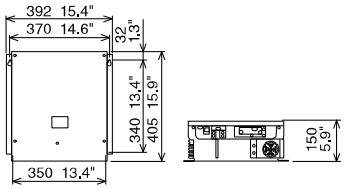
Trackball Control Unit RCU-026 1.5 kg 3.31 lb



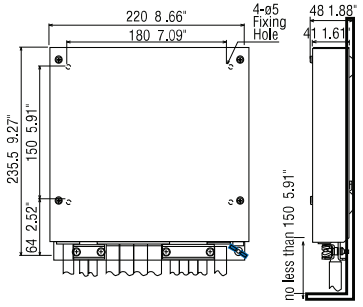
Power Supply Unit PSU-014/016 8.5 kg 18.7 lb



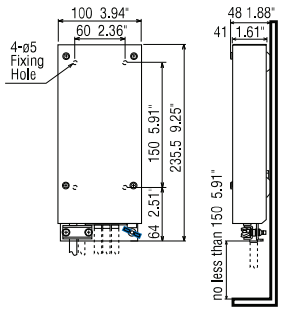
Power Supply Unit PSU-015/018 10 kg 22 lb



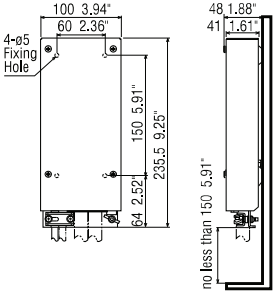
Sensor Adapter (Serial)
MC-3000S 1.5 kg 3.3 lb



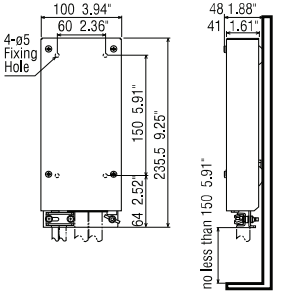
Sensor Adapter (Analog)
MC-3010A 0.8 kg 1.8 lb



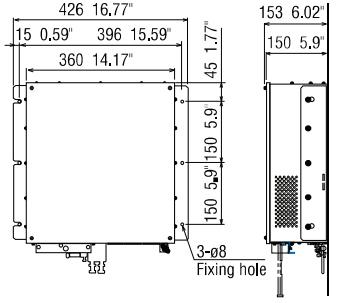
Sensor Adapter (Digital IN)
MC-3020D 0.8 kg 1.8 lb



Sensor Adapter (Digital OUT)
MC-3030D 0.8 kg 1.8 lb



Processor Unit EC-3000 14 kg 30.9 lb



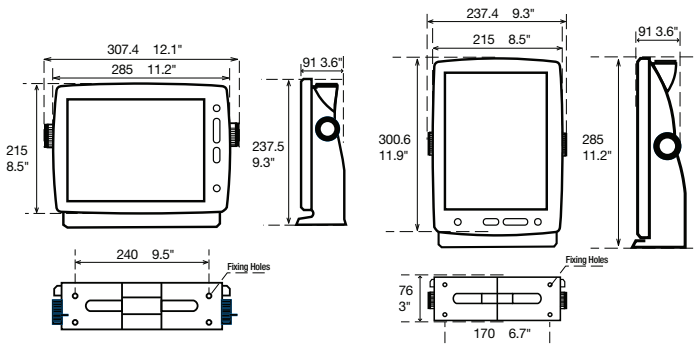
10.4" / 12.1" FLEX Function Display			
MODEL		**SFD-1010**	**SFD-1012**
DISPLAY UNIT			
Screen Size		10.4" Color LCD	12.1" Color LCD
Screen Resolution		1024 x 768 (XGA)	
Brilliance		800 cd/m²	
Viewing Angle		80°(minimum)	
Navigation Data		Date, Time, Course, Own Ship's position, Bearing, COG/SOG, Bow direction	
Weather Information		AWA, AWS, TWA, TWD, TWS, Air pressure, Water depth	
Languages		English, Japanese	
RADAR FUNCTIONS			
Orientation mode		Orientation mode Head-up, North-up, Course-up	
Trail Length		15/30 sec, 1/3/6/15/30 min or continuous	
ARPA Targets		0-30	
FISH FINDER FUNCTIONS			
Color Display		Depends on the external Fish Finder in use	
Display Mode		Display mode Single Frequency, Dual Frequency, Zoom, A-Scope	
Expansion Mode		Bottom-lock expansion, Bottom zoom	
MULTIBEAM SONAR FUNCTIONS (when connected to DFF-3D)			
Display Mode		Multibeam Fish Finder, Side-scan, 3D history	
Depth Range		1200 m max. (4000 ft, 650 fm, 800 HR, 750 pb)	
Adjustment		Display, Brilliance, Diagnosis	
INTERFACE			
Number of Ports	Serial	2 Ports, NMEA0183	
	LAN	1 Port, Ethernet 100Base-TX, RJ45	
	USB	1 Port, USB2.0 (Type A), for maintenance	
	NMEA2000	1 Port	
	HDMI Output	1 Port, 1280 x 720 (HD)	
Data Sentences	Input	GGA, GNS, HDG, HDT, MDA. MWV, RMA, RMB, RMC, THS, TLL, VHW, VTG, WPT, ZDA	
	Output	TLL	
POWER SUPPLY			
		12-24 VDC: 3.0-1.5 A	
ENVIRONMENTAL CONDITIONS			
Temperature		-15°C~+55°C	
Humidity		93%	
Protection		IP25	
Vibration		IEC60945 Ed. 4	

Drawings

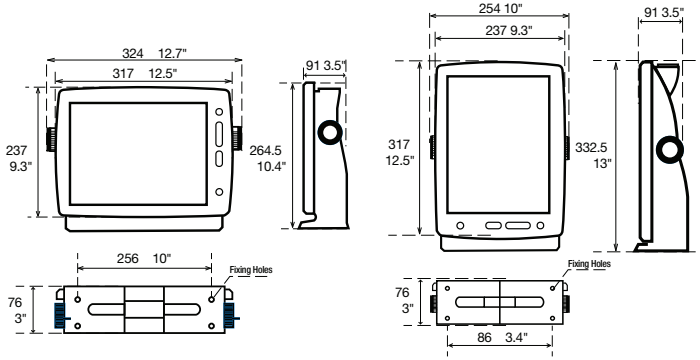
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

SFD-1010 / SFD-1012

SFD1010 2.4 kg 5.3 lbs



SFD1012 2.6 kg 5.7 lbs



4.2" GPS Navigator		
MODEL		**GP-39**
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	-

5.7" GPS DGPS Navigator		
MODEL		**GP-170**
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		**GP-1871F**	**GP-1971F**
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), or Navionics Platinum+ (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 1280 x 720 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, 1.1 - 0.6 A

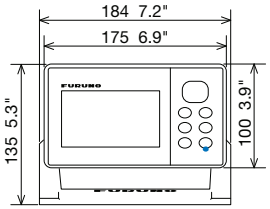
		12.1" Chart Plotter	12.1" Chart Plotter/Fish Finder
MODEL		**GP-3700**	**GP-3700F**
GPS/WAAS			
Receive Type	GPS	12 channels	
	WAAS/SBAS	2 channels	
Receiving Frequency		L1 (1575.42 MHz)	
Time to First Fix		90 s approx. (cold start)	
Tracking Velocity		999 kn	
SBAS (Satellite-Based Augmentation System)		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

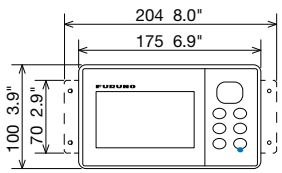
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

GP-39

Display Unit (Bracket Mount) 0.39 kg 0.86 lb

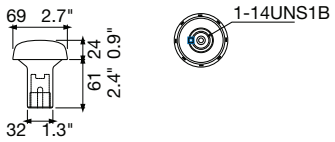


Display Unit (Flush Mount) 0.36 kg 0.79 lb

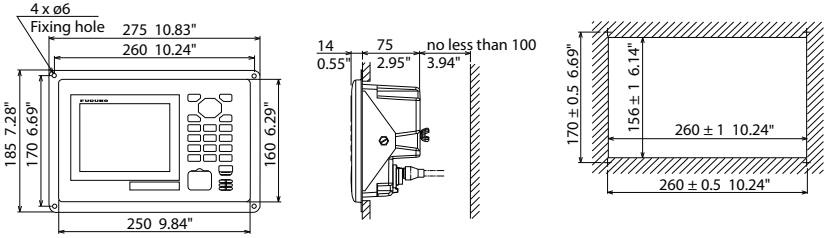


GP-170

GPS Antenna GPA017S 0.6 kg 1.3 lb

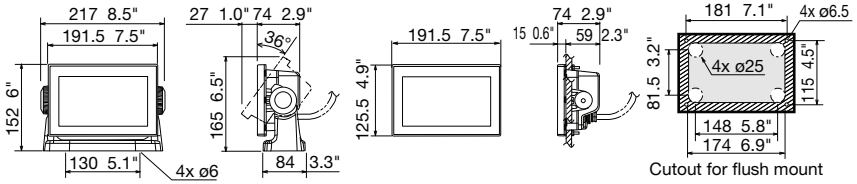


Display Unit (with optional flush mount kit) 2.2 kg 4.9 lb (without DGPS beacon receiver)
2.4 kg 5.29 lb (with DGPS beacon receiver)



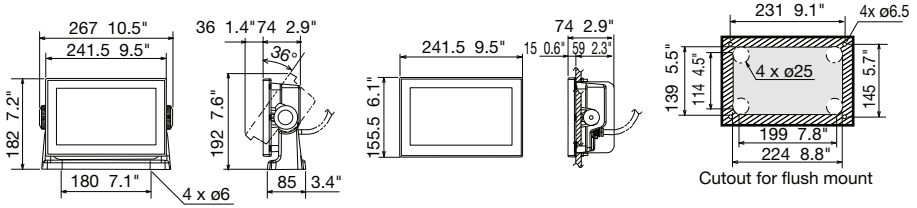
GP-1871F

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



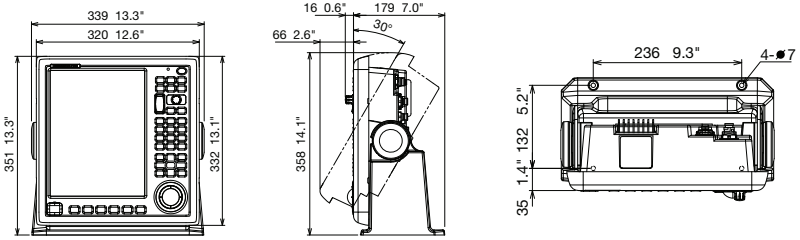
GP-1971F

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



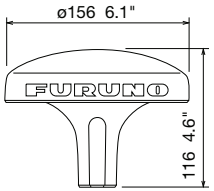
GP-3700/3700F

Display Unit (Bracket Mount) 4.8 kg 10.6 lb



DGPS Antenna

GPA021S 0.52 kg 1.15 lb



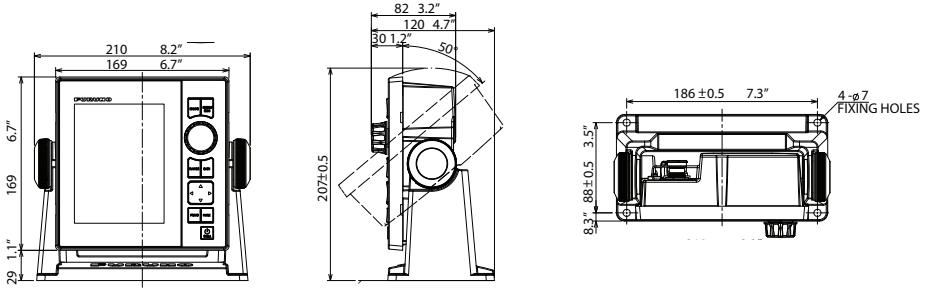
		5.7" Fish Finder	8.4" Fish Finder	10.4" LCD Fish Finder	12.1" LCD Fish Finder
MODEL		**FCV-600**	**FCV-800**	**FCV-295**	**FCV-1150**
GENERAL					
Frequency		50/200 kHz or 40 - 225 kHz	50/200 kHz and 40 - 225 kHz	The synthesized transducer works with frequencies in 28 to 200 kHz	
Transducer		300 W / 600 W	300 W/1 kW* / 600 W/1kW*	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	SVGA 600 x 800 pixels	640 x 480	800 × 600
Display Mode		Single frequency (50 or 200 kHz), TruEcho CHIRP™: 40kHz to 240 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, x8		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	
NMEA2000	Input	059392, 059904, 060160, 060416, 060928, 061184, 065240, 065280, 126208, 126720, 126996, 127250, 127252, 127257, 128259, 129025, 129026, 129029, 129283, 129284, 130306, 130310, 130311, 130312, 130314, 130316, 130577, 130821			
	Output	059392, 059904, 060928, 061184, 126208, 126464, 126720, 126993, 126996, 126998, 128259, 128267, 130310, 130312, 130316, 130821, 130822, 130830, 130831, 130832			
Interface (IEC61162-1, NMEA0183 Ver 1.0/2.0/3.0)	Input	BWC, GGA, GLL, GNS, HDG, HDT, MDA, MTW, MWV, RMA, RMB, RMC, THS, 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: 1.0-0.6 A	12-24 VDC: 1.6-0.8 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

Drawings

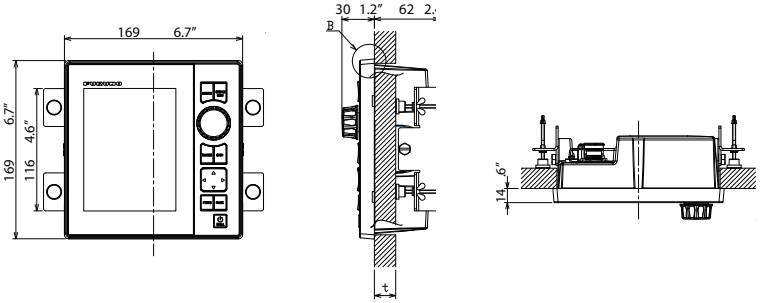
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FCV-600

Display Unit
(Bracket Mount) 1.3 kg 2.9 lb

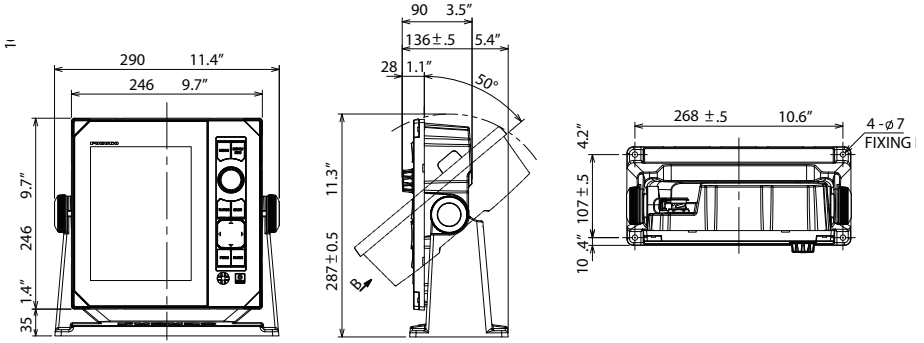


Display Unit
(Flush Mount) 1.1 kg 2.4 lb

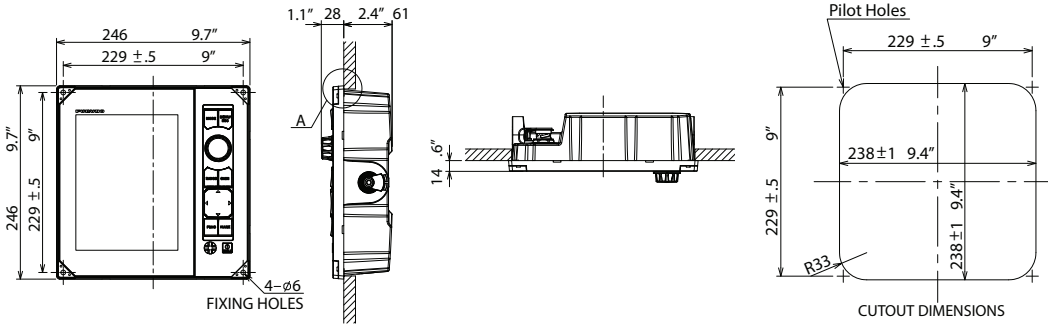


FCV-800

Display Unit
(Bracket Mount) 2.4 kg 5.3 lb

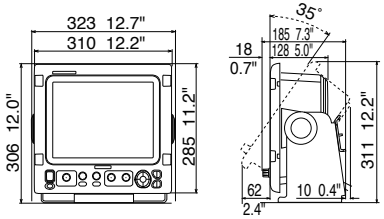


Display Unit
(Flush Mount) 1.9 kg 4.2 lb



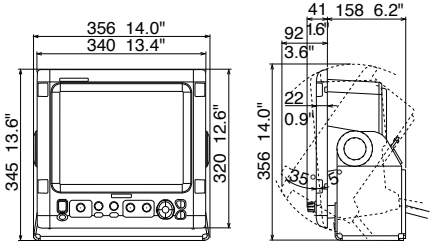
FCV-295

Display Unit
Flush Mount) 7.0 kg 15.4 lb

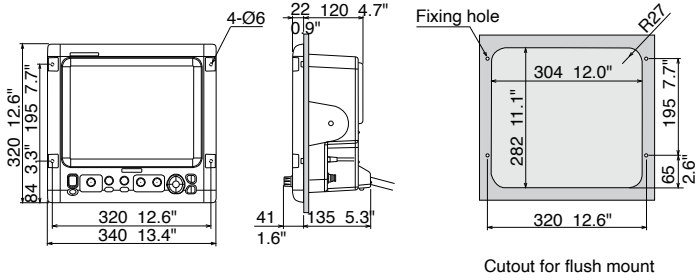


FCV-1150

Display Unit
(Bracket Mount) 8.2 kg 18.1 lb



Display Unit
(Flush Mount) 6.8 kg 15 lb



Cutout for flush mount

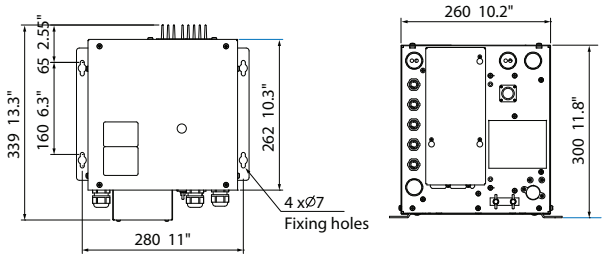
		Fish Finder	Hi-Resolution TruEcho CHIRP™ Fish Finder	TruEcho CHIRP™ with unique Fish Size Indicator
MODEL		**FCV-1900**	**FCV-1900B**	**FCV-1900G**
GENERAL				
Frequency		The synthesized transducer works with frequencies in 15 to 200 kHz		
Transducer		1, 2 or 3 kW		
DISPLAY (Processor unit)				
Display 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		
(NMEA0183 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

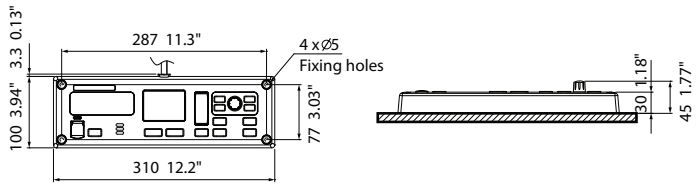
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FCV-1900

Processor Unit FCV-1901 — 10.2 kg 22.5 lb



Control Unit FCV-1902 — 1.1 kg 2.4 lb



TRANSDUCER LIST						STAND ALONE			
Sensor Type	Frequency	Type	Matching Box Required	Mount	Power Rating	FCV-800	FVC-600	GP-1871F/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

TRANSDUCERS for FCV-295/FCV-1150/FCV-1900/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 FCV-1900B/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 DFF-3D (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 DFF-3D & BBDS1/DFF-3D & 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 GP-1871F/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

		12.1" Searchlight Sonar	12.1" Dual Frequency Searchlight Sonar
MODEL		**CH-500**	**CH-600**
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		**CSH-5L MARK-2**	**CSH-8L MARK-2**	**CSH-10**
GENERAL				
Frequency		55 kHz or 68 kHz	85 kHz	83.5 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		Scan/Echo: 32 colors, Mark: 6 color
Mark		Own ship's track, Heading line, Direction/distance, Fish school, Event, Target lock		Own ship, Bow Line, Direction/Distance, Event, Fish School, Electronic Direction Scale, Wake, Tide Scan (direction, distance), Cursor Position (distance, depth, direction), Ship Speed Event, target Lock
Range Scale		50, 85, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 800, 1000, 1200, 1600 m		50, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1400, 1600, 2000 m
Pulselength		0.5 to 20 ms (depending on range scales)		
Ship Speed		18 kn MAX (raise/lower operation up to 16 kn)		20 kn MAX (raise/lower operation up to 18 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	Frequency 1 kHz
	Sector	20°, 40°, 80°, and 120° selectable		-
Language		English, Spanish, Danish, Dutch, French, Italian, Norwegian, Thai, Vietnamese, Burmese, Indonesian, Japanese		
INTERFACE				
NMEA0183 (Ver 1.5/2.0/2.2)		2 ports		5 Ports (Ver 1.5/2.0/3.0/4.0/4.1)
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		CUR, DBS, DBT, DPT, GGA, GNS, HDG, HDM, HDT, MDA, MTW, RMC, VBW*, VDR, VHW, VTG, ZDA Forward/Backward/Left/Right boat speed required
	Output	TLL (external data required)		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		External KP: 1 ch, current loop or contact enclosure input: 5-15 V, output 12 volt, 1 ch. VI-1100A
Video Signal Output	Method	RGB analog, separated synchronization, XGA (VESA)		HDMI, XGA / SXGA - 2 channel
	Resolution	1024 x 768 pixels, 65 MHz clock		1280 x 1024
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		400 mm: 7s, 600 mm: 10s
Allowable Ship's Speed		18 kn max. (16 kn during raise/lower operation)		20 kn MAX. (raise/lower operation up to 18 kn)
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	DC 24 V, 4.0-2.0 A

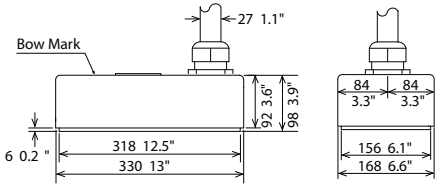
WASSP Multibeam Sonar	
MODEL	**S3, S3PR, F3/160, F3X/160, F3X/80, W3, WMBW3P-160E**
GENERAL	
Transmission Frequency	S3, F3, and F3X: 160 kHz, 90-190 kHz/F3XL: 80 kHz/W3: 90-190 kHz
Effective Beam Width	F3/F3X: 200 m, F3XL: 450 m
Beam Spacing	FA: 3.2°
Beam Width	120° x 4° (Athwartships x Fore-aft), PS: 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, Side-scan, 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

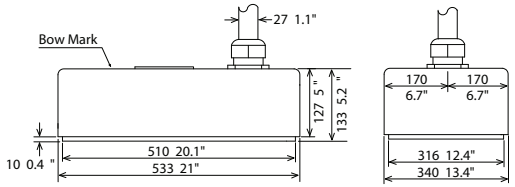
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

S3 / S3PR / F3/160 / F3X/160 / F3X/80 / W3

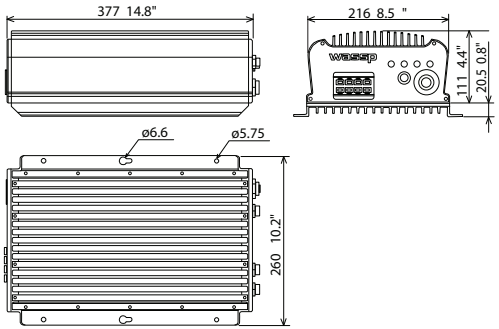
Transducer
(G3: 160 kHz) WMB-160 15 kg 33.1 lb (cable dependent)



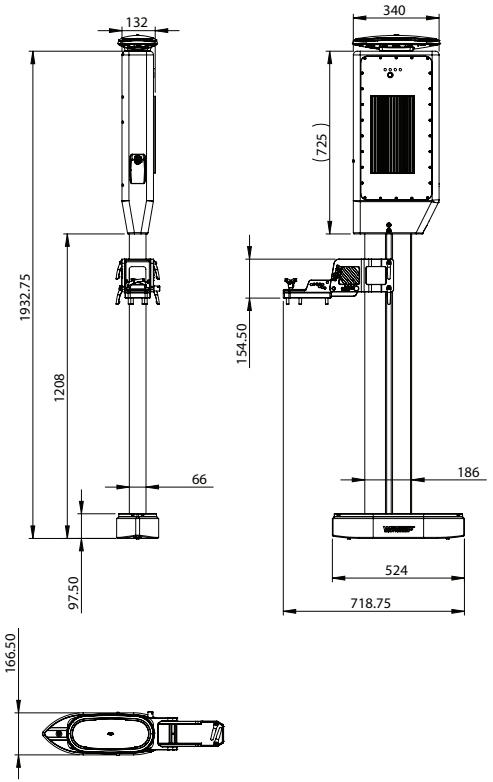
Transducer
(G3: 80 kHz) WMB-80 39 kg 86.0 lb (cable dependent)



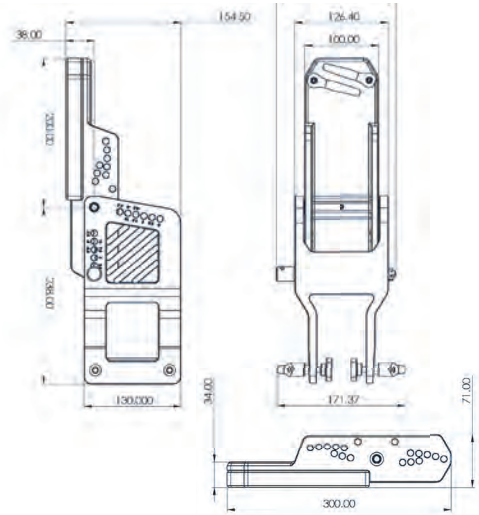
Transceiver Unit DRS (F3 DRX) 8.3 kg 18.3 lb



WMBW3P-160E Assembly

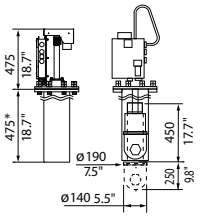


WMBW3P-160E Bracket

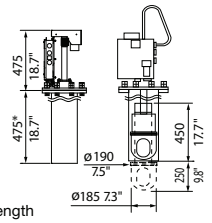


CH-500/CH-600

6" Type Hull Unit (250mm travel)
CH-505 (180 kHz) 33 kg 73 lb

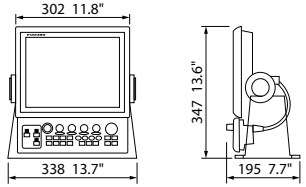


8" Type Hull Unit (250mm travel)
CH-505 40 kg 88 lb

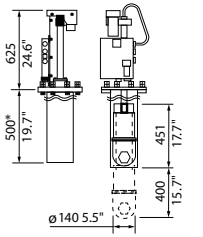


*Minimum Length

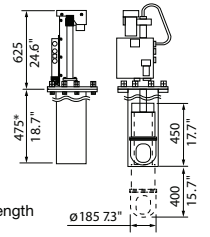
Display/Control Unit 4.0 kg 9.0 lb



6" Type Hull Unit (400mm travel)
CH-504 34 kg 75 lb

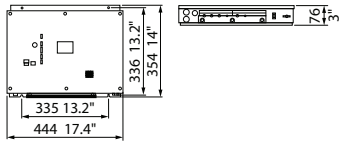


8" Type Hull Unit (400mm travel)
CH-504 41 kg 90 lb

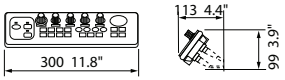


*Minimum Length

Transceiver Unit CH-503 3.3 kg 7.2 lb

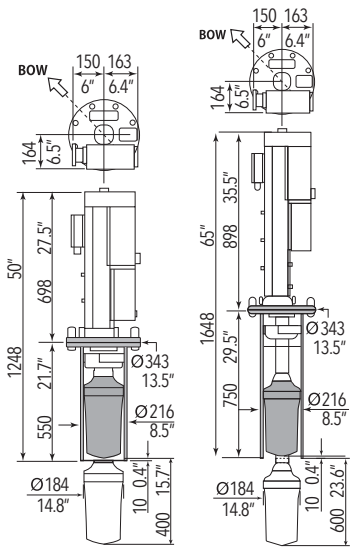


Control Unit CH-502/602 1.0 kg 2.2 lb

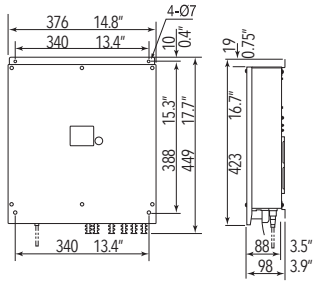


CSH-10

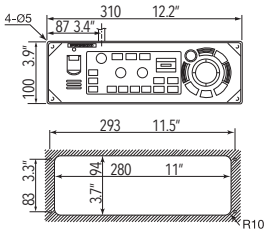
Hull Unit CSH-1040 (400 mm travel) 81 kg 178.6 lb
Hull Unit CSH-1041 (600 mm travel) 87 kg 191.8 lb



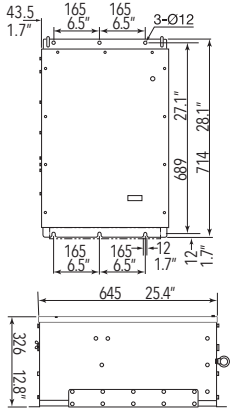
Processor Unit
CSH-1003 7.6 kg 16.8 lb



Control Unit SCU-002
5 m cable 1.2 kg 2.6 lb
10 m cable 1.7 kg 3.7 lb

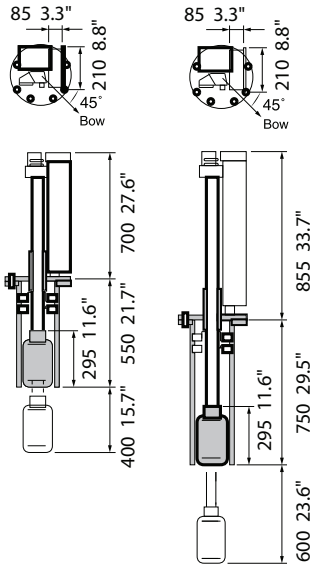


Transceiver Unit
CSH-101 37kg 81.6 lb

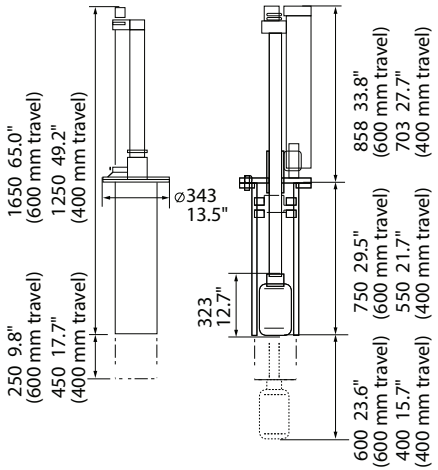


CSH-5L MARK-2/CSH-8L MARK-2

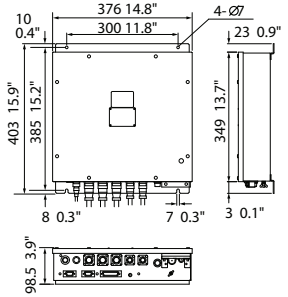
Hull Unit (400mm travel) CSH-5041-A 70 kg 154 lb
Hull Unit (600 mm travel) CSH-5040-A 75 kg 165 lb



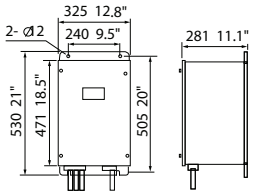
Hull Unit (400mm travel) CSH-8041-A 81 kg 178 lb
Hull Unit (600 mm travel) CSH-8040-A 82 kg 180.8 lb



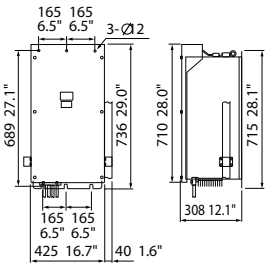
Processor Unit
CSH-5210-A 3.4 kg 7.5 lb



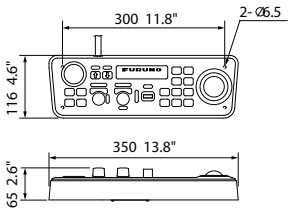
Transceiver Unit
CSH-5130A-5L 20 kg 44.1 lb



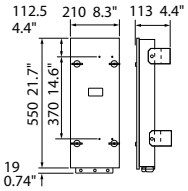
Transceiver Unit
CSH-8030A-8L 37 kg 81.6 lb



Control Unit
CSH-5211-A 3.5 kg 7.7 lb



Preamplifier
CSH-5020-A 6.5 kg 14.3 lb



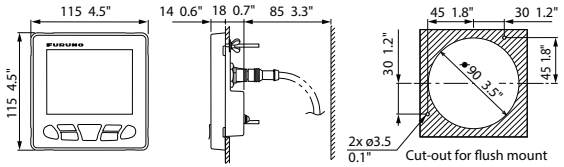
Autopilot		
MODEL		**NAVpilot-300**
CONTROL UNIT		
Type		Color LCD
Screen Size		4.1"
Effective Display Area		82.6 (W) x 61.9 (H) mm
Screen Resolution		320 x 240 dots (QVGA)
Screen Brightness		700 cd/m2 typical
Screen Contrast		8 steps
PROCESSOR UNIT		
Steering Mode		STBY, Auto, Dodge, NFU (Non-follow up), Turn, Advanced auto*, SABIKI™, Navigation*, FishHunter™, 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 NMEA2000		LEN 2
Processor Unit Non-NMEA2000		12-24 VDC, 0.22 A max.
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 TZtouchXL series – TZT10X/13X/16X/22X/24X – NavNet TZtouch3 series – TZT9F/12F/16F/19F 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

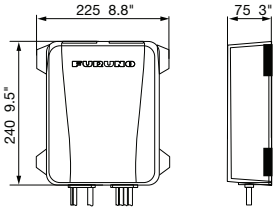
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

NAVpilot-300

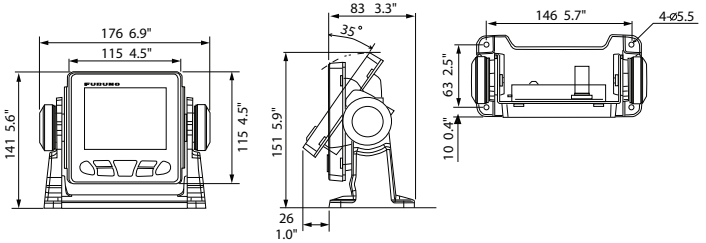
Control Unit FAP-3011 (Flush Mount) 0.22 kg 0.48 lb



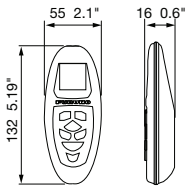
Processor Unit FAP-7002 1.5 kg 3.3 lb



Control Unit FAP-3011 (Bracket Mount) 0.43 kg 0.95 lb



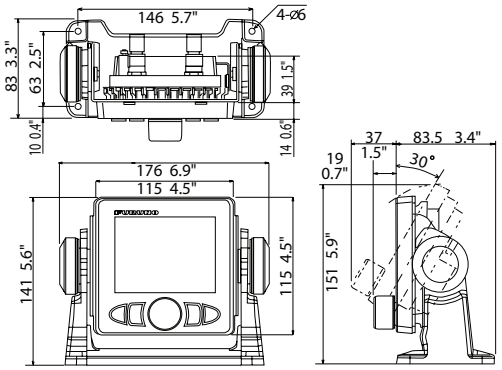
Gesture Controller GC-001 0.12 kg 0.26 lb



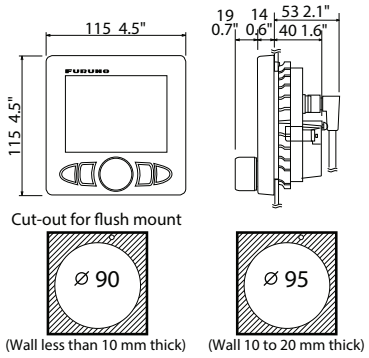
Autopilot			
MODEL		**NAVpilot-711C**	**NAVpilot-1000**
CONTROL UNIT			
Type		Color LCD	Color LCD
Screen Size		4.1"	5.7"
Effective Display Area		82.6 (W) x 61.9 (H) mm	120 (W) x 87 (H) mm
Screen Resolution		320 x 240 dots	640 x 480 dots (VGA)
Screen Backlight		8 steps	8 steps
PROCESSOR UNIT			
Steering mode		STBY, Auto, Dodge (FU, NFU, Course), Turn, Remote, Advanced auto*, SABIKI™**, Navigation*, Wind*, FishHunter™* * external data required. ** NAVpilot-711C only	STBY, AUTO, Advanced AUTO, NAV+1 (Standard/Precision), FU-RC+2, NFU-RC+1+2, FU-KEY+2, NFU-KEY+2, DISENGAGED (FU/NFU: Follow-Up/Non-Follow-UP, RC/KEY: remote/keyboard control) +1:Non-IMO mode only, +2: Available only when the RRU is installed
Sea Condition Adjustment		Auto/Manual-Calm/Moderate/Rough	
Rudder Angle Settings		10 - 45 deg	±45 deg
Alarm		Heading deviation, Cross-track error*, Ship's speed*, Depth*, Water temperature*, Wind*, Watch, Log trip* * external data required	Heading monitor, Watch, Off heading
INTERFACE			
Ports		NMEA2000: 1, NMEA0183: 2	NMEA2000: 1, NMEA0183: 4, IEC61162-450: 1
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	AAM, ACN (ACM), APB, BOD, BWC, BWR, GGA, GLL, GNS, HBT, HCR, HDG, HDM, HDT, MWV, RMB, RMC, ROT, THS, VBW, 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, 130306/310/311/312/313/314/577/818/821/827/880	059392/904, 060160/416/928, 061184, 065240/283/284, 126208/464/720/992/996, 127250/258/259, 129025/026/029/033/283/284/285/538, 130306/577/816/818/827/841
Output	NMEA0183	DBT, DPT, GGA, GLL, GNS, HDG, HDM, HDT, MTW, MWV, RMB, RMC, ROT, RSA, VHW, VTG, VWR, VWT, ZDA	ALC, ALF, ALR, ARC, EVE, GGA*, GLL*, GNS*, HBT, HDG*, HDM*, HDT*, HTD, RMB*, RMC*, ROT*, RSA, THS*, VBW*, VHW*, VTG*, ZDA* * for Non-IMO type
	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	059392/904, 060928, 061184, 126208/464/720/993/996/998, 127245/237, 130816/822/823/827/841
ENVIRONMENT			
Temperature		-15° C to +55° C	
Waterproofing	Processor unit	IP20	IP22
	Other unit	IP56	IP22
POWER SUPPLY			
Non-NMEA2000		12-24 VDC: 4.0 - 2.0 A (excluding pump)	12-24 VDC (10.8-31.2 V): 4.0-2.0 A (control unit: 3 units)
NMEA2000		LEN 1	LEN 1

NAVpilot-711C

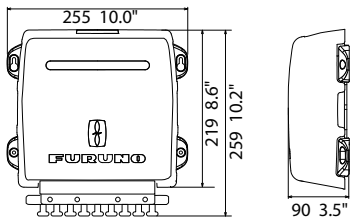
Control Unit
FAP-7011C (Table Mount) 0.39 kg 0.9 lb



Control Unit
FAP-7011C (Surface Mount) 0.33 kg 0.7 lb

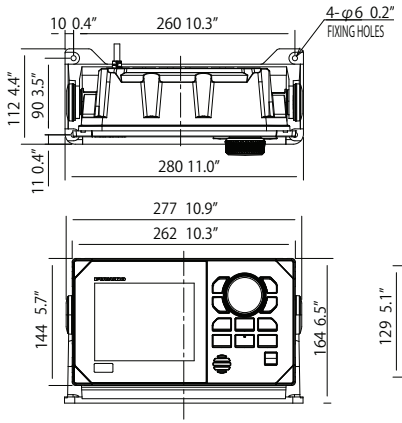


Processor Unit FAP-7002 1.9 kg 4.2 lb

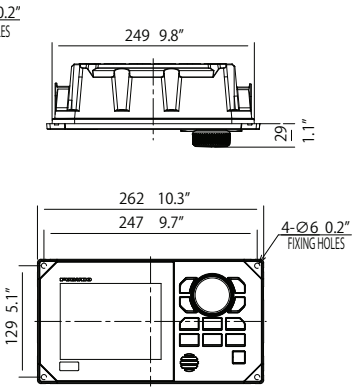


NAVpilot 1000

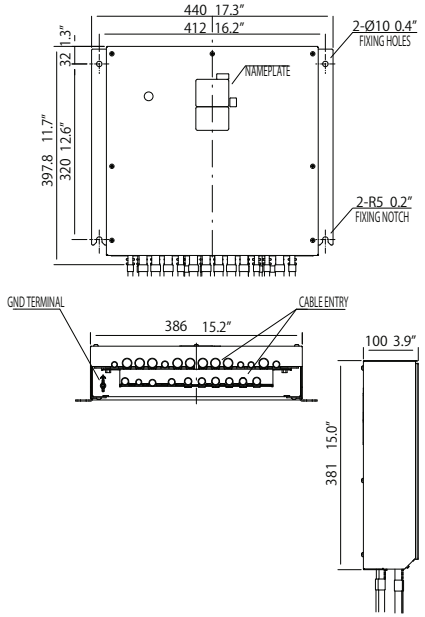
Control Unit
FAP-10001 (Table Mount) 1.2 kg 2.65 lb



Control Unit
FAP-10001 (Surface Mount) 0.95 kg 2.09 lb



Processor Unit
FAP-10002 6.0 kg 13.22 lb



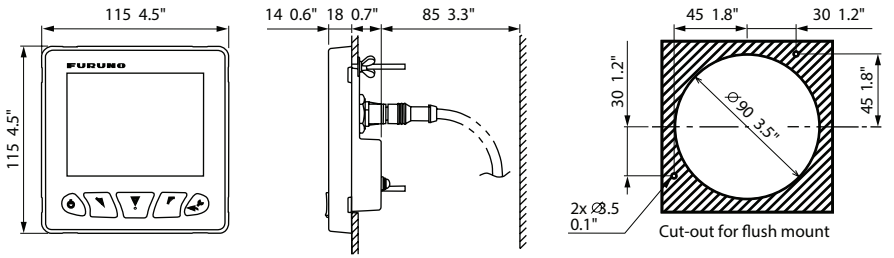
Instrument/Data Organizers	
MODEL	**FI-70**
GENERAL	
Type	4.1" Color LCD
Screen Resolution	QVGA (320 x 240)
Brightness	Typical 700 cd/m2
Display Mode	Analog meter, Graph, Highway, Race timer, Simple AIS, Data box
Language	English, French, Spanish, German, Italian, Portuguese, Swedish, Danish, Norwegian, 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

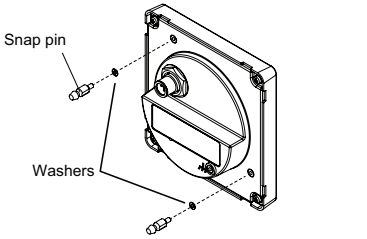
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FI-70

Control Unit — 0.22 kg 0.48 lb



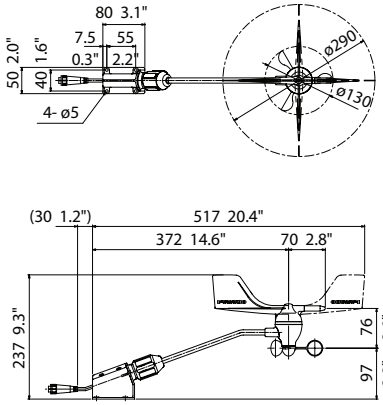
Front Mount (optional installation kit required)



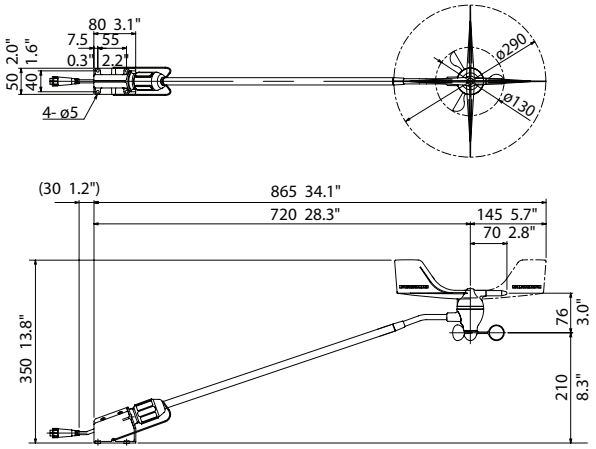
Electronic Navigation Instruments					
	FI-5001 Wind Transducer	FI-5001L (Long Shaft) Wind Transducer	DST-810 Depth/Speed/Temp sensor	FI-5002 Junction Box	IF-NMEAFI Analog NMEA Data Converter
GENERAL					
Info:	Power supply: 12 VDC, less than 40 mA Transducer cable: 30/50 m		Frequency: 235 kHz Cable: 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 (FI-5001or FI-5001L) Speed/Temperature sensor (ST-02PSB or ST-02MSB) Power supply: 15 VDC, less than 200 mA

FI-5001

Wind Transducer FI-5001 (option) 0.3 kg 0.7 lb

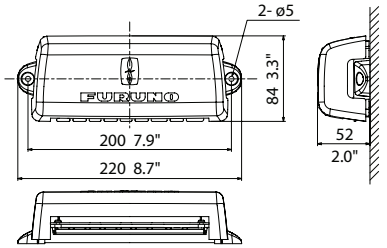


Wind Transducer FI-5001L Long Shaft (option) 0.4 kg 0.9 lb



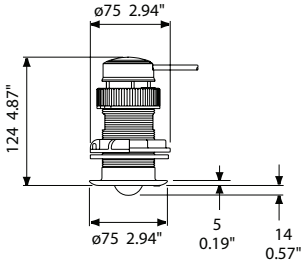
FI-5002

Junction Box FI-5002 (option) 0.3 kg 0.7 lb



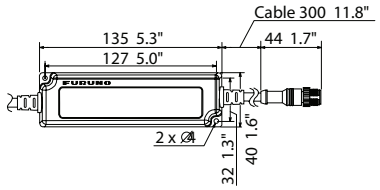
DST-810

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



IF-NMEAFI

Analog NMEA Data Converter (option) 0.3 kg 0.7 lb



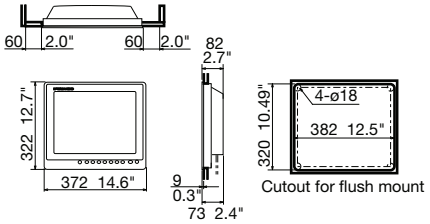
	15" Marine Display	19" Marine Display	27" Marine Display
MODEL	**MU-152HD**	**MU-192HD**	**MU-270W**
DISPLAY CHARACTERISTICS			
Type		19 inches, landscape	27 inches, landscape
Screen Resolution		SXGA (1280 x 1024)	WUXGA (1920 x 1200)
Contrast Ratio (typical)	900: 1	900: 1	1,500: 1
Viewing Angle (typical)			left/right and up/down: 85°
Max Brightness (typical)	1000 cd/m2	1,000 cd/m2	400 cd/m2
Min Brightness (typical)		0.2 cd/m2 or less	
INTERFACE			
Analog RGB (D-SUB/15 pins)			1 port
DVI (DVI-D)		1 port	1 port
Composite Video (NTSC/PAL)		1 port	1 port
Built-in Scaler		1 port (for dimmer control)	SVGA to WUXGA
POWER SUPPLY			
	12-24 VDC, 1.9-0.9 A	12-24 VDC (10.8-31.2 V): 4.9-2.3 A	
ENVIRONMENT (IEC 60945 test method)			
Temperature			
Waterproofing			
EQUIPMENT LIST			
Standard			
Option			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

Drawings

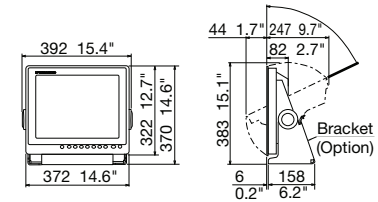
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

MU-152HD

Flush Mount 4.9 kg 10.8 lb

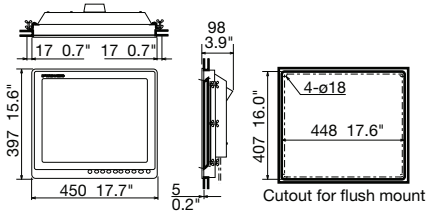


Bracket Mount 6.9 kg 15.2 lb

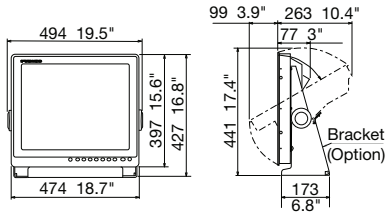


MU-192HD

Flush Mount 12.8 kg 28.2 lb

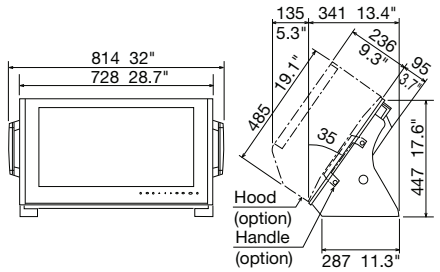


Bracket Mount 18.9 kg 41.7 lb

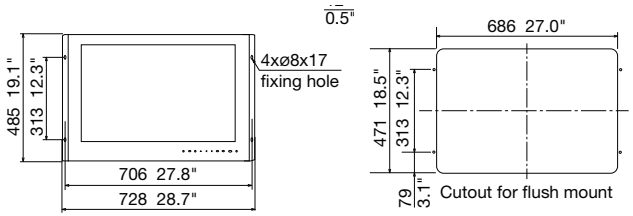


MU-270W

Bracket Mount 21.0 kg 46.3 lb



Flush Mount 13.0 kg 28.7 lb



Remote Display

MODEL	RD-33
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)

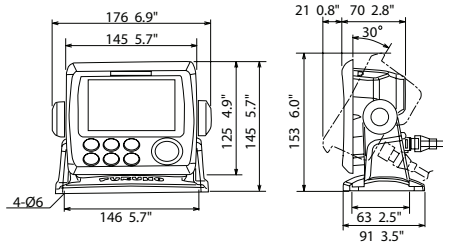
Integrated Heading Sensor

MODEL		PG-500	PG-700
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 through GPS navigator
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)

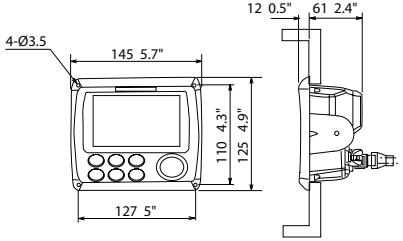
Drawings - RD-33/PG-500/PG-700

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

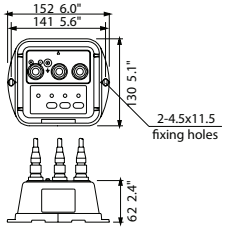
RD-33 Display Unit (Bracket Mount) 0.7 kg 1.54 lb



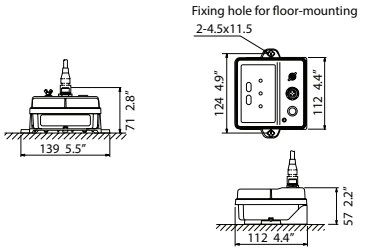
RD-33 Display Unit (Flush Mount) 0.59 kg 1.3 lb



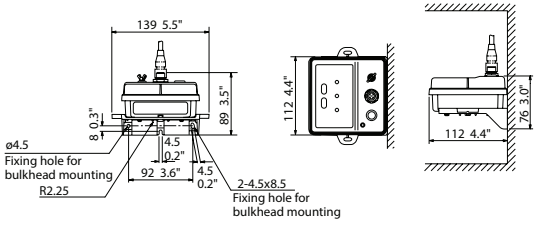
PG-500 0.3 kg 0.7 lb



PG-700 Main Unit (Floor Mount) 0.3 kg 0.7 lb



PG-700 Main Unit (Bulkhead Mount) 0.35 kg 0.77 lb



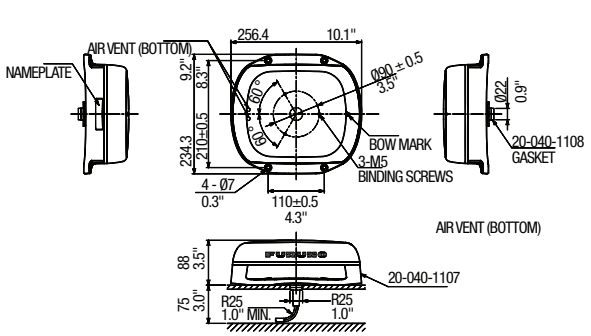
Satellite Compass™			
		SCX-20	SCX-21
GENERAL			
Frequency		1575.42 MHz (GPS/Galileo/QZSS/SBAS), 1602.5625 MHz (GLONASS)	
Tracking Code		C/A (GPS/QZSS/SBAS), E1B (Galileo), 1OF (GLONASS)	
Heading/Roll/Pitch Accuracy		1.0° static, 0.5° dynamic	
Heave Accuracy		5 cm (1σ)	
Follow-up		45°/s rate-of-turn	
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			
		4 LEN @ 9 VDC	12-24 VDC: 0.2-0.1 A

Drawings

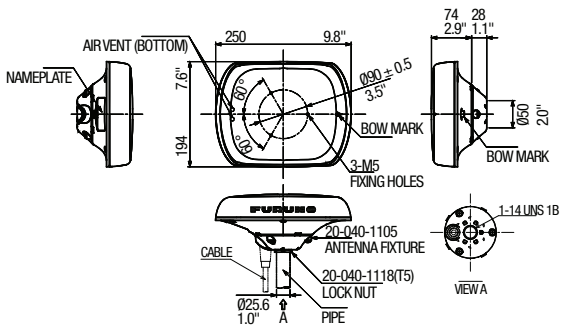
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

SCX-20/21

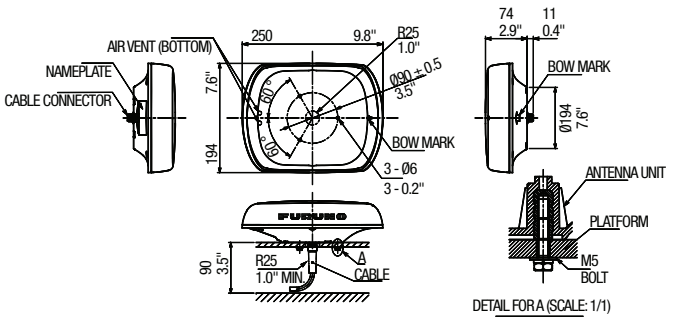
SCX-20 Sensor Unit (Roof Mount) 2.2 kg 4.9 lb



SCX-20/21 Sensor Unit (Pole Mount) 1.2 kg 2.64 lb



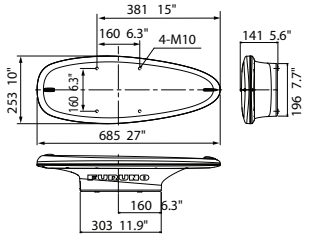
SCX-20 Sensor Unit (No Mount) 1.0 kg 2.2 lb



Satellite Compass™				
MODEL		**SC-33**	**SC-70**	**SC-130**
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)	

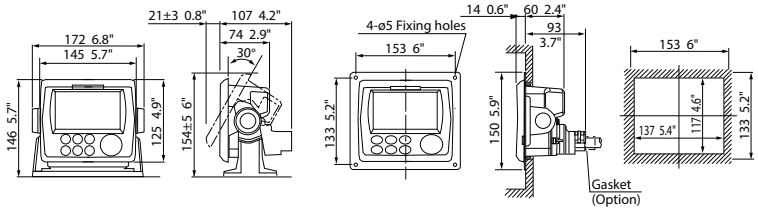
SC-33

Sensor Unit 2.5 kg 5.5 lb

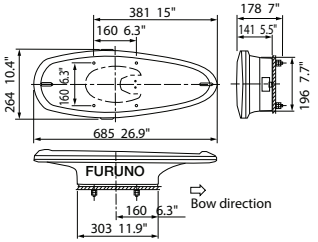


SC-70/130

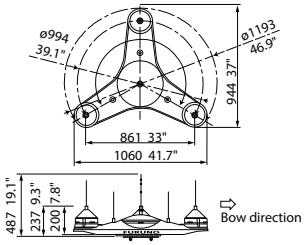
SC-70/130 Display Unit 0.7 kg 1.5 lb



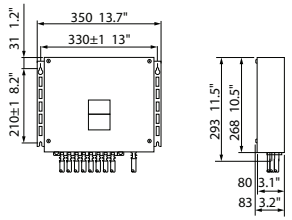
SC-70 Sensor Unit 2.8 kg 6.17 lb



SC-130 Sensor Unit 7.1 kg 15.6 lb



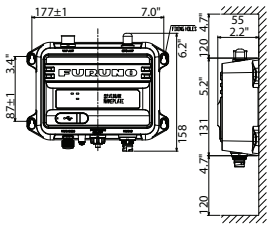
SC-70/130 Junction Box 2.9 kg 6.39 lb



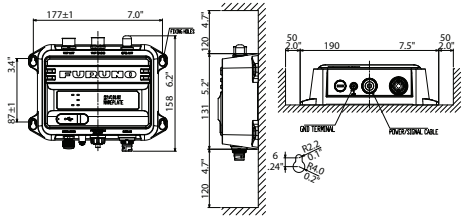
		AIS Receiver	Class-B+ AIS Transceiver	U-AIS Transponder
MODEL		**FA-40**	**FA-70**	**FA-170**
STANDARDS				
		IEC 60945 Ed.4 IMO MSC.140 (76) ITU-R M.1371-5, EN 303 413 V1.1.1 EN 301 843-1 V2.2.1 IEC 60945 Ed.4+CORR.1, IEC 62368-1 Ed.3	IMO MSC.140 (76) ITU-R M.1371-5, DSC: ITU-R M.825-3 IEC 62287-1 Ed.3.0, 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, PIWWI-VD, 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.

FA-40/70

Receiver Unit
FA-40 — 0.45 kg 1.0 lb

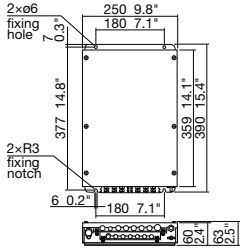


Transceiver Unit
FA-70 — 0.5 kg 1.1 lb

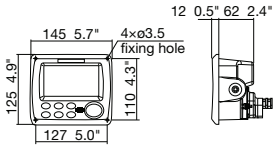


FA-170

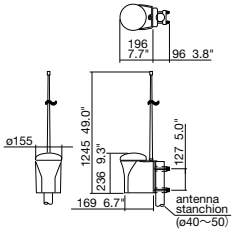
Transponder Unit
FA-1701 — 3.0 kg 6.6 lb



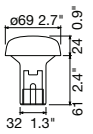
Display Unit
FA-1701 — 0.6 kg 1.3 lb



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



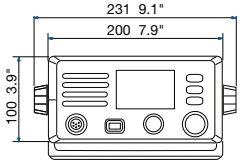
GPS Antenna
GPA017S — 0.15 kg 0.3 lb

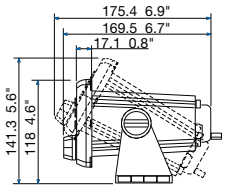


Marine VHF Radiotelephone		
MODEL		**FM-4800/4850**
GENERAL CHARACTERISTICS		
Frequency Range		TX: 156.025 to 162.000 MHz, RX: 155.500 to 163.275 MHz
Communication System		Simplex/Semi-duplex
Modulation		16K0G3E (F3E) Voice, 16K0G2B (F2B) DSC
Display		Monochrome, 192 x 128 dot (FM-4800 / HS-4800 only)
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.

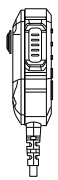
Drawings - FM-4800/4850 *Refer to Online manual for more details. For illustration purposes only; not drawn to scale.*

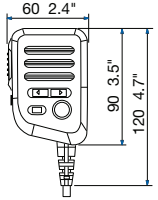
Transcribe Transceiver Unit FM-4800 1.7 kg 3.8 lb

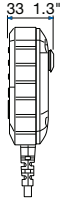




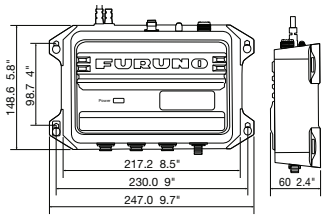
Microphone MIC-4800 (FM-4800 only) 0.25 kg 0.56 lb



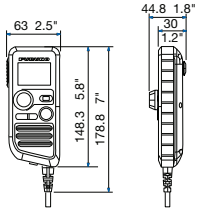




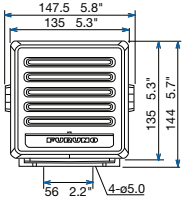
Transceiver Unit FM-4850 1.75 kg 3.85 lb

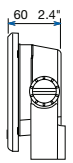


Handset HS-4800 (option) 0.3 kg 0.66 lb



Speaker SP-4800 (option) 0.76 kg 1.69 lb

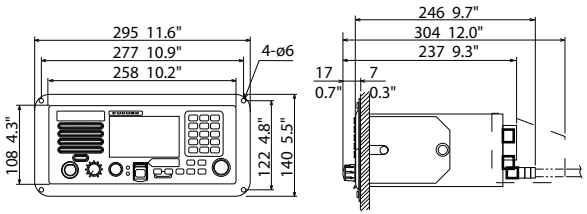




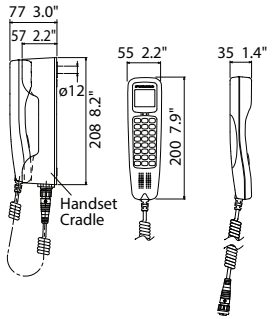
VHF Radiotelephone		
MODEL		**FM-8900S**
GENERAL CHARACTERISTICS		
Class of Emission		G3E (Radiotelephone), G2B (DSC)
Communication System		Simplex/Semi-duplex
Channels		All VHF channels according to ITU-R Radio Regulations Appendix 18, All channels in FCC Part 80, Max 20 Private channels where permitted 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.)

FM-8900S

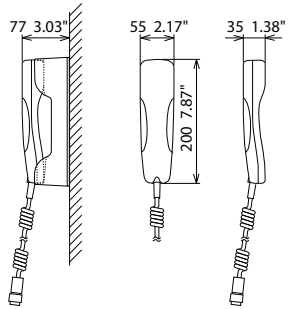
Transceiver Unit (Flush Mount) 4.2 kg 9.3 lb



Remote Station RB-8900 0.7 kg 1.5 lb



Handset HS-2003 0.2 kg 0.4 lb



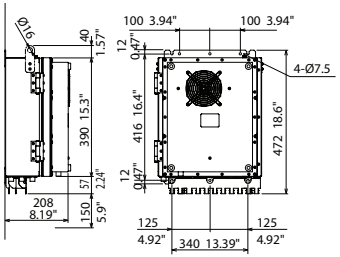
MF/HF Radiotelephone			
MODEL		**FS-1575**	**FS-2575**
GENERAL			
Frequency Range	TX	1.6 to 27.5 MHz (100Hz Steps)	
	RX	0.1 to 29.9 MHz (10Hz Steps)	
Channels		256 user-specified channels plus ITU, SSB/TELEX channels	
Rules and Regulations		ITU-R M. 1082-1, ITU-R M. 1173-1, ITU-R M. 476-5, ITU-R M. 490, 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

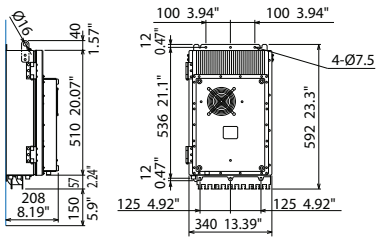
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FS-1575/2575

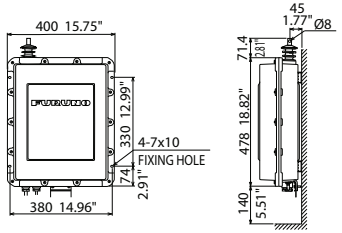
Transceiver Unit
FS-1575T 16 kg 35.2 lb



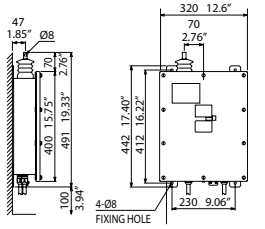
Transceiver Unit
FS-2575T 20 kg 44.1 lb



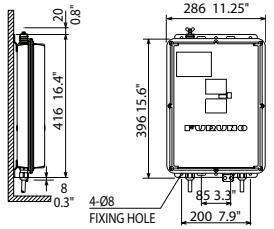
Antenna Coupler
AT-5075 9.2 kg 20.1 lb



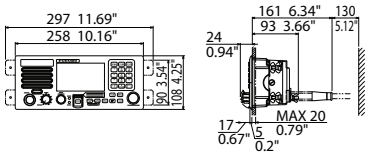
Antenna Coupler
AT1575-SUS 8.8 kg 19.4 lb



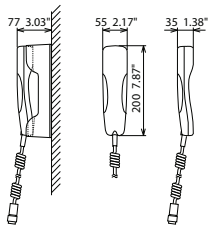
Antenna Coupler
AT1575-AES 2.6 kg 5.7 lb



Controller Unit
FS-2575C 1.8 kg 4.0 lb



Headset
HS-2003 0.5 kg 1.2 lb

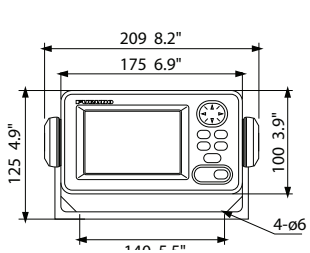


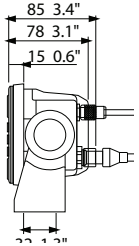
NAVTEX Receiver		
MODEL		**NX-300**
NAVTEX RECEIVER		
Receiving Frequency		518 kHz or 490 kHz
Mode of Reception		F1B
Sensitivity		2μ V e.m.f. (50 ohms), 4% error rate
Message Category		A: Navigational warning B: Meteorological warning C: Ice report D: Search and rescue information/piracy and armed robbery 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	**LH-5000**
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

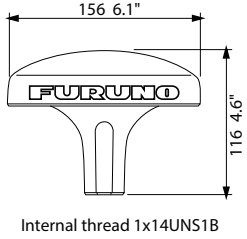
NX-300

Display Unit NX-300 0.68 kg 1.5 lb





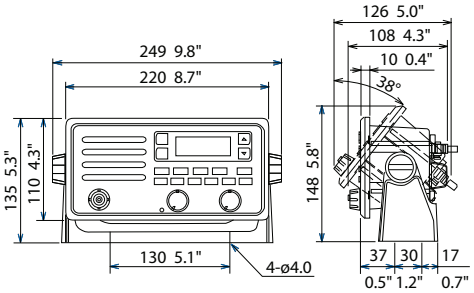
Antenna Unit NX3H-D 0.9 kg 2.0 lb



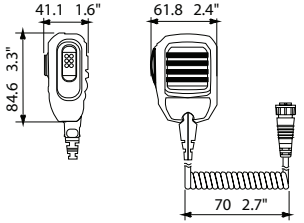
Internal thread 1x14UNS1B

LH-5000

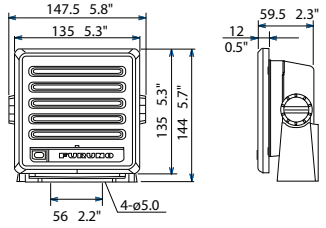
Loud Hailer 1.61 kg 3.5 lb



Microphone MIC-5000 1.61 kg 3.5 lb



Intercom Speaker (option) 0.76 kg 1.7 lb



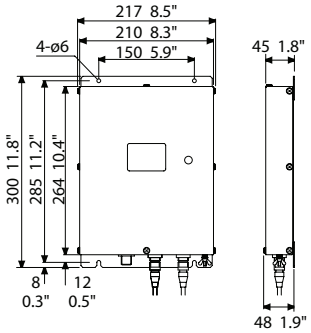
Facsimile Receiver		
MODEL		**FAX-30**
GENERAL		
Frequency Range		80 kHz to 160 kHz, 2 MHz to 25 MHz, 490 kHz, 518 kHz (NAVTEX)
Class of Emission		F3C, J3C, F1B (NAVTEX)
Receiving System		Double superheterodyne
Number of Channel		1000 channels
Storage	Fax	12 pictures
	NAVTEX	130 messages
Scanning Speed		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

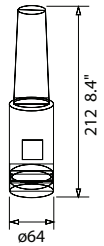
Refer to Online manual for more details. For illustration purposes only; not drawn to scale.

FAX-30

Receiver Unit 2.0 kg 4.4 lb



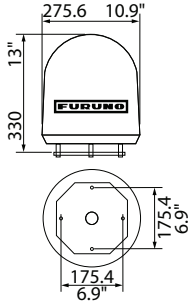
Preamp FAX-5 2.0 kg 4.4 lb



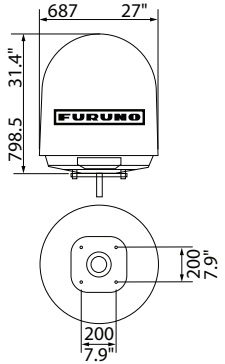
		INMARSAT FleetBroadband	
		FELCOM251	FELCOM501
GENERAL			
Transmitting Frequency		1626.5 - 1660.5, 1668.0 - 1675.0 MHz	
Receiving Frequency		1518.0 - 1559.0 MHz	
INTERFACE			
Ethernet	RJ45	4 ports	
2-wire analog telephone	RJ11	2 ports (4 ports with optional adapter)	
USB		1 port USB 2.0 (RS-232C with 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

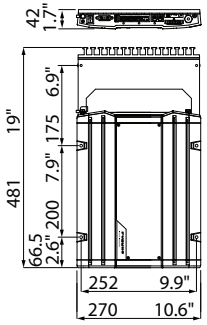
Antenna
FB-1251 3.9 kg 8.6 lb



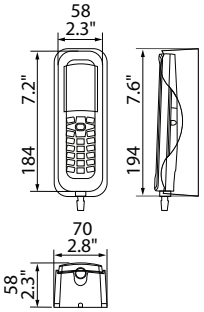
Antenna
FB-1501 23 kg 50.7 lb



FELCOM251/501 Communication Kit
FB-2001 2.5 kg 5.5 lb



Handset
FB-8001 0.63 kg 1.4 lb



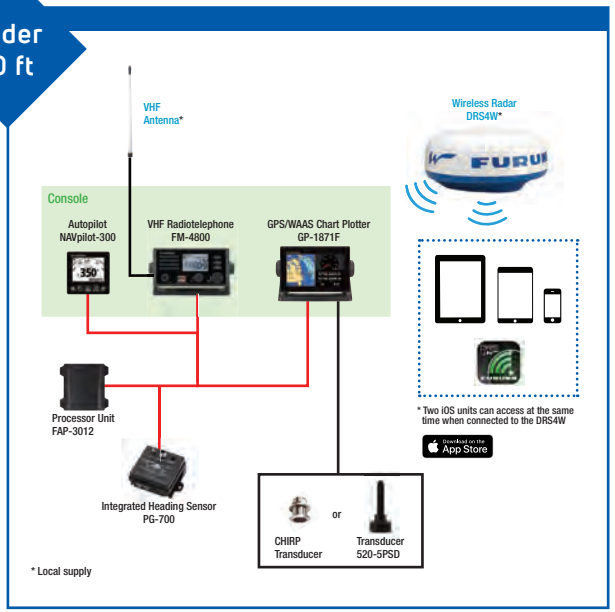
Recommendations

Common Runabout Product Recommendations

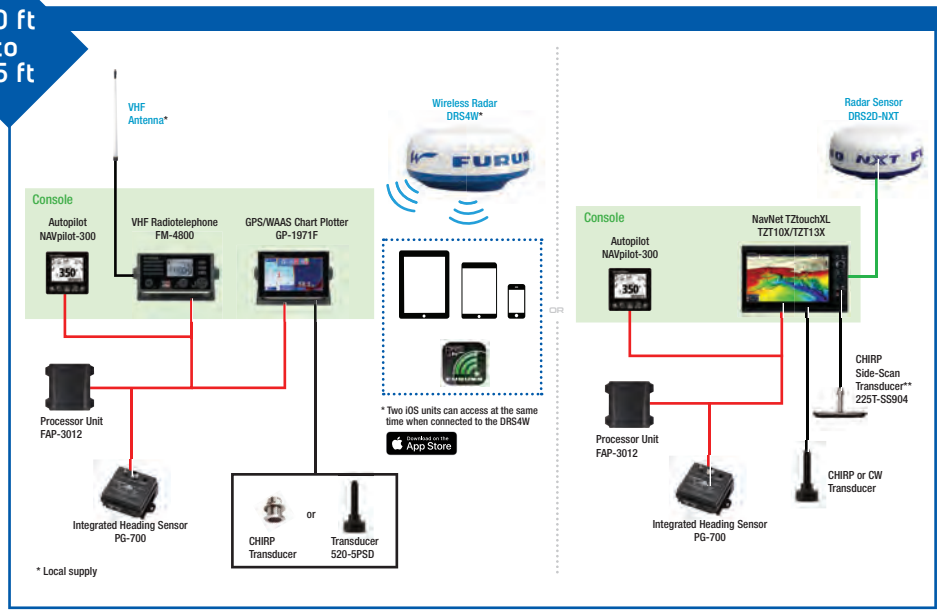
— NMEA2000
— Ethernet
— Other

Product suggestions only - Installation diagram does not depict all necessary connectors or terminators

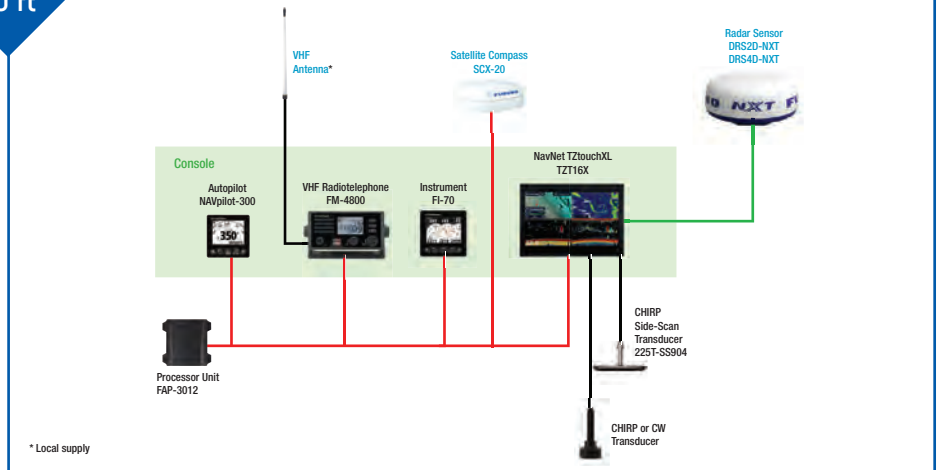
Under 20 ft



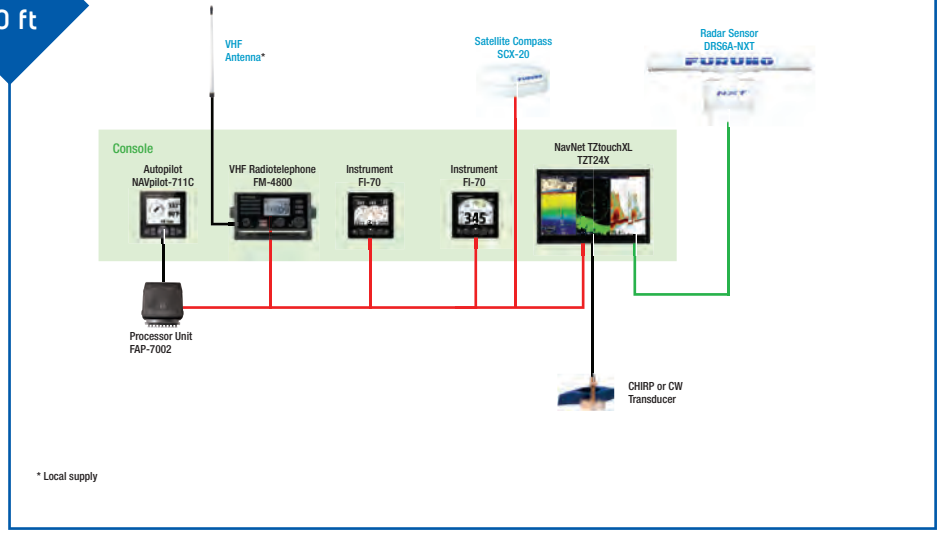
20 ft to 25 ft



25 ft to 30 ft



Over 30 ft

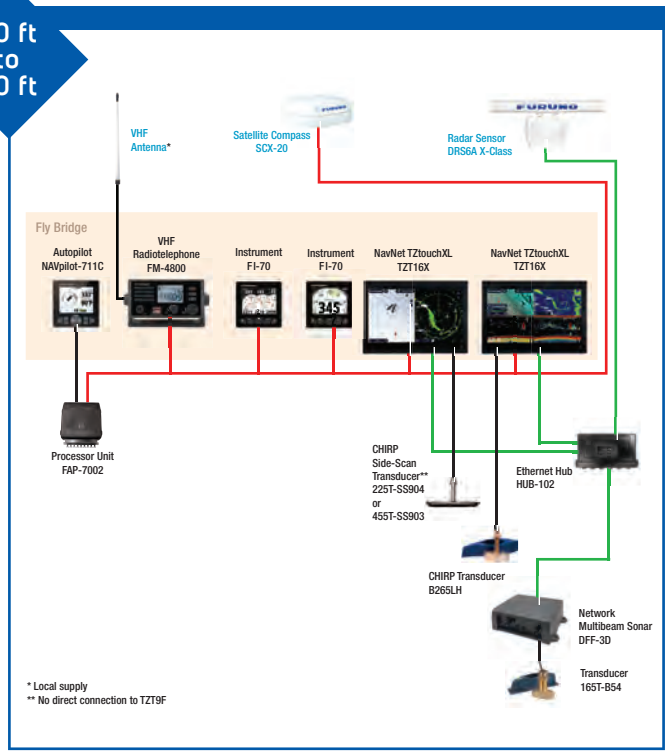


Common Sport Fishing Product Recommendations

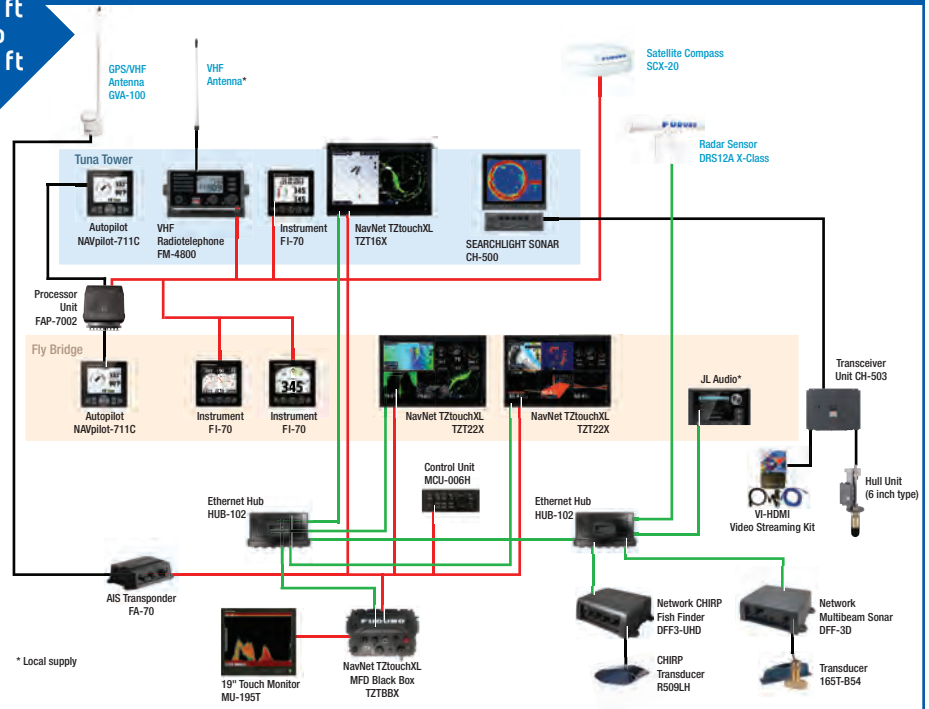
— NMEA2000
— Ethernet
— Other

Product suggestions only - Installation diagram does not depict all necessary connectors or terminators

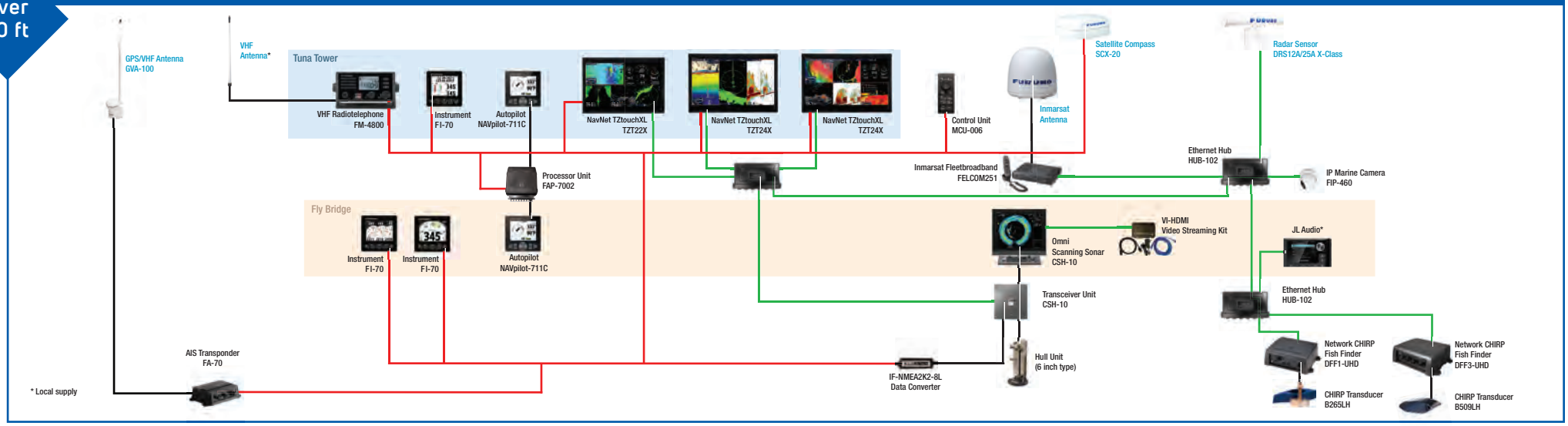
30 ft to 50 ft



50 ft to 80 ft



Over 80 ft



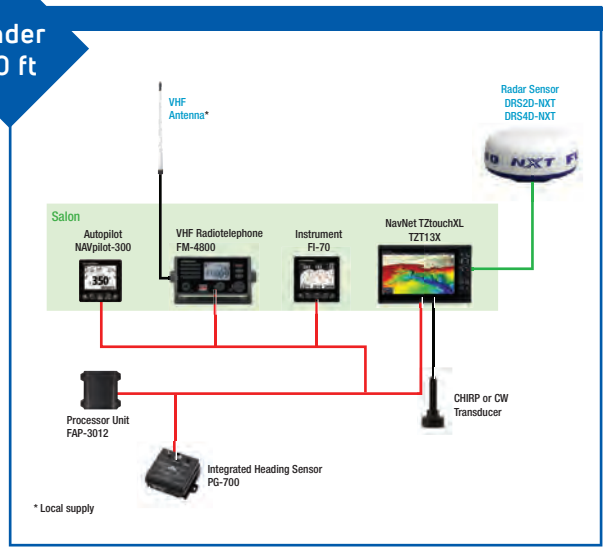
Recommendations

Common Sport Cruiser Product Recommendations

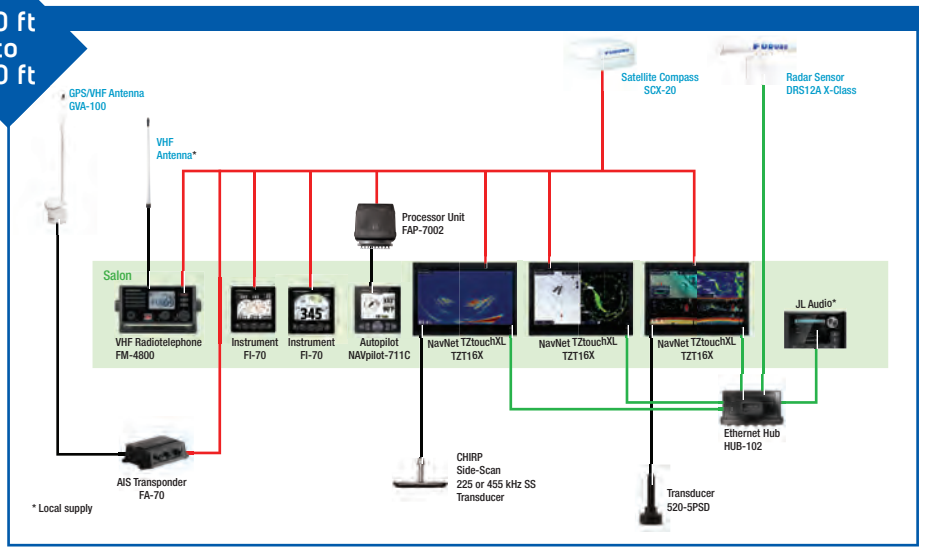
- NMEA2000
- Ethernet
- Other

Product suggestions only - Installation diagram does not depict all necessary connectors or terminators

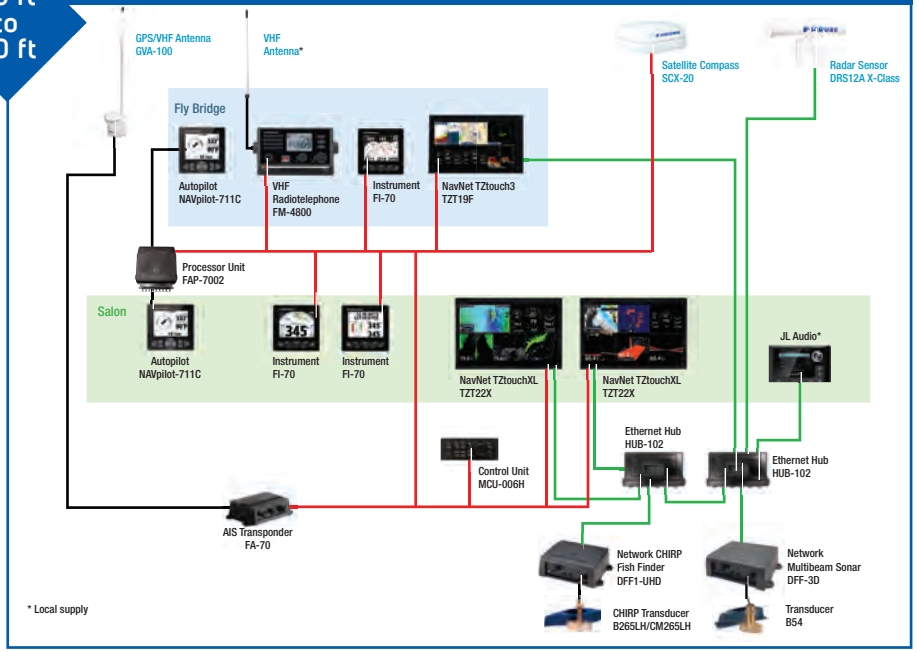
Under 30 ft



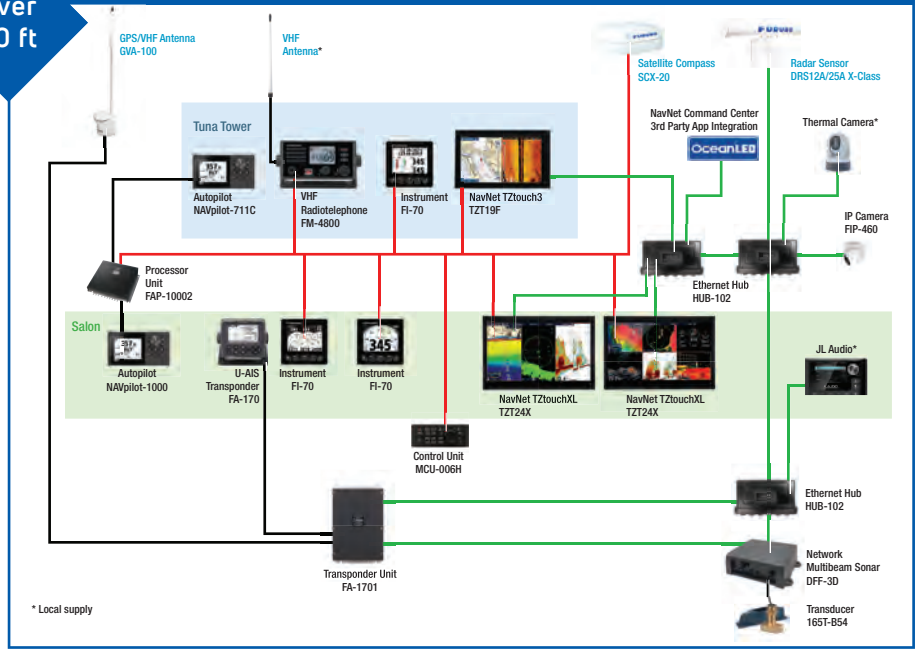
30 ft to 50 ft



50 ft to 80 ft



Over 80 ft

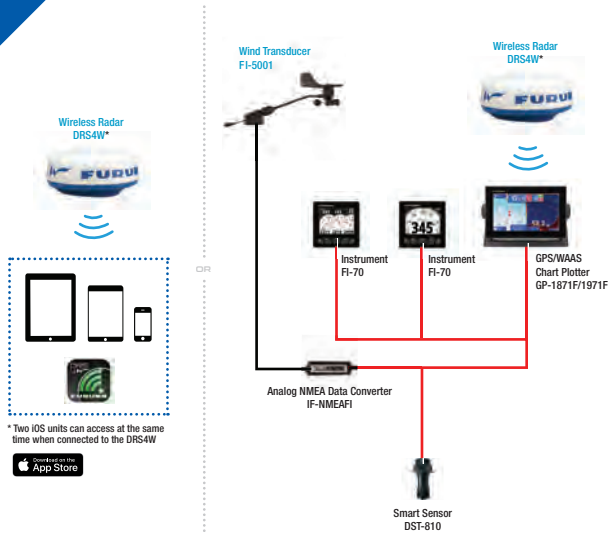


Common Sailboat Product Recommendations

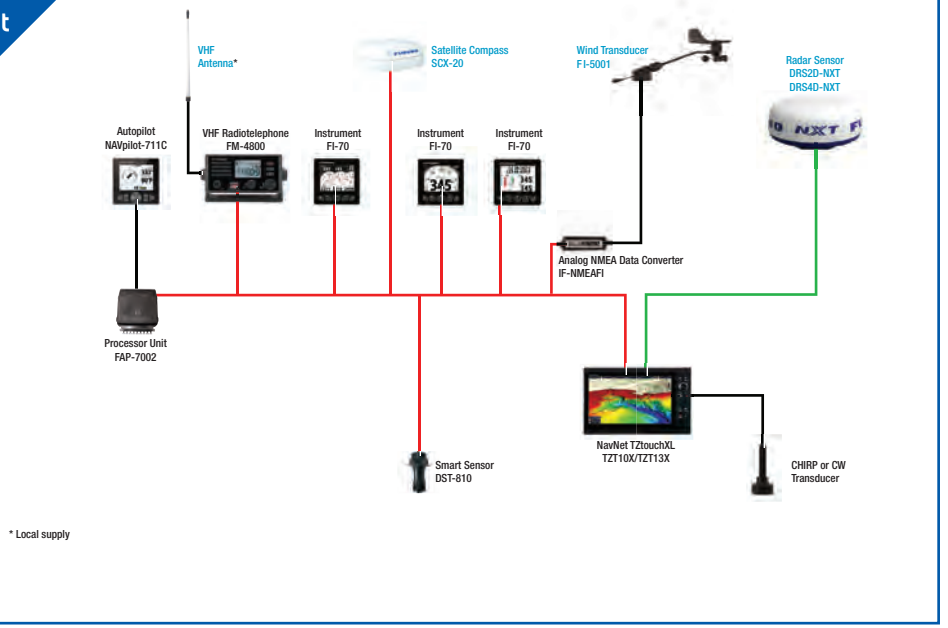
- NMEA2000
- Ethernet
- Other

Product suggestions only - Installation diagram does not depict all necessary connectors or terminators

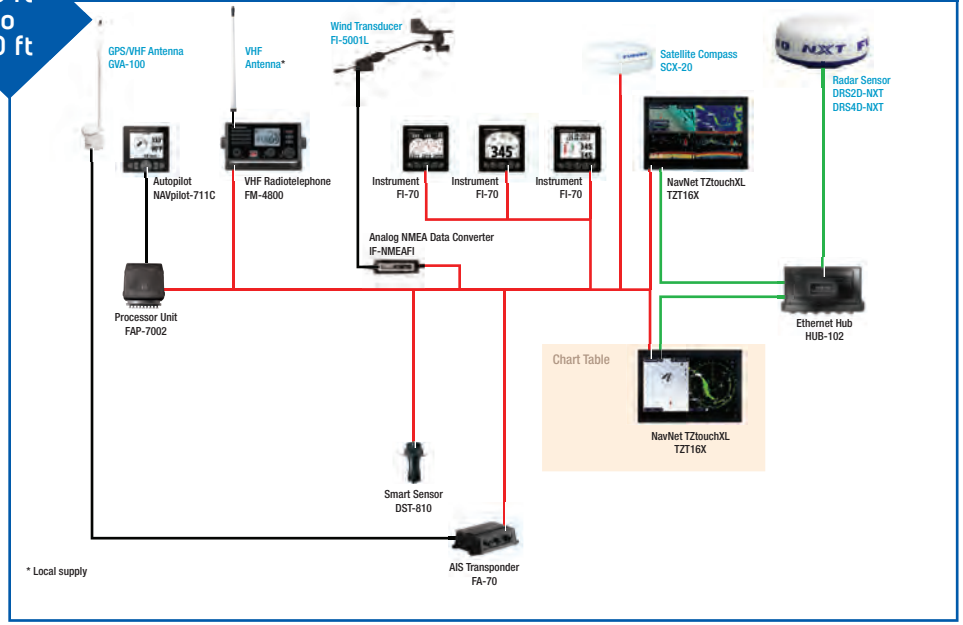
Under 30 ft



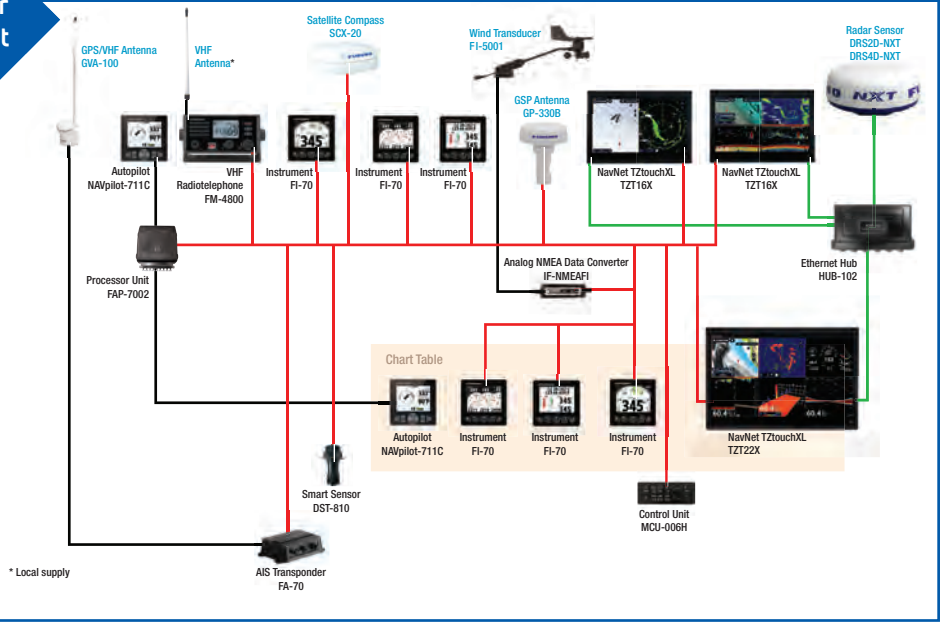
30 ft to 50 ft



50 ft to 80 ft



Over 80 ft



Furuno's Global Network

HISTORY:

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 257 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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