FURUNO

Marine Electronics Catalog

FURUNO

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

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

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

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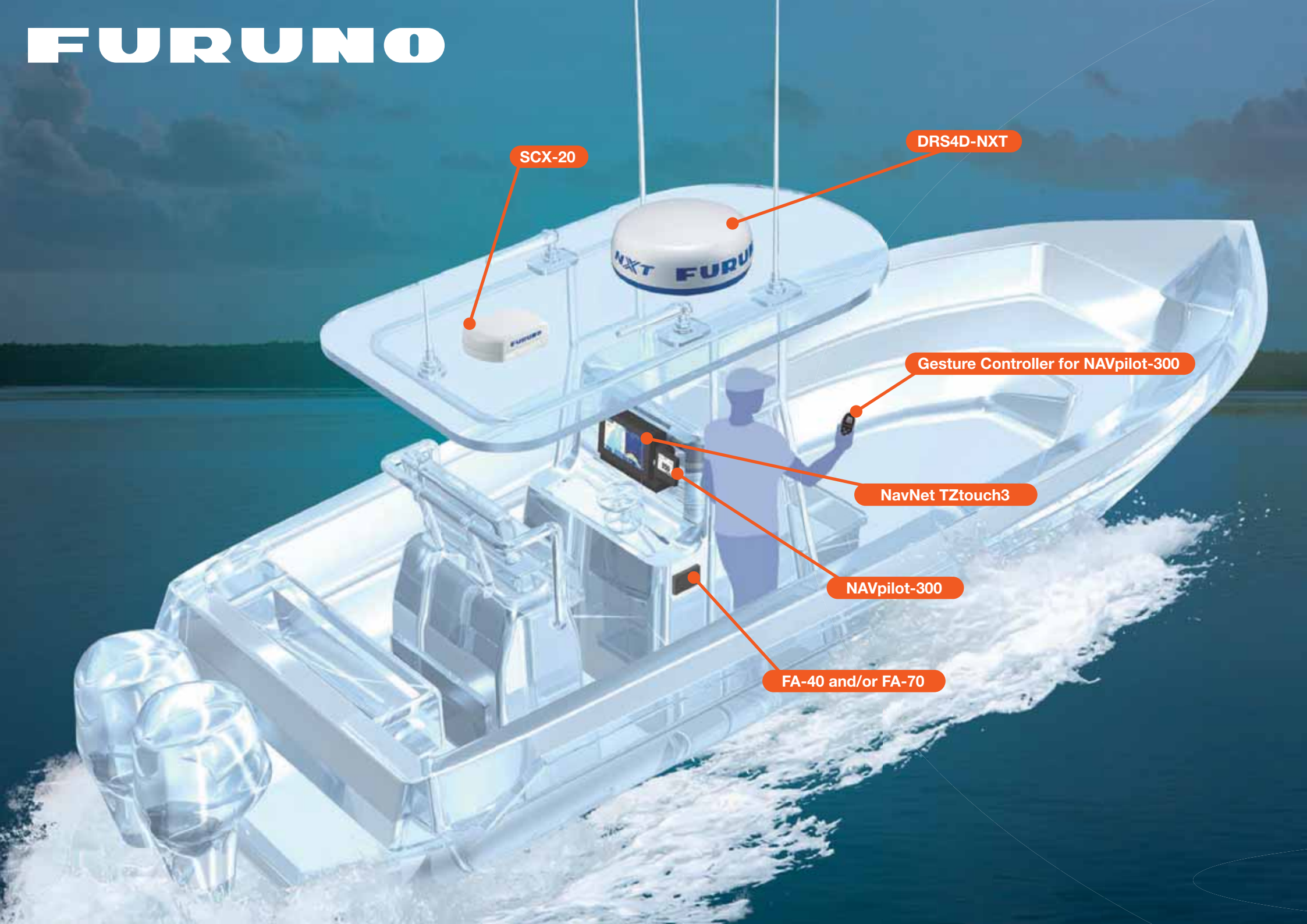
CONTENTS

FURUNO

SCX-20

DRS4D-NXT

Gesture Controller for NAVpilot-300

NavNet TZtouch3

NAVpilot-300

FA-40 and/or FA-70

Powerful Technology, *Compact Design*

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

NEW

NEW

AIS Receiver
Model **FA-40**

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

Satellite Compass™
Model **SCX-20**

NAVpilot
Model **NAVpilot-300**

Gesture Controller

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

NEW

NEW

Hybrid Control MFD with built-in TruEcho CHIRP™ Fish Finder
Model **TZT12F**

NAVnet
TZtouch3

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

FURUNO

Satellite Compass™

NEW!
HI-POWER
200W

NEW!
HI-POWER
100W

Radar Sensor

NAVpilot-711C

NavNet TZtouch3

Network Sonar/Fish Finder

Solid-State Doppler Radar
Model **DRS-NXT Series
(DRS12A/25A-NXT)**

NEW

Satellite Compass™
Model **SCX-20**

Powerful Tools for Powerful Boats

- Built-in Dual Channel 1kW TruEcho CHIRP™ & GPS Receiver (TZT12F/TZT16F)
- Large 19" and 16" Multi-Touch IPS displays, and 12" Hybrid Control IPS display with RotoKey™
- High-power sensor options - 2/3kW TruEcho CHIRP™ Amp & 100W or 200W Solid-State Doppler Radars
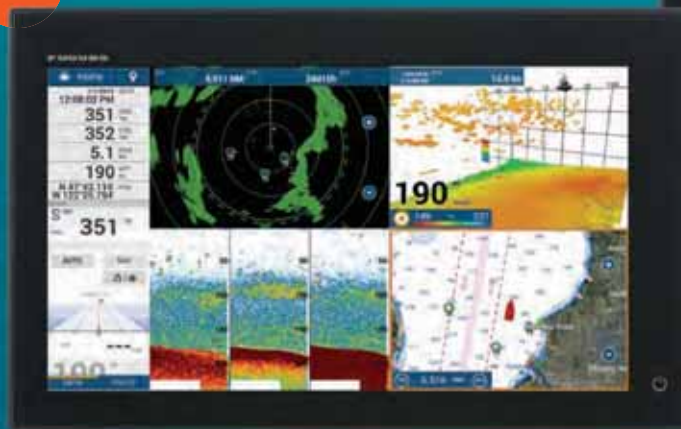
NAVnet *TZ touch 3*

NEW

NEW

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

NEW

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

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

NAVpilot
Model **NAVpilot-711C**

NEW

Black Box TruEcho CHIRP™ Fish Finder Amp
Model **DI-FFAMP**

Black Box Network TruEcho CHIRP™ Fish Finder
Model **DFF1-UHD**

Black Box Network Multi Beam Sonar
Model **DFF-3D**

NavNet Series

NAVnet TZ touch3

NEW! 16"

NEW! 12"

Your favorite MFD just got a major upgrade. Experience speeds so fast you'll be going on a power trip.

Model SDU-001

SD Card Unit (option)
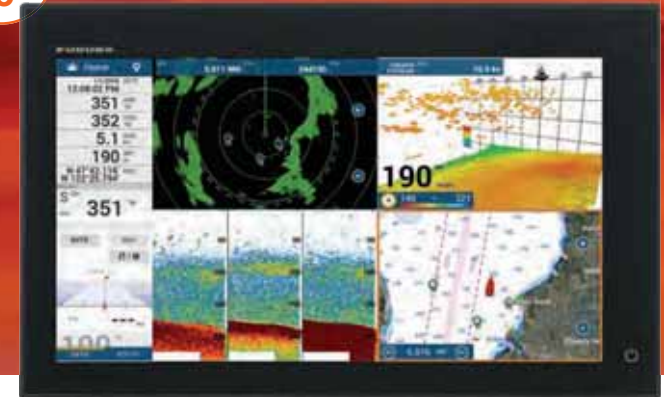for TZT12F/TZT16F/TZT19F

Model TZT12F - 12"   ▶▶▶Spec P88

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

Model TZT16F - 16"   ▶▶▶Spec P88

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

KEY FEATURES:

- Available as 12" Hybrid Control, 16" or 19" All-Glass In-Plane Switching (IPS) Multi-Touch MFD
- Quad-Core CPU powers TimeZero technology with lightning speed!
- Quad-Screen display configuration allows for presentation of 1, 2, 3, or 4 different functions
- IPS LCD provides superior viewability from virtually any angle
- Internal GPS receiver
- Built-In True Dual-Channel 1kW TruEcho CHIRP™ Fish Finder
- Deep Impact high-power 2kW/3kW TruEcho CHIRP™ Fish Finder for NavNet TZtouch3; go deeper by connecting a 5kW/10kW transducer (BT-5 required)
- Compatible with NavNet TZtouch2 networks
- Sync up any data with a tablet or smartphone
- Add Autopilot, Instruments, Radar, AIS, Multi-Beam Sonar, and a variety of other sensors to your NavNet TZtouch3 network
- Full Autopilot control from MFD when connected to the NAVpilot-300/711C Compatible with CZone digital switching
- Tablet & Smart phone apps: TZ First Mate with cloud backup, NavNet Remote, NavNet Viewer and NavNet Controller for your iOS and Android™ devices

DEEP IMPACT

BDS Bottom Discrimination Sounder

TimeZero Designed by MAXSEA

RezBoost

ACCU·FISH

MTC Multi Touch Control

AIS

AUTO

Bonded LCD

CAN bus

Enhanced Sunlight Viewable

Ethernet Plug&Play

FISH FINDER Internal

GPS Internal Antenna

Polarized Friendly

Target Tracking

VIDEO IN OUT

NMEA2000 Certified

Go On A
POWER TRIP

NEW!
19"

Model **TZT19F - 19"**   ▶▶▶Spec P88
**19" Multi-Touch MFD 1920x1080 (FHD)
with built-in TruEcho CHIRP™ Fish Finder**

Model **MCU-002**
Remote Control Unit (option)

Model **MCU-004**
Remote Control Unit (option)

Model **MCU-005**
Control Unit (option)

THE RETURN OF HYBRID CONTROL

Captains who have smaller boats know that when you are crashing through the waves, it can be difficult to get an accurate tap on the screen. That's why we made our TZtouch3 12" MFD with Hybrid Control. You get the best of both worlds with a full multi-touch display and a handy, built-in keyboard that features a RotoKey™, cursor pad and dedicated buttons.

Key:

Short Press

Long Press

1 Home/Settings

2 Event/MOB

3 RotoKey™

4 Shift Screen Control/Fullscreen

5 Cancel/Center

6 Cursor Pad

7 Function 1/Function 2

8 Power/Quick Access Page

NavNet Series

	DOME	OPEN ARRAYS - 3.5', 4', OR 6'		
NXT	DRS4D-NXT	DRS6A-NXT	DRS12A-NXT	DRS25A-NXT
X-CLASS	DRS4DL+	DRS6AX	DRS12AX	DRS25AX

See page 16 for more details.

NEW!
HI-POWER
200W

NEW!
HI-POWER
100W

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, TZtouch3 just made it all easier with TZ Cloud and the new 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" as well as "Datacore by Navionics" vector cartography are optional charts that can be easily unlocked. Mapmedia cartography integrates cutting edge algorithms with high resolution image processing techniques to deliver a fusion of digital navigation charts and satellite photography.

Raster Mode

**Vector Mode**

SATELLITE PhotoFusion™

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.

CMOR CHARTS (US ONLY)
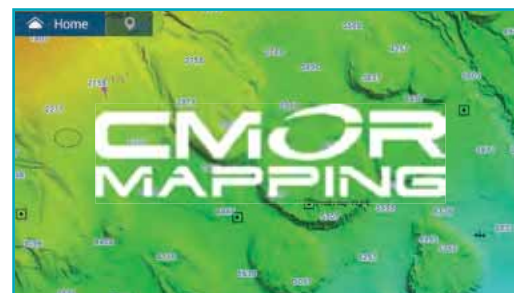
CMOR's high-resolution, shaded-relief bathymetric bottom images help navigators identify suitable locations for fishing and diving.
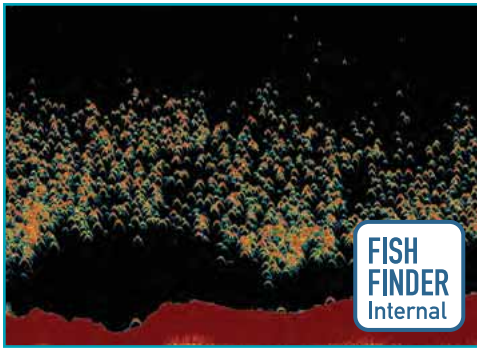
FIND MORE FISH WITH TruEcho CHIRP™

The internal 1kW TruEcho CHIRP™ Fish Finder inside TZtouch3 is designed to operate across a wide range of frequencies utilizing a broadband transducer and delivers significant advantages to signal clarity & target definition. Due to the constant sweeping of frequencies, it is capable of gathering more & higher quality data than traditional Fish Finders.

FISH FINDER Internal

DEEP IMPACT TruEcho CHIRP™

Introducing Deep Impact - DI-FFAMP, a new high-power TruEcho CHIRP™ Fish Finder designed specifically to work with NavNet TZtouch3. This 2kW or 3kW TruEcho CHIRP™ Fish Finder gets you down to the deepest waters to find your catch. You can even connect a 5kW or 10kW transducer! (BT-5 required)

DEEP IMPACT

TruEcho CHIRP

NEW! 2kW/3kW CHIRP AMP

484
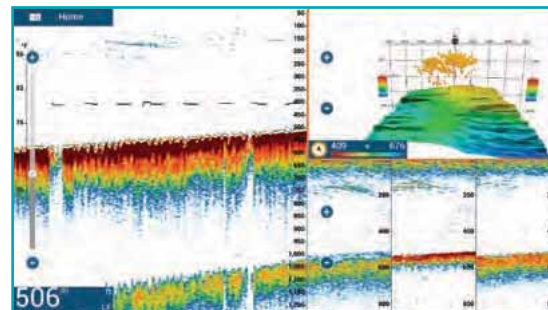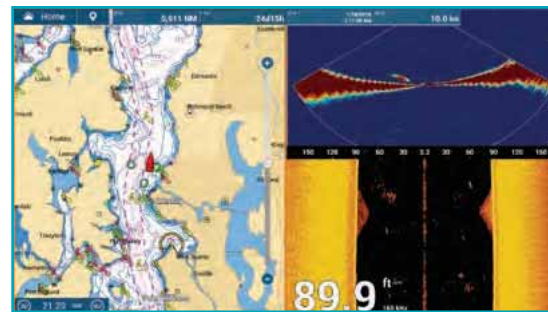
EASILY SEE WHERE TO DROP LINES

When you find fish, you can quickly drop a mark on your Chart Plotter for a return drift. Then looking at the DFF-3D's Cross Section and Side Scan Modes, you can easily determine which side of the boat the fish are on, how deep they are, and how far out from the boat they are swimming. It's almost like you have a tracker attached to them!

89.9 ft

USE DFF-3D WITH YOUR FISH FINDER

This is a powerful combination that helps you get on the fish like never before. Use your standard Fish Finder on low-frequency to go deep and 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.

506

MULTI BEAM

DFF-3D

NavNet Series

NAVnet
TZ touch2

Model TZTL12F - 12.1" ▶▶▶Spec P89

12.1" MFD 1280 x 800 (WXGA)

Model TZTL15F - 15.6" ▶▶▶Spec P89

15.6" MFD 1366 x 768 (FWXGA)

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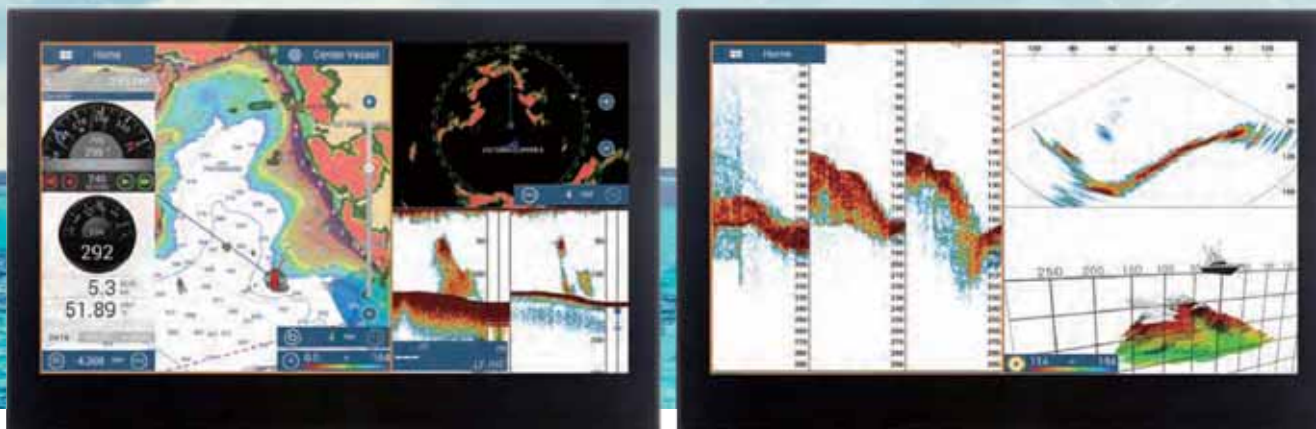
KEY FEATURES:

- Internal GPS Antenna
- Edge-to-edge glass front
- Internal RezBoost™ Fish Finder
- Compatible with CZone Digital Switching
- Seamless, smooth chart operation with TimeZero™ Technology
- Enhanced touch gestures like edge swiping for frequently used functions
- The graphical user interface has been renewed and refined, focusing on usability and ease of operation
- Add Autopilot, Instruments, Radar, AIS, and a wide variety of other sensors to your NavNet TZtouch2 network
- Connect up to 6 NavNet TZtouch2/TZtouch displays on one network
- Manual Fuel Management enables visual evaluation of fuel levels and consumption

- With an Internet connection, NavNet TZtouch2 can wirelessly access real-time weather data
- Sunlight viewable multi touch display with impressive brightness, 1300 cd/m^2 for TZTL12F and 1000 cd/m^2 for TZTL15F
- Tablet & Smart phone apps: NavNet Remote, NavNet Viewer and NavNet Controller for your iOS and Android™ devices

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

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

Enhanced Sunlight Viewable — Ethernet Plug&Play — FISH FINDER Internal — GPS Internal Antenna — NMEA2000 Certified

Total Control,
Simply Refined

Model SDU-001

SD Card Unit (option)
for TZTL12F/TZTL15F

Model PSD-003

Switch Box for TZT2BB

Model MCU-002

Remote Control Unit (option)

Model MCU-004

Remote Control Unit (option)

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

Model TZT2BB

▶▶▶Spec P89

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

KEY FEATURES:

• Internal RezBoost™ Fish Finder
• Full HD HDMI video input available
• Compatible with CZone Digital Switching
• Fast processor (CPU) for impressive performance
• Seamless, smooth chart operation with
  TimeZero™ Technology
• Enhanced touch gestures like edge swiping for frequently
  used functions
• The graphical user interface has been renewed and refined,
  focusing on usability and ease of operation
• Independent display and operation of dual screens with
  built-in dual CPU
• Add Autopilot, Instruments, Radar, AIS, and a wide variety
  of other sensors to your NavNet TZtouch2 network

• Connect up to 5 NavNet TZtouch2/TZtouch displays on
  one network
• With an Internet connection, NavNet TZtouch2 can
  wirelessly access real-time weather data
• Tablet & Smart phone apps: NavNet Remote, NavNet
  Viewer and NavNet Controller for your iOS and
  Android™ devices
• Manual Fuel Management enables visual evaluation of fuel
  levels and consumption

Model MCU-005

Control Unit (option)
TZTL12F/15F: Software version 6.01 or later
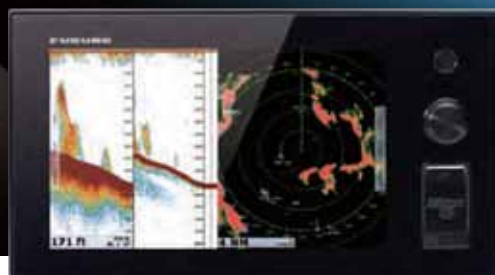
NAVnet

TZ touch
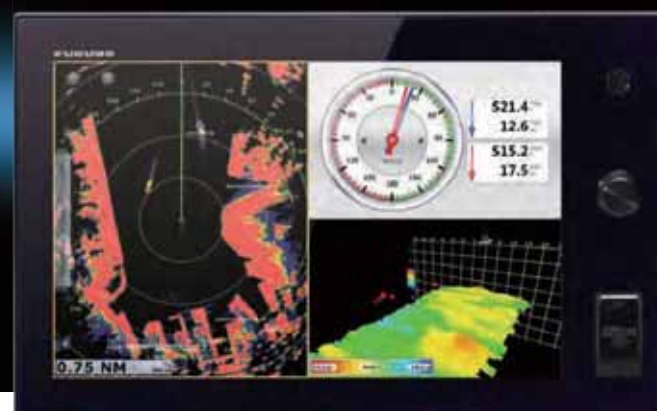
Discover the world's first multi-touch marine display units with unmatched quality only Furuno can offer.

RotoKey

MTC Multi Touch Control

TimeZero Designed by MAXSEA

3D CHART	AIS	AUTO	Bonded LCD	CAN bus	Enhanced Sunlight Viewable

Ethernet Plug&Play	Polarized Friendly	Target Tracking	VIDEO IN/OUT	NMEA2000 Certified	NM EA ®

2012/13*/14*
*TZT14

Model TZT9 - 9"   ▶▶▶ Spec P90

9" MFD 800 x 480 (WVGA)

Model TZT14 - 14.1"   ▶▶▶ Spec P90

14.1" MFD 1280 x 800 (WXGA)
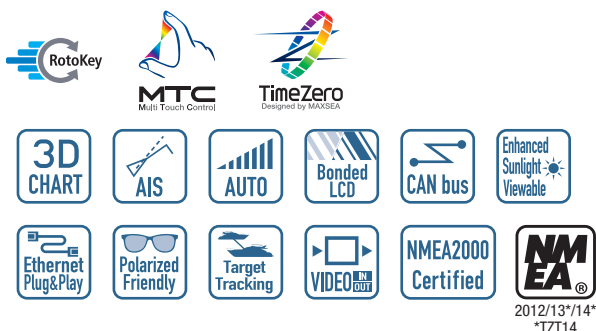
KEY FEATURES:

- Dual SD Card slots
- NMEA2000 network interface
- Sunlight viewable multi touch display
- Simple, flat display with minimal mechanical keys
- Luxury, piano-black wide screen coated with glass panel
- Synchronize data with NavNet TZtouch2 instantaneously
- Easy, intuitive and slick operation with touch screen and RotoKey™
- Seamless, instant chart/Radar redraw with TimeZero™ Technology
- Detailed 3D and 2D charts and high resolution satellite images

- Add Radar, Network Fish Finder, Multi Beam Sonar, AIS, and a variety of other sensors
- Connect up to 6 TZtouch/TZtouch2 displays, 5 when connecting a TZT2BB Black Box.
- Save up to 30,000 user points, 30,000 ship's track points and 200 planned routes with up to 500 waypoints per route
- Wireless LAN connectivity for weather information and automatic chart unlocking
- Tablet & Smartphone apps: NavNet Remote, NavNet Viewer and NavNet Controller for your iOS and Android™ devices

Total Control at your fingertips

Model **TZTBB**   ▶▶▶ Spec P90

Multi Function Display Black Box
1280 x 720 (16:9), 1280 x 800 (16:10),
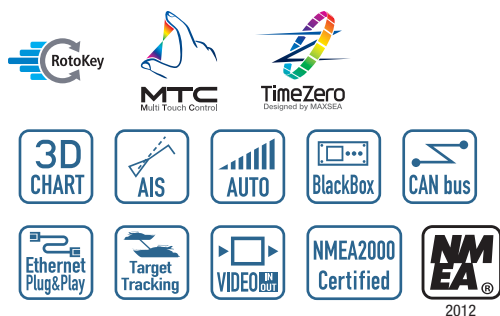1280 x 960 (4:3), 1280 x 1024 (5:4)

Model **MCU-002**

Remote Control Unit (option)

Model **MCU-004**

Remote Control Unit (option)

RotoKey

MTC
Multi Touch Control

TimeZero
Designed by MAXSEA

3D CHART

AIS

AUTO

BlackBox

CAN bus

Ethernet Plug&Play

Target Tracking

VIDEO IN OUT

NMEA2000 Certified

NMEA®
2012

MTC
Multi Touch Control

MULTI TOUCH CONTROL
Furuno elevated marine touch screen technology to an entirely new level with the industry's first multi touch MFD. The use of multi touch technology opens the door to a wide variety of gesture-based commands.

TOUCH... AND GO! MENU SELECTION
Be more hands-on with our easy-to-understand touch screen interface. You'll have full control of each component connected to the network right at your fingertips.

NXT Radar

Model DRS25A-NXT

Model DRS12A-NXT

Model DRS6A-NXT

Model DRS4D-NXT

Model DRS4D-NXT ▶▶▶ Spec P95
NXT Radome

Model DRS6A/12A/25A-NXT ▶▶▶ Spec P95
NXT Radar Array

KEY FEATURES:

• Solid State pulse compression Doppler Radar with no preheating time and low energy consumption (no use of a magnetron)
• Revolutionary Target Analyzer™ function instantly identifies hazardous targets
• Fast Target Tracking and Auto Target Acquire function, up to 100 targets
• RezBoost™ beam sharpening to increase resolution
• Effective horizontal beam width* can reach 0.7° with DRS6A/12A/25A-NXT (XN13A), and 2.0° with DRS4D-NXT *when using RezBoost™
• Bird Mode to find the best fishing grounds by tracking birds
• Simple installation, no need to open the radome (DRS4D-NXT only), external PSU is not required
• New smart-connector cable for retrofitting existing DRS cable installations (DRS4D-NXT only)
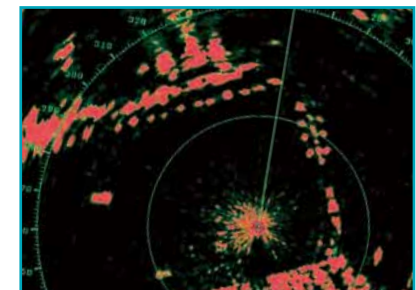
SPOT HAZARDOUS TARGETS INSTANTLY

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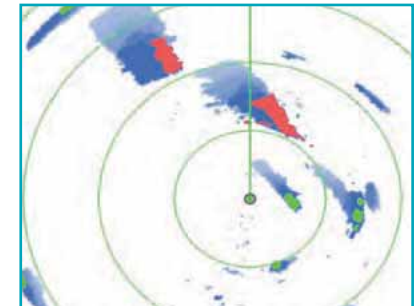
REZBOOST™ BEAM SHARPENING

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

BIRD MODE

Doppler

RezBoost

TARGET ANALYZER

UHD Ultra High Definition

NMEA® 2008-2014, 2016, 2018-2019

X-Class Radar

X-Class Radar

Radome

Model DRS25A X-Class

Model DRS12A X-Class

Model DRS4D (U.S. Only)
DRS4DL+

Model DRS6A X-Class

KEY FEATURES:

- Digital Signal Processing enhances short and long range detection
- Dual range scanning for two different radar ranges (not available on DRS4DL+)
- Enhanced auto gain anti-clutter controls and auto tuning
- Bird mode helps you identify birds, automatically adjusting the gain and sea for optimal visibility
- Fast Target Tracking takes only seconds for a speed and course vector to be displayed
- Advanced side lobe reduction technology
- Spot-on Radar-Chart Overlay on both 2D and 3D chart presentations
- AIS overlay "AIS-over-Radar" presentation for precise vessel tracking*
- Radar Guard Zone and Watchman features alert you to potential dangers
- VRM (Variable Range Marker) and EBL (Electronic Bearing Line) give distance and bearing indications
- Low noise gearbox that is 20% lighter than previous models
- No Power Supply Unit required for most installations
- * Appropriate sensor required.

		DRS4D	DRS4DL+	DRS4D-NXT	DRS6A-NXT	DRS12A-NXT	DRS25A-NXT	DRS6A X-Class	DRS12A X-Class	DRS25A X-Class
Output Power		4 kW	4 kW	Solid-state, 25 W	Solid-state, 25 W	Solid-state, 100 W	Solid-state, 200 W	6 kW	12 kW	25 kW
Size		24 inch	19 inch	24 inch	3.5 ft/4 ft/6 ft	3.5 ft/4 ft/6 ft	4 ft/6 ft	3.5 ft/4 ft/6 ft	4 ft/6 ft	4 ft/6 ft
Antenna Type		Radome	Radome	Radome	Open	Open	Open	Open	Open	Open
Beam Width	Horizontal	4°	5.2°	3.9°	2.3°/1.9°/1.35°	2.3°/1.9°/1.35°	1.9°/1.35°	2.3°/1.9°/1.35°	1.9°/1.35°	1.9°/1.35°
	Vertical	22°/ 22°/ 22°	25°	25°	22°/22°/22°	22°/22°/22°	22°/22°	22°/22°/22°	22°/22°	22°/22°
Max. Range		36 NM	36 NM	48 NM	72 NM	96 NM	96 NM	96 NM	96 NM	96 NM
48 rpm Capability		—			●	●	●	●	●	●
Functions		Head-up, North-up* True Echo Trail, TT, AIS	Head-up, North-up* True Echo Trail, TT, AIS	Head-up, North-up*, True Echo Trail, Bird mode, TT, AIS, Target Analyzer	Head-up, North-up*, True Echo Trail, Bird mode, TT, AIS, Target Analyzer	Head-up, North-up*, True Echo Trail, Bird mode, TT, AIS, Target Analyzer	Head-up, North-up*, True Echo Trail, Bird mode, TT, AIS, Target Analyzer	Head-up, North-up*, True Echo Trail, Bird mode, TT, AIS	Head-up, North-up*, True Echo Trail, Bird mode, TT, AIS	Head-up, North-up*, True Echo Trail, Bird mode, TT, AIS
Dual Range Scanning		—	—	(Range is limited to 12 NM)	(Range is limited to 12 NM)	(Range is limited to 12 NM)	(Range is limited to 12 NM)	●	●	●
Fast Target Tracking		●	●	●	●	●	●	●	●	●
MFD version required	TZtouch2	5.01	5.01	3.01	5.01	6.21	6.21	3.01	4.01	4.01
	TZtouch	5.01	5.01	4.21	5.01	6.01	6.01	4.21	5.01	5.01

* Heading input required for North-up. Heading input is not required for Target Analyzer function, but is recommended for greater performance. The Radar antenna complies with IEC62252 Ed. 1:2004 (Clauses 4.33, 5,33, Annex D) relevant to radio characteristic.

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.

Moving vessel

Flock of birds

Stationary vessel
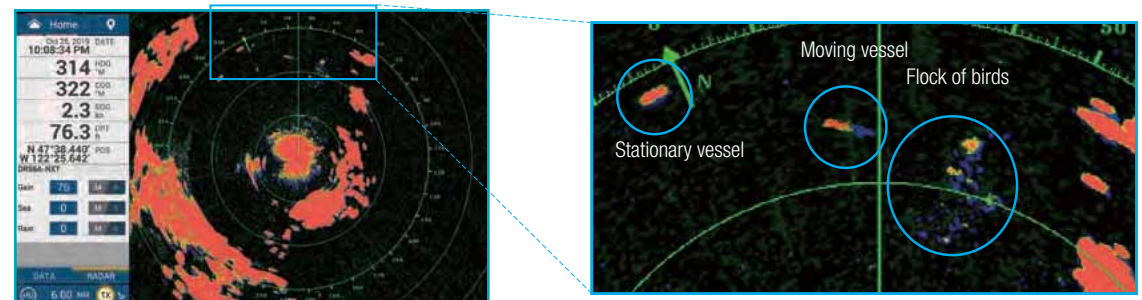
High Power TruEcho CHIRP™ for TZtouch3

NEW!
2kW/3kW CHIRP AMP

Model DI-FFAMP
▶▶▶Spec P94

Deep Impact TruEcho CHIRP™ Amp

KEY FEATURES:

	DI-FFAMP
Frequency	18 to 225kHz
Output Power	2kW/3kW
ACCU-FISH	Yes**
Bottom Discrimination*	Yes**
Transducer	2kW or higher compatible transducer

* Depending on bottom type and water conditions

** With appropriate transducer

GO DEEPER WITH MORE POWER THAN THOUGHT POSSIBLE

You spoke. We listened. And now we delivered! TZtouch3 incorporates a powerful internal 1kW TruEcho CHIRP™ Fish Finder. For many, this is the perfect Fish Finder, but for some, they need more power. So, we proudly bring you Deep Impact (DI-FFAMP), a high-powered 2kW/3kW amplifier that connects to the internal TruEcho CHIRP™ Fish Finder. But if that's not enough, Deep Impact gives you 5kW with the right booster (BT-5 Booster). Go big or go home!

FISH FINDER Internal

Multi Beam Sonar

Model DFF-3D*

Black Box Network
Multi Beam Sonar *see page 57 for details

KEY FEATURES:

	DFF-3D
Frequency	165 kHz
Range Scale	Up to 1,200 m
Detection Range	200 m* (Side beam best performance) 300 m* (Main beam directly under boat)
ACCU-FISH	N/A
Bottom Discrimination	N/A
Transducer	800 W

* Depending on bottom type and water conditions.

MULTI BEAM SONAR

The Multi Beam 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*.

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

Cross Section
Cross section displays the real-time sea column echo in 120 degrees port and starboard.

Side Scan
Side scan clearly displays the shape of structure as a high definition image in port and starboard direction.
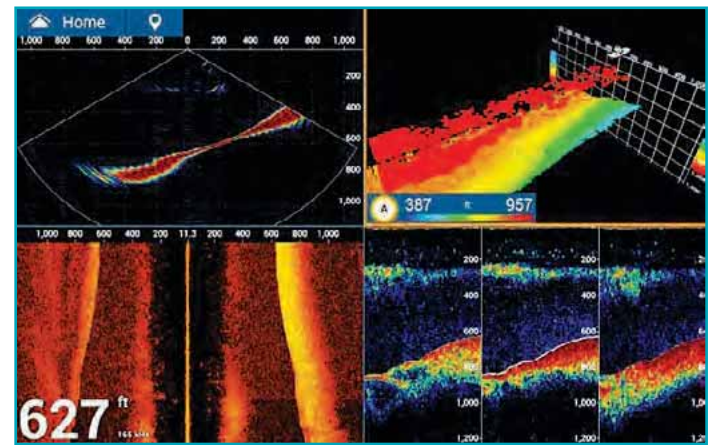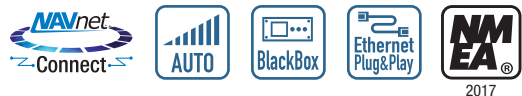
3D History Mode
The 3D sounder history provides an intuitive and easy to understand 3D image of the seafloor, along with fish school icons.

3-way Split
A single (directly under boat) or triple direction (middle, left and right) Fish Finder image are displayed simultaneously.

Digital Fish Finders

Model DFF1-UHD
▶▶▶Spec P93

Black Box Network
TruEcho CHIRP™ Fish Finder

KEY FEATURES:

	DFF1-UHD
Frequency	Dual frequency 50 ± 20 kHz and 200 ± 25 kHz
Range Scale	Up to 1,200 m
Broadband	Available
ACCU-FISH	Available
Bottom Discrimination	Available
Transducer	1 kW

Model BBDS1
▶▶▶Spec P93

Black Box Network
Bottom Discrimination Fish Finder

KEY FEATURES:

* For DFF3 with 50/200-IT transducer only

	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

Model DFF3
▶▶▶Spec P93

Black Box Network
Network Fish Finder

KEY FEATURES:

* For DFF3 with 50/200-IT transducer only

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

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.

◆ TZtouch2/TZtouch3

◇ TZtouch

TRACK RECORDING ◆◇

Track recording by SST Variation draw 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.

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

Probability mode

Graphic mode

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.
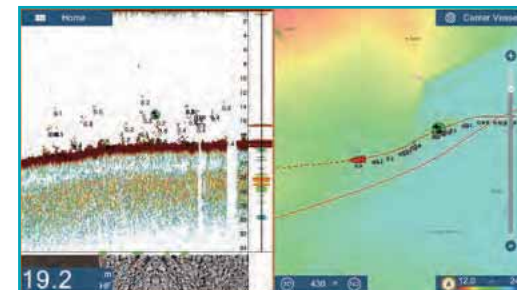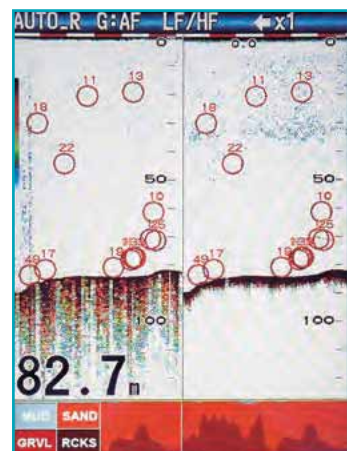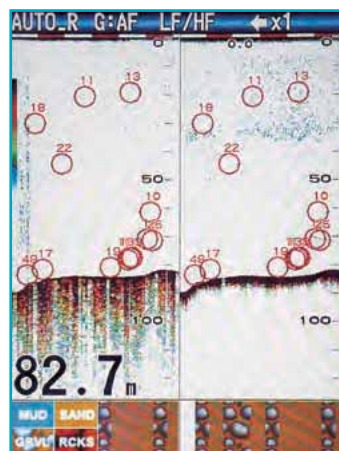
WHITE EDGE HELPS EASILY IDENTIFY SEABED ◆

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.

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
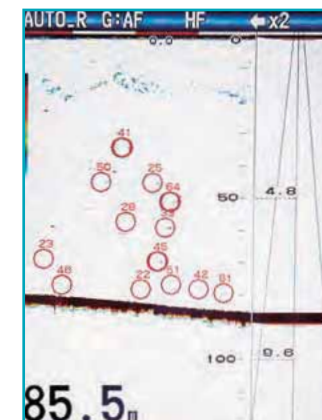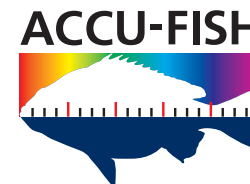
# Onboard Systems Monitoring

CZONE DIGITAL SWITCHING ◆

CZone digital switching by BEP simplifies the installation and operation of complex electrical systems. NavNet TZtouch2/TZtouch3 is compatible with CZone controls, allowing you to operate CZone equipment.

* Lean more about CZone Digital Switching at www.czone.net

CZone, engine, navigation and various NMEA2000 data can be laid out on the same screen.
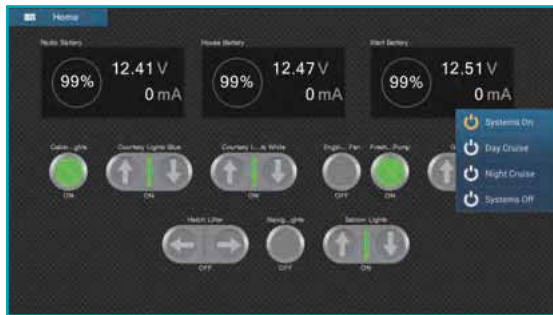
CZone Control & Monitoring

MARINE AUDIO FUSION-LINK ◆◇

Enjoy the ability to control all FUSION-Link enabled 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 and video entertainment from the NavNet TZtouch Series.

MARINE WEATHER FORECAST ◆◇

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.

* Internet connection is required.

BBWX4 SiriusXM Satellite Weather:
Keep track of weather with Furuno's BBWX4 Fourth-Generation Sirius/XM Satellite Weather Receiver for NavNet TZtouch/TZtouch2/TZtouch3.
(Only available in U.S. and Canada)
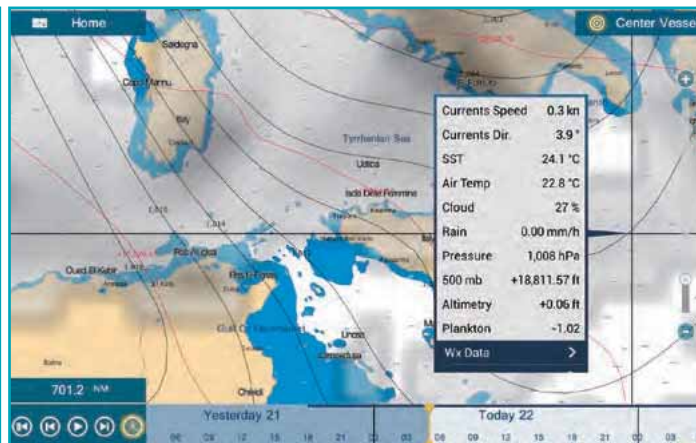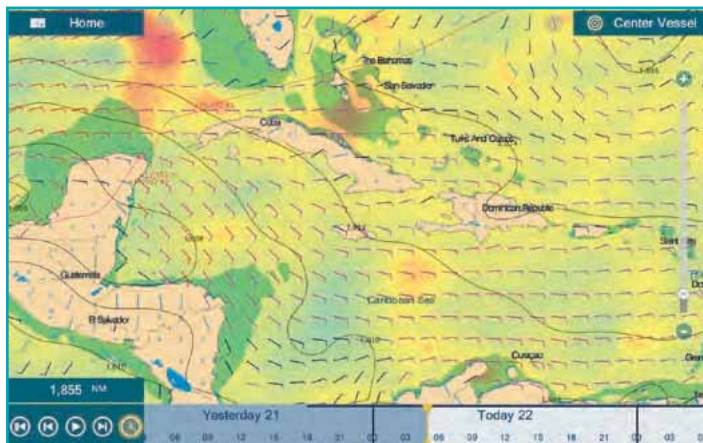
MY TIMEZERO™ CLOUD DATA ◆

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

View Info On Your Smart Devices Wirelessly

TZ FIRST MATE KEEPS TRACK OF YOUR CATCH & LOCATION

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

TZ CLOUD: NEVER LOSE WAYPOINTS, ROUTES OR SETTINGS AGAIN

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

(*cloud.mytimezero.com raster planning charts for US only)

TZ PC Software

NEW!
TZ CLOUD APP

TZtouch3

cloud.mytimezero.com

TZ iBoat iOS App

FOR APPS AND SMART DEVICES

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

NAVNET VIEWER APP

Conveniently view instruments as well as the Fish Finder of your NavNet TZtouch/TZtouch2/TZtouch3 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. Even if you change the display on your NavNet MFD, you can still view the Fish Finder on your smart devices.

Download on the App Store   GET IT ON Google Play

Compatible with NavNet TZtouch/TZtouch2/TZtouch3

NAVNET CONTROLLER APP

Wirelessly control NavNet TZtouch/TZtouch2/TZtouch3 with touch controls just like the real thing. With a scroll pad, cursor pad and dedicated keys within the app, controlling NavNet TZtouch/TZtouch2/TZtouch3 is simple and straightforward.

Download on the App Store   GET IT ON Google Play

Compatible with NavNet TZtouch/TZtouch2/TZtouch3

NAVNET REMOTE APP

Take full control of your NavNet TZtouch3/TZtouch2/TZtouch 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.

Download on the App Store   GET IT ON Google Play

Compatible with NavNet TZtouch/TZtouch2/TZtouch3

NavNet Series
Network Product Lineup
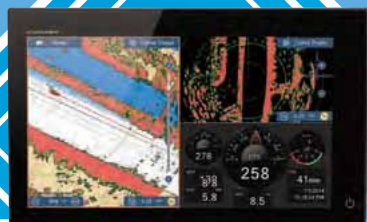
NAVnet *TZ touch2*   **NAV**net *TZ touch3*

NMEA0183 to CAN bus converter available; The optional IF-NMEA2K2 converts NMEA0183 sentences to FURUNO VCAN bus and NMEA2000 PGN's, enabling conventional NaVNet navigation devices to be incorporated into the NaVNet TZtouch3/TZtouch2 network

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RADAR

Radar Sensor
DRS4D (U.S. only)
DRS4DL+
DRS NXT Series
DRS X-Class Series
Ethernet

Marine Radar
FAR-1513-BB/1518-BB* Series
Ethernet

Marine Radar
FAR-21x7-BB/22x8-BB* Series
Ethernet

*TZtouch2 software version 6.01 or later
**1 TZtouch3 unit required

FISH FINDERS

FISH FINDER Internal

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

Multi Beam Sonar
DFF-3D
Ethernet

Network Fish Finder
DFF1-UHD/DFF3/DI-FFAMP**
Ethernet

Bottom Discrimination Fish Finder
BBDS1
Ethernet

Depth/Speed/Temp Sensor
DT-800/DST-800
CAN bus

AIS

AIS Receiver
FA-40
CAN bus | NMEA0183

Class-B+ AIS Transceiver
FA-70
CAN bus | NMEA0183

U-AIS Transponder
FA-170
Ethernet

GPS

GPS Internal Antenna *

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

GPS Navigator
GP-33
CAN bus | NMEA0183

GPS/WAAS Receiver Antenna
GP-330B
CAN bus

INSTRUMENT/ DATA ORGANIZERS

Data Organizer
FI-70
CAN bus

Data Organizer
RD-33
CAN bus

NAVnet *TZ touch*

NMEA0183 to CAN bus converter available; The optional IF-NMEA2K2 converts NMEA0183 sentences to FURUNO VCAN bus and NMEA2000 PGN'S, enabling conventional NMEA0183 navigation devices to be incorporated into the NavnetTZtouch network

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Radar Sensor
DRS4D (U.S. only)
DRS4DL+
DRS NXT Series
DRS X-Class Series
Ethernet

Marine Radar
FAR-1513-BB/1518-BB* Series
Ethernet

Marine Radar
FAR-21x7-BB/22x8-BB* Series
Ethernet

*TZtouch software version 6.01 or later
**TZtouch software version 3.01 or later

Multi Beam Sonar
DFF-3D
Ethernet

Network Fish Finder
DFF1-UHD/DFF3
Ethernet

Bottom Discrimination Fish Finder
BBDS1
Ethernet

Color LCD Sounder
FCV-1150
Ethernet

Depth/Speed/Temp Sensor
DT-800/DST-800
CAN bus

AIS Receiver
FA-30
Ethernet

Class-B AIS Transponder
FA-50
Ethernet

U-AIS Transponder
FA-170
Ethernet

GPS/WAAS Receiver Antenna
GP-330B
CAN bus | NMEA0183

GPS Navigator
GP-33
CAN bus | NMEA0183

Data Organizer
FI-70
CAN bus

Data Organizer
RD-33
CAN bus

AUTOPILOT

Autopilot
NAVpilot-300
CAN bus

Autopilot
NAVpilot-711C
CAN bus | NMEA0183

Autopilot
NAVpilot-300
CAN bus

Autopilot
NAVpilot-700
CAN bus | NMEA0183

Autopilot
NAVpilot-711C
CAN bus | NMEA0183

COMPASS

Integrated Heading Sensor
PG-700
CAN bus

Compass
SC-70
CAN bus | CAN bus

Satellite Compass™
SC-33
CAN bus | NMEA0183

Satellite Compass™
SCX-20/21
NEW
NMEA2000 | NMEA0183

Integrated Heading Sensor
PG-700 **PG-500**
CAN bus NMEA0183

Compass
SC-70
CAN bus | NMEA0183

Satellite Compass™
SC-33
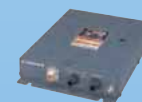CAN bus | NMEA0183

Satellite Compass™
SCX-20
NEW
CAN bus

VHF COMMUNICATION

Marine VHF Radiotelephone
FM-4800
CAN bus

Marine VHF Radiotelephone
FM-4850
CAN bus

Marine VHF Radiotelephone
FM-4800S

Marine VHF Radiotelephone
FM-4800
CAN bus

Marine VHF Radiotelephone
FM-4850
CAN bus

Marine VHF Radiotelephone
FM-4800S

WEATHER/PC PLOTTER

Network Weather Facsimile Receiver
FAX30
Ethernet

Satellite Weather
BBWX4
Ethernet

TIMEZERO
Marine Software
Ethernet

Network Weather Facsimile Receiver
FAX30
Ethernet

Satellite Weather
BBWX4
Ethernet

OTHER

Thermal Camera
Video | Ethernet

Analog Camera
Video

IP Camera
Ethernet

FUSION
Marine Entertainment System
MS-RA670/770 Series, etc.
Ethernet

Digital Switching System
CZONE
CAN bus

HDMI*
*TZT2BB/TZT16F/TZT19F only

Analog Camera
Video

IP Camera
Ethernet

FUSION
Marine Entertainment System
MS750 Series, etc.
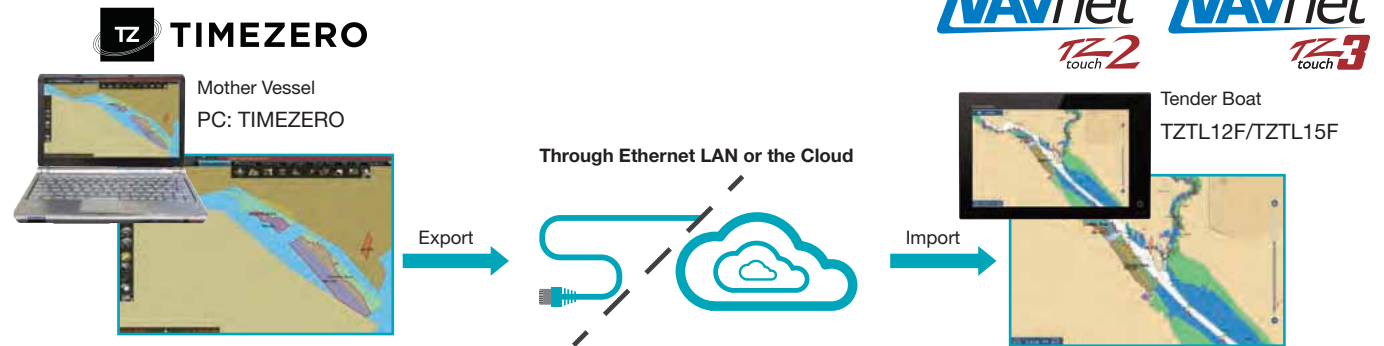Ethernet
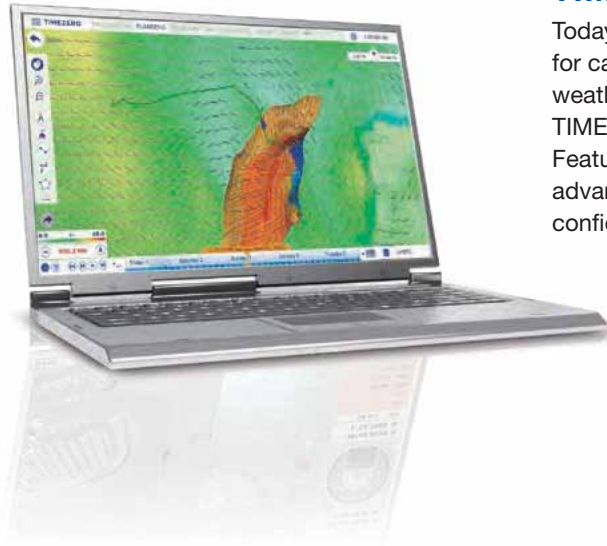
TIMEZERO Software

TIMEZERO IS A POWERFUL NAVIGATION TOOL

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 MaxSea's 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.

SEAMLESSLY EXCHANGE YOUR USER OBJECTS WITH TZTOUCH3/TZTOUCH2 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 TZtouch2/TZtouch3.

* Software version 4.01 or later

Mother Vessel
PC: TIMEZERO

Through Ethernet LAN or the Cloud

Export

Import

Tender Boat
TZTL12F/TZTL15F

TZ iBoat (iPad APP)

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

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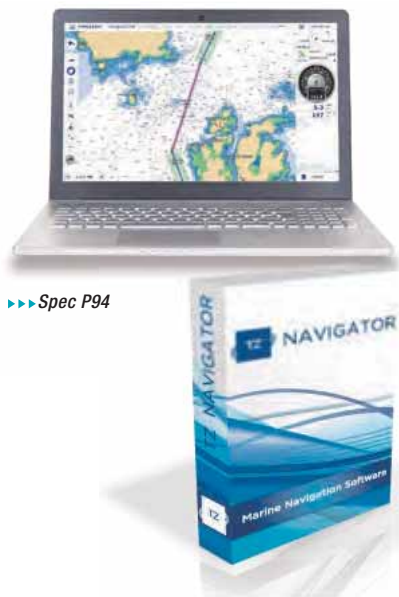
*AIS module sold separately.

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

* Radar Module (in-app purchase) required.

TZ NAVIGATOR V4

- Marine navigation software with a fast and smooth full 2D/3D chart engine: our navigation software operates in a fully rendered 3D environment and delivers unparalleled speed and a seamless chart plotting experience
- Worldwide chart coverage: mm3d chart catalogue with raster and vector charts (C-MAP and Datacore by Navionics)
- Connect your GPS and Autopilot (NMEA compatible serial ports or Ethernet by Furuno)
- Free worldwide weather forecast service: download/overlay weather updates for free, allowing you to perform advanced planning
- New 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
- ActiveCaptain integration: TIMEZERO is the first navigation software to offer ActiveCaptain Points-of-Interest (POI) integration and real-time updating
- 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)
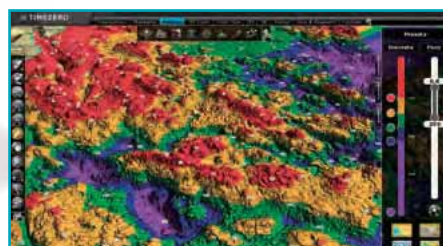

New Route Planning Safety
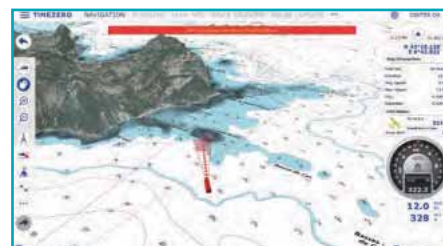
New Security Cone
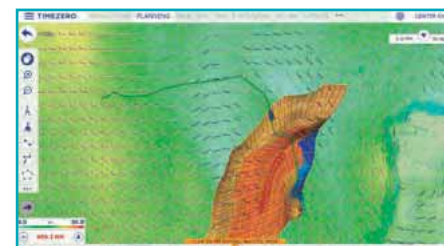
The Weather Routing with the TZ Routing Module
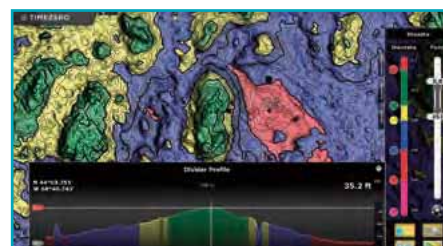
TZ PROFESSIONAL V4

- The latest version of the PBG module allows you to create clearer, more realistic charts of the seafloor. Connect to DFF-3D Multi Beam 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 information that is most pertinent is shown first
- Keeping up-to-date charts is an essential element to ensure the safety of all those at sea. Now compatible with the official S57/S63 formats

- Thanks to augmented reality cutting-edge technology, TZ professional allows you to display the active route and cross track distance directly on the camera video feed. Identify all boats equipped with AIS system surround you and prevent any collision risk
- Up to three monitors can be used simultaneously working on independent workspaces
- TZ Professional introduces the new Premium Oceano-O service for pelagic fishing. It provides higher resolution and a new type of multi-layer data. This service is geared toward commercial fisherman and advanced sport fishermen who want to target best possible fishing spots

New PBG Module

New Profile Window

TZ Professional V3 charts + AIS

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

AUTO

MODEL1623

▶▶▶Spec P99

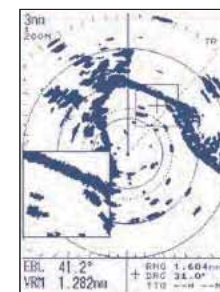### 5.7" Silverbright LCD Marine Radar

KEY FEATURES:

- Exceptional short-range target detection
- Automatic adjustment of antenna rotation speed according to selected range scale for optimum performance at all ranges
- Watchman mode with very low power consumption —only 8W
- Display a "lollipop" indication of selected waypoint position (optional input required)
- Excellent screen clarity, day or night
- Reverse video feature for nighttime visibility
- Zoom window for close observation of a specific area
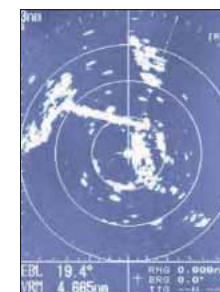- Intuitive operation with simple key layout
- Not available in EU

Antenna Selections:

Model	MODEL1623
Output Power (kW)	2.2
Size	15" Radome
Range Scale (NM)	0.125-16
Rotation Speed	24/31/41 rpm

Zoom

Reverse

NAV Data

NAV Data

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

	Radar App	Simulator App*
App version	2.0.0	Simulator_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.

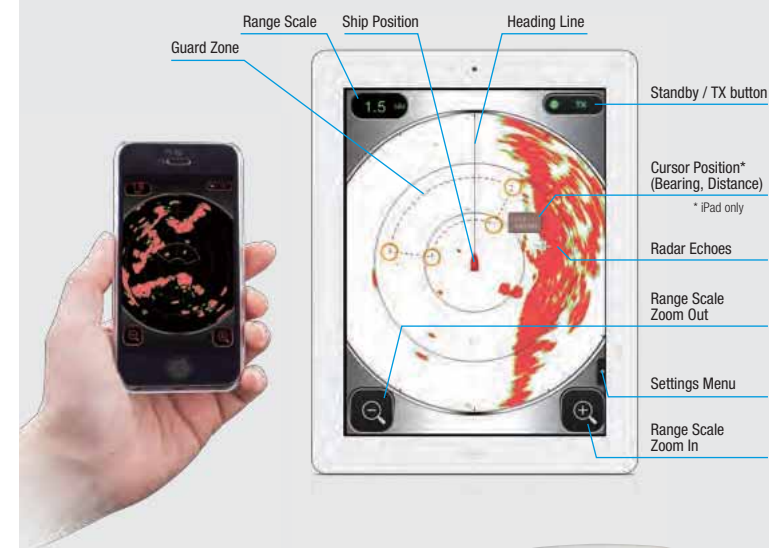## Model **DRS4W**

▶▶▶Spec P98

1st Watch Wireless Radar

KEY FEATURES:

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

  * Radar Module (in-app purchase) required.

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

Range Scale   Ship Position   Heading Line

Guard Zone

Standby / TX button

Cursor Position*
(Bearing, Distance)

* iPad only

Radar Echoes

Range Scale
Zoom Out

Settings Menu

Range Scale
Zoom In

Model GP1871F/GP1971F

The Furuno DRS4W Wireless Radar can be connected to the GP1871F/GP1971F GPS/WAAS Chart Plotter.*

* Refer to pages 43-44 for details.

MODEL1815

▶▶▶Spec P99

8.4" Color LCD Radar

KEY FEATURES:

- Compact radome antenna with 4 kW transmitter output power
- Low power consumption - 38W max
- Easy installation and intuitive operation
- Advanced auto-adjust settings for Gain/Sea clutter and Rain clutter
- 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 multiple colors
- User-programmable function keys
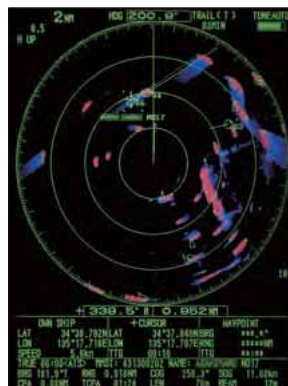- Swivel mounting bracket to adjust the angle of the display unit

Antenna Selections:

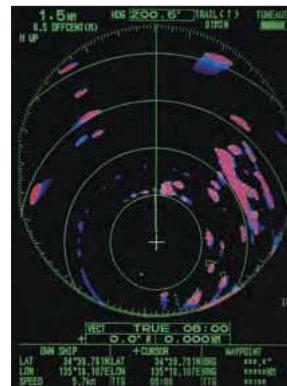| Model	MODEL1815
Output Power (kW)	4
Size	19" Radome
Range Scale (NM)	0.0625-36
Rotation Speed	24 rpm

FAST TARGET TRACKING

Fast Target Tracking function manually or automatically acquires and tracks 10 targets. After selecting a target, it only takes 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.

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.
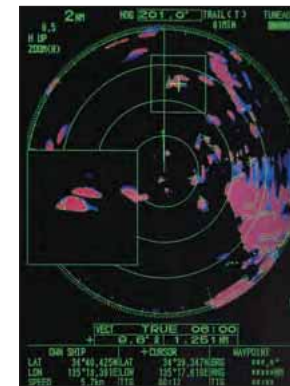

AIS/ Fast Target Tracking

AIS Symbols

Sleeping AIS Target Lost Target Activated Target Dangerous Target Selected Target

Target Tracking (TT) Symbols

01 At acquisition → 01 ← Vector ← Target number
a few seconds after acquisition

Off center

Gain/Sea/Rain setting menu

Zoom

OFF CENTER

Own ship position can be shifted to a pre-selected point on the screen. This allows the operator to focus on a specific area ahead of or around the vessel without losing track of the position.

GAIN/SEA/RAIN

To display targets clearly and accurately, the gain must be adjusted. The 1815 can do this automatically for you. By automatically adjusting the gain, the Radar eliminates unnecessary echoes and displays a clear image.

ZOOM MODE

The Zoom function expands the length and width of a selected target with the magnification of 2.0, in the zoom window.

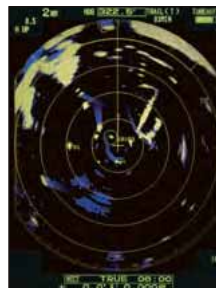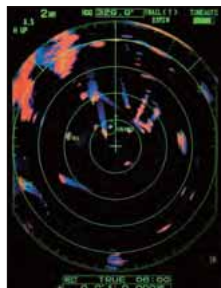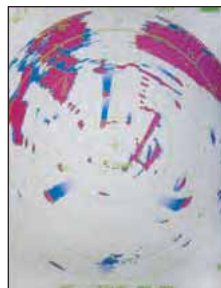## TRUE TRAIL MODE

When using the True Trail Mode, moving objects will show up on the main screen with a gradational trail. These trails make it possible to see the movement of nearby vessels in the blink of an eye.
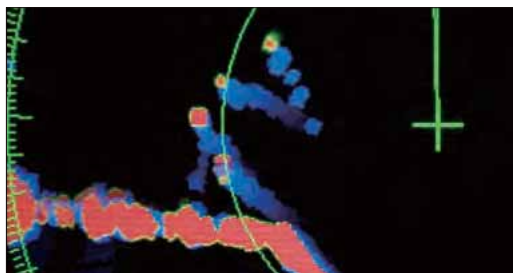
True Trail Mode

Adjustable display colors

MULTI-STATION CONFIGURATION

Multi-station configuration allows up to three RDP-157 (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.

Ethernet

Up to 3

Reliability, durability, and flawless performance are the hallmarks of this user-friendly and feature-packed Radar series!

AUTO | Target Tracking | AIS | Enhanced Sunlight Viewable | Bonded LCD

MODEL1835/1935/1945

10.4" Color LCD Radar

KEY FEATURES:

- Easy-to-install 10.4" color LCD (350 cd/m2) display
- Bonded LCD provides clear view in all weather conditions
- Stable AIS/TT* with zoom display function
- Full Screen Mode allows operators to observe a wider range around the vessel
- Enhanced Auto Tuning/Gain/Anti-Clutter controls
- Echoes in yellow, green, orange or multiple colors
    *Optional input required

Antenna Selections:

Model	MODEL1835	MODEL1935	MODEL1945
Output Power (kW)	4	4	6
Size	24'' Radome	3.5' Open	4' Open
Range Scale (NM)	0.0625-36	0.0625-48	0.0625-64
Rotation Speed	24 rpm	24 rpm 48 rpm (option)	

AIS/TARGET TRACKING

Up to 100 AIS and 10 TT targets can be tracked and overlaid on the Radar screen to assist the operator in tracking vessel movements. Since AIS works by a VHF transceiver system, a variety of navigational information such as vessel name, speed, ROT, draft, and the destination of the selected targets can be included in real time. Unlike TT targets, AIS targets are visible even if they are located behind large ships or islands.

AIS targets can show that a vessel is coming from behind an object such as an island, where the Radar beam does not reach.
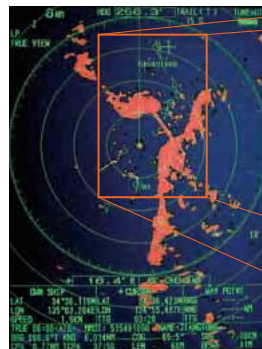

AIS/ Fast Target Tracking

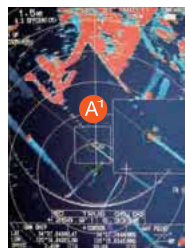The vessel behind an island

Own ship's position
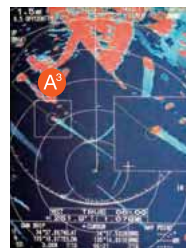
AIS target

515491000

TT target

TARGET ZOOM

A target can be shown in a zoom display while its detailed movements are tracked by AIS or TT. Conventional zoom function is also available by which the operator sets the zoom function on the target manually.
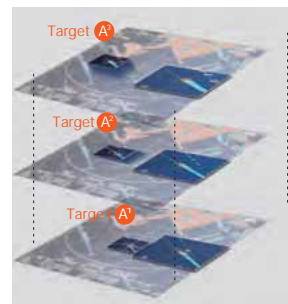

Target acquired and tracked

Tracked target shifts position

Zoom box tracks the targetted object according to its movement

Target A¹
Target A²
Target A³

ANTI-CLUTTER CONTROLS

Adding to the enhanced auto clutter controls, dedicated rotary knobs are provided for the suppression of unwanted echoes from sea clutter, rain and other forms of precipitation. Anti-clutter settings can be adjusted manually to remove sea and rain clutter from the Radar screen to gain a clearer view of Radar targets.
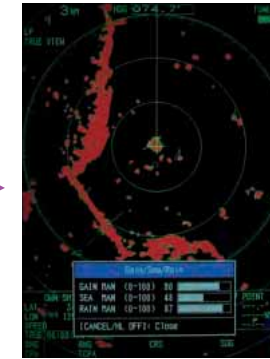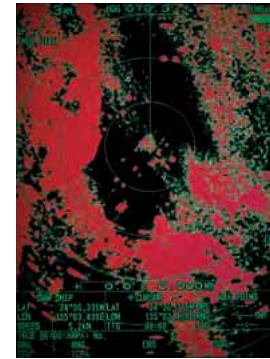
Dedicated rotary knobs to adjust GAIN/STC/FTC for simplified control.

OFF-CENTER MODE

With a push of the "OFF CENTER" button, own ship position is shifted to a pre-selected point on the screen. This allows the operator to focus on a specific area ahead of or around the vessel without losing track of the position.
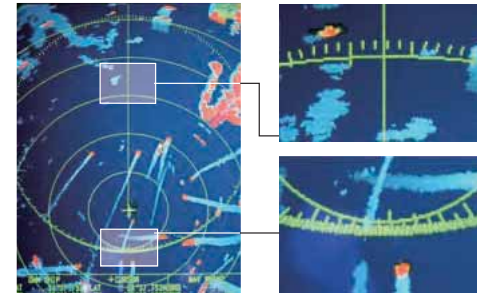
Clearance between the markings of the bearing scale is changed according to the proximity between own ship and the bearing circle, as shown in the images on the left-hand side. This is useful when estimating a target echo's bearing without using an EBL.

SHORT-RANGE TARGET DISCRIMINATION

With its advanced signal processing technology, the 1835/1935/1945 series demonstrates substantial increases in target detection, particularly in close range. As shown in the pictures at right, the Radar clearly displays thin piers from a very short distance.

Discern between vessel traffic, rain, and surface reflections to find and track the movement of targets and remove unnecessary echoes.

NMEA 2015 (FR-8065)

UHD Ultra High Definition

AUTO | Target Tracking | AIS | Enhanced Sunlight Viewable

Model FR-8065/8125/8255 ▶▶▶ Spec P101

12.1" Color LCD Radar

KEY FEATURES:

- One-touch auto-adjust settings for Gain/Sea/Rain clutter
- 48 rpm high-speed antenna rotation provides clear information in narrow passages and on high-speed vessels
- Wide viewing angle LCD for great visibility from any angle
- True Motion Trails and AIS/TT Target Tracking with a zoom display function
- State-of-the-art signal processing makes it easy to identify targets in rain and poor visibility
- "True View Mode" means Radar echoes move smoothly when own vessel is in motion

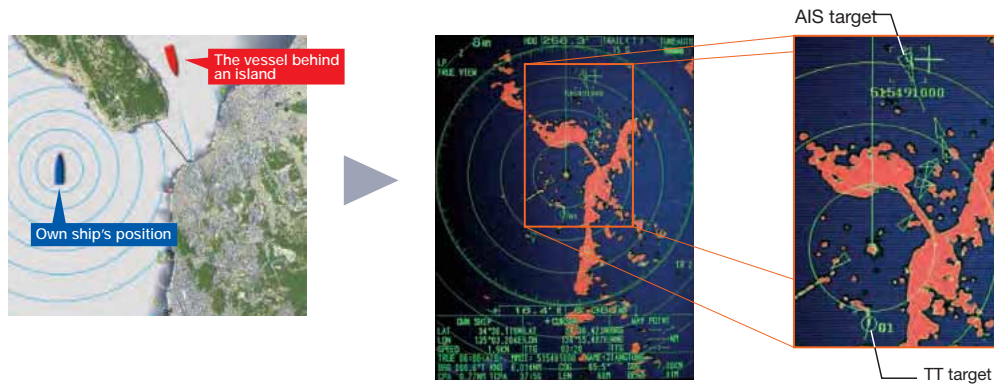**Antenna Selections:**

Model	MODEL FR-8065	MODEL FR-8125	MODEL FR-8255
Output Power (kW)	6	12	25
Size	4/6' Open Array		
Range Scale (NM)	0.0625-72		0.0625-96
Rotation Speed	24 or 48 rpm		

AIS/TARGET TRACKING

Up to 100 AIS and 10 TT targets can be tracked and overlaid on the Radar screen to assist the operator in tracking vessel movements. Since AIS works by using a VHF transceiver system, a variety of navigational information such as vessel name, speed, ROT, draft, and the destination of the selected targets can be included in real time. Unlike TT targets, AIS targets are visible even if they are located behind large ships or islands. AIS targets can show that a vessel is coming from behind an object, such as an island, where the Radar beam does not reach.


AIS/ Fast Target Tracking

The vessel behind an island

Own ship's position

AIS target

TT target

TARGET ZOOM

A target can be shown in a zoom display while its detailed movements are tracked by AIS or TT. Conventional zoom function is also available by which the operator sets the zoom function on the target manually.

A^1 A^2 A^3

Time passes

* AIS transponder and ARP11 are required to use the zoom display function
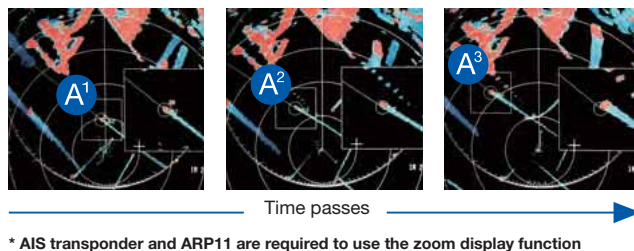
TRUE TRAIL MODE

When using the True Trail Mode, moving objects will show up on the screen with a colorful trail. True trails make it possible to see the movement of nearby vessels at a glance!
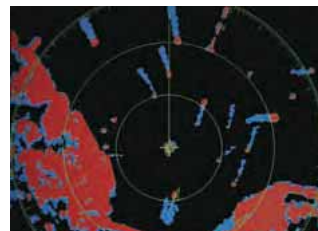
TRUE VIEW MODE

The Radar echoes move smoothly on the main display thanks to "True View Mode". True View Mode is based on the head-up mode. During the Radar sweep, the echoes move according to the heading of your ship.

Since echoes move in real-time, the discrepancy between an observed target and what is displayed on the Radar screen is greatly reduced.

ADVANCED SIGNAL PROCESSING

Even during rainfalls or severe weather conditions, Radar echoes are clearly displayed, and unnecessary echoes can easily be removed instantly. The technology for removing sea, rain and snow clutter has been greatly enhanced, utilizing Furuno's state-of-the-art knowledge in digital signal processing.
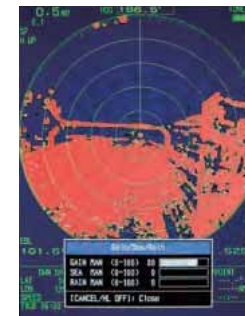
A/C Rain turned off, the marina is completely covered by the rain echo.
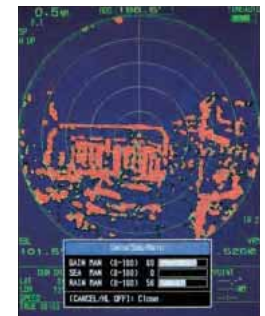
A/C Rain turned on, the marina appears clearly.

FULL SCREEN AND OFF-CENTER MODES

Make use of the whole display surface with Full-Screen mode, giving you more information when making important decisions. When combining Full-Screen mode with Off-Center mode, any target or point of interest can be observed in detail. The overlay information can be turned off to observe targets obstructed by the text, as well as providing an unobstructed Radar view.

Radar

NEW
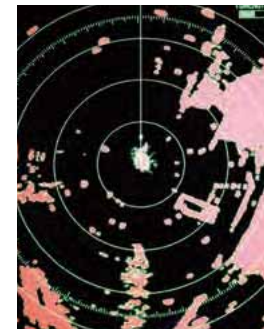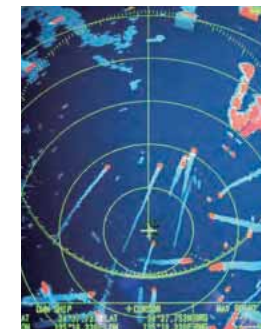
Model FAR-1416/1426

15" Color LCD Radar with Chart Plotter

KEY FEATURES:

- Simple operation with "point-and-click" menu functionality
- Built-in chart overlay on Radar presentation
- Use Target Analyzer™ to discern hazards, simply by looking at the color of their echo
- Instant speed vector display for tracked targets
  - A speed vector will be displayed after clicking on a select target.
- Improved sea and rain clutter removal function
  - Automatic Clutter Elimination (ACE) function provides clear echoes.
- Space-saving and straightforward installation with processor built into the display
- Straightforward operation using a trackball and wheel menu selector

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

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			

CHART OVERLAY ON RADAR

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 Chart Radar presentation and chart map are overlaid, North-Up, Course-Up, and Head-Up direction modes are available.

AUTOMATIC CLUTTER ELIMINATION (ACE) PROVIDES UNPRECEDENTED 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).
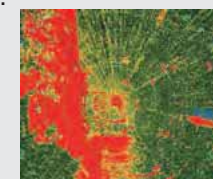
ACE OFF   ACE ON
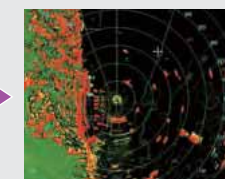
TARGET ANALYZER™ FUNCTION

Target Analyzer™ function displays moving targets, stationary targets, rain, sea surface and targets closing in on your vessel in different colors. It can increase your safety, as well as improve situational awareness.
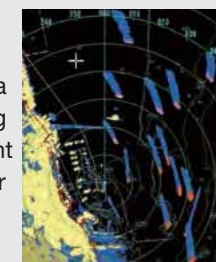
FAST TARGET TRACKING

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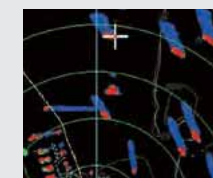
Before selecting a target   After selecting targets

SIMPLIFIED CONTROLS

The Radar can be controlled with only a Furuno RCU-030 Controller (optional supply), or a standard PC mouse or trackball - that's how simple it is to use!

Antenna Selections:

Model	FR-1908V-BB	FR-1918V-BB
Output Power (kW)	4	12
Size	6.5' or 8' Open	
Range Scale (NM)	0.125-96	
Rotation Speed	26 rpm	

Model **FR-1908V-BB/1918V-BB**

▶▶▶Spec P102

Black Box River Radar

DESIGNED FOR INLAND WATERWAYS

10 preset tow configurations for fast creation & call-up of barge/vessel icons, and distances in inland units (statute mile, barge length/width in feet).
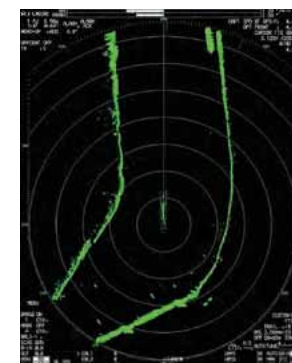
SEE MORE WHERE IT COUNTS

The portrait display of this River Radar produces a clear and contrast-strong image both day and night, and can be dimmed down to almost zero if necessary. Its ultra-short pulse length provides superior resolution and river bank, buoy & vessel detection.

KEY FEATURES:

- Utilizes 17"-19" Portrait LCD Display (Supplied separately, MU190V 19" Display shown)
- Compact "Black Box" processor w/high-resolution (SXGA 1024 x 1280) output
- Commercial-grade gearbox with choice of 6.5 or 8-foot antenna
- 4kW or 12kW transmitter output power
- 10 preset tow configurations for fast creation & call-up of barge/vessel icons
- Distances in inland units (statute mile, barge length/width in feet)
- Slim RCU-032 keyboard for saving space on dashboard or captain's chair, or RCU-030 trackball only
- Remote USB mouse capability for dual-station control
- Rate of Turn (ROT) indicator and rudder position indicator (with NMEA input)
- Easy single port connection to SC-70 Satellite Compass offers heading, rate of turn, position, course/speed and new three-axis speed display for accurate docking and tow building

- Dual video output for multiple monitors (1 DVI-I & 1 RGB) or for connection to a Voyage Data Recorder (VDR)
- Dual SD card slots allow automatic (timed) Radar screenshot archiving & configuration backup/restore
- Dual Radar combination possible - display two River Radar systems on one screen
- Network up to four antennas and processors
- Storage of up to 24 hours of Radar images on SD memory card
- Docking mode available (requires two GPS sensors)
- Displays up to 300 AIS targets, 2 EBL's and 2 VRM's
- Available in United States only

AUTO

Target Tracking

AIS

CAN bus

Radar

Photo: 15" Marine Display
MU-150HD (Optional supply)

NEW

Model FAR-1513-BB/1523-BB ▶▶▶Spec P103

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
- Use Target Analyzer™ to discern hazards simply by looking at the color of their echo
- 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 select target
- AIS compatible out of the box (external AIS input required)
  - Targets are automatically acquired and information can easily be displayed on-screen

UHD Ultra High Definition | TARGET ANALYZER

AUTO | BlackBox | Target Tracking | Ethernet Plug&Play | AIS | VIDEO IN/OUT

Antenna Selections:

Model	FAR-1513-BB		FAR-1523-BB	
Output Power (kW)	12		25	
Size	4' Open	6' Open	4' Open	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).
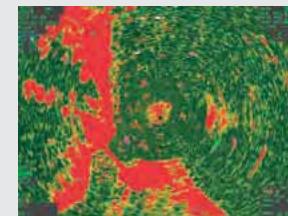
ACE OFF

ACE ON

FAST TARGET TRACKING

After selecting a target, it only takes 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.

Speed and course vector

Before selecting a target
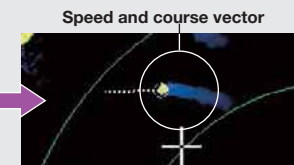
After selecting a target

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 immediately, simply by the color displayed.
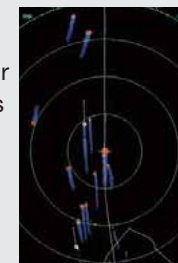
Target Analyzer™ can increase safety, as well as improve situational awareness.

Photo: 15" Marine Display MU-150HD (Optional supply)

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.

Antenna Selections:

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

Model FAR-1518-BB/1528-BB ▶▶▶Spec P103

Black Box Radar

KEY FEATURES:

- FAR-1518-BB/1528- BB 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-BB 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

FAST TARGET TRACKING

After selecting a target, it only takes 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
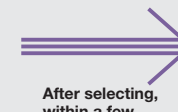
After selecting, within a few seconds
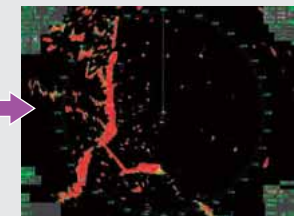
Speed and course vector

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).
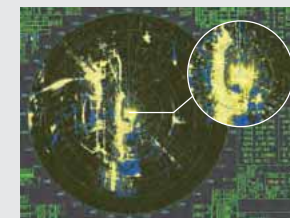

ACE OFF
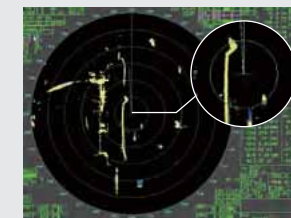
ACE ON

SCALABLE ETHERNET NETWORK SYSTEM

FAR-15x8-BB 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.
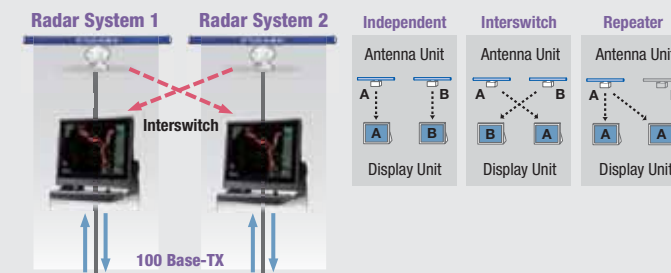
Radar

Winner of the 2019 NMEA Commercial Product of Excellence Award

NEW

NEW

Photos: 19" Marine Display MU-190 (Optional supply)

Model FAR-2218-BB/2228-BB/2238S-BB ▶▶▶Spec P105-106

Black Box Radar

KEY FEATURES:

- FAR-2218-BB/2228-BB Marine Radar meets the criteria for IMO certification for category 2 (vessels below 10,000 GT)
- Use Target Analyzer™ to discern hazards simply by looking at the echo color
- Accurately track other vessels in order to avoid collisions with Furuno's innovative Fast Target Tracking functionality
- Improved sea and rain clutter removal function - Automatic Clutter Elimination (ACE) function provides clear echoes

Model FAR-2238SNXT-BB ▶▶▶Spec P106

NMEA 2019

Black Box Solid-State Radar

- Instant speed vector display for tracked targets - a speed vector will be displayed shortly after clicking on a select 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-22x8 Series can overlay Radar echoes on external ECDIS and GPS Plotter
- Model FAR-2238SNXT-BB-SSD coming soon!

UHD Ultra High Definition

TARGET ANALYZER

NAVnet Connect

AUTO

BlackBox

Target Tracking

Ethernet Plug&Play

AIS

VIDEO

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.

InstantAccess bar™

Radar function menu

Display setting menu
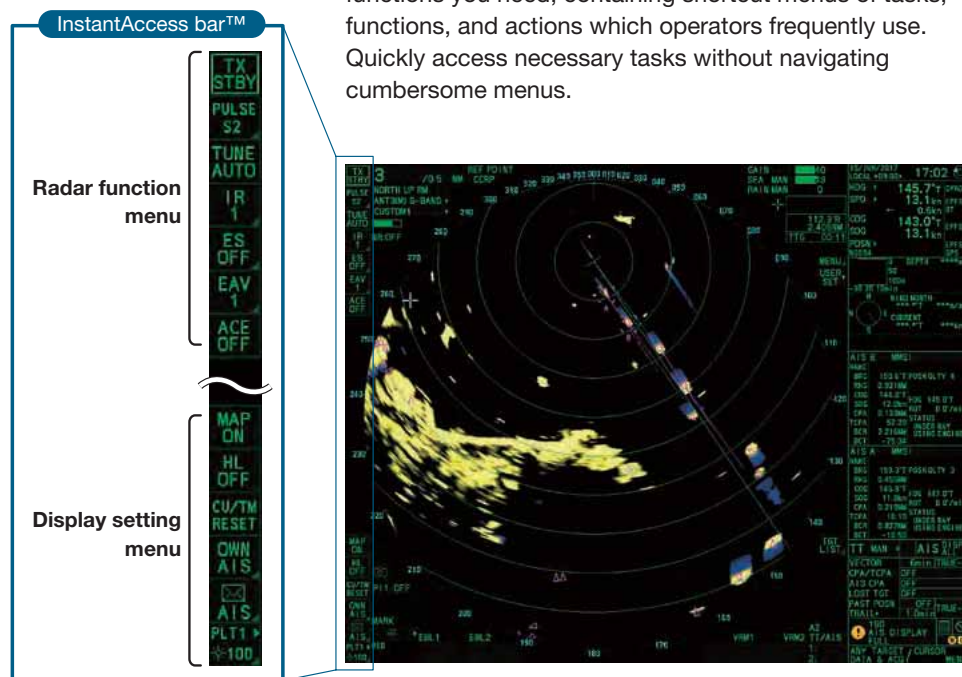
NXT SOLID-STATE RADAR SPECIALIZED IN TARGET DETECTION AND MAINTAINABILITY (S-BAND ONLY)

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

Antenna Selections:

Open Array	X-Band Radar		S-Band Radar	Solid-State Radar
	FAR-2218-BB	FAR-2228-BB	FAR-2238S-BB	FAR-2238SNXT-BB
Output Power	12 kw	25 kw	30 kw	Solid-State, 250 w
Size	4/6.5/8' Open		8/10/12' Open	
Range Scale (NM)	0.125-96			
Rotation Speed	24/42 rpm			

FAST TARGET TRACKING FUNCTION FOR EARLY PREVENTION OF COLLISION

With Fast Target Tracking, the FAR-22x8 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.

Target vector

Target information
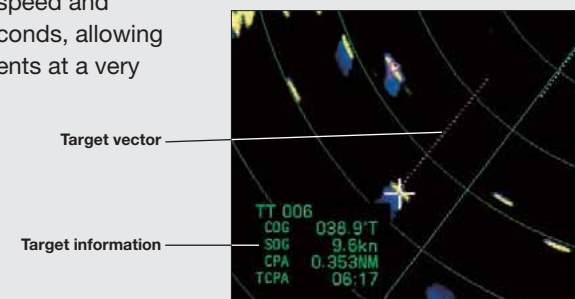
AUTOMATIC CLUTTER ELIMINATION (ACE) FOR UNPRECEDENTED ECHO CLARITY

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 the sea and weather conditions.

(ACE) OFF

(ACE) ON

TARGET ANALYZER™ FUNCTION

Target Analyzer™ function displays moving target, stationary targets, rain, sea surface and targets closing in on your vessel in different colors. Spot hazardous targets immediately, simply by the color they are displayed in. Target Analyzer™ can increase safety, as well as improve situational awareness.
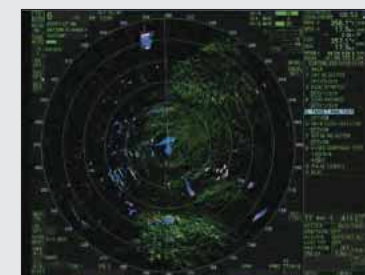
MULTIFUNCTION DISPLAY (MFD) CAPABILITY

Furuno offers workstations that combine flexibility and redundancy. Users may easily select ECDIS, Chart Radar, Conning display or Alert Management System at any multi-function display. Navigators will enjoy reduced workload and significant freedom to move about the bridge. All necessary information is available on a variety of displays and at locations that may be altered as required.

Model FAR-3210-BB/FAR-3220-BB/FAR-3230S-BB/FAR-3230SSSD-BB

Black Box Chart Radar

KEY FEATURES:

- Available X-Band (12/25kW) or S-Band (30kW or 250W Solid-State)
- New Solid-State S-Band transceiver generates clear echo images, even from weak targets and small craft.
- 4', 6.5' or 8' Open Array (X-Band) or 12' Open Array (S-Band)
- IMO Approved Chart Radar
- Newly designed, aerodynamic antennas with enhanced durability
- Less maintenance using brushless DC motor
- Ethernet link between scanner unit and BDU eliminates loss of signal between antenna and processor
- Advanced Furuno technology with new features, such as Automatic Clutter Elimination (ACE)
- Improved Target Tracking function requires only seconds and tracks even high-speed and rapidly maneuvering vessels

- Optional LAN Signal Converter allows users to extend the cable between the antenna unit and processor unit or to utilize the existing cables when retrofitting
- Advanced Interference Reduction (IR) function
- Common sensor adapter makes installation and maintenance simple
- Complies with EC62388 Ed. 2.0, IEC61174 Ed. 3.0, IEC62288, IEC61162-1 Ed. 4.0, IEC61162-2

Antenna Selections:

Open Array	X-Band Radar		S-Band Radar	Solid-State Radar
	FAR-3210-BB	FAR-3220-BB	FAR-3230S-BB	FAR-3230SSSD-BB
Output Power	12 kw	25 kw	30 kw	Solid-State, 250W
Size	4/6.5/8' Open		8/10/12' Open	
Range Scale (NM)	0.125-96			
Rotation Speed	24 rpm (available 42 rpm option)			

ADVANCED TOOLS FOR SIMPLIFIED NAVIGATION

The user interface of the Radar utilizes carefully organized operational tools: The Status Bar and The InstantAccess Bar. These operational tools deliver straightforward, task-based operation, allowing the operator to quickly perform tasks without having to navigate a complex menu tree.
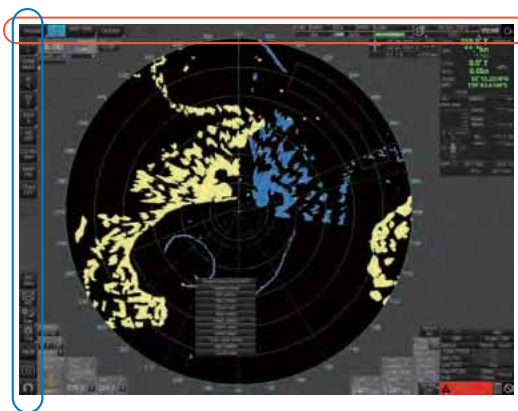
FAST TARGET TRACKING

After selecting a target, it only takes 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.
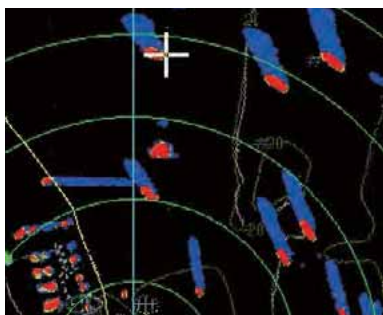
Before selecting a target
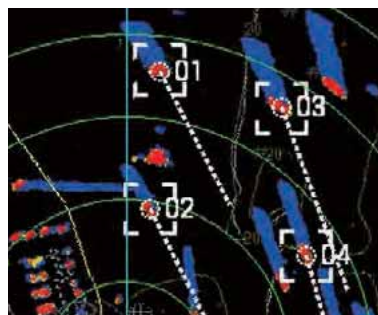
Speed and course vector

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 immediately, simply by the color they are displayed in. It can increase your safety as well as improve situational awareness.
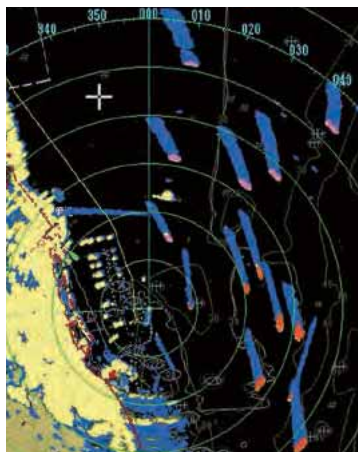
CHART OVERLAY ON RADAR PRESENTATION

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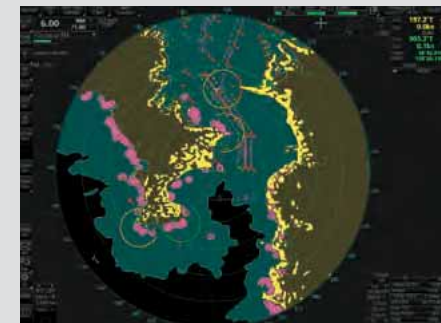
AUTOMATIC CLUTTER ELIMINATION (ACE) FOR UNPRECEDENTED ECHO CLARITY

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).
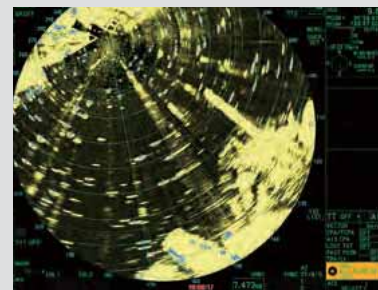

Automatic Clutter Elimination (ACE) OFF
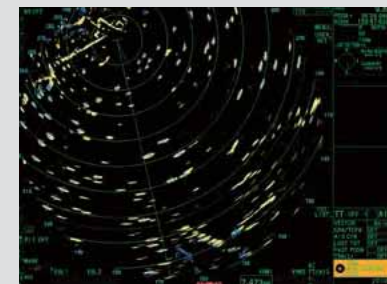
Automatic Clutter Elimination (ACE) ON

NEW, REFINED ANTENNAS WITH HIGH SIGNAL ACCURACY AND EXCELLENT RELIABILITY

High image quality is achieved by the signal processor inside the new antenna unit, directly converting signals from analog to digital before sending them to the main processor unit. The new antenna shape minimizes aerodynamic drag and lightens the burden on the gear box.

Installation and maintenance are now easier than ever. All components of the gear box are integrated into one block that can easily be removed from the gear box when maintenance is required.

X-Band Radar sensor

S-Band Radar sensor

GPS/Chart Plotters

Model GP-33

4.3" GPS Navigator

KEY FEATURES:

- 4.3" Sunlight Viewable color LCD
- Maximum visibility under various ambient conditions, both at night and under direct sunlight (brightness of the LCD is 700 cd/m^2)
- Enhanced data legibility thanks to large characters & high-res display
- Stores up to 10,000 waypoints, 100 routes and 3,000 track points
- 7 display modes available, including 2 user-customized modes
- Supports both NMEA0183 and NMEA2000
- Contact closure capability available on the 10-pin connector
- Enhanced precision utilizing SBAS (Satellite-Based Augmentation System) for more accurate measurements, heading, position, etc.

CAN bus   Ethernet Plug&Play   NAVnet Connect

SEVEN DIFFERENT DISPLAY MODES

The GP-33 provides navigation data and displays it in a wide variety of numerical and graphical formats.

Nav Data

Waypoint

Satellite Monitor

Highway

User Display

COG

Plotter

Easy to mount on/off the bracket.

Model **GP-39**

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 DATA ON NETWORKED DEVICES

Fish Finder   TLL (Target Latitude/Longitude) sentence   **GP-39**

Position information

IMPORT/EXPORT WAYPOINTS AND ROUTES

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

1st GP-39   USB flash drive (Local supply)   **2nd GP-39**

GP-32   Signal converter (Local supply)   **GP-39**
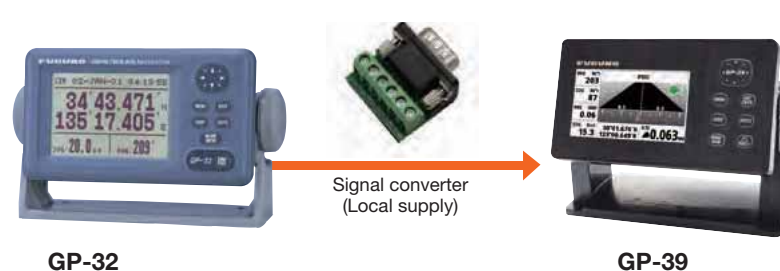
Model **GP-170/170D**

5.7" GPS/DGPS Navigator

KEY FEATURES:

- Full compliance with IMO MSC.112 (73) and IEC 61108-1: performance and testing standards for GPS receiver
- Newly designed GPS chip and antenna unit deliver enhanced stability and precision in position fixing
- Enhanced precision utilizing SBAS (Satellite-Based Augmentation System) and DGPS (DGPS available on GP-170D only; requires a GPS radio beacon receiver and GPA-021S antenna unit, available as options)
- Simplified menu operation
- Bridge Alert Management (BAM) compliant

BRIDGE ALERT MANAGEMENT READY

The GP-170/170D 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.

Model GP-1871F

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

Model GP-1971F

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

KEY FEATURES:

• Easy and intuitive operation with multi-touch interface
• Daylight viewable multi-touch display with excellent readability, brightness of 1000 cd/m² (typical)
• Anti-reflective glass coating, strengthened glass filter
• Anti-fingerprint treatment on AR glass*
• Internal GPS/WAAS antenna for simple and easy installation
• Compatible with standard C-MAP 4D charts
• 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
• Optional: Compatible with DRS4W 1st Watch Wireless Radar
  * GP-1971F only

"I have a pair of GP-1971F's 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
CAN bus
AUTO
3D CHART
Enhanced Sunlight Viewable
Bonded LCD
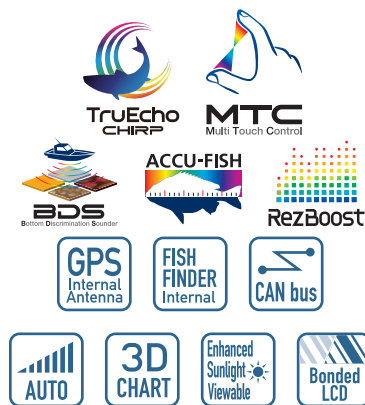
VARIOUS SCREEN MODE OPTIONS AVAILABLE

The Chart Plotter utilizes full-featured C-MAP 4D charts. C-MAP 4D provides powerful data that you can overlay onto a rich vector chart, such as relief vectors, tidal streams and marine plans, significantly boosting situational awareness. Creating routes and waypoints is as simple as touch-and-go. When connected to an AIS receiver, you can see valuable AIS data on the display. C-Weather, which provides downloadable wind, wave, weather, humidity and temperature information to add to your planning, is another standard feature.

Plotter with AIS symbols
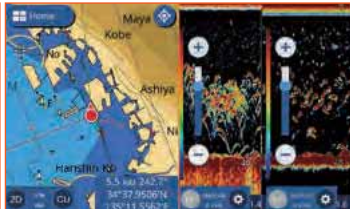
Plotter + Fish Finder
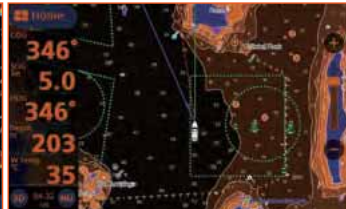
Night mode

Plotter + Instrument (Compass/Data)
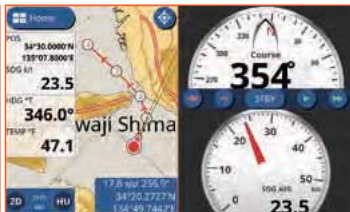
Plotter + Instrument (Autopilot/SOG)

C-Weather information

OPTIONAL: WIRELESS RADAR CONNECTION TO DRS4W VIA iOS

Radar can be overlayed onto the Chart Plotter display via wireless connection to the Furuno DRS4W 1st Watch Wireless Radar. The DRS4W's wireless configuration makes it a breeze to add the compact 19" Radar dome to any vessel. The DRS4W can also display the Radar presentation on one 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.

INTUITIVE GUI: INHERITED FROM NAVNET TZTOUCH2

Tap the "Home Button" for instant access to the main menu and display modes.

Save your favorite display modes in the Quick Page list and easily switch between modes.

Home Menu

Shortcut Menu

BUILT-IN TruEcho CHIRP™ DIGITAL FISH FINDER
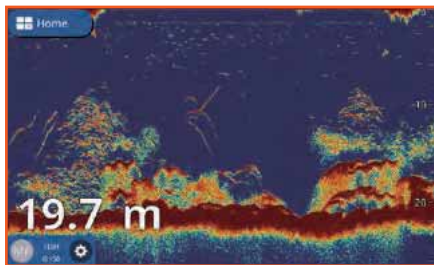
Built-in TruEcho CHIRP™ Fish Finder capabilities. The high level of detail available with TruEcho CHIRP™ technology helps to distinguish fish schools, even when close to the seabed.

* TrueEcho CHIRP™ transducer required.
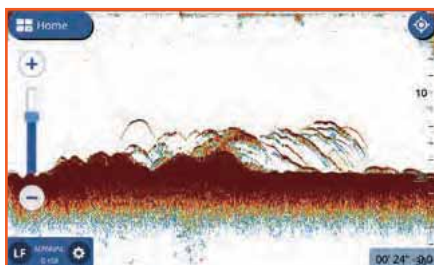
TruEcho CHIRP™ Fish Finder*

Furuno RezBoost™ data processing provides a higher resolution picture of fish schools from a standard 50/200 kHz transducer.

* Must be connected to a compatible dual-frequency transducer.

RezBoost™ Fish Finder*

SPOT AND DIFFERENTIATE FISH FROM THE BOTTOM

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

* Must be connected to a compatible dual-frequency transducer.

ACCU-FISH™*

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

* Must be connected to a compatible dual-frequency transducer.

Bottom Discrimination Function*

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

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Model GP-3700 ▶▶▶ Spec P113

12.1" GPS/WAAS Chart Plotter

Model GP-3700F ▶▶▶ Spec P113

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

KEY FEATURES:

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

SMART FEATURES FOR EASE OF USE

Both the 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.

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.
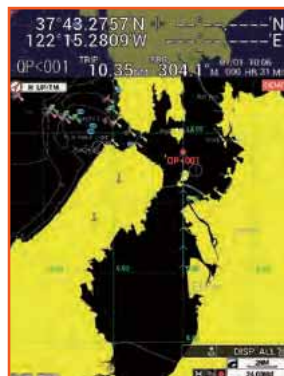
Head Up Mode
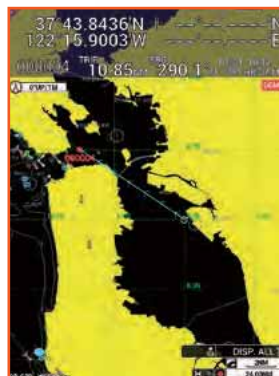
Specified Direction Up Mode

Colorful keys allows 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.

ACCU-FISH AND BOTTOM DISCRIMINATION*

*SEE NOTES

*NOTES:

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

Single Frequency mode
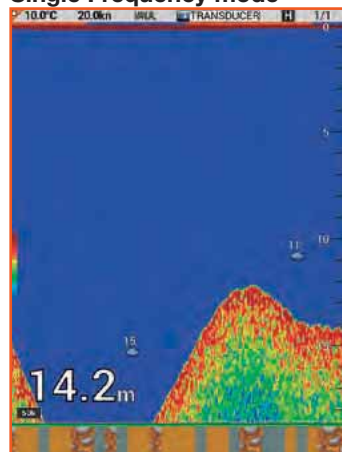
Graphic Mode:

Rocks		Gravel	
Sand		Mud	

Dual Frequency mode
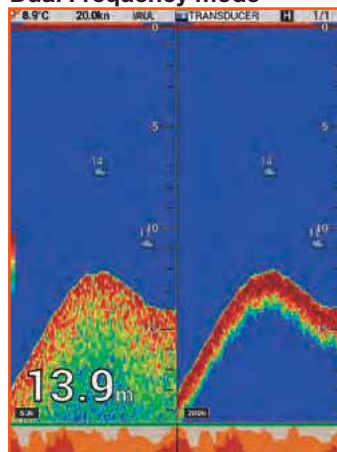
Probability Mode:

Rocks		Gravel	
Sand		Mud	

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 preferences.

*GP-3700F only
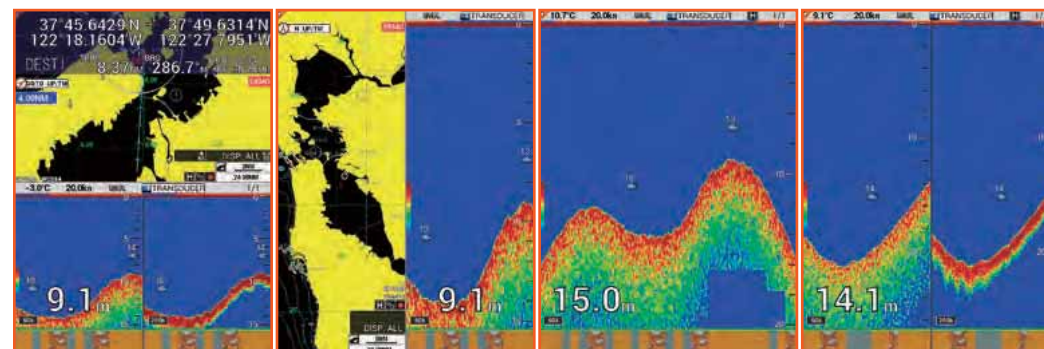
Plotter and Dual Frequency   **Plotter and Single Frequency**   **Single Frequency Fish Finder**   **Dual Frequency Fish Finder**

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

RezBoost

ACCU-FISH

BDS
Bottom Discrimination Sounder

AUTO

Bonded LCD

Enhanced Sunlight Viewable

Polarized Friendly

8.4" Fish Finder

5.7" Fish Finder

KEY FEATURES:

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

BOOST RESOLUTION WITH REZBOOST™

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

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

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

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

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

BOTTOM DISCRIMINATION FUNCTIONALITY

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

Probability Mode:
Rocks   Gravel
Sand   Mud

Graphic Mode:
Rocks   Gravel
Sand   Mud
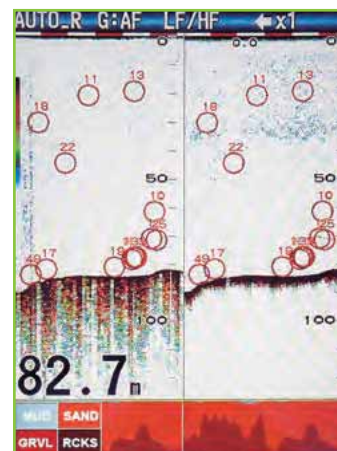
Probability mode
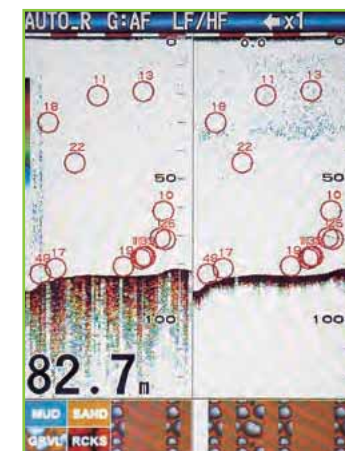
Graphic mode

DIFFERENTIATE WITH ACCU-FISH™

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

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

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

Display fish marks

ACCU-FISH™ OFF

ACCU-FISH™ ON

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 2 Connect
FDF FURUNO Digital Filter
ACCU-FISH 2
Bonded LCD
Enhanced Sunlight Viewable
AUTO
FFS
NMEA 2010/2011 1

Model FCV-295 ▶▶▶ Spec P115
10.4" Color LCD Sounder

Model FCV-1150 ▶▶▶ Spec P115
12.1" Color LCD Sounder
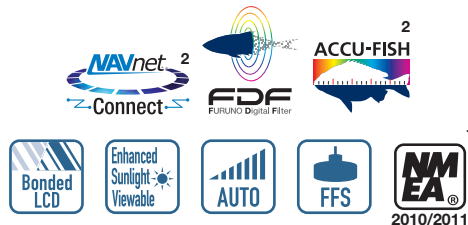
KEY FEATURES:

• 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 connected with CA50/200-1T transducer)
• Bottom Hardness output to TimeZero and PC Navigation suites for 3D mapping (Coming Soon!)

*Requires appropriate sensors
1 FCV-295 only
2 FCV-1150 only

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.
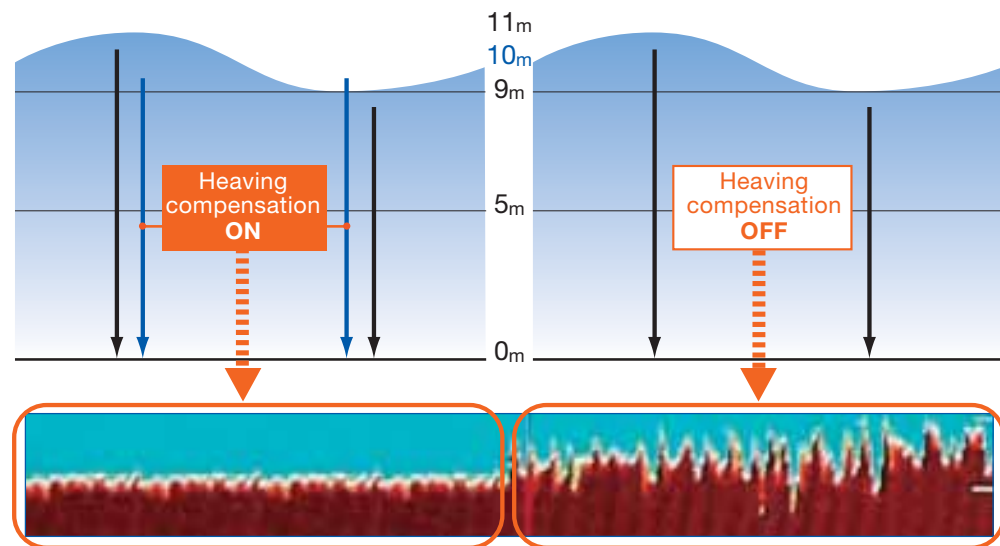
DISCERN BETWEEN STRUCTURE AND FISH RETURNS

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 discrimination between bottom fish and the seabed.

White edge

White line
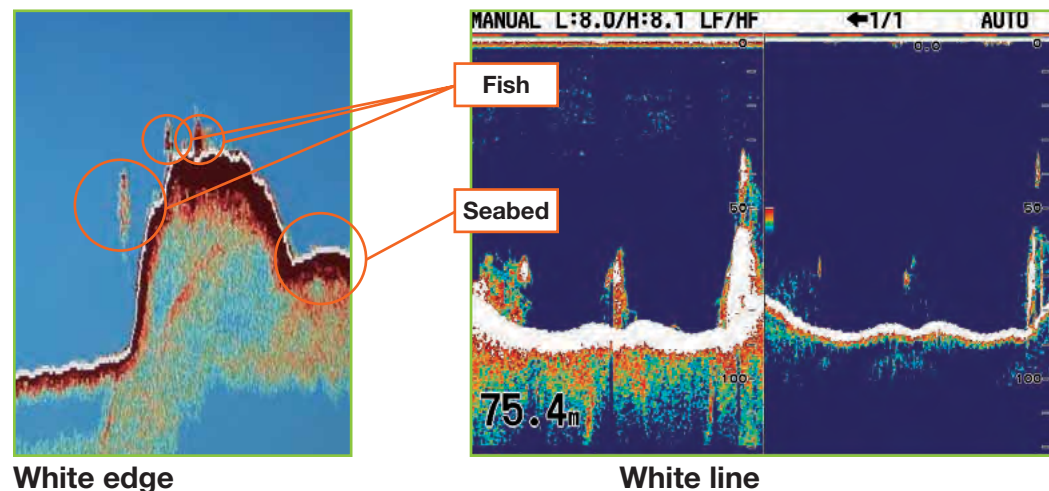
OPTIMIZED WITH FURUNO DIGITAL FILTER

Furuno digital filter optimizes the gain to obtain highly defined images of underwater conditions. The FCV-295 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 reef and even individual fish with absolute clarity.

Fish targets close to seabed
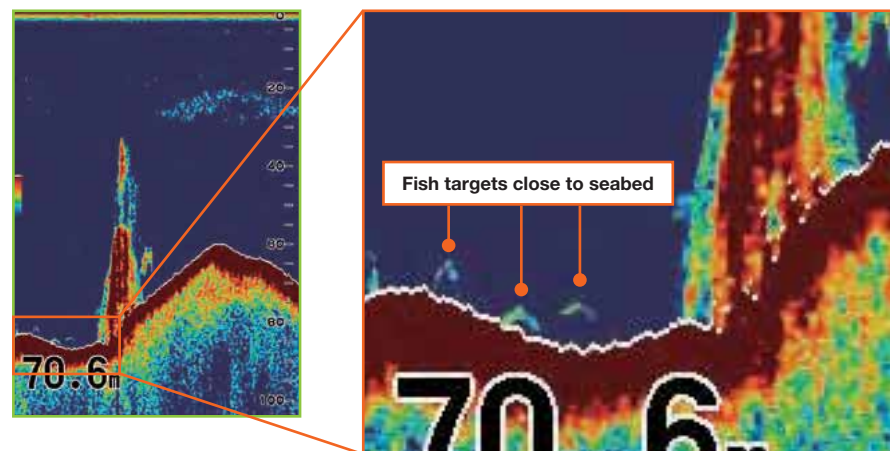
POST PROCESSING GAIN CONTROL

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
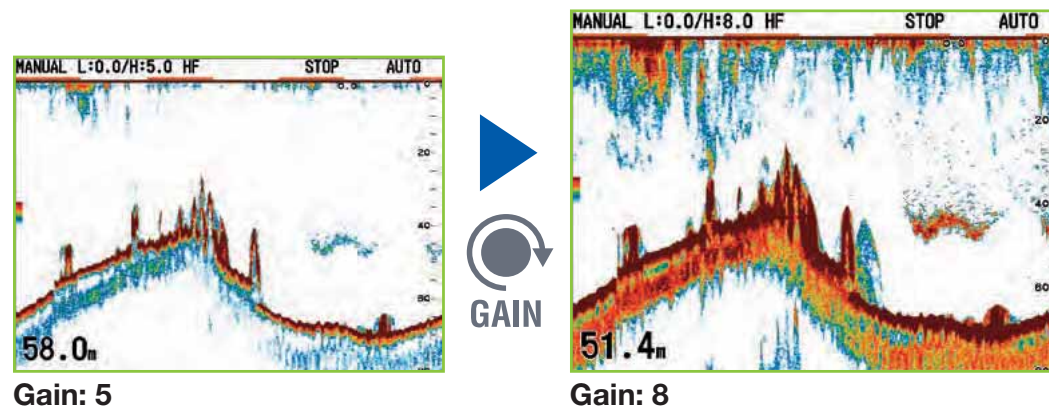
Fish Finders

Photo: 19" Marine Display
MU-190HD (Optional supply)

With a transmission rate that has been increased by up to 1.4 times (200m range), the FCV-1900 series ensures excellent target separation and clarity. You will be seeing individual targets and fish reefs like never before.

FDF
FURUNO Digital Filter

FFS   AUTO   BlackBox
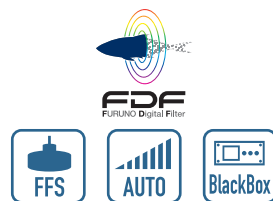
Model **FCV-1900**

▶▶▶ Spec P117

Black Box 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-190HD (Optional supply)

Model FCV-1900B

Black Box HI-REZ TruEcho CHIRP™ Fish Finder

KEY FEATURES:

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

Model FCV-1900G

Black Box TruEcho Chirp™ w/ UNIQUE FISH FINDER INDICATOR

KEY FEATURES:

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

Photo: 19" Marine Display
MU-190HD (Optional supply)

INCREASED TRANSMISSION RATE FOR MORE DETAIL

In low frequency, the fish is 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.
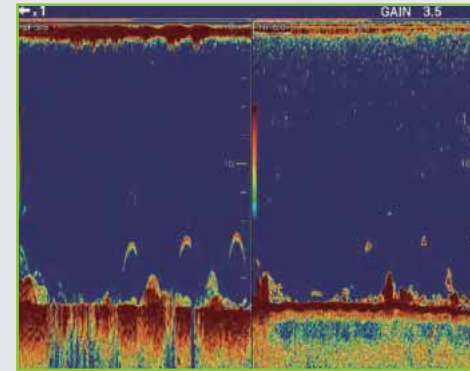
Individual fish
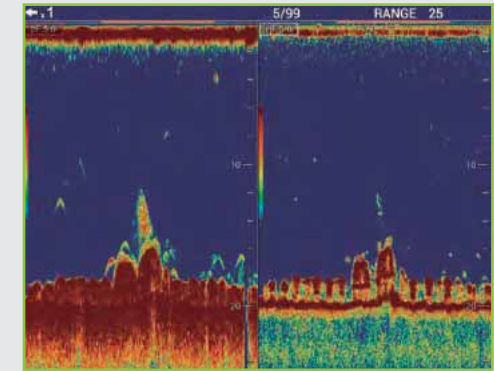
Fish reef

VARIOUS 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.
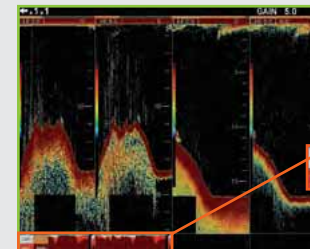
Connect a BBDS1 network fish finder for bottom discrimination.

Display up to four different frequencies
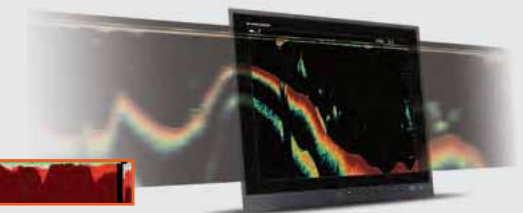
Scroll back function to see where you've been
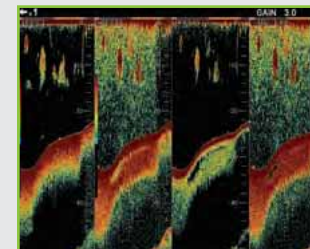
Simultaneous gain setting for increased visibility

Low Frequency   High Frequency (high gain)   High Frequency (low gain)   Mix Display

Sonars

Model CH-500

12.1" Searchlight Sonar

Find fish all around your vessel, not just underneath it!

NMEA2000 Certified   CAN bus   VIDEO OUT
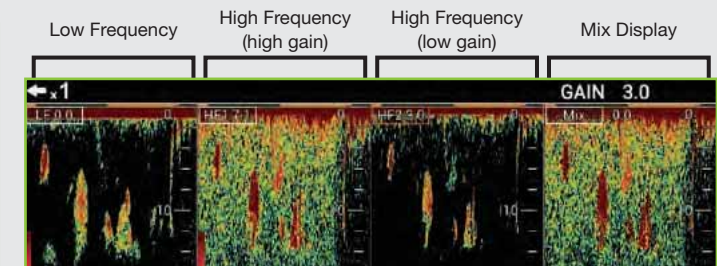
KEY FEATURES:

• 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 20m range
• 6 tilt angles for training speed adjustment according to user's needs
  - Lower tilt angles produce more precise scans, while higher tilt angles are faster
• 11 display modes selectable for every situation
• HD LCD with 1024 x 768 XGA* resolution for detailed echo images and clear view
  * The display is optimized for this resolution.

• Quick Gain Control allows instantaneous gain adjustment
• Built-in motion sensor provides a stabilized target presentation in rough sea conditions
• Audible target detection freeing the user from continuous watch of the display (Requires Loudspeaker option)
• Frequency: 60/88/150/180/240 kHz

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

Bubbles

Small fish school

Big fish school

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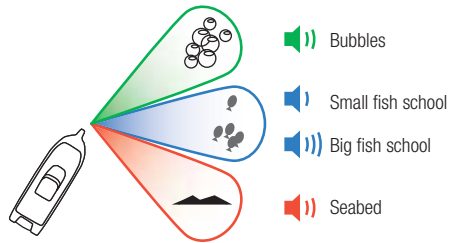
Figure out intuitively what is detected by differentiating their sound with the audible target detection

BUILT-IN MOTION SENSOR PROVIDES STABILIZED TARGET PRESENTATION IN ROUGH SEA CONDITIONS

The CH Series is the first of its class to have in its core an integrated stabilizer. In rough seas, the ship tends 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.

Stabilizer OFF

Stabilizer ON
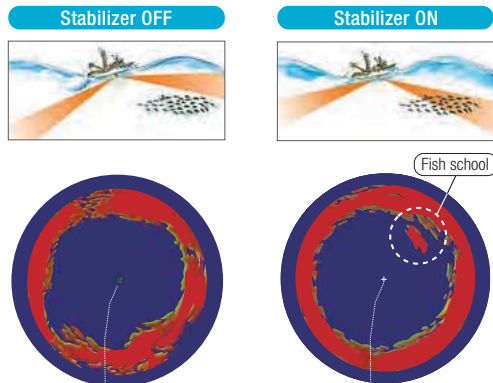
Fish school
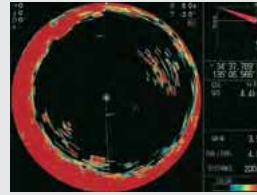
Horizontal

Horizontal

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)
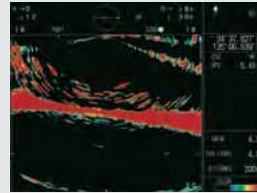
Vertical

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

Full-circle A-Scope

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

Echo sounder

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

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.

Combination displays
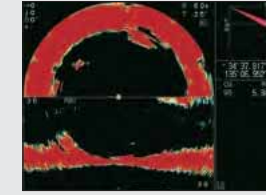
Half-Horizontal + Vertical
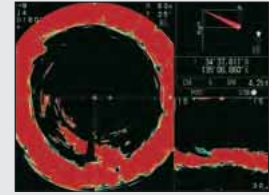
Horizontal + Vertical
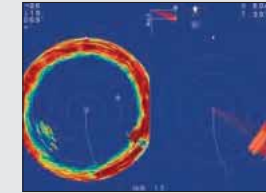
Horizontal + Full-circle A-Scope
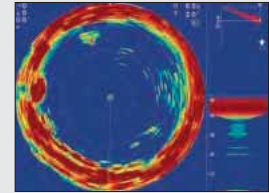
Horizontal + A-Scope
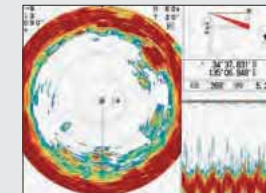
Horizontal + History
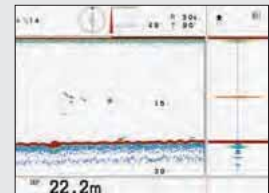
Echo sounder + A-Scope

Vertical Search

Horizontal Search

Sonars

Model CH-600

12.1" Dual Frequency Searchlight Sonar

Furuno Sonar technology delivers a more productive fishing operation.

NMEA2000 Certified | CAN bus | VIDEO OUT
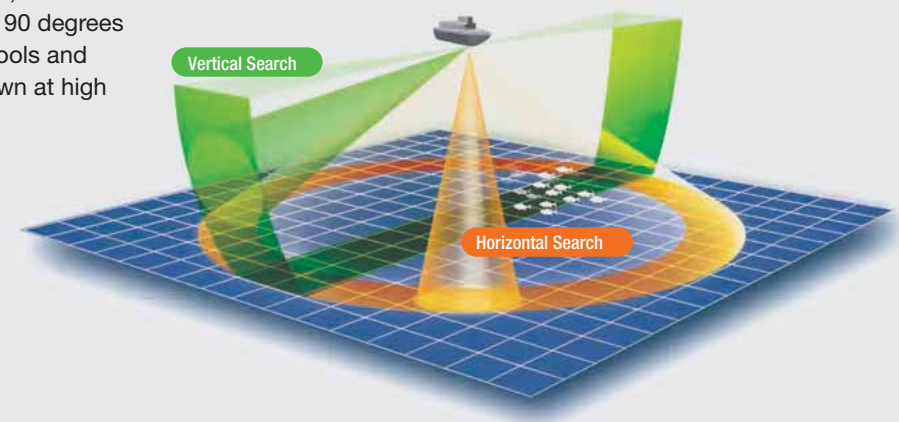
KEY FEATURES:

- 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
- Frequency: 60/153, 85/215 kHz
- Audible target detection freeing the user from continuous watch of the display (available with optional Loudspeaker)

ULTRA-FAST TRAINING SPEED

6° step
Clear echo

24° step
Fast scanning

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.

24° step   6° step

360° scanning

| 24° | 21° | 18° | 15° | 12° | 6° |

Speed for quick finding   Precision for clear echo
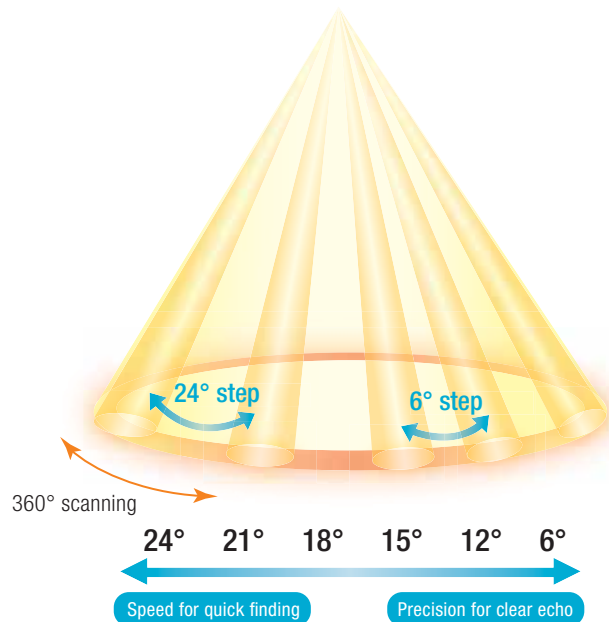
DUAL-FREQUENCY REVEALS THE PRESENCE OF SARDINES AND BAITFISH

With the Horizontal Dual-Frequency mode, both low and high frequency are used and displayed at the same time in split view. By comparing echo shapes at low and high frequency, it becomes possible to ascertain the actual presence of the fish, even the small ones.

Both low and high frequency echoes overlaid to only show the echoes that matter to the fisherman. It becomes easy to identify species regardless of their distance to the ship.

Horizontal Dual-Frequency mode
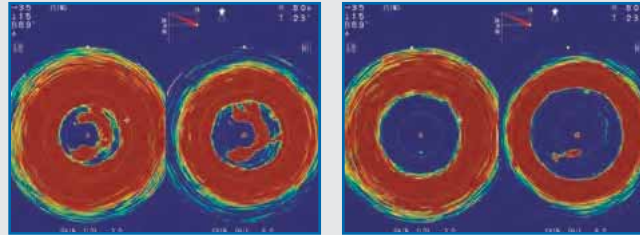
Echoes of Sardine schools
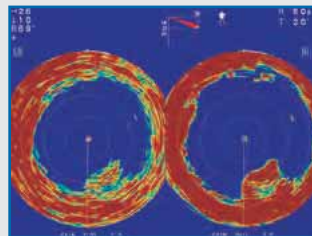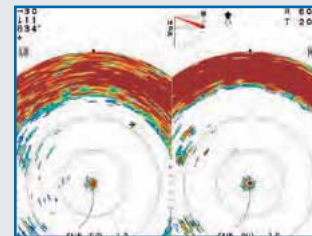
Horizontal Mix Display
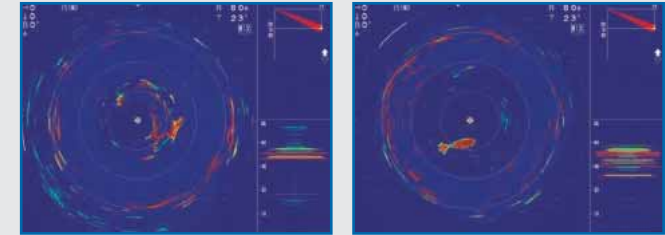
Echoes of baitfish
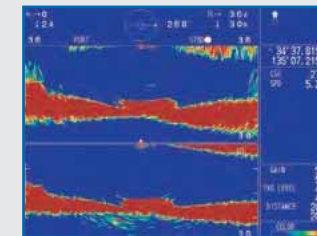
Horizontal Scan

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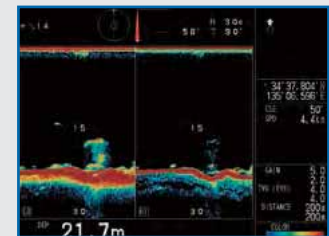
When fully retracted and with the transducer pointed straight down, the sonar can be used as a fish finder for seabed and fish schools

ADVANCED SIGNAL PROCESSING OFFERING HIGH-RESOLUTION OUTPUT

Powerful signal and image processing based on a unique interpolation technology provides images in high resolution. 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 stress on the eyes.

Fish school

Seabed
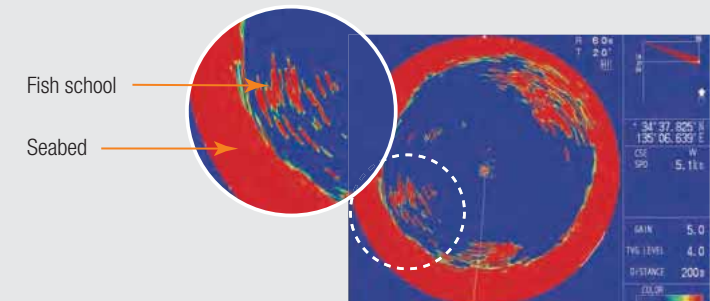
Optional remote controller provides armchair control of range and gain settings

Scan a full

360 degrees in

half of a second!

| Model **CSH-8L MARK-2** | ▶▶▶Spec P120 | Model **CSH-5L MARK-2** | ▶▶▶Spec P120 |

Black Box Omni Sonar   **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

• Variety of available monitors built to meet the needs of tournament vessels

• The 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 on the flybridge

• 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 or 107 kHz

THE SUCCESSFUL FISHERMAN'S SECRET WEAPON!

The CSH-5L/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 battlewagons, midwater trawlers, purse seiners, or anyone desiring more successful fishing expeditions. Operating at 85 KHz, the CSH-8L MARK-2 is a mid-frequency Sonar. Its narrow beam width coupled with its enhanced target identification capabilities make it ideal for searching near the vessel or in shallow waters.

PURPOSE-BUILT TO INCREASE YOUR CATCH

Speed is essential when tracking fast swimming species. The CSH-5L/8L MARK-2 scans a full 360 degrees around the vessel in only half a second, so you'll never miss a fishing opportunity. The transducer consists of fixed, phased-array elements that transmit the echo in all directions simultaneously. Displaying information from every direction around the vessel without having to mechanically rotate the transducer allows this Sonar to scan quickly, greatly improving your operation. The CSH-5L/8L MARK-2's ultra-fast scanning speed and audible target alarm means far less risk of the skipper missing a crucial change in the action.

Detection image of Omni Sonar
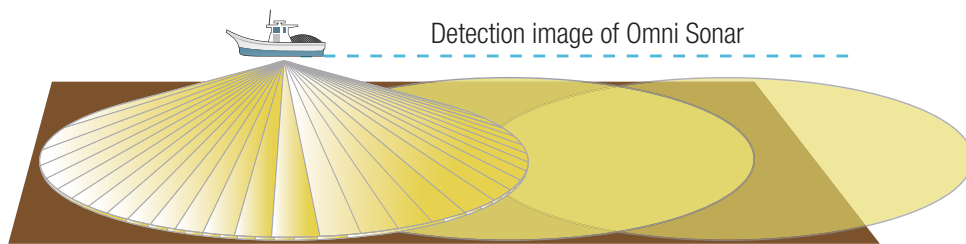
SIMPLIFIED INSTALLATION, SIMPLIFIED CONTROLS

The CSH-5L/8L MARK-2's compact keyboard and Black Box configuration are designed to offer a flexible installation, and a variety of monitors are available to suit your installation and operational requirements. Furuno's MU-series Marine Monitors are specially designed to meet the requirements of marine professionals around the world. An additional display and a small remote controller can be simply plugged into the processor unit to add a fully functional second station.

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 1000ft 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.

SELECTABLE USER-FRIENDLY OPERATING MODES
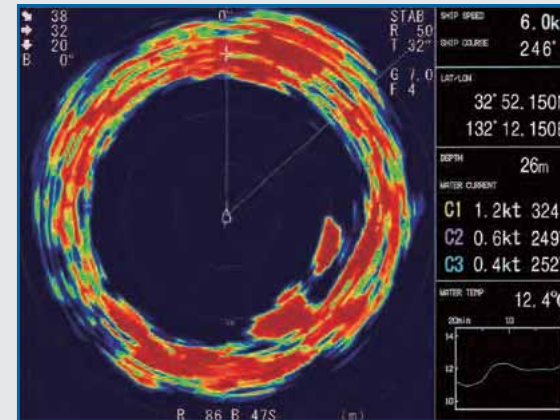
Sonar Display
Navigation data can be displayed in the text window, with connection of appropriate sensors. This mode is useful for detecting and tracking schools of fish.
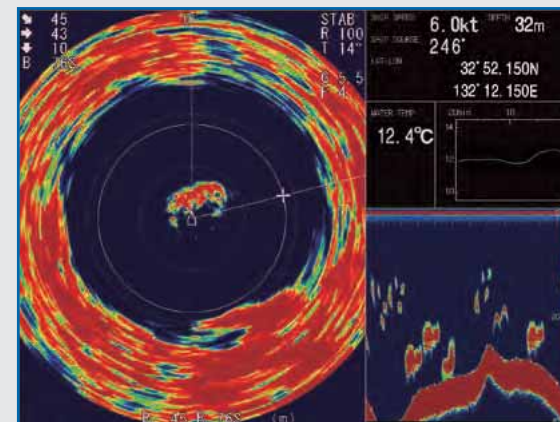
Sonar + Fish Finder*
The Sonar picture appears on the left and the signal fed from the Fish Finder at the lower right side of the screen. This mode is suitable for judging fishschool concentration.
 * Interface with Fish Finder required.
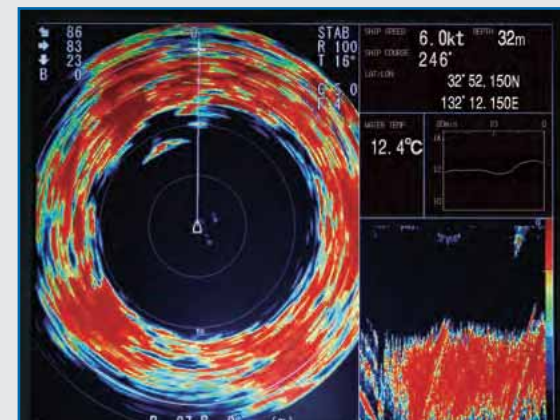
Sonar + Audio
Sonar picture appears on the left and the audio display at the lower right side of the screen. This mode is useful for analyzing echoes in a desired area.

Model DFF-3D

Network Multi Beam Sonar

KEY FEATURES:

• Outer beam detection range is up to 200m in a 120-degree swath port and
  starboard direction*
• Deep water, main beam penetration directly under the boat is approx. 300m*
• Complete set of menus in each display mode
• The built-in motion sensor (standard supply) stabilizes the display to give
  clear and stable images, even under rough sea conditions
• 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
Frequency	165 kHz
Range Scale	Up to 1,200m
Detection Range	200m* (Side beam best performance) 300m* (Main beam directly under boat)
ACCU-FISH	N/A
Bottom Discrimination	N/A
Transducer	800W

* Depending on bottom type and water conditions.

2017

INNOVATIVE TOOL FOR EXPLORING THE WATER COLUMN AND SEABED
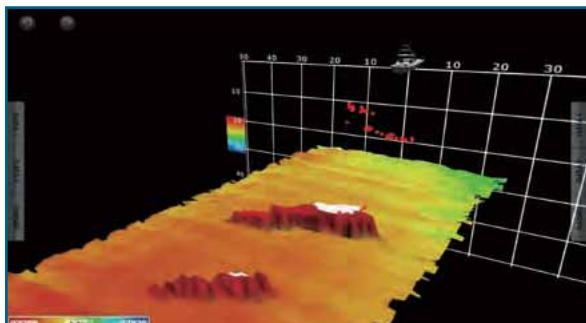
3D History

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.
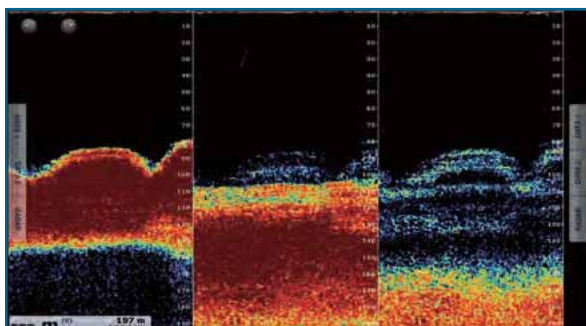
Triple/Single Beam Sounder

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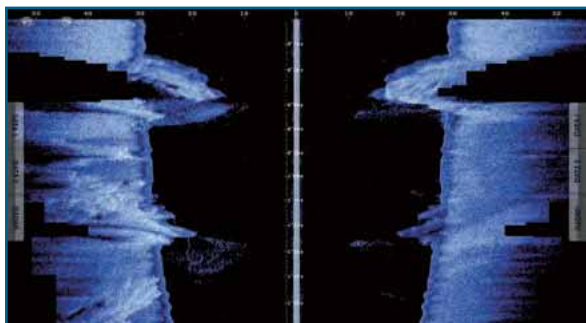
Side Scan

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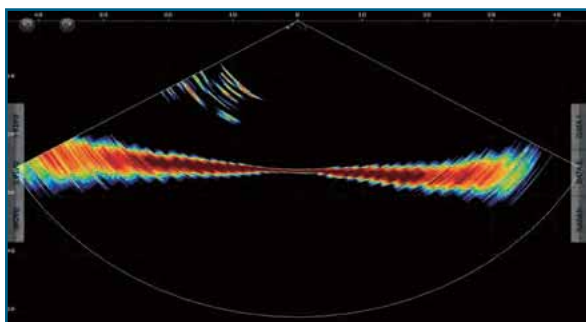
Cross Section

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

UNDERSTAND FISH DISTRIBUTION EASILY, AT-A-GLANCE!

You may think you've seen 3D Multi Beam 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. We're talking 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. Now you can see fish schools and the underwater landscape at great depths in amazing detail. The DFF-3D turns your NavNet TZtouch, TZtouch2, or TZtouch3 MFD into a Multi Beam 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.
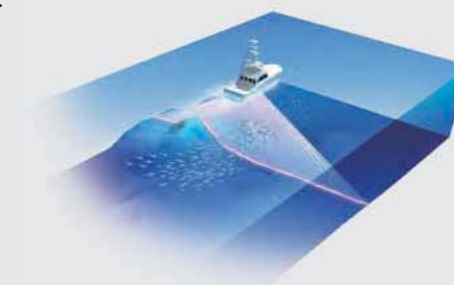
A TRANSDUCER OPTION FOR EVERY VESSEL

With the DFF-3D, there is a transducer to meet the needs of any installation. Thru-Hull, Transom Mount, 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/roll/yaw. There are even combo transducers that combine DFF-3D with either CHIRP or dual-frequency 50/200 kHz elements, so your Multi Beam 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

wassp
MULTIBEAM
SEE IT ALL

MULTI BEAM   TruEcho CHIRP

AUTO   BlackBox   Ethernet Plug&Play

Model WMB-1320F/1320S/4340/6340   ▶▶▶Spec P121

F3 and F3X Series Multi Beam Sonar

KEY FEATURES:

- The 3rd generation WASSP WMB-1320F is designed for fishing and mapping operations, allowing you to maximize your catch while minimizing your time at sea
- The entry-level WASSP WMB-1320S for mapping and survey is now more sensitive, with a higher dynamic range and lower noise level
- Built for fishing and mapping, the WASSP WMB-4340 delivers mapping at over 500 meters, and sounding at over 550 meters depth
- Built for fishing operations, the WASSP WMB-6340 shows fish targets at over 850 meters, with bottom detection at over 1,000 meters depth
- Save bathymetric recording data directly into standard CDX user interface software
- Cost-effective solution for multiple applications
- Choose your own functions with new license options
- TimeZero compatible with optional license

Visit www.wassp.com for complete details

	WASSP S/F3/F3X
Frequency	68-92 kHz (WASSP S) or 136-184 kHz (WASSP F)
Range Scale	Up to 1,000 meters
Fish Detection Range	Up to 850 meters

* Depending on bottom type and water conditions.

GENERATE YOUR OWN PERSONAL MULTI BEAM CHART
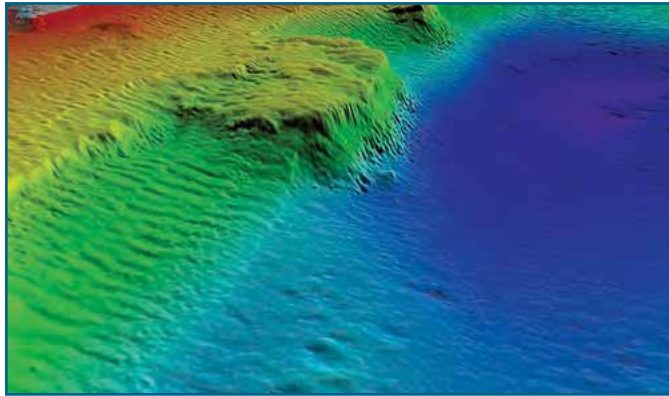
WASSP 3D

The WASSP F3/S3 and new 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 even in the most demanding marine environments, each and every time.

CUSTOMIZE YOUR WASSP WITH LICENSING OPTIONS

Outstanding performance, versatility and value. That's what you expect and exactly what you get with the WASSP F3/S3/F3X Multi Beam Sonars. These next generation WASSP packages deliver on every front – accurate, versatile, user-friendly, and scalable to your exact needs. The system has a wide range of features and capabilities, optimized for all types of inshore and offshore fishing, and/or for generating a complete picture of seafloor bathymetry for mapping and survey, ensuring efficiency and increased productivity, whatever model you employ.

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.
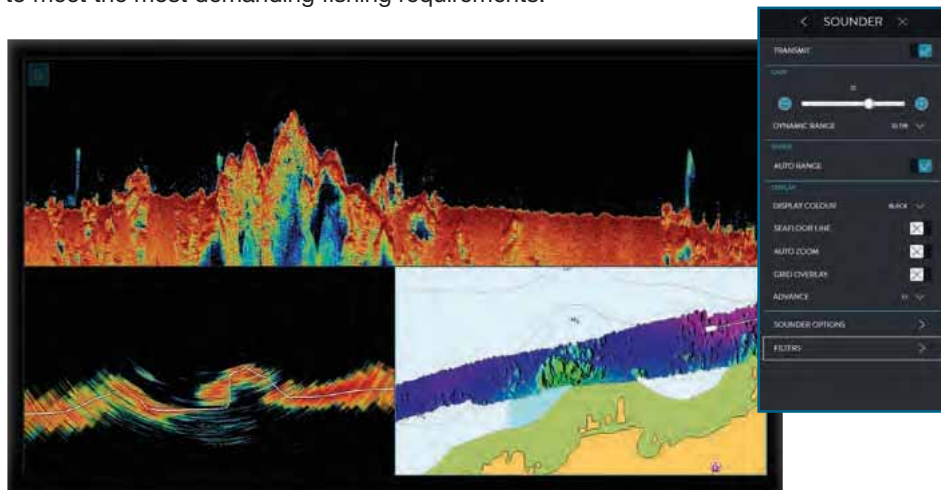
WIRELESS LINK TO TENDER PROVIDES SAFE PASSAGE IN POORLY CHARTED AREAS

WASSP's next generation DRX based Multi Beam Sonar has taken the important step of going wireless. This wireless link technology allows RHIB's 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 ships bridge and its decision makers.

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 of the 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.

VARIOUS PRESENTATION MODES
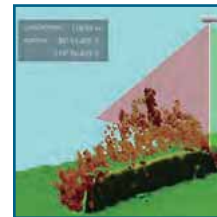
| 3D Fish Density Overlay | Fish Finder | 2D Mapping to 500m | Backscatter (Bottom Hardness) at 200m |
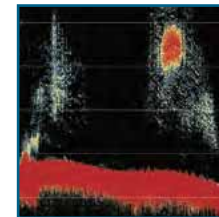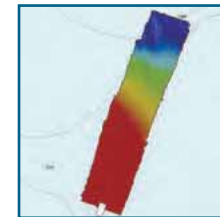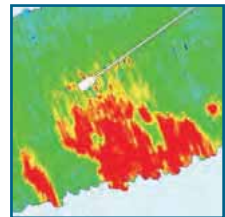
ALL-IN-ONE DRX TRANSCEIVER IS VERSATILE AND READY FOR THE NEXT ADVANCES IN TECHNOLOGY

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.

WASSP TRANSDUCER

The WASSP Sonar Transducer is available in 2 frequencies:

- 136-184 kHz Wideband (160 kHz center) for WMB1320F, WMB1320S, and WMB4340
- 68-92 kHz Wideband (80 kHz center) for WMB6340

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 · FPS FURUNO Power-assist Steering · FANTUM FEEDBACK

Bonded LCD · CAN bus · Enhanced Sunlight Viewable · NMEA2000 Certified · Bluetooth®

Self-Learning Autopilot with Gesture Controller

Self-Learning Autopilot

KEY FEATURES:

- Self-Learning and adaptive software; each time the boat goes to sea, the software learns about sea conditions and calculates the best adjustment for smooth steering
- Fantum Feedback™ offers simplified installation (no need for physical rudder feedback unit while delivering enhanced steering control
- Volvo Penta IPS, Yamaha Helm Master™, Yanmar, and Seastar VCS compatible
- Easy installation and smart network-based system configuration
- Waterproof Processing Unit (IP55) and Control Unit (IP56)
- Optional revolutionary SAFE HELM and POWER ASSIST brings unrivaled steering control and comfort at the helm*
- Selectable "Economy" and "Precision" Navigation Modes combine adaptive technology providing fuel and power savings of 2.5% or more**
- "Precision" provides for tighter course keeping, within 0.01 NM of the set course
- Perfect for inboard or outboard power boats and sail boats (NAVpilot-711C only)
- Autopilot control available from NavNet TZtouch3/TZtouch2/TZtouch/GP-1871F/1971F

* Required Options - HRP11 or HRP17 Pump and FPS8 Power Steering Module.

** Based on Furuno testing and "Scenarios for a Clean Energy Future 2000" - U.S. Department of Energy (www.ornl.gov/sci/eere/cef)

JUST PUSH, POINT AND SHOOT! (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!

Bluetooth

* Bluetooth communication between Processor Unit and Gesture Controller only.

Push   Hold the button and point to the desired heading   Release

Gesture Button
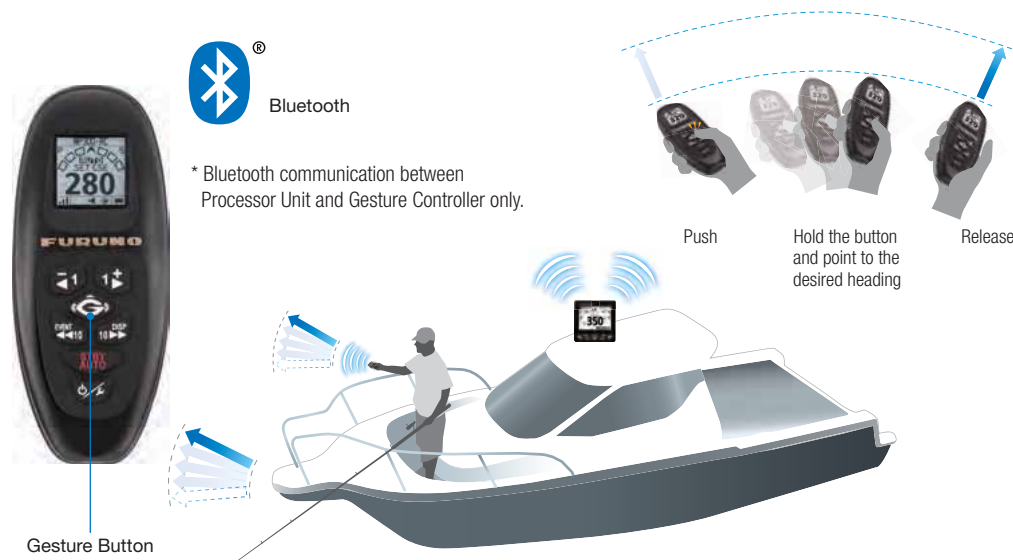
GRAPHIC DISPLAYS

Several types of graphic displays are available, allowing you to customize the data to suit your own preferences with either 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™

Compass

Highway Mode Day/Night

Wind

Rudder

Engine Speed
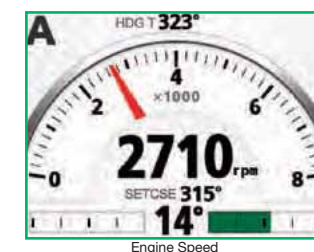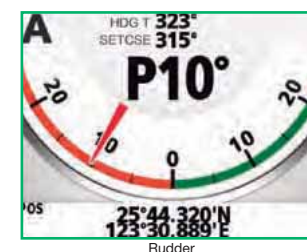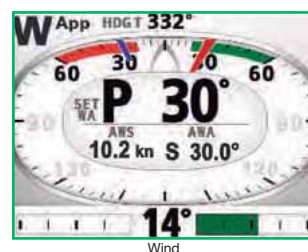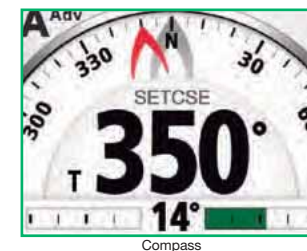
"SABIKI™ MODE" FOR NAVPILOT-300 OR NAVPILOT-711C

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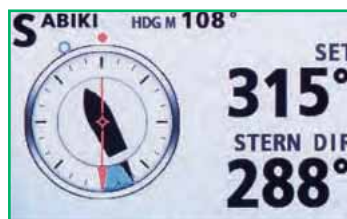
SABIKI™ mode

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, the 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.

SABIKI™ "ON"

Wind or Current

SABIKI™ "OFF"

Wind or Current
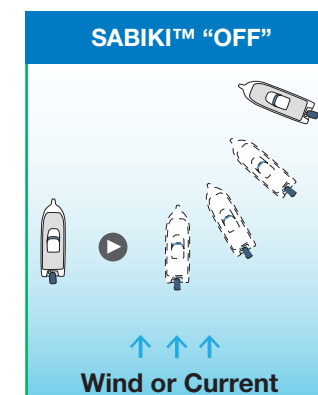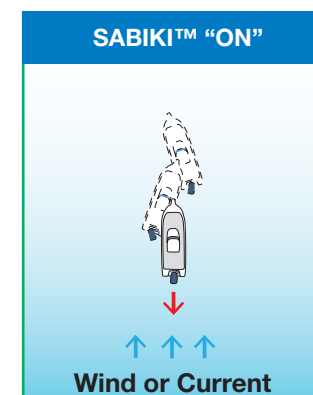
Instrument/Data Organizers

Model FI-70

▶▶▶Spec P125

4.1" Color LCD Instrument/Data Organizer

KEY FEATURES:

- Designed to perfectly match NavNet TZtouch/TZtouch2/TZtouch3 and NAVpilot-300/NAVpilot-711C on your helm
- Clear 4.1" screen that is viewable even under direct sunlight
- Simple and intuitive interface allows full customization
- Bonded color LCD ensuring condensation free operation, as well as great visibility
- Use legacy wind sensors (FI-5001/FI-5001L) with the analog IF-NMEAFI Converter
- Low power consumption (0.15A max)
- Simple AIS display through connected CAN bus devices
- Share language and brilliance settings between FI-70s when grouping them together

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 easily be 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.
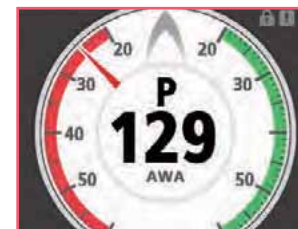
Heading   Wind (CH AWA/AH TWA)   Engine RPM (Single)

AIS
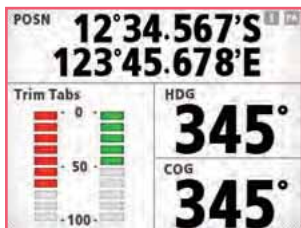
Graph

Timer

Data Box (Split)

Data box (Single)

Rudder

Roll & Pitch

Highway

Engine RPM (Triple)

DAY AND NIGHT MODES AVAILABLE

Day and Night modes are 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.

SENSORS AND ACCESSORY OPTIONS

Model FI-5001/5001L

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

Model DST-800

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

Model FI-5002

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

Model IF-NMEAFI

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

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.

DIAGRAM SETUP EXAMPLE

FI-5001/FI-5001L
Wind Transducer

IF-NMEAFI
Analog NMEA Data Converter

FI-70

NAVpilot-300/
NAVpilot-711C

NavNet TZtouch/TZtouch2/TZtouch3

FI-5002
Junction Box

FAP-7002
Processor unit

FI-5002
Junction Box

CAN bus
Others

DST-800
Depth/Speed/Temp Sensor

PG-700
Heading Sensor

Transducer*

Model MU-150HD - 15"

XGA (1024 x 768) Monitor

Model MU-152 - 15"

XGA (1024 x 768) Monitor

Model MU-190 - 19"

SXGA (1280 x 1024) Monitor

Model MU-190HD - 19"

SXGA (1280 x 1024) Monitor

Model MU-231 - 23.1"

UXGA (1600 x 1200) Monitor

PICTURE IN PICTURE (PIP)
(MU-150HD/152/190HD/190/231/270W)

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

SLIM, LIGHTWEIGHT AND COMPACT
(MU-150HD/152/190HD/190/231/270W)

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-190HD   MU-150HD

WATERPROOF
(MU-150HD/152/190HD)

The MU-150HD/152/190HD has a waterproof display and is built to stand up to tough marine conditions when mounted at fly bridge console. The display can be rinsed in water for easy, worry-free cleaning.

LOW POWER CONSUMPTION
(MU-150HD/152/190HD/190/231)

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

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

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

U.S. only
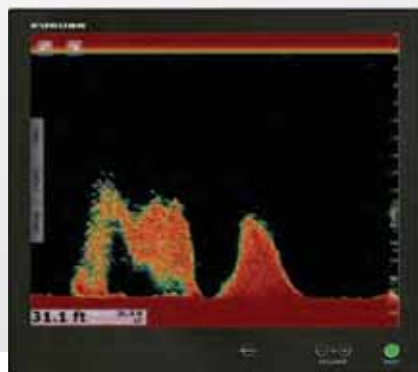
Model MU-175T - 17"
SXGA (1280 x 1024) Touch Monitor

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

Model MU-270W - 27"
WUXGA (1920 x 1200) Monitor

VIDEO IN

	MU-150HD	MU-152	MU-190HD	MU-190	MU-231	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 by DVI signal	✓	✓	✓	✓	✓	✓	✓	✓	✓
1,000 cd/m^2 brightness provides superior visibility even in direct sunlight	✓	—	✓	—	—	—	✓	✓	✓
Built-in scaler allows various resolutions	VGA to SXGA	VGA to SXGA	VGA to SXGA	VGA to SXGA	VGA to UXGA	SVGA to WUXGA	VGA to SXGA	VGA to SXGA	SVGA to HD
Selectable inputs include RGB analog, DVI (Digital Video Interface) and Composite	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multi-Touch Control - compatible with NavNet TZtouch/TZtouch2/TZtouch3	—	—	—	—	—	—	✓	✓	✓

Remote Displays

Model RD-33

▶▶▶Spec P129

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 visual aid
- Full-screen single box presentation down to six-way split screen presentation available
- Supports both CAN bus and NMEA0183 interface
- Two independent CAN bus input and output ports incorporated for daisy chain networking
- Internal NMEA0183/CAN bus conversion capability available
- Straightforward operation comparable to 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, color 4.3" LCD may be installed in a compact space, remote from its data sources. The screen is impressively bright, remarkably crisp and easy to read. Various display modes are available, including Speedometer, Highway and Text. The Text mode presents up to six of the most necessary types of data. The display layout can be customized for your specific needs. This versatile product can also be added to a NavNet system, displaying a variety of navigation data from the CAN bus network.

NEW AND IMPROVED LOOK AND FEEL

The 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.

CAN bus | Enhanced Sunlight Viewable | NAVnet Connect

DISPLAY OPTIONS IN TWO DIFFERENT STYLES

Wind A

Wind B

SOG A

SOG B

CUSTOMIZABLE SPLIT-SCREEN PRESENTATION MODE

You can customize the view to display the 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
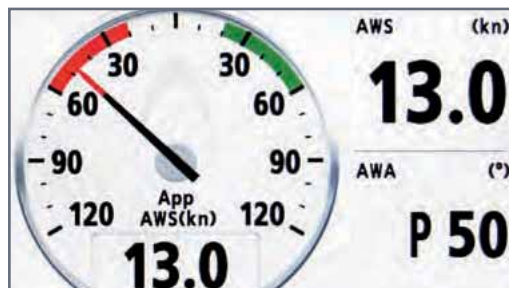
6-Way Split

Model **RD-50**

▶▶▶Spec P129

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 display background color for use both day and night
- Up to 10 displays can be connected with a daisy chain cable, with display brilliance able to be tuned from one dimmer controller

VERSATILE AND BRIGHT DATA DISPLAY

The RD-50 is an 8.4" Color LCD remote display unit 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.

Compasses

NEW

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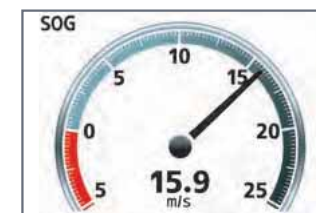
The perfect heading solution for any vessel installations, even where the view of satellites may sometimes be obstructed!

Multi-GNSS

NMEA2000 Certified

NAVnet Connect

Model SCX-20

NMEA2000 Satellite Compass™

Model SCX-21

NMEA0183 Satellite Compass™

KEY FEATURES:

- Perfect for NavNet TZtouch/TZtouch2/TZtouch3, NAVpilot-300/711C, Sonar 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!

	SCX-20	SCX-21
Heading Accuracy	1.0° rms (static), 0.5° rms (dynamic)	
GPS Fix	5m approx. (2 drms, HDOP < 4)	
MSAS Fix	4m approx. (2drms, HDOP < 4)	
WAAS Fix	3 m approx. (2drms, 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, while the SCX-20/21's four antennas can calculate heading information using any one of the six baselines drawn between the four antennas.
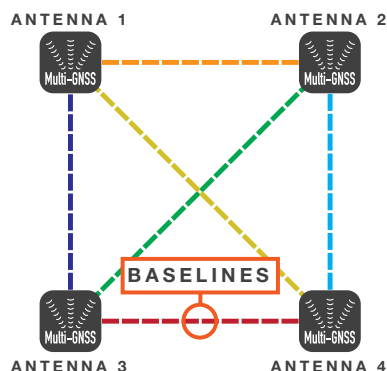
The unprecedented quad-antenna design of the SCX-20 and SCX-21 makes them capable of calculating extremely accurate heading, pitch, roll, and heave information. They are the perfect heading solution for complex vessel installations where the view of satellites may sometimes be obstructed.

TRUE MOTION ECHO TRAILS FOR RADAR/CHART PLOTTERS

True echo trails are available when the SCX-20 or SCX-21 is connected to your 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.
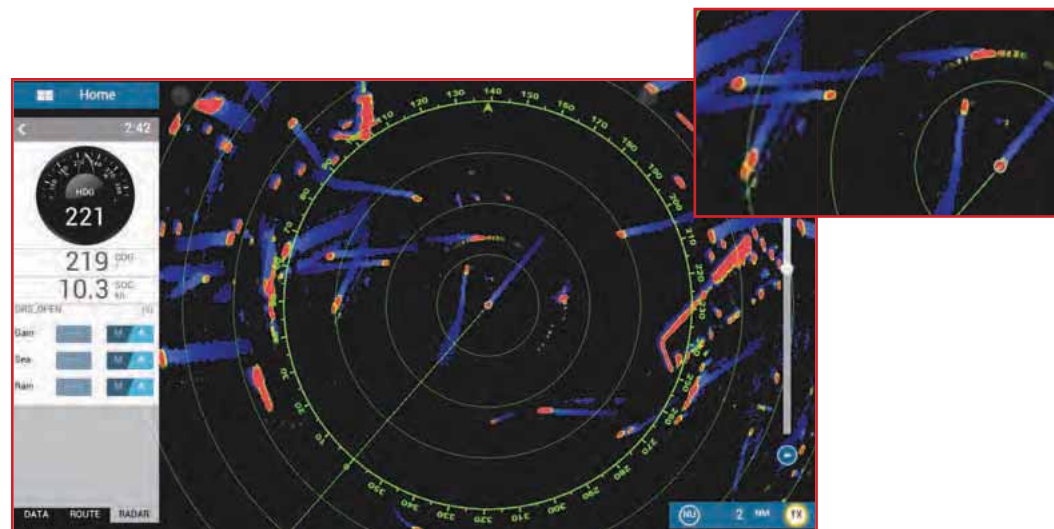
RADAR ECHO TRAIL ZIG-ZAG DOMINATION

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
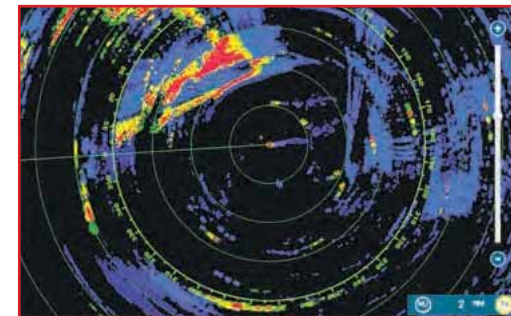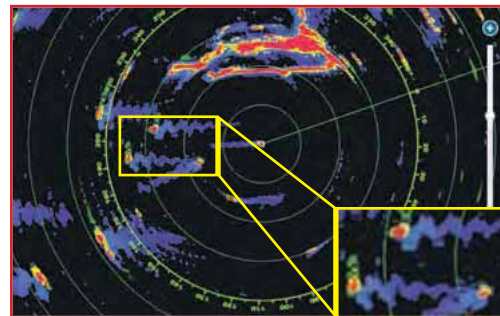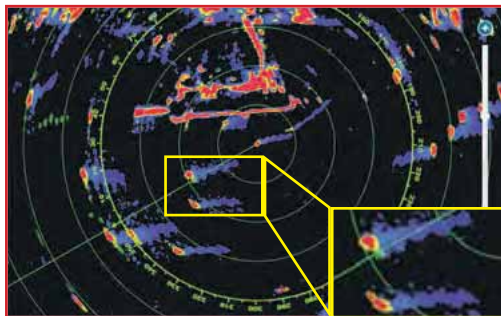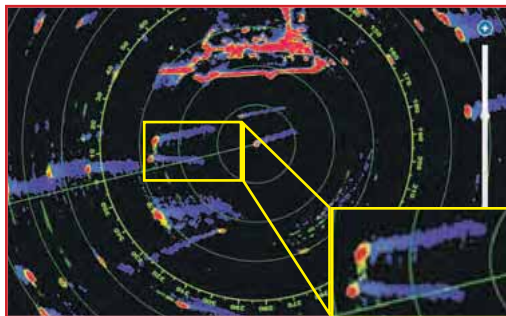
Company C

Company A

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

Compasses

Model SC-33

NMEA2000 Dome Satellite Compass™

KEY FEATURES:

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

CAN bus   NMEA2000 Certified   NMEA®   NAVnet Connect

2009/10/11/19

BASIC SPECIFICATIONS OF SC-33 (PAGE 130)

	SC-33
Heading Accuracy	0.4° rms
GPS Fix	10m (95%)
GNSS Fix	3m (95%)
Follow-up Rate	45° per sec.
Setting Time	1 min
Antenna Unit	Radome

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.
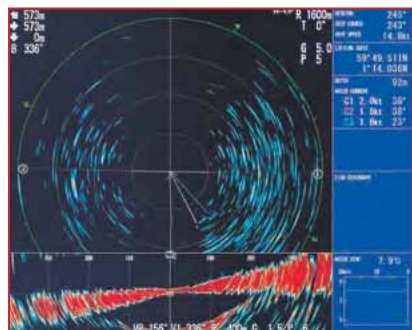
BEFORE stabilization

AFTER stabilization
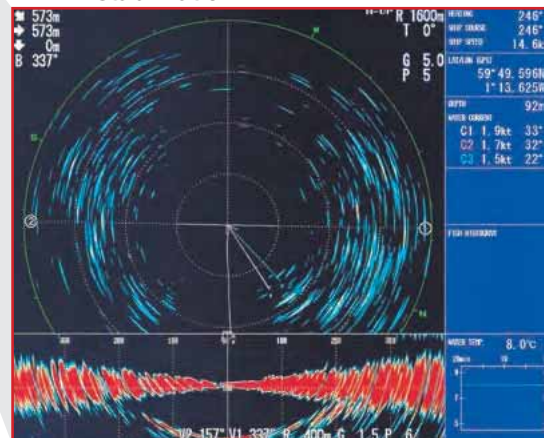
HEAVING COMPENSATION FOR FISH FINDERS

Even in heavy seas, accurate heave compensation from the SC-33 enables Fish Finders, such as the FCV-1150 or NavNet TZtouch/TZtouch2/TZtouch3, to show you an unwavering presentation of the seabed, without the undulations caused by sea conditions.

Heaving compensation **ON**

Heaving compensation **OFF**
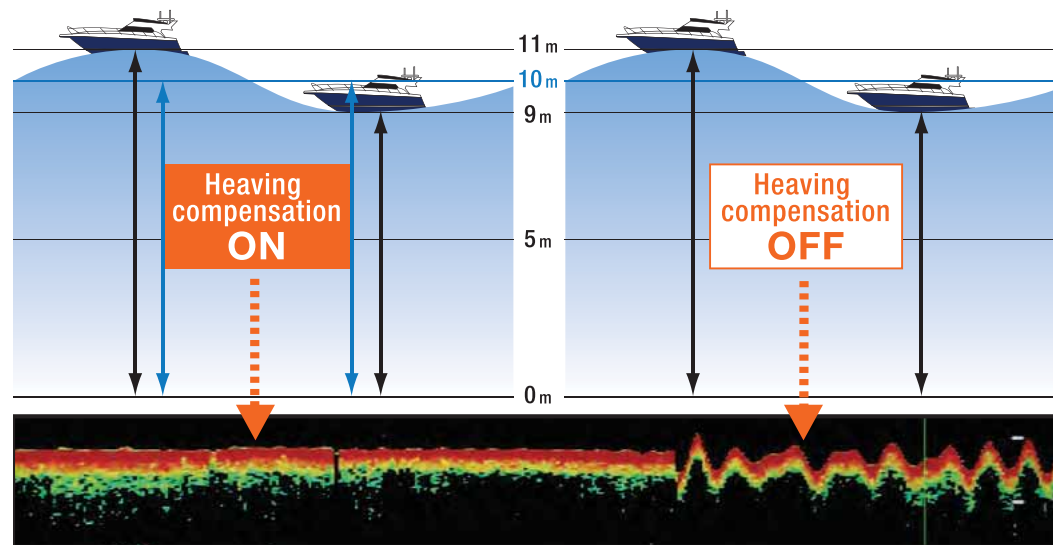
SC-703 for SC-70

SC-1303 for SC-130

CAN bus Multi-GNSS NAVnet Connect

Satellite Compass™

Satellite Compass™

KEY FEATURES:

- Tri-sensor 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 the IEC and ISO standards
- Rapid follow-up rate 40°/s (twice the IMO high speed craft requirement, 20°/s)
- Maintenance free and no recurring costs, as there are no mechanical parts
- Super short attitude fixing time - 90 sec (time will differ slightly depending on equipment location)
- Easy to retrofit when using existing antenna cabling* (For SC-50/55/60/110/120)

  *Requires the LAN_CNV kit, available as an optional extra.

- Precision Pitch/Roll data in Analog* and Digital formats for Vessel Stabilization, Sonar, etc.

  *Requires the IF-NMEASC, available as an optional extra

BASIC SPECIFICATIONS OF SC-70/SC-130

	SC-70	SC-130
Heading Accuracy	0.4° rms	0.25° rms
GPS Fix	10 m approx.	
DGPS Fix	5 m approx.	
WAAS Fix	3 m approx.	
Follow-up Rate	0.1°/s, 0.01°/s or 0.001°/s rate-of-turn (select from menu)	
Setting Time	3 mins	4 mins
Antenna Unit	Radome type	Open type

BOW AND 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.
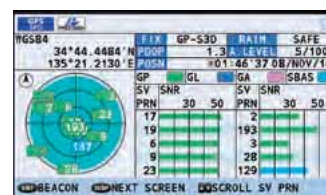
GPS Integrity Mode   Navigational Data   Speed Mode
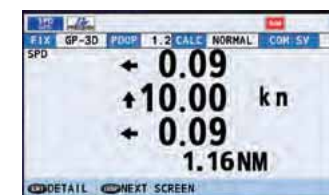
Model **PG-700**

Integrated Heading Sensor

KEY FEATURES:

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

CAN bus

NAVnet Connect

EASY MOUNTING WITH L-BRACKET

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.

Mounting with L-bracket

Rotate by 90°

Model **PG-500**

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 incorporated

NAVnet Connect

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.

Model FA-40

▶▶▶Spec P132

AIS Receiver

NEW

COMING SOON

KEY FEATURES:

• Enhances safe navigation by receiving critical navigation information from local AIS-equipped vessels
• Serial output to NavNet and PCs for added redundancy and installation flexibility
• Serial output for integration with various Radar and Chart Plotter systems
• Compatible with NavNet TZTouch/TZtouch2/TZtouch3

NAVnet Connect

NMEA2000 Certified

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 that 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 a serial port. This provides simple and easy connection to NavNet systems. AIS capable radar, Chart Plotters and TimeZero are interfaced through the FA-40 serial port. 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 P132

Class B+ AIS Transceiver

NEW

COMING SOON

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 TZtouch/TZtouch2/TZtouch3
• Flexible integration with various AIS compatible Radar and Chart Plotters
• Switchable, high-speed SO-TDMA and CS-TDMA
• Internal VHF Splitter

NAVnet Connect

NMEA2000 Certified

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-30/50

AIS Receiver/Class-B AIS Transponder

KEY FEATURES:

- Enhances safe navigation by receiving critical navigation information from local AIS-equipped vessels
- Network output to NavNet and PCs for added redundancy and installation flexibility
- Serial output for integration with various Radar and Chart Plotter systems
- Fully satisfies the technical standards for Class-B AIS, IEC 62287-1 (FA-50 only)
- Receives both Class-A and Class-B AIS information
- Outputs data to NavNet TZtouch2/TZtouch, through Ethernet
- Flexible integration with various AIS compatible Radar and Chart Plotters

NAVnet Connect

INFORMATION TO BE RECEIVED

Dynamic Data
- Ship's position
- Course over ground (COG)
- Speed over ground (SOG)
- Rate of turn (ROT)*
- Heading
- Navigation status*

Static Data
- MMSI (Maritime Mobile Service Identity)
- IMO number*
- Ship's name
- Type of ship
- Call sign
- Length and beam
- Location of position-fixing antenna on the ship

Voyage Related Data
- Ship's draft*
- Hazardous cargo
- Destination and ETA*

Safety-related message

*Class-A AIS Only

Model FA-170

Class A AIS Transponder

KEY FEATURES:

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

NAVnet Connect

COLLISION AVOIDANCE MADE EASY

Displays symbols for AIS-equipped ships, base stations, AIS-SART's, and so on. When you select a specific target, the information about the ship (MMSI [or name, when available], heading, SOG, COG, etc.) is displayed.
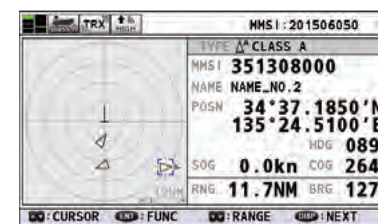
- Own ship symbol
- Target
- Selected target
- (B) Aid to Navigation (physical)
- Aid to Navigation (physical)
- Aid to Navigation (virtual)
- AIS-SART/AIS MOB/EPIRB-AIS
- SAR aircraft
- SAR vessel

Communications

NAVnet Connect | AIS | GPS Internal Antenna | CAN bus | NMEA2000 Certified
*
*FM-4800 only

Model **FM-4800**
▶▶▶Spec P133

**Marine VHF Radiotelephone
with built-in AIS Receiver**

KEY FEATURES:

• Built-in AIS Receiver for situational awareness and collision avoidance
• Built-in 72 channels GPS Receiver (FM-4800)
• 25W/1W output power
• Class D DSC with Distress, Individual and All Ship calls
• 30W PA/Loud Hailer with automatic fog signals and listen back
• NMEA2000 and NMEA0183 networking
• ATIS mode available for inland waterway
• Pre-programmed frequency band for USA, Canadian and International marine channels, plus 10 weather channels where available
• Initiate DSC calls directly from NavNet TZtouch2/TZtouch3 Series when connected via NMEA2000
• Dual Station with optional handset
• Up to 3 Handsets/Speakers connectable (FM-4850)
• Fully waterproof (Transceiver, Microphone and Handset all IP67)

Model **FM-4850**
▶▶▶Spec P133

**Black Box Marine VHF Radiotelephone
with built-in AIS Receiver**

BUILT-IN GPS (FM-4800)
Built-in Hi-Sensitivity 72 channels GPS with internal antenna which eliminates external GPS antenna and its wiring requirements.

BUILT-IN AIS RECEIVER
When connected to a MFD or chart plotter that can read and display AIS data, the built-in AIS Receiver will enhance your safety at sea by providing all the data you need for situational awareness and collision avoidance.

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

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

Optional Handset
HS-4800

Optional Speaker
SP-4800

Model FM-8900S

VHF Radiotelephone (simplex/semi-duplex)

KEY FEATURES:

- Semi-duplex 25W VHF radiotelephone with built-in Class A DSC and CH70 watchkeeping receiver
- Fully meets GMDSS 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 the interfaced GPS receiver
- ATIS signal transmission available for inland waterways
- Replay of the latest received voice call, which is automatically recorded, for 120 seconds

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Model FS-1575/2575

MF/HF Radiotelephone

KEY FEATURES:

- FS-1575 150W MF/HF Radio
- FS-2575 250W 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 (480x272 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

Pictured: FM-4800 with optional handset.

Model LH-5000

Loud Hailer

Optional Intercom

KEY FEATURES:

- Two powerful 30W 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 (5W each)
- Built-in high quality speaker
- Bright LCD for easy operation
- Flush mount capability
- Fully waterproof 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.

Intercoms

LH-500

Horn Speaker
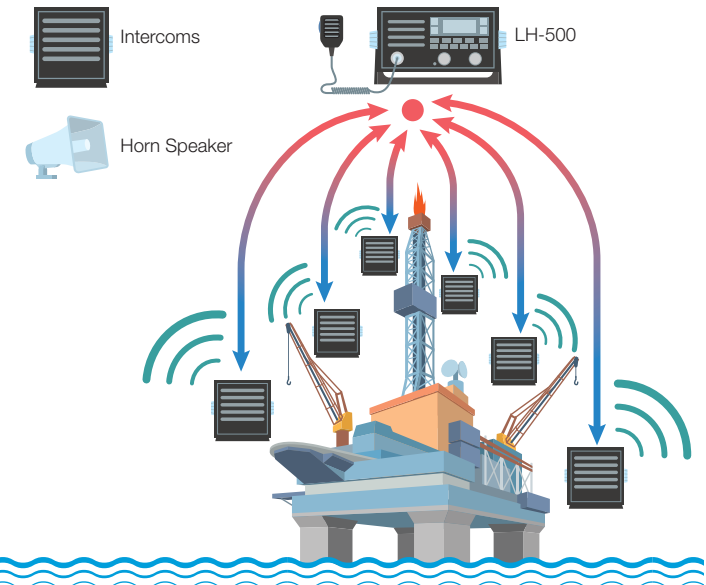
Model NX-300
▶▶▶ Spec P136

NAVTEX Receiver

U.S. Only — Non-CEMarking

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.

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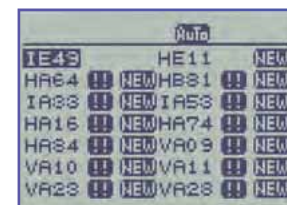
Message List

Nav Data

Model FAX-30
▶▶▶ Spec P137

Black Box Weather Facsimile Receiver

BlackBox NAVnet Connect

KEY FEATURES:

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

CONNECT VIA PC OR NAVNET DISPLAY

Furuno's FAX-30 is a waterproof "Black Box" unit that connects directly to a NavNet display or an Ethernet hub with a single Ethernet cable. If it is connected to an Ethernet hub that has multiple NavNet displays attached, each of those displays will have access to the FAX-30. On a PC, the images and information are displayed by simply using your 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

Technical Specifications

NavNet TZtouch3

NavNet TZtouch3 MFDs			
	TZT12F	**TZT16F**	**TZT19F**
DISPLAY UNIT			
Type	Color TFT multi touch IPS LCD		
Screen Size	12.1" Wide	15.6" Wide	18.5" Wide
Screen Resolution	WXGA 1280 x 800	FHD 1920 x 1080	FHD 1920 x 1080
Screen Brightness	900 cd/m2 (typical)	1000 cd/m2 (typical)	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		
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	100ms or 10Hz		-
CHART PLOTTER			
Cartography	MapMedia mm3d chart (C-MAP/Navionics/NOAA) and CMOR		
Memory Capacity	30,000 user points, 30,000 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	30 ARPA Targets with fully automatic target aquisition (Heading input required)		
Radar Alarms	Guard Zone, CPA/TCPA, Trigger, Video, Azimuth, Heading Line		
FISH FINDER			
Transmit Frequency	CW: 50/200 kHz, CHIRP: 40 kHz to 225 kHz		
Transducer	300/600 W or 1 kW* *Matching box MB1100 required for some transducers.		
Display Range	2 to 1,200 m; shift 0 to 1,200 m		
Extension Mode	ACCU-FISH™, A-Scope, Auto (Fishing/Cruising), RezBoost™, Bottom Discrimination, TruEcho CHIRP™ with compatible transducer		
Picture Advance	8 steps: x4, x2, x1, 1/2, 1/4, 1/8, 1/16, stop		
Fish Finder Alarms	School of fish, School of fish for bottom lock		
INTERFACE			
NMEA2000	1 Port		
Input	065280, 126992/993/996, 127237/245/251/257/488/489/505, 128259/267, 129025/026/029/330/038/039/040/041/291/538/540, 129793/794/798/801/802/808/809/810, 130306/310/311/312/313/314/316/577/578, 130817/818/820/822/823/826/827/828/880		
Output	126992/993/996, 127250/251/257/258, 128259/267/275, 129025/026/029/033/283/284/285, 130306/310/311/312/313/314/316		
NMEA0183	1 Serial Output Port		
Output	AAM, APB, BOD, DBT, DPT, GGA, GLL, GNS, GSA, GSV, RMB, RMC, RTE, TTM, VDM, VTG, WPL, XTE, ZDA		
LAN	2 Ports (100 BASE-TX)		
USB	1 Port (USB2.0) for touch monitor and control unit or chart/user data	2 Ports (USB2.0) for touch monitor and control unit or chart/user data	
Video I/O	Input: 2 Ports (NTSC/PAL) Output: 1 Port (HDMI 720p)	Input: 2 Ports (NTSC/PAL) and 1 Port HDMI 1080p (FHD) or less Output: 1 Port (HDMI 1080p)	
AUX I/O	2 Ports (Event Switch and External Power Switch)		
SD Card Slot	1 Slot (Micro SDXC, rear), 2 Slots Card Unit: Model SDU-001 (option)		
Wireless LAN	IEEE802.11b/g/n, Transmit frequency: 2.412 to 2,462 GHz, 11dBm max		
Transducer Connection	1 Port Transducer, 1 Port DI-FFAMP		
ENVIRONMENT			
Temperature (IEC60945)	-15°C to +55°C		
Relative Humidity	93% or less at +40° C		
Waterproofing	IP56		
POWER			
	12-24 VDC		
	2.3 - 1.2 A	4.3 - 2.2 A	4.7 - 2.3 A

NavNet TZtouch2

	NavNet TZtouch2 MFDs		
	TZTL12F	**TZTL15F**	**TZT2BB**
DISPLAY UNIT			
Type	Color TFT multi touch LCD		Requires optional color LCD, recommended color LCD with touch panel control
Screen Size	12.1" Wide	15.6" Wide	Dependent upon display selected
Screen Resolution	WXGA 1280 x 800	FWXGA 1366 x 768	FHD 1920 x 1080 (recommended), XGA 1024 x 768, SXGA 1280 x 1024
Screen Brightness	1300 cd/m2 (typical)	1000 cd/m2 (typical)	Dependent upon display selected
Signal Interface			Picture: HDMI, Extended HDCP Touch Panel: USB 2.0, Windows® 7 multi-touch
Language	Chinese, Danish, English (USA/UK), Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Russian, Spanish, Swedish		
GPS/WAAS			
Receiver Type	GPS: 56 channels, SBAS: 1 channel (C/A mode, WAAS)		-
Receiving Frequency	L1 (1575.42 MHz)		-
Time to First Fix	100 s (cold start)		-
Tracking Velocity	999 kn		-
SBAS	WAAS, EGNOS, MSAS		-
ACCURACY			
Internal Antenna	GPS: 10 m Max, WAAS: 3 m Max, MSAS: 7 m Max		-
CHART PLOTTER			
Cartography	MapMedia mm3d chart (C-MAP/Navionics/NOAA) and CMOR		
Memory Capacity	30,000 user points, 30,000 points for ship's tracks, 200 planned routes (500 points per route)		
Alarms	Anchor Watch, XTE, Proximity, Depth, Temperature, Speed, etc.		
RADAR			
Display Modes	Head-up*, North-up *Heading input required.		
Echo Trail	Interval: 15 s, 30 s, 1 min, 3 mins, 6 mins, 15 mins, 30 mins and continuous (heading input required)		
Target Tracking	30 Targets*, 100 Targets* (with DRSNXT series) *Heading input required.		
FISH FINDER			
Transmit Frequency	50/200 kHz		
Transducer	600 W or 1 kW* *Matching box MB1100 required for some FURUNO transducers.		
Display Range	2-1, 200 m, shift: 0-500 m		
Extension Mode	RezBoost™*, ACCU-FISH™*, Bottom Discrimination*, A-Scope, Auto (Fishing/Cruising), Bottom Zoom, Bottom Lock *Compatible transducer required		
Picture Advance	8 steps: x4, x2, x1, 1/2, 1/4, 1/8, 1/16, stop		
INTERFACE			
NMEA2000	1 Port		
Input	059392, 059904, 061184, 060928, 065280, 126208, 126720, 126992, 126996, 127237, 127245, 127250, 127251, 127257, 127258, 127488, 127489, 127505, 128259, 127267, 129025, 129026, 126029, 126033, 126038, 126039, 126040, 126041, 126291, 126538, 126540, 129793, 129794, 129798, 129801, 129802, 129808, 129809, 129810, 130306, 130310, 130311, 130312, 130313, 130314, 130316, 130577, 130578, 130817, 130818, 130820, 130822, 130823, 130826, 130827, 130828, 130880		
Output	059392, 059904, 061184, 060928, 126208, 126464, 126720, 126992, 126993, 126996, 127250, 127251, 127257, 127258, 128259, 128267, 128275, 129025, 129026, 129029, 129033, 129283, 129284, 129285, 130306, 130310, 130312, 130313, 130314, 130316, 130821, 130822, 130823, 130827		
NMEA0183	1 Integrated Output Port		
Output	AAM, APB, BOD, DPT, DBT, GGA, GLL, GNS, GSA, GSV, RMB, RMC, RTE, TTM, VTG, WPL, XTE, ZDA		CUR, DPT, GGA, GSV, HDG, HDT, MDA, MTW, MWV, RSA, ROT, VDM, VHW, VTG, XDR, ZDA
LAN	1 Port (100 BASE-TX)		3 Ports (100 BASE-TX)
USB	1 Port (USB2.0)		5 Ports (USB2.0)
Video I/O	Input: 2 Ports (NTSC/PAL), Output: 1 Port (HDMI 1280 x 720p)		Input: 2 Ports (NTSC/PAL), 1 Port (HDMI, FHD 1920 x 1080p, SXGA 1280 x 1024p, XGA 1024 x 768p) Output: 2 Ports (HDMI, FHD 1920 x 1080p, SXGA 1280 x 1024p, XGA 1024 x 768p)
AUX I/O	1 Port (External Event/MOB Input/Operator Fitness/Alarm Output)		1 Port (External Event/MOB Input/Power switch/Alarm Output)
SD Card Slot	1 Slot (Micro SDXC, rear), 2 Slots Card Unit: Model SDU-001 (option)		2 Internal Slots (SXDC card - supports up to 256 GB)
Wireless LAN	IEEE802.11b/g/n, Transmit frequency: 2.4 GHz band		
Transducer Connection	1 Port		
ENVIRONMENT			
Temperature (IEC60945)	-15°C to +55°C		
Waterproofing	IP56		Processor: IP22, Switch Box: IP56, Control Unit (optional): IP56
POWER			
	12-24 VDC		
	3.0-1.5 A	3.6-1.8 A	2.6-1.3 A

NavNet TZtouch

NavNet TZtouch MFD's			
	TZT9	**TZT14**	**TZTBB**
DISPLAY UNIT			
Type	Color TFT multi touch LCD		Requires optional color LCD with touch panel control, supports both
Screen Size	9" Wide	14.1" Wide	Dependent upon display selected
Screen Resolution	WVGA 800 x 480	WXGA 1280 x 800	Suport both wide and non-wide resolutions 1280 x 720 (16:9), 1280 x 600 (16:10), 1280 x 960 (4:3), 1280 x 1024 (5:4)
Screen Brightness	900 cd/m2 (typical)		Dependent upon display selected
Language	Chinese, Danish, English (USA/UK), Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Spanish, Swedish		
CHART PLOTTER			
Cartography	MapMedia mm3d chart (C-MAP/Navionics/NOAA)		
Memory Capacity	30,000 user points, 30,000 points for ship's tracks, 200 planned routes (500 points per route)		
Alarms	Anchor Watch, XTE, Proximity, Depth, Temperature, Speed, etc.		
RADAR			
Display Modes	Head-up*, North-up *Heading input required.		
Echo Trail	Interval: 15 s, 30 s, 1 min, 3 mins, 6 mins, 15 mins, 30 mins and continuous		
Target Tracking	30 Targets*, 100 Targets* (with DRSNXT series) *Heading input required		
INTERFACE			
NMEA2000	1 Port		
Input	059392, 059904, 060928, 061184, 065280, 126208, 126720, 126992, 126996, 127237, 127245, 127250, 127251, 127257, 127258, 127488, 127489, 127505, 128259, 128267, 129025, 129026, 129029, 129033, 129038, 129039, 129040, 129041, 129538, 129540, 129793, 129794, 129798, 129808, 129809, 129810, 130306, 130310, 130311, 130312, 130313, 130314, 130577, 130578		
Output	059392, 059904, 061184, 060928, 126208, 126464, 126720, 126992, 126996, 127250, 127251, 127257, 127258, 128259, 128267, 129025, 129026, 129029, 129033, 129283, 129284, 129285, 130306, 130310, 130312, 130313, 130314, 130316, 130821, 130822, 130823, 130827		
LAN	1 Port (100 BASE-TX)		3 Ports (100 BASE-TX)
USB	1 Port (USB2.0)		6 Ports (USB2.0)
Video I/O	Input: 2 Ports (NTSC/PAL), Output: 1 Port (DVI-D)		Input: 2 Ports (NTSC/PAL), Output: 2 Ports (DVI-D)
Line Out	1 Port		
SD Card Slot	2 Slots (SXDC card - supports up to 128 GB)		
ENVIRONMENT			
Temperature (IEC60945)	-15°C to +55°C		
Waterproofing	IP56		Processor: IP22, Switch Box: IP56 (front panel)
POWER			
	12-24 VDC		
	3.5-1.8A	5.0-2.5A	2.6-1.3A (includes switch box)

NavNet TZtouch3

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

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

NavNet TZtouch2

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

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

SD Card Unit SDU-001 (option) 0.1 kg 0.22 lb

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

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

NavNet TZtouch

Multi Function Display (Tabletop Mount) TZT9 4.7 kg 10.4 lb

Multi Function Display (Flush Mount) TZT9 4.5 kg 9.9 lb

Multi Function Display Black Box TZTBB MPU-002 8 kg 17.6 lb

Multi Function Display (Tabletop Mount) TZT14 8.0 kg 17.6 lb

Multi Function Display (Flush Mount) TZT14 7.1 kg 15.6 lb
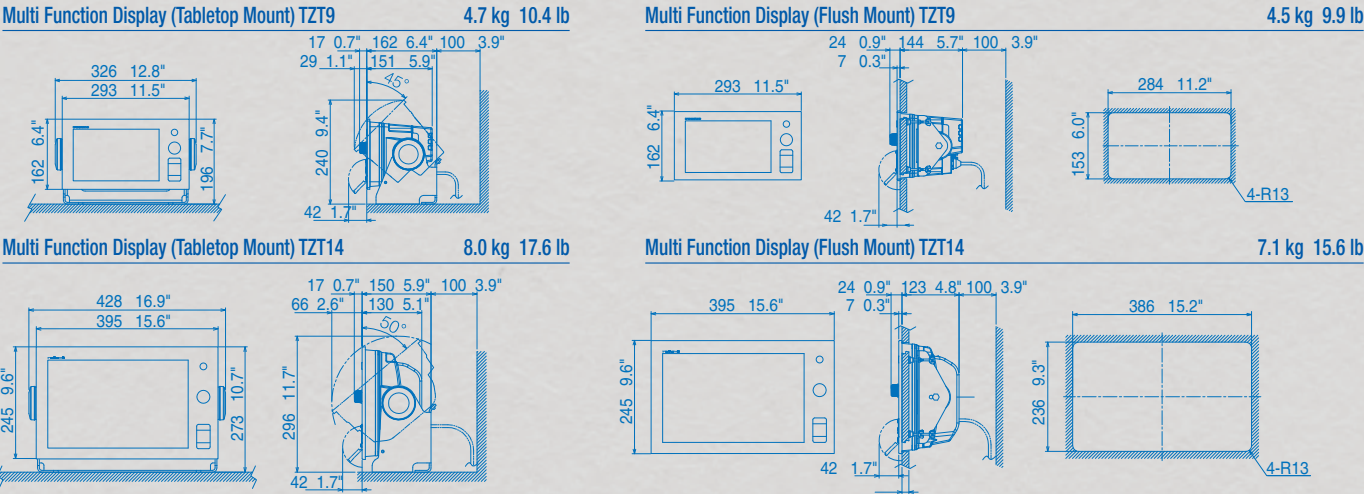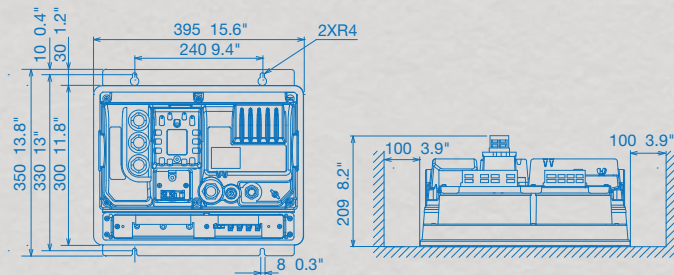
Multi Function Display (Flush Mount) TZT16F　　5.9 kg　13.0 lb
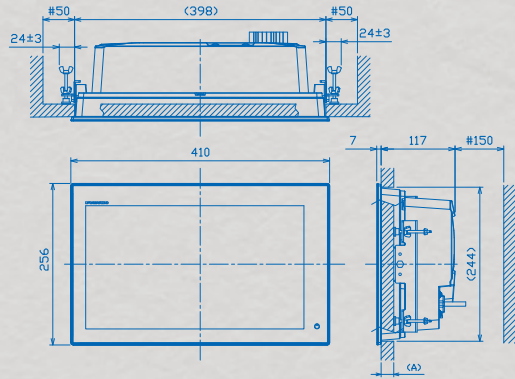
Multi Function Display Flush Mount TZT16F Cutout Dimension
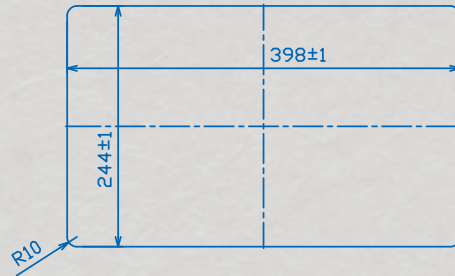
Multi Function Display (Flush Mount) TZT19F　　7.8 kg　17.2 lb
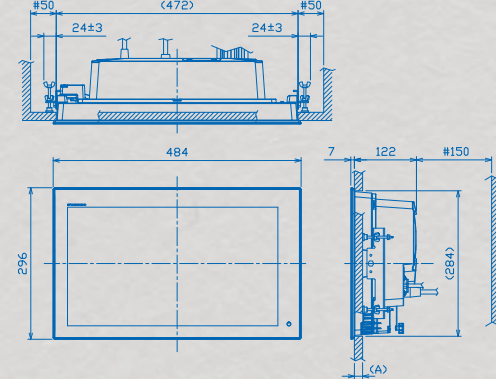
Multi Function Display Flush Mount TZT19F Cutout Dimension
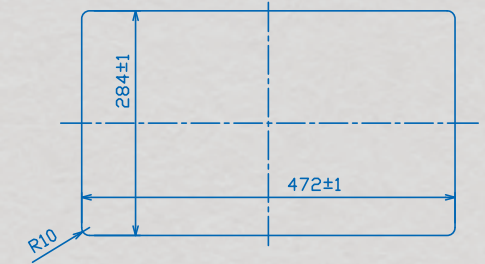
Multi Function Display Black Box TZT2BB Switch Box PSD-003　　0.75 kg　1.7 lb

Cutout for mounting

Multi Function Display TZT2 Control Unit MCU005 (option)　　1.0 kg　2.2 lb

Fixing hole

Multi Function Display Black Box TZT2BB MPU-004　　3.9 kg　8.6 lb
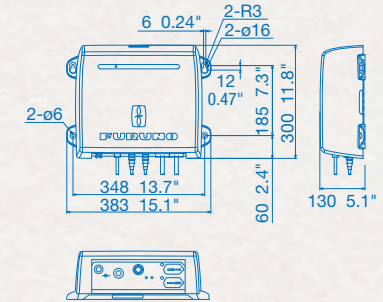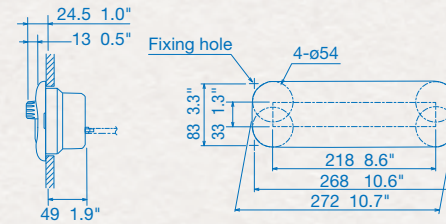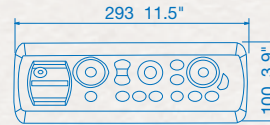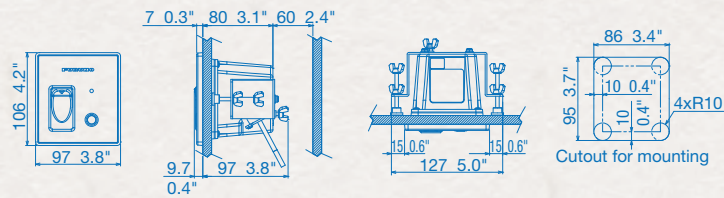
Remote Control Unit MCU002 (option)　　0.14 kg　0.3 lb

Remote Control Unit MCU004 (option)　　0.4 kg　0.9 lb

Fixing hole

Multi Function Display Black Box TZTBB Switch Box PSD-002　　0.75 kg　1.7 lb

Cutout for mounting
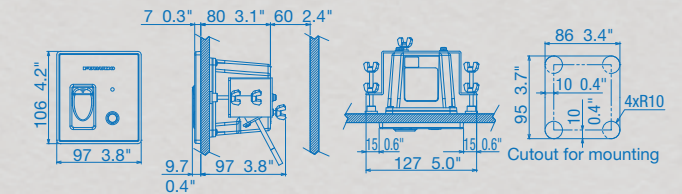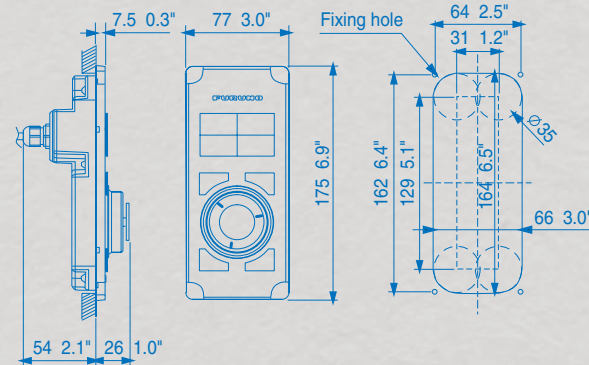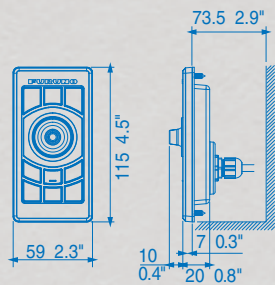
NavNet Series Fish Finders

	NETWORK BOTTOM DISCRIMINATION SOUNDERS		
	BBDS1	**DFF1-UHD**	**DFF3**
TRANSCEIVER & DISPLAY			
Display Modes	Single (50 or 200 kHz), Dual (50 and 200 kHz), Bottom-lock, Bottom-Zoom, ACCU-FISH™*, Bottom Discrimination*, Marker Zoom, A-scope *Compatible transducer required	Single (High or Low frequency), Dual (Both High and Low frequencies), Bottom-lock, Bottom-Zoom, ACCU-FISH™*, Bottom Discrimination*, Marker Zoom, A-Scope *Compatible transducer required	Single (high or low), Dual (high and low), Bottom-lock, Bottom-Zoom, ACCU-FISH™*, Marker Zoom, A-scope *Compatible transducer required
Frequency	Dual frequency 50 and 200kHz	Dual frequency CHIRP 50 ±20 & 200 ±25 kHz	The synthesized transducer works with dual frequencies between 28 and 200 kHz
Broadband (CHIRP)	N/A	Yes	N/A
Range Scale	Max. 1,200 m	Max. 1,200 m	Max. 3,000 m
ENVIRONMENT			
Temperature	-15°C to +55°C		
Waterproofing	IP20	IP55	IP20
POWER SUPPLY			
	12-24 VDC		
	12W, 1.1-0.4A	30W, 2.8-1.4A	30W, 2.8-1.4A
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 More Transducer options are available. Contact your Furuno dealer.	**1 kW** Broadband transducers by AIRMAR® 42-65 kHz (low), 130-210 kHz (high) CM265LH, B265LH (with temperature sensor) CM275LHW, B275LHW More Transducer options are available. Contact your Furuno dealer.	**1/2/3 kW** 28 kHz: CA28F-8, CA28BL-6HR, CA28BL-12HR 38 kHz: CA38BL-9HR, CA38BL-15HR 50 kHz: CA50B-6/6B, CA50B-9B, CA50BL-12HR, CA50BL-24HR 68 kHz: CA68F-8H, CA68F-30H 82 kHz: CA82B-35R 88 kHz: CA88B-8, CA88B-10, CA88F-126H 107 kHz: CA100B-10R 150 kHz: CA150B-12H 200 kHz: CA200B-5S, CA200B-8/8B, CA200B-12H 50/200 kHz: CA50/200-1T More Transducer options are available. Contact your Furuno dealer.

Network Fish Finder/Bottom Discrimination Sounder BBDS1   1.3 kg 2.9 lb
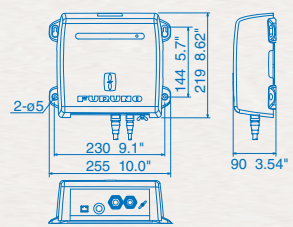
Network Fish Finder DFF1-UHD   3.1 kg 6.8 lb
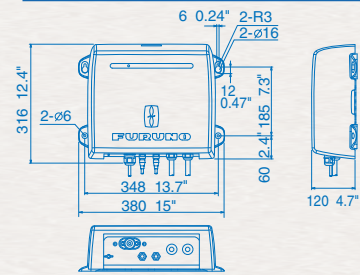
Network Fish Finder DFF3   3.8 kg 8.4 lb

	NETWORK MULTI BEAM SONAR
	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	
	165T-B54 or 165T-SS54 (thru-hull mount), or 165T-TM54 (transom mount) Combo Transducers: 165T-50/200-SS260 (thru-hull mount), 165T-265LHPM488 (pocket mount), or 165T-50/200-TM260 (transom mount)

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

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

Network Multi Beam Sonar DFF-3D   3.0 kg 6.6 lb
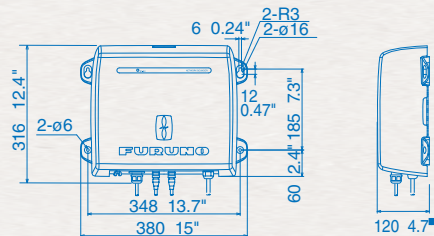
Network Sounder Power Amplifier DI-FFAMP   7.0 kg 15.4 lb
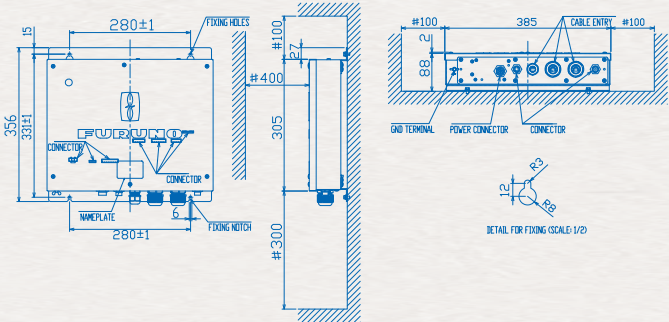
NavNet Series Radar

		NavNet SERIES RADAR SENSOR				
		DRS4DL+	**DRS4D-NXT**	**DRS6A-NXT**	**DRS12A-NXT**	**DRS25A-NXT**
ANTENNA						
Type		ø480 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°	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°	25°	22°/22°/22°		
Antenna Rotation Speed		24 rpm	24*/36/48 rpm range coupled or 24 rpm fixed * In dual range mode, speed is limited to 24 rpm			
RF TRANSCEIVER						
Frequency		9410 ± 30 MHz	CH1: 9380 MHz (P0N), 9400 MHz (Q0N) CH2: 9400 MHz (P0N), 9420 MHz (Q0N) CH3: 9420 MHz (P0N), 9440 MHz (Q0N)			
Pulselength & PRR		S: 0.08 µs/360 Hz (0.0625 to 0.5 NM) M: 0.3 µs/360 Hz (0.75 to 2 NM) L: 0.8 µs/360 Hz (3 to 36 NM)	P0N: 0.08 µs to 1.2 µs/1100 Hz Q0N: 5 µs to 18 µs/1100 Hz	P0N: 0.04µs to1.2µs/ 700Hz to 2000Hz Q0N: 5µs to 48µs/ 700Hz to 2000Hz	P0N: 0.04µs to1.2µs/ 700Hz to 2000Hz Q0N: 5µs to 48µs/ 700Hz to 2000Hz	P0N: 0.04µs to1.2µs/ 700Hz to 2000Hz Q0N: 5µs to 48µs/ 700Hz to 2000Hz
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	Temperature: -25°C to +55°C, Waterproofing: IP26	Temperature: -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		

19" Radome Radar Sensor DRS4DL+ 5.7kg 12.7 lb

ø488 19.2"
75 3.0"
220 8.7"
166 6.5"
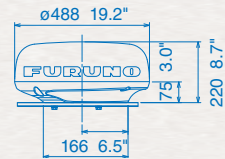
24" Radome Radar Sensor DRS4D-NXT 7.3kg 16.1 lb

ø610 24.0"
75 3.0"
220 8.7"
165 6.5"
338 13.3"

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

XN10A 1036   40.8"
XN12A 1255   49.4"
XN13A 1795   70.7"

266 10.5"

NavNet SERIES RADAR SENSOR		
DRS6AX	**DRS12AX**	**DRS25AX**
1036 mm Open (3.5') 1255 mm Open (4') 1795 mm Open (6')	1255 mm Open (4') 1795 mm Open (6')	
2.3°/1.9°/1.35°	1.9°/1.35°	
22°/22°/22°		
24/36/48 rpm range coupled or 24 rpm fixed		
9410 ±30 MHz		
0.08 μs/3000 Hz (0.0625 to 0.75 NM) 0.15 μs/3000 Hz (1 to 1.5 NM) 0.3 μs/1500 Hz (2 NM) 0.5 μs/1000 Hz (3 to 4 NM) 0.8 μs/600 Hz (6 to 9 NM) 1.2 μs/600 Hz (12 to 64 NM) 1.2 μs/550 Hz (72 to 96 NM)		
6 kW	12 kW	25 kW
0.0625 to 96 NM		
Temperature: -25°C to +55°C, Waterproofing: IP56		
24 VDC, 4 A	24 VDC, 4.5 A	24 VDC, 5.6 A

3.5 ft Open Radar Sensor DRS6AX   20.0 kg 44.1 lb
4 ft Open Radar Sensor DRS6AX   21.0 kg 46.3 lb
6 ft Open Radar Sensor DRS6AX   23.0 kg 50.7 lb

4 ft Open Radar Sensor DRS12AX   21.0 kg 46.3 lb
6 ft Open Radar Sensor DRS12AX   23.0 kg 50.7 lb

4 ft Open Radar Sensor DRS25AX   22.0 kg 48.5 lb
6 ft Open Radar Sensor DRS25AX   24.0 kg 53.0 lb

XN10A : 1036 40.8"
XN12A : 1255 49.4"
XN13A : 1795 70.7"

150 5.9"
78 3.1"
4-ø12 Fixing hole
200 7.9"
⇨ Bow
4-ø12 Fixing hole
92 3.6"
140 5.5"
Cable entry
200 7.9"

445 17.5"
130 5.1"
285 11.2"
160 6.3"
330 13"

266 10.5"
360 14.2"
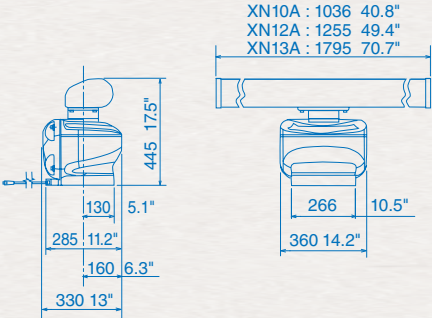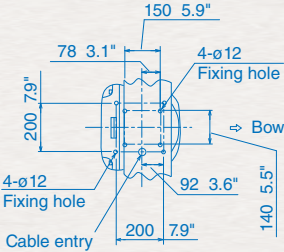
GPS/WAAS Receiver Antennas

	GPS/WAAS RECEIVER ANTENNAS
	GP330B and GP330B/0183
RECEIVER CHARACTERISTICS	
Receiver Type	Twelve discrete channels, C/A code, all-in-view, WAAS, 10Hz
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 Marine Software

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

GPS/WAAS Receiver Antenna GP330B and GP330B/0183   0.22 kg   0.49 lb

ø99.1 3.90"

83.2 3.28"
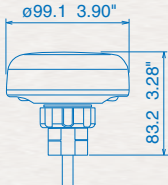
1st Watch Wireless Radar

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

1st Watch Wireless Radar DRS4W   5.7 kg 12.5 lb
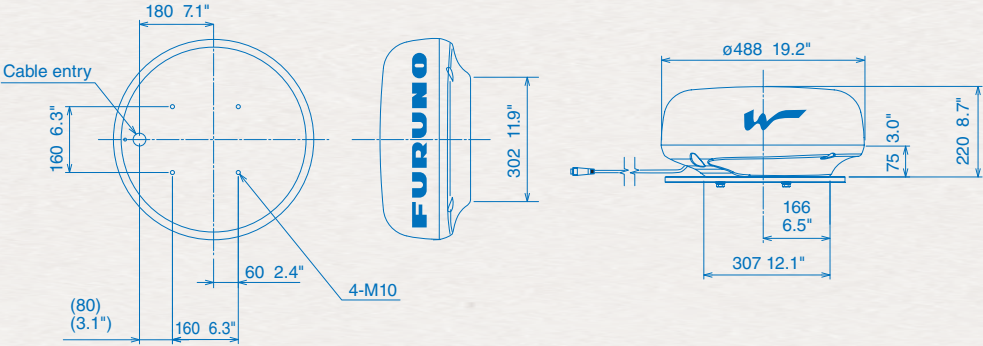
Radar

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

MODEL1623 Display Unit 1.3 kg 2.9 lb

MODEL1623 Antenna 4.6 kg 10.1 lb

MODEL1815 Display Unit (Bracket Mount) 2.2 kg 4.9 lb

MODEL1815 Display Unit (Flush Mount) 1.6 kg 3.5 lb

MODEL1815 Antenna 6.5 kg 14.3 lb

		10.4" COLOR LCD RADAR		
		MODEL1835	MODEL1935	MODEL1945
ANTENNA				
Type		ø602 mm Radome (24")	1000 mm Open (3.5')	1200 mm Open (4.0')
Beamwidth	Horizontal	4.0°	2.4°	1.9°
	Vertical	20°	22°	
Rotation speed		24 rpm	24 rpm 48 rpm (option)	
RF TRANSCEIVER				
Frequency		9410 ±30 MHz (X-band)		
Pulselength & PRR		0.0625-1.6 NM: 0.08μs/2100 Hz 1.5-3.2 NM: 0.3μs/1200 Hz 3-64 NM: 0.8μs/600 Hz		
Output power		4 kW		6 kW
IF frequency		60 MHz		
DISPLAY				
Display unit		10.4" color LCD		
Effective Display Area		158 (W) x 211 (H) mm		
Screen Resolution		640 x 480, VGA		
Accuracy	Range	1.0% of range in use or 8 m, which is greater		
	Bearing	±1°		
Range and range ring interval	Range	0.0625, 0.125, 0.25, 0.5, 0.75, 1, 1.5, 1.6, 2, 3, 3.2, 4, 6, 8, 12, 16, 24, 32, 36, 48*, 64* (*range max. MODEL 1935/1937: 48 NM, MODEL 1945: 64 NM)		
	Ring	0.03125, 0.0625, 0.125, 0.125, 0.25, 0.25, 0.5, 0.4, 0.5, 1, 0.8, 1, 2, 2, 3, 4, 6, 8, 12, 12*, 16* (*ring max. MODEL 1935/1937: 12 NM, MODEL 1945: 16 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 (required optional board ARP-11)		
AIS targets		Up to 100 (Data input from AIS is required.)		
Interface	Input	GNS, GGA, RMC, GLL, VTG, VHW, BWR, BWC, RMB, HDT, HDG, HDM, XTE, DPT, DBT, MTW, MWV, VWT, VWR, ZDA		
	Output	RSD, TLL*, TTM* (ARP-11 and external data required for TLL/TTM)		
ENVIRONMENT				
Temperature	Display unit	-15°C to +55°C		
	Antenna unit	-25°C to +55°C		
Waterproofing	Display unit	IPX5		
	Antenna unit	IPX6		
POWER SUPPLY				
	Display unit	12-24 VDC: 4.1-2.0 A	12-24 VDC: 6.8-3.3 A (24 rpm) 8.2-3.8 A (48 rpm)	12-24 VDC: 7.3-3.5 A (24 rpm) 8.8-4.1 A (48 rpm)

MODEL1835/1935/1945/1937 Display Unit   5.4 kg 11.9 lb
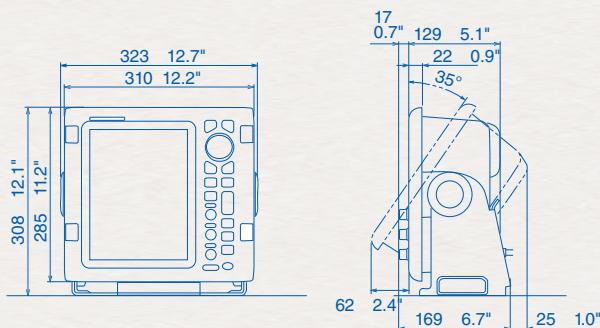
24" Radome Antenna   8 kg 17.6 lb
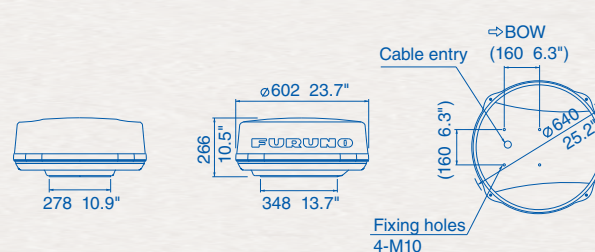
3.5 ft Open Antenna   22 kg 48.5 lb
4 ft Open Antenna   25 kg 55.1 lb
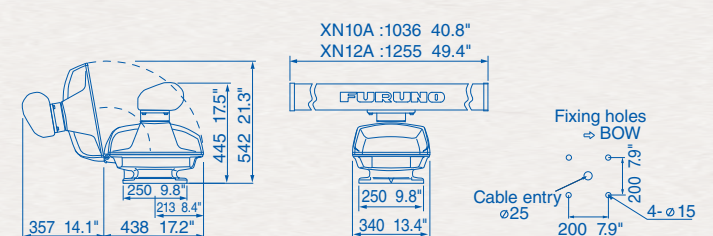
Radar		12.1" LCD RADAR		
		FR-8065	**FR-8125**	**FR-8255**
ANTENNA				
Type		1255 mm Open (4') or 1795 mm Open (6')		
Beamwidth	Horizontal	1.9˚(4' Open: XN12A) or 1.35˚ (6' Open: XN13A)		
	Vertical	22˚		
Rotation speed		24 rpm/48 rpm (option)		
RF TRANSCEIVER				
Frequency		9410 ±30 MHz (X-band)		
Pulselength & PRR		0.125-1.5 NM: 0.08µs/2100 Hz 1.5, 2, 3 NM: 0.3µs/1200 Hz 3-36 NM: 0.8µs/600 Hz 48, 64 NM: 0.8µs/550 Hz 72, 96* NM: 0.8µs/500 Hz * FR8255 only		
Output power		6 kW	12 kW	25 kW
IF frequency		60 MHz		
DISPLAY				
Display unit		12.1" color LCD		
Effective Display Area		184 (H) x 246 (V) mm		
Screen Resolution		600 (H) x 800 (V)		
Accuracy	Range	0.9% of range in use or 8 m, which is 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, 36, 48, 64, 72, 96* NM (range max. FR8065/8125: 72 NM, FR8255: 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, 6, 8, 8, 12, 16* NM * FR8255 only		
Echo trail		interval: 15 s, 30 s, 1, 3, 6, 15, 30 min., or continuous		
TT targets		Up to 10 (Required optional board ARP-11)		
AIS targets		Up to 100 (Data input from AIS is required)		
Interface (IEC61162, NMEA0183)	Input	BWC, BWR, DBT, DPT, GGA, GLL, GNS, HDG, HDM, HDT, MTW, MWV, RMB, RMC, THS, TTM (for radiotelephone only), VHW, VTG, VWR, VWT, XTE, ZDA		
	Output	RSD, TLL*, TTM* (*ARP-11 and external data required for TLL/TTM)		
ENVIRONMENT				
Temperature	Display unit	-15°C to +55°C		
	Antenna unit	-25°C to +55°C		
Waterproofing	Display unit	IPX5 (front), IPX2 (rear)		
	Antenna unit	IPX6		
POWER SUPPLY				
	Display unit	24 VDC 24 rpm: 3.6 A 48 rpm: 3.9 A	24 VDC 24 rpm: 3.9 A 48 rpm: 4.5 A	24 VDC: 3.0 A
	Power supply unit	—	—	24 VDC 24 rpm: 2.3 A 48 rpm: 2.7 A

FR-8065/8125/8255 Display Unit (Tabletop Mount)   5.8 kg 12.8 lb

4 ft Open Antenna   25 kg 55.1 lb
6 ft Open Antenna   27 kg 59.5 lb
with XN12A 1255 49.4"
with XN13A 1795 70.7"

FR-8065/8125/8255 Display Unit (Flush Mount)   5.3 kg 11.7 lb

Cutout for flush mount
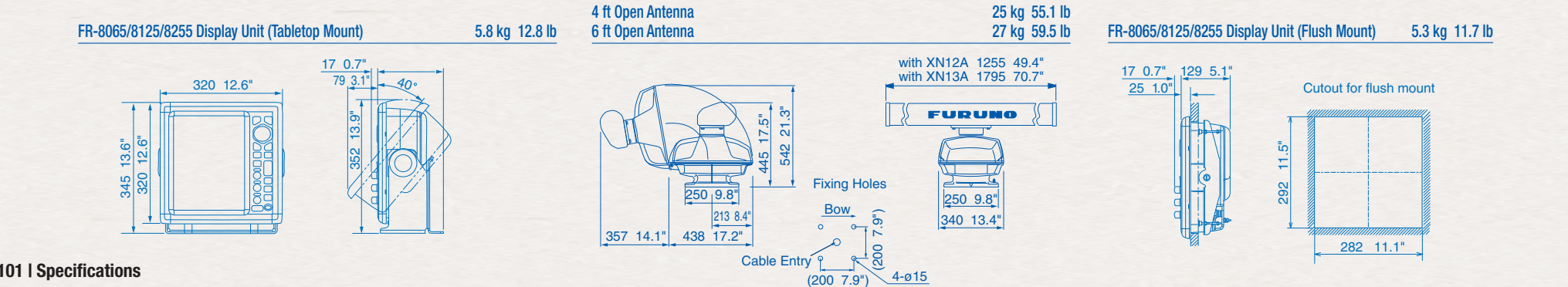
		15" MULTI-COLOR LCD RADAR		BLACK BOX RIVER RADAR	
		FAR-1416	**FAR1-426**	**FR-1908V-BB**	**FR-1918V-BB**
ANTENNA					
Type		1255 mm Open (4')/1795 mm Open (6')		6.5' (XN20AF) or 8'(XN24AF) Open Array	
Beamwidth	Horizontal	1.9˚ (XN12A), 1.35˚ (XN13A)		1.23˚ (XN20AF), 0.95˚ (XN24AF)	
	Vertical	22˚		20˚	
Rotation speed		24/48 rpm		26 rpm	
RF TRANSCEIVER					
Frequency		9410 ±30 MHz, P0N			
Pulselength & PRR		S: 2100 Hz (0.125 to 1.5 NM), M: 1200 Hz (1.5 to 3 NM), L: 600 Hz (3 to 72 NM)	S: 2100 Hz (0.125 to 1.5 NM), M: 1200 Hz (1.5 to 3	S: 0.04 µS / 4000Hz (0.125 to 2 or 0.15 to 4 NM) M: 0.12 µS / 2000 Hz (1.6 to 4 or 1.5 to 4 or 3 to 8 NM) M2: 0.28 µS / 2000 Hz (4 to 16 or 3 to 16 or 6 to 32 NM) L: 0.6 µS / 1000 Hz (8 to 64 or 6 to 64 or 12 to 64 NM)	
Output power		12 kW	25 kW	4 kW	12 kW
IF frequency	IF	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 consortships, 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		1.5% of range in use or 5 m whichever is the greater	
	Bearing	±1°		±0.5˚	
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		0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96 NM	
	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		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	
Echo trail		Interval: 15 s, 30 s, 1-30 min. (30 s steps) or continuous		Interval: off/1.25/2.5/5 seconds (river) or off/5/15/30 seconds or 1/3/6 minutes (sea)	
TT targets		Up to 50 (manually) - Time of vector: OFF/30 s/1 to 60 min. (external data required)		100 Targets	
AIS targets		Up to 300 - Time of vector: OFF/30 s/1 to 60 min. (AIS, GPS and heading required)		300 Targets	
Radar Map		-		5,000 pts	
INTERFACE					
Heading		1 Port: AD-10 format or IEC61162-1		2 Ports: AD-10 format or IEC61162-2	
Serial		3 Ports: IEC61162-1		IEC61162-2: 2 Ports (AIS/HDG), IEC61162-1: 4 Ports (GPS/LOG/AMS/ECDIS)	
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		ALR, DBS, DBT, DPT, DTM, GBS, GGA, GLL, GNS, HDT, HTD, MWV, RMC, ROT, RSA, THS, VDM, VDO, VHW, VTG, VWR, VWT, 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		TTM	
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)		Alert output: 4 ch, Remote ACK input, System fail, power fail	
Sub display		2 Ports (Signal: HD, BP, Trigger and Video)		1 Port (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		Processor Unit: IP20	
	Antenna unit	IP26		IP46	
	Control unit	IP22		IP22	
POWER SUPPLY					
		24 VDC, 5 A	24 VDC, 5.6 A	24 VDC: 3.9 A max.	

Radar

		MARINE RADAR			
		FAR-1513	**FAR-1523**	**FAR-1518**	**FAR-1528**
ANTENNA					
Type		1255 mm Open (4') or 1795 mm Open (6')		1260 mm Open (4') or 2040 mm Open (6.5')	2040 mm Open (6.5') or 2550 mm Open (8')
Beamwidth	Horizontal	1.9˚ (XN12A), 1.35˚ (XN13A)		1.9˚ (XN12AF), 1.23˚ (XN20AF)	1.23˚ (XN20AF), 0.95˚ (XN24AF)
	Vertical	20˚			
Rotation speed		24 rpm or 48 rpm			
RF TRANSCEIVER					
Frequency		9410 MHz ±30 MHz, P0N			
Pulselength & PRR		S: 2100 Hz (0.125 to 1.5 NM) M: 1200 Hz (1.5 to 3 NM) L: 600 Hz (3 to 96 NM)		3000 Hz (0.125 to 3 NM), 0.08 µs 2760 Hz (0.125 to 6 NM), 0.12 µs 1500 Hz (0.75 to 24 NM), 0.22 µs 1000 Hz (0.75 to 24 NM), 0.38 µs 1000 Hz (3 to 24 NM), 0.68 µs 600 Hz (6 to 96* NM), 1.2 µs * 500 Hz on 96 NM range.	
Output power		12 kW	25 kW	12 kW	25 kW
IF frequency	IF	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, 1-30min. (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)

Radar - FAR-1416/1426/1513/1523/1518/1528

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

341 13.4"
236 9.3"
424 16.7"
338 13.3"
216 8.5"
30°
428 16.9"
56 2.2"
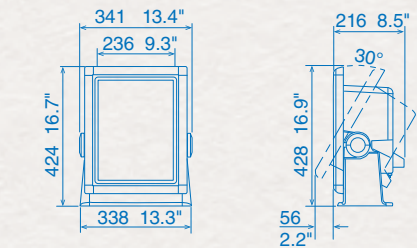
Display Unit (Portrait/Flush Mount) 8.1 kg 17.8 lb

350 13.8"
334 13.1"
311 12.2"
6×ø7
387 15.2"
426 16.8"
216 8.5"
34.5 1.4"

Cutout for mounting
205 8.1"
322 12.7"
205 8.1"
294 11.6"
4×R15
334 13.1"

Control Unit 3.5 kg 7.7 lb

103 4.1"
130 5.1"
150 5.9"
340 13.4"
360 14.2"
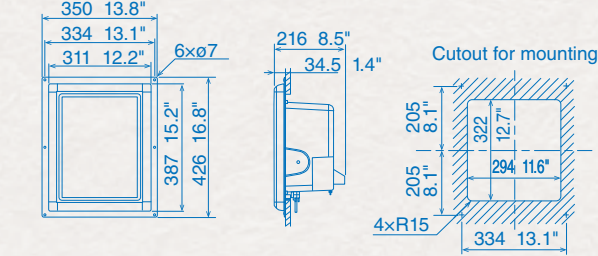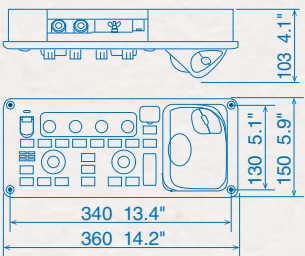
Display Unit (Horizontal/Tabletop Mount) 8.5 kg 18.7 lb

386 15.2"
310 12.2"
394 15.5"
338 13.3"
202 8"
30°
399 15.7"
32 1.3"

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

6×ø7
426 16.8"
387 15.2"
350 13.8"
334 13.1"
311 12.2"
216 8.5"
34.5 1.4"

Cutout for mounting
322 12.7"
334 13.1"
294 11.6"
4×R15
205 8.1"
205 8.1"
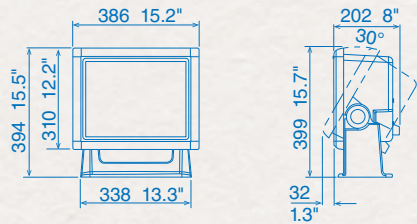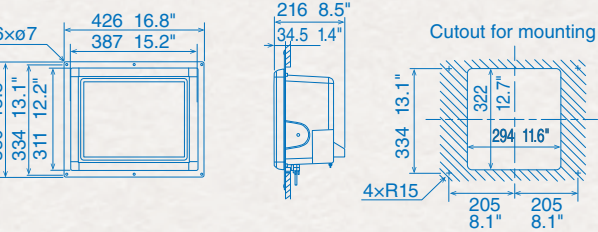
Trackball Control Unit 0.4 kg 0.9 lb

2×ø6.5 Fixing Holes
70 2.8"
8 0.3"
130 5.1"
100 3.9"
40 1.6"
14 0.6"
85 3.3"

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

with XN12A 1255 49.4"
with XN13A 1795 70.7"

FURUNO

445 17.5"
542 21.3"
(250 9.8")
(213 8.4")
357 14.1"
438 17.2"
250 9.8"
340 13.4"

Fixing Holes
Bow
(200 7.9")
Cable Entry
(200 7.9")
4-ø15
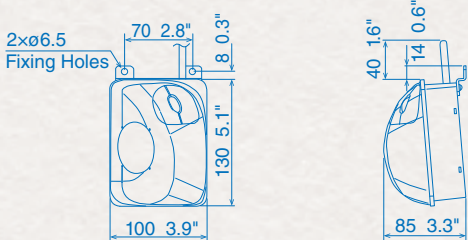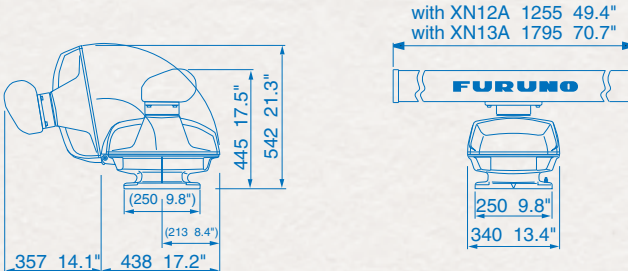
FAR-1513/1523/1518/1528 Processor Unit DC: 6.2 kg 13.7 lb
AC: 6.8 kg 15 lb

2-ø6 Fixing hole
400 15.7"
350 13.8"
260 10.2"
9 0.4"
32.3 1.3"
370 14.6"
336 ± 0.5
297 11.7"
357 14.1"
368 14.5"
6 0.2"
6 0.2"
2×R3
Optional
160 6.3"
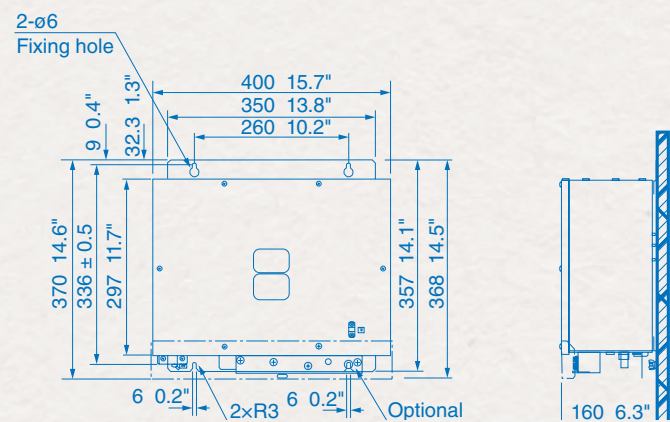
FAR-1513/1523/1518/1528 Control Unit 1.2 kg 2.6 lb

3.3 0.1"
287 11.3"
4-ø5 Fixing
100 3.9"
77 3.0"
310 12.2"
30 1.2"
45 1.8"

Radar

		BLACK BOX MARINE RADAR	
		FAR-2218-BB	**FAR-2228-BB**
ANTENNA			
Type		1297 mm Open (4') or 2097 mm Open (6.5') or 2597 mm Open (8')	
Beamwidth	Horizontal	1.9° (4' Open: XN12CF), 1.23° (6.5' Open: XN20CF) or 0.95 (8' Open: XN24CF)	
	Vertical	20°	
Rotation speed		24 rpm or 42 rpm	
RF TRANSCEIVER			
Frequency		9410 MHz ±30 MHz, P0N	
Pulselength & PRR		S1: 3000 Hz (0.125 to 2 NM), 0.07 μs S2: 3000 Hz (0.5 to 4 NM), 0.15 μs M1: 1500 Hz (0.75 to 12 NM), 0.3 μs M2: 1200 Hz (1.5 to 24 NM), 0.5 μs M3: 1000 Hz (3 to 24 NM), 0.7 μs L: 600 Hz (6 to 96 NM), 1.2 μs	
Output power		12 kW	25 kW
IF frequency	IF	60 MHz	
DISPLAY			
Accuracy	Range	1 % of the maximum range of the scale in use or 10 m, whichever is the greater	
	Bearing	±1°	
Range and range ring interval	Range	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96 NM	
	Ring	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 12, 16 NM	
Echo trail		Interval: 15 s, 30 s, 1, 3, 6, 15, 30 m or continuous	
TT targets		100 targets in 24/32 NM (external data required)	
AIS targets		350 targets (external data required)	
Rader Map		20,000 pts	
INTERFACE (Processor unit)			
Serial		8 ports (IEC61162-1/2: 2 ports, IEC61162-1: 4 ports, AD-10: 1 port) (1 port for sub-display unit from antenna sensor)	
Interface (IEC61162, NMEA0183)	Input	ABK, ACK, ACN, ALR, BWC, BWR, CUR, DBK*1, DBS*1, DBT, DDC, DPT, DTM, GGA, GLL, GNS, HBT, HDT*1, MTW, MWV, OSD, RQA, RMB, RMC, ROT, RTE, 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, TLB, TLL*2, TTD, TTM, VSD *2 for B-type radar	
Contact closure		Alert output: 6 ports: contact signal, load current 250 mA (Normal close/ open: 4, system fail: 1, Power fail: 1)	
LAN		2 ports (100 BASE-TX)	
DVI		2 ports: DVI-D, DVI-I or RGB picture data (VDR)	
RS-232C		1 port: brilliance control	
Sub display (for ECDIS)		2 ports (HD, BP, Trigger and Video signal)	
ENVIRONMENT			
Temperature	Processor unit	-15°C to +55°C (storage: -20°C to +70°C or less)	
	Antenna unit	-25°C to +55°C (storage: -25°C to +70°C or less)	
Waterproofing	Processor unit	IP22	
	Antenna unit	IP56	
POWER SUPPLY			
	Processor unit	100-230 VAC: 2.2-1.1 A (24 rpm), 2.8-1.4 A (42 rpm)	100-230 VAC: 2.6-1.3 A (24 rpm), 3.9-1.7 A (42 rpm)

		BLACK BOX MARINE RADAR	
		FAR-2238S-BB	**FAR-2238SNXT-BB**
ANTENNA			
Type		3822 mm Open (12')	
Beamwidth	Horizontal	2.6° (8' open: SN24CF) or 2.3° (10' open: SN30CF) or 1.8° (12' open: SN36CF)	
	Vertical	25°	
Rotation speed		24 rpm or 42 rpm	
RF TRANSCEIVER			
Frequency		3050 MHz ±30 MHz, P0N	CH1 P0N: 3043.75 MHz, Q0N: 3063.75 MHz +5 MHz or CH2 P0N: 3053.75 MHz, Q0N: 3073.75 MHz +5 MHz
Pulselength & PRR		S1: 3000 Hz (0.125 to 2 NM), 0.07 µs S2: 3000 Hz (0.5 to 4 NM), 0.15 µs M1: 1500 Hz (0.75 to 12 NM), 0.3 µs M2: 1200 Hz (1.5 to 24 NM), 0.5 µs M3: 1000 Hz (3 to 24 NM), 0.7 µs L: 600 Hz (6 to 96 NM), 1.2 µs	P0N: 0.07µs to1.2µs/ 600Hz to 2400Hz Q0N: 5.0µs to 18.3µs/ 600Hz to 2400Hz
Output power		30 kW	Solid-state, 250 W
IF frequency	IF	60 MHz	
DISPLAY			
Accuracy	Range	1 % of the maximum range of the scale in use or 10 m, whichever is the greater	
	Bearing	±1°	
Range and range ring interval	Range	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 72, 96 NM	
	Ring	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 12, 16 NM	
Echo trail		Interval: 15 s, 30 s, 1, 3, 6, 15, 30 m or continuous	
TT targets		100 targets in 24/32 NM (external data required)	
AIS targets		350 targets (external data required)	
Rader Map		20,000 pts	
INTERFACE			
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, 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, 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: 2.2-1.1 A (24 rpm), 2.8-1.4 A (42 rpm)	100-230 VAC:3.0-1.5 A (24 rpm), 5.8-2.6 A (42 rpm)

Radar - FAR-2218-BB/2228-BB/2238S-BB/2238SNXT-BB

4 ft Open Antenna XN12AF   33 kg 73 lb

XN12AF:1260 49.6"

310 12.2"
240 9.4"
4-ø15
240 9.4"
300 11.8"

555 21.9"
124 4.9"
18 0.7"
300 11.8"
468 18.4"

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

XN20AF:2040 80.3"
XN24AF:2550 100.4"

310 12.2"
240 9.4"
4-ø15
240 9.4"
300 11.8"

570 22.4"
137 5.4"
18 0.7"
468 18.4"

Processor Unit RPU-013   10 kg 22 lb

385 15.2"
370 14.6"
2-ø7
25 1.0"
410 16.1"
340 13.4"
380 15.0"
350 13.8"
7 0.3"

26 1.0"
498 19.6"
418 19.5"
183 7.2"
98
90
95 3.7"
360 14.2"
411 16.2"
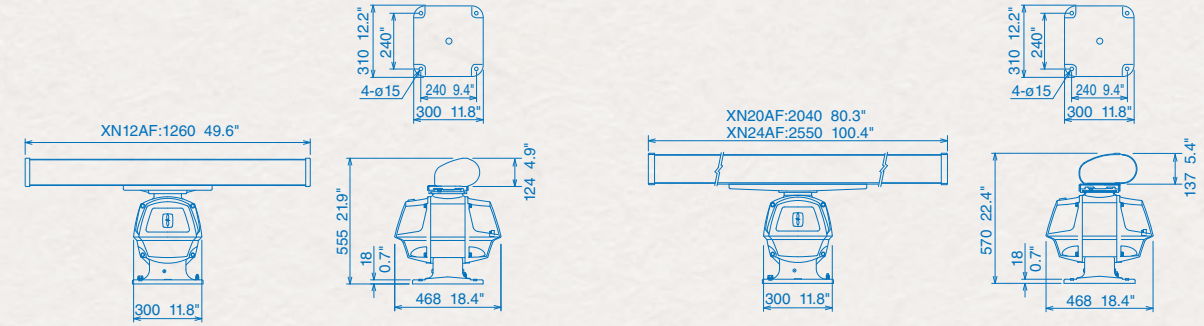
10 ft S-band Antenna SN30AF   135 kg 297.6 lb
12 ft S-band Antenna SN36AF   142 kg 313.1 lb

SN36AF: 3765 148.2"
SN30AF: 3090 121.7"
421 16.6"
184 7.2"
432 17.0"

373 14.7"
426 16.8"
710 28.0"
420 16.5"
565 22.2"

530 20.9"
110 105 100 105 110
4.3" 4.1" 3.9" 4.1" 4.3"
137 5.4"
8-ø15
350 13.8"
432 17.0"
250 9.8" 286 11.3"
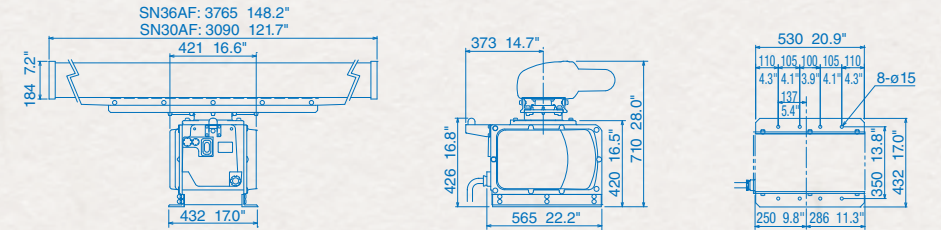
4 ft Open Antenna   XN12CF   46.2 kg 101.9 lb
6.5 ft Open Antenna XN20CF   48.1 kg 106.1 lb
8 ft Open Antenna   XN24CF   49.3 kg 108.7 lb

XN12CF: 1297 51.1"
XN20CF: 2097 82.6"
XN24CF: 2597 102.2"

109 4.3"
575 22.7"
395 15.6"
15 0.6"
255 10.0" 257 10.1"
409 16.1"
9 0.35"

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

SN24CF: 2547 100.2"
SN30CF: 3072 120.9"
SN36CF: 3822 150.5"

769 30.3"
457 18.0"
12 0.5"
640 25.2"
420 16.5" 69 2.7"

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)

385 12.63"
370 12.14"
3-ø7
36 1.18"
340 11.15"
410 13.45"
350 11.48"
359 11.78"
183 6.00"
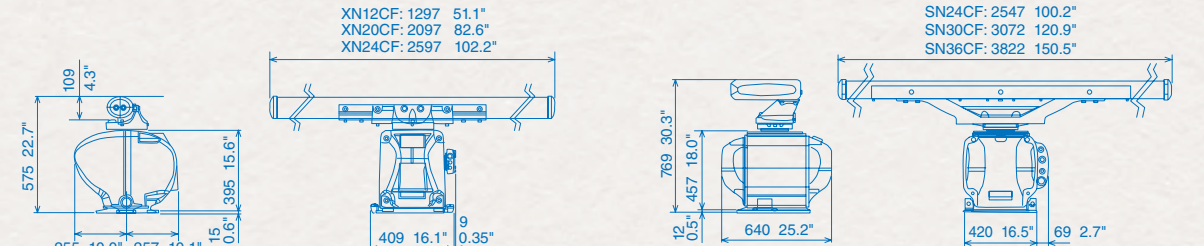
Full-keyboard
Control Unit RCU014   3.7 kg 8.2 lb

136 5.4"
180 7.1"
308 12.1"
398 15.7"
4-ø4
39 1.5"
54 2.1"

Trackball
Control Unit RCU015   2.4 kg 5.3 lb

110 4.3" 4-ø4
136 5.4"
180 7.1"
160 6.3"
35 1.4"
50 2.0"

Trackball
Control Unit RCU016   2.4 kg 5.3 lb

110 4.3" 4-ø4
136 5.4"
180 7.1"
160 6.3"
35 1.4"
50 2.0"

Chart Radar

		CHART RADAR	
		FAR-3000-BB (X-band)	**FAR-3000-BB (S-band Magnetron or Solid State)**
ANTENNA			
Type		1260 mm Open (4'), 2040 mm Open (6.5') or 2550 mm Open (8')	3765 mm S-band (12')
Beamwidth	Horizontal	1.9˚(4' Open: 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	
RF TRANSCEIVER			
Frequency		9410 ±30 MHz	3050 ±30 MHz
Pulselength & PRR		0.125, 0.25 NM: 0.07 μs/3000 Hz 0.5 NM: 0.07, 0.15 μs/3000 Hz 0.75 NM: 0.07, 0.15, 0.3 μs/3000, 1500 Hz 1 NM: 0.07, 0.15, 0.3 μs/3000, 1500 Hz 1.5, 2 NM: 0.07, 0.15, 0.3, 0.5 μs/3000, 1500, 1200 Hz 3, 4 NM: 0.15, 0.3, 0.5, 0.7 μs/3000, 1500, ,200, 1000 Hz 6, 8, 12 NM: 0.3, 0.5, 0.7, 1.2 μs/1500, 1200, 1000, 600 Hz 16, 24 NM: 0.5, 0.7, 1.2 μs/1200, 1000, 600 Hz 32, 48, 96 NM: 1.2 μs/600 Hz	0.125, 0.25 NM: 0.07 Q0N/5.0, 2400 Hz 0.5 NM: P0N 0.07, 0.18, Q0N/5.0 7.5, 2400 2000 Hz 0.75, 1 NM: P0N 0.07 0.18 0.3, Q0N/5.0 7.5 12.5, 2400 2000 1500 Hz 1.5, 2 NM: P0N 0.07 0.18 0.3, Q0N/5.0 7.5 12.5, 2400 2000 1500 Hz 3, 4 NM: P0N 0.07 0.18 0.3, Q0N/5.0 7.5 12.5, 2400 2000 1500 Hz 6, 8 NM: P0N 0.3 0.5 0.7 1.2, Q0N/12.5 17.5 18.3, 1500 1060 1000 600 Hz 12, 16, 24 NM: P0N 0.5 0.7 1.2, Q0N/17.5 18.3,1060 1000 600 Hz 32, 48, 96 NM: P0N 1.2, Q0N/18.3,600 Hz
Output power		12 kW / 25 kW	30 kW Magnetron
DISPLAY			
Accuracy	Range	1% of the maximum range of the scale in use or 10 m, whichever is the greater	
	Bearing	±1˚	
Range and range ring interval	Range	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12,16, 24, 32, 48, 72, 96 NM	0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8,12, 16, 24, 32, 48, 72, 96 NM
	Ring	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 12, 16 NM	0.025, 0.05, 0.1, 0.25, 0.25, 0.25, 0.5, 0.5, 1, 1, 2, 2, 4, 4, 8, 8, 12,16 NM
Echo trail		interval: 15, 30 s, 30 m or continuous	
TT targets		Up to 200	
AIS targets		Up to 1000 (Data input from AIS, GPS and heading is required)	
Interface (IEC61162, NMEA0183)	Input	ABK, ACK, ACN, ALR, CUR, DBT, DPT, DTM, GGA, GLL, GNS, HBT, HDT, MTW, MWV, RMC, THS, VBW, VDM, VDO, VDR, VHW, VTG, ZDA	
	Output	ABM, ACK, ALC, ALF, ALR, ARC, BBM, EVE, HBT, OSD, RSD, TLB*, TTD*, TTM*, 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 PSU-014: 3.7 A PSU-015: 6.4 A PSU-016: 2.8 A PSU-017: 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

Chart Radar - FAR-3000-BB (S- or X-Band, Solid State ot Magnetron)

Radiator XN12CF 46.2 kg 101.9 lb
XN20CF 48.1 kg 106.1 lb
XN24CF 49.3 kg 108.7 lb

XN12CF: 1297 51.1"
XN20CF: 2097 82.6"
XN24CF: 2597 102.2"

Radiator SN36CF 144 kg 317.5 lb

3822 150.5"

109 4.3"
575 22.7"
395 15.6"
15 0.6"
255 10.0"
257 10.1"
409 16.1"
9 0.35"

769 30.3"
457 18.0"
12 0.5"
640 25.2"
420 16.5"
69 2.7"
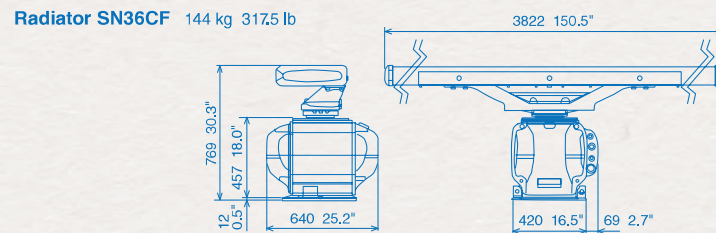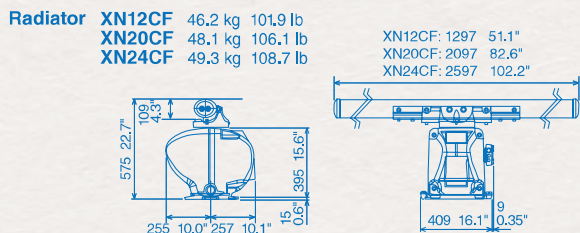
Monitor Unit

MU-190 8.8 kg 19.4 lb

MU-231 12.8 kg 28.2 lb

MU-270W 13 kg 28.7 lb

110 4.3"
397 15.6"
450 17.7"
489 19.3"

112 4.4"
484.9 19.1"
553 21.8"
592 23.3"

95 3.7"
12 0.5"
485 19.1"
313 12.
728 28.7"
70 27.8"
4xΦ8x17 fixing hole

448 17.6"
389 15.3"
4-Ø18
Cutout for flush mount

554 21.8"
471 18.5"
4-R10
Cutout for flush mount

less than 4xR10 pilot hole 6
706 27.8"
686 27.0"
471 18.5"
313 12.3
79 3.1
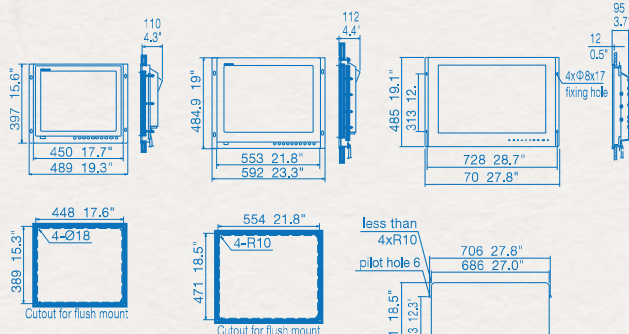
Transceiver Unit for FAR-3320W

RTR-108 17 kg 37.5 lb

37 1.5"
12 0.5"
200 7.9"
200 7.9"
70 2.8"
384 15.1"
422 16.6"
291 11.5"
8 0.3"
279.5 11.0"
70 2.8"
484 19.1"
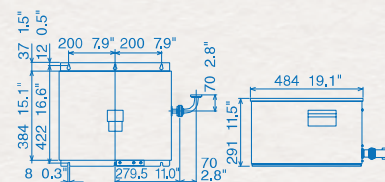
Transceiver Unit for FAR-3330SW

RTR-109 22 kg 48.5 lb

15 0.6"
260 10.2"
260 10.2"
546 21.5"
291 11.5"
10 0.4"
94 3.7"
65 2.6"
606 23.9"
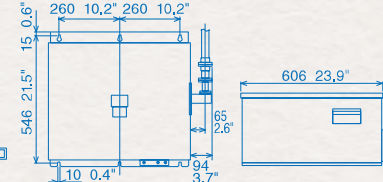
Power Supply Unit

PSU-014/016 8.5 kg 18.7 lb

392 15.4"
370 14.6"
32 1.3"
340 13.4"
405 15.9"
350 13.4"
150 5.9"

PSU-015/018 10 kg 22.0 lb

392 15.4"
370 14.6"
32 1.3"
340 13.4"
405 15.9"
350 13.4"
150 5.9"

Sensor Adapter

Serial : MC-3000S 1.5 kg 3.3 lb

220 8.66"
180 7.09"
235.5 9.27"
150 5.91"
64 2.52"
48 1.88"
41 1.61"
no less than 150 5.91"
4-ø5 Fixing Hole

Analog : MC-3010A 0.8 kg 1.8 lb

100 3.94"
60 2.36"
150 5.91"
235.5 9.25"
64 2.51"
48 1.88"
41 1.61"
no less than 150 5.91"
4-ø5 Fixing Hole

Digital In : MC-3020D 0.8 kg 1.76 lb

100 3.94"
60 2.36"
150 5.91"
235.5 9.25"
64 2.52"
48 1.88"
41 1.61"
no less than 150 5.91"
4-ø5 Fixing Hole

Digital Out : MC-3030D 0.8 kg 1.76 lb

100 3.94"
60 2.36"
150 5.91"
235.5 9.25"
64 2.52"
48 1.88"
41 1.61"
no less than 150 5.91"
4-ø5 Fixing Hole

Control Unit

RCU-025 3.1 kg 6.84 lb

32 1.26"
339 13.3"
180 7.09"
216 8.50"
398 15.7"

72 2.83" max.
no less than 70 2.76"
10 to 20 0.39" to 0.79"
55 2.17"
38 1.50"

398 15.7"
170 6.69"
180 7.09"
388 15.3"
Cutout for flush mount
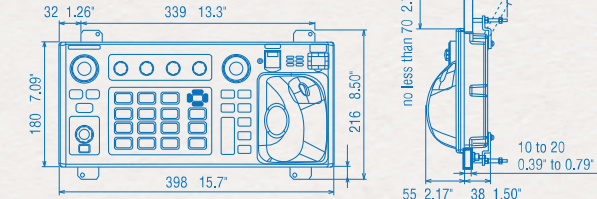
Trackball Control Unit

RCU-026 1.5 kg 3.31 lb

no less than 70 2.76"
Max 70 2.76"
180 7.09"
120 4.72"

120 4.72"
170 6.69"
180 7.09"
110 4.33"
Cutout for flush mount
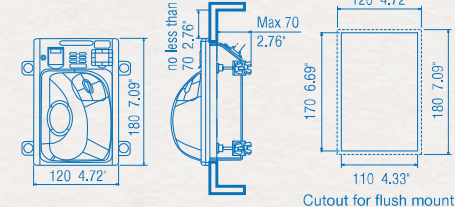
Processor Unit

EC-3000 14 kg 30.9 lb

426 16.77"
15 0.59"
396 15.59"
360 14.17"
45 1.77"
153 6.02"
150 5.9"
150 5.9"
150 5.9"
3-ø8 Fixing hole
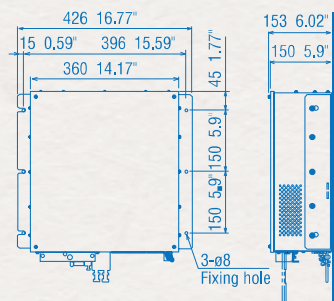
Switching Hub

HUB-100 1.5 kg 3.31 lb

270 10.63"
255 10.03"
4-ø5 Fixing Hole
47 1.85"
45 1.77"
115 4.53"
162 6.38"
145 5.71"
242 9.53"
15 0.59"
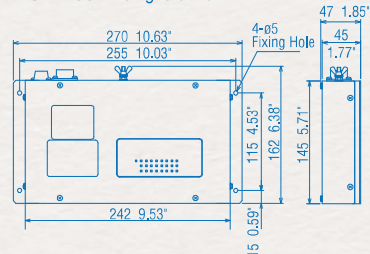
Intelligent Hub

HUB-3000 1.5 kg 3.31 lb

350 13.79"
336 12.23"
4-ø5 Fixing hole
33 1.3"
103 4.06"
153 6.02"
172 6.77"
324 12.76"
no less than 100 3.94
42 1.65"
no less than 150 5.91"

GPS/DGPS Navigator

		4.3" GPS NAVIGATOR	4.2" GPS NAVIGATOR
		GP-33	**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		Within 90 s (cold start)	90 s approx. (cold start)
Tracking Velocity		999 kn	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		4.3" Color LCD	4.2" Color LCD
Effective Display Area		95.04 (W) x 53.85 (H) mm	92 (W) x 52 (H) mm
Screen Resolution		480 x 272	
Display Modes		Plotter, Steering, Highway, NAV data,User display1, User display2, Satellite monitor	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, XTE, Speed, WAAS, Time, Trip, Odometer	Arrival, Anchor watch, Cross track error, Speed, WAAS (SBAS), Time, Trip
INTERFACE			
Ports		NMEA0183: 1, NMEA2000: 1	NMEA0183: 1, USB: 1
Interface	Output	(NMEA0183) AAM, APB, BOD, BWC, BWR, DTM, GGA, GLL, GSA, GSV, RMB, RMC, VTG, XTE, ZDA (NMEA2000) 059392, 060928, 061184, 126208, 126464, 126720, 126992, 126996, 127258, 129026, 129029, 129033, 129044, 129283, 129284, 129285, 129538, 129539, 129540, 130822, 130823	(NMEA0183) AAM, APB, BOD, BWC, BWR, DTM, GGA, GLL, GSA, GSV, RMB, RMC, VTG, XTE, ZDA
	Input	(NMEA2000) 059904, 065286, 060928, 061184,126208, 126720	(NMEA0183) RTE, TLL
ENVIRONMENT			
Temperature	Display Unit	-15°C to +55°C	
	Antenna Unit	-25°C to +70°C	
Waterproofing	Display Unit	IP56	IP55
	Antenna Unit	IPX6	IP56
POWER SUPPLY			
	Non NMEA2000	12-24 VDC: 0.24-0.12 A	12-24 VDC: 0.7-0.3 A
	NMEA2000	15 VDC, LEN7	—

GP33 Display Unit (Bracket Mount)   0.72 kg 1.6 lb

GP33 Display Unit (Flush Mount)   0.6 kg 1.3lb

GP39 Display Unit (Bracket Mount)   0.39 kg 0.86 lb

GP39 Display Unit (Flush Mount)   0.36 kg 0.79 lb

172 6.8"
145 5.7"
30°
125 4.9"
146 5.7"
146 5.7"
4-Ø6 fixing holes
23 0.9" 73 2.9"
154 6.1"
63 2.5"
88 3.5"

4-Ø3.5
145 5.7"
110 4.3"
125 4.9"
128 5.0"
12 0.5" 61 2.4"
40 1.6"
40 1.6"
40 1.6"
125 4.9"
Pilot holes
R12
130 5.1"
110 4.3"

184 7.2"
175 6.9"
135 5.3"
100 3.9"

204 8.0"
175 6.9"
100 3.9"
70 2.9"

		5.7" GPS DGPS NAVIGATOR
		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 reciever)

GPS Antenna GPA017S   0.6 kg 1.3 lb
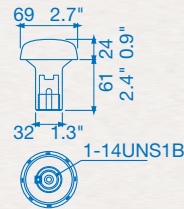
GP-170 Display Unit (with an optional flush mount kit)   2.2 kg 4.9 lb (without DGPS beacon receiver)
2.4 kg 5.29 lb (with DGPS beacon receiver)
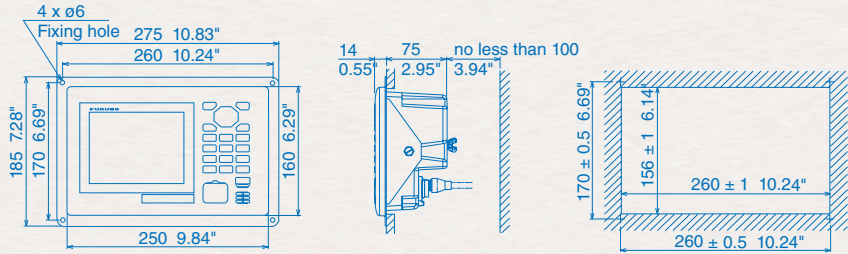
GPS/Chart Plotter

		7" WIDE CHART PLOTTER/FISH FINDER	9" WIDE CHART PLOTTER/FISH FINDER
		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)	
ACCURACY			
Internal Antenna		\ GPS:10 m Max, WAAS: 5 m Max, MSAS: 7.5 m Max	
DISPLAY			
Type		7" Wide Color TFT LCD	9" Wide Color TFT LCD
Screen Size		154 x 85 mm	199 x 113 mm
Screen Resolution		WVGA 800 x 480 pixels	WVGA 800 x 480 pixels
Screen Brightness		1000 cd/m2 (typical)	1000 cd/m2 (typical)
Language		\ English (US & UK), French, Spanish, German, Italian, Portuguese, Danish, Swedish, Norwegian, Finnish, Greek, Japanese, Chinese	
Display Modes		\ Chart Plotter, Fish Finder, Radar*1, AIS*2, Instruments*3 (Nav Data, Engine, Wind, Fuel tank, Autopilot*4, etc.), GPS status *1: Connected to the 1st Watch Wireless Radar DRS4W required; *2: Connected to AIS sensor required; *3: Connected to external sensors required; *4: Connected to the FURUNO NAVpilot 300 or 700 series require	
Memory Capacity		\ 30,000 points for ship's track and waypoints, 1,000 planned routes (Max. 50 points per route) 5,000 quickpoints	
Fish Finder			
Transmit Frequency		\ CW: 50/200 kHz, CHIRP: 40 to 225 kHz	
Transducer		\ 300 W or 600 W or 1 kW* (Transducer depent) * 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 +70deg°)	
Waterproofing		\ IP56	
POWER SUPPLY			
		12-24 VDC, 1.0-0.5 A	12-24 VDC, 1.0-0.5 A

GPS/Chart Plotter

		12.1" CHART PLOTTER	12.1" CHART PLOTTER/FISH FINDER
		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		GP3700: Head Up, North Up, Auto Course Up, Course Up, Go To Up, Specified Direction Up. GP3700F: As GP3700, 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

GPS/Chart Plotter - GP-1871F/1971F/3700/3700F

GP-1871F Display Unit (Bracket Mount)   1.1 kg 2.4 lb
GP-1871F Display Unit (Flush Mount)   0.9 kg 2.0 lb

217 8.5"
191.5 7.5"
152 6"
27 1.0" 74 2.9"
36°
165 6.5"
191.5 7.5"
15 0.6" 59 2.3"
125.5 4.9"
74 2.9"
130 5.1"
4x ø6
84 3.3"

181 7.1" 4x ø6.5
81.5 3.2" 4x ø25 115 4.5"
148 5.8"
174 6.9"
Cutout for flush mount
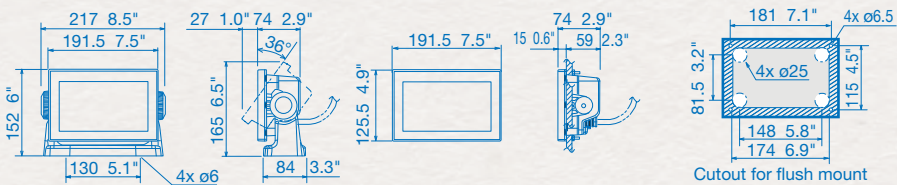
GP-1971F Display Unit (Bracket Mount)   1.5 kg 3.3 lb
GP-1971F Display Unit (Flush Mount)   1.3 kg 2.9 lb

267 10.5"
241.5 9.5"
182 7.2"
36 1.4" 74 2.9"
36°
192 7.6"
241.5 9.5"
15 0.6" 59 2.3"
155.5 6.1"
74 2.9"
180 7.1"
4 x ø6
85 3.4"

231 9.1" 4x ø6.5
139 5.5" 4 x ø25 114 4.5" 145 5.7"
199 7.8"
224 8.8"
Cutout for flush mount
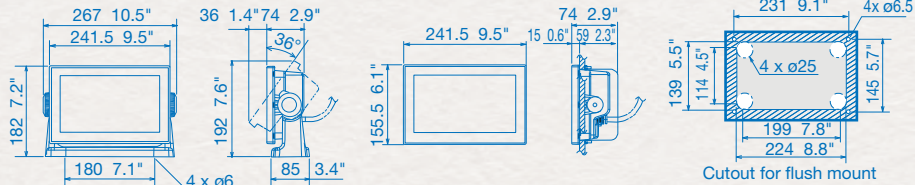
GP-3700/ Display Unit (Bracket Mount)   4.8 kg 10.1 lb
GP-3700F Display Unit (Bracket Mount)   4.8 kg 10.6 lb

339 13.3"
320 12.6"
351 13.3"
332 13.1"
16 0.6" 179 7.0"
30°
66 2.6"
358 14.1"
236 9.3" 4-ø7
132 5.2"
35 1.4"
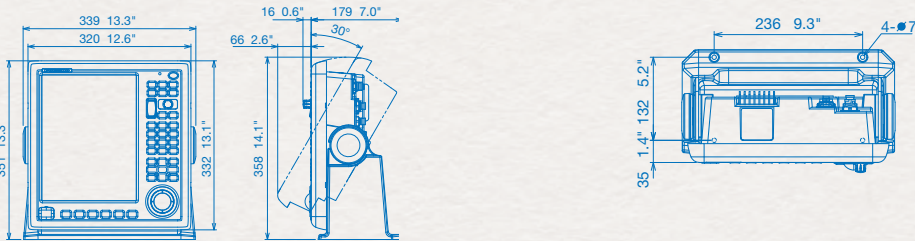
GPA021S (For DGPS)   0.52 kg 1.15 lb

ø156 6.1"
FURUNO
116 4.6"
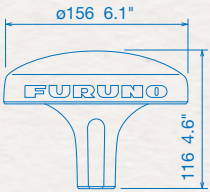
Fish Finder

	5.7" FISH FINDER	8.4" FISH FINDER	10.4" LCD SOUNDER	12.1" LCD SOUNDER
	FCV-628	**FCV-588**	**FCV-295**	**FCV-1150**
General				
Frequency	50 and 200 kHz		The synthesized transreceiver works with frequencies in 28 to 200 kHz	
Transducer	600 W	600 W/1 kW*	1, 2 or 3 kW	
DISPLAY				
Type	5.7" TFT color LCD	8.4" TFT color LCD	10.4" TFT color LCD	12.1" TFT color LCD
Screen Resolution	VGA 480 x 640 pixels		640 x 480	800 × 600
Display Mode	Single frequency (50 or 200 kHz), Dual-frequency, Zoom, Nav data, A-scope, Marker zoom, Bottom zoom, Bottom-lock, Bottom Discrimination, ACCU-FISH™, RezBoost™		Single mode (high/low frequency), Dual-frequency, Zoom, Mix, A-scope, Marker zoom, Bottom zoom, Bottom-lock expansion	
Display Range *m, ft, fa, p/b can be selectable in the menu	2-1200 m		5-3000 m	
Range Shift	up to 1200 m		0-2000 m	
Zoom Range — Bottom-lock expansion	2-10 m		5-200 m	
Zoom Range — Bottom & Marker Zoom	2-1200 m			
Picture Advance Speed	8 steps: stop, 1/16, 1/8, 1/4, 1/2, x1, x2, x4		6 steps: stop, 1/16, 1/8, 1/4, 1/2, x1, x2, x4	
Pulselength & TX rate	0.04-3.0 ms, Max 3,000 pulse/min		0.1-5.0 ms, 20-3000 pulse/min	
Interface (IEC61162-1, NMEA 0183 Ver 1.0/2.0/3.0) — Input	BWC, GGA, GLL, GNS, HDG, HDT, MDA, MTW, MWV, RMA, RMB, RMC, VHW, VTG, XTE, ZDA		BWC, GGA, GLC, GLL, GNS, GTD, HDG, HDT, MDA, MTW, MWW, RMA, RMB, RMC, VHW, VTG, XTE	BWC, GGA, GLC, GLL, GNS, GTD, HDG, HDT, MDA, MTW, MWW, RMA, RMB, RMC, VHW, VTG, XTE, HVE, att, hve, req
Interface — Output	DBS, DBT, DPT, MTW*, RMB*, VHW*, TLL* by key operation * External data required.		DBS, DBT, DPT, MTW*, TLL**, SDmrk, VHW, RMB, dat *Optional sensor required **External data required	
ENVIRONMENT				
Temperature	-15°C to +55°C			
Waterproofing	IP56		IP55 (When flush mounted)	
POWER SUPPLY				
	12-24 VDC: 1.1-0.5 A	12-24 VDC: 1.3-0.6 A	12-24 VDC: 2.6-1.3 A, 100/110/220/230 VAC, optional rectifier required	12-24 VDC: 3.3-1.7 A, 100/110/220/230 VAC, optional rectifier required

* The FCV588 can be connected with the transducers of 1 kW output power, when interfaced with the Matching Box MB-1100 for some Furuno transducers.

Fish Finder - FCV-628/588/295/1150

FCV-628 (Bracket Mount)   1.3 kg 2.9 lb

FCV-628 (Flush Mount)   0.9 kg 2.0 lb

Cutout for Flush Mount

FCV-1150 (Flush Mount)   6.8 kg 15.0 lb

Fixing hole

Cutout for flush mount
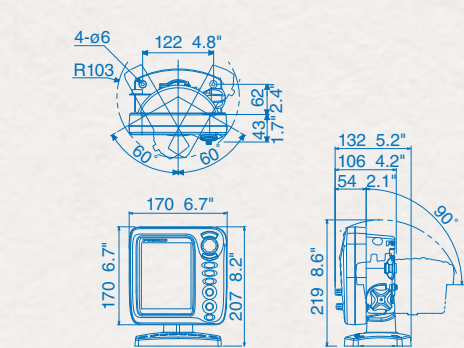
FCV-588 (Bracket Mount)   2.3 kg 5.1 lb
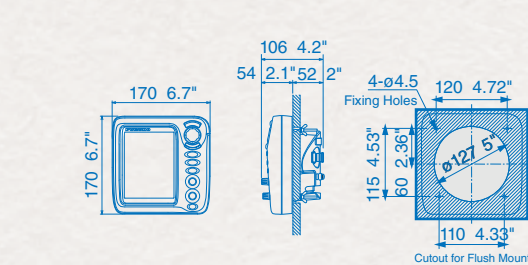
FCV-588 (Flush Mount)   1.6 kg 3.5 lb

Cutout for Flush Mount

FCV-295   7.0 kg 15.4 lb
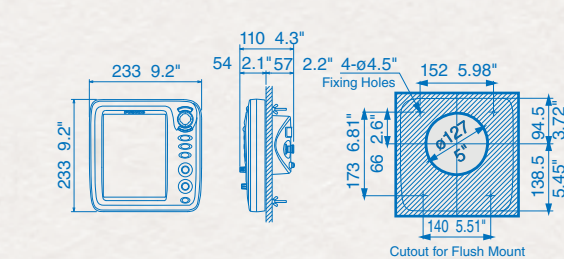
FCV-1150 (Bracket Mount)   8.2 kg 18.1 lb
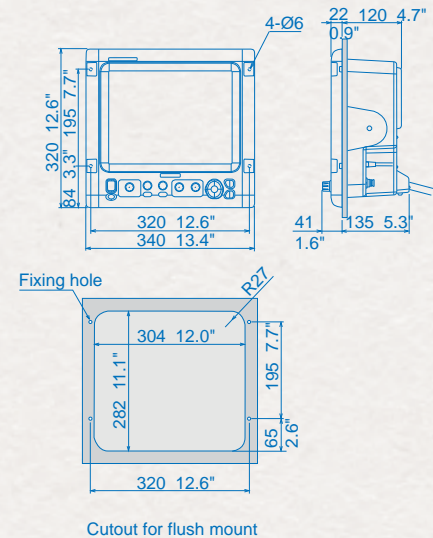
Fish Finder

	FISH FINDER	HI-REZ TruEcho CHIRP FISH FINDER	TruEcho CHIRP WITH UNIQUE FISH SIZE INDICATOR
	FCV-1900	**FCV-1900B**	**FCV-1900G**
General			
Frequency	15 to 200 kHz, Free-synthesize		
Transducer	1, 2 or 3 kW		
DISPLAY (Processor unit)			
Display mode	Single frequency high/low), Dual-frequency, Zoom, User 1/2 (available to use mixture, multi-gain, telesounder and external sounder display), Bottom-lock expansion, Bottom zoom, Marker zoom, Discrimination zoom		
Display Range *m, ft, fa, p/b can be selectable in the menu	5 to 3000 m		
Range Shift	up to 2000 m		
Zoom Range	2 to 200 m		
Fish size histogram	—	—	2 m depth or more, specified transducer required
Picture Advance Speed	6 steps: stop, 1/4, 1/2, 1/1, 2/1, 4/1		
Data recording	Echo display and measured data can be recorded to internal memory		
Language	English, Danish, French, Spanish, Norwegian, Russian, Chinese, Korean, Japanese		
INTERFACE			
NMEA0183	3 Ports for Input/Output		
Interface Input	GGA, GLL, GNS, MTW, VHW, VTG, ZDA		
(NMEA 0183 Ver 1.5/2.0/3.0) Output	DBS, DBT, DPT, MTW, TLL		
LAN	1 port*, Ethernet 100Base-TX *Hub required		
CIF	1 port		
Net sonde	1 port (sonde marker/sonde KP)		
Video	1 port, HDMI type-D		
External KP	1 port		
Temperature sensor	1 port		
USB	1 port (USB2.0)		
ENVIRONMENT			
Temperature	-15°C to +55°C		
Waterproofing	IP22		
POWER SUPPLY			
	12-24 VDC: 8.3-3.9 A		

Processor Unit FCV-1901   10.2 kg 22.5 lb
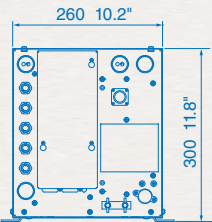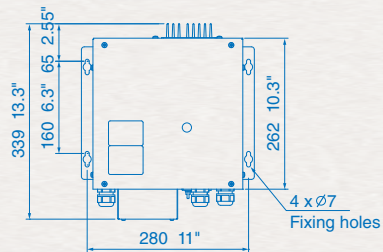
Contro Unit FCV-1902   1.1 kg 2.4 lb

TRANSDUCERS for FCV-295/FCV-1150/FCV-1900/DFF3

	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)

	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)

	1 kW
42 to 65 kHz (low)/130 to 210 kHz (high)	CM265LH, CM275LHW, B265LH, B275LHW (Airmar®)

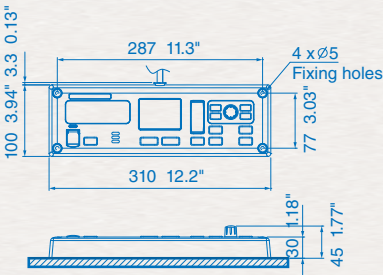## TRANSDUCER for DFF-3D (MULTI BEAM)

	800 W
165 kHz	B54 (Thru-hull)/TM54 (Transom)/SS54 (Stainless)

TRANSDUCERS for DFF-3D & BBDS1/DFF3D & DFF1-UHD (COMBINATION)

	1kW
165 kHz and 50/200 kHz Multi Beam 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) Multi Beam and CHIRP	165T/265LHPM488 (Pocket)

TRANSDUCERS for GP-1871F/1971F (CHIRP)

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

TRANSDUCER LIST

| | | | | | | | | Stand Alone | | | |
	Frequency	Type	Matching Box required	Mount	Power Rating	FCV-628		FCV-588		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		● ◎		● ◎		● ◎		● ◎	

* Airmar® Model name   ○Matching Box required   ●ACCU-FISH mode available   ◎Bottom discrimination display mode available

Searchlight Sonar

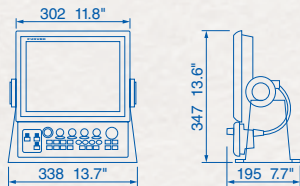|		12.1" SEARCHLIGHT SONAR	12.1" DUAL FREQUENCY SEARCHLIGHT SONAR
		CH-500	**CH-600**
GENERAL			
Frequency		60/88/150/180/240 kHz, 1 frequency selectable	60/153 kHz or 85/215 kHz (dual frequency) selectable
Output Power		0.8-1.5 kW (depending on frequency), power reduction function available	1 kW
DISPLAY			
Type		12.1" color LCD	
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/ Transciver 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)	

Scanning Sonar

		FULL-CIRCLE SCANNING SONAR	
		CSH-5LMK-2	**CSH-8LMK-2**
GENERAL			
Frequency		55 kHz or 68 kHz	85 kHz or 107 kHz
DISPLAY			
Display Mode		Single scan, Fish Finder combination* (single and Fish Finder), Audio combination (single and audio pictures) * Fish Finder or Echo sounder required	
Colors		Scan/Echo: 16 colors, Mark: 1 color	
Mark		Own ship's track, Heading line, Direction/distance, Fish school, Event, Target lock	
Range Scale		50, 85, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 800, 1000, 1200, 1600 m	
Pulselength		0.5 to 20 ms (depending on range scales)	
Ship Speed		18 kn max (raise/lower operation up to 16 kn)	
Tilt		Manual control: 0° to 55° in 1° steps Automatic tilt scan: 4° to 52°	
Audio Search	Frequency	800 Hz	1 kHz
(By external loudspeaker)	Sector	20° , 40° , 80° and 120° selectable	
Language		English, Spanish, Danish, Dutch, French, Italian, Norwegian, Thai, Vietnamese, Burmese, Indonesian, Japanese	
INTERFACE			
NMEA0183 (Ver1.5/2.0/2.2)		2 ports	
Interface	Input	CUR, DBS, DBT, DPT, GGA*, GLC, GLL*, GTD, HDG, HDM, HDT, MTW, RMA, RMC, VDR, VHW, VTG * disabled for NMEA0183 Ver.1.5	
	Output	TLL (external data required)	
Log, E/S, KP		Speed log pulse (contact signal): 200/400 pulse/NM Sonde, E/S signal: VI-1100A applicable External KP: Current loop, 0 to 12 V	
Video Signal Output	Method	RGB analog, separated synchronization, XGA (VESA)	
	Resolution	1024 x 768 pixels, 65 MHz clock	
CIF data input		Location, Ship's speed, Bearing, Current data (1 layer), Water depth, Water temperature, Multiple layer current data	
HULL UNIT			
Transducer travel		400 mm or 600 mm	
Raising/lowering Time		400 mm: 14 s, 600 mm: 20 s	
Allowable Ship's Speed		18 kn max. (16 kn during raise/lower operation)	
Driving system		Remote electric control	
ENVIRONMENT			
Temperature		0°C to +55°C	
Waterproofing		IPX2 (w/o connector panel of processor unit)	
POWER SUPPLY			
Processor unit		100-240 VAC: 4.0-2.0 A, 1 phase, 50-60 Hz	100-240 VAC: 4.5-2.2 A, 1 phase, 50-60 Hz

Multi Beam Sonar

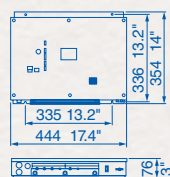|	MULTI BEAM SONAR
	F3/F3i/F3L/F3Li (WMB-1320F/1320Fi/1320FL/1320FLi/4340/6340)
GENERAL	
Transmission Frequency	Wide band;F3/ F3i: 160 kHz, F3L/F3Li: 80 kHz
Effective Beam Width	F3/F3i: 200 m, F3L/F3Li: 450 m
Beam Spacing	FA: 3.2°
Beam Width	120° x 4° (Athwartships x Fore-aft), PS: 4.4°
Maximum Depth* (best performnce)	F3/F3i: 200 m (Side Beam), 400 m (Main Beam directly under boat) F3L/F3Li: 450 m (Side Beam), 900 m (Main Beam directly under boat) * Depth capability subject to a variety of external factors
Max Range Resolution	2 cm
Tide Correction	Fully Geo Referenced
DISPLAY	
Display Mode	Bathymetry, Sonar polar view, Sounder (single, triple & quint beam) (Licensing options) Backscatter, Open Client Support, Water Column Targets, Uncorrected Data, XYZ export, Sidescan, RTK tides, other export formats
MINIMUM PC SPECS	
OS	Windows 8.1, 10
CPU	2 Ghz, 4 Cores/4 Threads
Memory	8 GB (Min. 4 GB)
Graphics	Direct X11
Screen Resolution	Full HD 1920 x 1080 (Min. XGA 1024 x 768)
SSD	2 TB (Min. 250 GB)
Network	Ethernet - GbE, WiFI802.11ac
Dual Screen Support	YES
INTERFACE (Transceiver Unit)	
NMEA0183/RS422/RS232	GGA, GGK, GLL, HDG, HDM, HDT, HVE, PASHR, PTNL PFEC, RMC, RCD, TSS1, ZDA
Ethernet	GbE
Other Interfaces	PPS, KP, Remote Power
ENVIRONMENT	
Temperature	0°C to +50°C (storage: -200°C to +85°C)
Waterproofing	IP56, Bulkhead mounted (IP67 option available)
POWER SUPPLY	
	9-32 VDC

Searchlight Sonar

CH-500/600 Display Unit and Cintrol Unit   4.0 kg   9.0 lb

302 11.8"
347 13.6"
338 13.7"
195 7.7"

CH-503 Transceiver Unit   3.3 kg   7.2 lb

336 13.2"
354 14"
335 13.2"
444 17.4"
76 3

CH-502/602 Control Unit   1.0 kg   2.2 lb

113 4.4"
99 3.9"
300 11.8"

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

625 24.6"
500* 19.7"
451 17.7"
400 15.7"
ø140 5.5"
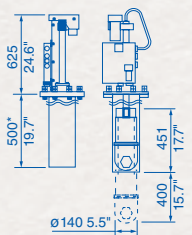
CH-504 8" Type Hull Unit (400mm travel)   41 kg   90 lb

625 24.6"
475* 18.7"
450 17.7"
400 15.7"
ø185 7.3"
*Minimum Length
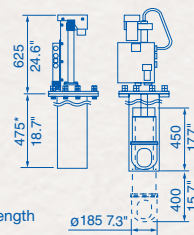
CH-505 6" Type Hull Unit (250mm travel)   33 kg   73 lb

475 18.7"
475* 18.7"
450 17.7"
250 9.8"
ø190 7.5"
Ø140 5.5"
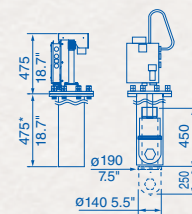
CH-505 8" Type Hull Unit (250mm travel)   40 kg   88 lb

475 18.7"
475* 18.7"
450 17.7"
250 9.8"
ø190 7.5"
Ø185 7.3"
*Minimum Length
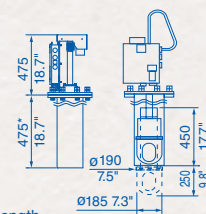
Scanning Sonar

DRS (F3 DRX) Transceiver Unit   8.3 kg   18.3 lb

ø6.6
ø5.75
260 10.2"
377 14.8"
216 8.5"
111 4.4"
20.5 0.8"
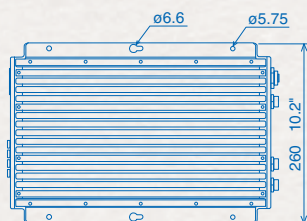
WMB-160 (G3: 160 kHz) Transducer   15 kg   33.1 lb (Cable dependent)

27 1.1"
Bow Mark
92 3.6"
98 3.9"
6 0.2"
318 12.5"
330 13"
84 3.3"
84 3.3"
156 6.1"
168 6.6"
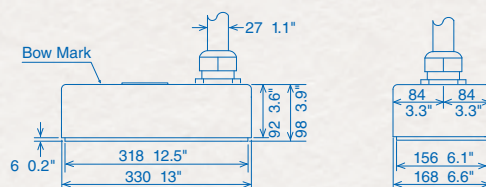
WMB-80 (G3: 80 kHz) Transducer   39 kg   86.0 lb (Cable dependent)

27 1.1"
Bow Mark
127 5"
133 5.2"
10 0.4"
510 20.1"
533 21"
170 6.7"
170 6.7"
316 12.4"
340 13.4"
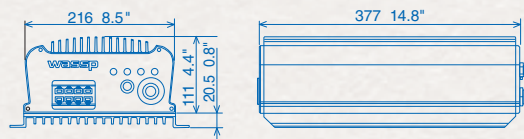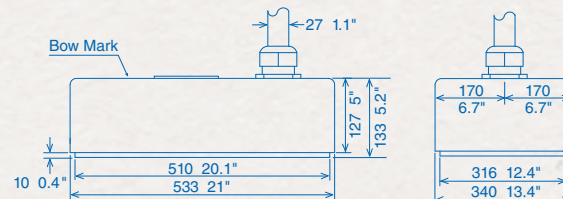
Multi Beam Sonar

CSH-5211-A Control Unit   3.5 kg   7.7 lb

300 11.8"
2-Ø6.5
116 4.6"
65 2.6"
350 13.8"
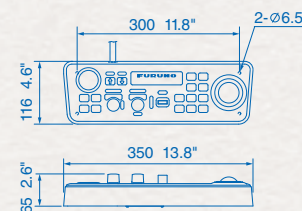
CSH-8030-A-8L Transceiver Unit   37 kg   81.6 lb

165 6.5"
165 6.5"
3-Ø12
689 27.1"
736 29.0"
710 28.0"
715 28.1"
165 6.5"
165 6.5"
425 16.7"
40 1.6"
308 12.1"
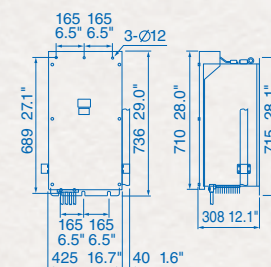
CSH-5130-A-5L Transceiver Unit   20 kg   44.1 lb

325 12.8"
2- Ø12
240 9.5"
281 11.1"
530 21"
471 18.5"
505 20"
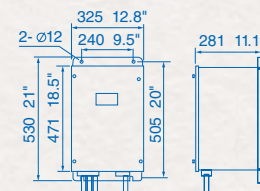
CSH-5210-A Processor Unit   3.4 kg   7.5 lb

10 0.4"
376 14.8"
300 11.8"
4-Ø7
23 0.9"
403 15.9"
385 15.2"
349 13.7"
8 0.3"
7 0.3"
3 0.1"
98.5 3.9"
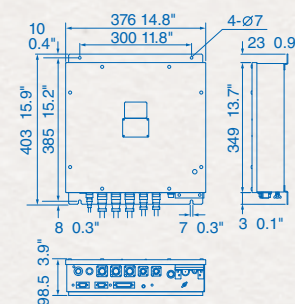
CSH-5040-A (600 mm travel) Hull Unit   75 kg   165.0 lb
CSH-5041-A (400 mm travel) Hull Unit   70 kg   154.0 lb

85 3.3"
210 8.8"
85 3.3"
210 8.8"
45° Bow
45° Bow
700 27.6"
855 33.7"
295 11.6"
550 21.7"
750 29.5"
400 15.7"
295 11.6"
600 23.6"
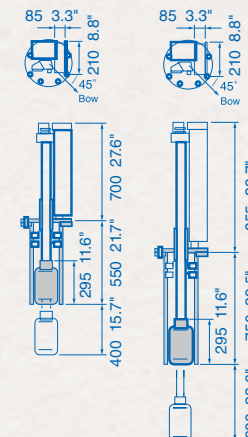
CSH-8040-A (600 mm travel) Hull Unit   82 kg   180.8 lb
CSH-8041-A (400 mm travel) Hull Unit   81 kg   178.6 lb

1650 65.0" (600 mm travel)
1250 49.2" (400 mm travel)
858 33.8" (600 mm travel)
703 27.7" (400 mm travel)
ø343 13.5"
323 12.7"
750 29.5" (600 mm travel)
550 21.7" (400 mm travel)
250 9.8" (600 mm travel)
450 17.7" (400 mm travel)
600 23.6" (600 mm travel)
400 15.7" (400 mm travel)

CSH-5020-A Preamplifier   6.5 kg   14.3 lb

112.5 4.4"
210 8.3"
113 4.4"
550 21.7"
370 14.6"
19 0.74"
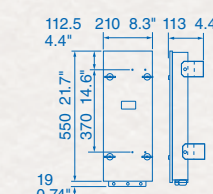
Autopilots

	AUTOPILOT
	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" monocrome 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
NMEA2000	1 Port, DBW control
Contact Signal	3 Ports
ENVIRONMENT	
Temperature	-15°C to +55°C
Waterproofing — Processor Unit	IP55
Waterproofing — Control Unit	IP56
Waterproofing — Gesture Controller	IP67
POWER SUPPLY	
Processor Unit	12-24 VDC, 0.22 A max. (LEN 2)
Conrol Unit	15 VDC, 0.29 A max. (LEN 6)

NAVpilot-300 Control Unit FAP-3011 (Flush Mount)   0.22 kg 0.48 lb
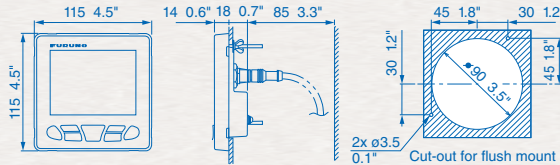
NAVpilot-300 Processor Unit FAP-7002   1.5 kg 3.3 lb

NAVpilot-300 Control Unit FAP-3011 (Bracket Mount)   0.43 kg 0.95 lb

NAVpilot-300 Gesture Controller GC-001   0.12 kg 0.26 lb
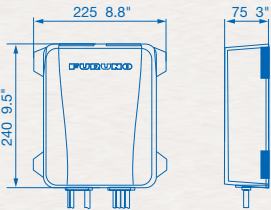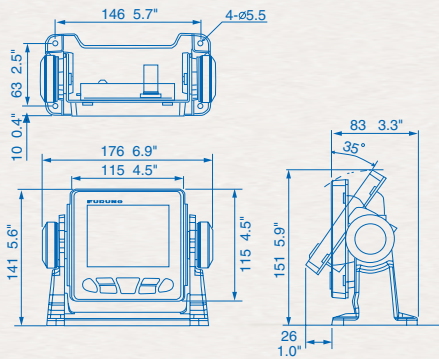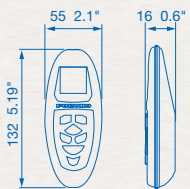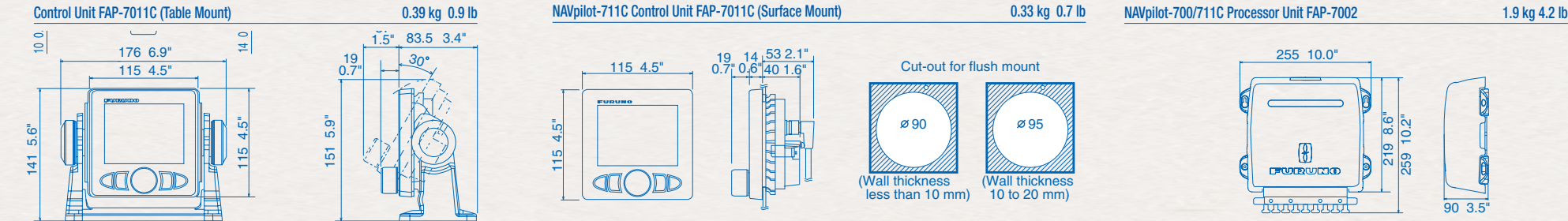
	AUTOPILOT
	NAVpilot-711C
CONTROL UNIT	
Type	Color LCD
Screen Size	4.1"
Effective Display Area	82.6 (W) x 61.9 (H) mm
Screen Resolution	320 x 240 dots
Screen Backlight	8 steps
PROCESSOR UNIT	
Steering mode	STBY, Auto, Dodge (FU, NFU, Course), Turn, Remote, Advanced auto*, SABIKI™**, Navigation*, Wind*, Fish HunterTM* * external data required. ** NAVpilot 711C only.
Sea Condition Adjustment	Auto/Manual-Calm/Moderate/Rough
Rudder Angle Settings	10 - 45 deg
Alarm	Heading deviation, Cross-track error*, Ship's speed*, Depth*, Water temperature*, Wind*, Watch, Log trip* * external data required
INTERFACE	
Ports	NMEA2000 (NMEA2000): 1, NMEA0183: 2

Input	NMEA0183: NMEA2000 (NMEA2000):	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 059392/904, 060928, 061184, 126208/720/992/996, 127250/251/258/488/489, 128259/267, 129025/026/029/033/283/284/285, 130306/310/311/312/313/314/577/818/821/827/8 80
Output	NMEA0183: NMEA2000 (NMEA2000):	DBT, DPT, GGA, GLL, GNS, HDG, HDM, HDT, MTW, MWV, RMB, RMC, ROT, RSA, VHW, VTG, VWR, VWT, ZDA 059392/904, 060928, 061184, 126208/464/720/992/996, 127237/245/250/251/258, 128259/267, 129025/026/029/033/283/284/285, 130306/310/311/312/822/823/827

ENVIRONMENT		
Temperature		-15°C to +55°C
Waterproofing	Processor unit	IP20
	Other unit	IP56
POWER SUPPLY		
		12-24 VDC: 4.0 - 2.0 A (excluding pump)

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

NAVpilot-711C Control Unit FAP-7011C (Surface Mount) 0.33 kg 0.7 lb

Cut-out for flush mount

ø 90 (Wall thickness less than 10 mm)

ø 95 (Wall thickness 10 to 20 mm)

NAVpilot-700/711C Processor Unit FAP-7002 1.9 kg 4.2 lb

Instrument/Data Organizers

	INSTRUMENT/DATA ORGANIZER
	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 madeg 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 temperatuere, 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

ELECTRONIC NAVIGATION INSTRUMENTS				
FI-5001 **Wind Transducer**	**FI-5001L (Long Shaft)** **Wind Transducer**	**DST-800** **Depth/Speed/Temp sensor**	**FI-5002** **Junction Box**	**IF-NMEAFI** **Analog NMEA Data Converter**
GENERAL				
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 Extrernal 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

Instrument FI-70
0.22 kg   0.5 lb

115 4.5"
115 4.5"
14 0.6" 18 0.7" 85 3.3"

45 1.8" 30 1.2"
30 1.2" 45 1.8"
ø90 3.5"
2x ø3.5 0.1"
Cut-out for flush mount

Instrument (Front Mount) FI-70
0.24 kg   0.5 lb

115 4.5"
115 4.5"
16 0.6" 16 0.6" 85 3.3"

Pilot Holes
45 1.8" 30 1.2" R9.5
90 3.5" 30 1.2" 45 1.8"
ø90 3.5"
R9.5
90 3.5"
Cut-out for flush mount

Frontmount Installation (optional kit required)

Snap pin

Washers

85 3.3"
45 1.8" 30 1.2"
30 1.2" 45 1.8"
ø90 3.5"
2x ø3.5 0.1"
Cut-out for flush mount

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

80 3.1"
7.5 55
0.3" 2.2"
50 2.0"
40 1.6"
4- ø5
ø290
ø130

(30 1.2") 517 20.4"
372 14.6" 70 2.8"
237 9.3"
76 3.0"
97 3.8"
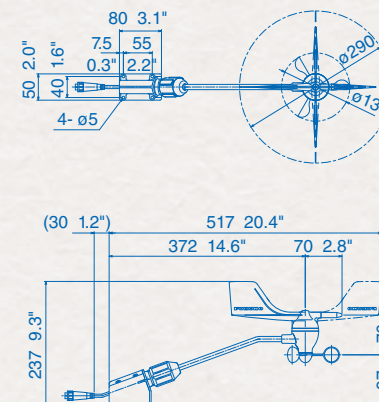
Depth/Speed/Temp Sensor DST-800 (option)
0.9 kg   2.0 lb

ø75 2.94"
124 4.87"
ø75 2.94"
5 0.19"
14 0.57"

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

80 3.1"
7.5 55
0.3" 2.2"
50 2.0"
40 1.6"
4- ø5
ø290
ø130

(30 1.2") 865 34.1"
720 28.3" 145 5.7"
70 2.8"
350 13.8"
76 3.0"
210 8.3"

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

2- ø5
84 3.3"
200 7.9"
220 8.7"
52 2.0"

Analog NMEA Data Converter IF-NMEAFI (option)
0.35 kg   0.77 lb

Cable 300 11.8"
135 5.3" 44 1.7"
127 5.0"
2 xø4
32 1.3"
40 1.6"
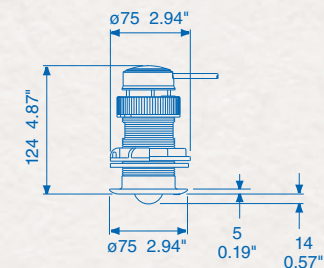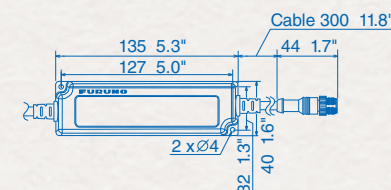
Monitors

	15" MARINE DISPLAY	19" MARINE DISPLAY
	MU-150HD	**MU-190HD**
DISPLAY CHARACTERISTICS		
Type	15 inches, landscape	19 inches, landscape
Screen Resolution	XGA (1024 x 768)	SXGA (1280 x 1024)
Contrast Ratio (typical)	600: 1	900: 1
Viewing Angle (typical)	left/right and up/down: 80° or more	
Max Brightness (typical)	1000 cd/m2	1000 cd/m^2
Min Brightness (typical)	0.2 cd/m2 or less	
INTERFACE		
Analog RGB (D-SUB/15 pins)	1 port	
DVI (DVI-D)	2 ports	
Composite Video (NTSC/PAL)	3 ports	
Built-in Scaler	VGA to SXGA	
POWER SUPPLY		
	12-24 VDC 2.8-1.4 A	12-24 VDC 8.4-3.9 A
ENVIRONMENT (IEC 60945 test method)		
Temperature	-15°C to +55°C	
Waterproofing	IP56 (CFR46, front panel), IP22 (rear panel)	
EQUIPMENT LIST		
	Standard 1. Display Unit 2. Installation Materials, Accessories and Spare Parts **Option** 1. Cable Assembly 2. Bracket Assembly (w/knobs) 3. Hood Assembly 4. Flush Mount Kit (for fixing at front)	**Standard** 1. Display Unit 2. Installation Materials, Accessories and Spare Parts **Option** 1. Cable Assembly 2. Bracket Assembly (w/knobs for MU190) 3. Hood Assembly 4. Dust Cover 5. Flush Mount Kit (for fixing at rear)

MU-150HD Flush Mount　　5.4 kg 11.9 lb
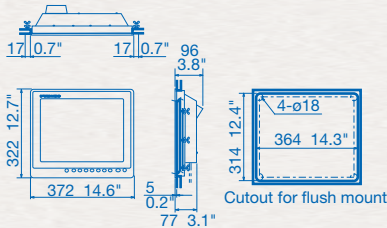
MU-152 Flush Mount　　4.9 kg 10.8 lb

MU-190HD Flush Mount　　8.2 kg 18.1 lb

MU-150HD Bracket Mount　　7.4 kg 16.3 lb

MU-152 Bracket Mount　　6.9 kg 15.2 lb

MU-190HD Bracket Mount　　11.0 kg 24.3 lb

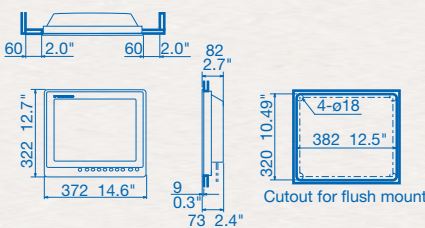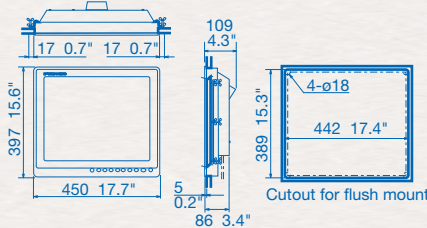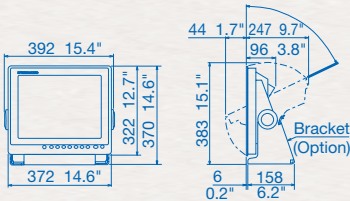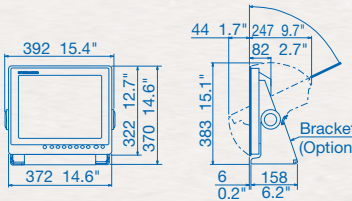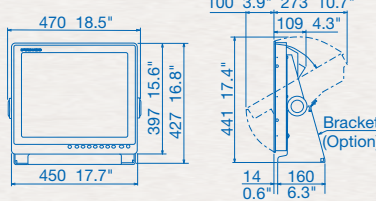|	19" MARINE DISPLAY	23.1" MARINE DISPLAY	27" MARINE DISPLAY
	MU-190	**MU-231**	**MU-270W**
DISPLAY CHARACTERISTICS			
Type	19 inches, landscape	23.1 inches, landscape	27 inches, landscape
Screen Resolution	SXGA (1280 x 1024)	UXGA (1600 x 1200)	WUXGA (1920 x 1200)
Contrast Ratio (typical)	900: 1	600: 1	1500: 1
Viewing Angle (typical)	left/right and up/down: 80° or more		left/right and up/down: 85°
Max Brightness (typical)	450 cd/m2	400 cd/m2	
Min Brightness (typical)	0.2 cd/m2 or less		
INTERFACE			
Analog RGB (D-SUB/15 pins)	1 port		
DVI (DVI-D)	2 ports		
Composite Video (NTSC/PAL)	1 port		
Built-in Scaler	VGA to SXGA		SVGA to WUXGA
POWER SUPPLY			
	100-230 VAC 0.7-0.4 A	100-230 VAC 1.0-0.6 A	100-230 VAC 0.7-0.4 A
ENVIRONMENT (IEC 60945 test method)			
Temperature	-15°C to +55°C		
Waterproofing	IP22		
EQUIPMENT LIST			
	Standard 1. Display Unit 2. Installation Materials, Accessories and Spare Parts **Option** 1. Cable Assembly 2. Bracket Assembly (w/knobs for MU190) 3. Hood Assembly 4. Dust Cover 5. Flush Mount Kit (for fixing at rear)	**Standard** 1. Display Unit 2. Installation Materials, Accessories and Spare Parts **Option** 1. Cable Assembly 2. Bracket Assembly 3. Hood Assembly 4. Dust Cover 5. Flush Mount Kit (for fixing at rear)	**Standard** 1. Display Unit 2. Installation Materials, Accessories and Spare Parts **Option** 1. Cable Assembly 2. Bracket Assembly 3. Flush Mount Assembly (Rear) 4. Hood Assembly (Front/Rear) 5. Dust Cover 6. Handgrip Assembly 7. Crimping Tool

MU-190 Bracket Mount   11.0 kg 24.3 l

MU-231 Bracket Mount   18.9 kg 41.7 lb

MU-270W Bracket Mount   21.0 kg 46.3 lb

MU-190 Flush Mount   8.8 kg 19.4 lb

MU-231 Flush Mount   12.8 kg 28.2 lb

MU-270W Flush Mount   13.0 kg 28.7 lb
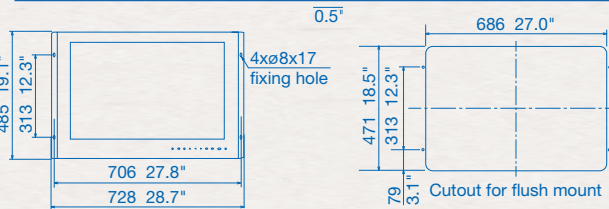
Remote Displays

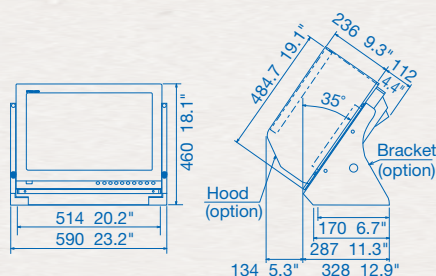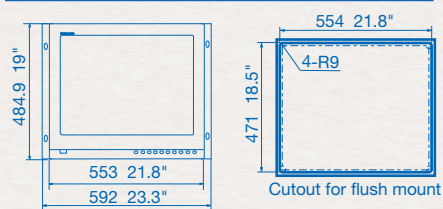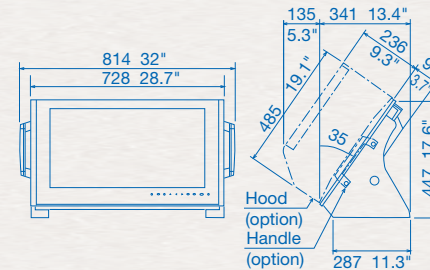|	REMOTE DISPLAY
	RD-33
GENERAL	
Type	4.3" color LCD
Effective Display Area	95.04 (W) x 53.85 (H) mm
Screen Resolution	480 x 272
Display style	1/2/3/4 data, Highway, Graph, Alphanumeric, 6-way split
Display mode	Nav data, Highway, Heading, Speed, Depth Graph, Graph, Layline, STW, SOG, RPM, Rudder, Wind angle, Airtemp, 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)

Compass

		INTEGRATED HEADING SENSOR	
		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 by swinging the boat
INTERFACE			
I/O Port	Input	1 port	NMEA2000: 1
	Output	2 ports (one port drives 3 outputs)	NMEA2000: 1
Output		FURUNO AD-10 format, IEC 61162-1 (NMEA0183 Ver2.0) HDG, HDT, HDM	065284, 127250
Input		IEC 61162-1 (NMEA0183 Ver1.5/2.0) RMC, VTG	059904, 060928, 061184, 126720, 126208, 130818, 165283
Data Update	AD-10 formatted	25 ms	----
	IEC 61162-1 (NMEA0183)	100 ms, 200 ms or 1 s selected	----
ENVIRONMENT			
Temperature		-15°C to 55°C	
Waterproofing		IPX5 (IEC 60529), CFR46 (USCG standard)	IP55
Power Supply			
		12-24 VDC: 120-30 mA	12 VDC: 0.1 A (LEN: 3)

RD-33 Display Unit (Bracket Mount) 0.7 kg 1.54 lb
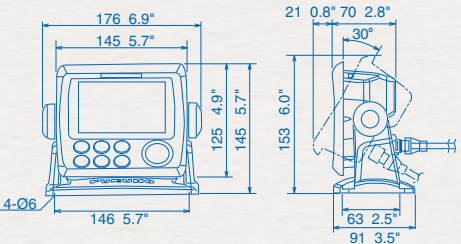
RD-33 Display Unit (Flush Mount) 0.59 kg 1.3 lb

PG-500R 0.3 kg 0.7 lb

PG-700 (floor mounting) Main Unit 0.31 kg 0.7 lb
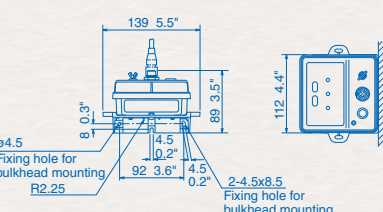
PG-700 (bulkhead mounting) Main Unit 0.35 kg 0.77 lb

Compass

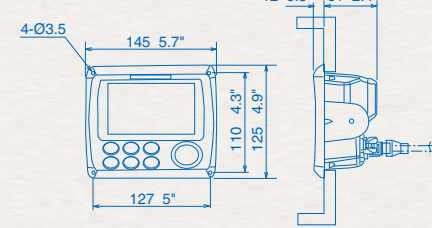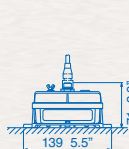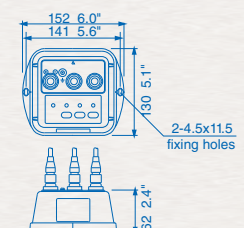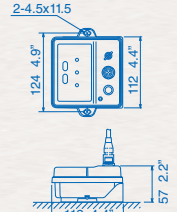|		SATELLITE COMPASS™		
		SC-33	**SC-70**	**SC-130**
GENERAL				
Heading Accuracy		0.4° rms	0.4° rms	0.25° rms
Heading Resolution		0.1˚	0.1°, 0.01° or 0.001° (select from menu)	
Follow-up		45°/s rate-of-turn	40°/s rate-of-turn	
Position fixing time		60 sec typical	60 sec typical	
Position Accuracy		GNSS: 5 m approx., SBAS: 4 m approx., WAAS: 3 m approx. (2 drms, HDOP<4)	GPS: 10 m approx., DGPS: 5 m approx., WAAS: 3 m approx., MSAS: 7 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 connecter (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 Reolution		----	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 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
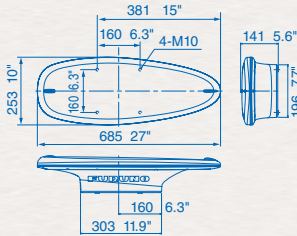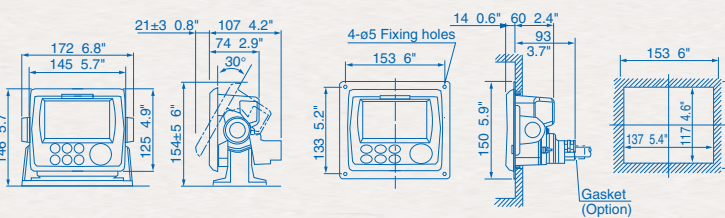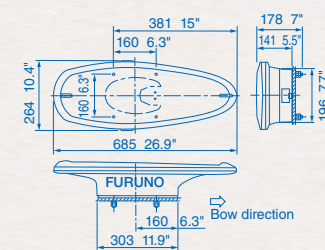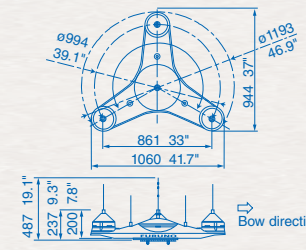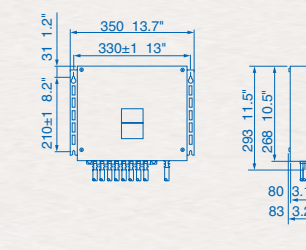
Compass

	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	
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	-
Interface (NMEA2000) — 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* (*GP39 required)
Interface (NMEA0183) — 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 (*GP39 required) P Sentences: GPatt, GPhve, GPimu, pidat, SDmrk, GPmsv, hdcom
ENVIRONMENT		
Temperature	-20°C to +55°C	
Waterproofing	IP56	
POWER SUPPLY		
	12-24 VDC: 0.2-0.1 A (4 LEN @ 9 VDC)	

SCX-20 Sensor Unit - Roof Mount 2.2 kg 4.9 lbs
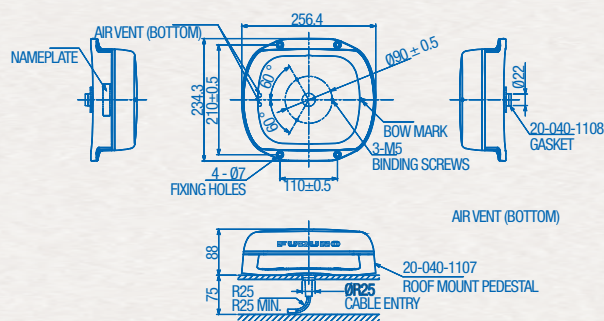
SCX-20/21 Sensor Unit - Pole Mount 1.2 kg 2.64 lbs

SCX-20 Sensor Unit - No Mount 1 kg 2.2 lbs

FA-40 0.45 kg, 1.0 lb
FA-70 0.52 kg 1.1 lb

FA-40 1.7 kg, 3.7 lb
FA-30 1.5 kg 3.3 lb

Transponder Unit FA-1701 3.0 kg 6.6 lb

Display Unit FA-1702 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

Communications

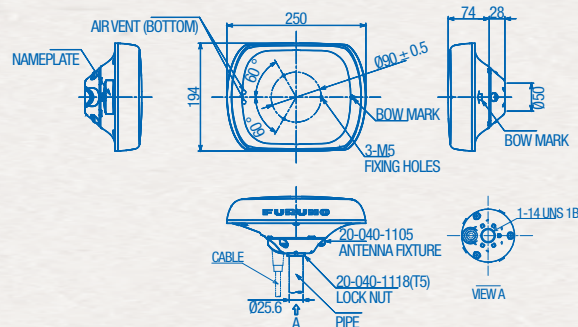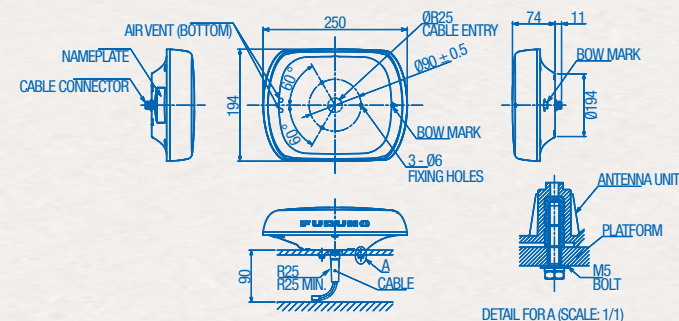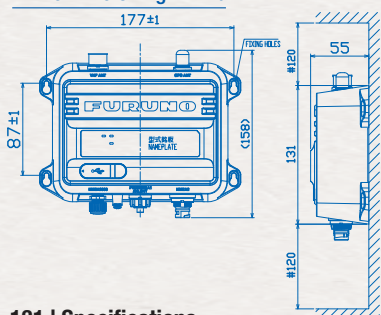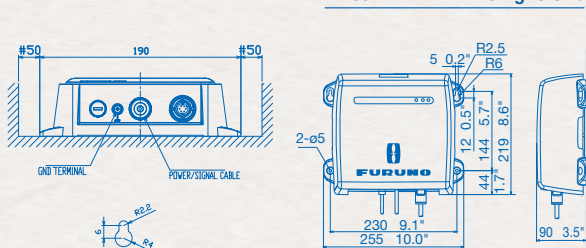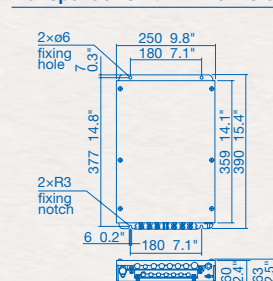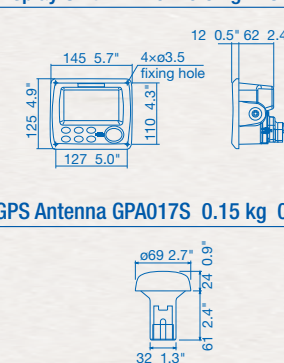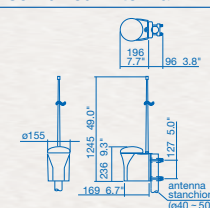|		AIS RECEIVER	AIS RECEIVER	AIS RECEIVER	CLASS-B+ AIS TRANSCEIVER	U-AIS TRANSPONDER
		FA-30	**FA-40**	**FA-50**	**FA-70**	**FA-170**
STANDARDS						
		IMO MSC.74 (69) ANNEX 3, ITU-R Rec. M.1371-2, IEC 60945 Ed.4, IMO Res. A.917 (22)	IEC 60945 Ed.4 IMO MSC.140 (76) ITU-R M.1371-5, EN 303 413 V1.1.1 EN 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, 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 (FA30/40: RX Frequency)		156.025 to 162.025 MHz				
Output Power		----	----	----	5W or 1W(SOTDMA), 2W(CSTDMA)	1 W / 12.5 W
Channel Spacing		25 kHz/12.5 kHz	25 kHz	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, 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	ACK, ACA, AIQ, DTM, GBS, GGA, GLL, GNS, HDT, OSD, RMC, VBW, VTG, DSC, DSE, ZDA	ACA, ACK, AIQ, DTM, GBS, GGA, GLL, GNS, HDT, OSD, RMC, SSD, THS, VBW, VSD, VTG	ACK, ABM, DTM, GBS, GGA, GLL, GNS, HDT, OSD, RMC, THS, SSD, VBW, VSD, VTG, AIQ, DSC, DSE	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	VDM, VDO, ACA, ACS, ALR, TXT	ABK, ACA, ACS, ALR, GGA, GLL, RMC, SSD, TXT, VDM, VDO, VER, VSD, VTG	ABK, ACA, ACS, ALR, TXT, VDM, VDO	ABK, ACA, ACS, ALR, GGA, GLL, RMC, SSD, TXT, VDM, VDO, VER, VSD, VTG	ABK, ACA, ACS, ALC, ALF, ALR, ARC, EPV, HBT, LR1, LR2, LR3, LRF, LRI, NAK, PIWWIVD, PIWWSPR, PIWWSSD, PIWWVSD, SSD, TRL, TXT, VER, VDM, VDO, VSD
NMEA2000	Input	----	059392, 059904, 060160, 060416, 060928, 065240, 126208, 127250	----	059392, 059904, 060160, 060416, 060928, 065240, 126208, 127250	----
	Output	----	059392, 059904, 060928, 126208, 126464, 126992, 126993, 126996, 126998, 127258, 129025, 129026,129029, 129038, 129039, 129040, 129041, 129540, 129792, 129793, 129794, 129795, 129796, 129797, 129798, 129800, 129801, 129802, 129803, 129804, 129805, 129806, 129807, 129809, 129810, 129811, 129812, 129813	----	059392, 059904, 060928, 126208, 126464, 126992, 126993, 126996, 126998, 127258, 129025, 129026,129029, 129038, 129039, 129040, 129041, 129540, 129792, 129793, 129794, 129795*, 129796, 129797, 129798, 129800, 129801, 129802, 129803, 129804*, 129805, 129806, 129807, 129809, 129810, 129811, 129812*, 129813* (*SOTDMA mode only)	----
Ethernet		10/100BASE-T	----	10/100BASE-T	----	100Base-TX, RJ45 connector, Auto MDI/MDIX
ENVIRONMENT						
Temperature	Antenna Unit	----	-25°C to +70°C	-30°C to +70°C	-25°C to +70°C	-30°C to +70°C
	Other Units	-15°C to +55°C				
Waterproofing	Antenna Unit	----	IP56	IPx6	IP56	IP56
	Other Units	IP20	IP55	IP20	IP55	Transponder unit: IP22 at bulkhead mount, IP20 at floor Monitor unit: IP22, IP35 with optional waterproofing kit Pilot plug unit (front panel)/Power supply unit: IP22
POWER SUPPLY						
Transponder Unit (FA30: Receiver Unit)		12-24 VDC, 1.2-0.6 A	12-24 VDC, 0.3-0.2 A	12-24 VDC, 2.0-1.0 A	12-24 VDC, 1.8-0.9 A	12-24 VDC, 6-3 A
Display Unit:		----	----	----	----	12 VDC, 0.3 A max.

Communications

MARINE VHF RADIOTELEPHONE
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
TRANSMITTER		
Output Power		25 W max, 1 W at power reduction
Max. Frequency Deviation		±5 kHz max
Spurious Emission	Standby	less than 2 nW
	Transmit	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 (FM4800 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.

FM-4800 Transceiver Unit   1.7 kg 3.8 lb   **Microphone MIC-4800 (FM-4800 only)**   0.25 kg 0.56 lb   **FM-4850 Transciever Unit**   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
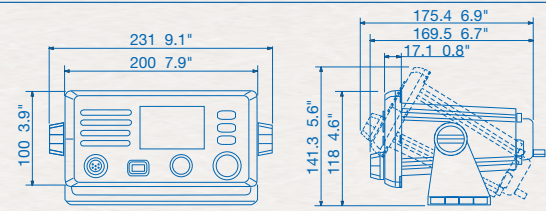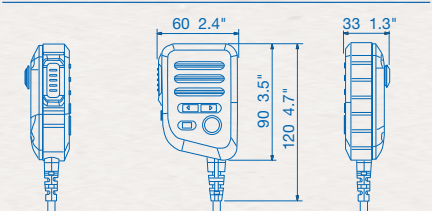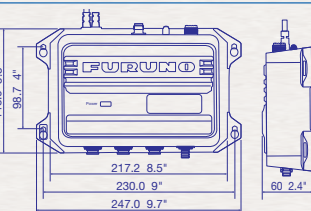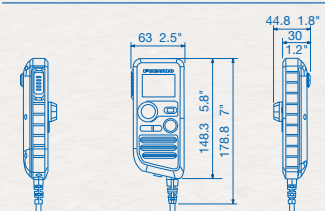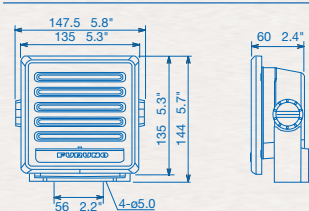
	VHF RADIOTELEPHONE
	FM-8900S

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 chan els 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: ITU-R Rec M.493-14 (2015-09), ITU-R M.541-10 (2015-10), ITU-R Rec M.689-3 (2012.03), EN 300 338-1/-2 V1.4.1 (2017.02)
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	DSC frequency	156.525 MHz (CH70)
Characteristics	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

		24 VDC
	RX	2.3 A (MAX), 1.3 A (standby)
	TX	4.7 A (MAX)

Transceiver Unit (Flushmount) FM-8900S   4.2 kg 9.3 lb
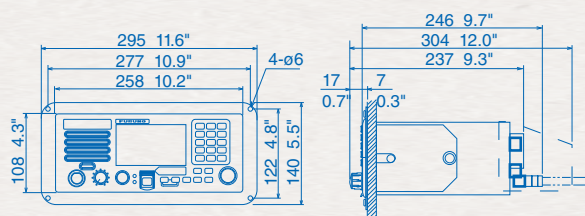
Remote Station RB-8900   0.7 kg 1.5 lb
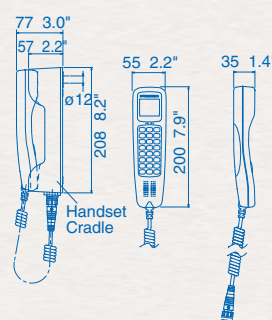
Handset HS-2003   0.2 kg 0.4 lb

Communications

		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 Frequency	General	All DSC frequencies in MF/HF	
	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

Transceiver Unit FS-1575T — 16 kg 35.2 lb
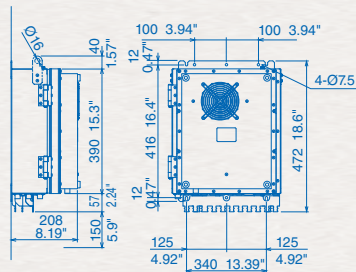
Controller Unit FS-2575C — 1.8 kg 4.0 lb
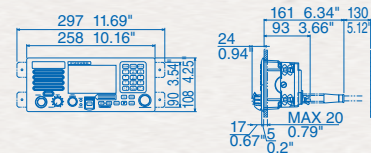
Antenna Coupler AT1575-SUS — 8.8 kg 19.4 lb
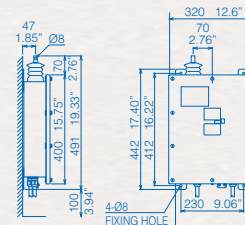
Transceiver Unit FS2575T — 20 kg 44.1 lb
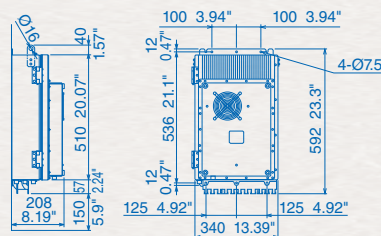
Antenna Coupler AT5075 — 9.2 kg 20.1 lb
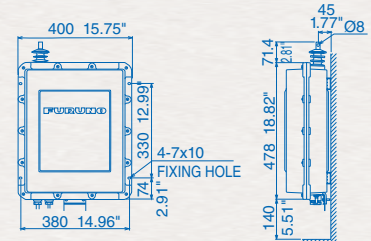
Antenna Coupler AT1575-AES — 2.6 kg 5.7 lb
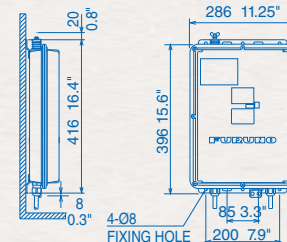
Handset HS-2003 — 0.5 kg 1.2 lb

NAVTEX RECEIVER		
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, RMC	
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	
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 — 0.68 kg 1.5 lb
209 8.2"
175 6.9"
125 4.9"
100 3.9"
4-ø6
140 5.5"
85 3.4"
78 3.1"
15 0.6"
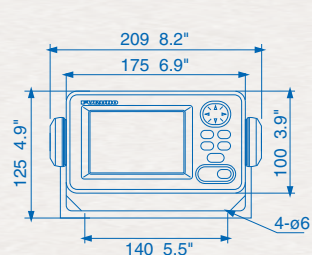
NX3H-D Antenna Unit — 0.9 kg 2.0 lb
156 6.1"
116 4.6"
FURUNO
Internal thread 1x14UNS1B
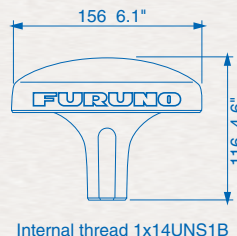
LH-5000 Loud Hailer — 1.61 kg 3.5 lb
249 9.8"
220 8.7"
135 5.3"
110 4.3"
130 5.1"
4-ø4.0
126 5.0"
108 4.3"
10 0.4"
38°
148 5.8"
37 30 17
0.5" 1.2" 0.7"
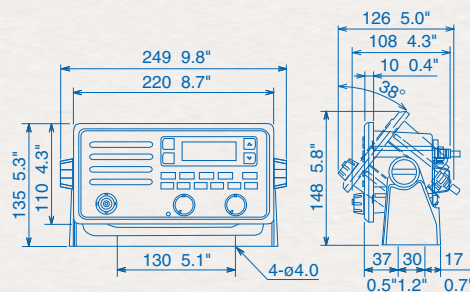
LH-5000 Microphone MIC-5000 — 0.22 kg 0.5 lb
41.1 1.6"
84.6 3.3"
61.8 2.4"
70 2.7"
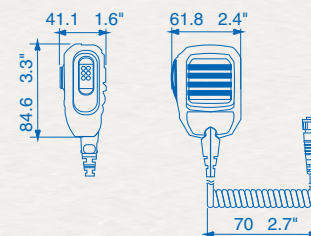
LH-5000 Intercom speaker (option) — 0.76 kg 1.7 lb
147.5 5.8"
135 5.3"
135 5.3"
144 5.7"
56 2.2"
4-ø5.0
59.5 2.3"
12 0.5"
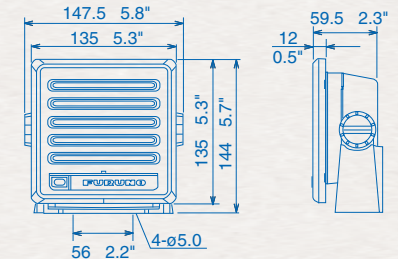
Communications

FACSIMILE RECEIVER — FAX-408

RECEIVER CHARACTERISTICS		
Frequency Range		2 MHz to 25 MHz in 100 Hz steps
Number of Channels	User programmed	164
	Pre-programmed	150
Receiving System		Synthesized double super heterodyne
Mode of Reception		F3C
Sensitivity		MF/HF: 2µV at 20 dB SINAD

RECORDER CHARACTERISTICS	
Recording System	Thermal head printing
Recording Paper	216 mm x 20 m with effective width of 212 mm
Scanning Speed	60, 90, 120 rpm
Gradation	9 levels
Phase Control	Automatic or manual
Operation	Automatic* or manual *By APSS signal Schedule Timer 16 programs/week

ENVIRONMENT	
Temperature	-10°C to +50°C

POWER SUPPLY	
	12-24 VDC:2.3-1.15A

FACSIMILE RECEIVER — 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

FAX-08 Receiver Unit — 5.6 kg 12.3 lb

102.5 4.04"
337 13.3"
321 12.6"
305 12.0"
240 9.45"
350 13.8"
4-ø6
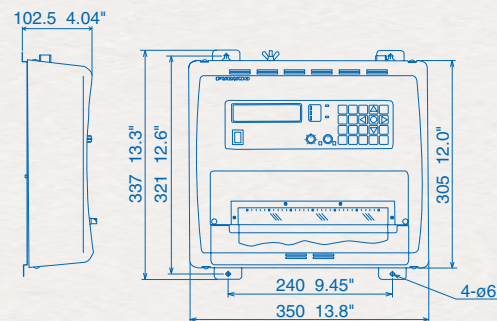
FAX-30 Receiver Unit — 2.0 kg 4.4 lb

217 8.5"
210 8.3"
150 5.9"
4-ø6
45 1.8"
300 11.8"
285 11.2"
264 10.4"
8 0.3"
12 0.5"
48 1.9"
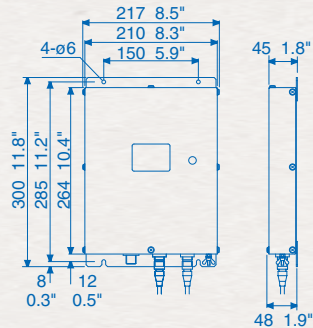
Preamp Unit FAX-5 — 1.3 kg 2.9 lb

212 8.4"
ø64

		INMARSAT FLEETBROADBAND	
		FELCOM-251	**FELCOM-501**
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 adaptor)	
USB		1 port USB 2.0 (RS-232C with optional adaptor)	
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	

FELCOM-251 Antenna 3.9 kg 8.6 lb

275.6
330
175.4
175.4
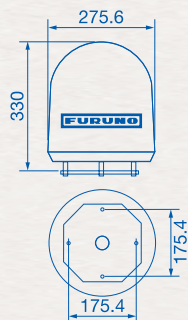
FELCOM-501 23 kg 50.7 lb

687
798.5
200
200
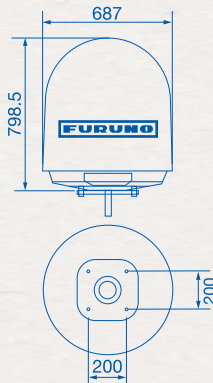
FELCOM-251/501 Communication Unit
FB-2001 2.5 kg 5.5 lb

42
175
481
200
66.5
252
270
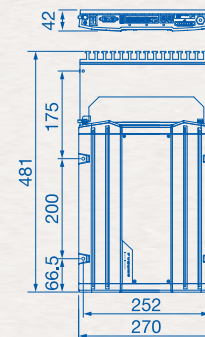
Handset FB-8001 0.63 kg 1.4 lb
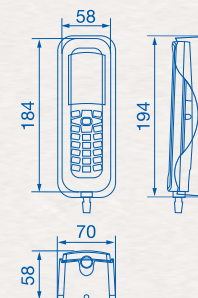
58
184
194
70
58

inmarsat

INMARSAT FleetBroadband

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, etc.
  - Wide range of incoming call settings available, i.e., 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

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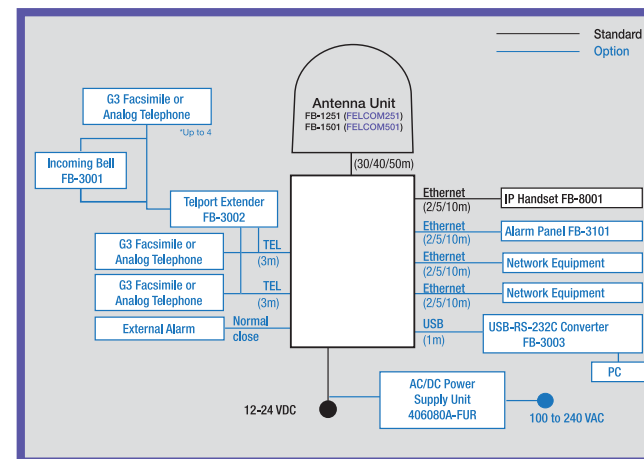
*A vessel needs to notify Inmarsat Satellite of which spot beam area the vessel is located in. This way, the Inmarsat Satellite can transmit the spot beam to the vessel's location.

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	

SafeComNet™

FURUNO Mobile Satellite Services

inmarsat

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

*For service faster than 4 Mbps, please consult with your nearest distributors.

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

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.

LCR (Least Cost Routing)   **Traffic Control**   **Firewall**

IP Routing   **VPN**   **IP PBX**

IP Routing

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

VPN

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

IP PBX

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

Onboard LAN Network

IP phone   Internet / email   Pre-paid call   Kiosk PC   Surveillance camera   Hotspot   Monitoring system
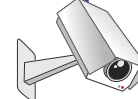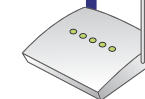
System Recommendations

Common Runabout Product Recommendations

NMEA2000
Ethernet
Other
NMEA2000 T Connector

Product suggestions only - not an installation diagram

Under 20 ft

Wireless Radar DRS4W*

VHF Antenna*

Console
Autopilot NAVpilot 300
VHF Radiotelephone FM-4800
GPS/WAAS Chart Plotter GP-1871F

Your iPad/iPad mini/iPhone
Marine Radar

*Two iOS units can access at the same time when connected to the DRS4W.

Processor Unit FAP-3012

Integrated Heading Sensor PG-700

CHIRP Transducer   or   Transducer 520-5PSD

* Local supply

20 ft to 25 ft

Wireless Radar DRS4W*

Radar Sensor DRS4DL+

VHF Antenna*

Console
Autopilot NAVpilot 300
VHF Radiotelephone FM-4800
GPS/WAAS Chart Plotter GP-1971F

Autopilot NAVpilot 300
NavNet TZtouch2 TZT12F

Your iPad/iPad mini/iPhone
Marine Radar

*Two iOS units can access at the same time when connected to the DRS4W.

Processor Unit FAP-3012

Integrated Heading Sensor PG-700

CHIRP Transducer   or   Transducer 520-5PSD

Processor Unit FA-P3012

Integrated Heading Sensor PG-700

Transducer 520-5PSD

* Local supply

25 ft to 30 ft

VHF Antenna*

Radar Sensor DRS4D-NXT

Console
Autopilot NAVpilot 300
VHF Radiotelephone FM-4800
Instrument FI-70
NavNet TZtouch2 TZT16F

Processor Unit FAP-3012

Integrated Heading Sensor PG-700

Transducer 520-5PSD

* Local supply

Over 30 ft

VHF Antenna*

Radar Sensor DRS6A-NXT

Console
Autopilot NAVpilot 711C
VHF Radiotelephone FM-4800
Instrument FI-70
Instrument FI-70
NavNet TZtouch2 TZT19F

Processor Unit FAP-7002

Integrated Heading Sensor PG-700

Ethernet Hub HUB-101

Network CHIRP Fish Finder DFF1-UHD

CHIRP Transducer B265LH

* Local supply

Common Sport Fishing
Product Recommendations

── NMEA2000
── Ethernet
── Other
▬ NMEA2000 T Connector

*Product suggestions only -
not an installation diagram*

30 ft to 50 ft

VHF Antenna*

Radar Sensor DRS6A X-Class

Fly Bridge

Autopilot NAVpilot-711C
VHF Radiotelephone FM-4800
Instrument FI-70
Instrument FI-70
NavNet TZtouch3 TZT16F
NavNet TZtouch3 TZT16F

Processor Unit FAP-7002

Integrated Heading Sensor PG-700

Ethernet Hub HUB-101

Network CHIRP Fish Finder DFF1-UHD

CHIRP Transducer B265LH

* Local supply

50 ft to 80 ft

GPS/VHF Antenna GVA-100
VHF Antenna*
Satellite Compass SCX-20
Radar Sensor DRS12A X-Class

Tuna Tower

Autopilot NAVpilot-711C
VHF Radiotelephone FM-4800
Instrument FI-70
NavNet TZtouch3 TZT19F
SEARCHLIGHT SONAR CH-500

Processor Unit FAP-7002

Fly Bridge

Autopilot NAVpilot-711C
Instrument FI-70
Instrument FI-70
Multi Touch Monitor*
Multi Touch Monitor*

Fusion Marine Audio*

Transceiver Unit CH-503

Switch Box
Control Unit MCU-005

NavNet TZtouch2 TZT2BB

Ethernet Hub HUB-101

Hull Unit (6inch type)

Integrated Heading Sensor PG-700

AIS Transponder FA-70

Network CHIRP Fish Finder DFF1-UHD

CHIRP Transducer B265LH

Network Multi-Beam Sonar DFF-3D

Transducer B54

* Local supply

Over 80 ft

GPS/VHF Antenna GVA-100
VHF Antenna*
Satellite Compass SCX-20
Radar Sensor DRS12A/25A X-Class

Tuna Tower

VHF Radiotelephone FM-4800
Instrument FI-70
Autopilot NAVpilot-711C
NavNet TZtouch3 TZT19F

Junction Box FI-5002
Processor Unit FAP-7002

Inmarsat Antenna

Inmarsat Fleetbroadband FELCOM250

Ethernet hub HUB-101
IP Camera*

Fly Bridge

Instrument FI-70
Instrument FI-70
Autopilot NAVpilot-711C

Multi Touch Monitor*
Multi Touch Monitor*
SEARCHLIGHT SONAR CH-600

Fusion Marine Audio*

Integrated Heading Sensor PG-700

AIS Transponder FA-70

Switch Box
NavNet TZtouch2 TZT2BB
Transceiver Unit CH-503
Control Unit MCU-005
Ehternet Hub HUB-101

Hull Unit (6inch type)

Network CHIRP Fish Finder DFF1-UHD

CHIRP Transducer B265LH

Network Multi-Beam Sonar DFF-3D

Transducer B54

* Local supply

System Recommendations

Common Sport Cruiser Product Recommendations

- NMEA2000
- Ethernet
- Other
- NMEA2000 T Connector

Product suggestions only - not an installation diagram

Under 30 ft

VHF Antenna*

Radar Sensor DRS4D-NXT

Salon
- Autopilot NAVpilot-300
- VHF Radiotelephone FM-4800
- Instrument FI-70
- NavNet TZtouch2 TZTL12F

Processor Unit FAP-3012

Integrated Heading Sensor PG-700

Transducer 520-5PSD

* Local supply

30 ft to 50 ft

GPS/VHF Antenna GVA-100

VHF Antenna*

Satellite Compass SCX-20

Radar Sensor DRS12-AX X-Class

Processor Unit FAP-7002

Salon
- VHF Radiotelephone FM-4800
- Instrument FI-70
- Instrument FI-70
- Autopilot NAVpilot-711C
- NavNet TZtouch3 TZT16F
- NavNet TZtouch3 TZT16F
- NavNet TZtouch3 TZT16F
- Fusion Marine Audio*

Ethernet Hub HUB-101

Integrated Heading Sensor PG-700

AIS Transponder FA-70

Transducer 520-5PSD

* Local supply

50 ft to 80 ft

GPS/VHF Antenna GVA-100

VHF Antenna*

Satellite Compass SCX-20

Radar Sensor DRS-12AX X-Class

Fly Bridge
- Autopilot NAVpilot-711C
- VHF Radiotelephone FM-4800
- Instrument FI-70
- NavNet TZtouch3 TZT19F

Processor Unit FAP-7002

Salon
- Autopilot NAVpilot-711C
- Instrument FI-70
- Instrument FI-70
- Multi Touch Monitor*
- Multi Touch Monitor*
- Fusion Marine Audio*

Integrated Heading Sensor PG-700

NavNet TZtouch2 TZT2BB

Switch Box

Control Unit MCU-005

Ethernet Hub HUB-101

AIS Transponder FA-70

Network CHIRP Fish Finder DFF1-UHD

CHIRP Transducer B265LH/CM265LH

Network Multi-Beam Sonar DFF-3D

Transducer B54

* Local supply

Over 80 ft

GPS/VHF Antenna GVA-100

VHF Antenna*

Satellite Compass SCX-20

Radar Sensor DRS12-AX/25A-X X-Class

Fly Bridge
- Autopilot NAVpilot-711C
- VHF Radiotelephone FM-4800
- Instrument FI-70
- NavNet TZtouch3 TZT19F

IP Camera*

Ethernet Hub HUB-101

Processor Unit FAP-7002

Salon
- Autopilot NAVpilot-711C
- U-AIS Transponder FA-170
- Instrument FI-70
- Instrument FI-70
- Multi Touch Monitor*
- Multi Touch Monitor*
- Fusion Marine Audio*

Integrated Heading Sensor PG-700

NavNet TZtouch2 TZT2BB

Switch Box

Control Unit MCU-005

Ethernet Hub HUB-101

Transponder Unit FA-1701

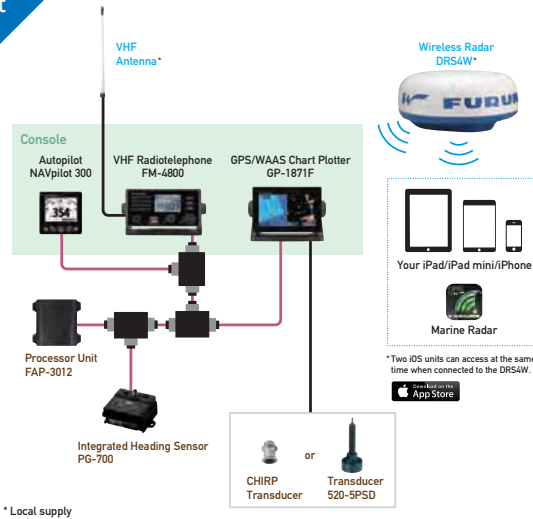Network Multi-Beam Sonar DFF-3D

Transducer B54

* Local supply

Common Sailboat Product Recommendations

NMEA2000
Ethernet
Other
NMEA2000 T Connector

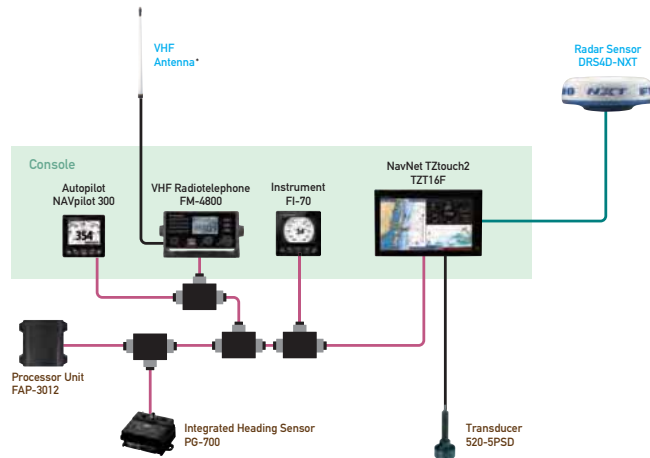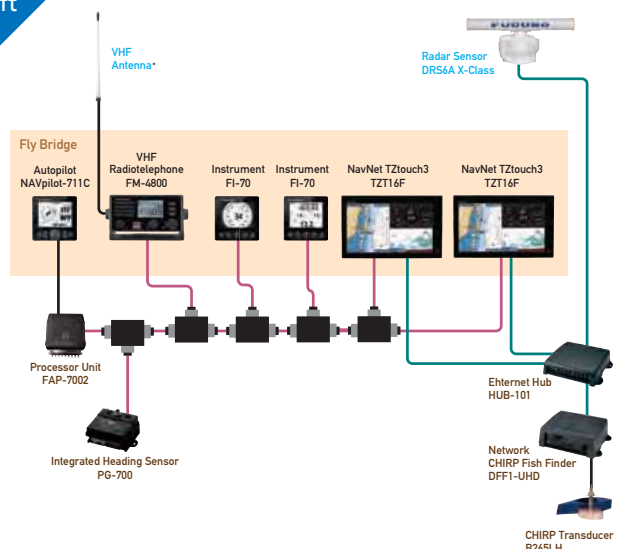*Product suggestions only - not an installation diagram*

Under 30 ft

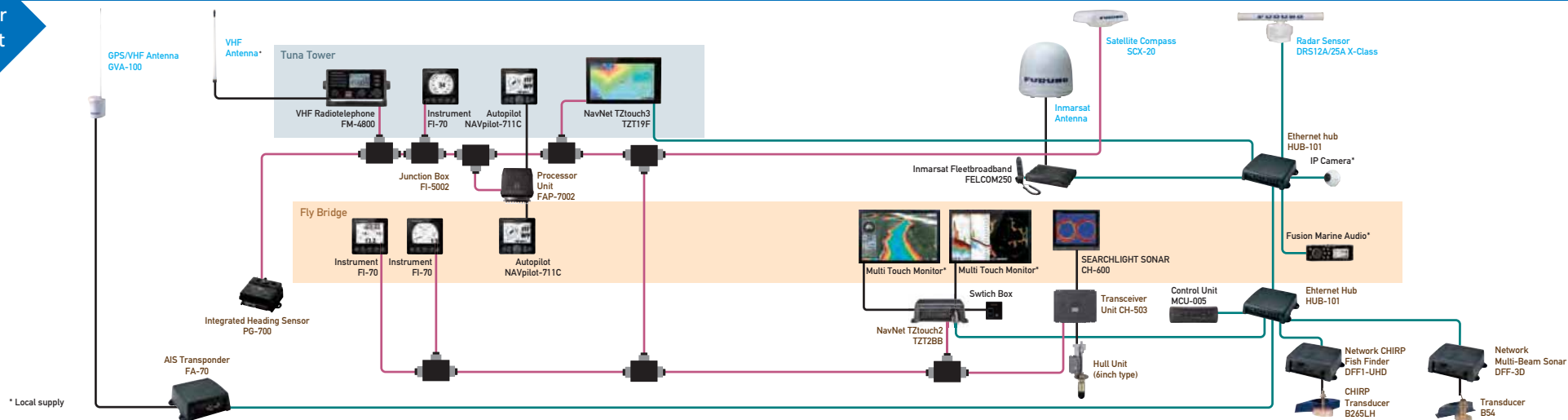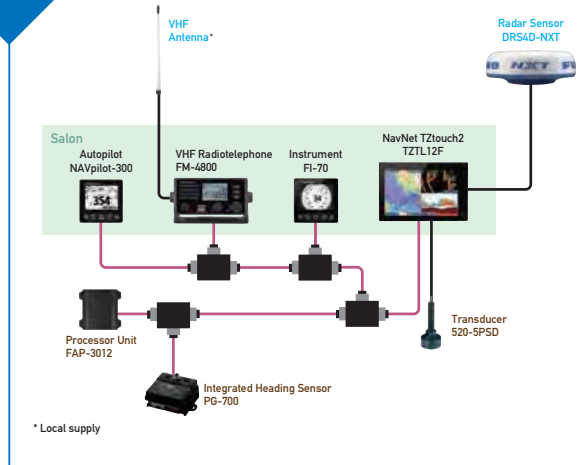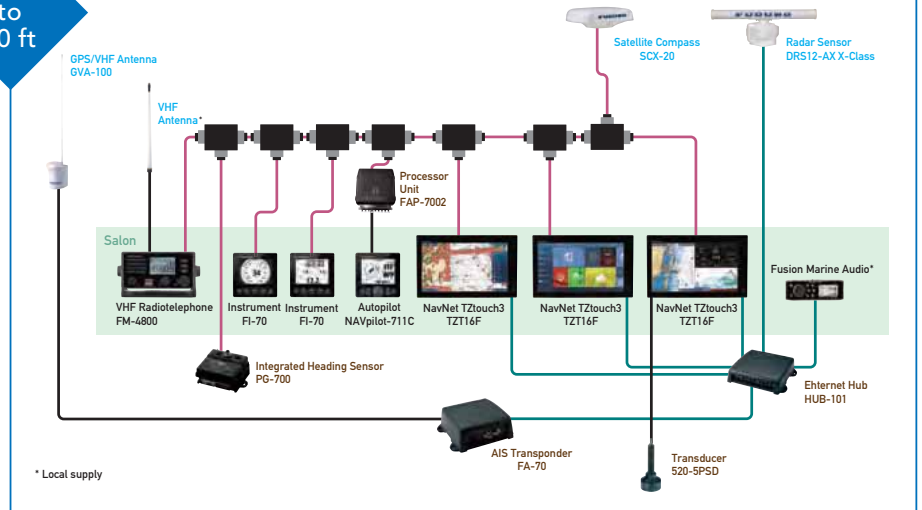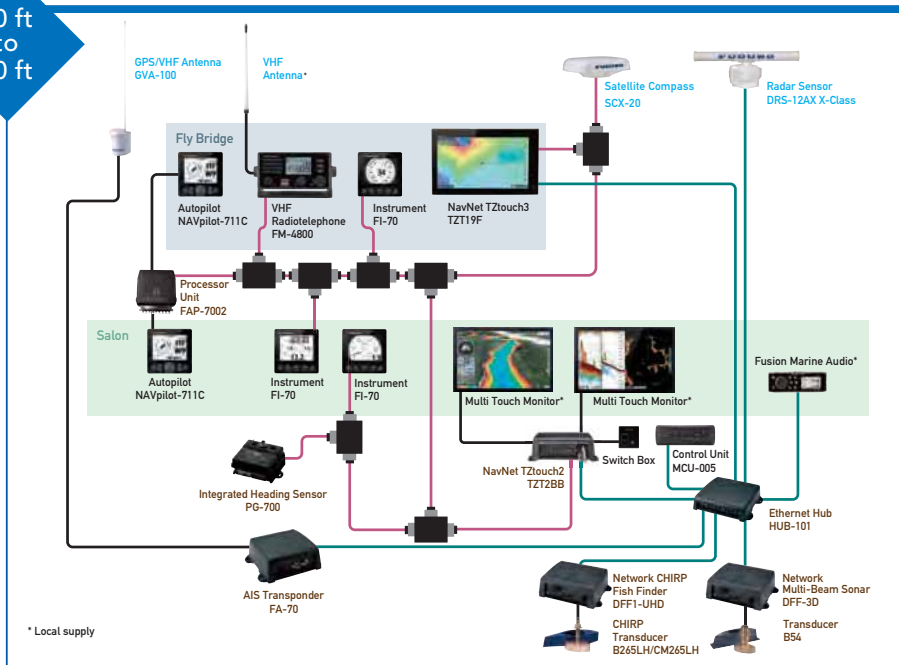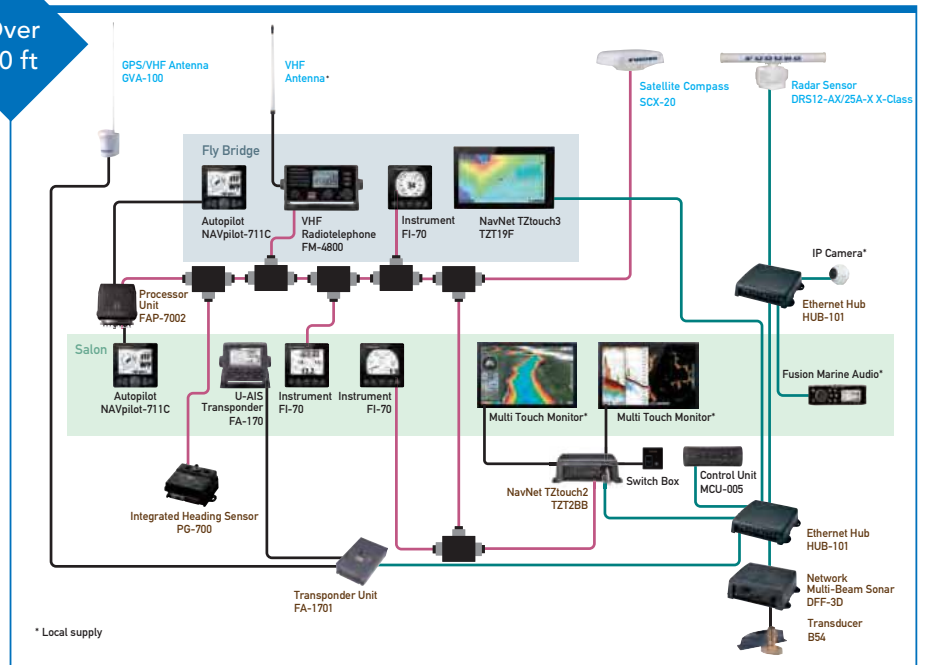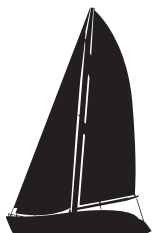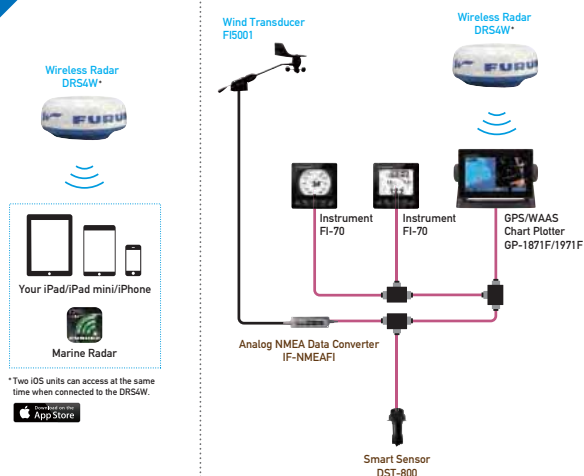Wireless Radar DRS4W*

Your iPad/iPad mini/iPhone

Marine Radar

* Two iOS units can access at the same time when connected to the DRS4W.

Wind Transducer FI5001

Wireless Radar DRS4W*

Instrument FI-70

Instrument FI-70

GPS/WAAS Chart Plotter GP-1871F/1971F

Analog NMEA Data Converter IF-NMEAFI

Smart Sensor DST-800

30 ft to 50 ft

VHF Antenna*

Wind Transducer FI-5001

Radar Sensor DRS4D-NXT

Autopilot NAVpilot-711C

VHF Radiotelephone FM-4800

Instrument FI-70

Instrument FI-70

Instrument FI-70

Analog NMEA Data Converter IF-NMEAFI

Processor Unit FAP-7002

Integrated Heading Sensor PG-700

Smart Sensor DST-800

NavNet TZtouch2 TZTL12F

Transducer 520-5PSD

* Local supply

50 ft to 80 ft

GPS/VHF Antenna GVA-100

VHF Antenna*

Wind Transducer FI-5001L

Radar Sensor DRS4D-NXT

Autopilot NAVpilot-711C

VHF Radiotelephone FM-4800

Instrument FI-70

Instrument FI-70

Instrument FI-70

NavNet TZtouch2 TZTL12F

Analog NMEA Data Converter IF-NMEAFI

Processor Unit FAP-7002

Ethernet Hub HUB-101

Integrated Heading Sensor PG-700

Smart Sensor DST-800

Chart Table

NavNet TZtouch2 TZTL15F

AIS Transponder FA-70

* Local supply

Over 80 ft

GPS/VHFAntenna GVA-100

VHF Antenna*

Wind Transducer FI-5001L

GSP Antenna GP-330B

Radar Sensor DRS4D-NXT

Autopilot NAVpilot-711C

VHF Radiotelephone FM-4800

Instrument FI-70

Instrument FI-70

Instrument FI-70

NavNet TZtouch2 TZTL15F

NavNet TZtouch2 TZTL15F

Processor Unit FAP-7002

Analog NMEA Data Converter IF-NMEAFI

Ethernet Hub HUB-101

Integrated Heading Sensor PG-700

Smart Sensor DST-800

Chart Table

Autopilot NAVpilot-711C

Instrument FI-70

Instrument FI-70

Instrument FI-70

Multi-Touch Monitor*

Switch Box

NavNet TZtouch2 TZT2BB

AIS Transponder FA-70

* Local supply

Furuno's Global Network

FURUNO ELECTRIC CO., LTD.
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- ● Subsidiaries and representative offices
- ● Service centers
- ● National distributors

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

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

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

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Fax: +1 360-834-9400
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Fax: +1 410-479-4429

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Fax: +45 36-77-45-01
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Phone: +46 31-709-89-40
Fax: +46 31-49-70-93
URL: http://www.furuno.se/

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Indonesia
Phone: +62 (0)213511282
Fax: +62 (0)213511283
E-mail: fid@furuno.id
URL: http://www.furuno.id/

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URL http://www.furuno.my/

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Fax: +1 410-479-4429

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(9120) Provincia del Chubut
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         4451929/4451236
Fax: +54 280 4451377
E-mail: service@navalstar.com

Ministro Brin 982
(1158) - Buenos Aires
Phone: +54 11 4362-6874
         +54 11 4300-8616
Fax: +54 280 44513377
E-mail: service@navalstar.com

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Refer to FURUNO U. S. A., INC., U.S.A.

Authorized service provider:
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CEP 20.241-080
Phone: +55 21 2187-2400
E-mail: radiomar@radiomar.com.br

CHILE
Refer to FURUNO U. S. A., INC., U.S.A.

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E-mail: cespinoza@marco.cl

Electrónica Marina ITECH Ltd
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Tel: +56 41 2697819
Fax: +56 41 2697819
E-mail: info@itechmarine.cl

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Refer to FURUNO U. S. A., INC., U.S.A.

Authorized service provider:
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Cartagena-Colombia
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Fax: +57 5 663-3643
E-mail: mosoriov@iteccolombia.com

CURACAO
Refer to FURUNO U. S. A., INC., U.S.A.

ECUADOR
Refer to FURUNO U. S. A., INC., U.S.A.

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Ave. Juan Tanca
Marengo 200
Piso 1 of #1
Guayaquil
Phone: +593 4-2395701/2290486
Fax: +593 4-2286780
E-mail: elemar@electromarina.com.ec

MEXICO
Refer to FURUNO U. S. A., INC., U.S.A.

PERU
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