www.furuno.co.jp

WWW.NAVNET.COM

Quick access to all the facts about NavNet 3D at NavNet.com!

At NavNet.com, you can access the contents with in-depth product information from various angles, including a NavNet 3D demonstration film, introduction to the product, product specifications, online tutorial, system suggestions and more. Also, you can find answers to questions you may have in our solution database (FAQs) on the web site.

NavNet 3D online user-registration

For your convenience, you can register your NavNet 3D products online at NavNet.com. When you register online, you will automatically gain access to your "My NavNet" page where you will gain access to various premium benefits, including: online software updates, online chart updates, personalized system builder and the latest news feed on your system.

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FURUNO World Wide Warranty 2 YEARS

New Product Guide

FURUNO

Preloaded
with full-scale, complete NOAA Raster & Vector Chart libraries for the entire U.S. Coastline, including Alaska and Hawaii!

NAVnet 3D

POWERED BY MAXSEA

WWW.NAVNET.COM

NAVnet 3D

Adding a New Dimension to 3D

The world of onboard navigation systems has evolved. Calls for faster redraw and a more instinctively clear user-interface have been heard and answered. FURUNO's dedication to deliver the best marine electronics has led to the most innovative, powerful solution for onboard navigation ever.

Prepare yourself for a revolution. Introducing NavNet 3D.

POWERED BY MAXSEA

FURUNO's NavNet 3D redefines the user interface of onboard navigation systems.

FURUNO's new NavNet 3D is a groundbreaking navigation system that introduces new concepts for a user interface that makes navigating your vessel easier than ever before. Once you start using NavNet 3D, you will be amazed at how a system so powerful can be so simple to use. NavNet 3D comes fully loaded with a variety of groundbreaking, new features that will expand your navigational horizons.

The only acceptable redraw time is zero, TimeZero™.

NavNet 3D uses a new cutting-edge technology we have named "TimeZero"™. It facilitates instant chart redraw, allowing zooming in and out, chart panning, changing chart display modes and other chart handling functions seamlessly and with no lag time. TimeZero™ brings you a truly seamless navigation environment you have to see to believe.

TimeZero Technology

True 3D environment for a more instinctive chart presentation.

NavNet 3D incorporates a whole new dimension to chart presentation with Full Time 3D chart rendering. You can choose a 2D top-down view of the navigation chart for a look and feel that duplicates a traditional chart plotting presentation. Or, you can choose to pan and zoom the chart to any angle at any range scale you choose instantly. There is no "3D mode" to change into and no waiting, because NavNet 3D operates in this 3D environment full time. In addition, you choose what type of charts you want to view from raster, vector or combine them with FURUNO's new Satellite PhotoFusion™ charts. This variety of chart presentations helps to improve your situational awareness by giving you unprecedented control over your charting environment.

NavNet 3D Cartography

NavNet 3D's powerful graphic engine has added new chart presentation options to the conventional 2D method of chart plotting. With 3D charts and our new Satellite PhotoFusion™, you can now blend satellite imagery with critical chart data like never before. These new presentation options allow you to visually identify the exact position of your vessel, together with information about the surrounding area on instinctively clear chart orientations that you control.

Navigate in True 3D with Raster, Vector and Bathymetric Charts

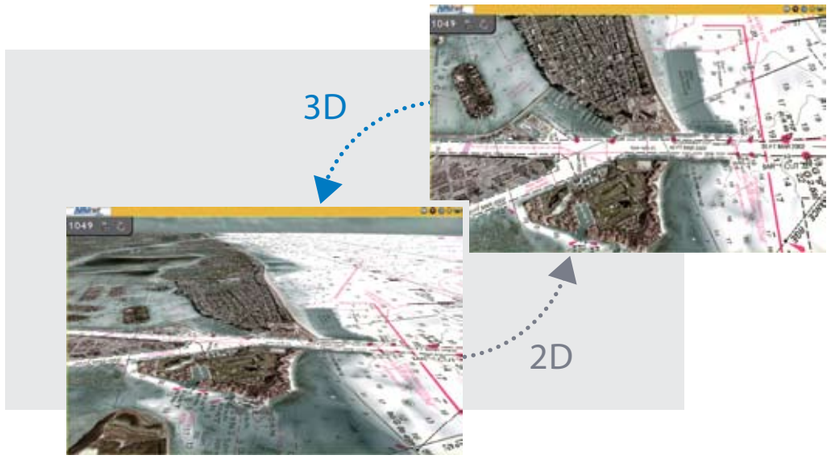
NavNet 3D incorporates native 3D chart architecture that allows for a full-time 3-dimensional presentation, as opposed to 2D charts that require special effects to appear 3D. There are no special modes; that limit your ability to navigate the way you want. With NavNet 3D's true 3D environment, you can see all of the information you want with no limitations on what information you wish to view. Plan your routes and enter points directly on your raster or vector native 3D charts. Radar overlay, Sirius Network Weather Receiver, AIS, plus all of your chart symbols and depth soundings; any and all of the information can be displayed at will. This is the beauty of navigating in a true 3D. You have full control over the presentation all of the time.

3D Key

Even though your raster or vector charts are operating in their native 3D environment full-time, one long press of the 3D key will toggle the chart from a familiar 2D top-down perspective, to your favorite 3D angle.

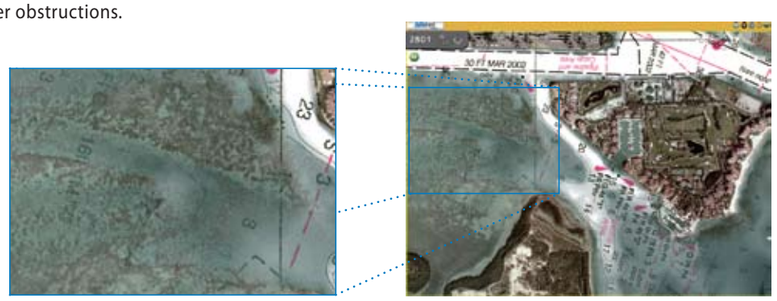
3D Raster

3D Vector



Satellite PhotoFusion™

Our satellite photography can now be fused with raster or vector chart information. Land areas (zero depth) are completely opaque, so that these areas are displayed as high-resolution satellite photos on the chart. As the depth increases, the satellite photography becomes more transparent so that you will know where the shallows end and the deeper water starts, and also allowing the raster or vector chart to be visible.
High-resolution satellite photography aids in seabed classification so that you will be able to easily identify areas of sand, rock, coral or other obstructions.



Satellite & Raster/PhotoFusion™

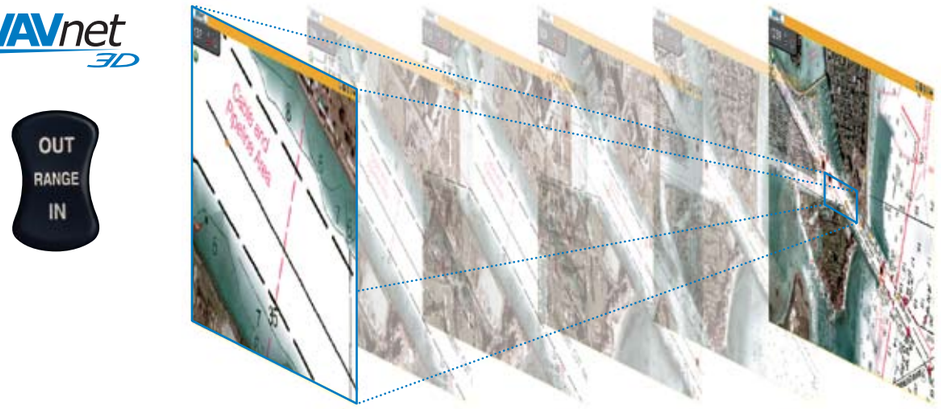
Satellite & 3D

The Only Acceptable Wait Time is Zero: TimeZero™ Technology Makes Chart Redraw a Thing of the Past

NavNet 3D's high-speed processor and powerful graphic engine deliver TimeZero™ technology – instant, seamless chart handling with no lag or loading time. Blink and you will miss it! TimeZero™ technology redefines the meaning of stress-free operation by smoothing out your chart handling actions.

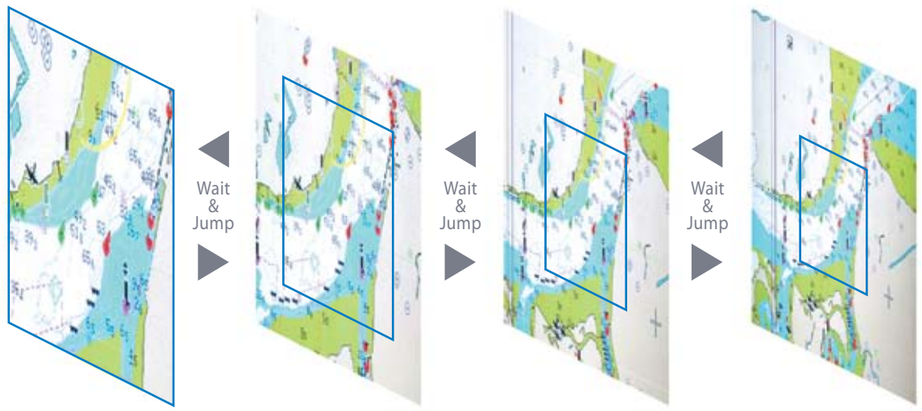
Chart scaling without limitation

Zoom seamlessly and continuously to whatever chart scale you desire. Instead of limiting you to a small handful of chart scales to choose from like traditional chart plotters, TimeZero™ architecture allows you to seamlessly zoom in or out to the exact magnification level you like without steps or limitations.



Smooth scaling allows you to stop at any range scale you desire.

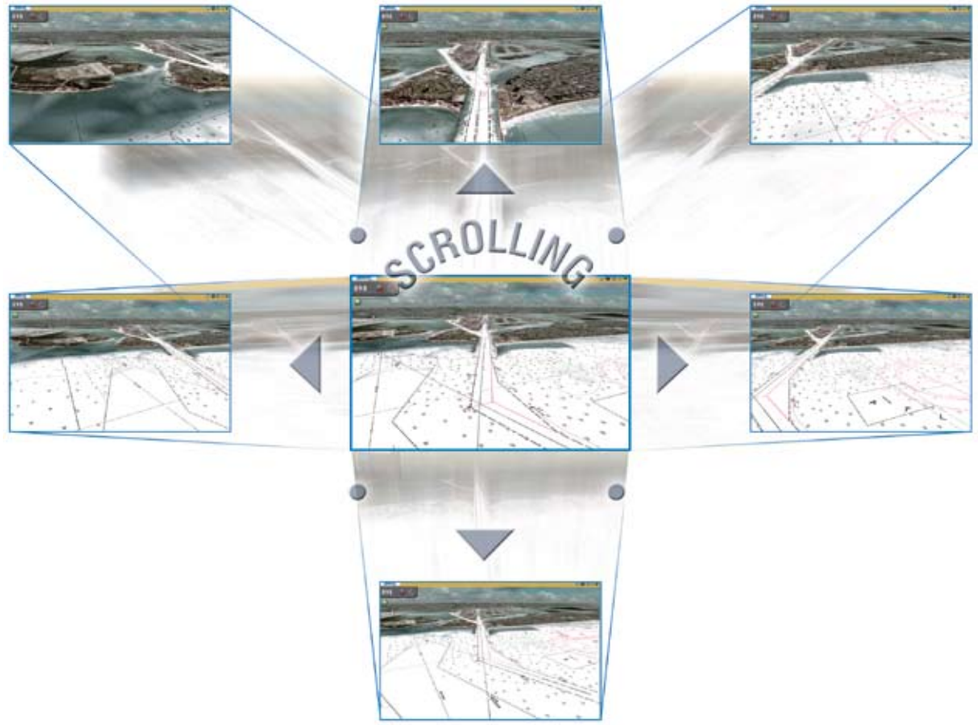
Conventional Chart Plotter



Conventional chart plotters have fixed range scales that you select from.

Easy chart panning gives you freedom to explore

You can pan the chart by simply pressing the scroll pad. This gives you freedom to explore the chart data, allowing you to focus on a specific area ahead of or around your vessel without losing track of your position on the chart. Explore the chart data at your leisure, and then instantly return to own ship at the touch of a single dedicated ship button.
Displaying True and Relative Motion is now more intuitive than ever before. TimeZero™ technology provides a useful utility for focusing on a specific direction such as the area ahead of your vessel.

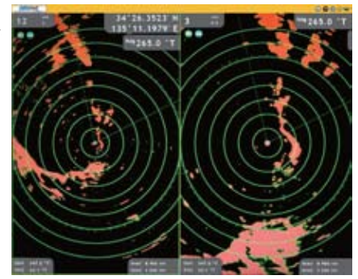


FURUNO's NavNet 3D Digital Solution sets a new Stan dard

NavNet 3D operates on a fully digitized environment with its highly sensitive digital sensors for radar and fish finder. The operating structure is also digitized, delivering total fusion of hardware and software modules in its operation scheme, utilizing Ethernet, NMEA0183 and NMEA2000®.

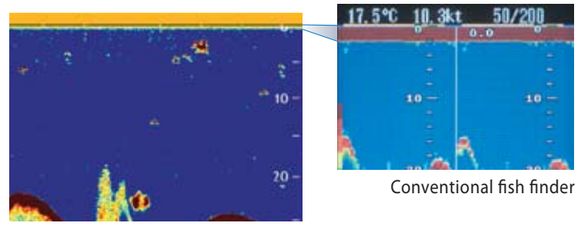
New Ultra High Definition (UHD™) Digital Radar

NavNet 3D integrates Ultra High Definition (UHD™) Digital Radar that facilitates fully automatic, high-precision Gain, Sea/Rain Clutter and Tuning Control for hands-free operation and ultimate performance. One of the amazing features of FURUNO UHD™ Digital Radar is a fully independant "Real-Time" dual range radar display, which scans and displays two different radar ranges with no lag at all. This greatly enhances your situational awareness.



FURUNO Digital Filter (FDF™) Fish Finder

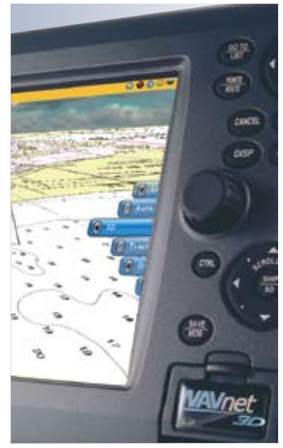
You probably know about digital fish finders, but are not quite sure what the term really means. FURUNO Digital Filter (FDF™) fish finders feature advanced filtering capabilities and digital auto tuning, which eliminates noise, while delivering the ability to spot individual fish with clarity, accuracy and detail.



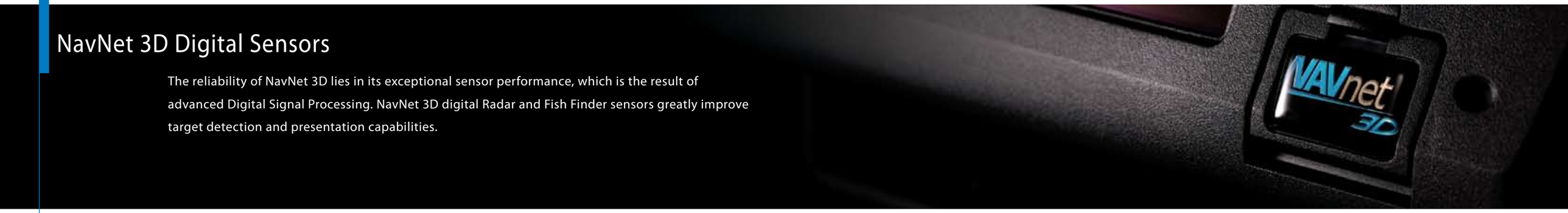
DFF1 Conventional fish finder

NavNet 3D RotoKey™ puts a whole new spin on "User Friendly"

NavNet 3D challenges a conventional menu operating system with a whole new concept, the "RotoKey™" on-screen revolving menu key. By turning a rotary knob on the control panel, RotoKey™ will be activated, giving you full access to NavNet 3D controls.



NavNet 3D Digital Sensors



The reliability of NavNet 3D lies in its exceptional sensor performance, which is the result of advanced Digital Signal Processing. NavNet 3D digital Radar and Fish Finder sensors greatly improve target detection and presentation capabilities.

Ultra High Definition (UHD™) Digital Radar

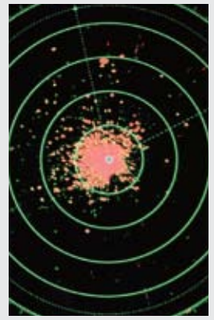
FURUNO has taken its NMEA award-winning radar technology to the next level with Ultra High Definition Digital Radar. UHD™ offers crystal clear, noise-free target presentation with automatic real-time digital signal processing. Antenna rotation speed (24/36/48 rpm) is automatically shifted to the appropriate pulse length. Commercial-grade radar performance is now available in the ultimate MFD navigation suite.

UHD
Ultra High Definition

NavNet 3D Real-Time Digital Auto Gain/Sea/Rain Controls

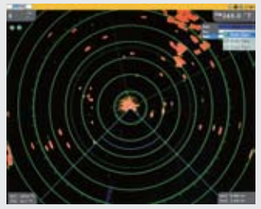
NavNet 3D employs revolutionary real-time digital auto Gain/Sea/Rain controls to deliver noise-free radar presentation. With this new technology, NavNet 3D computes and applies an adaptive omni-directional anti-clutter filter with variable intensity depending on bearing.

Auto Gain/Sea/Rain Controls On



Auto Gain/Sea/Rain Controls Off

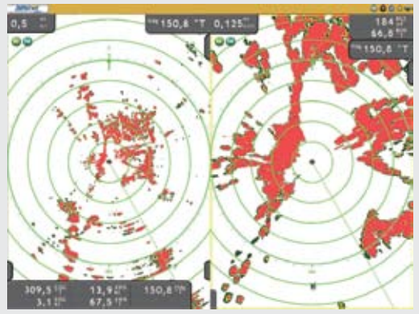
Auto Gain/Sea/Rain Controls On



Auto Gain/Sea/Rain Controls Off

Real-time Dual Range Radar

NavNet 3D's simultaneous scanning technology drives our powerful dual-range radar, providing unsurpassed target detection. With each sweep of antenna, dual progressive scan transmissions are sent, received and processed to display two separate radar ranges on your NavNet 3D display simultaneously. Each radar presentation acts autonomously, allowing for manipulation of individual gain and clutter controls.



FURUNO Digital Filter (FDF™) Fish Finder

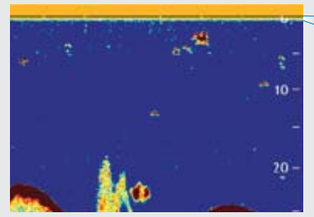
FURUNO's DFF1 features the FURUNO Digital Filter (FDF™) technology. This new digital network sounder can turn any NavNet display into a powerful dual frequency digital fish finder with selectable 600 W or 1 kW output power. The DFF1 operates in the 50/200 kHz frequencies, and can display either frequency alone or both on the same display.

FDF
FURUNO Digital Filter

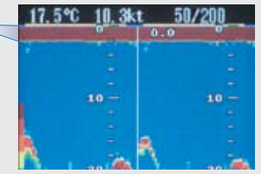
The main difference between digital and conventional fish finders lies in the filtering capabilities and auto adjustments. Our award-winning FDF™ technology helps to optimally adjust the gain, STC (Clutter) and output power as well as suppress surface clutter. It also makes the picture clearer and easier to decipher. However, even the best digital filter won't help unless you start with a solid basis, such as FURUNO's renowned fish finder technology. This is why FURUNO has been the best friend to fishermen for generations. For those who require more power, connect the conventional ETR-30N (BBFF3), which has a high output power of 1/2/3 kW and operates in frequencies from 28 to 200 kHz.

Exceptional Shallow Water Detection with Surface Clutter Suppression

Surface clutter, caused mainly by vessels propeller, can be significantly reduced by the digital filter. This enables you to spot fish targets that are close to the surface.



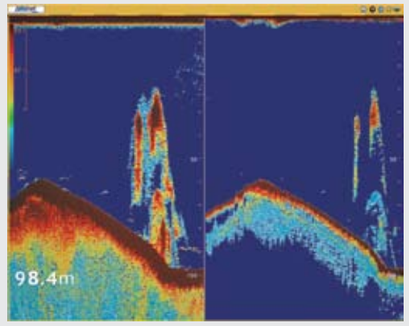
DFF1



Conventional fish finder

Detailed Target Presentation

The digital filter of the DFF1 optimizes the gain to obtain highly detailed images of underwater conditions, clearly showing fish targets suspended in the water column as well as those close to the seabed. The digital filter eliminates noise to deliver sharp, detailed images of fishing reefs and individual fish with absolute clarity.

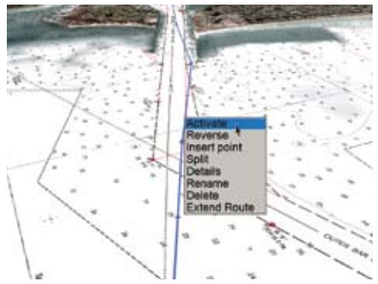


Scalable operating system

NavNet 3D is designed with a user-friendly, scalable operating environment, accommodating new boaters as well as experienced navigators. It lets you customize how much or how little control you have over the system.

1 Point & Click Interface

NavNet 3D provides the easiest user interface on the market with a combination of both RotoKey™ and a familiar point-and-click cursor pad control. The power of the point-and-click interface allows for incredibly simple operation - click anywhere on the screen for context-sensitive options for that area. Click on any data box to access detailed information for that function. A variety of features can be accessed through a familiar left or right click interface. You can also connect a generic USB mouse to further simplify operation.



2 Disp Key

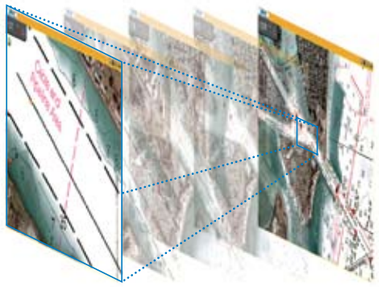
One press of the Disp key allows you to easily select the presentation you desire. Five intelligently designed hot-pages are available to you right out of the box, with the ability to save up to ten custom hot-pages. Customize any hot-page with a simple long press of the RotoKey™, which launches the hot-page wizard.

3 RotoKey™

This is NavNet 3D's revolutionary new control that merges the power and versatility of soft keys with an easy-to-use rotary knob! One turn of the RotoKey™ gives you instant access to full control of NavNet 3D. The RotoKey™ is designed as a part of NavNet 3D's scalable operating system; a short press of the RotoKey™ gives you access to a user-selected set of the functions that you select upon installation from Basic, Standard, Full or Custom, while a longer press of the key displays all of the functions available. Never leave your navigation screen to enter a menu again!

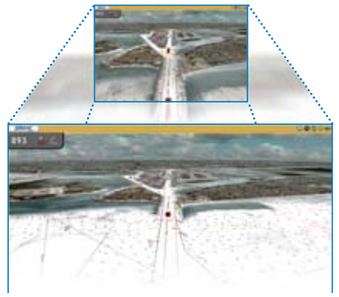
4 Range Key

A simple press of the Range key allows you to adjust the chart/radar range scale of your choice with smooth zooming-in/out actions – no chart screen redraw or lag at all thanks to TimeZero™ Technology!



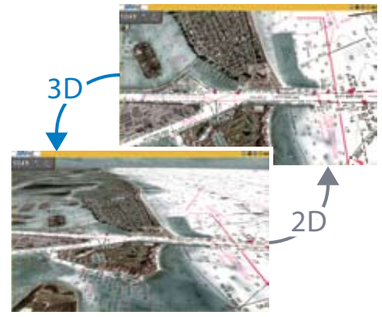
5 Scrolling Pad

The scrolling pad allows independent scrolling and panning capabilities from a dedicated omni-pad. Pan the chart, shift the radar without any screen redraw or lag. You can also control Axis IP cameras without accessing complicated menus or changing your current presentation.



6 3D Key

One long press of the 3D key will toggle the chart from 3D to a familiar 2D, top-down perspective. While the chart remains in its native 3D environment, only the perspective shifts. Press the key again and you toggle back to 3D. There is no special mode required to shift back to 3D perspective.



NavNet 3D Network: Building Block Solution

NavNet 3D is built on an Ethernet network, allowing you to add as few or as many components as you desire along with up to ten displays to create your perfect navigational suite. Further, you can connect NMEA0183 and NMEA2000® devices to any display or BB processor and share that information across the Ethernet network automatically. User setting data can also be transferred by using SD cards for synchronization of operation settings amongst networked displays. Power on/off synchronization amongst all of the NavNet 3D display units can be achieved when the dedicated Ethernet hub HUB101 is used.

The NavNet 3D system is built upon the most advanced chart plotter technology. Add to this UHD™ Radar and FDF™ Fish Finder, along with your choice from a wide variety of sensor options and up to ten displays. In addition, FURUNO's NAVpilot autopilot and ARPA Radar series FAR-2xx7 can also be connected to the system through the dedicated Ethernet network. It is easy to see how the basic chart plotter display becomes the genesis of the most sophisticated navigational suite available.

NAVnet 3D Connect

Network satellite weather receiver*
BBWX1
Ethernet

Network weather facsimile
FAX-30
Ethernet

Smart sensor
NMEA2000®

Network fish finder
DFF1/ETR-30N (BBFF3)
Ethernet

IP camera
Ethernet

External Alarm Output & Point/ MOB Alert Input
Contact

Variable Line Level/ Stereo Output
Stereo

GPS/WAAS antenna
NMEA0183

Radar sensors
Ethernet
NMEA2000®

All the NavNet 3D radar sensors incorporate a NMEA 2000® port to which certain NMEA2000® sensors can be directly connected. Power for these networked sensors is supplied directly from the radar itself. This unique feature allows for flexible installation of multiple NMEA 2000® sensors without the need to run cables all the way to the main processor unit. NMEA 2000® data is converted and distributed throughout the NavNet 3D Ethernet network.

MOB Pendant System Ready
Any NN3D system is compatible with every Wireless MOB Pendant System through the MOB Contact Closure Input.

*For the US market only

PC software
Ethernet

AIS
FA-30/150
Ethernet for FA-30
NMEA0183 for FA-30/150

Nav data organizer/ Remote display
RD-30
NMEA0183

Instruments
FI-50
NMEA2000®

Compass
PG-500
NMEA0183

GPS Heading sensor
SC-30/50/110
NMEA2000® for SC-30
NMEA0183 for SC-30/50/110

Autopilot
NAVpilot 500/511/520
NMEA0183

FURUNO ARPA RADAR Series FAR-2xx7 can be connected to NavNet 3D through the Ethernet data link.

SPECIFICATIONS

Multi Function Display		MFD8	MFD12
DISPLAY UNIT			
Type		8.4" Color TFT LCD	12.1" Color TFT LCD
Screen Size		8.4", 170.4 x 127.8 mm	12.1", 246.0 x 184.5 mm
Screen Resolution		VGA 640 x 480 pixels	SVGA 800 x 600 pixels
Screen Brightness		700 cd (typical)	1100 cd (typical)
Display Colors		Chart Plotter/Menu: 262,144 colors Fish Finder: 64 colors Radar: 16 Colors	
Language		English, French, Spanish, German, Italian, Portguise, Swedish, Danish, Norweigean, Finish, Greek, Chinese, Thai, Japanese	
PLOTTER CHARACTERISTICS			
Memory Capacity		Up to 12,000 points for ship's tracks, 2000 user points, 200 planned routes (100 points per route)	
Display Modes		Course plot, NAV data, Navigational instrument display, Engine monitoring display	
Latitude Limit		Between 85°N and 85°S	
Alarms		Anchor Watch, XTE, Proximity, Depth, Temperature, Speed, Trip Log, Countdown, Timer, Alarm Clock	
RADAR CHARCTERISTICS			
Display Modes		Head-up, Course-up*, North-up*, Relative Motion, True Motion** (*Heading input required **Heading and speed inputs required)	
Echo Trail		Interval: 15 s, 30 s, 1 min, 3 mins, 6 mins, 15 mins, 30 mins and continuous	
INTERFACE			
LAN		1 Port, 100 BASE-TX	
NMEA0183		3 Ports for Input/Output	
Interface (NMEA0183)	Input:	DBT, DPT, DSC, DSE, GGA, GLL, GNS, HDG, HDM, HDT, MDA, MTW, MWV, RMA, RMB, RMC, ROT, RSA, TLL, VDM, VHW, VTG, VWR, VWT, WPL, ZDA, AAM, APB, BOD, BWC, BWR, GSA, GSV, TTM, VBW, VDO, VDR, VLM, XTE, ZTG	
	Output:	AAM, APB, BOD, BWC, BWR, DBT, DPT, GGA, GLL, GNS, HDG, HDT, MTW, MWV, RMA, RMB, RMC, ROT, TLL, VHW, VTG, WPL, XTE, ZDA, ZTG, DSC, DSE, GSA, GSV, HDM, MDA, RSA, TTM, VBW, VDR, VLW, VWR, VWT	
NMEA2000®		1 Port	
Interface (NMEA2000®)	Input:	059904, 061184, 060928, 065280, 126208, 126992, 126996, 127237, 127245, 127250, 127251, 127257, 127258, 128259, 128267, 128275, 128520, 129025, 129026, 129029, 129033, 129283, 129284, 129291, 129539, 129540, 129808, 130306, 130310, 130311, 130577, 130578	
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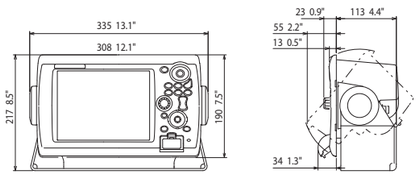
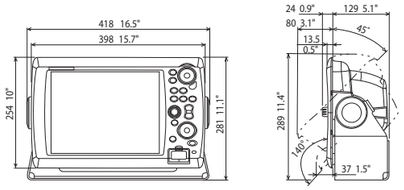
USB Port		1 Port (USB 1.1)	
Video Output		1 Port (DVI-D VGA)	1 Port (DVI-D SVGA)
Video Input		2 Ports (NTSC/PAL)	
Line Out		1 Port	
SD Card Slot		2 Slots	
Variable Line Level Stereo Output		1 Port	
ENVIRONMENT			
Temperature (IEC60945)	Display Unit	-15°C to +55°C	
	Processor Unit		
	Control Unit	N/A	
Waterproofing	Display Unit	IP56 (IEC60529)	
	Processor Unit	N/A	
	Control Unit	N/A	
POWER SUPPLY			
		12-24 VDC	
		33 W/77 W (with DRS2D)/88 W (with DRS4D)/92 W (withDRS4A)/ 102 W (with DRS6A)/130 W (with DRS12A)/165 W (with DRS25A)	44 W/88 W (with DRS2D)/99 W (with DRS4D)/103 W (withDRS4A)/ 112 W (with DRS6A)/141 W (with DRS12A)/176 W (with DRS25A)
		100/110/220/230 VAC with optional rectifier RU-1746B-2/PR-62/RU-3423	

Multi Function Display		MFDBB
DISPLAY UNIT		
Type		12.1" Color TFT LCD with Control Unit (DCU12) or custom monitor of your choice
Screen Size		12.1", 246.0 x 184.5 mm (DCU12)
Screen Resolution		SVGA 800 x 600 pixels, XGA 1024 x 768 pixels or SXGA 1280 x 1024 pixels
Screen Brightness		Please refer to the specifications of DCU12, MU-120C/155C/170C
Display Colors		Chart Plotter/Menu: 262,144 colors Fish Finder: 64 colors Radar: 16 colors
Language		English, French, Spanish, German, Italian, Portguise, Swedish, Danish, Norweigean, Finish, Greek, Chinese, Thai, Japanese
PLOTTER CHARACTERISTICS		
Memory Capacity		Up to 12,000 points for ship's tracks, 2000 user points, 200 planned routes (100 points per route)
Display Modes		Course plot, NAV data, Navigational instrument display, Engine monitoring display
Latitude Limit		Between 85°N and 85°S
Alarms		Anchor Watch, XTE, Proximity, Depth, Temperature, Speed, Trip Log, Countdown, Timer, Alarm Clock
RADAR CHARCTERISTICS		
Display Modes		Head-up, Course-up*, North-up*, Relative Motion, True Motion** (*Heading input required **Heading and speed inputs required)
Echo Trail		Interval: 15 s, 30 s, 1 min, 3 mins, 6 mins, 15 mins, 30 mins and continuous
INTERFACE		
LAN		4 Port Hub in included, 100 BASE-TX
NMEA0183		3 Ports for Input/Output
Interface (NMEA0183)	Input:	DBT, DPT, DSC, DSE, GGA, GLL, GNS, HDG, HDM, HDT, MDA, MTW, MWV, RMA, RMB, RMC, ROT, RSA, TLL, VDM, VHW, VTG, VWR, VWT, WPL, ZDA, AAM, APB, BOD, BWC, BWR, GSA, GSV, TTM, VBW, VDO, VDR, VLM, XTE, ZTG
	Output:	AAM, APB, BOD, BWC, BWR, DBT, DPT, GGA, GLL, GNS, HDG, HDT, MTW, MWV, RMA, RMB, RMC, ROT, TLL, VHW, VTG, WPL, XTE, ZDA, ZTG, DSC, DSE, GSA, GSV, HDM, MDA, RSA, TTM, VBW, VDR, VLW, VWR, VWT
NMEA2000®		1 Port
Interface (NMEA2000®)	Input:	059904, 061184, 060928, 065280, 126208, 126992, 126996, 127237, 127245, 127250, 127251, 127257, 127258, 128259, 128267, 128275, 128520, 129025, 129026, 129029, 129033, 129283, 129284, 129291, 129539, 129540, 129808, 130306, 130310, 130311, 130577, 130578
	Output:	059392, 060928, 061184, 065280, 126208, 126464, 126992, 126996, 127237, 127245, 127250, 127251,127257, 127258, 128259, 128267, 128275, 128520, 129025, 129026, 129028, 129029, 129033, 129038, 129040, 129283, 129284, 129285, 129291, 129539, 129540, 129792, 129793, 129794, 129795, 129796, 129797, 129798, 129799, 129800, 129801, 129802, 129803, 129804, 129805, 129808, 130306, 130310, 130311, 130577, 130578
USB Port		2 Ports (USB 2.0)
Video Output		2 Ports (DVI-D)
Video Input		4 Ports (NTSC/PAL)
Line Out		1 Port
SD Card Slot		2 Slots
Variable Line Level Stereo Output		1 Port
ENVIRONMENT		
Temperature (IEC60945)	Display Unit	-15°C to +55°C (DCU12)
	Processor Unit	0°C to +45°C
	Control Unit	-15°C to +55°C
Waterproofing	Display Unit	IP56 (DCU12 when flush mounted) IEC60529
	Processor Unit	IP20 (MPU-001 when flush mounted)
	Control Unit	IP56 (MCU-001 when flush mounted) IEC60529
POWER SUPPLY		
		12-24 VDC
		104 W/163 W (with DRS2D)/171 W (with DRS4D)/190 W (withDRS4A)/ 206 W (with DRS6A)/229 W (with DRS12A)/Power consumption with DRS25A has yet to be finalized.
		100/110/220/230 VAC with optional rectifier RU-1746B-2

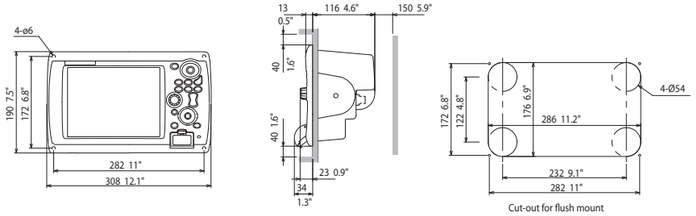
Multi Function Display (Table-top Mount) MFD8
4.7 kg 10.4 lb



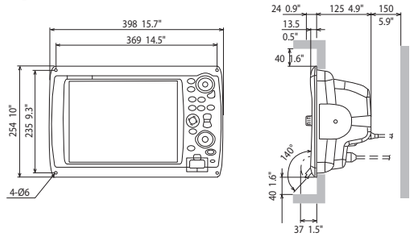
Multi Function Display (Table-top Mount) MFD12
6.8 kg 15.0 lb

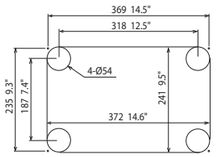


Multi Function Display (Flush Mount) MFD8
3.9 kg 8.6 lb

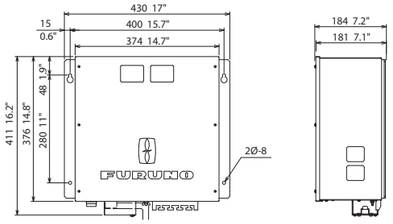


Multi Function Display (Flush Mount) MFD12
5.4 kg 11.9 lb

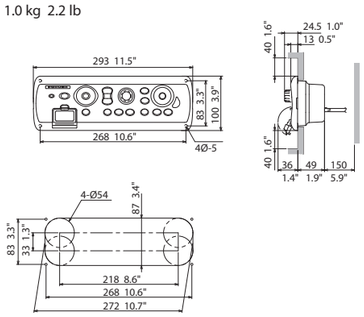




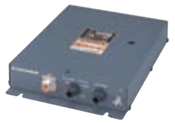
Multi Function Display MFDBB
BlackBox Processor Unit MPU-001
15.0 kg 33.1 lb



BlackBox
Control Unit MCU-001
1.0 kg 2.2 lb



Network Fish Finder	DFF1	ETR-30N (BBFF3)
TRANSCEIVER & DISPLAY		
Display Modes	Single (50 or 200 kHz), Dual (50 and 200 kHz), Bottom-lock, Bottom-Zoom, Bottom Discrimination, Marker Zoom, A-Scope	Single (High or Low frequency), Dual (Both High and Low frequencies), Bottom-lock, Bottom-Zoom, Bottom Discrimination, Marker Zoom, A-Scope
Frequency	Dual frequency 50 kHz and 200 kHz	The synthesized transducer works with dual frequencies between 28 and 200 kHz
Outpot Power	600 W/1 kW (Specify when ordering)	1, 2 or 3 kW (Specify when ordering)
Range Scale	8 basic range scales customized to max. 1,200 m (4,000 ft, 650 fa)	Any range customized between 2 and 1,500 m
Range Phasing	Up to 2,400 m (8,000 ft, 1,300 fa)	Up to 3,000 m (9,850 ft, 1640 fa)
ENVIRONMENT		
Temperature	+15°C to +55°C	
Water Proofing	IEC 60529 IP20	IEC 60529 IPX0
POWER SUPPLY		
	12-24 VDC	12-24 VDC
	12 W	30 W
TRANSDUCERS (Specify when ordering)		
	600 W 50/200 kHz: 520-5PSD (Plastic, thru-hull), 520-5MSD (Bronze, thru-hull), 520-5PWD (Plastic, transom), 525ST-MSD (Bronze, thru-hull with speed/temp sensor), 525ST-PWD (Plastic, transom, with speed/temp sensor) 1kW (Optional Matching box, MB-1100 may be required) 50 kHz: 50B-6, 50B-6B, 50B-9B 200 kHz: 200B-5S, 50/200 kHz: 50/200-1T, 50/200-12M	28 kHz: 28F-8, 28F-18, 50BL-24H, 28F-24H 50 kHz: 50B-6/6B, 50B-9/9B, 50F-8G, 50B-12, 50BL-12 65-110 kHz: 82B-35R 88 kHz: 88B-8, 88B-10, 88F-126H 107 kHz: 100B-10R 200 kHz: 200B-5S, 200B-8/8B, 200B-8N, 200B-12H



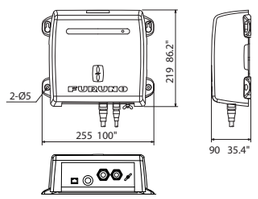
(for the US market only)

GPS/WAAS Receiver Antenna GP-320B	
RECEIVER CHARACTERISTICS	
Receiver Type	Twelve discrete channels, C/A code, all-in-view, WAAS
Receiving Frequency	L1 (1575.42 MHz)
Time to First Fix	12 s (warm start)
Tracking Velocity	999 kt
Geodetic Systems	WGS-84, NAD-27 and others
Accuracy	10 m (GPS) 3m (WAAS)
ENVIRONMENT (IEC 60945 test method)	
Temperature	-25°C to +70°C
Waterproofing	IEC 60529 IPX6
POWER SUPPLY	
	12-24 VDC
	1 W

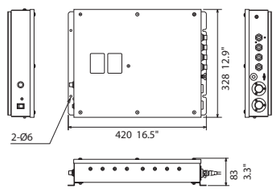
Network Weather Facsimile Receiver FAX-30	
TRANSCEIVER CHARACTERISTICS	
Frequency Range	80 kHz to 160 kHz, 2 MHz to 25 MHz, 490 kHz, 518 kHz (NAVTEX)
Class of Emmision	F3C, J3C, F1B (NAVTEX)
Receiving System	Double superheterodyne
Storage	Fax: 12 pictures NAVTEX: 130 messages
ENVIRONMENT (IEC 60945 test method)	
Temperature	-15°C to +55°C
Waterproofing	IEC 60529 IPX2
POWER SUPPLY	
	12-24 VDC
	12 W

Network Satellite Weather Receiver BBWX1	
TRANSCEIVER CHARACTERISTICS	
Receiver Type	Sirius Satellite Radio Weather Receiver
Mounting	Bulkhead
Interface	Ethernet
ENVIRONMENT	
Temperature	0°C to +55°C (Operating) -35°C to +85°C (Storage)
WaterProofing	IEC 60529 IPX5
POWER SUPPLY	
	12-24 VDC
	10 W

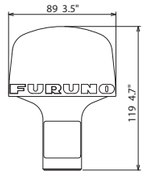
Network Fish Finder DFF1
1.3 kg 2.9 lb



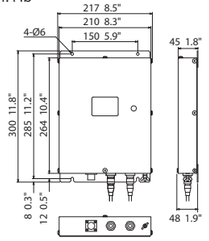
Network Fish Finder ETR-30N-BBFF3
5.6 kg 12.4 lb



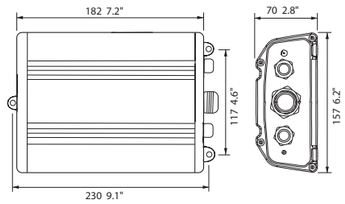
GPS/WAAS Receiver Antenna GP-320B
0.8 kg 1.8 lb
10 m cable attached



Network Weather Facsimile Receiver FAX-30
2.0 kg 4.4 lb

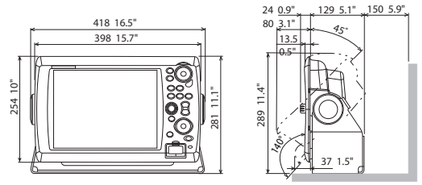


Network Satellite Weather Receiver BBWX1
1.9 kg 4.2 lb
(for the US market only)

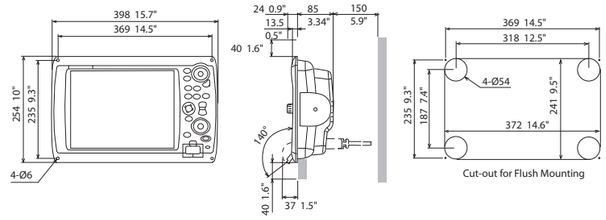


Display Control Unit		DCU12
DISPLAY UNIT		
Screen Size		12.1 inches, 246.0 x 184.5 mm
Resolution		SVGA 800 x 600 pixels
Contrast Ratio		600: 1
Viewing Angle	vertical	+45 to -55°
	horizontal	left 70° to right 70°
Brightness		1100 cd
INTERFACE		
DVI		1 port, DVI-D
Composite (RCA)		NA
ENVIRONMENT (IEC 60945 test method)		
Temperature		-15°C to +55°C
Waterproofing		IP56 (when flush-mounted)
POWER SUPPLY		
		12-24 VDC

Display Control Unit (Table-top Mount) DCU12
5.7 kg 12.6 lb

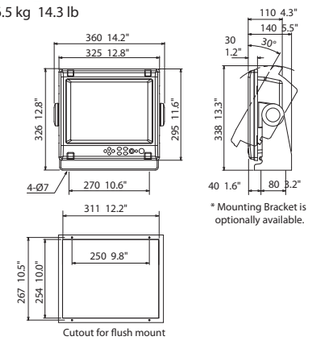


Display Control Unit (Flush Mount) DCU12
5.4 kg 11.9 lb

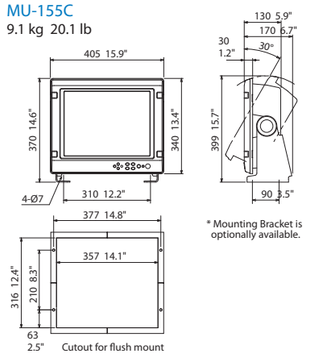


LCD Display		MU-120C	MU-155C	MU170C
DISPLAY UNIT				
Screen Size		12.1 inches, 246.0 x 184.5 mm	15 inches, 304.1 x 228.1 mm	17 inches, 338.0 x 270.0 mm
Resolution		SVGA 800 x 600 pixels	XGA 1024 x 768 pixels	SXGA 1280 x 1024 pixels
Contrast Ratio		300: 1	400: 1	500: 1
Viewing Angle	vertical	+60 to -50°	+85 to -85°	+75 to -75°
	horizontal	left 70° to right 70°	left 85° to right 85°	left 80° to right 80°
Brightness		1000 cd		
INTERFACE				
DVI		1 port, DVI-D		
Composite (RCA)		3 ports, RCA		
ENVIRONMENT (IEC 60945 test method)				
Temperature		-15°C to +55°C		
Waterproofing		IPX5 (when flush-mounted)		IPX6 (when flush-mounted)
POWER SUPPLY				
		12-24 VDC		

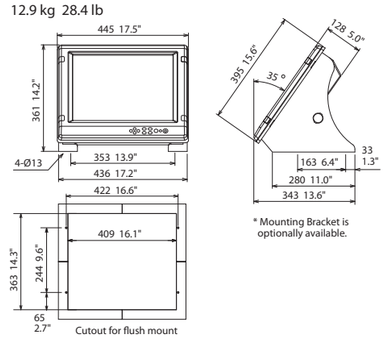
MU-120C
6.5 kg 14.3 lb



MU-155C
9.1 kg 20.1 lb



MU-170C
12.9 kg 28.4 lb

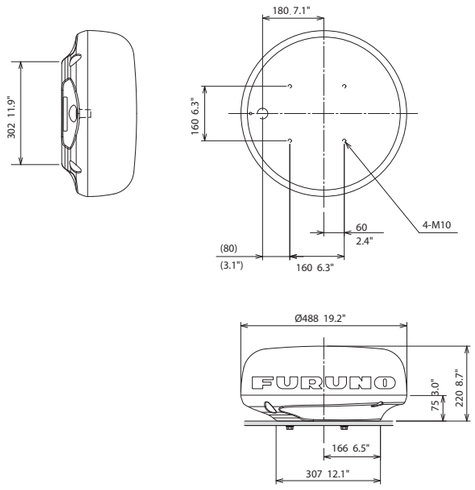


SPECIFICATIONS

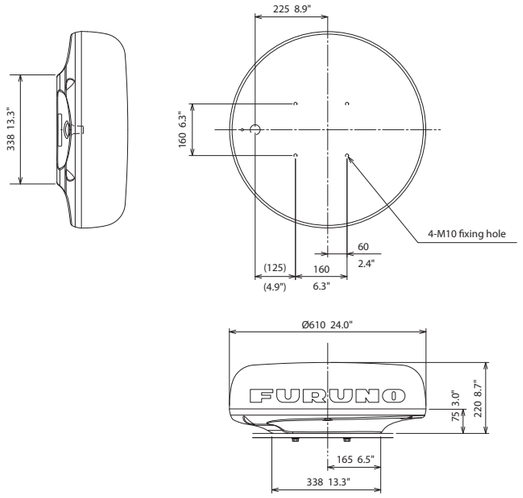
NavNet 3D Radar Sensor		DRS2D	DRS4D	DRS4A
ANTENNA				
Peak Output Power		2.2 kW	4 kW	4 kW
Type		19" Radome	24" Radome	3.5' Open
RF TRANSCEIVER				
Frequency		9410 ± 30 MHz		
Pulselength & PRR		0.08 µs/3000 Hz (0.0625 to 0.75 nm) 0.15 µs/3000 Hz (1 to 1.5 nm) 0.3 µs/1500 Hz (2 nm) 0.5 µs/1000 Hz (3 to 4 nm) 0.7 µs/600 Hz (6 to 8 nm) 0.8 µs/600 Hz (8 to 24 nm)	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) 0.7 µs/600 Hz (6 to 8 nm) 0.8 µs/600 Hz (8 to 36 nm)	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) 0.7 µs/600 Hz (6 to 8 nm) 0.8 µs/600 Hz (8 to 48 nm)
Beam Width	Horizontal	5.2°	3.9°	2.3°
	Vertical	25°	25°	22°
Range Scales		0.0625 to 24 nm	0.0625 to 36 nm	0.0625 to 48 nm
Antenna Rotation Speed		24/36/48 rpm		
Wind Load		Relative Wind 70 kt		
ENVIRONMENT				
Temperature		-30°C to + 55°C		
Waterproofing		IP26		
Power Amp Unit	MFD8	Not required (Power Provided by the Display Unit)		PSU-012
	MFD12	Not required (Power Provided by the Display Unit)		
	MFDBB	Not Required (Power Provided by the BB Processor)		

NavNet 3D Radar Sensor		DRS6A	DRS12A	DRS25A
ANTENNA				
Peak Output Power		6 kW	12 kW	25 kW
Type		4' Open	4'/6' Open	4'/6' Open
RF TRANSCEIVER				
Frequency		9410 ± 30 MHz		
Pulselength & PRR		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) 0.7 µs/600 Hz (6 to 8 nm) 0.8 µs/600 Hz (8 to 64 nm)	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) 0.7 µs/600 Hz (6 to 8 nm) 0.8 µs/600 Hz (8 to 64 nm) 0.8 µs/550 Hz (72 nm)	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) 0.7 µs/600 Hz (6 to 8 nm) 0.8 µs/600 Hz (8 to 64 nm) 0.8 µs/550 Hz (72 to 96 nm)
Beam Width	Horizontal	1.9°	1.9°/1.4°	1.9°/1.4°
	Vertical	22°	22°/22°	22°/22°
Range Scales		0.0625 to 64 nm	0.0625 to 72 nm	0.0625 to 96 nm
Antenna Rotation Speed		24/36/48 rpm		
Wind Load		Relative Wind 70 kt		
ENVIRONMENT				
Temperature		-30°C to + 55°C		
Waterproofing		IP26		
Power Amp Unit	MFD8	PSU-012	PSU-012	PSU-013
	MFD12	Not required (Power Provided by the Display Unit)	PSU-012	PSU-013
	MFDBB	Not Required (Power Provided by the BB Processor)		PSU-013

19" Radome Radar Sensor DRS2D
6.0 kg 13.2 lb



24" Radome Radar Sensor DRS4D
7.0 kg 15.4 lb



3.5' Open Radar Sensor DRS4A
22 kg 48.5 lb

4' Open Radar Sensor DRS6A/12A/25A
22 kg 48.5 lb

6' Open Radar Sensor DRS12A/25A
25 kg 55.1 lb