



A nautical chart background with depth contours (45, 50, 65, 75, 80, 85, 70, 60, 50, 30, 25, 10, 0) and dashed red lines indicating distances (750 yd, 500 yd, 250 yd). A red boat icon is positioned at the bottom center, and a pink fish icon is at the top left. A yellow line connects the fish icon to the boat icon.

FURUNO

Complete Navigator's Guide to Chart Plotters

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The world's first video Plotter, the Furuno GD-101, displayed Loran position and ship's Track on a simple vector grid.

Modern Furuno Chart Plotters are sophisticated, powerful, versatile tools that are capable of much, much more than their predecessors. Each generation has improved upon the last, culminating in Furuno's NavNet TZ-touch3 multi touch, Multi Function Displays, the pinnacle of modern Chart Plotting technology.

This guide will teach you what a Chart Plotter is, what it can and cannot do, and offer tips and tricks for making the most out of this important addition to your helm.



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The Evolution of Chart Plotting

Chart Plotters have come a long way since Furuno developed the world's first Video Plotter in 1979. That machine, the GD-101A, determined its position via LORAN. The GD-101A displayed position and ship's Track on a green vector screen. No electronic charts were available at that time, and location and Track were displayed on a simple vector grid. Since then, LORAN has given way to GPS, digital cartography choices have opened up with both Vector and Raster options available from a number of sources, and more powerful optional functions have been introduced.

Today's helm is a technological marvel compared to the helms of the past. Your Radar can show you all of the objects in the water around you even through the thickest fog or the dark of night. Your Fish Finder can unveil what is beneath you, increasing your awareness of the underwater world around your vessel. Only your Chart Plotter, though, can show you cartographically where you are, where you've been, and where you're headed.

Your Chart Plotter serves a number of useful functions on your boat. It allows you, the navigator, to:

- Know your current location at a glance
- Show charted obstructions, buoys, navigation lanes and other ATN (Aids To Navigation)
- Show Bathymetry (water depth) for a given location
- Save Waypoints for important locations so you can navigate back to them at any time
- Plan out your voyage and save your Routes
- Steer your Autopilot
- Save and view your Track
- Instantly record MOB (Man Overboard) location
- Record travel time and plot ETA to destination
- Find specific POI (Point Of Interest), such as harbors and fueling stations
- View tidal and current forecasts

Chart Plotter Configurations

Furuno offers a variety of Chart Plotter configurations. Your local Furuno dealer is sure to have a model that suits your needs.

NavNet

In 2001, Furuno revolutionized Marine Electronics with the introduction of NavNet and the world's first Ethernet-based networked bridge. Multiple displays and black-box peripheral devices could be linked together, sharing data from a number of sources and allowing for complete control of every part of the system from any display on the network. NavNet vx2 built upon this success, adding even more cartography options and more powerful peripheral devices. In 2007, NavNet 3D re-invented the entire system. Operating in a fully 3D environment, NavNet 3D allowed for navigation in the traditional top-down, 2D or an impressive new 3D environment, giving the navigator the ability to see farther ahead and around the vessel.

Today, Furuno's NavNet TZtouch3 incorporates our fully-rendered 3D technology into an easy-to-use multi-touch Multi Function Display. With NavNet TZtouch3, taps, pinches and swipes translate into actions instantaneously on the screen, transforming the way in which you plan and navigate from the helm.

GP-Series Chart Plotters

While the NavNet series is definitely as powerful a system as you are likely to find, not every mariner needs such an advanced navigation suite. In fact, plenty of boaters will do just fine with a simple Chart Plotter/Fish Finder combination unit, and that is where the GP series from Furuno shines.

The Furuno GP series Chart Plotters are available as a Chart Plotter/Fish Finder combination unit. This series offers the flexibility and simplicity of having these two essential navigation tools in a compact, durable and waterproof housing that is at home on any bridge or helm, no matter how limited space may be. Each model in the series is packed with legendary Furuno quality and backed by our industry leading customer service.



Principles of GPS

What is GPS?

GPS is an acronym for Global Positioning System. GPS is comprised of 27 satellites in orbit around the earth (24 operating satellites, with three backup satellites). These satellites are organized in their orbits so that, at any moment, at least four satellites are within line of sight of any spot on the surface of the Earth. Each satellite transmits a distinct radio signal that can be received by your consumer GPS device. When your device receives these coded signals from three or more satellites, it is able to use them to determine its own position by means of a mathematical formula called trilateration. The concept of trilateration is simple, but it can be a little tricky to explain.

Imagine that you need to know the actual location of the spot you are standing in, and that your only means of determining that location is in relation to known objects around you. You can determine your precise location by measuring the distance between yourself and these known objects.

In this example, your location can be described as follows: You are 654 miles from San Francisco, 415 miles from Boise, and 176 miles from Seattle. If you draw a circle around each of these cities on a map, with a radius equal to your known distance from each location, these three circles will converge at a single point. This intersection is your precise location. You are at Furuno USA Headquarters in Camas, WA!

So far, so good! It gets a little trickier, though, because this is a two-dimensional example and we live in a three-dimensional world. Now, imagine that instead of a circle, the radius around San Francisco, Boise and Seattle are actually three-dimensional spheres. These three spheres will all converge at two points instead of only one. We need a fourth sphere intersecting at one of these two convergences to tell us which location we are actually at. In reality, the fourth sphere is already known - we're standing on it! The fourth sphere is the earth. The second convergence point is somewhere out in space and can be safely disregarded by your GPS device.

DGPS

DGPS, or Differential Global Positioning System, is a means of augmenting the accuracy of a GPS Receiver. DGPS stations are ground-based (not satellite) locations that send out a coded signal that can be referenced by your DGPS-enabled device. This coded signal acts in much the same way as a GPS signal from a satellite, only it is more accurate because the DGPS station's ground-based location is fixed, and there is less atmospheric interference between the DGPS station and your DGPS receiver to distort or delay the signal. Differential GPS uses this coded signal to correct the standard GPS signal and dramatically increase the accuracy of your GPS device. DGPS can improve standard GPS accuracy (approximately 10 meters, or 32 feet) to 5 meters, or about 16 feet.

WAAS

WAAS, or Wide Area Augmentation System, was developed by the Federal Aviation Administration to improve GPS accuracy for aircraft. However, it is equally effective for ground-based navigation. In the WAAS system, ground-based stations record small deviations in the standard GPS signal, then send that information to a network of geo-stationary satellites. These satellites transmit a deviation correction signal, which your GPS/WAAS receiver can use to improve the accuracy of the standard GPS signal. In this way, standard GPS location accuracy can be improved to a tolerance of 3 meters, or about 10 feet.

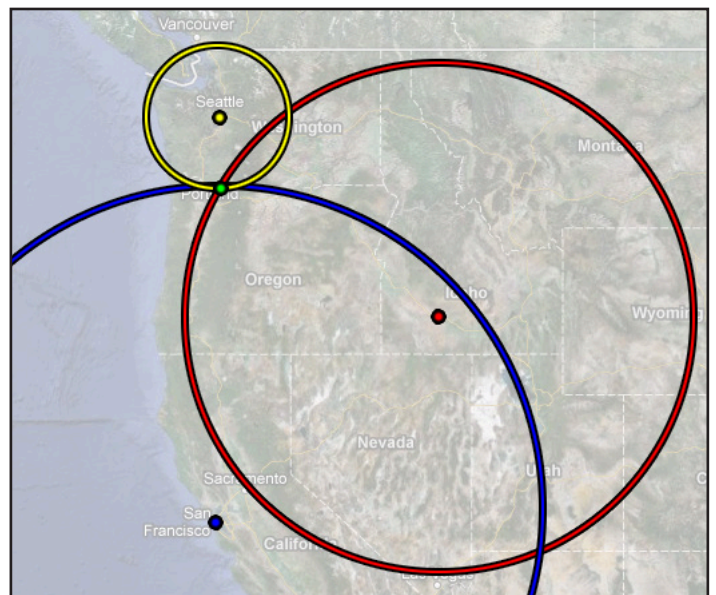


Figure 1 - Example of GPS Trilateration

Understanding Latitude & Longitude

Once your GPS has determined your location, it can inform you of your current 'address' on the globe. This address is expressed as a set of coordinates called Latitude and Longitude.

It is easiest to begin thinking of Latitude and Longitude lines as a grid that encircles the globe. Instead of a flat grid, though, such as a sheet of graph paper, Latitude/Longitude is a 3-dimensional grid, so we'll need to consider this in our example.

Let's start with the longest line on that grid, one that most of us are familiar with - the equator. The equator is the imaginary 'ring' that divides the globe into two roughly equal hemispheres, the Northern hemisphere and the Southern hemisphere. The equator is our first horizontal line on the globe, and we call this a line of *Latitude*. Latitude tell us how far north or south of the equator our address can be found. Since the equator is our first line of Latitude, it's given an 'address' of zero. As we move north, we encounter more 'rings,' called parallels because they are parallel with the equator. With each parallel that we approach moving north, the number in our Latitude coordinate increases. Moving south of the equator decreases the number for your Latitude coordinate, so if your address is in the southern hemisphere, this coordinate is expressed as a negative number.

When thinking of *Longitude*, it is easiest to consider these lines not as 'rings' that encircle the globe, but as half-circles. These half-circles, called *meridians*, extend from the north pole to the south pole. Unlike Latitude, which divides the northern and southern hemispheres based on the Earth's rotational axis, the starting position for Longitude is an arbitrary point. The current starting point, called the Prime Meridian, is located at the Royal Observatory in Greenwich,

England. This point was selected in 1884 to be the common 'zero point' of Longitude, and is the standard of international time reckoning. This is an important standard! When you consider your time zone, for example, you are actually comparing your longitude to the Prime Meridian.

As we move east or west from the Prime Meridian, we encounter more vertical lines, called lines of Longitude, or meridians. There are a total of 360 meridians encircling the globe. The 180th line of Longitude is on the direct opposite side of the globe from the Prime Meridian, and is called the International Date Line. The 180th meridian is where we separate the two calendar days that are current on the earth.

Whew! With us so far? Let's take it a step further. You know that the two coordinates for your location are expressed in Latitude (North/South) and Longitude (East/West). As a default, these coordinates are expressed in a format called *Decimal Degrees* on Furuno equipment. Let's take the equator as an example. This complete circle of the Earth is divided into 360 'degrees,' separated by meridians. Each degree is divided into 60 equal parts, called minutes, and each minute is enhanced by a decimal number of tenths, hundredths, and thousandths for a great degree of accuracy. For example, Furuno USA headquarters is located at 45°59'8889"N , -122°45'4302"W (45 degrees, 59.8889 minutes north of the equator and 122 degrees, 45.4302 minutes west of Prime Meridian.)

See the inside back cover for instructions on converting between different Lat/Lon formats.

Of course, it is possible to determine your rough position without the use of electronics - navigators have done so for centuries - but such instruction is beyond the scope of this guide. Furuno *strongly* encourage all mariners to learn about navigation without the use of electronics. Seriously. Please learn this stuff - it could save your life!

Charts: Raster, Vector and Bathymetric

Perhaps the most common question for first-time chart plotter buyers is, "What kind of charts do I need?" The answer is...it depends! Let's go over the differences in cartography, and in the end, you will see why the answer to this question is not as simple as it may at first appear.



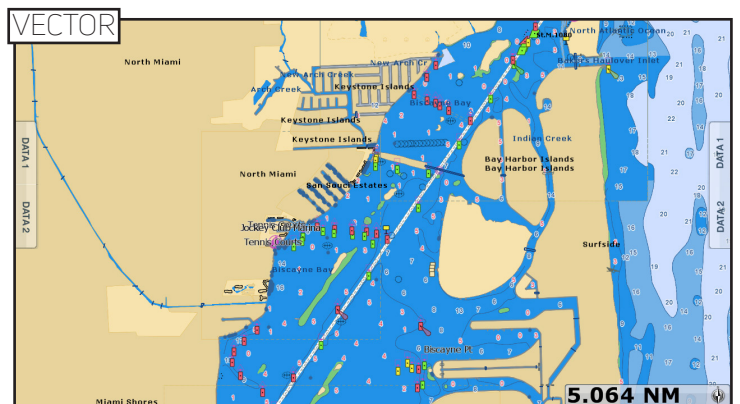
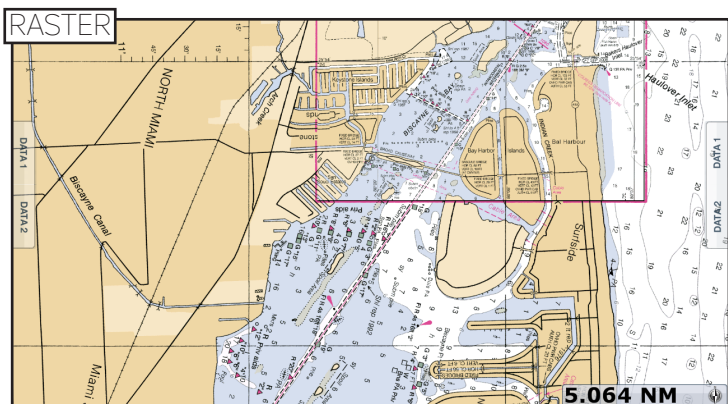
Raster

Raster charts are simply scanned paper charts that have been digitized for use on an electronic Chart Plotter. Think of these as digital photographs of the actual paper charts - for, this is exactly what they are! Raster charts maintain the look and feel of paper charts you may already be familiar with, and many boaters have decided that these are the charts they prefer simply because of this familiarity.

Vector

Vector charts are a digital representation of the information found on paper charts. Think of Vector charts as a database of information that your Chart Plotter's software uses to draw the chart on the screen. Coastlines, shipping lanes, buoys, wrecks and other obstructions, even spot soundings - all of this information is stored in the machine not as an image or map, but only as mathematical data that your Chart Plotter can access to draw a picture of your chart. Vector charts typically contain more data than a Raster chart, and this data is organized in individual 'layers' which can be turned on or off, allowing you to display as much or as little information as you desire.

There are pros and cons for each option. Raster charts may be more familiar and, depending on your preference, more pleasing to the eye, but keep in mind that as you rotate the chart, text elements will rotate with it. Spot soundings, port names, Notices to Mariners - all of these text elements will rotate as the chart rotates. This means that the text may appear upside down or at odd angles, making it harder for you to read. Also, when you are viewing the chart at a close-in range scale, the appearance may not be as crisp as when you are zoomed out to a larger range scale.



Vector charts do not have these limitations. Because the text elements are not part of a static image, they will not rotate as the chart is rotated, and so will always appear in the correct orientation. Because Vector charts are drawn on demand and are not part of a static image, there are no issues of the chart being illegible or 'fuzzy' at any range. Vector charts may be updated more frequently, and so they may contain more up-to-date data than an equivalent Raster chart. They may, however, appear to be more 'basic' even though they contain the same data. We highly recommend you visit your local Authorized Furuno Dealer to see examples of both Raster and Vector charts for your area before making a decision which format you'd like to navigate with.

Some systems, such as NavNet TZtouch and Nobeltec TimeZero, are able to use both Raster and Vector charts. In this case, you can select the chart format you prefer for the area in which you are navigating, with the option to swap charts at will.

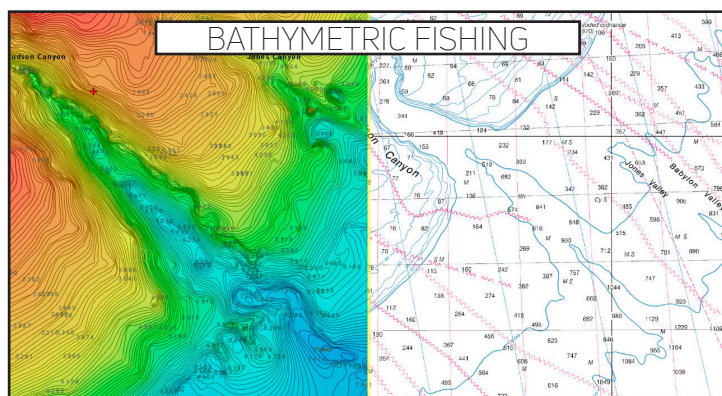
Bathymetric

Bathymetric, or 'Fishing' Charts, depict the contour of the sea floor. These charts present an accurate, measurable description and visual presentation of the submerged terrain. These charts provide the commercial and recreational fisherman with a powerful tool to enhance their catch.

Bathymetric charts differ from navigation charts in that the presentation of underwater features is their primary purpose. Safe navigation is the primary purpose of a navigation chart.

Raster vs. Vector cartography is really a matter of personal preference. Furuno offers you the freedom to choose which cartography you'd like to

Accurate bathymetric data can make the difference between a successful fishing trip and a disappointing one. Unfortunately, bathymetric charts from official sources can be inaccurate. For example, while bathymetric surveys of hard bottoms tend to remain accurate, muddy or sandy bottoms can change significantly year-to-year because of weather and ocean currents. Fortunately, powerful tools are available from Furuno that provide the fisherman the means to update or create accurate, up-to-date bathymetric renderings of the bottom terrain. These tools are Nobeltec TimeZero with PBG (Personal Bathymetric Generator) and the extremely powerful WASSP survey sonar. These tools provide the fisherman, the diver and the scientist with the ability to update in real time existing bathymetric charts or data or to create a completely new and accurate rendition of the bottom topography, including reefs, drop offs, wrecks, boulders and other anomalies. Bathymetric charts, based on official NOAA data for The United States are available free-of-charge to Furuno NavNet 3D and all NavNet TZ Touch users.



Bathymetric, or 'Fishing' charts, show the bottom contours. Here we see a side-by-side presentation of the same fishing chart for Hudson Canyon, with and without Depth Shading. Notice how simple it is to understand the charted depth at a glance with Depth Shading turned on.

CMOR Charts

CMOR Mapping provides detailed shaded relief charts that come from methodical surveys of the ocean bottom with high-resolution echosounders — not point soundings and historical records. The colors on your CMOR Chart are a useful tool to understand the depth and type of bottom, where red represents the shallowest part of the data set and violet the deepest, so you can easily determine depth by color.

Waypoints and Routes

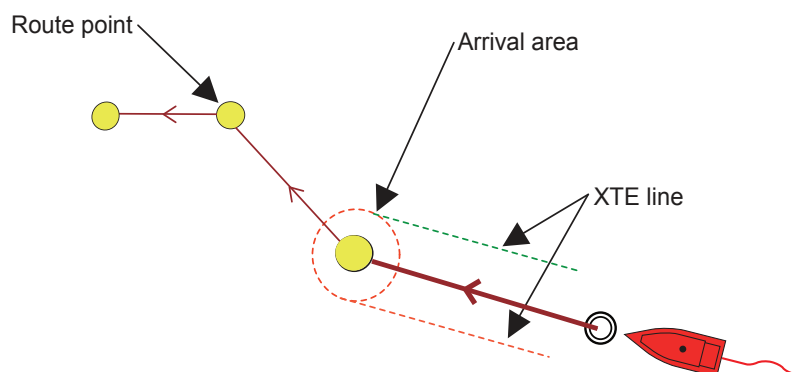
The meat-and-potatoes of your Chart Plotter is your list of Waypoints and Routes. In navigation terminology, a Waypoint is any location you create and save on the Chart Plotter display. A Waypoint can be a fishing spot, a reference point, or any other important location. You can use a Waypoint you have entered to set a destination and send this information to your Autopilot, or use the Highway display to keep you on course while you manually steer to your Waypoint.

When you have a series of Waypoints that you'd like to navigate to in order, then you want to create a Route. A Route is a series of two or more Waypoints strung together and navigated to in a specific order. The operator navigates to the beginning Waypoint at the start of the Route, then to the next Waypoint in the Route, and so on until the destination is reached. When you follow a route, the current leg is shown as a red dashed line and the previous leg is shown as a light gray line.

You have the ability to begin navigation in the middle of the route, or to edit a Route at any time. You can also skip individual Waypoints without permanently editing the entire Route, navigate Routes in reverse, or deviate from your current Route momentarily (to navigate around an obstacle, for example) and then easily resume navigation of the current Route. Some Furuno models even have a 'Flyover' feature to animate the Route you've created on your display.

XTE (Cross Track Error)

XTE is a visual indicator to keep you on-course to your next Waypoint. The XTE line for port side is red, for starboard side it is green. You can show or hide these lines, and set alarms to let you know when the XTE limits you set have been crossed.



"Control. Control! You must learn control."

Jedi Master Yoda, The Empire Strikes Back

The interface for your Chart Plotter should be comfortable for you to use. Ideally, it should be simple, thorough, and intuitive enough so you don't waste time searching through complicated menus to find the function you're looking for.

All NavNet TZtouch3 MFDs have a multi-touch interface that is as simple to use as the phone in your pocket, and the Edge Swipe feature puts all of the important controls you'll use every day right at your fingertips. The 9" TZT9F and 12" TZT12F include front panel controls to make operation that much simpler, combining "The Best of Both Worlds" when it comes to NavNet control

Mariners who want a simple, remote touch-screen display, look no further than the innovative TEU001B Touch Encoder Unit. This stylish little unit provides a compact, touch-based interface that emulates the familiar Edge Swipe UI of NavNet TZtouch2 and NavNet TZtouch3. It also incorporates a beautifully designed RotoKey™ for easy access and tactile control of many common operations, including zoom in/out and quick menu scrolling. The color LCD touchscreen will enhance the look of any dash while providing incredible armchair control.



POINTS/GO TO key

CursorPad

HOME/CTRL key

ESC/MENU key

ENT key

EVENT/MOB key

RotoKey™

POWER/BRILL key

Behind cover:
- SD card slot
- USB micro connector
- RESET button

6

Front panel controls may vary by model

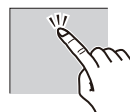
Multi-Touch Interface

Multi-Touch has become common in our daily lives. Most smart phones utilize multi-touch to zoom in and out of pages and photos. Furuno is proud to be the first in the industry to bring this revolutionary technology to your helm.



Furuno Multi-Touch is available on our NavNet TZtouch, TZtouch2, and TZtouch3 product lines. Taps, swipes and pinches all bring your Chart Plotter to life. You can even create your own custom gestures and assign them to the functions you use the most.

Here is a list of common gestures:



Tap to select an object or menu item



Drag to pan charts or scroll through the menu

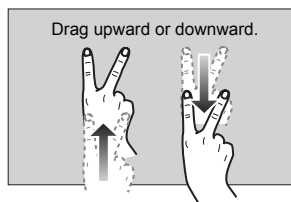


Zoom in



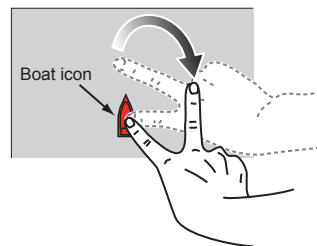
Zoom out

Pinch to zoom in or out of chart



Drag upward or downward.

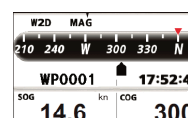
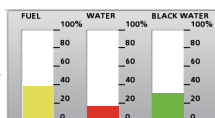
Drag up or down with two fingers to alternate between 2D and 3D viewing modes



Boat icon

Place one finger on the boat icon then rotate the second finger to alternate between Head-Up and North-Up navigation

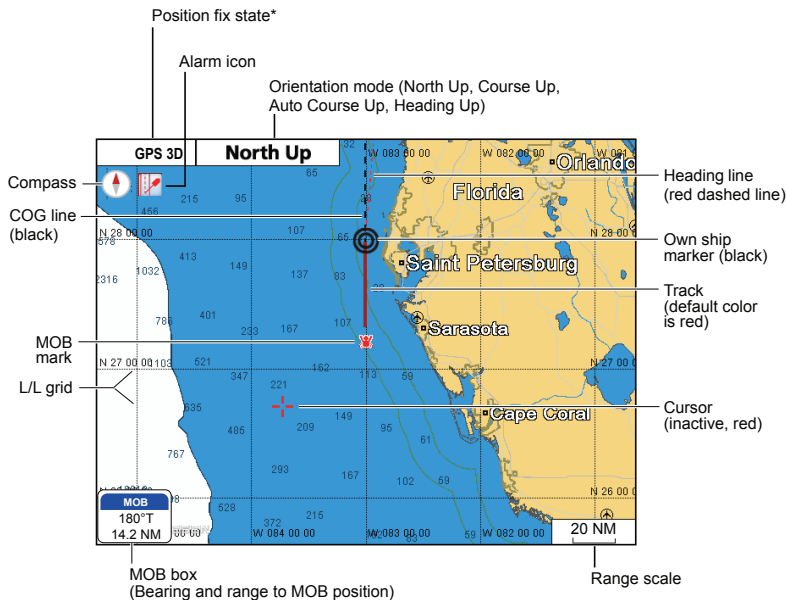
Assign a "Two-Finger Tap" to whatever function you like!



The Big Picture

The different screen modes available on every Furuno Chart Plotter make the information you need available when you need it. Let's take a look at some of the basic displays and what they're used for.

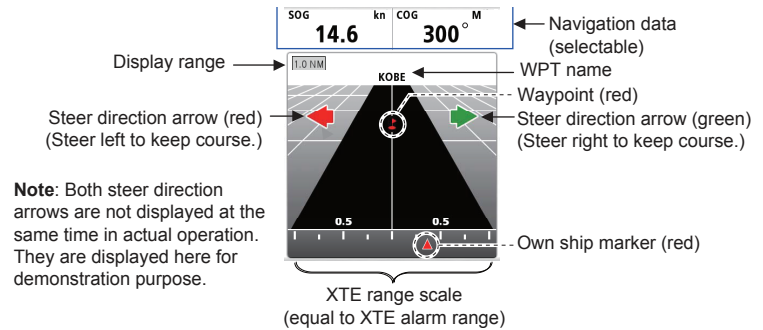
The basic Chart Plotter screen begins with your location on the chart. Generally speaking, your first view when you fire up the Chart Plotter will mark your precise location. You will also be presented with a selection of useful data on the screen.



The above sample screen gives us a lot of information about our current situation. We can clearly see where we are, where we're heading, and where we've been. This is the most basic at-a-glance information your Chart Plotter provides. Beginning from this basic screen, most Furuno Chart Plotters offer a great deal of customization. For instance, there is a HUGE volume of available information that we don't see on this basic screen. Would you like to track the water temperature? The actual water depth recorded by your Fish Finder? Wind speed and direction? How about the distance and bearing to your next Waypoint? All of this information and much, much more can be displayed by adding data boxes to your screen.

Staying On Course

One of the more useful features of your Furuno Chart Plotter is the Highway mode. This display plots your course to the next Waypoint as - you guessed it - a 'highway' lane, alerting you when you're off-course, and giving you instruction on how to steer to get back on track to your destination.



Tracks and Marks

An easy way to record where you've been and to view your movement at a glance is to turn on the Ship's Track feature of your Chart Plotter. The Track feature records and displays your ship's movement as a colored Track line on the chart, customizable in a number of different ways.

When Track is turned on, the Chart Plotter records a series of points and connects them with a line on the chart - your Track line. Most Furuno Chart Plotters offer you the option to record your Track by either time or distance. That is, you can set your system to record points over time (anywhere from one new point every second to only one point per hour), or by distance (from one point every 0.1 nm, up to only one new point per 10 nm).

The color of your Track line can be customized as well. For example, you can select a single color for your Track, or you can have the Track displayed as a variable color that changes with the depth, speed or sea surface temperature, or even with changes in the bottom makeup (Bottom Discrimination required).

If you want or need more information displayed on your bridge, consider an RD33 Data Display. Here are some of the different types of information you can show:



Navigation data x3



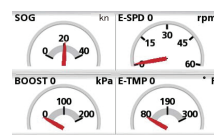
Navigation data x1



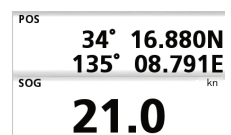
Navigation data x4



Meter x1 (ex. SOG)



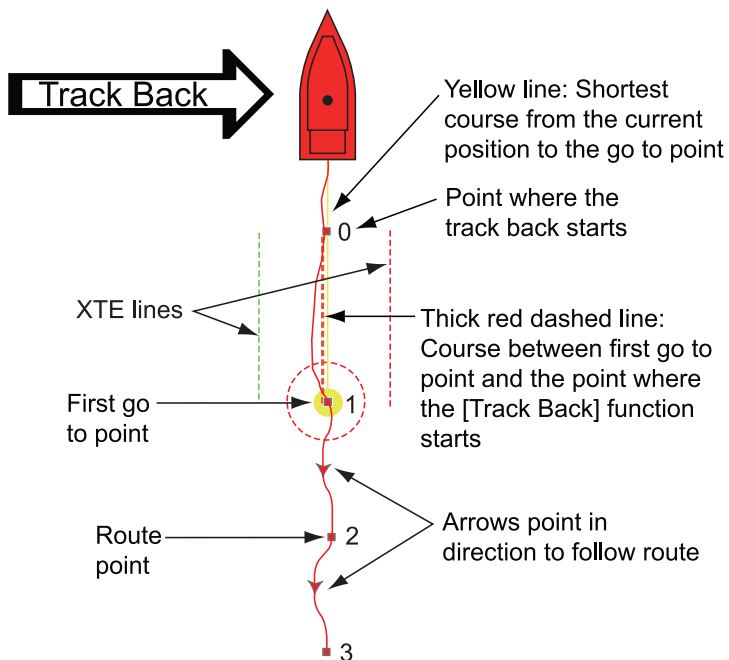
Meter x4



Navigation data x2

All Furuno Chart Plotters can create a Track, but the customization options will vary depending on model.

Your Track remains on the Chart Plotter even after the power is turned off. You can save recorded Tracks for later playback, and you can also make a Route from your Tracks using Furuno's **Track Back** feature. **Track Back** takes an existing Track and creates a Route, where the Waypoints are created for you automatically. This is an easy way for you to recreate a previous voyage. For example, when laying a series of crab or lobster pots, the recorded Track can be saved as a Route so that you can go back to collect your catch of the day easily and efficiently.



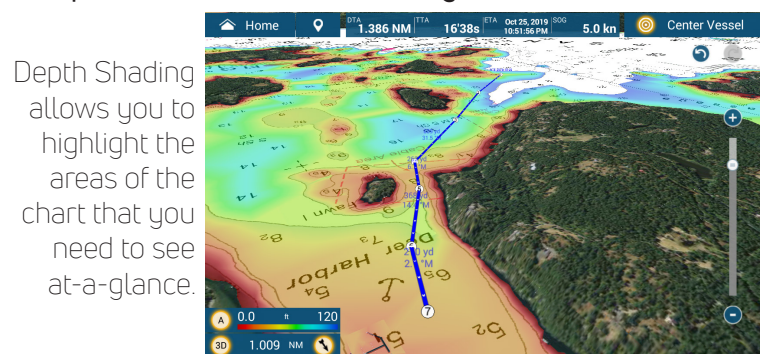
A favorite trick of savvy fisherman is to utilize the Track line to find the temperature rip. The rip is often visible from the surface, appearing as a strip of calm water bounded by rough water to either side. By setting your Track color to SST Color Variant, the color of your Track line will change with water temperature, and you will be able to identify where the actual temperature rip is located. This is very useful, as plankton, bait fish and game fish tend to gather in a food chain around temperature rips. Experienced anglers know that temperature rip located over good bottom structure are often key ingredients for turning a good day on the water into a great one.

Depth Shading

All current Furuno Chart Plotters can show depth shading - that is, color shades overlaid on the chart that reflect the depth of the

charted area. Using Depth Shading, you can easily tell where the shallows end and the deeper, safer-to-navigate waters begin.

Depth Shading can be customized so that preset depths are shaded in colors of your choice.



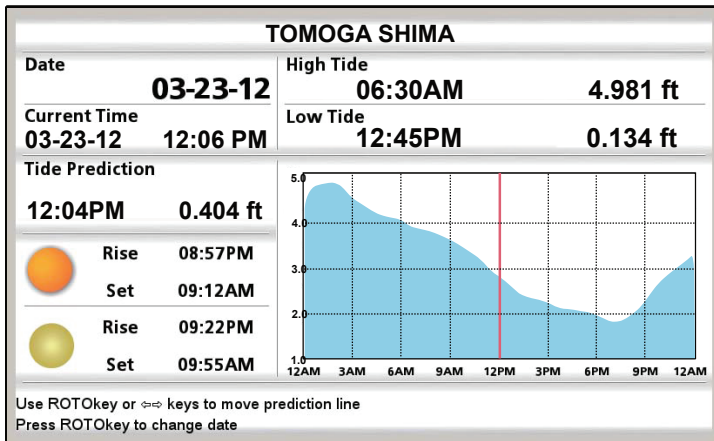
Overlay

When it comes to information overlay, look no further than NavNet TZtouch3 or Nobeltec TimeZero PC Chart Plotting Software. The TimeZero engine that drives these systems allows for an unprecedented level of customization when it comes to expanding the display presentation. Of course, Depth Shading and Satellite Photo Overlay are standard fare these days. TimeZero, though, presents this information in an entirely new way that we call Satellite Photo Fusion. Satellite Photo Fusion allows you to overlay the Satellite photography onto your chart, but the photo will only show in areas where there is a charted depth of zero - that is, land masses. From there, the photo becomes less opaque as the water depth increases, allowing you to see the chart information where you need it without being obscured by the photo image. The result is the smooth, attractive transition from sat photo to chart.



Tides & Currents

Every Furuno Chart Plotter includes an almanac of world Tides & Currents. This information is good to have on hand when you need it!



Every day, there are two instances each of High and Low Tide, spaced approximately 13 hours apart. Using your Chart Plotter's tidal data, you will know exactly when these instances will occur for a given area. You will also be able to determine the tide level for whatever time of day or night you choose.

There are compelling reasons why this may be important. If you're at anchor, you will want to know that you've let out enough line to stay anchored when the tide comes in, and also that your vessel won't ground when the tide goes out. If your voyage will take you through inlets or intra-coastal waterways that are bridged, you will need to know that your vessel has sufficient clearance *before* you attempt to navigate these hazards, not during, and certainly not after!

Sirius XM Satellite Weather

Furuno has a selection of tools that can bring a whole new level of situational awareness to your Chart Plotter. It began with the FAX30 Weather Fax, delivering digital weather information directly to your screen without the need for a dedicated printer. The 200WX Ultrasonic Weather Station provides a host of useful, real-time information. Where it really gets interesting, though, is with the addition of the BBWX series for NavNet, and NavCenter downloads for NavNet TZtouch.

The BBWX series Sirius XM Satellite Weather Receiver works with all NavNet TZtouch and NavNet 3D models, and can also be used with all C-MAP by Jeppesen versions of NavNet vx2 (7", 10.4" and Black Box units).

The BBWX series provides the following information:

- Up-to-the-minute weather forecasting at sea
- Satellite Sea Surface Temperatures
- Animated NOWRad® weather radar
- Pressure isobars and frontal boundaries
- Squall lines and surface pressure
- Wind forecasts using wind barbs or arrows
- Marine text forecasts
- Lightning strike reports & storm tracking
- Buoy reports
- Wave height forecasts
- Sirius Satellite Radio control (requires Sirius Satellite Radio subscription)
- Fish Mapping

Free NavCenter Weather on NavNet TZtouch

The NavCenter animated weather tool, exclusive to NavNet TZtouch, is completely free and easy to use. The tool gives navNet TZtouch users unlimited access to weather forecasts, worldwide, 24 hours a day. The data is provided free-of-charge by NavCenter. You only need to select geographic coverage, data type and period of time, and then choose how to receive the file. NavNet TZtouch provides up to 16 days of weather forecasting.

The NavCenter data display provides forecast data that includes:

- Wind
- Waves
- SST (Sea Surface Temperature)
- Cloud
- Rain
- Pressure
- 500mb
- Air Temp
- Currents
- Altimetry
- Plankton

Use these for planning fishing trips!

Size Matters

The question, "What size screen do I need?" has been asked by just about everyone who ever purchased a Chart Plotter. The answer is really a combination of factors, such as available helm space and your individual needs and personal preference. That being said, our recommendation is to install the largest screen possible.

Screen size is important. For starters, you will be viewing charts that you may be accustomed to seeing in their much larger paper format. When you unfold the chart, you can see your position as well as a large area around you quite clearly on the paper. Although all of this information and more will be available on your Chart Plotter, you may find yourself zooming in to your current position, then zooming out to get a better view of the charted area around you, quite frequently. You may ask yourself, after doing this for a while, "Why didn't I just get the larger screen?"

The ability to take in your whole navigational situation in one screen is something to consider. More available screen space means more data available at-a-glance.

This is not to say that a small screen is unusable. The layout and controls of every Furuno product are painstakingly thought-out to create the best user experience. Consider that you will be using your Chart Plotter a great deal, and make sure you select the model that is the best for your situation.

Back It Up (your data, that is)

All Furuno Chart Plotters allow you to back up your data. Depending on your model, it may be as simple as inserting an SD memory card and pressing a few keys, or it may require a little more effort on your part to backup your library of Waypoints, Routes and Marks. Once you have built that library of data, it is important to create a backup in case of theft, lightning strike, or any other catastrophic failure of the unit. You will have worked hard to build up your library, and you should definitely spend the time to periodically make a backup copy - just in case.

DSC - Why It's So Important

When connected to a DSC-enabled Radiotelephone or VHF, the DSC (Digital Selective Calling) message information feature alerts you when you have received a DSC position request or a DSC distress call. This is important! When a fellow boater is in distress, the ability of the closest vessel to respond can be the difference between life and death; if you should ever need it (and we're hoping that you never do), the ability to instantaneously transmit your vessel ID and position at the touch of a button cannot be understated. Again, we hope you never need it! In the event that you do, though, you will be *very* glad that you have it.

Pro Tips:



Capt. Jack Carlson boasts more than two decades under his belt as a Professional Keys Fishing Guide. He and his three sons make their home port in Marathon, Florida Keys. Two Conchs provides outstanding Florida Keys fishing charters, getting their clients to the fishing grounds fast so they have more time for fishing. Capt. Jack shared some of his favorite tips and tricks with us:

1. Hot Pages on NavNet TZtouch3

Down here in the Keys, our fishing options are wide open. We can be fishing the reef one minute, sailfishing the next, dolphin fishing offshore right after that. Being able to have all of my pages set up is great. I've got my 3KW Fish Finder, I can see the yellowtails balled up, and I can put that on a page with the GPS. When I want to switch to offshore, I can switch to a page with my GPS and Radar, so I can go find the birds. Having them already set up, I can edge swipe down and pick which one I want to use and have it all set. It just saves time.

2. Organize your waypoints

Furuno TZtouch3 has made point organization so simple. Hit the home button, then list, then points. I have it sorted by name. I can enter in the name that I have saved and it comes up. To list my catches, just go to home, list, then catches. I can list them by species; grouper, snapper, and many more. TZtouch3 has also made finding the nearest spots easy. I can see the spots that are nearest to me and if I want to see the ones further away, just hit range again and it's going to find the ones that are furthest away from you.

Keep Your Friends Close

When connected to your DSC-enabled VHF, your Chart Plotter becomes a powerful tool for safety on the water. Many Furuno Chart Plotters offer you the ability to create a 'Buddy List' of other vessels. The Buddy List feature allows you to enter the MMSI number of other vessels, then contact them directly through your VHF. When activated, your VHF and your Buddies VHF will automatically switch to the same unused channel, and let you both know when that connection has been established.

Some Chart Plotters have the ability to use your buddies' DSC information in an even more extraordinary way in what is called DSC Location Polling. If you've both got the proper equipment, you can get the location of each vessel on your Chart Plotter, complete with range, bearing and even course information. This is a great way for you to keep tabs on your buddies on the water.

Share Location On The Sly

When your GPS is connected to your DSC-enabled VHF, you can easily - and quietly - share your location with your buddies who are out on the water. Using the DSC Polling function above, select your buddies' MMSI number and send them a direct message

Let's say we just caught a grouper and I saved my spot. I like to name it. I'll put a comment, what I caught the grouper on. So, now we have our spot. We have the name. What I caught the fish on and the length of the fish. And of course, the species. If I'd like to go to that spot later, I'll just hit goto and it's going to take me right there.

3. Follow the tides

TZtouch3 includes all your tide tables right in the unit. It's very easy to access your tides with the edge swipe. Swipe out, hit your tides, and it's going to call up your nearest tide station. You can see how strong the tide is going to be on the graph, and let me tell you what. This is very important whether you're navigating in shallow waters for the larger vessels or even fishing.

The fish definitely bite better on different tides and having this information right at your fingertips, not only will increase your catch, but if you're in a big yacht, it may even save you a lot of damage to your boat.

through your VHF radio. This will show up as a boat icon on your buddies' chart plotter, cluing them in to your location. This is handy if you're both trying to find fish, one of you is having better luck than the other, and you don't want to broadcast your sweet spot over open frequencies.

Fill In The Details

When creating new Waypoints, take the time to fill in all of the details, select an appropriate icon, and give it a descriptive name. This will make it easier for you to pick out the points you are looking for both in the Waypoint list and on the chart. When you are searching for a particular item in a list populated with hundreds of Waypoints, you'll be glad you did!

It's Okay To Be Alarmed

If you're not utilizing the alarms available on your Chart Plotter, then you're missing out on a great deal of functionality available right at your fingertips. Each of the alarms available to you can be customized to suit your needs. Here are some of the Alarm features that you can find on most Furuno Chart Plotters.

- **Anchor Alarm:** Informs you that your boat is moving when it should be at rest.
- **Arrival Alarm:** Informs you that your boat is approaching a destination Waypoint.

4. Protect your investment

I have 3,000 spots. Keeping them safe, that is number one. The pin code, I know those other boats aren't going to have that. I've been asking for years, like man, why doesn't somebody come out with that? I've seen it online, people complaining about it, and Furuno, home run. If someone were, to God forbid, steal the unit or try to enter it, there's no way they're going to get my personal information and all the spots I've worked so hard for. Even if they steal the unit, they still can't get my numbers. What you guys have done is 100 percent game changing and I'm happy to be running Furuno on all of my boats.

With Furuno, my points are finally safe.

- **Black Water Tank Alarm:** Warns you when the black water tank level goes higher than the specified percentage.
- **Depth Alarm:** Sounds when the depth is within the alarm range set.
- **Fuel Tank Alarm:** Warns you when the fuel level goes below the specified percentage.
- **Shear Alarm:** Sounds when the water temperature exceeds a set value.
- **Speed Alarm:** Tells you when the speed of your boat is above or below the range you have set.
- **Temperature Alarm:** Alerts you to changes in water temperature.
- **Trip Alarm:** Alerts you when you have traveled the distance set.
- **Water Tank Alarm:** Warns you when the water tank level goes below the specified percentage.
- **XTE Alarm:** Warns you when your boat is off its intended course.

Be Prepared!

Always have paper charts onboard and keep track of your position throughout every voyage. Remember that a single lightning strike or electrical problem can disable ALL of your electronics in an instant.

Every time you turn on your Chart Plotter, you may notice a warning message that reminds you that the use of any electronic device is an aid to navigation only, not a complete solution. Your Chart Plotter is only one tool in your toolbox, not the only tool, so it is incumbent upon the navigator to be prepared by keeping an analog record of the vessels location. Learning the basics of celestial navigation is highly recommended - especially if your voyage will take you beyond sight of land, in which case such knowledge is not only suggested, but vital.

Know Your Limits

Most Furuno Chart Plotters have a built-in odometer and trip meter that can tell you the distance traveled with each trip. This is useful not only to determine the distances you travel on every voyage, but you can use the odometer to accurately gauge your boat's fuel consumption.

Plan Ahead

When you're heading out on the water, be prepared. Know your route ahead of time. Plan out your routes in the days before your voyage, and be ready with a backup plan if needed.

Keep A Record

When your fishing an area and getting strikes, be sure to mark where you're getting the most action by saving the location to your Chart Plotter's memory. Furuno GPS Chart Plotters allow for ample storage space for points and marks - use them! You'll be glad you did when you start getting hookups in the same location you marked as successful on the last trip.

Invest Time In Your System

Having the latest and greatest electronics onboard is all but meaningless if you don't know how to use them. Spend the time to become very familiar with your electronics. Your Radar, your Fish Finder, your VHF/SSB, and your Chart Plotter are wonderful tools to keep you safe on the water and to make every trip as enjoyable and productive as possible. You don't want to spend your time on the water trying to figure out what that dot on your screen is and why it's getting closer. The only way to really know what you're looking at is to spend the time learning how to read your display. This is true not only for your Chart Plotter, with the wealth of information available to you on a single screen, but is equally true for your Radar and Fish Finder.

Go beyond the basics. Invest some time becoming familiar with the operation and interpretation of your electronics.

Be Prepared! We Mean It!

Did we mention this already? Well, we're saying it again. If you're not familiar with Celestial Navigation, sign yourself up for a class and learn to navigate without your electronics. *Practice it. Know it. Never lose sight of shore without this knowledge.*



PC Chart Plotting

The same advanced engine that drives NavNet TZtouch3 can be incorporated on your PC in a software package called Nobeltec TimeZero. Nobeltec TimeZero advances PC Chart Plotting to the next level, allowing you to navigate in ways never before possible. An eye-popping graphics engine, updated tool sets, and the ability to network with other Furuno equipment such as Radar, Fish Finders and AIS, not to mention included raster and vector charts for the entire U.S. coastline, make this one of the most powerful PC navigation package you can own.

Just as NavNet TZtouch3 runs in a full-time 3D environment, so does Nobeltec TimeZero. What you see on the screen is representative of what you are experiencing on the bridge of your vessel. You can switch from the traditional 2D view to the impressive 3D perspective at the click of a mouse, allowing you to scroll, pan, zoom in and zoom out with a smooth, fast and seamless graphics engine. Navigating in a fully 3D environment offers you a true perspective and wider area of view around the ship, which will allow you to better plan your routes, while TimeZero technology updates the information on your screen with virtually no redraw.

You can begin using Nobeltec TimeZero right out of the box with free, detailed raster and vector charts for the U.S. that are included. These high resolution charts are professional quality and cover the entire US Coast, including Alaska, Hawaii, Pacific Islands and Great lakes.

For enhanced charts both in the United States and worldwide, MapMedia offers a complete range of nautical charts called .mm3d. MapMedia .mm3d charts are available in Raster and/or Vector Chart formats.

If you have a NavNet TZtouch (any generation) or NavNet 3D network, any additional chart you purchase for Nobeltec TimeZero will also be unlocked on your NavNet system. This means you can plan your voyage on your PC from home and then navigate those routes from your helm, exactly as planned.

When you bring your PC onboard, Nobeltec TimeZero can connect to your NavNet TZtouch or NavNet 3D network right out of the box. You can have full control of your NavNet Radar and Chart Plotter system directly from your PC. Nobeltec TimeZero integrates seamlessly with NavNet via Ethernet connection.

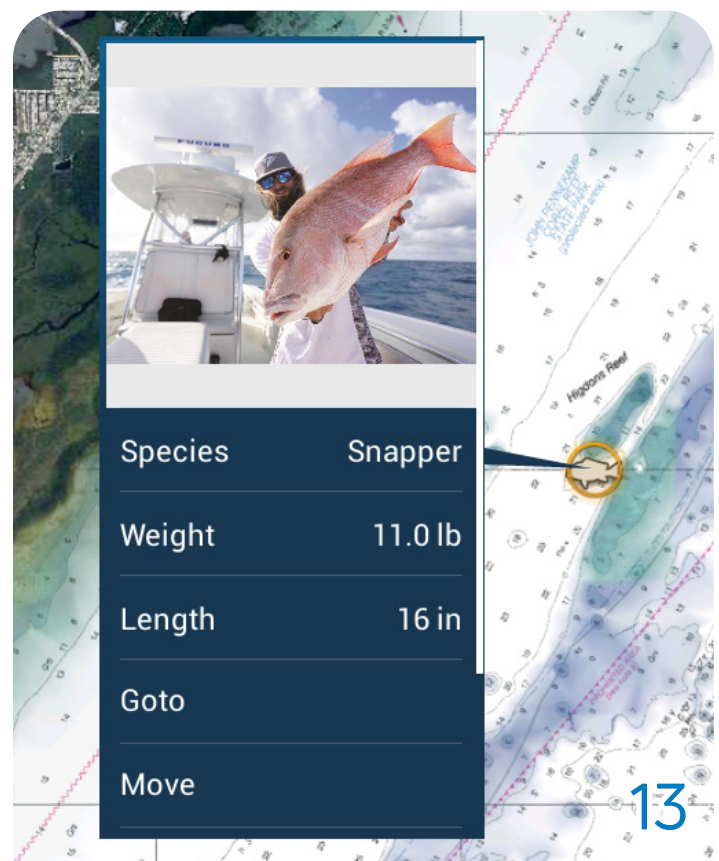
Once your software is registered at www.Nobeltec.com, you gain access to a variety of service and support areas, all free-of-charge. Personalized weather downloads, chart and software updates as well as practical tips, training and technical support are all available on-demand, 24 hours a day.

Smart Phone and Tablet Apps

NavNet's custom Viewer app allows you to bring up a variety of screens on your Tablet or Smart Phone, such as your Chart Plotter, Fish Finder, Radar, or a whole host of navigation data options. Taking the concept a step further, our Remote Controller app (for Tablets only) puts the power of your NavNet TZtouch system directly in your hand, allowing you to take full control of your system via WiFi.

TZ First Mate App

Wouldn't it be nice to make a note of what you caught and how big it was? TZtouch3 can do exactly that when you drop an event mark. Choose the species, enter length & weight, 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.



Legacy Products

Furuno has been producing Video/Chart Plotters for over thirty years. In that time we've sent a lot of different models out onto the water and we're happy to report that many of these legacy systems are still in use today. Furuno is proud to be among the *very* few manufacturers still able to service many of our legacy products. For example, there are thousands of vessels equipped with the older GP1650F/NT or GP1850F/NT combo units, happily leading their owners right back to their favorite strike zones time and again. There are, however, some limitations that owners of legacy products should be aware of.

Our products have evolved, and one of the problems owners of legacy products may encounter is updating their cartography. While your GP1850F or first-generation NavNet may be the workhorse you've come to rely on, the chart card format those systems use has become outdated, and it may be difficult to acquire updated charts for your unit. Consult your dealer for information on getting up-to-date charts for these older units.

NavNet

In 2001, Furuno introduced the world's first Ethernet-based onboard network with the very first iteration of NavNet. Two short years later, NavNet vx2 came on the scene, and this extremely reliable system has been in use ever since. Very few Chart Plotters have enjoyed the product lifespan of NavNet vx2, and it remains a viable, affordable option for many mariners to this day.

NavNet vx2 is the predecessor to NavNet 3D, TZtouch, TZtouch2, and TZtouch3. These updated systems add on many features, such as true 3D navigation, Satellite Photo Fusion and touch-screen operation.

It goes without saying that NavNet vx2 was not as powerful as later generations. For its time, though, NavNet vx2 was a truly groundbreaking system with an advanced set of options and rock-solid performance and reliability. The latest generation of NavNet, called TZtouch3, has again changed the landscape with the amount of new features available for your helm.

Here are just a few of the many new features that NavNet TZtouch3 delivers:

- Powerful quad-core processor for lightning-fast response time
- Built-in Side-Scan - 750' to port and starboard!
- Built-in Dual Channel 1kW TruEcho CHIRP™ & CW Fish Finder
- Built-in Raster and Vector charts for the entire US coastline, plus the ability to unlock the pre-installed C-Map, Navionics, and CMOR charts
- Easiest-to-use MFD on the market to use
- Edge-swipe and single-tap menu options
- Navigate in a 3D environment - perfect for planning and navigating routes
- FREE NavCenter worldwide weather downloads
- PIN CODE Lock feature keeps your data safe
- Base system is ready for you to add amazing X-Class or NXT Radar, plus Fish Finder options, AIS, Weather Fax, Satellite Weather, and more
- Create your routes at home using TZ Navigator, a web browser, or TZ iBoat iOS App, then download from the cloud to your TZtouch3 MFD
- Create events on your MFD and retrieve them at home - data is synchronized automatically & securely to My TimeZero
- TZ Cloud also stores photos, marks, routes, boundaries, and catch data
- Radar Overlay on chart
- Add the DFF3D Multi Beam Sonar to see fish and bottom structure 120° port-starboard for 650+ feet, and directly below for 1,000+ feet
- Create stunning shaded relief bottom charts with your DFF3D with PBG (Personal Bathymetric Generator)
- Backed by Furuno's legendary customer support and worldwide service



Chart Plotter Terminology:

AIS

Automatic Identification Systems. A compatible Chart Plotter equipped with appropriate receiving equipment can display the vessel name, position, course, speed and more from surrounding AIS-equipped vessels. AIS is not limited by line of sight, as Radar is, and can display the correct position of obstructed AIS targets.

Anchor Alarm

Monitors movement of own vessel at anchor. If position deviates by a preset distance, an Anchor Watch alarm is sounded.

ARPA

Automatic Radar Plotting Aid. A supplement to Radar for collision avoidance, ARPA calculates a tracked objects course, speed and closest point of approach (CPA), signaling if there is a danger of collision.

Chart Plotter

An electronic device capable of displaying the vessels actual position on an electronic chart when connected to a GPS Receiver.

DSC

Digital Selective Calling. A communication standard for sending pre-defined, digital messages using radio frequency. Requires connection to appropriate VHF Radio.

ECDIS

Electronic Chart Display and Information System. A sophisticated chart plotter that meets the rigorous maritime standards of the IMO and other governing bodies, such that the electronic charts are a legal, acceptable replacement for paper charts. Most Chart Plotters do not meet the standards to qualify as a true ECDIS.

EGNOS

European Geostationary Navigation Overlay Service. A Satellite-Based Augmentation System (SBAS) very similar to WAAS in North America. A geostationary satellite sends a coded signal that can be received and processed by EGNOS-enabled GPS systems to refine the accuracy of current position.

Fish Finder

Specialized sonar system used by fishermen to track water depth and locate fish. Some Fish Finders can also display water temperature and bottom composition, with appropriate sensors. A dual purpose Chart Plotter/Fish Finder is often referred to as a Combo Unit.

GMDSS

Global Maritime Distress Safety System. An internationally agreed-upon set of safety procedures, specific equipment, and communication protocols used to increase safety at sea and facilitate the rescue of distressed vessels.

GNSS

Global Navigation Satellite System. A general term for any one of the various satellite navigation systems around the world. GPS, Galileo and GLONASS are all examples of GNSS.

GPS

Global Positioning System. A satellite-based navigation system, maintained by the government of the United States of America, that provides position and time data to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. Position is given in Longitude/Latitude coordinate format.

GLONASS

GLobal NAVigation Satellite System. A Russian Satellite-Based Augmentation System (SBAS) very similar to WAAS in North America. A geostationary satellite sends a coded signal that can be received and processed by GLONASS-enabled GPS systems to refine the accuracy of current position.

IHO

International Hydrographic Organization. The International Hydrographic Organization is the inter-governmental organization representing the hydrographic community. It enjoys observer status at the United Nations where it is the recognized competent authority on hydrographic surveying and nautical charting. In nautical charting, it is generally IHO standards and specifications that are used.

IMO

International Maritime Organization. The IMO, headquartered in London, is a specialized agency of the United Nations. The IMO's primary purpose is to develop and maintain a comprehensive regulatory framework for shipping. The purview of the IMO includes safety and environmental concerns, legal matters, technical cooperation, maritime security and the efficiency of shipping.

Latitude

The geographic coordinate that specifies the North/South position of a given point on the Earth. Latitude ranges from 0 degrees at the equator to 90 degrees North or South at the Earth's poles.

Longitude

The geographic coordinate that specifies the East/West position of a given point on Earth. 0 degrees, called the Prime Meridian, runs through the Royal Observatory at Greenwich, England. Longitude of other places is measured as an angle east or west from the Prime Meridian.

LORAN

LONG RAnge Navigation was a terrestrial (land-based) radio navigation system, a precursor to modern GPS. LORAN utilized radio signals transmitted by fixed land beacons, with the LORAN receiver calculating its position by measuring the time from the signals transmission to its reception. LORAN is no longer in service.

Nautical Chart

A map representing a marine or water area and nearby coastlines. Nautical charts provide information on depth, sunken or semi-submerged obstacles, buoys, currents and ATN (Aids to Navigation). Some nautical charts may supply other information as well, such as refueling spots, marinas and harborages.

MOB (Man Overboard)

Man overboard is a situation in which a person has fallen from the boat into the water and is in need of rescue. Whoever sees the person's fall should shout "man overboard" to alert other crew members, and they should attempt to maintain visual contact with the person in the water. Pointing continuously at the victim can aid the helmsman in approaching the victim.

Most Furuno GPS Chart Plotters have a dedicated, instantly accessible Man Overboard (MOB) button on the front. This button should be pressed immediately when a Man Overboard alarm is raised, causing the Chart Plotter to record the latest known position of the person overboard. This allows the boat to return to the fallen person even if visual contact is lost.

MSAS

Multi-function Satellite Augmentation System. A Japanese-based Satellite Based Augmentation System (SBAS) very similar to WAAS. A geostationary satellite sends a coded signal that can be received and processed by MSAS-enabled GPS systems to refine the accuracy of current position.

NMEA

National Marine Electronics Association. The NMEA was founded in 1967 as a vehicle to strengthen the relationship between electronics manufacturers and their dealers. The NMEA has developed two uniform interface standard for digital data exchange between different marine electronic products, called NMEA0183 and NMEA2000. NMEA0183 uses a basic ASCII serial communication protocol. NMEA2000 is bit more complex, has higher data rate, and uses a binary message format instead of ASCII. NMEA-enabled devices may share information with each other across a data network. For example, your Fish Finder may utilize NMEA to send depth information to your Chart Plotter so that accurate, current depth information can be displayed on your Chart Plotter screen.

Radar

RADIO Detecting And Ranging. Radar uses reflected microwaves to measure and display the distance of objects around our vessel and their bearing relative to your position. No other piece of marine electronics can give you as much information about objects around your own ship as Radar.

Raster Chart/RNC

Raster Navigation Charts. A scanned image of a paper chart. Raster charts maintain the look and feel of a paper chart, complete with their limitations. For example, the text on a Raster chart will rotate as the chart is rotated, which may make it difficult to read.

Route

A Route is a series of two or more Waypoints strung together and navigated to in a specific order. The GPS operator navigates to the beginning Waypoint at the start of the Route, then to the next Waypoint in the Route, and so on until the destination is reached.

SART

Search and Rescue Transponder. A self-contained, waterproof radar transponder intended for emergency use at sea. The SART is used to locate a survival craft or distressed vessel by creating a series of dots on a rescuing ship's radar display. A SART will only respond to an X-band (3 cm wavelength) radar.

SiriusXM Weather

Comprehensive satellite weather information service from Sirius XM. XM Satellite Weather is a paid subscription service.

SOLAS

International Convention for the Safety Of Life at Sea. An international maritime treaty that ensures ships flagged with signatory nations comply with minimum safety standards in construction, equipment and operation. Regarded as the most important of all international treaties concerning the safety at sea.

SONAR

SOund Navigation And Ranging. Sonar uses sound propagation to navigate, detect underwater objects such as fish, reefs or wrecks, or to determine the nature and depth of the seafloor. SONAR is generally a term reserved for commercial-grade equipment. Also see Fish Finder.

Vector Charts/ENC/DNC

These electronic charts are configured and displayed on demand by your Chart Plotter from a library of stored data points. Vector images are created 'on-the-fly' by your Chart Plotter as you navigate.

WAAS

Wide Area Augmentation System. A North American Satellite Based Augmentation System (SBAS). WAAS was developed and implemented as an air navigation aid by the Federal Aviation Administration to augment the Global Positioning System (GPS), with the goal of improving accuracy, integrity, and availability. Essentially, WAAS is intended to enable aircraft to rely on GPS for all phases of flight, including precision approaches to any airport within its coverage area. WAAS works equally well for augmenting the position accuracy of both terrestrial and maritime GPS receivers.

Waypoint

In navigation terminology, a Waypoint is any location you create and save on the Chart Plotter display. A Waypoint can be a fishing spot, a reference point, or any other important location. You can use a Waypoint you have entered to set a destination, and a series of Waypoints can be strung together to create a Route.

XTE (Cross Track Error)

The Track between two Waypoints is always a straight line, and XTE, or Cross track error, is the distance the vessel is to either port or starboard of that line between the two waypoints. The XTE line for port side is red, and for starboard side it is green.

When the distance between two Waypoints is short, set XTE to a smaller number. For longer voyages with greater distance between Waypoints, increase the number for XTE to allow for shifts along the vessel's Track due to winds and tide.

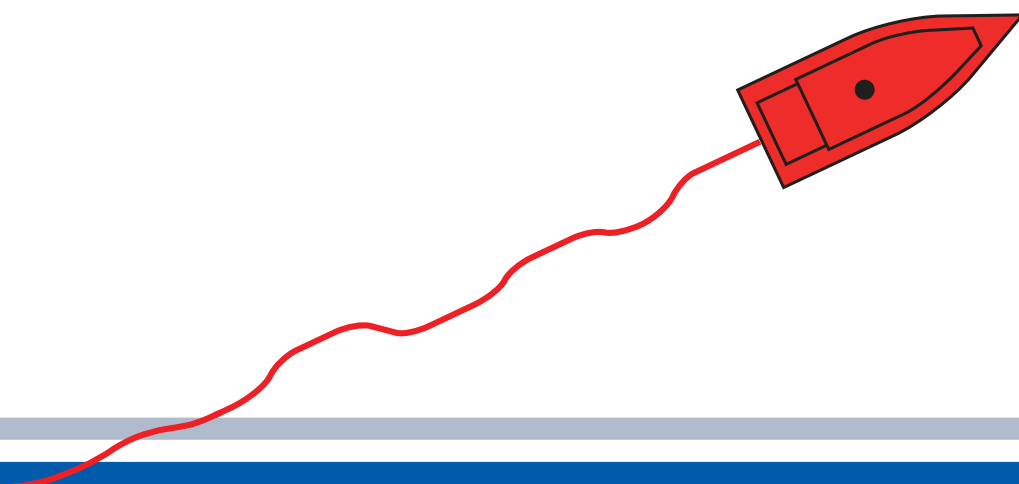


Chart Plotter FAQ's

We've gathered a list of some of the most frequently asked questions about Chart Plotters and provided the answers in this section. If you have a question that is not answered in this book, you can visit us on the web at www.FurunoUSA.com and click on the Support button. You can browse through answers to questions, or search for your answer by model, topic or keyword. If you can't find the answer you're looking for, you can ask the folks on our user forum. A knowledgeable technician will respond with your answer in a timely manner.

Q: What's the best chart card format for me to use, Navionics or C-Map?

A: Furuno has developed Chart Plotters to utilize a variety of chart formats. We realize that charting companies offer different levels of coverage and details in various areas. To ensure that you select the chart format that best suits your needs you should contact your local dealer or the chart company directly. Please verify which chart card formats your model utilizes before purchasing your charts. Also note, each chart card format will have various physical sizes depending on the model/manufacturer that it is designed for.

While we are no longer producing Furuno charts, you may view the coverage of the Furuno charts on our web site. Go to the "Previous Products" tab and click on "Chart Cards". The phone numbers for the other chart companies are listed below.

Contact Navionics: (800) 848-5896 or visit www.navionics.com

Contact C-MAP: (800) 424-2627 or visit www.c-map.com

Q: Are NavNet vx2 Charts compatible with NavNet 3D, TZtouch, TZtouch2, or TZtouch3?

A: No, however, NavNet 3D and the TZtouch series are preloaded with the entire U.S. NOAA Raster (RNC), Vector (S57-ENC), and Bathymetric Database. Free high resolution satellite photos are available for the USA coastline as well. The dealer or end user can download and install specific satellite photo areas on the internal hard drive.

In addition to the free MapMedia U.S. NOAA charts, optional MapMedia vector charts utilizing C-Map by Jeppesen and Datacore by Navionics data, that has been converted into MapMedia "MM3D" format, are available for purchase for a variety of areas around the world. For a complete list of available charts in raster or vector format, visit our web site at www.FurunoUSA.com, select NavNet 3D under the Products Menu, and then select Charts For NavNet 3D.

Note: All NavNet 3D chart data must originate from MapMedia in the "MM3D" format. C-Map and Navionics chips that are not in the "MM3D" format that are currently used in NavNet vx2 and other chart plotters will not work on NavNet 3D.

Q: How are charts installed in NavNet 3D?

A: Charts are installed on the system using SD-Cards. The Charts will be copied (transferred from the SD-Card to the internal memory) allowing you to install multiple areas at the same time. When the installation is done, the SD-Cards can be removed and stored safely for backup. On the MFDBB, charts can also be installed using a USB Jump Drive (available only with NavNet 3D software version 1.12 and above). For complete step by step instructions on how to install charts, you can view our NavNet 3D training videos by clicking on "Learning" on the top navigation of the website. Once the page is loaded, click on "NavNet 3D Training Videos."

Unlock codes are required for any chart that has been purchased. You should receive the unlock codes from the dealer when you purchase the chart.

Q: Can I directly load NOAA charts from the NOAA website?

A: No, not directly. NavNet 3D and NavNet TZtouch can only display MapMedia charts in MM3D format. For the USA, the MapMedia chart data comes from the NOAA BSB raster chart and S57 vector chart library. You are able to update your NavNet 3D charts for free using an SD Card and a PC connected to Internet (to download the charts). Updated information will be posted to registered users when new updates are available.

Q: What is the chart coverage for NavNet 3D and NavNet TZtouch outside the USA?

A: A complete NavNet 3D/NavNet TZtouch MM3D chart catalog is available on our website at www.FurunoUSA.com. You can find this catalog by selecting "NavNet 3D" or "NavNet TZtouch" from the Products menu and then selecting "Charts for NavNet 3D" or "Charts for NavNet TZtouch." From there, you can sort the charts by region. You can also view the entire chart catalog at www.MapMedia.com.

Q: Will the BBWGPS work with the GP1670/1870 series?

A: No, the GP1670/1870 plotter series utilizes an internal GPS antenna. There is also a connection on the GP1670 and GP1870 models to utilize an external GPA017, GPA018 or GPA019 GPS antenna, if desired.

Q: I need a GPA016 antenna. I understand it is no longer available. Can I use the GPA017 style instead?

A: Yes, the GPA016, GPA017, GPA017S and GPA017S/S antennas are interchangeable as long as the permanently attached 10-meter signal cable of the GPA017 is compatible with your installation requirements.

Q: My Furuno GPS navigator switches waypoints about .5 nm before arrival and sometimes skips waypoints in a route altogether. What could cause this?

A: Some Furuno GPS navigators have an arrival alarm function. The default setting for this feature is .5 nm range. The arrival alarm function serves two purposes:

- 1) An audible alarm sounds at waypoint arrival
- 2) At this time the unit switches to the next waypoint

This switch to the next waypoint occurs even if the audible alarm is turned off. Please check the arrival alarm range setting and adjust if necessary. Consult your operator's manual for alarm setting procedures.

Remember to account for typical speed and navigational hazards when selecting an arrival alarm range.

Q: Can I use my Loran TD waypoints in my Furuno GPS/Chart Plotter?

A: Yes. You can use your TD waypoints in your Furuno GPS/Chart Plotter. Please refer to the TD setup section in your operator's manual for proper configuration.

Q: How close can I mount my GPS/DGPS/WAAS sensor to my Radar dome?

A: The most important factor to consider is that the GPS antenna must not be in the Radar beam. Please refer to operator's/installation manual for safe distance information.

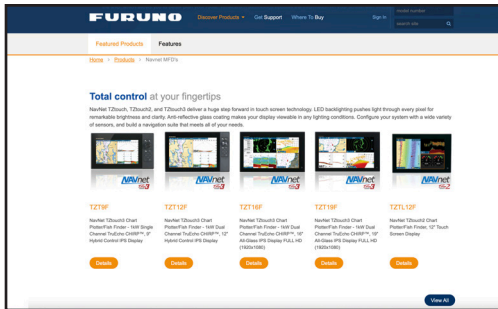
Q: Do I have to subscribe to a service to use my GPS, DGPS or WAAS receivers?

A: No, reception and use of GPS satellites, DGPS & WAAS signals are free.

Q: I have a non-Furuno WAAS GPS antenna installed on my boat. Can I use this antenna to provide GPS data to my NavNet 3D system?

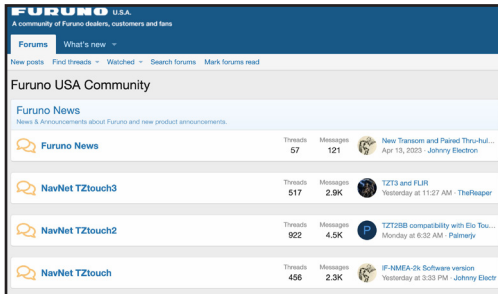
A: Yes, you may use a non-Furuno GPS or WAAS antenna, as long as it outputs the NMEA 0183 GLL, or GGA sentences for position information. You should be aware that, if your GPS does not provide the NMEA sentence "ZDA," Time and Date will not be displayed. Also, you will not be able to access Satellite Status information. Satellite Status information can only be displayed when using a Furuno GP330B or BBWGPS sensor. Please check with the GPS antenna manufacturer to determine what NMEA information your GPS antenna provides. NavNet TZtouch requires an NMEA2000 GPS connection.

Additional Resources:



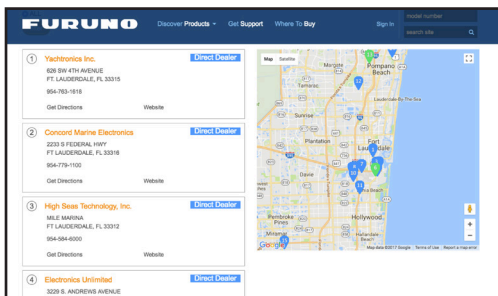
www.FurunoUSA.com

Visit our web site at www.FurunoUSA.com for information on the entire line of award-winning Furuno Chart Plotters. Browse through our catalog of Radars, Fish Finders, Sonar, and Communication products to round out your helm. Plus, you can register your Furuno products through our web portal.



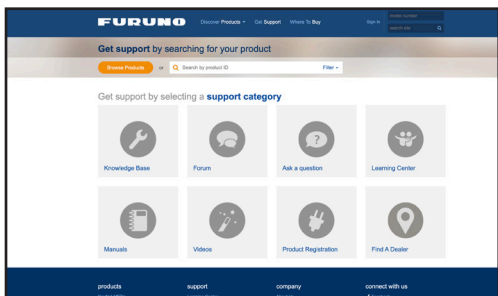
Furuno User Forum

The Furuno Forum on our web site at www.FurunoUSAForum.com is staffed by our knowledgeable Technical Support specialists. Here, you can ask questions and get answers about your Furuno products. Join our rapidly growing pool of knowledgeable Furuno users today!



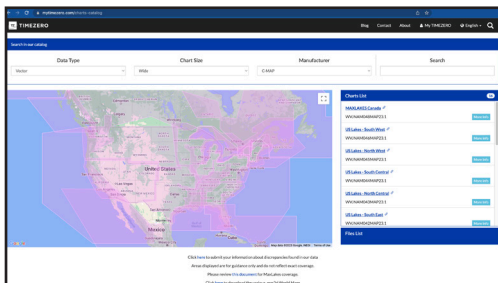
Authorized Furuno Dealers

Your local Furuno dealer is a valuable resource when it comes to answering specific questions about the electronics that are right for you. To find your nearest Furuno dealer, simply go to our web site at www.FurunoUSA.com and click on Where To Buy. Enter your zip code and you will receive a complete list of Furuno dealers in your



Furuno Support Center

Have a question that needs a quick answer? Click on support and browse through our extensive library of frequently asked questions.



www.MapMedia.com

MapMedia distributes all of the charts for NavNet 3D, TZtouch, TZtouch2, and TZtouch3. Our website at www.FurunoUSA.com will help you locate the charts you want, and the link we provide to download those charts will take you to MapMedia's site.

Lat/Lon Coordinate Formats:

There are three basic forms of a coordinate:

- Degrees, Minutes, Hundredths of a Minute N 24° 49.50', W 080° 30.50
- Degrees, Minutes, Seconds N 24° 49' 30", W 080° 49' 30"
- Degrees, Decimal Minutes (Furuno default format) N 24.825, W 080.508
-
- Note that these coordinates are all for the same position. Furuno GPS receivers, with the exception of the GP32 and GP37, are able to display position in all three forms of notation. Longitude degrees should always be notated with three numbers (for example: 080.508, not 80.508).

NOAA Charts are always notated in degrees, minutes and hundredths of a minute. National Geospatial Agency charts are generally notated in degrees, minutes and seconds. Degrees and decimal minutes are generally used for surveying.

Lat/Lon Format Conversion:

Here are the basic rules of Lat/Lon conversion:

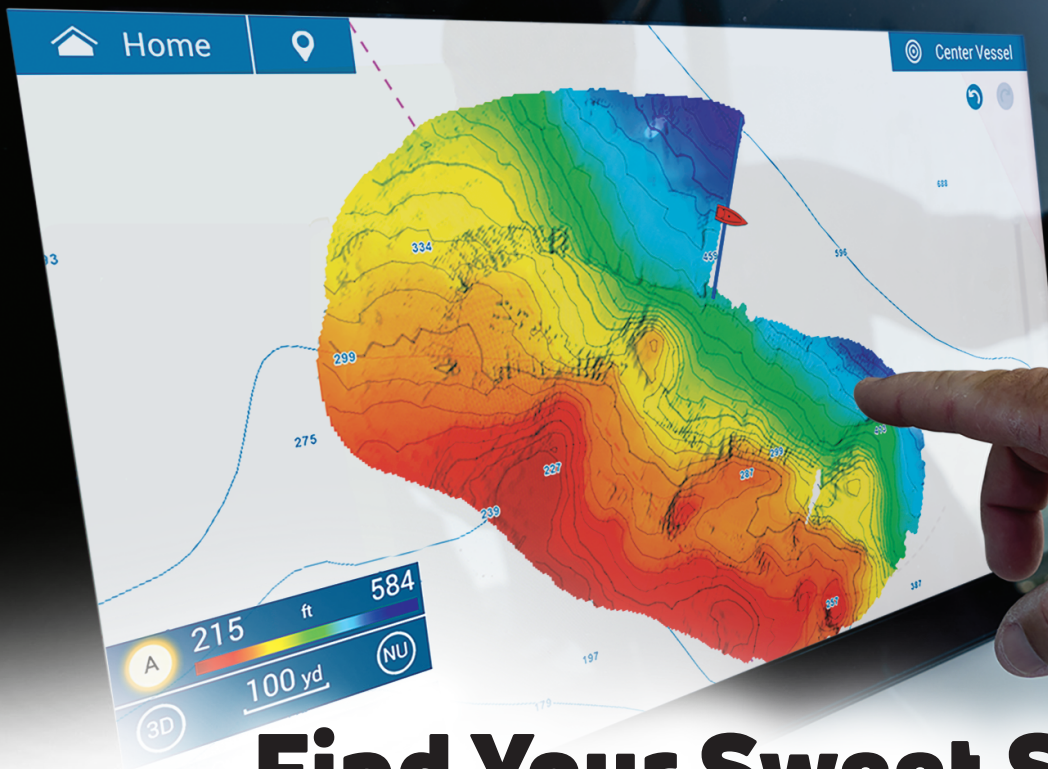
- 1 Nautical Mile = 6076 feet
- 1 Minute = 6076 feet
- 0.1 Minutes = 607.6 feet
- 0.01 Minutes = 60.76 feet
- 0.001 Minutes = 6.076 feet

To convert Seconds to hundredths, use the following formula: $\frac{100s}{60}$ where s = seconds.

To convert Seconds to thousandths, use the following formula: $\frac{1000s}{60}$ where s = seconds.

To convert hundredths to Seconds, use the following formula: $\frac{60h}{100}$ where h = hundredths.

To convert thousandths to Seconds, use the following formula: $\frac{60h}{1000}$ where h = hundredths.



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