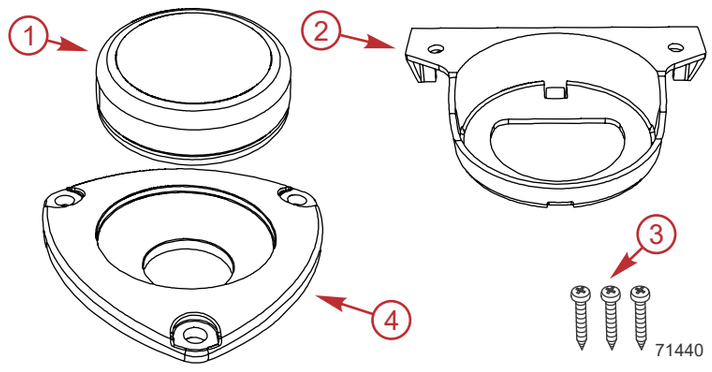
SMARTCRAFT/NMEA 2000 GPS

IMPORTANT: This document guides our dealers, boatbuilders, and company service personnel in the proper installation or service of our products. If you have not been trained in the recommended servicing or installation procedures for these or similar Mercury Marine products, have the work performed by an authorized Mercury Marine dealer technician. Improper installation or servicing of the Mercury product could result in damage to the product or personal injury to those installing or operating the product. Always refer to the appropriate Mercury Marine service manual for component removal and installation instructions.

NOTE: After completing installation, place these instructions with the product for the owner's future use.

Components Contained in Kit



Ref. No.	Qty.	Description
1	1	GPS sensor
2	1	Under helm bracket
3	2	Screws, wood #8 (5.4 mm (0.21 in.) x 13 mm (0.51 in.)
4	4	Deck mounted bracket

⚠ WARNING

Use of this GPS as a navigational source for any automatic pilot system where that system has control of the vessel heading, steering systems, trolling motors, or engines could result in serious injury or death from the loss of vessel control. These referenced automatic piloting systems include but are not limited to Mercury Marine joystick and electric steering systems in all configurations.

Certification

NMEA 2000 load equivalency number (LEN)	2
NMEA certification	Yes
Product name	Mercury SmartCraft/N2K GPS
Description	Mercury GNSS receiver for SmartCraft or N2K applications
Manufacturer code	144-Mercury Marine
Product code	27251
Class code	60-Navigation
Function code	145-Ownship position (GNSS)

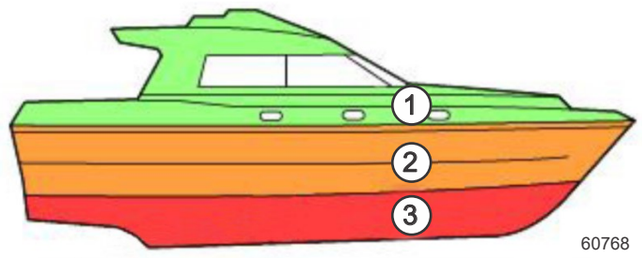
Mounting Requirements

IMPORTANT: The GPS sensor must be located a minimum of 91.44 cm (36 in.) away from any vessel electronic accessories, such as stereo amplifiers and high/low voltage switching devices that emit magnetic or electronic interference.

IMPORTANT: The GPS sensor connection is considered a drop-off of the CAN bus or NMEA network. Ensure that the installation of the GPS sensor does not exceed CAN bus length specifications.

IMPORTANT: The installation location must take into account the following requirements:

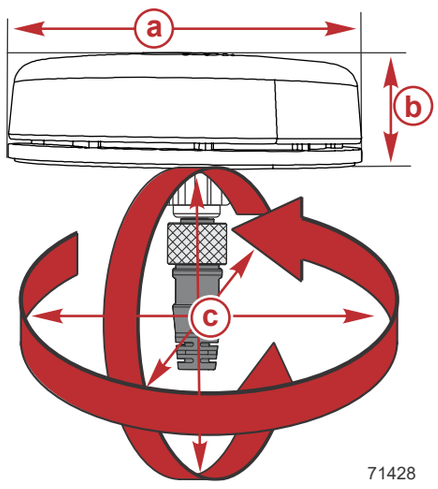
- **Elevation (above vs below deck)**—Although the GPS sensor antenna can be mounted above or below the deck, mounting above the deck will yield optimal performance.



Location	Location description
1	Mounted above deck with a clear unobstructed view of the sky in all directions. This location provides optimal GPS sensor performance.
2	Mounted below deck with only one level of fiberglass between the sky and the GPS sensor. A reduction in sensor performance will occur when mounted below deck.
3	This location is not recommended for the GPS sensor installation.

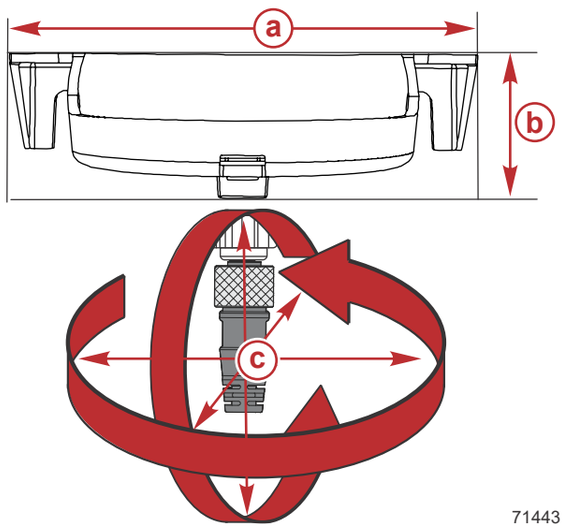
- **All Location Requirements**—Mount the GPS sensor in an area close to the vessel's center of gravity to reduce pitch and roll effects on position reporting. Install the GPS sensor a safe distance away from all hazards that could result in physical damages, excessive vibration, or excessive heat.
- **Electromagnetic Interference (EMI)**— Poor performance and loss of satellite signals will result from mounting the GPS sensor too close to strong sources of EMI. Observe the following installation requirements regarding EMI:
  - Mount the GPS sensor a minimum of 0.91 m (3 ft) from any engine(s).
  - Mount the GPS sensor a minimum of 0.91 m (3 ft) from any radio or radar antennas.
  - Do not mount the GPS sensor in the direct path of any radar antennas.
  - Do not mount the GPS sensor within .91 m (3 ft) of any electronic equipment that produces strong electro-magnetic fields such as: stereo amplifiers or 12-volt switching devices such as C-Zone components.
- **Vessel construction**—Do not mount the GPS sensor in locations where immediate surroundings of the boat structure contain large metallic or reflective material surfaces.
- **Prevailing conditions**—Calm and clear weather conditions provide optimal conditions for GPS sensor accuracy. Locations at extreme North or South latitudes may reduce the GPS satellite signal strength. GPS sensors that are mounted below deck will be more susceptible to performance issues when operating in sub-optimal conditions or locations.

GPS Sensor and Connector Clearance Dimensions



a - 60.7 mm (2.39 in.)
b - 18.5 mm (0.73 in.)
c - 76.2 mm (3 in.) connector clearance

Under Helm Bracket and Connector Clearance Dimensions



a - 102.5 mm (4.03 in.)
b - 32 mm (1.26 in.)
c - 76.2 mm (3 in.) connector clearance

Sensor Installation

GPS Sensor Mounting

IMPORTANT: Perform the installation only with the vessel at a complete standstill either on land or secured to a dock.

Deck Mounted Bracket

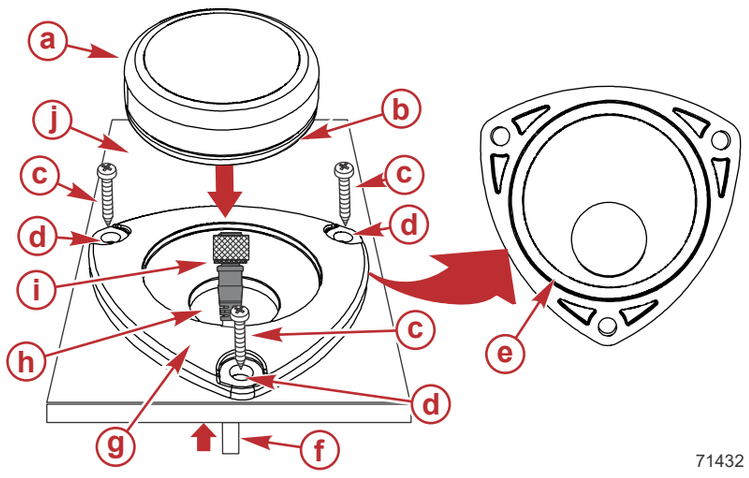
1. Using the dimensions from **GPS Sensor and Connector Clearance Dimensions**, choose a suitable location to mount the GPS sensor deck mounted bracket.
2. Using the deck mounted bracket as a template, mark the location for the NMEA 2000 harness pass-through hole on the deck and mark the location for the three screws on the deck.

   IMPORTANT: Do not drill through the deck mounted bracket.
3. Use a 22 mm hole saw or suitable cutting tool to remove the deck material for the NMEA 2000 harness pass-through hole.
4. Drill three pilot holes using a 3.18 mm (1/8 in.) drill bit for the #8 screws.
5. Apply a bead of weather-proof marine grade sealant to fill the sealant groove on the bottom of the deck mounted bracket.

6. Affix the deck mounted bracket to the deck surface while aligning the pass-through hole in the deck to the hole in the bracket. Simultaneously, align the screw holes in the bracket with the pre drilled pilot holes.

   IMPORTANT: Do not overtighten the three screws.

   NOTE: *Different deck materials may require the screws to be tightened to specific torque values.*
7. Install the deck mounted bracket on the deck with the three screws.
8. Remove any excess sealant that has pushed through to outside of the deck mounted bracket or inside of the hole in the deck.
9. Route the NMEA 2000 harness through the hole in the deck and deck mounted bracket.
10. Thread and tighten by hand the NMEA 2000 harness end onto the GPS NMEA receptacle, being careful not to cross-thread the fittings.
11. Locate and remove the paper covering on the adhesive ring located on the bottom of the GPS sensor.
12. Install the GPS sensor into the deck mounted bracket. Press firmly in multiple locations around the GPS sensor to ensure 360-degree contact between the adhesive ring and deck mounted bracket.



a - GPS sensor
b - Bottom of GPS sensor
c - Screw (3)
d - Hole in deck mounted bracket (3)
e - Groove
f - Cable
g - Deck mounted bracket
h - Hole in the deck
i - GPS NMEA cable end
j - Deck

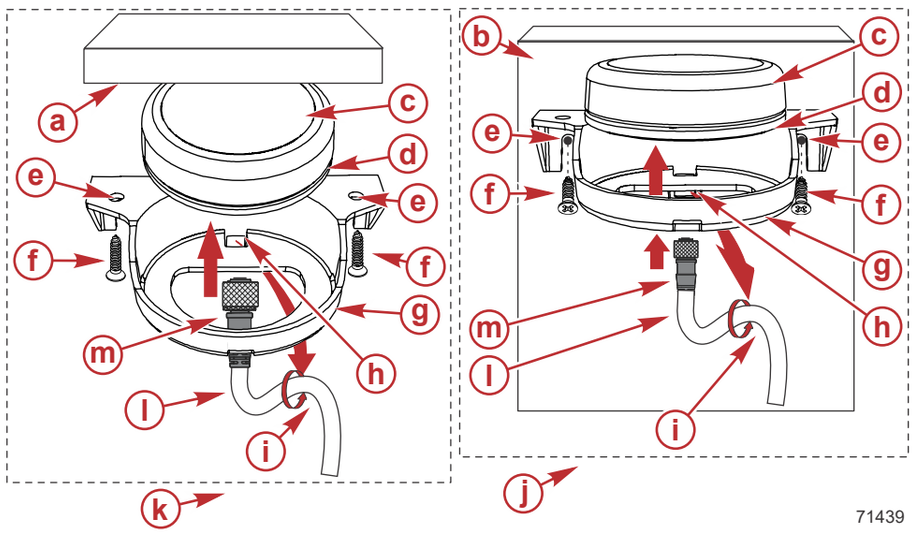
Under Helm or Bulkhead Mounting

1. Using the dimensions from **Under Helm Bracket and Connector Clearance Dimensions**, choose a suitable location to mount the GPS sensor under helm bracket.
2. Route the NMEA 2000 harness through the under helm bracket.
3. Thread and tighten by hand the NMEA 2000 harness end onto the GPS NMEA receptacle, being careful not to cross-thread the fittings.
4. Remove the paper covering on the adhesive ring located on the bottom of the GPS sensor.
5. Install the GPS sensor into the under helm bracket. Press firmly in multiple locations around the GPS sensor to ensure 360-degree contact between the adhesive ring and the under helm bracket.
6. Place the under helm bracket assembly flush against the underside of the helm or the bulkhead surface.

7. Mark and use a 3.18 mm (1/8 in.) drill bit to pre-drill the screw holes into the underside of the helm or the bulkhead surface.

   IMPORTANT: Do not overtighten the two screws.

   NOTE: *Different deck materials may require the screws to be tightened to specific torque values.*
8. Install the under helm bracket assembly under the helm or the bulkhead surface with the two screws.
9. Make a strain relief in the cable as shown below and attach the strain relief to the under helm bracket spur with a cable tie.

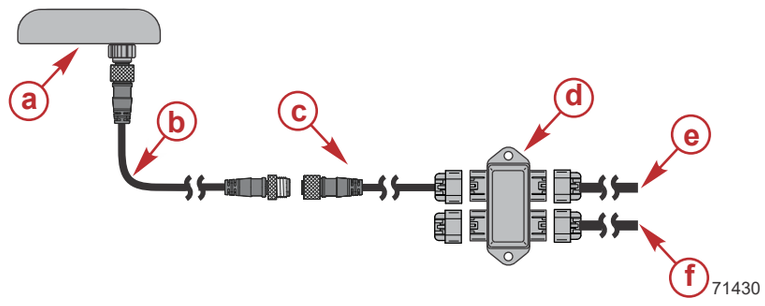


- **a -** Underside of helm surface
- **b -** Bulkhead
- **c -** GPS sensor
- **d -** Bottom of GPS sensor
- **e -** Under helm bracket screw hole (2)
- **f -** Screw (2)
- **g -** Under helm bracket
- **h -** Spur
- **i -** Strain relief
- **j -** Under helm mounting
- **k -** Bulkhead mounting
- **l -** NMEA 2000 harness
- **m -** NMEA 2000 harness end

GPS Sensor Connections

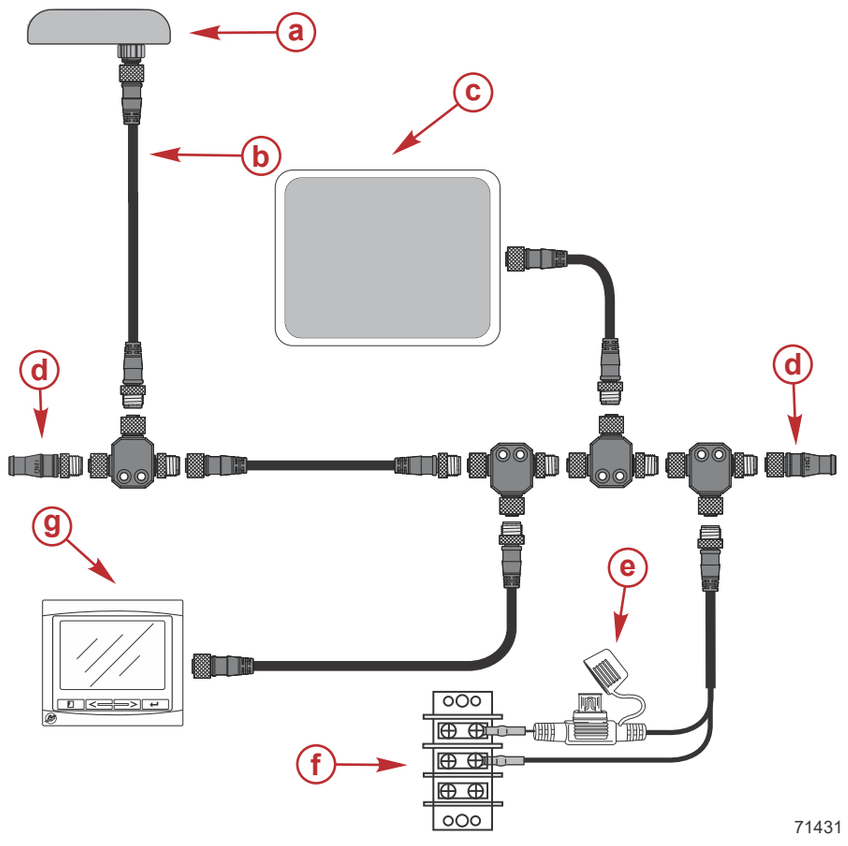
The GPS sensor is fully compatible with Mercury SmartCraft and NMEA 2000 communication networks. Refer to the following diagrams to properly connect the GPS sensor to the network.

GPS Sensor Connection—CAN P



- **a -** GPS sensor
- **b -** NMEA 2000 harness (optional)
- **c -** CAN P GPS sensor harness (sold separately)
- **d -** Junction box (J-box) 4-way shown
- **e -** SmartCraft gauge or device
- **f -** Helm harness

GPS Sensor Connection—NMEA 2000



- **a -** GPS sensor
- **b -** NMEA 2000 harness
- **c -** Chartplotter
- **d -** 120-ohm termination resistor, 1 male and 1 female
- **e -** NMEA 2000 fused power source
- **f -** Accessory power relay terminal bus
- **g -** SmartCraft multifunction device

Verification

GPS Speedometer

Using a NMEA 2000 multifunction display (MFD), locate the network device list and verify that the GPS sensor is on the list of devices. Refer to the MFD's operation manual to locate the network data screen.

Mercury Marine MFD or SmartCraft Gauge

1. Using a Mercury Marine multifunction display (MFD), locate the network device list and verify that the GPS sensor is on the list of devices. Refer to the MFD's operation manual to locate the network data screen.
2. For the System Tachometer, System Speedometer, MercMonitor, or other SmartCraft capable gauges refer to the applicable operation manual to correctly source the GPS sensor. Test operations.

Mercury Marine Active Trim Feature

Test and verify the functionality of the Active Trim. The GPS sensor should automatically connect to Active Trim controller.

NMEA 2000 PGN Information

Data PGNs	Data
59904	ISO Request
60160	ISO transport protocol
60416	ISO transport protocol
60928	ISO address claim
126464	PGN List
126992	System time
126993	Heartbeat
126996	Product information
126998	Configuration information
129025	Position, rapid update
129026	COG and SOG, rapid update
129029	GNSS position data
129539	GNSS DOPs
129540	GNSS sats in view

GPS Sourcing In MFD

For Heyday, Bravo Four S®, Smart Tow and other applications using CAN P GPS, the VesselView must be setup to look for GPS information on CAN P. This can be setup either in the Mercury menu vessel speed source selection or through the Mercury setup wizard.

- To select the source without going through the setup wizard, in the Mercury menu select **Vessel** and then select **Speed Source**. Under **GPS Source** ensure that **SmartCraft (CAN P)** is selected.
- To select the source using the Mercury setup wizard, in the **Device Configuration** screen, under **Speed Setup** and **GPS Source**, ensure that **SmartCraft (CAN P)** is selected. Continue through the setup wizard and exit to save changes.

To diagnose functionality issues, check the MFD source selection menu and ensure that the Mercury SmartCraft Gateway is selected as the source for position data. This can be found by navigating to **Settings -> Network -> Sources -> Position**. **VVL SmartCraft Gateway** must be selected to use a SmartCraft GPS source.

For continued diagnostics, go to the **Advanced source** selection to ensure that GPS data is sourced from the SmartCraft Gateway. The **Advanced source** selection can be found by scrolling to the bottom of the source selection menu then selecting **GPS**.

NOTE: *If the user chooses to use the Auto Selection feature of the MFD, they must first ensure that all desired data sources are powered on and transmitting data. In the case of the GPS, it must be powered on and in a suitable location to receive GPS signals. This typically means ensuring that the GPS unit has a clear view of the sky and is mounted away from other electronic devices, wiring and cabling, metals and dense materials.*

Auto select can be double checked by looking at the above mentioned locations in the MFD menus to ensure that the SmartCraft Gateway was selected as the data source and that the desired CAN bus (P or H) is chosen.

This GPS unit may not support SmartCraft messaging for satellite ephemeris data. Some GPS units will populate the satellite page in the MFD while others do not. This means that the MFDs satellites page may appear empty, or provide inaccurate time and date information. This VesselView or MFD satellite page is not helpful in diagnosing a loss of Smart Tow or GPS related data losses.

To check that SmartCraft GPS information is present on the CAN bus:

Navigate to **Settings -> Network -> Device List -> SmartCraft Gateway -> Data**.

If the SmartCraft GPS data is present it means that the GPS is available. Data items like **Course Over Ground** and **Speed Over Ground** will appear in the list. If the GPS has not acquired a signal these data items will not be in the list.

Products of Mercury Marine
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