OWNER'S GUIDE & INSTALLATION INSTRUCTIONS

Thru-Hull, NMEA 0183

High-Precision Temperature

Model **T42**

Data
Converter

T42

WARNING: Always wear safety goggles and a dust mask when installing to avoid personal injury.

WARNING: The power must be OFF before wiring if the instrument is already connected to a power source to avoid personal injury or death.

WARNING: The power supply voltage must be 12 VDC. Any other voltage may damage the sensor and/or result in fire, causing damage to the boat, personal injury, and/or death.

WARNING: A safe installation requires a 0.5 amp fast-blow fuse or circuit breaker. Failure to do so may result in fire, causing damage to the boat, personal injury, and/or death.

WARNING: Immediately check for leaks when the boat is placed in the water. Do not leave the boat unchecked for more than three hours. Even a small leak can allow considerable water to accumulate.

CAUTION: Never install a metal sensor on a vessel with a positive ground system.

CAUTION: Never install a bronze sensor in a metal hull because electrolytic corrosion will occur.

CAUTION: Never pull, carry, or hold the sensor by its cable; this may sever internal connections.

CAUTION: Never use solvents. Cleaners, fuel, sealants, paint, and other products may contain strong solvents, such as acetone, which attack many plastics, greatly reducing their strength.

IMPORTANT: Read the instructions completely before proceeding with the installation. These instructions supersede any other instructions in your instrument manual if they differ.
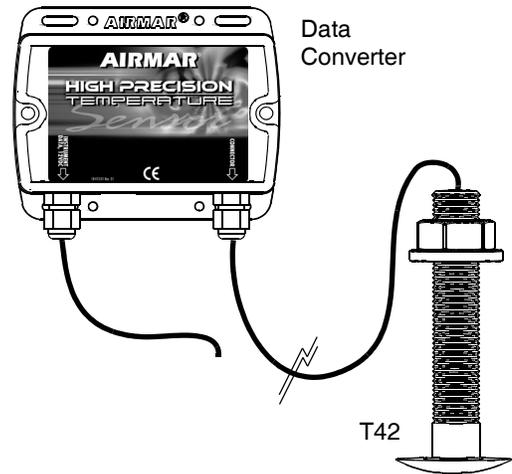
Applications

- Bronze sensor recommended for fiberglass or wood hull only.
- The hull must be a minimum of 8 mm (5/16") thick at the mounting location.

Mounting Location

Choose a location where the temperature sensor will be in contact with the water at all times.

Tools & Materials

Safety goggles
Dust mask
Electric drill
Drill bits: 3 mm *or* 1/8"
                        21 mm *or* 7/8"
Sandpaper
Mild household detergent *or* weak solvent (alcohol)
Marine sealant (suitable for below waterline)
Slip-joint pliers
Installation in a cored fiberglass hull (see page 2)
    Hole saw for hull interior: 30 mm *or* 1-1/4"
    Cylinder, wax, tape, and casting epoxy
Pencil
Grommet(s) (some installations)
Cutting pliers
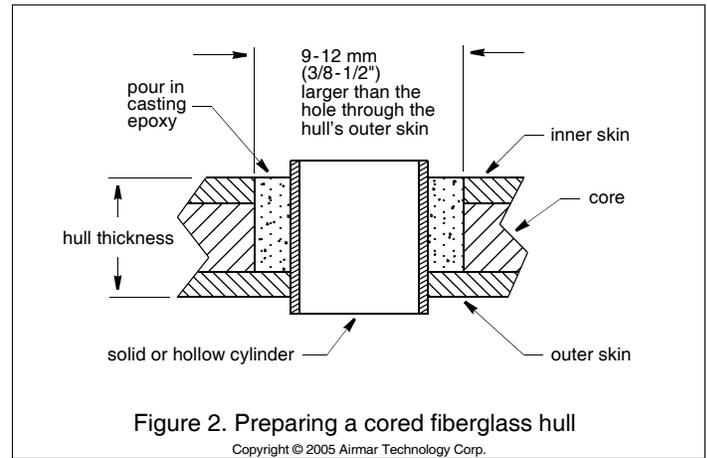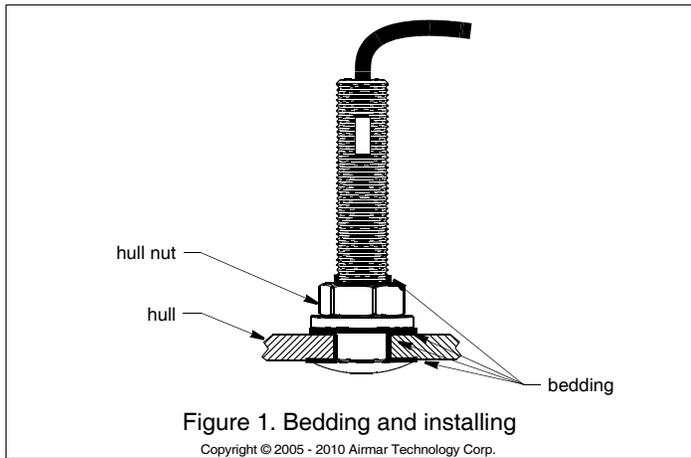Wire strippers
Heat-shrink tubing
Heat gun
Phillips screwdriver
Alcohol
Blade screwdrivers
Water-based anti-fouling paint (**mandatory in salt water**)

Figure 1. Bedding and installing
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Figure 2. Preparing a cored fiberglass hull
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Sensor Installation

Hole Drilling

Cored fiberglass hull—*Follow separate instructions on page 2.*

1. Drill a 3mm or 1/8" pilot hole from inside the hull. If there is a rib, strut, or other hull irregularity near the selected mounting location, drill from the outside.

2. Using the 21mm or 7/8" drill bit, cut a hole perpendicular to the hull from outside the boat.

3. Sand and clean the area around the hole, inside and outside, to ensure that the marine sealant will adhere properly to the hull. If there is any petroleum residue inside the hull, remove it with either mild household detergent or a weak solvent (alcohol) before sanding.

Bedding

CAUTION: Be sure all surfaces to be bedded are clean and dry.

1. Remove the hull nut (see Figure 1).

2. Apply a 2mm (1/16") thick layer of marine sealant around the flange of the sensor that will contact the hull and up the stem. The sealant must extend 6mm (1/4") higher than the combined thickness of the hull and the hull nut. This will ensure that there is marine sealant in the threads to seal the hull and hold the hull nut securely in place.

3. Apply a 2mm (1/16") thick layer of marine sealant to the flange of the hull nut that will contact the hull.

Installing

1. From outside the hull, thread the cable through the mounting hole.

2. Push the sensor into the mounting hole using a twisting motion to squeeze out excess marine sealant (see Figure 1).

3. From inside the hull, slide the hull nut onto the cable. Screw the hull nut in place. Tighten it with slip-joint pliers.
   Cored fiberglass hull—Do not over tighten, crushing the hull.
   Wood hull—Allow for the wood to swell before tightening.

4. Remove any excess marine sealant on the outside of the hull to ensure smooth water flow over the sensor.

Checking for Leaks

When the boat is placed in the water, **immediately** check around the thru-hull sensor for leaks. Note that very small leaks may not be readily observed. Do not to leave the boat in the water for more than 3 hours before checking it again. If there is a small leak, there may be considerable bilge water accumulation after 24 hours. If a leak is observed, repeat "Bedding" and "Installing" **immediately** (see page 2).

Installation in a Cored Fiberglass Hull

The core (wood or foam) must be cut and sealed carefully. The core must be protected from water seepage, and the hull must be reinforced to prevent it from crushing under the hull nut allowing the sensor to become loose.

CAUTION: Completely seal the hull to prevent water seepage into the core.

1. Drill a 3mm or 1/8" pilot hole from inside the hull. If there is a rib, strut, or other hull irregularity near the selected mounting location, drill from the outside. (If the hole is drilled in the wrong location, drill a second hole in a better location. Apply masking tape to the outside of the hull over the incorrect hole and fill it with epoxy.)

2. Using the 21mm or 7/8" drill bit, cut a hole from outside the hull through the *outer* skin only (see Figure 2).

3. From inside the hull using the 30mm or 1-1/4" hole saw, cut through the *inner* skin and most of the core. The core material can be very soft. Apply only light pressure to the hole saw after cutting through the inner skin to avoid accidentally cutting the *outer* skin.

4. Remove the plug of core material so the *inside* of the outer skin and the inner core of the hull is fully exposed. Clean and sand the inner skin, core, and the outer skin around the hole.

5. Coat a hollow or solid cylinder of the correct diameter with wax and tape it in place. Fill the gap between the cylinder and hull with casting epoxy. After the epoxy has set, remove the cylinder.

6. Sand and clean the area around the hole, inside and outside, to ensure that the sealant will adhere properly to the hull. If there is any petroleum residue inside the hull, remove it with either mild household detergent or a weak solvent (alcohol) before sanding.

7. Proceed with "Bedding" and "Installing" (see page 2).

Connecting

Guidelines

CAUTION: To reduce electrical interference from other electrical wiring and any on-board equipment with strong magnetic fields such as radar equipment, radio transmitters, boat engines, generators, etc., separate the cables by at least 1m (3').
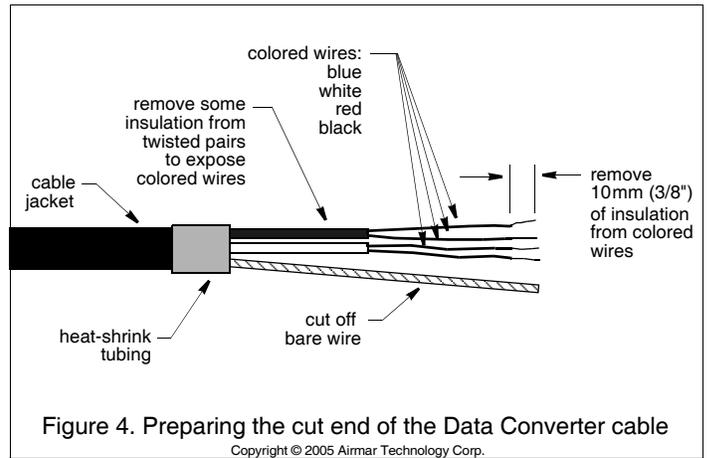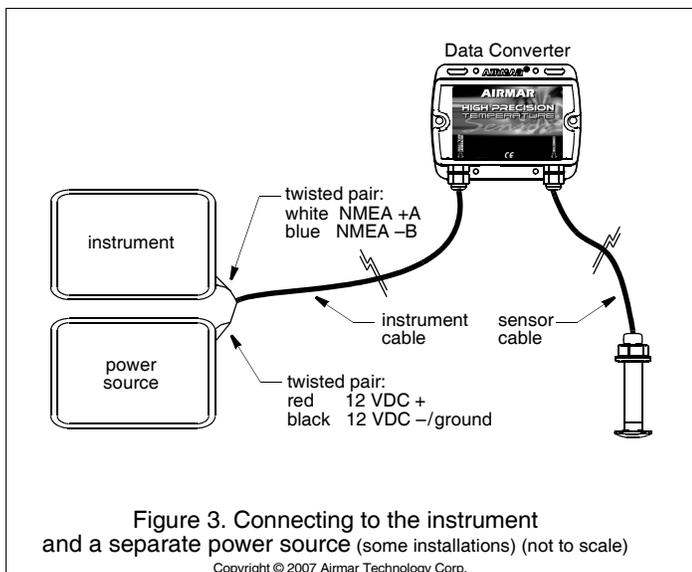
CAUTION: Be careful not to tear the cable jackets when passing them through the bulkhead(s) and other parts of the boat. Use grommet(s) to prevent chafing.

CAUTION: Make power connections to a 12 VDC power source that is isolated from the engine start battery(s). Voltage drops may cause the instrument/receiver/sensor to lose information and/or change operating mode.

CAUTION: Use a multimeter to check the polarity and the connections to the power supply before applying power to the sensor.

Locating the Data Converter & Routing the Cables

1. Select a convenient dry mounting location for the water-resistant Data Converter. Locate it a minimum of 1m (3') away from the display (see Figure 3). Position the converter so the bushings are easily accessible. If the Data Converter will be mounted on a vertical surface, be sure the bushings are facing downward to avoid water seeping into the box.

2. Hold the Data Converter at the selected location and mark the holes for the screws. *Do not fasten it in place at this time*.

3. Route the sensor cable from the temperature sensor to the Data Converter. *Do not fasten the cable in place at this time*.

4. Route the Data Converter cable from the Data Converter to the instrument (and power source on some installations). *Do not fasten the cable in place at this time.*

Figure 3. Connecting to the instrument and a separate power source (some installations) (not to scale)
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Figure 4. Preparing the cut end of the Data Converter cable
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Wiring the Instrument & Power Source

Some installations will connect to the power source within the instrument. Other installations require wiring to a separate power source located near the instrument.

1. If the instrument is connected to a power source, be sure the power is OFF before proceeding.

2. Allowing an extra 25 cm (10") for wiring ease, cut the instrument cable to length.

3. If the power source is separate from the instrument, strip the cable jacket and expose the two twisted pairs of wires (see Figure 4). Strip the outer insulation from each pair.

4. Strip 10mm (3/8") of insulation from each of the four colored wires making up the pairs.

5. Cut off the bare wire flush with the cable jacket.

6. Protect the cable's foil shielding from causing a short by using heat-shrink tubing around the jacket where the wires emerge from the cable. Be sure the tubing overlaps the wires a minimum of 6mm (1/4").

7. Connect the wires to the instrument following the instructions in your owner's manual (see Figure 3). Use the color code below:

   White   NMEA + A

   Blue   NMEA – B

8. Connect to the power supply. It will either be within the instrument or a separate power source. Use the color code below:

   Red   12 VDC +
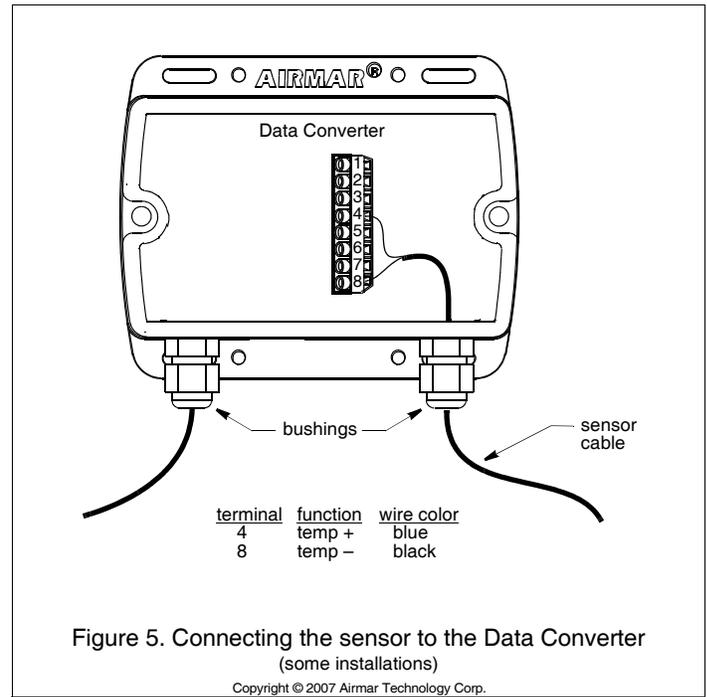
   Black   12 VDC –/ground

3

Connecting the Sensor to the Data Converter

If your sensor came with a connector, plug it into the Data Converter. If your sensor does not have a connector, follow the instructions below.

1. Allowing an extra 25 cm (10") for wiring ease, cut the sensor cable to length.

2. Remove the cover of the Data Converter. Peel the tape away from the inside and set the screws aside.

3. Push approximately 200 mm (8") of the sensor cable through the bushing of the Data Converter (see Figure 5). To ease sliding, apply alcohol to the cable jacket.

4. Strip 60 mm (2-1/2") of the outer jacket and foil shielding from the cut end.

5. Strip 10 mm (3/8") of conductor insulation from the end of each colored wire.

6. Cut off the bare wire flush with the cable jacket.

7. Protect the cable's foil shielding from causing a short by using heat-shrink tubing around the jacket where the wires emerge from the cable. The tubing must overlap the wires a minimum of 6 mm (1/4").

8. From outside the Data Converter, carefully pull the sensor cable until only 13 mm (1/2") of the cable jacket remains inside the box.

9. Connect each colored wire in turn to its corresponding terminal on the terminal block (see Figure 5). Following the color code listed on the inside of the Data Converter cover, insert the stripped end of the wire into the hole in the terminal and tighten the screw using a small blade screwdriver. *Be sure the stripped end of the wire is inserted up to its insulation only*. Do not include any insulation inside the terminal. Gently tug on the wire to ensure that it is securely fastened. Repeat this process until all the wires are connected.

10. Arrange the wires neatly inside the Data Converter, being sure that no bare wires are touching.

11. Hand tighten the nut on the bushing to make a water-resistant seal.

12. Reattach the Data Converter cover with the screws supplied.

Completing the Installation

1. Using a 3mm or 1/8" drill bit, drill the holes for the screws at the selected Data Converter mounting location.

2. Fasten the Data Converter using the four screws supplied.

3. Fasten all the cables in place.

terminal	function	wire color
4	temp +	blue
8	temp –	black

Figure 5. Connecting the sensor to the Data Converter
(some installations)
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Maintenance & Replacement

Aquatic growth can accumulate rapidly on the sensor's surface reducing its performance within weeks. Clean the surface with a Scotch-Brite® scour pad and mild household detergent taking care to avoid making scratches. If the fouling is severe, lightly wet sand with fine grade wet/dry paper.

Anti-fouling Paint

Surfaces exposed to salt water must be coated with anti-fouling paint. *Use water-based anti-fouling paint only*. Never use ketone-based paint since ketones can attack many plastics possibly damaging the sensor. Reapply anti-fouling paint every 6 months or at the beginning of each boating season.

Replacement Sensor & Parts

The information needed to order a replacement sensor is printed on the cable tag. Do not remove this tag. When ordering, specify the part number and date. For convenient reference, record this information at the top of page one.

Lost, broken, or worn parts should be replaced immediately.

Hull nut   02-031-3

Obtain parts from your instrument manufacturer or marine dealer.

Gemeco	Tel:	803-693-0777
(USA)	Fax:	803-693-0477
	email:	sales@gemeco.com
Airmar EMEA	Tel:	+33.(0)2.23.52.06.48
(Europe, Middle East, Africa)	Fax:	+33.(0)2.23.52.06.49
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