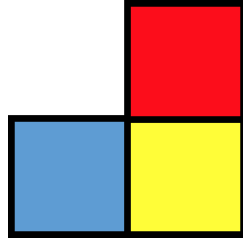


TCM-122 Thruster Control Module

Quick Start Guide



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Warnings / Cautions

WARNING: Before installing or troubleshooting any part of a bow / stern thruster system, locate the main battery switch that disconnects the thruster from all power sources (batteries) and ensure the thruster system is de-energized.

WARNING: The TCM-122 thruster control module is NOT an ignition protected device. It must not be installed in compartments or spaces requiring ignition protected electrical equipment.

WARNING: Never operate thrusters in close proximity to persons, animals or objects in the water. Serious injury or damage will occur if persons, animals or objects come in contact with rotating propellers.

WARNING: Do not operate the thruster unless the thruster propeller is submerged in water. Operating the thruster without mechanical resistance will allow it to spin up to dangerous RPM levels.

CAUTION: Thrusters are designed for short duration / intermittent use while docking or maneuvering. Thrusters can be operated continuously only for several minutes before overheating. Most thruster motors have a built-in thermal switch that will shut off the thruster motor ONLY IF the thermal switch is properly connected to the TCM-122 Thruster Control Module.

CAUTION: The thermal shut down feature described above can be disabled on the TCM-122 if your thruster motor is not equipped with a thermal shut-off switch. If the thermal shut off feature is disabled be sure to run the thruster motor ONLY for short periods. Overheating will cause serious damage to the motor windings.

CAUTION: The TCM-122 Thruster Control Module will protect the thruster motor against sudden reversal. The thruster can be used repeatedly to “bump” the boat in one direction, but a delay of several seconds will elapse to allow the thruster motor to coast to a stop before it can be operated in the reverse direction. Be sure to keep this in mind when using bow / stern thrusters to maneuver the boat.

CAUTION: Some thruster installations have controls in more than one location. Ensure only one directional control switch is used at the same time. If conflicting inputs are received simultaneously by the TCM-122, the thruster will not operate

CAUTION: If the thruster stops giving thrust while the thruster motor is running, there is possibly a problem in the drive system. You must immediately stop running the thruster and turn it off. Running the thruster motor for more than a few seconds without resistance from the propeller can cause serious damage.

WARNING: In addition to this manual, read and familiarize yourself with the Operating and Installation manuals for your thruster system. Be sure to comply with ALL WARNINGS and CAUTIONS that are applicable to your thruster system.

1 Introduction

This manual provides installation instructions for the TCM-122 thruster control module along with basic troubleshooting information. The TCM-122 control module is an aftermarket product that is compatible with Volvo Penta QL® BP-series bow and stern thrusters. It is a compatible replacement for P/N 41100658.

WARNING: The TCM-122 thruster control module is NOT an ignition protected device. It MUST NOT be installed in compartments requiring ignition protection.

1.1 Product Specifications:

Nominal operating voltage:	12/24 VDC
Dimensions:	138mm x 64mm x 29mm
Connector:	10-pin screw terminal (pluggable)
Directional Control Input:	SPDT switch between Switch Common and Port or Stbd Command
Directional Control Output:	V _{batt} and GND (reversible)
Over-Temp Protection:	Yes
Ignition protection:	<u>NO</u>

1.2 LED Indicators

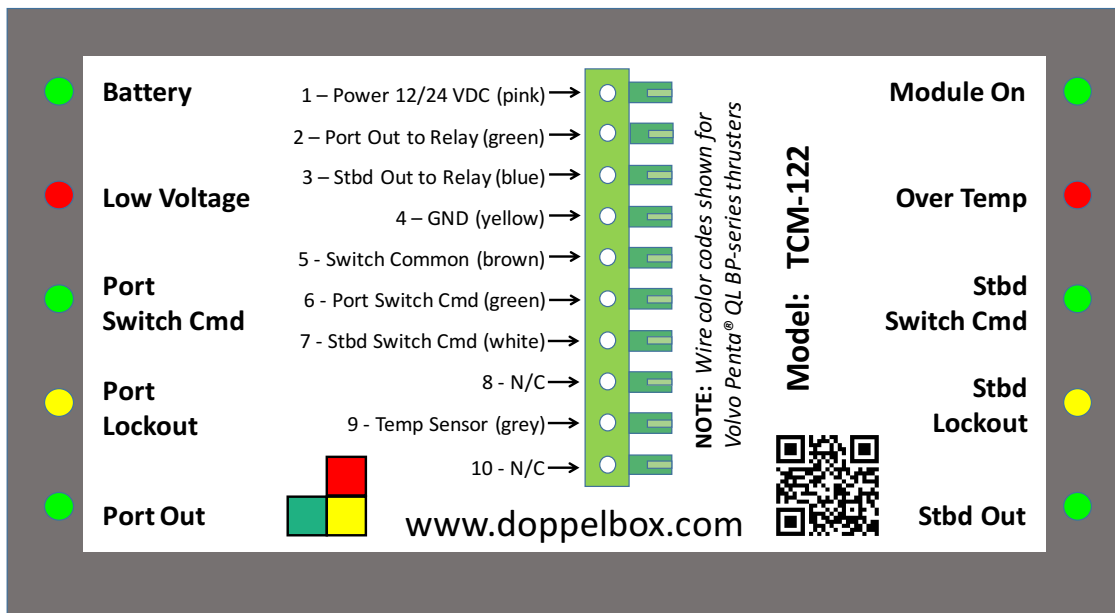


Figure 1.2-1 Front View of TCM-122 Includes LEDs and Terminal Pin Descriptions

The TCM-122 features several LEDs to aid in installation and troubleshooting:

Battery:	Indicates module is connected to 12/24 VDC
Module On:	Module powered ON
Low Voltage:	Low battery voltage condition is detected
High Temp:	Thruster motor over-temperature condition is detected
Port Cmd:	Module is receiving PORT directional command from Directional Control Switch/Joystick
Stbd Cmd:	Module is receiving STARBOARD directional command from Directional Control Switch/Joystick
Port Lockout:	Thruster operation in PORT direction momentarily disabled
Stbd Lockout:	Thruster operation in STARBOARD direction momentarily disabled
Port Out:	Module sending signal to thruster to operate in PORT direction
Stbd Out:	Module sending signal to thruster to operate in STBD direction

NOTE: Further details on LED indicators are provided in the Installation and Troubleshooting sections below.

2 Installation

These instructions describe installation on a vessel equipped with a Volvo Penta® QL BP-series bow or SP-series stern thruster. The TCM-122 Thruster Control Module is equipped with LEDs to facilitate proper installation and troubleshooting as shown in Figure 2-1.

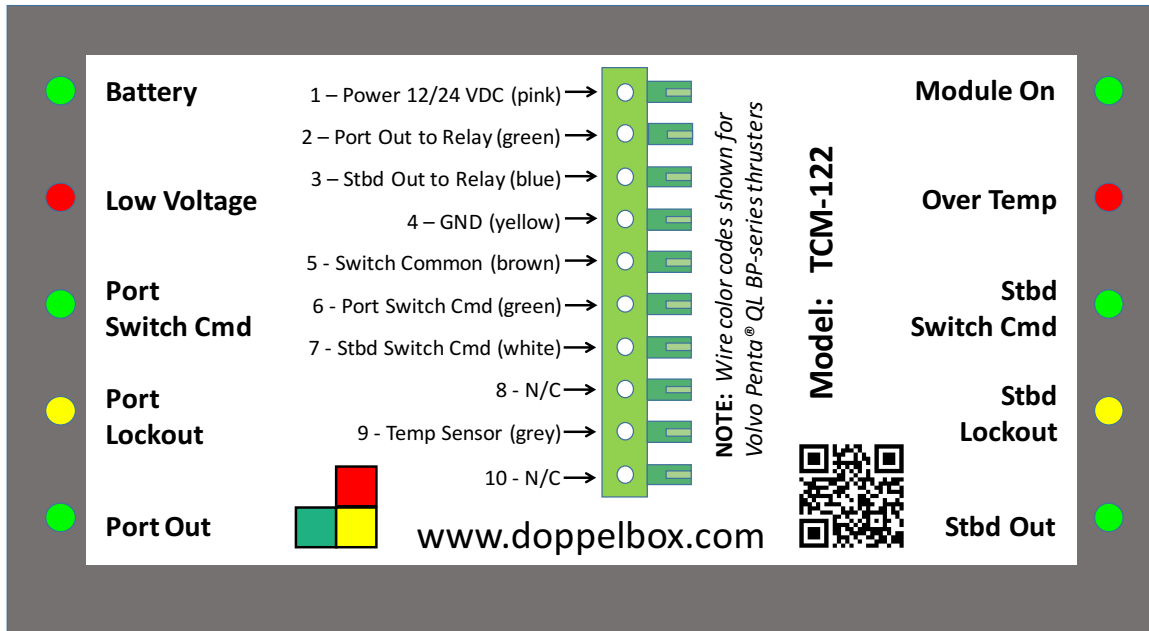


Figure 2-1 TCM-122 LEDs Facilitate Installation and Troubleshooting

2.1 Preparation

- 1.) Ensure the thruster system is completely de-energized.
 - a. Locate the main battery switch that disconnects the thruster system from all sources and de-energize the system.
 - b. Verify the system is de-energized with a multi-meter or other suitable instrument before commencing installation.
- 2.) Unplug the screw terminal block from the TCM-122.
 - a. The TCM-122 Thruster Control Module is equipped with a pluggable (removable) screw terminal block.
 - b. The screw terminal block can be removed from the module to facilitate wiring connections.
 - c. Removal of the screw terminal block from the module is much easier by grasping one end and gently working it loose, then grasp the other end and repeating.

- 3.) Locate the connection numbers on the screw terminal block to ensure wires are connected in the proper order.
- 4.) Connecting eight separate wires is required for installation. Locate all eight wires before starting installation. Wire color codes for Volvo Penta® QL BP-series and SP-series thrusters are as follows

1 – Pink:	12/24 VDC
2 – Green:	Reversing Relay
3 – Blue:	Reversing Relay
4 – Yellow:	Ground
5 – Brown:	Control Switch Common
6 – Green:	Control Switch Direction
7 – White:	Control Switch Common
8 – NC:	
9 – Grey:	Thruster Motor Thermal Switch
10 – NC:	

2.2 Connecting Power and Configuring Thermal Protection

- 5.) Connect Pin 1 to 12/24VDC (pink wire) and Pin 4 to Ground (yellow wire). Plug the screw terminal block back into the TCM-122 and turn power back on. Ensure the Battery, Module On and Over Temp LED's on the front face of the TCM-122 are illuminated (refer to Figure 2.2-1).

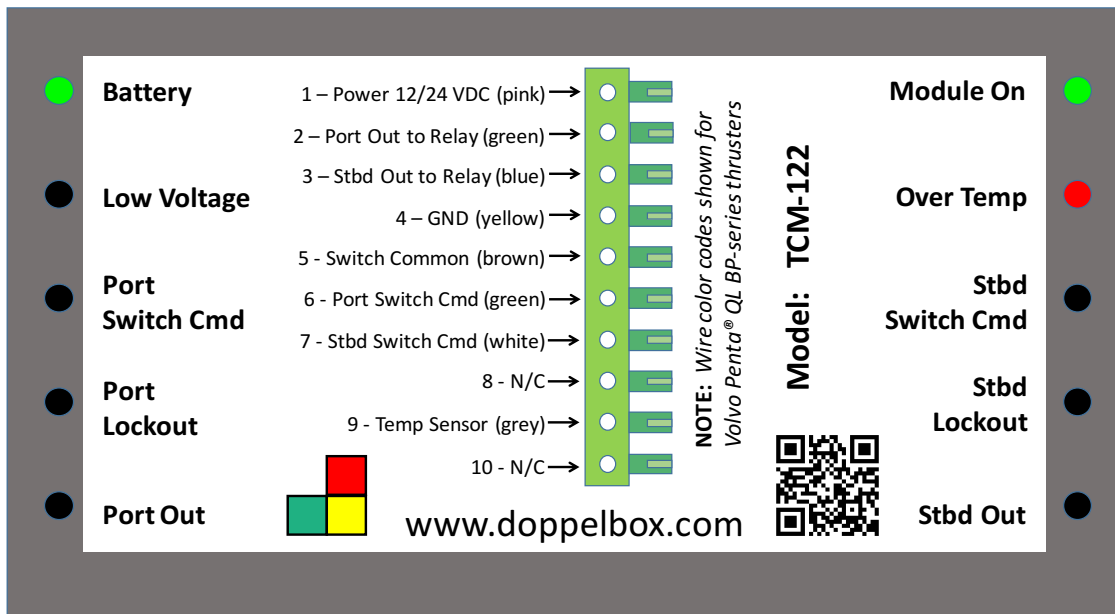


Figure 2.2-1 Power On and Over Temp LEDs will Illuminate with Pins 1 and 4 connected

6.) Turn power off and ensure the thruster system is de-energized. All LEDs should be extinguished. Unplug the screw terminal block and connect Pin 9 to the Thruster Motor Thermal Switch (grey wire). If your thruster motor is not equipped with a thermal switch, the thermal shut down feature must be disabled by connecting a small jumper wire between Pin 9 and Pin 8. Plug the screw terminal back in and turn power on. Ensure the *Battery* and *Module On* LED's are illuminated and the *Over Temp* LED is extinguished.

2.3 Connecting Directional Control Switch to TCM-122

7.) Turn power off and ensure the thruster system is de-energized. All LEDs should be extinguished. Unplug the screw terminal block and connect Pin 5 to Control Switch Common (brown), Pin 6 to Control Switch Direction (green), and Pin 7 to Control Switch Direction (white). Plug the screw terminal back in. Turn power back on and ensure the *Battery* and *Module On* LEDs are illuminated.

8.) Place the Directional Control Switch / Joystick in the Starboard position. Check the following:

- a. *Stbd Cmd* LED is illuminated
- b. *Port Lockout* LED is illuminated
- c. *Stbd Out* LED is illuminated

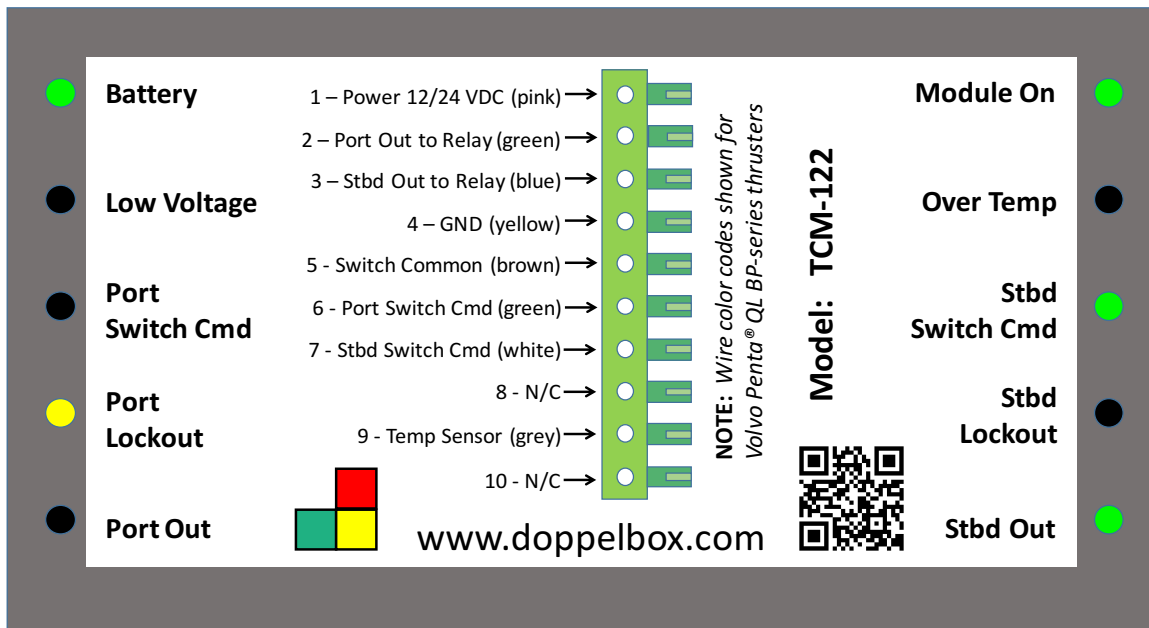


Figure 2.3-1 Port Lockout is enabled while Stbd Command is received. Port Lockout remains enabled for 3 seconds after Stbd Command is turned off.

- 9.) Release the Directional Control Switch. Ensure the *Stbd Cmd* and *Stbd Out* LEDs are extinguished immediately. The *Port Lockout* LED should remain illuminated for approximately 3 seconds before being extinguished.

IMPORTANT NOTE: If the *Port Cmd*, *Port Out*, and *Stbd Lockout* LEDs are illuminated when the Directional Control Switch is placed in the STARBOARD position, turn power off and ensure the thruster system is de-energized. All LEDs should be extinguished. Simply reverse the Green and White wires on Pins 6 and 7. Turn power back on and repeat Steps 8 and 9 above.

- 10.) Place the Directional Control Switch / Joystick in the Port position. Check the following:
 - a. *Port Cmd* LED is illuminated
 - b. *Stbd Lockout* LED is illuminated
 - c. *Port Out* LED is illuminated
- 11.) Release the Directional Control Switch. Ensure the *Port Cmd* and *Port Out* LEDs are extinguished immediately. The *Stbd Lockout* LED should remain illuminated for approximately 3 seconds and then be extinguished.

2.4 Connecting TCM-122 to Reversing Relay

- 12.) Turn power off and ensure the thruster system is de-energized. All LEDs should be extinguished. Unplug the screw terminal block and connect Pin 2 to the Green wire coming from the reversing relay and Pin 3 to Blue wire connected to the reversing relay (Blue). Turn power back on.
- 13.) Place the Directional Control Switch / Joystick in the STARBOARD position. Ensure the thruster turns on and provides thrust in the STARBOARD direction.

IMPORTANT NOTE: If the thruster pushes the vessel in the PORT direction when the Directional Control Switch is placed in the STARBOARD position, turn power off and ensure the thruster system is de-energized. All LEDs should be extinguished. Simply reverse the Blue and Green wires on Pins 2 and 3. Turn power back on and repeat Step 12 above.

- 14.) Place the Directional Control Switch / Joystick in the PORT position. Ensure the thruster turns on and provides thrust in the port direction

The TCM-122 is now installed and checked for proper operation.