CompX Marine Inc. • livorsi.com

One Touch Leveling Control

Livorsi Trim Pad (LTP) Series

Installation/Operation

For Hydraulic or Electric systems

www.Livorsi.com

Phone: 847-752-2424

sales@livorsi.com

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Theory of Operation

The Livorsi LTP is a multifunctional control interface designed for various marine devices such as trim tabs, outdrives, outboards, jack plates, and engine hatches. It provides position indication without the need for bulky control modules when used with electric actuators. Position indication is based on timing rather than electric sensors.

- The LTP sets a specific run time, typically 8 seconds by default (adjustable from 4 to 12 seconds), during which its LED indication scales from 0 to 100 percent.
- The optional N2K trim tab gateway can display tab position on an N2K network.
- **When configuring the run time, it's advised to round up to the next higher second to ensure full deployment and retraction of the device. For instance, if it takes 5.5 seconds for trim tabs to deploy fully, set the LTP run time to 6 seconds.**
- For accurate LED position indication, the device must always start from the fully retracted position. This is achieved with the auto retract feature, but if disabled, manual retraction will be necessary prior to key off / powering down.

Introduction

The One Touch control is potted and sealed to be waterproof. Actuators connect directly to the keypad, so no separate power module box is necessary.

The Livorsi (LTP) design advantages and features include:

- Convenient momentary “One Touch Start/Stop” button to raise or lower tabs.
- Improved fuel efficiency and faster speeds.
- Compatible with single or dual electric actuators per tab / compatible w/ hydraulic solenoid driven systems.
- Single station operation or dual station with an additional keypad.
- Automatic deployment to last tab position when ignition key switch is turned off and back on (see program chart).
- Direct actuator connection to LTP.
- Automatic tab retraction when connected to accessory switch or ignition key switch.
- Automatic dimming of display LED indicators when dim and brighten in sun light.
- NMEA2000 compatible for trim tab position displays on MFDs (Requires optional NMEA adapter).
- Operates on 12- or 24-Volts DC.
- 1 Year Warranty

Safety

- Failure to follow all instructions listed in this manual may result in equipment failure or serious injury.
- Never deploy tabs quickly at high speeds or above cruising speeds. This may cause the boat to turn quickly and become unstable and difficult to control.
- Stay alert, watch what you are doing and use common sense when operating your trim tab system.

How Do Trim Tabs Work

Improved Fuel Efficiency and Faster Speeds

Most importantly, the trim tabs may be adjusted to optimize speed and fuel efficiency. Typically, the bow rides high causing the stern to drag in the water at cruising or lower speeds. A boat owner will attempt to correct this problem by trimming his outdrive down to bring the bow down. This adjustment is extremely inefficient and reduces boat speed and increases fuel consumption, because trimming of the outdrive pushes water down to allow the transom to rise and bow to lower. In this scenario, the outdrive is not only propelling the boat forward but it is also pushing the bow down. The most efficient way to operate the boat is to adjust the tabs to maximize boat speed and level. The outdrive may then be adjusted so the prop shaft is parallel to the water to maximize the thrust to push the boat forward.

Faster Planing

For shallow water starts, trim tabs allow the boat to get up on plane faster. Faster planing can be accomplished by lowering the tabs to the fully deployed position. As the boat achieves plane, trim tabs may be raised until the boat is level.

Porpoising

Occasionally, an uneven load distribution or certain speeds will cause the boat to “porpoise”. This problem can easily be corrected by deploying both trim tabs simultaneously a few degrees until the “porpoising” stops.

Boat Leveling

Every boat owner has experienced passengers or equipment moved to one side of the boat, which causes the boat to lean to one side and leads to difficulty in handling the boat as well as an uncomfortable ride. Trim tabs give the ability to correct this problem by deploying the tab on the same side as the boat is leaning towards which levels the boat for a more comfortable ride.

Head Sea

Rough sea conditions can also be better managed with trim tabs. Typically, in a head sea, the boat speed must be reduced causing the bow to ride high. The waves will pound and beat the boat bottom for an extremely uncomfortable and slow ride. Trim tabs can be deployed to level the boat out and allow the hull to cut through the waves for a smoother and more efficient ride.

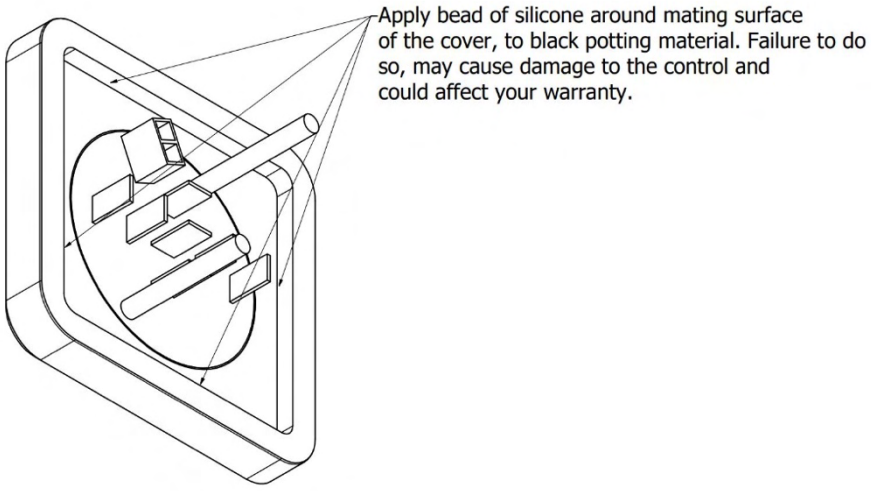
A Beam Sea or Quartering Seas

A beam or quartering sea can lead to a wet ride. To greatly reduce or eliminate the spray caused by waves or wind hitting the boat side, the windward side trim tab may be deployed to raise the windward side of the boat. Also retracting the leeward trim tab side may help.

Display Keypad Installation & Wiring LTP

Mounting Display Keypad:

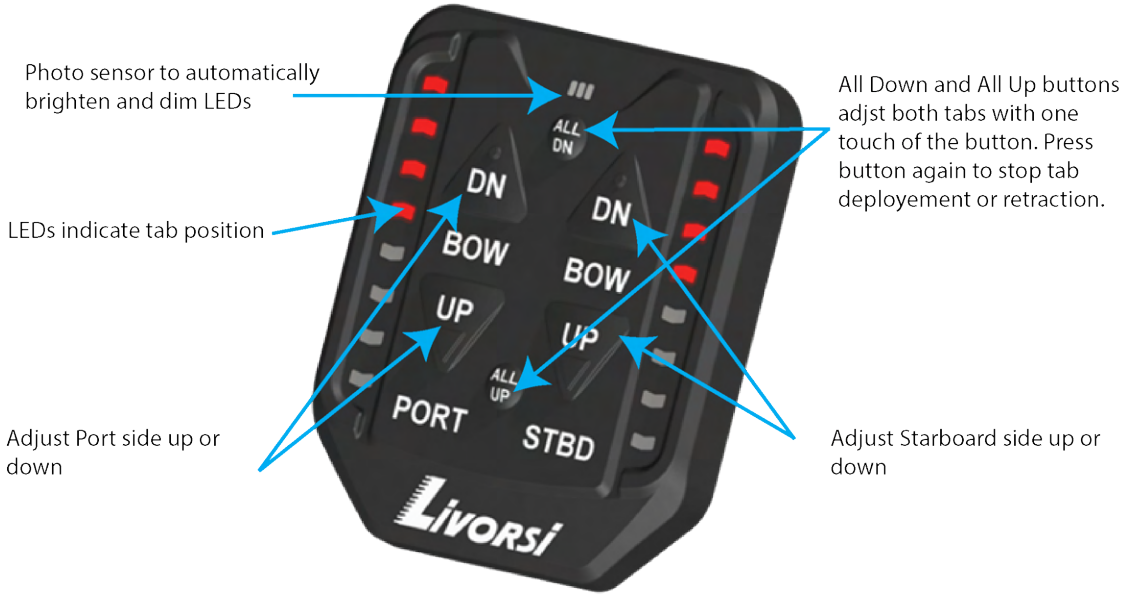
1. Locate the display keypad at the helm where it is convenient to access and view the LED indicators and a flat level surface.
2. Drill one 2" (50.8mm) hole as shown on page 13 for mounting display.
3. Apply a bead of silicone sealant around the underside of the display where the rubber overlay meets the black potting material. This will prevent water from entering under the display and reaching the wiring connections. See the diagram below.
4. Mount the display with the aluminum plate, washers and nylon nuts provided. **Only use nylon nuts provided. Do not overtighten the nylon nuts.**



Wiring Display Keypad

1. Refer to wiring diagram as shown on **page 11** for the LTP wiring connections.
2. The red (+12 vdc or +24vdc) wire from the boat's fuse panel and black battery negative wires should be a minimum size of 14 AWG (2.5mm^2)
3. **Important:** If using electric actuators, DC voltage source connected to LTP keypad must match actuator voltage (first letter in actuator serial A, C or S=12vdc, B or D=24vdc).
4. The AUX terminal must be connected to ignition key run position or accessory switch to automatically retract the tabs when key is switched to the OFF and turn on the display when key is switched to ON.
5. For dual station connections, a second LTP keypad and **LTPDSWH + Length** harnesses are required. See wiring diagram on page 11 for **LTPDSWH**.
6. For dual actuator per tab installation, connect both actuator wires from each actuator in parallel and follow the wiring diagram on page **11.**

Verify Display Settings and Operation LTP



Set Actuator Deployment Time:

Follow the programming chart and instructions on page 9 to program keypad to match the actuator deployment time.

Verify Connection and Operation:

1. Momentarily press the “ALL DN” (All Down) button (top button), and both actuators/tabs deploy simultaneously. Press button again to stop deployment or allow to fully deploy.
2. Momentarily press the “ALL UP” button (bottom button), and both actuators/tabs will retract simultaneously. Press button again to stop retraction or allow full retraction.
3. If the tab or tabs are moving in the opposite direction as described, switch or reverse the two actuator wires on the back of the keypad for the tab that moves in the wrong direction
4. Press and hold the starboard “STBD Bow Down” button (right button), and the port actuator/tab will deploy and release when fully deployed. Press and hold the “STBD Bow Up” button to retract the port tab and release when fully retracted.
5. Press and hold the “Port Bow Down” button (left button), and the starboard actuator/tab will deploy and release when fully deployed. Press and hold the “Port Bow Up” to retract the starboard tab and release when fully retracted.
6. If the wrong tab is moving as described in step 4 and 5, exchange the port and starboard wires on the back of the keypad and repeat the testing process.

LED Position Indicators

When retracting actuators/tabs, the top LED indicators will flash and then remain lit to show tabs are fully retracted. ***THE LED indicators show approximate tab position based on time.***

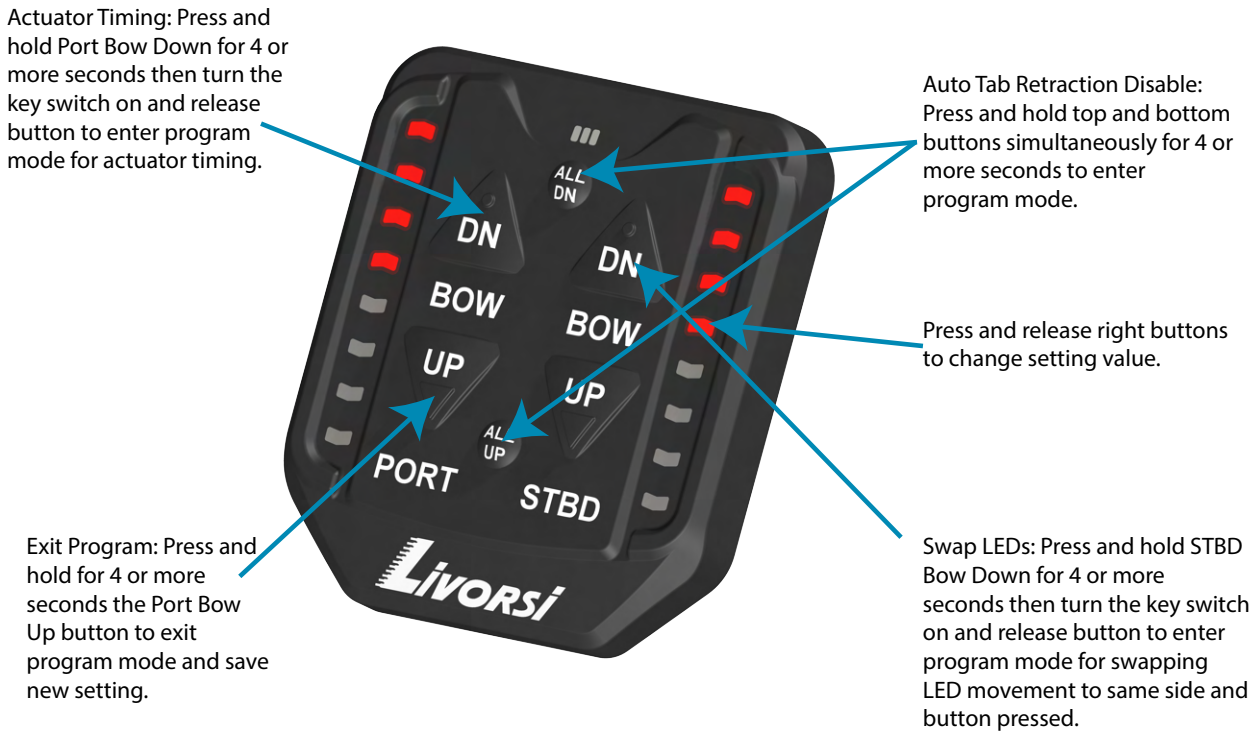
Automatic Tab Retraction:

There are a couple of options for automatically retracting the trim tabs. You may connect the accessory or run terminal of the ignition key switch to "AUX" terminal on keypad. When the ignition key switch is turned off, the tabs will retract automatically, and the display will turn off. Another option is to connect the "AUX" terminal to one side of an accessory switch and the other to +12vdc (see wiring diagram), so the tabs will only retract when this switch is turned off.

Enter, Adjust and Exit Program Mode:

- Before entering program mode, 12vdc or 24vdc must be applied to LTP terminals +12vdc and battery negative (see wiring) and AUX 12vdc must be off (ignition key switch or accessory switch off).
- Press and hold the appropriate button on the keypad that relates to the feature you would like to modify for 4 seconds or longer:
    - Auto Retract Prev. Position → Port BOW UP
    - Actuator Time → Port BOW DOWN
    - Swap LED Tracking → Stbd BOW DOWN
    - Disable Auto Retract → All UP + All DOWN

  then switch the ignition key switch or accessory switch to on. Release the button.
- Follow the instructions under "Change Setting" in the program chart to change the current setting.
- Press and hold the "Port Bow Up" button for a few seconds to save setting and exit program mode.
- See page 9 for full chart



Model Number	Display Color	Number of Stations/ Devices	Overall Width	Overall Height/Thickness	Mounting Hole Cutout (Diameter)	DC Volts	Main Power Power Input	Fuse Size Switched Terminal (MUST CONNECT)
LTP	Black	1 or 2 Stations/ 1 or 2 Devices	3.0”/77mm	3.4” (86mm) / .56” (14mm)	2” (50.8mm)	12/ 24	12vdc = 15 or 20 amp 24vdc = 10 amp	1 to 2 amp

Programming Chart

	Program Mode Sequence					
Setting	**Enter**	**Change Setting**	**Exit and Save**	**Range**	**Default**	**Program Details**
Auto Retract Previous Position	Press Port Bow Up 4 sec. or longer	Press/Release STBD Bow Down/Up button	Press and hold Port Bow Up for 4 sec. or longer	Standard or Remember last position	Standard	8 LEDs = Standard Auto Retract 1 LED = Return to last tab position before key switch off
Actuator Time	Press Port Bow Down 4 sec. or longer	Press and hold STBD Bow Down/Up button	Press and hold Port Bow Up for 4 sec. or longer	4 to 12 seconds	8 seconds	8 LEDs = 8 seconds 6 LEDs = 6 seconds 4 LEDs = 4 seconds
Swap LED Tracking	Press STBD Bow Down 4 sec. or longer	Press/Release STBD Bow Down/Up button	Press and hold Port Bow Up for 4 sec. or longer	LEDs track opposite side or same side as button press	Opposite	1 LED = LEDs track opposite of button press 8 LEDs = LEDs track same side as button press
Disable Auto Tab Retraction	Press All Up and All DN for 4 sec. or longer	Press/Release STBD Bow Down/Up button	Press and hold Port Bow Up for 4 sec. or longer	Enable or Disable	Enable	1 LED = Auto tab retract enabled 8 LEDs = Auto tab retract disabled (AUX connection is not required for this program mode.)

- Hydraulic tabs typically set default to 6 seconds.
- Electric tabs typically default to 8 seconds.

Automatic Tab Retraction to Previous Position:

When the accessory switch or ignition key switch (connected to keypad “AUX” terminal) is turned off, the tabs will automatically retract. When the accessory switch or ignition key switch is turned back on, the tabs will adjust to the last known position before key switch was turned off. Follow the instructions above to program the keypad for this feature (Auto Retract Previous Position). Turning main battery power off will erase previous tab position and adjust to new position on next trip.

Actuator Time:

Follow the programming chart and instructions on page 9 to program keypad to match the actuator deployment/retract time.

Swap LED Tracking:

Refer to program instructions on page 9 for “Swap LED Tracking” to move the LED indicators to the same side as the button being pressed for Bow Up/Down. The default setting shows the “tab position” on the LED indicators (i.e. pressing STBD button shows port tab being deployed and LEDs lit on left side of keypad). Swapping the LED indicators to same side as button being pressed shows what side of the vessel is going down or up. Program this to customer preference.

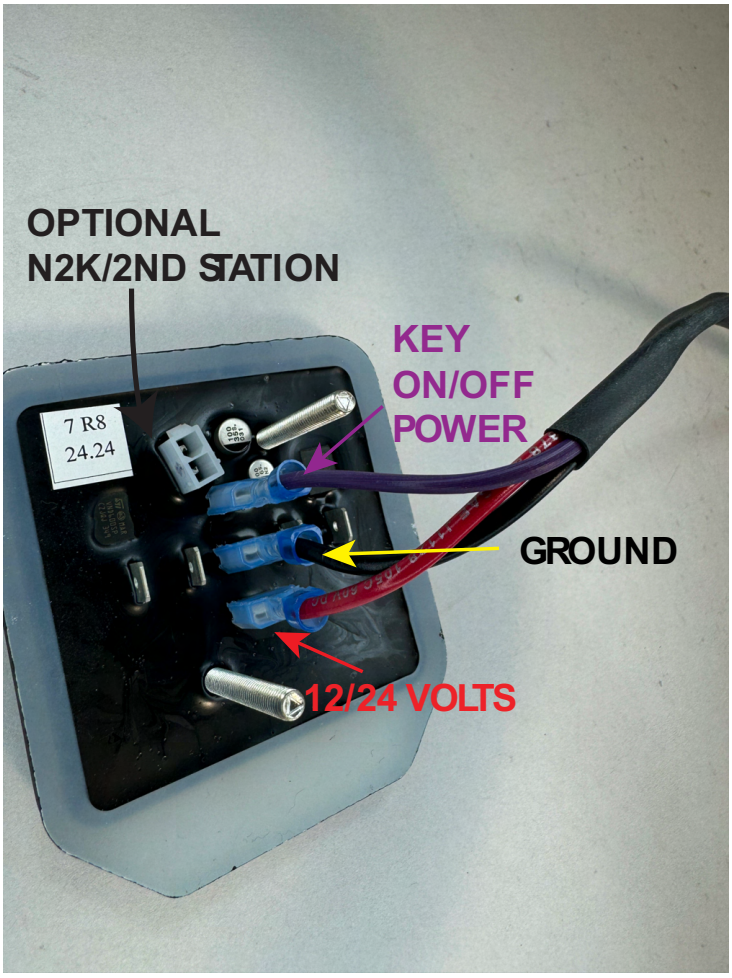
Disable Automatic Tab Retraction:

Refer to program instructions on page 9 for “Disable Auto Tab Retraction” to disable auto tab retraction. Press and hold the “All DN” and “All UP” buttons simultaneously for a few seconds to enter the mode and follow the instructions on page 9 of the programming chart. AUX terminal connection is not necessary for this program mode.

LEDs do not light:

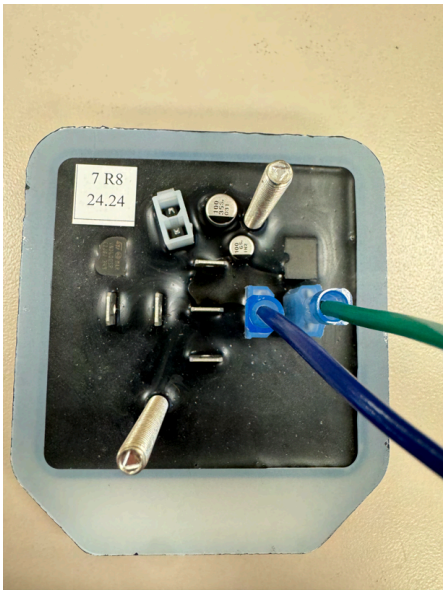
1. Test for +12vdc (or 24vdc) on back of LTP keypad at red “+” sticker terminal and middle terminal (battery negative).
2. Turn on ignition key switch or accessory switch (see Auto Tab Retraction p.8) which should show 12 or 24vdc on “AUX” terminal when switched on. The “AUX” terminal on the back of keypad must be connected to the ignition key switch or accessory switch. Turn key switch or accessory switch to ON and make sure the battery selector switch is turned on to light LEDs on keypad.

LTP Power Harness



Function	Color
Key On/Off Power	Purple
Ground	Black
12/24 Volts	Red

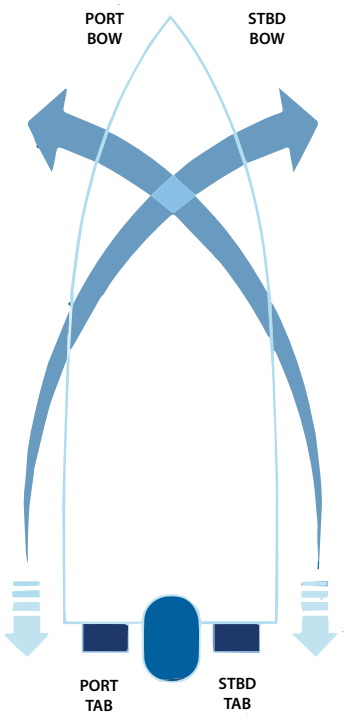
LTP Control Harness



Function	Color
Ascending Control	Blue Wire
Descending Control	Green Wire

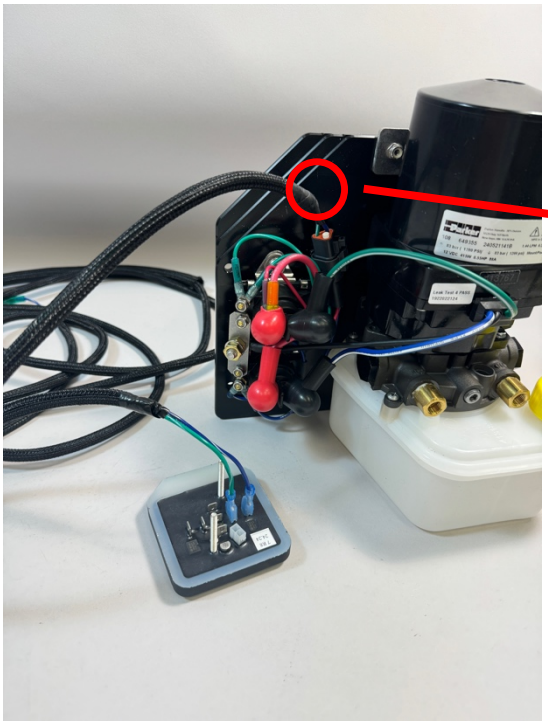
Port control harness will be connected to the starboard terminals.

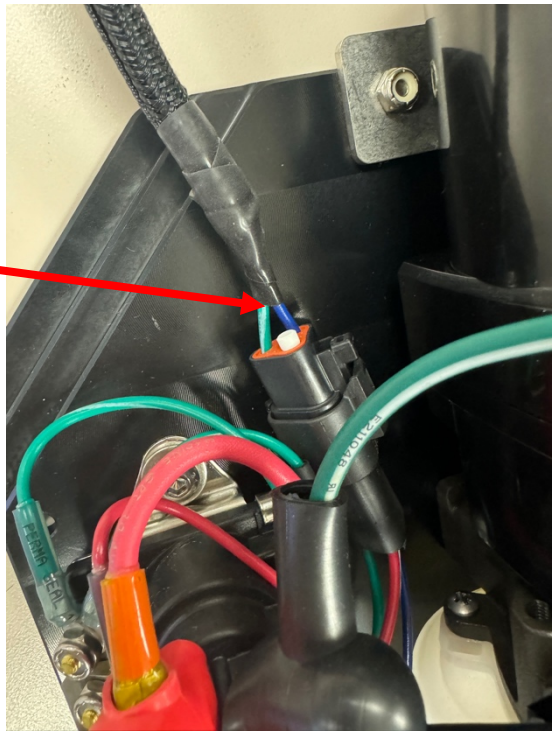
Starboard control harness will be connected to the starboard terminals.



LTP Control Harness

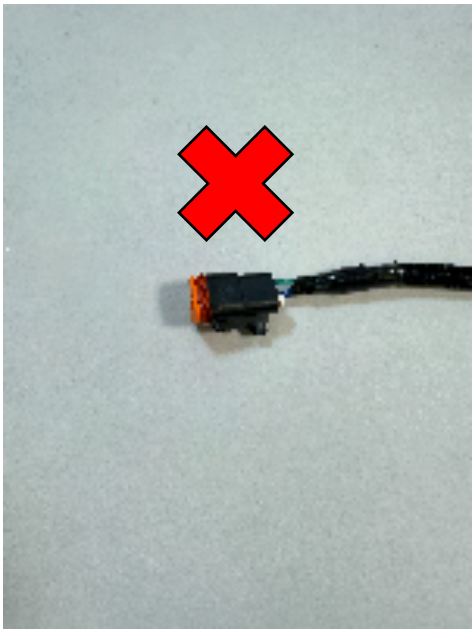
Livorsi Pump Connection





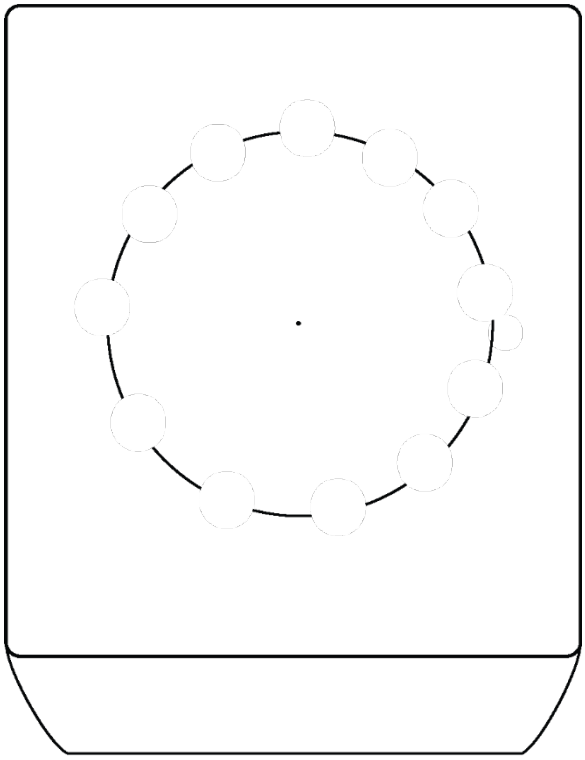
LTP Control Harness

Electric Actuator Connection



If using electric actuators, remove LTP Deutsch connector and replace with applicable connection.

Mounting Hole Cutout
2" (50.8mm)



CONTROL LINE

WARNING: Print this page above with "Actual Size" or "100% Custom Scaled" settings. Measure the control line above, it is **ONE INCH LONG**. If it measures less than one inch, the template measurements need to be scaled accordingly.

FAILURE TO DO SO COULD RESULT IN MISDRILLED HOLES.