



Livorsi DTS Controls Installation and Operation Manual

for Single/Dual Engine Digital Throttle and Shift Controls

Revised JUNE 2017

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Introduction

Safety Notes

NOTICE

This document is written to aid our dealers, boat builders, and company service personnel in the proper installation or service of our products. Persons who are not familiar with these or similar products produced by Livorsi Marine, Inc., and who have not been trained in the recommended servicing or installation procedures should have the work performed by an authorized Mercury Marine dealer technician. Improper installation or servicing of the Mercury Marine or Livorsi Marine product could result in damage to the product or personal injury to the installer or persons operating the product.

NOTICE

After completing installation, these instructions should be kept with the product for the owner's future use.

Notice to Personnel Installing this Kit

The installation of this product requires an installer who is specifically trained to work on Mercury Marine's or Livorsi Marine's digital throttle and shift (DTS) systems. The installer must be trained in the proper installation, electronic calibration, and operation of the DTS system. Failure to correctly install this product may make this product and /or the DTS system inoperable or unsafe for use.

CAUTION

Avoid possible injury or equipment damage. After installing this control, electronically calibrate the digital throttle and shift (DTS) system. Do not attempt any calibration unless you have been specifically trained in Mercury Marine's DTS systems. Improper electronic calibration of the DTS system will make this control and/or the DTS system inoperable or unsafe.

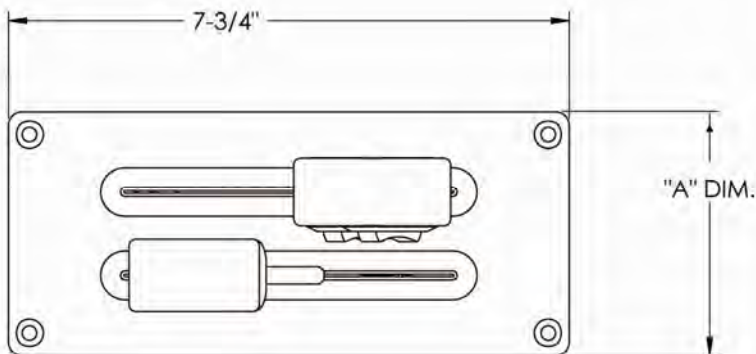
Electrical Requirements

DTS equipped boats require that the electrical systems meet the following guidelines:

- Use only marine starting batteries with a 1000 mca /800 cca/ 180 amp hour rating or higher. Deep cycle batteries do not deliver the power required for the DTS system.
- Secure all battery cables with standard hex nuts, tightened to 13.5 Nm (120 lb. in.) Do not use wing nuts, as they will not secure the battery cables properly.
- Ensure that the battery cable size (cross section) meets the minimum size requirements for the length of cable used. Refer to the installation manual supplied with the engine.
- Ensure that all power supply connections are clean and tight.

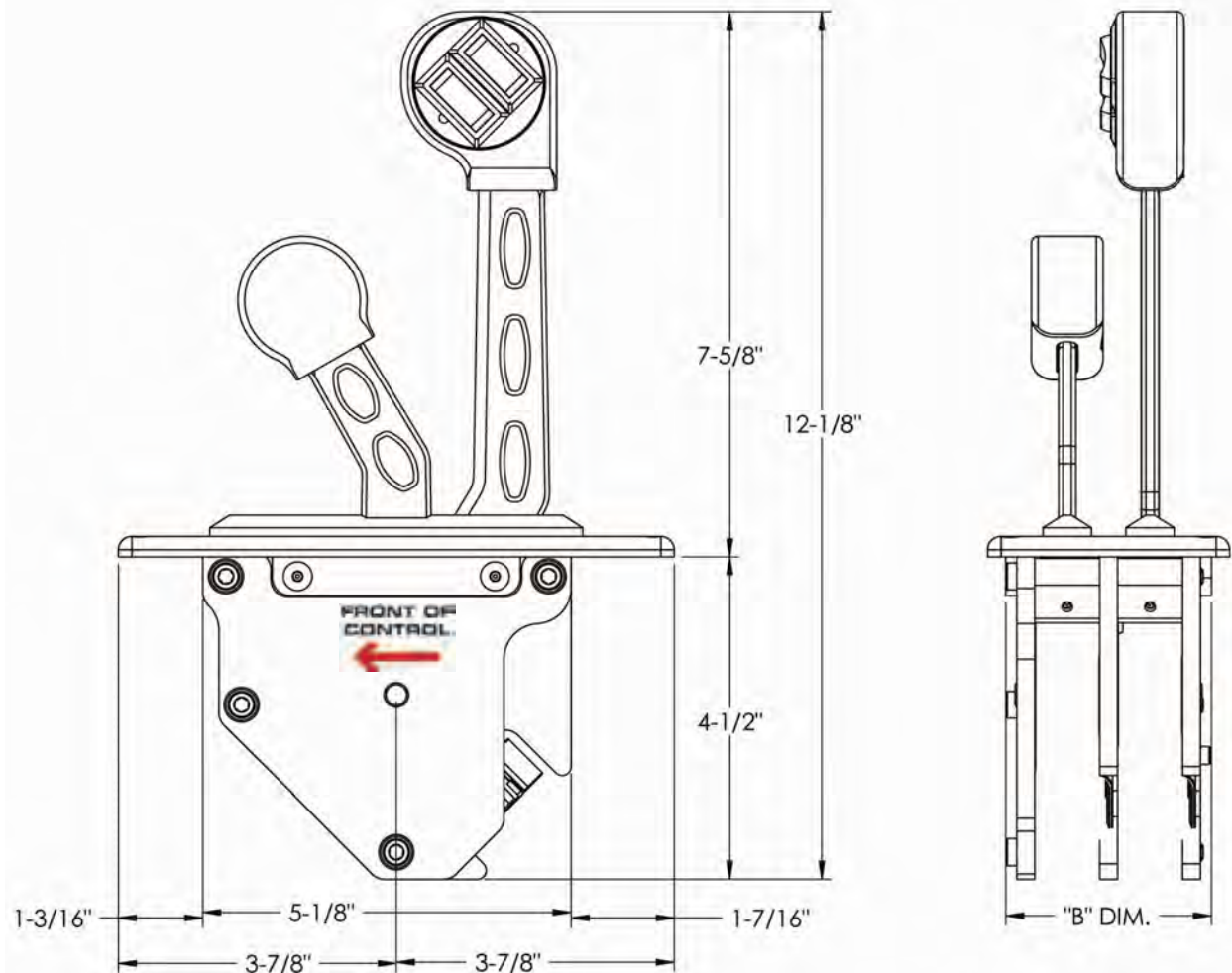
Livorsi DTS Control Dimensions

See cutout templates at the end of this manual.



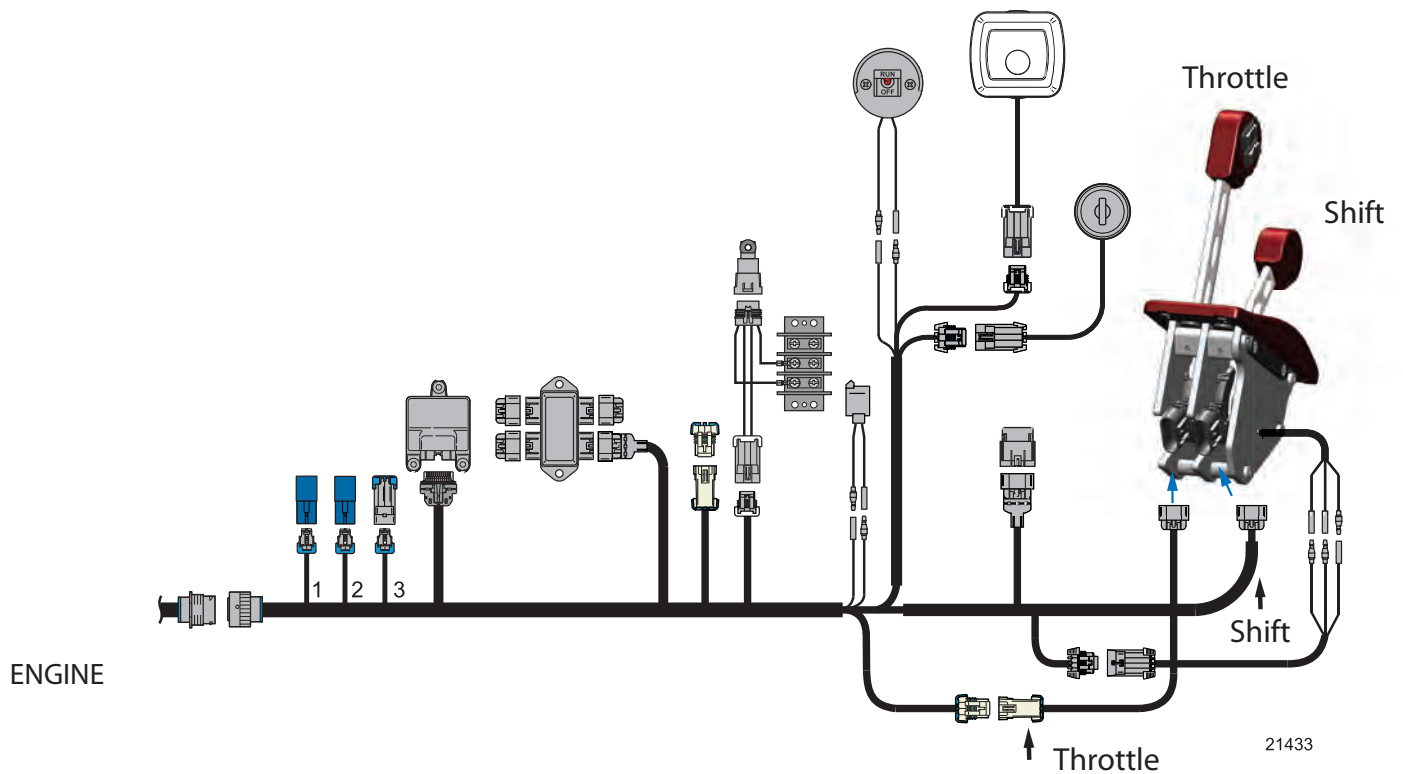
Livorsi DTS Control Dimension Chart

# of handles	"A" DIM	"B" DIM
2 handle	3- 3/8 in.	2- 7/8 in.
4 handle	5- 11/16 in.	5- 3/16 in.



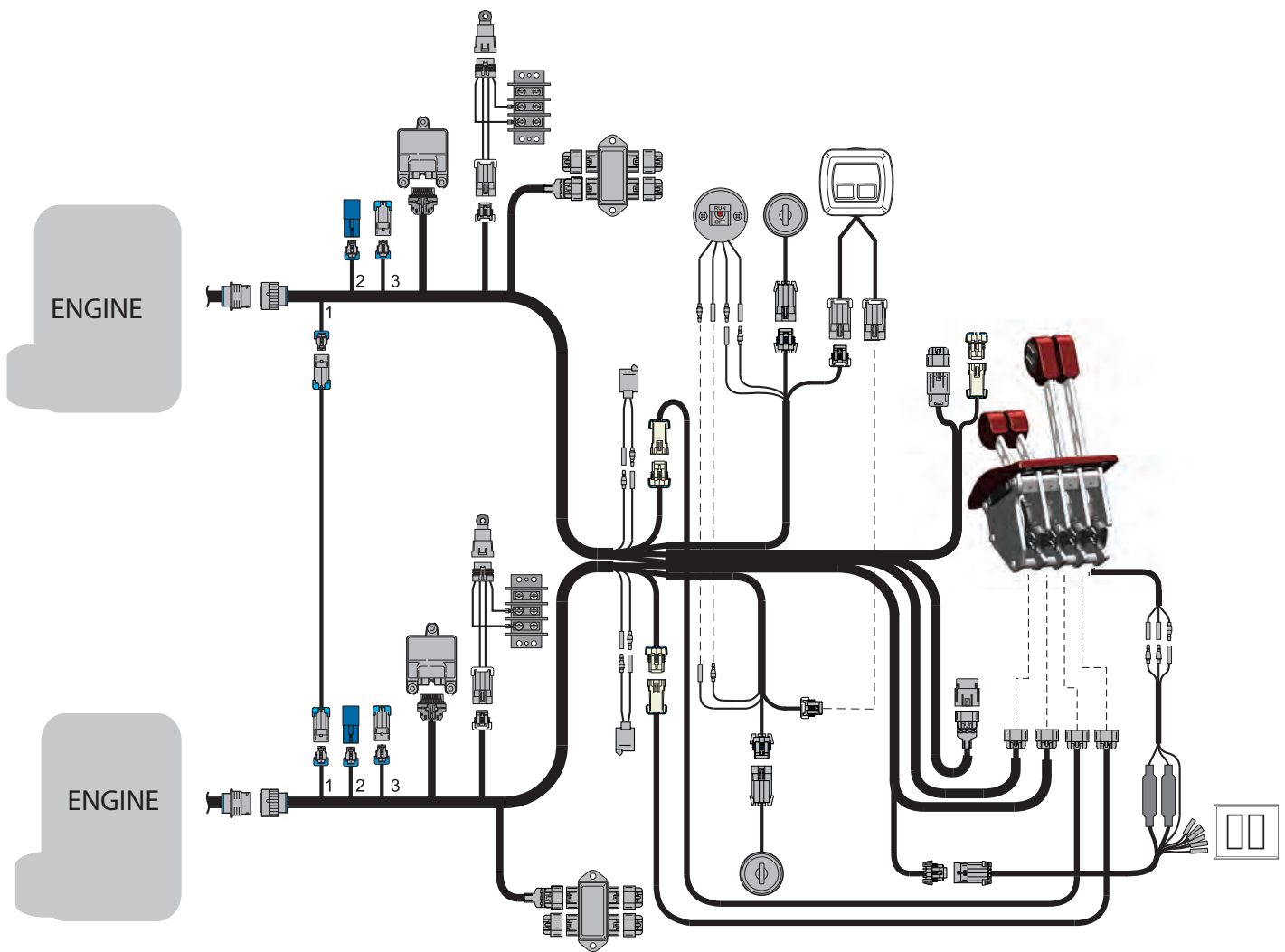
Architecture Drawing- Single Engine

The following information has been gathered from Mercury Marine and may not be current. Please contact Mercury Marine at 920-929-5000, for up to date installation and wiring diagrams.



Architecture Drawing-Dual Engine

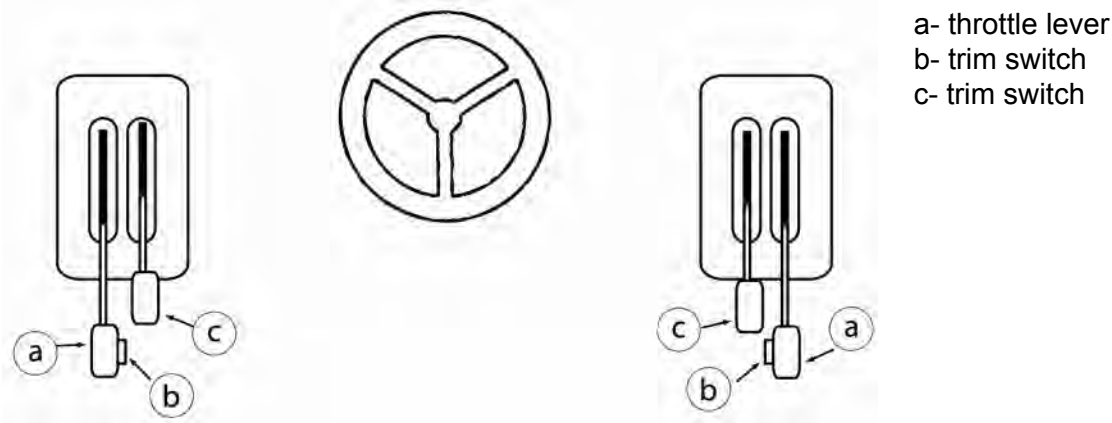
The following information has been gathered from Mercury Marine and may not be current. Please contact Mercury Marine at 920-929-5000, for up to date installation and wiring diagrams.



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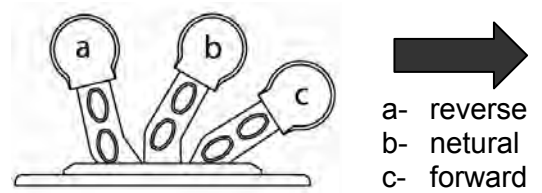
Operation

Control Quadrant Operation



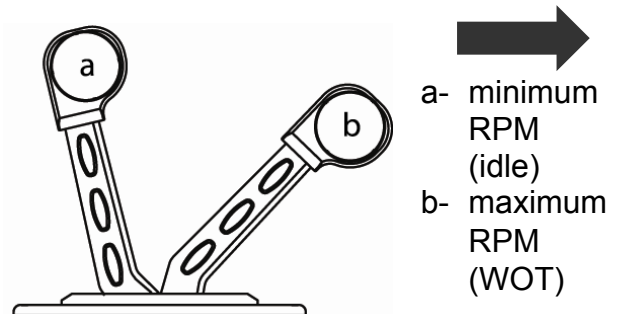
Shift Lever

- Shift into reverse by moving the shift lever to its aft position.
- Shift into neutral by moving the shift lever into its center position.
- Shift into forward by moving the shift lever into its forward position.

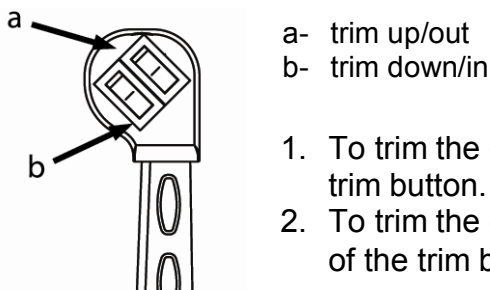


Throttle Lever

- Increase the RPM by moving the throttle lever forward. Achieve wide open throttle (WOT) by placing the throttle lever in its full forward position.
- Decrease RPM by moving the throttle lever back. Achieve minimum RPM (idle) by placing the throttle lever in its full aft position.



In-Handle Trim Switch



1. To trim the outboard or drive up/out, press the top area of the trim button.
2. To trim the outboard or drive down/in, press the bottom area of the trim button.

Neutral Safety Switch

The Livorsi DTS Control does not have a neutral safety switch. The start-in-gear protection is controlled electronically by the propulsion control module (PCM).

Installation

Installation location:

Installing the Control:

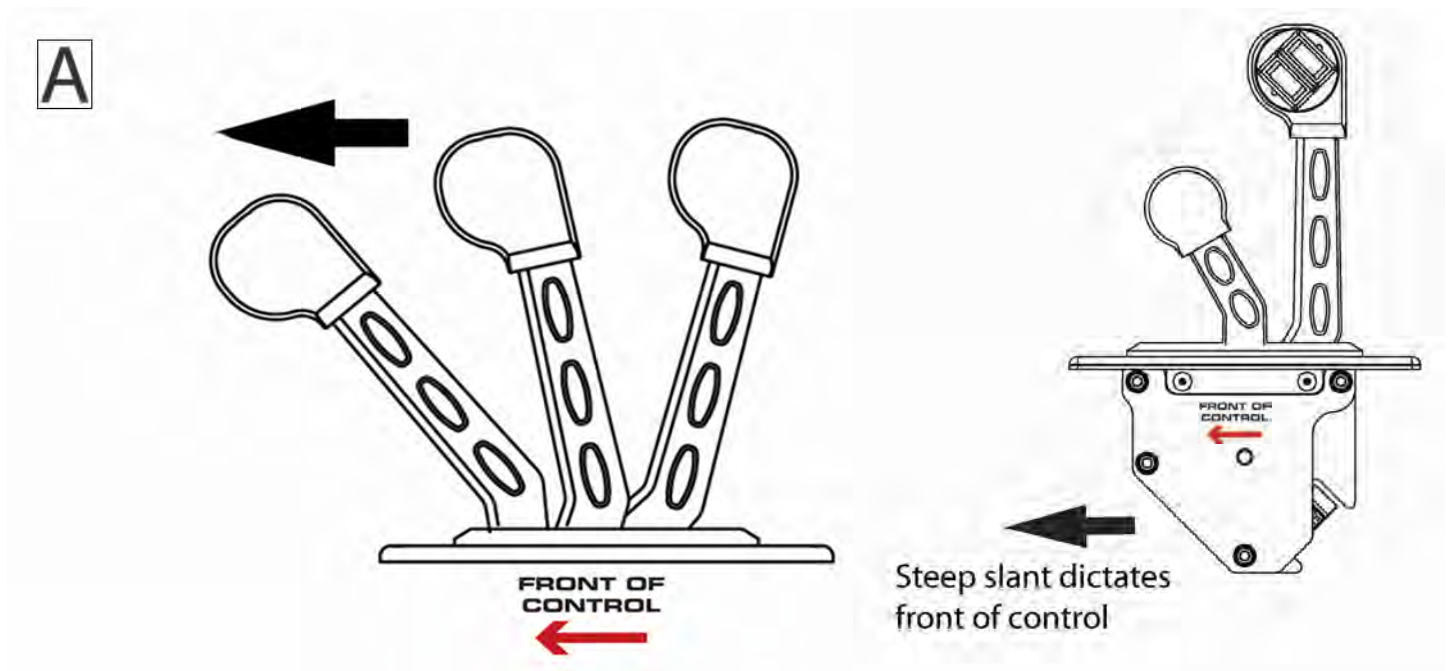
Understand the following criteria when selecting a Livorsi DTS Control location:

- Mount the control to provide the boat operator with a comfortable and controlling position during operation and allow sufficient hand and shift/throttle lever clearance.
- Mount the control to provide enough space for harnesses and wiring beneath the console panel.
- If equipped with a trim switch, locate the switch on the side of the throttle lever closest to the steering wheel.

Installing the Control:

Control Configuration

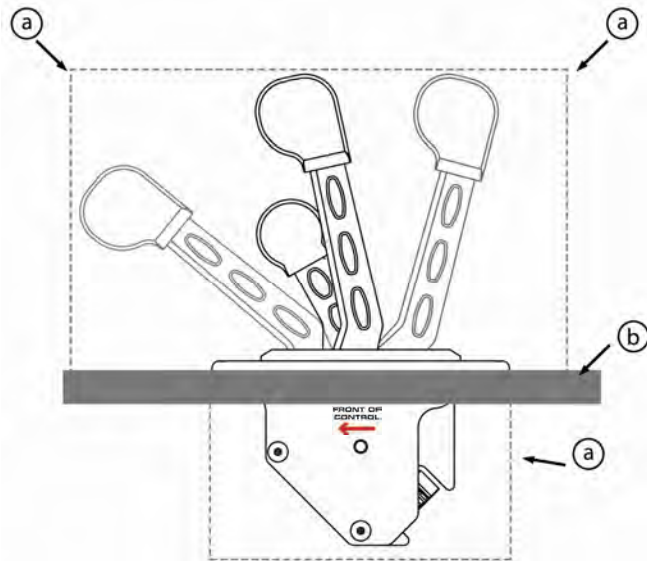
Important: Canting refers to the direction of bend in handle. Install the Livorsi DTS Controls in the orientation specified (Forward-cant only).



A) Forward cant models; arrow pointing to the ship's bow

Cutting the Control Console Opening:

Important: Ensure that the area below the console is clear of any wiring or items that may hinder or be damaged by drilling/cutting.



- a- clearance areas required (approximate)
 b- console

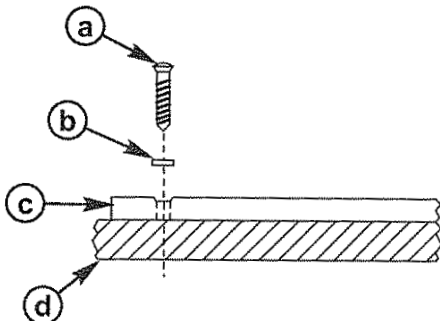
CAUTION

Avoid injury or product damage. Obstructions, such as braces and wiring, may be unseen when looking at the front of the dashboard. Before drilling or cutting any holes in the dashboard, check the area behind the dashboard for obstructions. Do not drill or cut when obstructions are present.

1. Remove the Console Cutout page, located at the end of this document. **Important:** Hole patterns between the DTS flat base and DTS contour base differ.
2. Transfer all drill holes and cut lines to the console in a suitable location. Refer to **Dimensions and Clearances** for help determining the installation location.
3. Use a #22 drill bit to drill the four required holes. Drill perpendicular to the console surface. Check for Clearance
4. Saw between the drilled holes along the cut lines. Cut perpendicular to the console surface.
5. Set the control into the opening and check for clearance and fit. Remove the control from the console.

Installing the Control to the Console:

1. Secure the control to the console using 4 x #10 screws and O-Ring



- #10 screws (x4)
 - U-ring * (x4)
 - Control quadrant assembly
 - Console
- **For an 8 handle control
- #10 screw (x6)
 - O-Ring (x6)

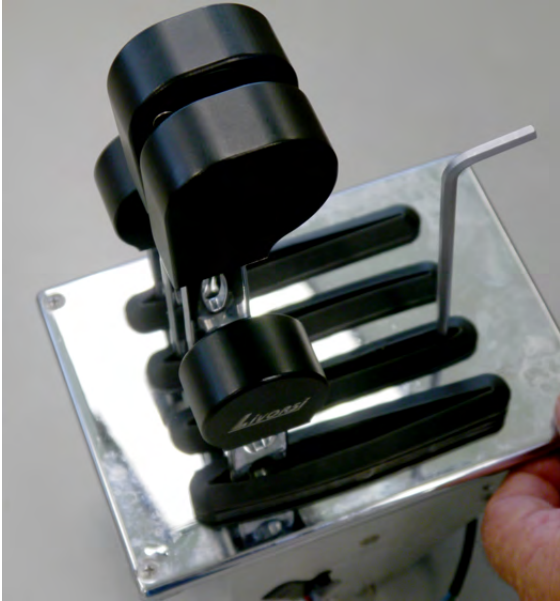
CAUTION

Avoid possible corrosion damage. Always install a U-ring * between each screw and the control plate. **8 C B C H C J 9 F H z < H 9 B °**
 Improper Installation, 2 1/4 x 3/4" 8 C B C H C J 9 F H z < H 9 B °
 & 1/4" x 3/4" 2 1/4 x 3/4" 8 C B C H C J 9 F H z < H 9 B °
 , 8 C B C H C J 9 F H z < H 9 B °

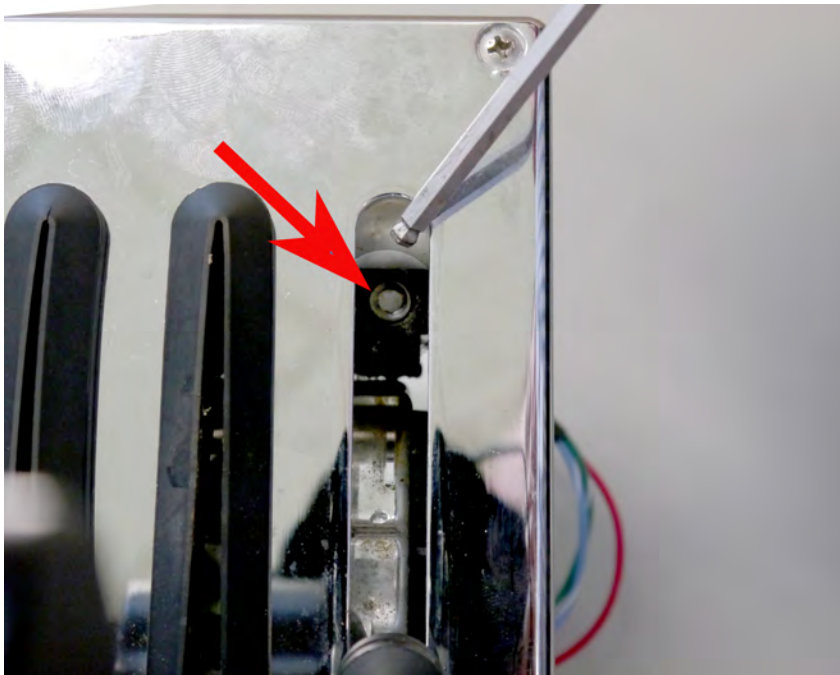
Adjusting Detent and Friction:

NOTE: All adjustments can be done WITHOUT removing control. You will NOT need to remove the dust boot or contour base to make adjustments.

1. Before adjusting make sure control is properly lubricated (See page 18)
2. Using a 3/16ths Allen wrench insert into adjusting block at FRONT of throttle.



4. Turn clockwise to increase friction / detent. Turn counter clockwise to decrease friction / detent
5. Make small $\frac{1}{4}$ turn adjustment and test control movement. Repeat if necessary.



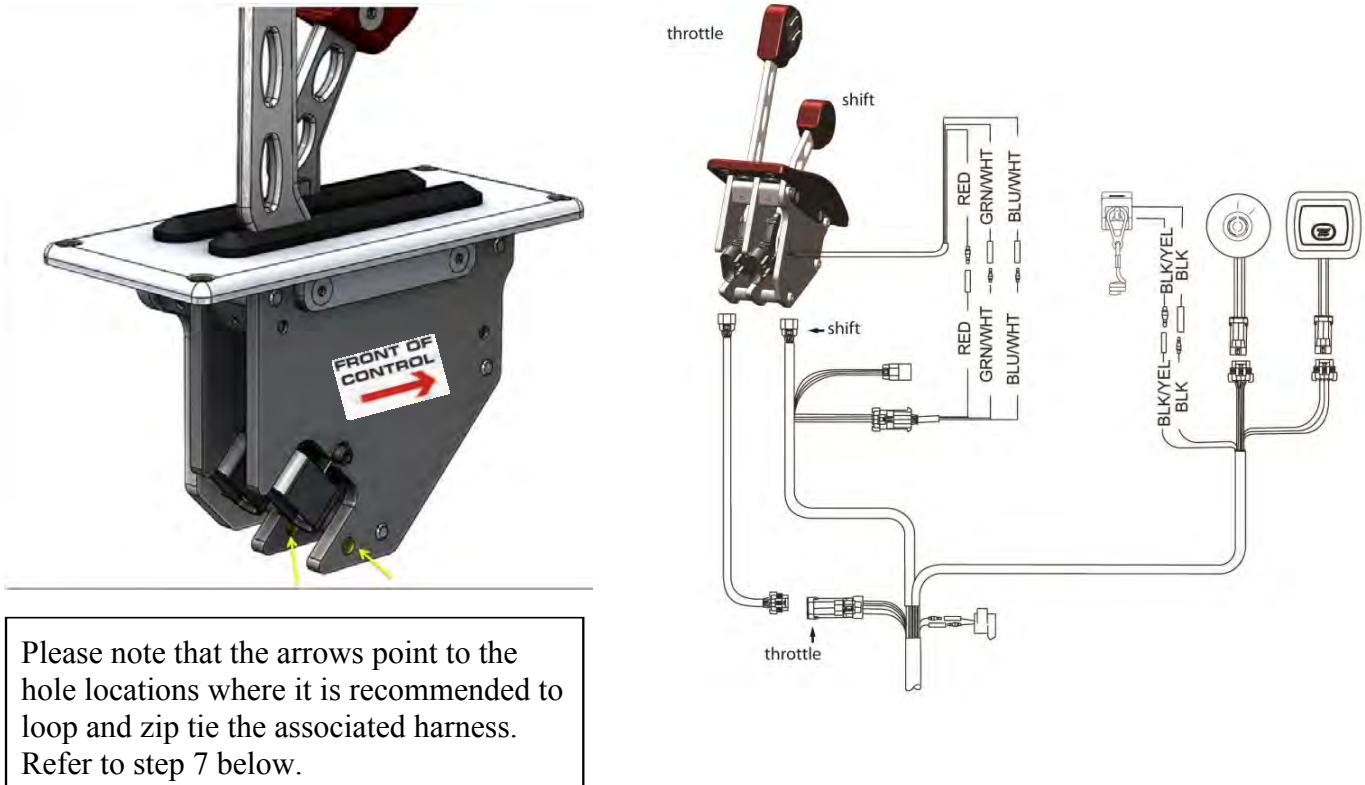
NOTE: Dust boot removed only for photo purposes to show adjusting block

Rigging the Control:

Connecting the SmartCraft Harness (Single Engine)

The following procedure explains how to connect the DTS Command Module Harness.

NOTE: The following information has been gathered from Mercury Marine and may not be current. Please contact Mercury Marine at 920-929-5000, for up to date installation and wiring diagrams.



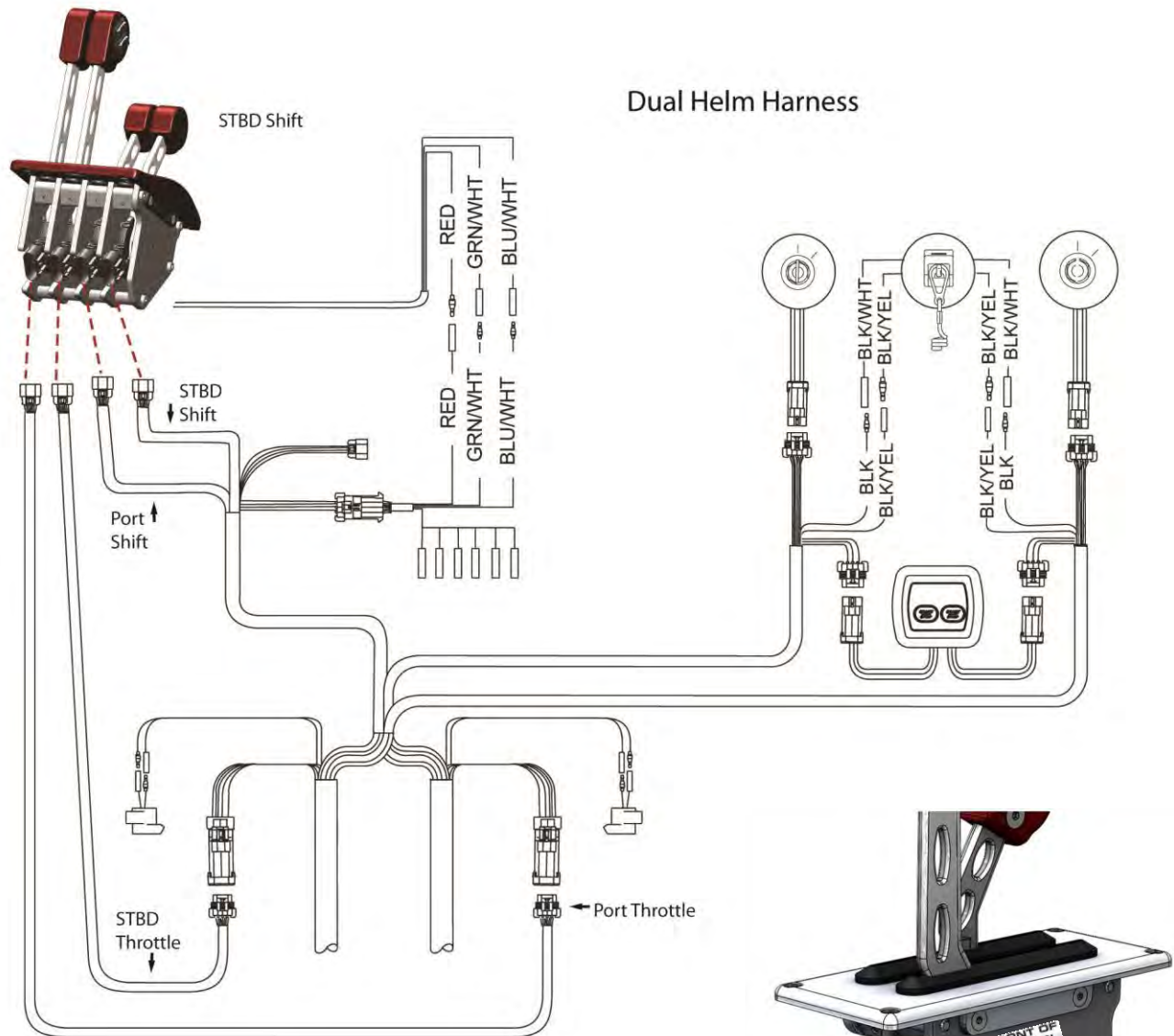
Please note that the arrows point to the hole locations where it is recommended to loop and zip tie the associated harness. Refer to step 7 below.

1. Connect the “LEVER 1” connector on the DTS command module harness to the shift potentiometer on the control console.
2. Connect the “FOOT THROTTLE” connector on the DTS command module harness to the throttle potentiometer on the control console using the adapter harness (P/N 89-891963A01).
3. Connect the trim adaptor harness to the DTS command module harness.
4. Connect the bullet connectors on the trim adaptor harness to the trim connections on the control.
5. Connect the start/stop switch (optional), warning horn, lanyard stop switch and key switch to the appropriate connections.
6. Make all the other DTS command module harness connections following the instructions included with the DTS Command Module kit.
7. Zip tie throttle and shift harnessing to the control base to provide appropriate strain relief.

Connecting the SmartCraft Harness (Dual Engine):

The following procedure explains how to connect the DTS Command Module Harness.

NOTE: The following information has been gathered from Mercury Marine and may not be current. Please contact Mercury Marine at 920-929-5000, for up to date installation and wiring diagrams.



Please note that the arrows point to the hole locations where it is recommended to loop and zip tie the associated harness. Refer to step 10 on the next page.



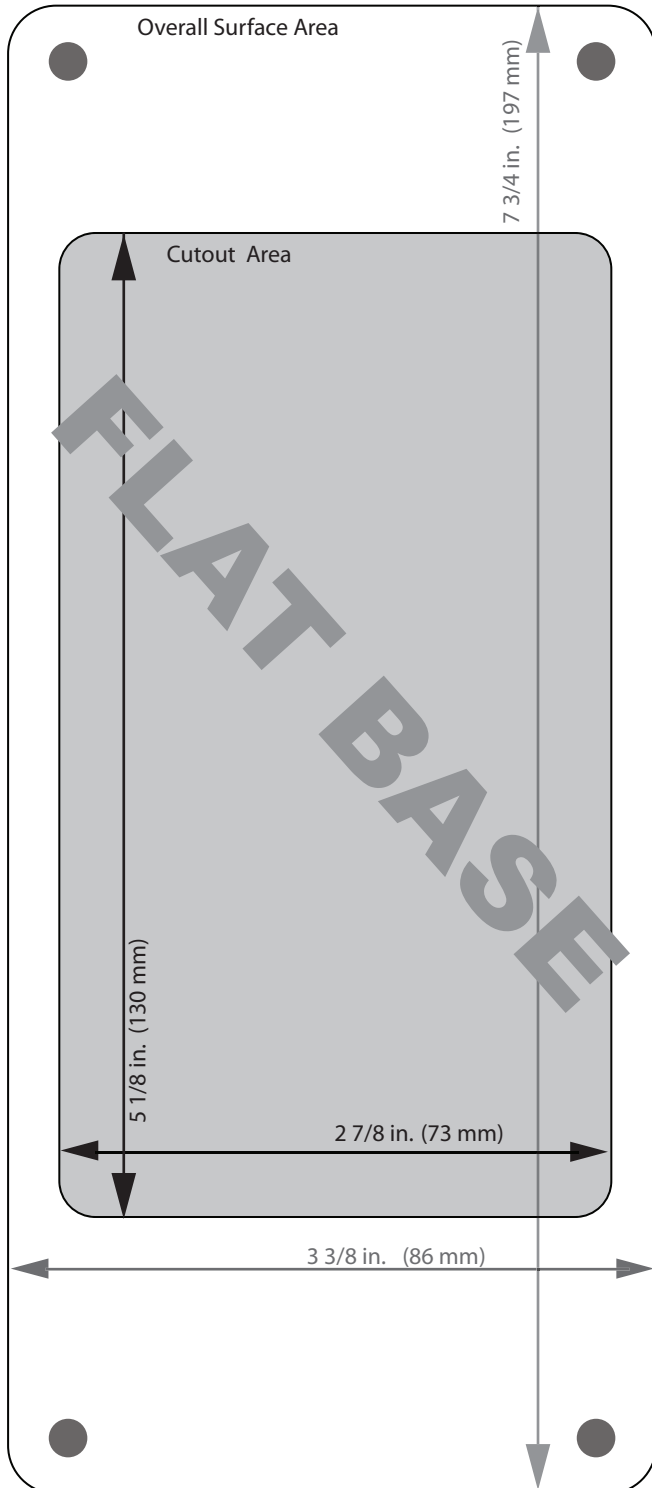
Control Connection	Harness Connection
Starboard Shift Potentiometer	“LEVER 1”
Port Shift Potentiometer	“LEVER 2”
Starboard Throttle Potentiometer	“LEVER 3”
Port Throttle Potentiometer	“LEVER 4”

1. Connect the “LEVER 1” connector on the DTS command module harness to the starboard control’s shift potentiometer
2. Connect the “LEVER 2” connector on the DTS command module harness to the port control’s shift potentiometer
3. Connect the “LEVER 3” connector on the DTS command module harness to the starboard control’s throttle potentiometer using the adaptor harness (P/N 89-891963A01).
4. Connect the “LEVER 4” connector on the DTS command module harness to the port control’s throttle potentiometer using the adaptor harness (P/N 89-891963A01).
5. Connect the trim adaptor harness to the DTS command module harness.
6. Connect the bullet connectors on the trim adaptor harness to the trim connections on the control.
7. Connect the six bullet connectors on the trim adaptor harness to the individual trim switches on the dash or console. (optional)
8. Connect the start/stop switch (optional), lanyard stop switch, and key switches to the appropriate connections, as shown.
9. Make all other DTS command module harness connections following the instructions included with the DTS Command Module kit.
10. Zip tie throttle and shift harnessing to the control base to provide appropriate strain relief.

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Mounting Templates

Livorsi DTS Controls **Flat Base** *Single Engine (2 handle)*



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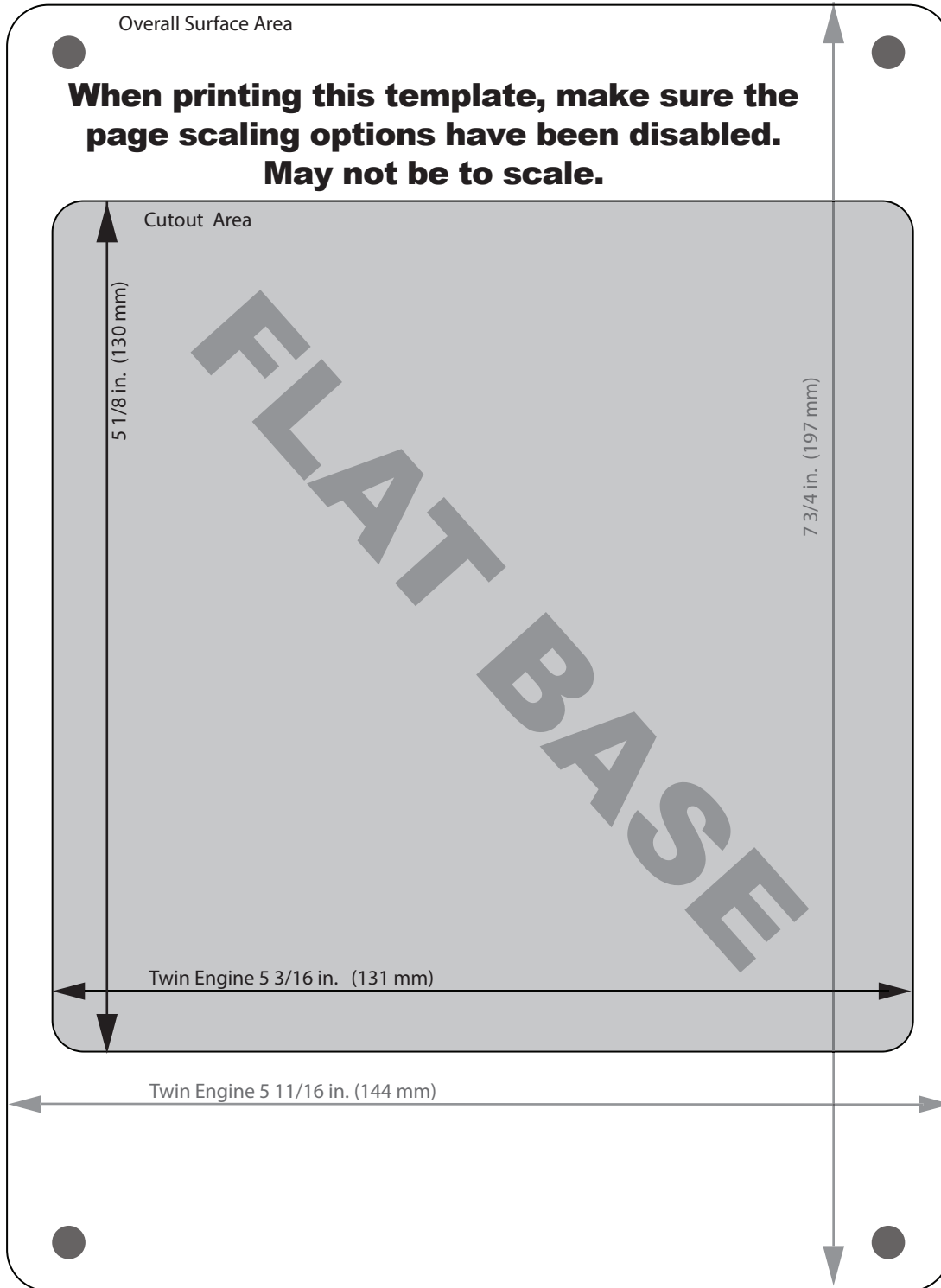
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Livorsi DTS Control **Flat Base**

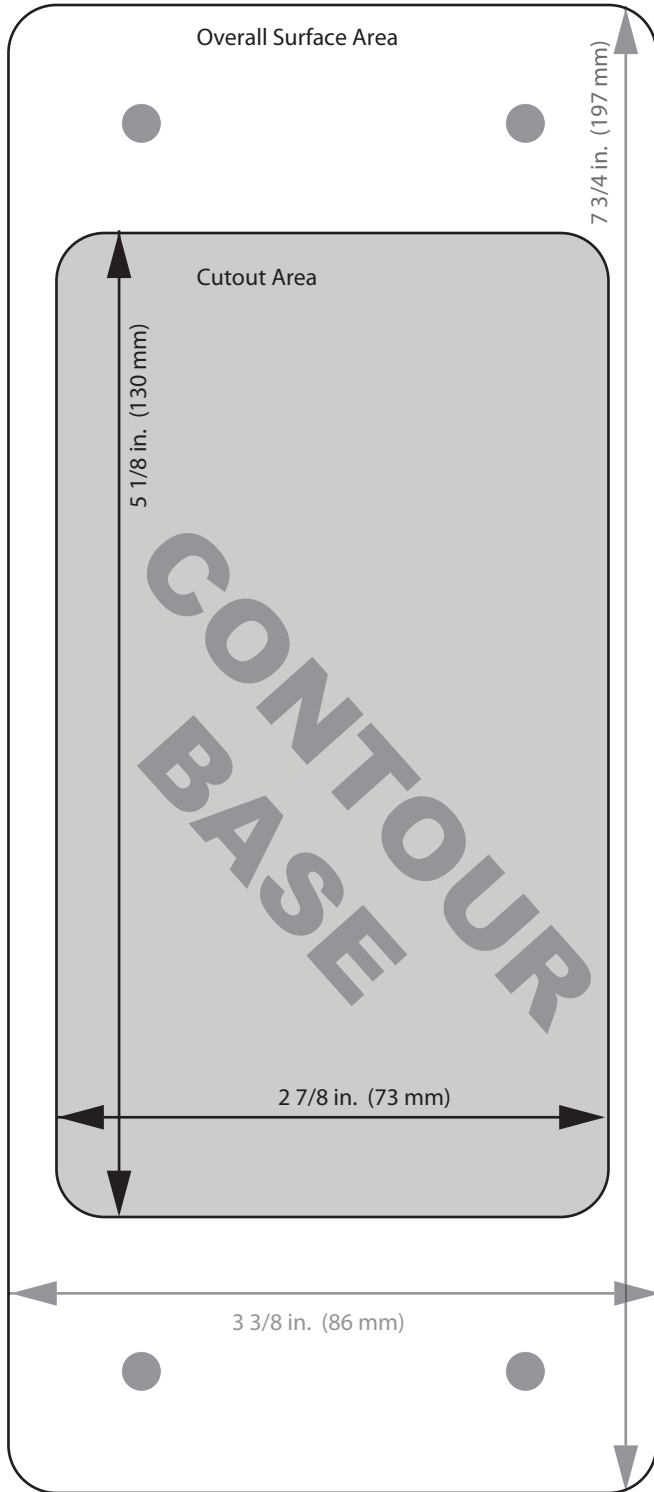
Twin Engine (4 handle)

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Livorsi DTS Controls Contour Base Single Engine (2 handle)



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Livorsi DTS Controls Contour Base

Twin Engine (4 handle)

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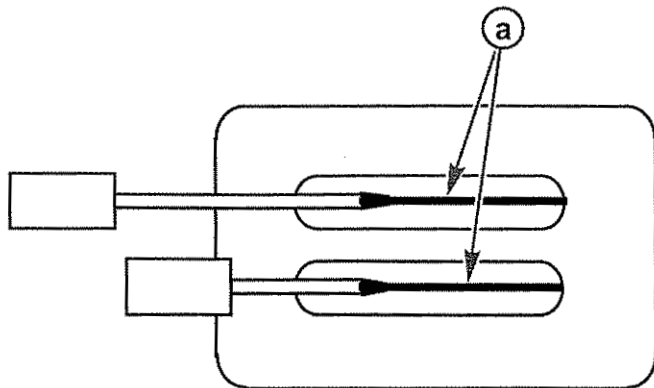


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Maintenance

Control Quadrant Maintenance:

IMPORTANT: Periodically lubricate the inside slit area of the rubber boots with a good-quality, rubber-compatible marine lubricant to ensure smooth movement of the handle within the rubber boot.



a- rubber boot slit

<UbX`Y`Gk]hW Maintenance:

IMPORTANT: Gá apá ă ăá] Á | Á cā ā * /ā Á à ^ | ç ^ á Á } Á @ Á cā á | ^ Á , ā & @ • Ę ā • ^ Á @ Á e - & c ^ á Á
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Corrosion Protection:

For maximum protection, especially in a saltwater environment, the control head and hand lever should be washed lightly with fresh water on a regular basis.

- Periodically check the control head mechanism for loose fasteners and signs of wear on moving parts.
- Keep moving parts well lubricated with a moisture-displacing lubricant.
- Periodically check the cables and engine connections for signs of wear and corrosion. Replace as necessary.

Warranty

All Livorsi Marine® products carry a limited one year warranty for repair or replacement at Livorsi's discretion. All Livorsi Marine® products are warranted to be free of defects in material and workmanship. Users/Customers of Livorsi Marine®/Livorsi® products agree not to hold Livorsi Marine, Inc., its owner or employees responsible for any damages occurring by improper installation or use of Livorsi Marine® or Livorsi® products. The company, owner or its employees will not be liable for more than the cost of the original product and in no event will Livorsi Marine® or Livorsi® be liable for special, indirect or consequential damages of any kind whatsoever.



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