



Welcome

You have selected one of the finest marine accessories available. It incorporates numerous design features to ensure operating ease and durability. With proper care and maintenance, you will enjoy using this product for many boating seasons. To ensure maximum performance and carefree use, we ask that you thoroughly read this manual.

This manual contains specific instructions for using and maintaining your product. Keep this manual with the product for reference whenever you are on the water.

Thank you for purchasing one of our products. We sincerely hope your boating will be pleasant.

Mercury Marine, Fond du Lac, Wisconsin, U.S.A.


Name / function:

Christopher D. Drees, President,
Mercury Marine



Read This Manual Thoroughly

IMPORTANT: If you do not understand any portion of this manual, contact your dealer.

Notice

Throughout this publication, safety alerts labeled WARNING and CAUTION (accompanied by the symbol ) are used to alert you to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. Observe these alerts carefully.

These safety alerts alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the service, plus common sense operation, are major accident prevention measures.

 WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Additional alerts provide information that requires special attention:

NOTICE
Indicates a situation which, if not avoided, could result in engine or major component failure.

IMPORTANT: Identifies information essential to the successful completion of the task.

NOTE: Indicates information that helps in the understanding of a particular step or action.

Descriptions and specifications contained herein were in effect at the time this manual was approved for printing. Mercury Marine, whose policies are based on continuous improvement, reserves the right to discontinue models at any time or to change specifications or designs without notice and without incurring obligation.

Warranty Message

The product you have purchased comes with a **Mercury Marine Limited Warranty**. The terms of the warranty are set forth in the Warranty Manual, which can be accessed any time on the Mercury Marine website, at <http://www.mercurymarine.com/warranty-manual>. The Warranty Manual contains a description of what is covered, what is not covered, the duration of coverage, how to best obtain warranty coverage, **important disclaimers, limitations, and waivers**, and other related information. Please review this important information.

Copyright and Trademark Information

© MERCURY MARINE. All rights reserved. Reproduction in whole or in part without permission is prohibited.

Alpha, Axius, Bravo One, Bravo Two, Bravo Three, Bravo Four S, Circle M with Waves Logo, GO BOLDLY, K-planes, Mariner, MerCathode, MerCruiser, Mercury, Mercury with Waves Logo, Mercury Marine, Mercury Precision Parts, Mercury Propellers, Mercury Racing, MotorGuide, OptiMax, Pro XS, Quicksilver, SeaCore, Skyhook, SmartCraft, Sport-Jet, Verado, VesselView, Zero Effort, Zeus, #1 On the Water and We're Driven to Win are registered trademarks of Brunswick Corporation. Mercury Product Protection is a registered service mark of Brunswick Corporation. All other marks are the property of their respective owners.

TABLE OF CONTENTS

Section 1 - Getting to Know the Joystick Piloting System

Vessel Personality.....	2	Trim/Tilt Operation with Key Off—Cowl Collision.....	4
Features and Controls.....	2	Throttle and Shift Operation with Three or More Engines.....	4
Audio Warning System.....	2	Triple-Engine Throttle and Shift Operation.....	4
Multifunction Display.....	2	Quad-Engine Throttle and Shift Operation.....	5
Electric Steering.....	3	5-Engine Throttle and Shift Operation.....	6
Joystick Piloting—Basic Operation.....	3	6-Engine Throttle and Shift Operation.....	7
Engine Guardian Strategy.....	3	Transporting a L6 or V8 JPO Boat.....	8
Low Battery Voltage Engine Control.....	4	Transporting and Towing a V12 Boat.....	8
Auxiliary Joystick (If Equipped).....	4	Trailing Boat/Outboard.....	8
Preventing Cowl Collision.....	4	Towing Boat Through Water.....	9
Preventing Cowl Collision Damage.....	4		

Section 2 - On the Water

Electronic Remote Control (ERC).....	12	To Maneuver the Boat in Forward or Reverse.....	22
Gen II Dual-Handle Console ERC.....	12	To Steer the Boat in Tight Turns at Low Speeds.....	23
ERC Supplemental Display.....	14	To Spin the Boat on its Axis at Low Speeds.....	23
Gen I Dual-Handle Console ERC.....	14	Maneuvering with the Joystick.....	23
Yacht Controls.....	15	Joystick Input and Boat Response.....	23
Digital Throttle and Shift (DTS) Features.....	15	Boats Equipped with Bow Thruster Integration.....	23
Dock Mode (If Equipped).....	15	Basic Maneuvers.....	24
Single-Lever Mode (Multiple Engine Only).....	16	Combination Maneuvers.....	26
Synchronizing Engines.....	16	Using the Adjust Button with the Joystick.....	29
Throttle-Only Mode.....	16	Joystick Trim Assist.....	29
Start/Stop All Engines.....	16	Autopilot Features.....	30
Engine Indicator LEDs.....	16	Chartplotter Requirements.....	30
No Engines Running - Start Engines.....	16	Autopilot Lights.....	30
All Engines Running - Stop Engines.....	17	Autopilot Modes.....	31
Some (Not All) Engines Running - Stop Engines.....	17	Skyhook Station Keeping.....	31
Interrupting the Start All Process.....	17	Important Safety Considerations.....	31
Helm Transfer.....	17	Engaging Skyhook.....	32
Transfer Light and Single-Helm Boats.....	17	Disengaging Skyhook.....	33
Requesting Helm Transfer.....	18	Using Skyhook.....	33
Helm Transfer and Autopilot.....	18	Auto Heading.....	34
Active Trim.....	18	Engaging Auto Heading.....	34
Introduction to Active Trim.....	18	Course Adjustment.....	34
Modes of Operation.....	18	Heading Precision.....	34
Setup and Configuration.....	19	Disengaging Auto Heading.....	35
Active Trim ERC Controls.....	19	Auto Heading Control via MFD.....	35
Active Trim Operation.....	20	Route Mode (Waypoint Sequencing).....	35
GPS.....	20	Arrival Zones.....	36
Resume Functionality.....	20	Waypoint Accuracy.....	36
Shallow Water Operation.....	20	Engaging Route Mode.....	36
Trailer Position.....	21	Route Precision.....	37
Selecting the Correct Profile.....	21	Disengaging Route Mode.....	37
What Trim Is.....	21	Auto Heading Button in Route Mode.....	37
How Trim Affects Boat Operation.....	21	Cruise Control.....	38
Boat Loading and Trim.....	22	Steering Wheel and Engine or Drive Position.....	38
Choosing an Active Trim Profile.....	22	Key Up.....	38
Active Trim Red Status Light.....	22	Engine Start Up.....	38
Single Flashing Red.....	22	Exiting Joystick.....	38
Double Flashing Red.....	22	Exiting Skyhook.....	38
Maneuvering the Boat.....	22	Exiting Route Mode.....	38
Traditional Maneuvering with Steering and Thrust.....	22		

Section 3 - Troubleshooting

Check the Multifunction Display First.....	40	Skyhook.....	42
Diagnosing DTS Problems.....	40	Steering System.....	42
Engine Guardian System.....	40	Warning Horn Sounds.....	42
Troubleshooting Charts.....	40	Thruster (if equipped).....	42
Troubleshooting Engine Related Problems.....	40	Audio Warning System.....	42
Autopilot.....	40	Caution.....	43
DTS Trackpad Features.....	40	Critical.....	43
Electronic Remote Controls.....	40	Nonconfigured Alarm.....	43
Joystick.....	41	Testing the Audio Warning System.....	43

Section 4 - Maintenance

Operator Responsibilities.....	46	Anti-Collision Link Cables and Springs.....	46
Joystick Maintenance.....	46	Checking Power Steering Fluid.....	46
V8 and L6 Models.....	46	V12 Models.....	46

Section 5 - Customer Assistance Information

Service Assistance.....	48	Ordering Literature.....	48
Local Repair Service.....	48	United States and Canada.....	48
Service Away From Home.....	48	Outside the United States and Canada.....	49
Parts and Accessories Inquiries.....	48		
Contact Information for Mercury Marine Customer Service	48		

Section 6 - Predelivery (PDI) and Customer Delivery (CDI) Checklists

Predelivery Inspection (PDI).....	52	Customer Delivery Inspection (CDI).....	53
-----------------------------------	----	---	----

Section 1 - Getting to Know the Joystick Piloting System

1

Table of Contents

Vessel Personality.....	2	Trim/Tilt Operation with Key Off—Cowl Collision.....	4
Features and Controls.....	2	Throttle and Shift Operation with Three or More Engines.....	4
Audio Warning System.....	2	Triple-Engine Throttle and Shift Operation.....	4
Multifunction Display.....	2	Quad-Engine Throttle and Shift Operation.....	5
Electric Steering.....	3	5-Engine Throttle and Shift Operation.....	6
Joystick Piloting—Basic Operation.....	3	6-Engine Throttle and Shift Operation.....	7
Engine Guardian Strategy.....	3	Transporting a L6 or V8 JPO Boat.....	8
Low Battery Voltage Engine Control.....	4	Transporting and Towing a V12 Boat.....	8
Auxiliary Joystick (If Equipped).....	4	Trailer Boat/Outboard.....	8
Preventing Cowl Collision.....	4	Towing Boat Through Water.....	9
Preventing Cowl Collision Damage.....	4		

Vessel Personality

Mercury Marine and the boatbuilder developed a vessel propulsion personality to ensure optimal performance of the joystick under ideal conditions. As wind and current conditions change, user input will be required to compensate.

Changing engine performance, propellers, or boat weight (including variations in ballast amounts) may affect the performance of the joystick as well as the top speed of the boat. Changing any parameter from the original factory equipment and settings can have a negative effect on performance. Propeller changes must not be made without first consulting the boat manufacturer and a Mercury product integration engineer.

The vessel propulsion personality is the property of the boat manufacturer. Changes or upgrades to the personality must be approved and distributed by the boat manufacturer. Mercury Marine will assist with software personality changes only at the request of the boat manufacturer.

Features and Controls

Audio Warning System

The power package is equipped with an audio warning system. The audio warning system monitors critical components and informs the operator when a malfunction has occurred. The warning system is not capable of protecting the power package from damage caused by a malfunction.

When an electronic control system detects a recordable malfunction, the audio warning system will sound to alert the operator. The duration and type of horn sound depend upon the nature of the fault condition. In the case of any horn sounding, the user should refer to the helm displays to understand the specific situation.

For the operator to view the fault code of the malfunction indicated and any recommended actions, the power package must be equipped with a gauge package that supports the warning system and can display fault codes.

The following instruments have screens that display fault codes:

- VesselView®, SmartCraft Connect, or other Mercury-approved multifunction display
- SmartCraft SC1000 Tachometer
- SmartCraft SC1000 Speedometer

NOTICE

A continuous horn indicates a critical fault. Operating the engine during a critical fault can damage components. If the warning horn emits a continuous beep, do not operate the engine unless avoiding a hazardous situation.

If the audio warning sounds, stop the engine immediately if the situation is not hazardous. Investigate the cause and correct it, if possible. If the cause cannot be determined, consult an authorized repair facility.

Multifunction Display

The power package will be connected to a multifunction display (MFD), such as the SmartCraft VesselView display or SmartCraft Connect. Some autopilot functions require the installation of a Mercury-approved MFD, such as the VesselView 703 (shown following). Refer to the MFD operation manual for detailed instructions on how to operate the vessel's display.



66855

Electric Steering

The electric steering system offers true steer-by-wire steering control and operational features. Operate the boat with caution, in an open area clear of obstructions or other boat traffic, to become familiar with the system's handling characteristics and the boat's response. The steering response, or how the boat translates in response to changes made to the wheel angle input, will vary depending on boat speed.

Become familiar with the number of turns in the steering wheel's range, lock-to-lock. The engines do not have to be running for this test (but the keys must be in the **ON** position). Steer to starboard until the wheel stops. Note the position of the wheel at the physical limit stop (steering end stop). Then turn the wheel to the port steering end stop while counting the number of turns in degrees or fractions of a revolution. The number of total turns divided in half will provide the approximate center position of the wheel.

Similar to the operation of a hydraulic steering system, the center position of the wheel can change, but the lock-to-lock, number of turns will not change. The centered position of the wheel will change if the wheel is turned away from the center position by more than one turn when the engines are started. At this point, the angle of the drives will match the wheel position within one turn of center in either direction.

If the wheel is not straight ahead when exiting auto heading or route mode, the wheel will adopt a center position based on where it is located on the exit of the autopilot mode. As the boat is driven, the center position of the wheel will gradually migrate back to the original center position. The changes will be gradual, but will cause the operator to intuitively move the steering wheel back toward the original established center position for straight ahead boat operation.

If equipped, the drive position indicator on the VesselView display will provide the straight ahead position of the drives.

The joystick offers intuitive control of the boat during low speed operation and docking. In this mode, engine speed is limited to prevent prop wash or cavitation. Pressing the adjust button on the joystick trackpad (to change from two lit segments to one) further reduces engine demand.

The remote control levers can be used for maneuvering if conditions require more thrust than is offered by either of the joystick modes.

The remote control lever must be in neutral position for the joystick to operate.

Joystick Piloting—Basic Operation

IMPORTANT: The vessel personality that determines how a boat responds to joystick commands was created for typical boat loading and operation in ideal boating conditions. Variations in wind, current, and boat loading will have a substantial effect on the performance of joystick operations. For example, a boat that is loaded heavily to the bow will behave differently than a boat that is loaded heavily to the stern. The vessel personality cannot anticipate nor compensate for these variables. It is the operator's responsibility to make the necessary corrections by changing the loading of the boat or by performing additional maneuvers to track the desired path.

The joystick offers intuitive control of the boat during low-speed operation and dock mode. In dock mode, engine speed is limited to prevent excessive prop wash or unacceptable boat dynamics. For multiple engine boats, pressing the adjust button on the joystick trackpad (to change from two lit segments to one) further reduces engine demand. The remote control levers must be used for boat maneuvering if conditions require more thrust than is offered by either joystick mode. On boats equipped with the thruster integration kit, pressing the adjust button will disable the thruster integration. The LED will go from two segments to one.

Although joystick operation is intuitive, avoid using it until an opportunity becomes available to become familiar with the boat's handling characteristics. Practice operating the boat with the joystick in open water. Thereafter, occasionally practice operating the boat without the joystick in case the joystick becomes inoperable.

The remote control levers must be in the neutral position for the joystick to operate.

Engine Guardian Strategy

IMPORTANT: Boat speed could be reduced to idle and may not respond to the throttle demands.

Engine Guardian Strategy is designed to help reduce the potential for engine damage by reducing engine power when a potential problem is detected by the PCM or SmartCraft system.

When the Guardian system detects a failure in the shift system or other abnormal condition, it will leave the shift actuator in the last known position. Therefore, if the drive is in gear and there is a fault, the drive remains in gear. Pulling the lanyard, activating the E-stop switch, or turning the key to the **OFF** position and restarting the engine will result in the gear position returning to neutral. This allows the operator to continue to maneuver the boat in forward gear and return to port.

Engine Guardian monitors:

- Engine oil pressure
- Coolant temperature
- Seawater pressure

Section 1 - Getting to Know the Joystick Piloting System

- Engine overspeed
- Shift system

Should Engine Guardian engage on the boat, the SmartCraft instrumentation will indicate this and advise the operator to reduce throttle if necessary. Engine Guardian may also reduce the throttle if the situation requires it.

To avoid a possible recurrence of the problem contact an authorized dealer. The PCM will store the faults and with this information the technician will be able to more rapidly diagnose problems.

Low Battery Voltage Engine Control

Engine idle speed may gradually increase in increments of 25 RPM to help compensate for low battery voltage. The increase of RPM will be minimal and may not be noticed. When docking or maneuvering the boat in close quarters, be aware that the engine RPM may increase without movement of the remote control handle or joystick.

Auxiliary Joystick (If Equipped)

An auxiliary joystick located at a separate station offers the same control of the boat as does a helm joystick. The operator may transfer to an auxiliary joystick station after meeting certain control requirements at the main helm.

There may be multiple auxiliary joystick stations located on the boat. Each auxiliary joystick station is equipped with a joystick and an E-stop switch.

The auxiliary joystick differs slightly from the standard joystick, in that it has only two buttons:

- An adjust button equipped with two indicator lights
- A transfer button equipped with an indicator light

Preventing Cowl Collision

Preventing Cowl Collision Damage

The anti-collision cables on the front of the engines prevent cowl collision while the boat is underway. Docking maneuvers with the joystick may cause the engines to splay toward the boat's center of gravity. If the key switches are turned off while the engines are splayed, the engines will remain splayed. To prevent an accidental cowl collision, ensure that the engines are centered before turning them off.

To automatically center the engines after using the joystick, leave the key switches in the **RUN** position. Move the steering wheel through the steering motor's slight resistance or twist the joystick in either direction. Turn the keys to the **OFF** position.

Trim/Tilt Operation with Key Off—Cowl Collision

Joystick Piloting for Outboards incorporates a feature that allows the operation of the trim for a specific amount of time after the ignition key is turned to the **OFF** position. The trim motor is not directly controlled by the trim/tilt switch. It is controlled by computer software. The computer must receive a request to activate the trim. After the key is turned to the **OFF** position, trim motor activation is available for 15 minutes.

After the key switch is turned off, use the trim switch on the electronic remote control handle, or the dash-mounted trim switch. The engines will trim up, but they will remain in the steering position they were at when the key was turned off. The angle of the boat transom, and how close each engine is mounted, has a direct effect on where the trim/tilt angle may allow the cowl to collide.

To avoid cowl collision when trimming up engines that are not operating, be sure to center the engines before turning them off.

Throttle and Shift Operation with Three or More Engines

Triple-Engine Throttle and Shift Operation

Movement of the handles on the remote control allows the boat operator to control the engine throttle speed and gear shift positions of all three engines.

The throttle and shift function is dependent on what engines are running. Refer to the following table.

Port Engine	Center Engine	Starboard Engine	Control Handle Function
Running	Running	Running	Port engine throttle and shift = controlled by port control handle
			Starboard engine throttle and shift = controlled by starboard control handle
			Center engine throttle = shadows the engine with the lowest throttle setting until the port and starboard engine are within 10% of one another at which point all engines synchronize to the starboard engine's RPM.
			Center engine shift = neutral unless both engines are in the same gear
Running	Running	Off	Port and center engine throttle and shift = controlled by port control handle
Off	Running	Running	Starboard and center engine throttle and shift = controlled by starboard control handle
Running	Off	Running	Port engine throttle and shift = controlled by port control handle
			Starboard engine throttle and shift = controlled by starboard control handle
Running	Off	Off	Port engine throttle and shift = controlled by port control handle
Off	Off	Running	Starboard engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned ON)	Running	Off (ignition key switch turned ON)	Center engine throttle and shift = neutral/idle unless both control handles are in the same gear

Turning off one of the outer engines while underway will cause the center engine to go into forced neutral/idle. Operation to the center engine can be restored by moving the control handle of the functioning outer engine back into neutral position and then engaging. The center engine speed and gear shift will then be controlled by the functioning outer engine.

Turning off the center engine while underway will have no effect on the operation of the outer engines.

If a failure should occur while underway which causes one of the outer engines into forced neutral/idle condition, the center engine will also be forced to neutral/idle. Operation to the center engine can be restored by moving the control handle of the functioning outer engine back into neutral and then engaging.

Quad-Engine Throttle and Shift Operation

Movement of the handles on the remote control allows the boat operator to control the engine throttle speed and gear shift positions of all four engines.

The throttle and shift function is dependent on what engines are running. Refer to the following table.

Port Outer Engine	Port Inner Engine	Starboard Inner Engine	Starboard Outer Engine	Control Handle Function
Running	Running	Running	Running	Port inner and outer engines throttle and shift = controlled by port control handle
				Starboard inner and outer engines throttle and shift = controlled by starboard control handle
Running	Running	Off	Off	Port inner and outer engine throttle and shift = controlled by port control handle
Off	Off	Running	Running	Starboard inner and outer engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned ON)	Running	Running	Running	Port inner engine throttle and shift = controlled by port control handle
Running	Running	Running	Off (ignition key switch turned ON)	Starboard inner engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned OFF)	Running	Running	Running	Port inner engine throttle and shift = controlled by starboard control handle
Running	Running	Running	Off (ignition key switch turned OFF)	Starboard inner engine throttle and shift = controlled by port control handle
Running	Off	Off	Running	Port outer engine throttle and shift = controlled by port control handle
				Starboard outer engine throttle and shift = controlled by starboard control handle

Section 1 - Getting to Know the Joystick Piloting System

Port Outer Engine	Port Inner Engine	Starboard Inner Engine	Starboard Outer Engine	Control Handle Function
Off (ignition key switch turned ON)	Running	Running	Off (ignition key switch turned ON)	Port inner engine throttle and shift = controlled by port control handle
				Starboard inner engine throttle and shift = controlled by starboard control handle

Turning off the starboard outer engine while underway will cause the starboard inner engine to go into forced neutral/idle. Operation to the inner engine can be restored by turning the starboard outer engine ignition key to the **ON** position and moving the starboard control handle back into neutral position and then engaging. The inner engine speed and gear shift will then be controlled by the starboard control handle.

Turning off the port outer engine while underway will cause the port inner engine to go into forced neutral/idle. Operation to the inner engine can be restored by turning the port outer engine ignition key to the **ON** position and moving the port control handle back into neutral position and then engaging. The inner engine speed and gear shift will then be controlled by the port control handle.

Turning off one of the inner engines while underway will have no effect on the operation of the outer engines.

If a failure should occur while underway which causes the starboard outer engines into forced neutral/idle condition, the inner starboard engine will also be forced to neutral/idle. Operation to the inner engine can be restored by moving the starboard control handle back into neutral and then engaging.

If a failure should occur while underway which causes the port outer engines into forced neutral/idle condition, the inner port engine will also be forced to neutral/idle. Operation to the inner engine can be restored by moving the port control handle back into neutral and then engaging.

5-Engine Throttle and Shift Operation

Movement of the handles on the remote control allows the boat operator to control the engine throttle speed and gear shift positions of all five engines.

The throttle and shift function is dependent on what engines are running. Refer to the following table.

Port Outer Engine	Port Engine	Center Engine	Starboard Engine	Starboard Outer Engine	Control Handle Function
Running	Running	Running	Running	Running	Port inner and outer engines throttle and shift = controlled by port control handle
					Starboard inner and outer engines throttle and shift = controlled by starboard control handle
Running	Running	Running	Off	Off	Port inner and outer engine throttle and shift = controlled by port control handle
Off	Off	Running	Running	Running	Starboard inner and outer engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned ON)	Running	Running	Running	Running	Port inner engine throttle and shift = controlled by port control handle
Running	Running	Running	Running	Off (ignition key switch turned ON)	Starboard inner engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned OFF)	Running	Running	Running	Running	Port inner engine throttle and shift = controlled by starboard control handle
Running	Running	Running	Running	Off (ignition key switch turned OFF)	Starboard inner engine throttle and shift = controlled by port control handle

Port Outer Engine	Port Engine	Center Engine	Starboard Engine	Starboard Outer Engine	Control Handle Function
Running	Off	Running	Off	Running	Port outer engine throttle and shift = controlled by port control handle
					Starboard outer engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned ON)	Running	Running	Running	Off (ignition key switch turned ON)	Port inner engine throttle and shift = controlled by port control handle
					Starboard inner engine throttle and shift = controlled by starboard control handle

6-Engine Throttle and Shift Operation

Movement of the handles on the remote control allows the boat operator to control the engine throttle speed and gear shift positions of all six engines.

The throttle and shift function is dependent on what engines are running. Refer to the following table.

Port Outer Engine	Port Engine	Port Inner Engine	Starboard Inner Engine	Starboard Engine	Starboard Outer Engine	Control Handle Function
Running	Running	Running	Running	Running	Running	Port inner and outer engines throttle and shift = controlled by port control handle
						Starboard inner and outer engines throttle and shift = controlled by starboard control handle
Running	Running	Running	Off	Off	Off	Port inner and outer engine throttle and shift = controlled by port control handle
Off	Off	Off	Running	Running	Running	Starboard inner and outer engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned ON)	Off (ignition key switch turned ON)	Running	Running	Running	Running	Port inner engine throttle and shift = controlled by port control handle
Running	Running	Running	Running	Off (ignition key switch turned ON)	Off (ignition key switch turned ON)	Starboard inner engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned OFF)	Off (ignition key switch turned OFF)	Running	Running	Running	Running	Port inner engine throttle and shift = controlled by starboard control handle
Running	Running	Running	Running	Off (ignition key switch turned OFF)	Off (ignition key switch turned OFF)	Starboard inner engine throttle and shift = controlled by port control handle
Running	Running	Off	Off	Running	Running	Port outer engine throttle and shift = controlled by port control handle
						Starboard outer engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned ON)	Off (ignition key switch turned ON)	Running	Running	Off (ignition key switch turned ON)	Off (ignition key switch turned ON)	Port inner engine throttle and shift = controlled by port control handle
						Starboard inner engine throttle and shift = controlled by starboard control handle

Transporting a L6 or V8 JPO Boat

NOTICE

Avoid damage to the steering system from operation while locked. Turning the ignition key switches to the ON or RUN positions with the steering locks in place can cause serious damage to the steering system. Always remove the steering locks before inserting the ignition keys into the switches.

The engines on a Joystick Piloting for Outboard boat are not connected by a tie bar and can move independently under the force of gravity and the vibrations incurred during transport, making it possible for the engines to contact each other.

To avoid the possibility of the engines making contact during transport:

1. Place the engines in their normal operating position.
2. Remove all ignition keys.
3. Remove the propellers (optional on short moves).
4. Place a steering lock for trailering onto the steering cylinder, as shown.



NOTE: For triple-, quad-, 5-, and 6-engine applications, the anti-collision cables are sufficient to restrain the center/inner engines.

5. Ensure that the steering lock knob is fully tightened.

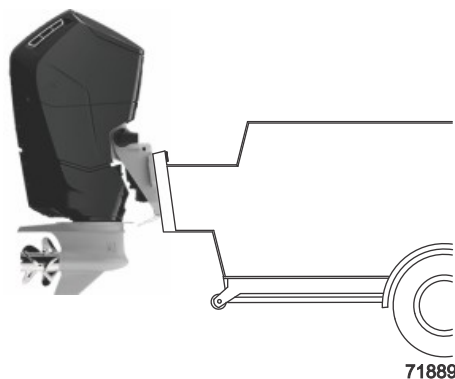
The engines may be raised to their full trailering position with the steering locks in place.

IMPORTANT: Always remove the steering locks before inserting the ignition keys into the switches.

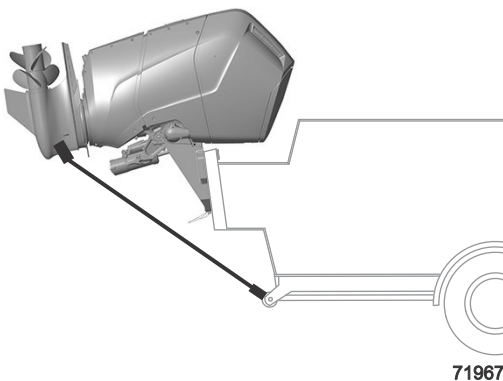
Transporting and Towing a V12 Boat

Trailering Boat/Outboard

When transporting the boat on a trailer, the outboard should be positioned in the vertical operating position with no additional support required.



If additional ground clearance is required, the outboard should be tilted up as needed and supported with an accessory transom support device.



Additional clearance may be required for railroad crossings, driveways, and trailer bouncing. See a local dealer for recommendations.

IMPORTANT: Do not rely on the power trim/tilt system to maintain proper ground clearance for trailering. The power trim/tilt system is not intended to support the outboard for trailering.

Towing Boat Through Water

If the boat is being towed by another boat on the water, trim the drives up out of the water so the propellers are clear above the water.

IMPORTANT: Do not use the drives as a rudder, transmission damage may occur.

Notes:

Section 2 - On the Water

Table of Contents

Electronic Remote Control (ERC).....	12	To Maneuver the Boat in Forward or Reverse	22
Gen II Dual-Handle Console ERC.....	12	To Steer the Boat in Tight Turns at Low Speeds ...	23
ERC Supplemental Display.....	14	To Spin the Boat on its Axis at Low Speeds	23
Gen I Dual-Handle Console ERC.....	14	Maneuvering with the Joystick.....	23
Yacht Controls.....	15	Joystick Input and Boat Response	23
Digital Throttle and Shift (DTS) Features.....	15	Boats Equipped with Bow Thruster Integration	23
Dock Mode (If Equipped)	15	Basic Maneuvers	24
Single-Lever Mode (Multiple Engine Only)	16	Combination Maneuvers	26
Synchronizing Engines	16	Using the Adjust Button with the Joystick	29
Throttle-Only Mode	16	Joystick Trim Assist.....	29
Start/Stop All Engines.....	16	Autopilot Features.....	30
Engine Indicator LEDs	16	Chartplotter Requirements.....	30
No Engines Running - Start Engines	16	Autopilot Lights.....	30
All Engines Running - Stop Engines	17	Autopilot Modes.....	31
Some (Not All) Engines Running - Stop Engines	17	Skyhook Station Keeping.....	31
Interrupting the Start All Process	17	Important Safety Considerations	31
Helm Transfer.....	17	Engaging Skyhook	32
Transfer Light and Single-Helm Boats.....	17	Disengaging Skyhook	33
Requesting Helm Transfer.....	18	Using Skyhook	33
Helm Transfer and Autopilot.....	18	Auto Heading.....	34
Active Trim.....	18	Engaging Auto Heading	34
Introduction to Active Trim.....	18	Course Adjustment	34
Modes of Operation	18	Heading Precision	34
Setup and Configuration	19	Disengaging Auto Heading	35
Active Trim ERC Controls.....	19	Auto Heading Control via MFD	35
Active Trim Operation.....	20	Route Mode (Waypoint Sequencing).....	35
GPS	20	Arrival Zones	36
Resume Functionality	20	Waypoint Accuracy	36
Shallow Water Operation	20	Engaging Route Mode	36
Trailer Position	21	Route Precision	37
Selecting the Correct Profile.....	21	Disengaging Route Mode	37
What Trim Is	21	Auto Heading Button in Route Mode	37
How Trim Affects Boat Operation	21	Cruise Control.....	38
Boat Loading and Trim	22	Steering Wheel and Engine or Drive Position.....	38
Choosing an Active Trim Profile	22	Key Up	38
Active Trim Red Status Light.....	22	Engine Start Up	38
Single Flashing Red	22	Exiting Joystick	38
Double Flashing Red	22	Exiting Skyhook	38
Maneuvering the Boat.....	22	Exiting Route Mode	38
Traditional Maneuvering with Steering and Thrust.....	22		

Electronic Remote Control (ERC)

Joystick piloting systems require a Digital Throttle and Shift (DTS) electronic remote control (ERC). Because it is electronic, an ERC is capable of several features beyond the basic remote control functions of throttle and shift. These additional features are described in **Digital Throttle and Shift (DTS) Features**.

There are several DTS ERCs that can be used with a joystick piloting system. Although all allow the digital control of throttle and shift that is necessary for a joystick piloting system, it is important to note that not all DTS ERCs are equipped with all DTS features.

Gen II Dual-Handle Console ERC

Gen II Mercury DTS ERCs do not have the trackpad found on Gen I ERCs. This means that some of the DTS features are not available from the ERC. Some features eliminated from the ERC, however, can still be controlled via a multifunction display (such as Mercury's VesselView display) or certain SmartCraft gauges.



71716

Dual-engine console ERC - no trim



71717

Dual-engine console ERC - with trim



71719

Triple-engine console ERC - standard



71721

Quad-engine console ERC - standard



71723

Five or six-engine console ERC

Premier ERCs have an integral display, and are available for dual, triple, or quad-engine configurations. Refer to **ERC Supplemental Display** for details.



71718

Dual-engine console ERC - premier



71720

Triple-engine console ERC - premier



71722

Quad-engine console ERC - premier

Description of Controls:

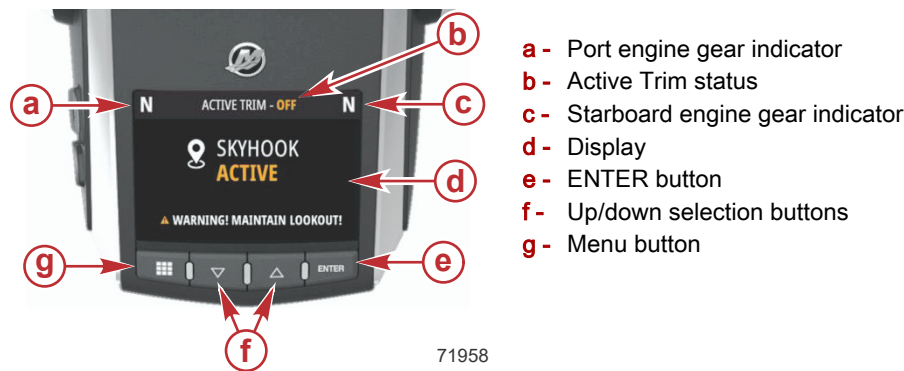


Quad-engine premier ERC shown, others similar

Ref	Control/LED	Function
a	Neutral (N) LEDs (one on each handle)	Illuminate when the engine is in the neutral gear position. The lights flash when the engine is in throttle-only mode.
b	Brightness (+ and -)	Increases and decreases the brightness settings for the lights and display (if equipped) on the ERC.
c	1 LEVER	Enables the throttle and shift functions of all engines to be controlled by the port lever. Refer to Single-Lever Mode .
d	TRANSFER	Allows boat control to be transferred to a different helm. Refer to Helm Transfer .
e	THROTTLE ONLY	Allows the boat operator to increase engine RPM without shifting into gear. Refer to Throttle-Only Mode .
f	ACTIVE TRIM (if equipped)	Turns the Active Trim feature ON or OFF. Refer to Active Trim .
	Profile ▲ and ▼	Changes the selected Active Trim profile.
	Active Trim LEDs (1, 2, 3, 4, 5)	Indicates the currently selected Active Trim profile.
g	START/STOP individual engines	Press to start or stop the indicated engine, as equipped: P (port), PC (port center), C (center), SC (starboard center), S (starboard)
h	Display and display buttons (if equipped)	Refer to ERC Supplemental Display for details.
i	START/STOP - ALL ENGINES	Starts or stops all engines. If some, but not all engines are running, pressing this button will stop all running engines. Refer to Start/Stop All Engines .
j	UP ▲ and DN ▼ —trim control (if equipped)	<p>Raises and lowers the engines/drives for best efficiency or for conditions such as shallow water or trailering.</p> <p>NOTE: Trim switches for the individual engines are located on the front (bow side) of the ERC.</p> <p>Some boats are equipped with separately-mounted trim controls.</p>

ERC Supplemental Display

The ERC supplemental display will show the faults and the status of various features. Warnings for advanced features, such as Skyhook and Active Trim, will appear on the ERC supplemental display. Visit mercurymarine.com for additional details.



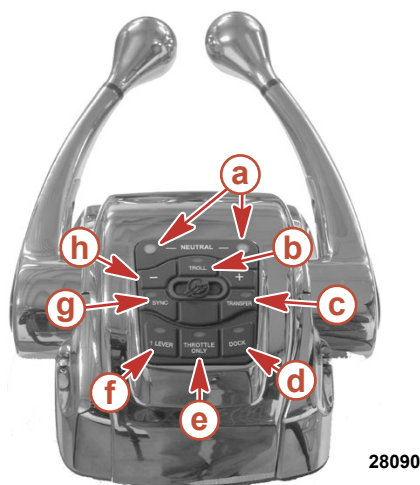
Gen I Dual-Handle Console ERC



Dual-engine ERC with integrated trim switches

Ref	Control	Function
a	Trim control - handle	Raises and lowers the engines/drives for best efficiency, or for conditions such as shallow water or trailering.
b	Trim control - trackpad	
c	NEUTRAL —lights	Illuminate when the engine is in the neutral gear position. The lights flash when the engine is in throttle-only mode.
d	TRANSFER	Allows boat control to be transferred to a different helm. Refer to Helm Transfer .
e	DOCK	Available during ERC operation only. Control lever throttle capacity is reduced to approximately 50% of normal control lever throttle demand.
f	+ increase	Increases the brightness settings for the trackpad.
g	THROTTLE ONLY	Allows the boat operator to increase engine RPM without shifting into gear. Refer to Throttle-Only Mode .
h	– decrease	Decreases the brightness settings for the trackpad.
i	1 LEVER	Enables the throttle and shift functions of all engines to be controlled by the port lever. Refer to Single-Lever Mode .
j	SYNC	Turns the auto-synchronization feature off or on. Refer to Synchronizing Engines .

Yacht Controls



28090

Yacht ERC with DTS trackpad

Ref	Control	Function
a	NEUTRAL lights	Illuminate when the transmission is in the neutral gear position. The lights flash when the engine is in throttle-only mode.
b	TROLL	Troll reduces the propeller speed to lower than that of engine speed for the first 25% of lever travel.
c	TRANSFER	Allows boat control to be transferred to a different helm. Refer to Helm Transfer .
d	DOCK	Reduces the throttle capacity to approximately 50% of normal throttle.
e	THROTTLE ONLY	Allows the boat operator to increase engine RPM for warm-up, without shifting the transmission into gear.
f	1 LEVER	Enables the throttle and shift functions of both engines to be controlled by the starboard lever.
g	SYNC	Turns the auto-synchronization feature off or on. Refer to Synchronizing Engines .
h	+ (increase) and - (decrease)	Increases and decreases idle speed only. The RPM range varies depending on application and engine model.

Digital Throttle and Shift (DTS) Features

IMPORTANT: Not all DTS ERCs are equipped with all DTS features. Some features are accessible via multifunction display (MFD) or SmartCraft gauge.

The DTS system features several operational modes for the electronic remote control (ERC) levers. Any of the listed features can operate simultaneously. Not all ERCs are equipped with all features.

Dock Mode (If Equipped)

Dock mode reduces the RPM throughout the throttle lever range by 50%, allowing finer control of engine power in close quarter situations. If more power is needed for boat maneuvering when environmental conditions require more thrust, do not use dock mode.

To engage dock mode:

1. Place both ERC levers in neutral.
2. Press the **DOCK** button located on the DTS trackpad.
3. The dock light turns on.
4. Place either ERC lever into gear.

NOTE: Engine RPM and available power will be proportionately reduced throughout the throttle lever range.

To disengage dock mode:

1. Bring both ERC levers to any detent or neutral.
2. Press **DOCK**. The dock light turns off.

Single-Lever Mode (Multiple Engine Only)

DTS features the ability to command all engines with a single lever. This feature simplifies engine management. Single-lever mode has no effect on the joystick function.

To engage single-lever mode:

1. Place both ERC levers in neutral.
2. Press **1 LEVER**. The single-lever light will turn on.
3. Place the port ERC lever into gear.
4. The RPM on the engines will increase and decrease in sync, while both drives remain in gear.

To disengage single-lever mode:

1. Place both ERC levers in neutral.
2. Press **1 LEVER**. The single-lever light will turn off.

Synchronizing Engines

Sync mode is an automatic engine synchronization feature that engages automatically at key-up. Sync mode monitors the position of both ERC levers. If both levers are within 10% of one another, all engines synchronize to the starboard engine's RPM. The SmartCraft system will automatically disengage sync at the last 10% of the lever range to allow each engine the ability to reach the maximum available RPM. Sync mode cannot engage until its minimum RPM is met.

Throttle-Only Mode

Placing the ERC in throttle-only mode will avoid unintended gear engagement. The engines or drives will turn using the steering wheel or the joystick and the RPM of the engines can be increased while in throttle-only mode, but the gear position will remain in neutral.

To engage throttle-only mode:

1. Place both ERC levers into neutral.
2. Press **THROTTLE ONLY**. The throttle-only light will turn on and the neutral lights will blink.
3. Place either ERC lever into forward or reverse detent position. The warning horn will beep each time the levers are moved into or out of gear while in throttle-only mode, but the drive will remain in neutral.

NOTE: Throttle-only mode also affects the joystick operation, if equipped. The drives will move and the engine RPM can be increased, but the gear position will remain in neutral.

4. The RPM of the engines can be increased.

To disengage throttle-only mode:

1. Place both ERC levers into neutral. Throttle-only mode will not disengage unless the ERC levers are in neutral.

NOTE: Pressing **THROTTLE ONLY** while the ERC levers are in gear will only turn off the throttle-only light. The engines will remain in throttle-only mode until the operator returns the levers to the neutral position.

2. Press **THROTTLE ONLY**. The throttle-only light will turn off.
3. The neutral lights stop flashing and remain illuminated. Either the ERC levers or the joystick (if equipped) can now be used to control the boat's movement.

Start/Stop All Engines

Dual-handle console ERCs have a **START/STOP ALL ENGINES** button, which allows starting or stopping all engines with a single button push. The exact behavior of the engines depends on:

1. How many engines are running when the button is pressed (none, all, or some)
2. Whether a particular engine's key switch is **ON** or **OFF**
3. What other actions the operator takes immediately after pressing the **START/STOP ALL ENGINES** button



72256

Engine Indicator LEDs

LEDs on the **START/STOP ALL ENGINES** button and the individual engine **START/STOP** buttons (on the aft end of the ERC) indicate the status of all engines.

No Engines Running - Start Engines

When no engines are running (and no engine status LEDs are lit), press the **START/STOP ALL ENGINES** button to start all engines.

1. The LED on the **START/STOP ALL ENGINES** button turns on.

2. The engines will start according to the following sequence (as equipped):
 - a. Starboard outer engine - the LED on the starboard outer (**S**) button will light when the engine starts.
 - b. Port outer engine - the LED on the port outer (**P**) button will light when the engine starts.
 - c. Starboard inner engine - the LED on the starboard inner (**C** or **SC**) button will light when the engine starts.
 - d. Port inner engine - the LED on the port inner (**PC**) button will light when the engine starts.

Certain conditions will cause an engine to be skipped in the starting sequence. The starting sequence will ignore an engine and continue with any remaining engines, if:

1. SmartStart times out (around 8 seconds) for an engine
2. The ignition key switch is **OFF** for an engine (the starting sequence will proceed with no delay)

All Engines Running - Stop Engines

When all engines are running (and all engine status LEDs are lit), press the **START/STOP ALL ENGINES** button to stop all engines. All engine status LEDs (individual and the **ALL ENGINES** LED) will turn off.

Some (Not All) Engines Running - Stop Engines

When some but not all engines are running (and the corresponding engine status LEDs are lit), press the **START/STOP ALL ENGINES** button to stop all running engines. All engine status LEDs (individual and the **ALL ENGINES** LED) will turn off.

Interrupting the Start All Process

Pressing any **START/STOP** button or turning an ignition key switch during engine start up is not recommended.

Helm Transfer

Some boats are designed to allow control of the boat from more than one location. These locations are commonly referred to as helms or stations. Helm transfer is a term used to describe the method of transferring control from one helm (or station) to another helm.

⚠ WARNING

Avoid serious injury or death from loss of boat control. The boat operator should never leave the active station while engine is in gear. Helm transfer should only be attempted while both stations are manned. One-person helm transfer should only be performed while engine is in neutral.

The helm transfer function allows the boat operator to select which helm is in control of the boat. Before a transfer can be initiated, the ERC levers at the active helm and at the helm intended for the transfer must be in the neutral position.

NOTE: If an attempt is made to transfer helm control when the ERC levers are not in neutral, a beep will sound and the helm transfer will not succeed until the levers at the helms are moved to neutral and the transfer is requested again.

Some fault codes may appear on the Mercury-approved multifunction display if other control or navigation functions are attempted after the helm transfer procedure is started. To remove the fault codes it may be necessary to cycle the key switch **OFF** and **ON**, and then restart the helm transfer procedure. Ensure that other control and navigation inputs are performed after the helm transfer is complete to avoid setting fault codes.

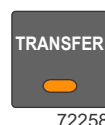
NOTICE

The ERC levers must be in neutral to perform a helm transfer. While in neutral your vessel could drift and collide with objects nearby resulting in damage. Keep an adequate look out while performing the helm transfer.

To avoid damage, use extra care when attempting a helm transfer while the boat is close to docks, piers, or other fixed items or when near other boats.

Transfer Light and Single-Helm Boats

IMPORTANT: On boats with a single-helm, the **TRANSFER** light is constantly on, whenever the ignition key switch is on. This is normal.



Requesting Helm Transfer

NOTE: Any movement of the joystick (if equipped) or ERC levers after pressing the transfer button terminates the helm transfer request. A single beep sounds and the transfer button light turns off signaling the end of the transfer request.



To request the transfer of boat control from one helm to another:

1. All of the ignition keys must be in the **ON** position.
2. All of the vessel's ERC levers must be in the neutral position.
3. At the helm that is being requested to be made active, press the **TRANSFER** button once. The transfer light turns on and one beep will sound confirming the impending transfer.

NOTE: If all ERC levers are not in neutral, the neutral lights will flash. Move all ERC levers to neutral and the neutral light will stop flashing.

4. With the transfer light and neutral light on, press the **TRANSFER** button a second time to complete the helm transfer.
5. When the helm transfer is complete, another beep sounds. The transfer light stays on at the active helm location.

NOTE: If the helm transfer is not completed in 10 seconds, the request is automatically cancelled and a double beep sounds. Control will remain at the existing active helm. Press the transfer button again to restart helm transfer.

6. The helm where the transfer request was initiated is now active and controls the boat.

Helm Transfer and Autopilot

Transferring control from an active helm to an inactive helm (from one station to another station) affects the functionality of autopilot modes. Some of the effects are listed.

- Auto heading mode will disengage when the ERC levers are moved to the neutral position. The auto heading must be engaged at the selected active helm.
- Requesting a helm transfer places the autopilot into standby mode. Any required inputs will need to be entered at the selected active helm.
- Skyhook will disengage when the transfer button is pressed the second time. Skyhook must be engaged at the selected active helm.
- If auto heading is activated, the helm transfer functionality is disabled. Turn this feature off and resume the transfer. At the selected active helm, engage auto heading.
- If route mode is activated, the helm transfer functionality is disabled. Turn this feature off and resume the transfer. At the selected active helm, engage route mode.
- Route mode (waypoint sequencing) control of the route and display of route data on the chartplotter does not automatically transfer to the chartplotter at the active helm. The chartplotter must be turned on at the selected active helm, input the waypoint route to be tracked, and engage route mode.

IMPORTANT: If faults are encountered while attempting to complete a helm transfer, all controlling modules for the engine and the joystick piloting system must be turned off. To turn these controlling modules off, turn both engines off and place both engine ERC handles in reverse full throttle for three seconds.

Active Trim

Introduction to Active Trim

Active Trim is Mercury Marine's patented GPS-based automatic trim system. This intuitive, hands-free system continually adjusts engine or drive trim for changes in operating conditions to improve performance, fuel economy, and ease of operation. It responds to boat maneuvers with precision and delivers a better overall driving experience. No knowledge of trimming an engine or drive is needed to take advantage of Active Trim.

- As the boat accelerates, the engine or drive will trim out.
- As the boat decelerates, for example, while making a turn, the engine or drive will trim in.
- Active Trim can be overridden at any time by using the regular, manual trim buttons.
- Active Trim allows the boat operator to compensate for changes in boat load, driver preferences, and weather conditions while maintaining full automatic control.

Modes of Operation

The Active Trim system has four modes of operation:

**1. Idle speeds**

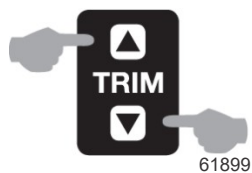
Maintains the existing trim position.

**2. Acceleration (hole shot)**

Tucks the engine or drive under to minimize bow rise and improve time-to-plane.

**3. Planing speeds**

Progressively trims the engine or drive based on GPS speed to maintain the most efficient running attitude.

**4. Override**

When the boat operator uses manual trim, the Active Trim system is immediately overridden, returning full control to the operator.

Setup and Configuration

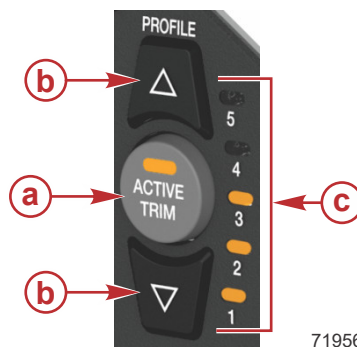
Refer to the authorized Mercury dealer for setup and configuration instructions.

Active Trim ERC Controls

IMPORTANT: Authorized Mercury dealers have the ability to disable the Active Trim feature. In this case, the Active Trim buttons and lights on the ERC will not function.

Section 2 - On the Water

Use the buttons and lights on the ERC to control the Active Trim feature.



Active Trim controls on the ERC

Ref	Control/LED	Function
a	ACTIVE TRIM button	Turns the Active Trim feature on or off.
	System status light	Provides Active Trim status information: <ul style="list-style-type: none">A constant amber light indicates that the system is working normally.A flashing amber light indicates that the Active Trim system is not controlling trim (user override). Press the ACTIVE TRIM button to resume Active Trim control.A flashing red light indicates a problem with the system. Refer to Active Trim Red Status Light.
b	PROFILE select buttons (▲ and ▼)	Up (▲) - Changes the adjustable trim profile to a more aggressive trim curve (more trim angle).
		Down (▼) - Changes the adjustable trim profile to a less aggressive trim curve (less trim angle).
c	Selected profile indicator LEDs (1, 2, 3, 4, 5)	Indicates the adjustable profile currently engaged. 1 is the least aggressive trim profile; 5 is the most aggressive. NOTE: If the LED indicators are flashing, Active Trim is in setup mode.

Active Trim Operation

- Active Trim automatically controls trim to maintain the optimum engine or drive position based on engine RPM and boat speed.
- Active Trim progressively trims out the engine or drive to maintain an efficient running attitude.
- Active Trim will maintain the last known trim position when operating at speeds in excess of 80 km/h (50 mph).
- Operation above 80 km/h (50 mph) may require trim adjustments using the panel mounted or control handle trim position switch.
- Active Trim will gradually return the engine or drive to the down position during deceleration.
- Active Trim will only function when the engine or drive is in the normal trim range.

GPS

Active Trim uses a GPS signal to determine boat speed. The Active Trim system will not automatically control trim until the GPS unit has acquired a signal.

Resume Functionality

If the boat operator overrides the Active Trim system at planing speeds using the trim button, or exceeds 80 km/h (50 mph), the system will stop controlling the trim. Active Trim will resume automatically under the following conditions:

- Override occurred above 80 km/h (50 mph) and the boat operator then decelerates to below 80 km/h (50 mph).
- Override occurred above 80% of the rated engine RPM and the boat operator then decelerates to below 80% of the rated engine RPM.
- Override occurred in the cruising speed range and then the boat operator decelerates to idle. Active Trim will become active on the next acceleration.

Shallow Water Operation

Active Trim cannot detect water depth and will not trim up automatically in shallow water. The boat operator will need to override Active Trim by trimming the engine or drive manually or pressing the **Active Trim** button.

Trailer Position

Placing the engine or drive in trailer position—over 50% of the adapted trim range, will prevent Active Trim from engaging. Any time the engine or drive is trimmed above its normal range—to navigate shallow water, launch the boat from a trailer, or load the boat onto a trailer, for example—the Active Trim must be manually trimmed down before it will function. This safety feature is meant to prevent the engine or drive from automatically trimming down and hitting something.

Selecting the Correct Profile

With so many available trim profiles, it can be difficult to determine which profile is the correct one. In making this determination, it is important to understand what trim is, how it affects boat operation, and how boat loading can influence the required trim angle. Armed with a clear understanding of these concepts, selecting the correct trim profile becomes simple.

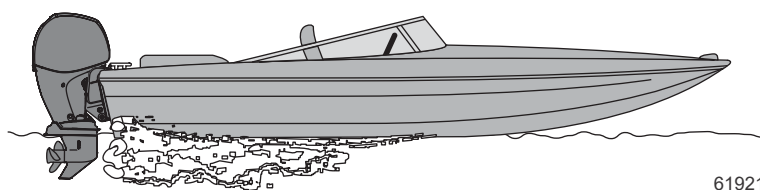
What Trim Is

The trim angle of an outboard or sterndrive is the angle between the boat bottom and the propeller shaft formed by moving the engine or sterndrive closer to the boat transom. This movement is called trimming in or down. Moving the engine or sterndrive further away from the transom is called trimming out or up. When a boat is cruising on plane and the trim is adjusted so that the propeller shaft is parallel to the surface of the water, that is said to be running at zero trim.

The term "trim" is generally used when referring to adjusting the outboard or sterndrive within the first 20° range of travel. This is the range used while operating the boat on plane. The term "tilt" is generally used when referring to adjusting the outboard or sterndrive further up or out of the water.

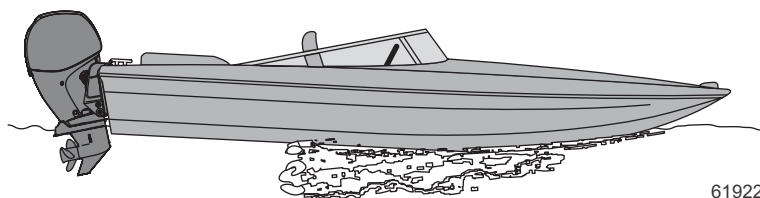
How Trim Affects Boat Operation

The trim angle of the outboard or sterndrive has a distinct effect on the planing angle of the boat, which in turn significantly alters the top speed and handling. The engine or drive should be trimmed in for best start-up acceleration and shortest time to plane. The engine or drive would then be trimmed out for peak performance. Active Trim automatically handles this transition for the operator.



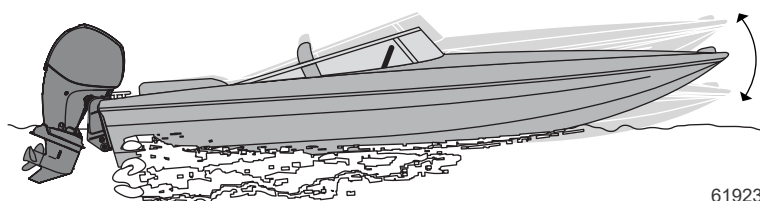
Engine or drive properly trimmed

If the engine or drive is trimmed in too far, the bow drops and the boat runs too wet. In this condition, top speed drops, fuel economy decreases, the boat may oversteer in one direction or the other (bow steering), and steering torque will increase (to the right with a right-hand rotation propeller). Occasionally, extreme trim down can cause a boat to list to the left (with a right-hand propeller).



Engine or drive trimmed in (bow too low)

If the engine or drive is trimmed out too far, the propeller may lose its hold on the water, fast V-bottom boats may start to walk from side to side (chine walking), steering torque will increase in the opposite direction so that when trimmed in, and getting on plane may be difficult or labored. Porpoising of the boat may also occur.



Engine or drive trimmed out (bow too high); porpoising

Boat Loading and Trim

Under normal loading and operating conditions while on plane, the boat bottom is roughly parallel to the surface of the water. Changing the loading of the boat will not change the trim angle as previously defined, but it will change the running attitude of the boat with respect to the surface of the water. Adding weight toward the stern of the boat will cause the bow to rise. Similarly, adding weight toward the bow of the boat will cause the bow to lower.

Changing the trim angle can compensate for a change in the running attitude of the boat. Increasing the trim angle will raise the bow of the boat, compensating for bow heavy loading. Decreasing the trim angle will lower the bow of the boat, compensating for stern heavy loading.

Choosing an Active Trim Profile

If Active Trim is configured properly, the normal setting for running on plane will be profile 2, 3, or 4. This allows the operator the flexibility to change the trim angle to compensate for variations in boat loading or other operating conditions. Selecting a higher number profile will raise the bow and selecting a lower number profile will lower the bow.

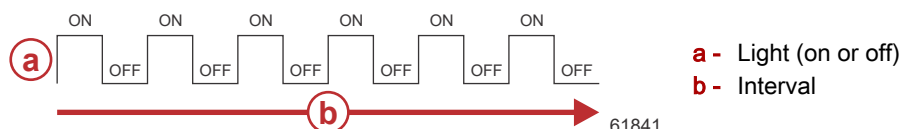
Use the preceding descriptions of trim in and trim out to help determine whether or not the boat is trimmed properly (refer to **How Trim Affects Boat Operation**). In general, this means the operator can increase the trim profile until the bow begins to porpoise (rise and fall), and then back off one level.

Active Trim Red Status Light



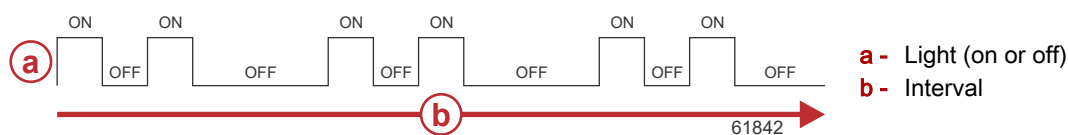
A flashing red light can indicate different things, depending on if it is a single or a double flash sequence.

Single Flashing Red



Fault Condition	Description	Notes
GPS signal intermittent	GPS signal has achieved fix, but is dropping out intermittently.	Indicates loss of GPS signal.
GPS signal unavailable	GPS has not achieved fix since key on.	Indicates obstructed GPS antenna or weak signal.

Double Flashing Red



Fault Condition	Description	Notes
Trim up or trim down not achieved	The engine did not achieve its trim setpoint while attempting to trim up or down.	Indicates a problem with hydraulic pump operation, fuse, connection, trim sensor, or trim down circuit.

Maneuvering the Boat

Traditional Maneuvering with Steering and Thrust

The addition of a joystick piloting system to the boat expands its maneuvering capability at slow speeds. However, the operator can still maneuver the boat using traditional steering and throttle controls at both planing and slow speeds. Mercury recommends practicing low speed and docking maneuvers with the boat using only the steering wheel and ERC levers, to ensure that the operator can safely control the boat in the unlikely event that the joystick fails.

To Maneuver the Boat in Forward or Reverse

Place one or all of the engines in forward or reverse gear and steer with the steering wheel as with any comparable boat.

To Steer the Boat in Tight Turns at Low Speeds

- To turn the boat in tight turns at low speeds, turn the wheel in the direction of the turn.
- To increase the turn rate of the boat after the wheel is completely turned:
 - Zeus boats: Increase the power to the drive that is located on the inside of the turn.
 - Outboard or sterndrive boats: Increase the power to the outside engine.

To Spin the Boat on its Axis at Low Speeds

1. Center the steering wheel.
2. To spin to the right, place the starboard engine in reverse and the port engine in forward.
3. To spin to the left, place the port engine in reverse and the starboard engine in forward.
4. To increase the rate of turn, simultaneously adjust each ERC lever for more throttle. More reverse throttle is typically needed to compensate for the greater thrust created by the engine in forward gear.

Maneuvering with the Joystick

The joystick provides a single-lever interface to maneuver the boat. Operating the boat with the joystick is well suited for close quarter operations and when docking. The joystick system independently controls steering angles and thrust to move or rotate the boat in a desired direction. For example, if the joystick is moved sideways, the control system commands the boat in the sideways direction.

The joystick gives three axis control: fore and aft, port and starboard, and rotational, or any combination thereof. For example, moving the joystick to port causes the boat to move sideways to port. Rotating the joystick causes the boat to rotate around its center. The joystick can be moved and rotated at the same time, allowing for intricate movements for maneuvering in tight quarters.

Factors such as wind, water conditions, thruster battery voltage levels (if equipped), and boat loading may degrade the accuracy of the response to the operator's joystick movements. Manual yaw correction may be required when commanding the boat in the fore and aft, port and starboard, or diagonal directions. To correct for unintended yaw during any maneuver, rotate the joystick in the direction opposite of the yaw.

The joystick is proportional, which means that the farther from the center the joystick is moved, the more thrust is applied to the boat in that direction.

To maneuver the boat with the joystick:

1. Move the electronic remote control (ERC) levers to the neutral position.
2. Move the joystick in the desired direction for the boat to move, or twist the joystick in the desired direction for the boat to rotate. The joystick can be moved and rotated at the same time.

Joystick Input and Boat Response

The following tables give some limited examples of the basic responses to inputs from the joystick.

IMPORTANT: All boat movements shown in the following tables are as they occur in a perfect environment. Practice joystick maneuvers under various conditions to learn how the boat responds.

- Real world variables—such as wind, current, waves, and boat loading—have an impact on boat behavior.
- Some boat/system configurations may execute maneuvers more precisely than others.



IMPORTANT: The images of the joystick and boat are examples only. The actual joystick and boat may appear different, but the principles still apply.


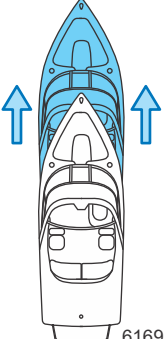

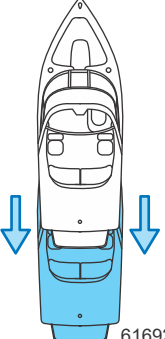

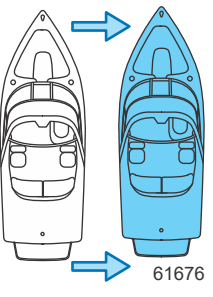
Boats Equipped with Bow Thruster Integration


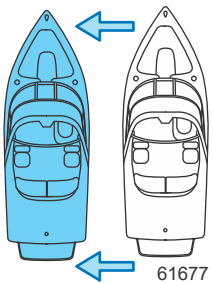

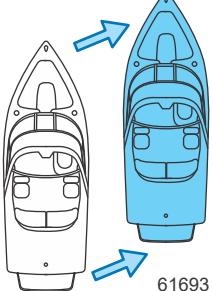

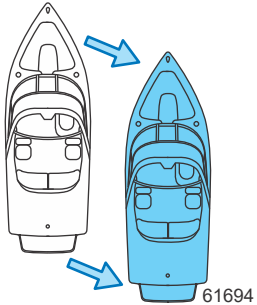

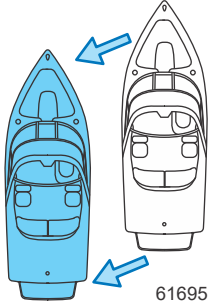
This system uses closed loop heading control to dampen bow and stern swinging (referred to as yaw) during joystick operation. An onboard sensor measures the yaw rate of the boat and actively counteracts the yaw motion of the boat.


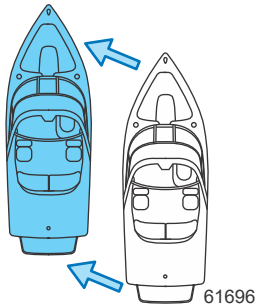
The bow thruster may continue to run for up to five seconds after the joystick is released to maintain a heading. The joystick light ring will indicate the direction of thrust used to control. Additional joystick commands can be given before the light turns green.


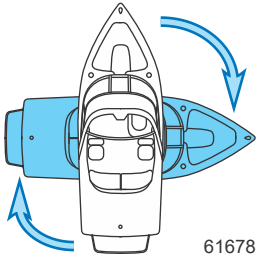

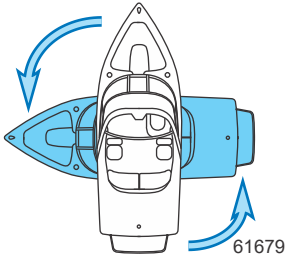
Basic Maneuvers

At Rest			
Joystick Input	Joystick Light Ring Action	Boat Response	Movement (white indicates starting position)
 60432	None = Joystick is not ready for use Green = Joystick is available for use	No change to boat position or movement. (The boat might not actually be at rest. One condition for light ring off is engine in gear while running the boat with ERC)	 61690

Linear Movement			
Joystick Input	Joystick Light Ring Action	Boat Response	Movement (white indicates starting position)
 60436	Top quadrant illuminates	Boat moves forward	 61691
 60437	Bottom quadrant illuminates	Boat moves aft	 61692
 60438	Right quadrant illuminates	Boat moves to starboard without rotating	 61676


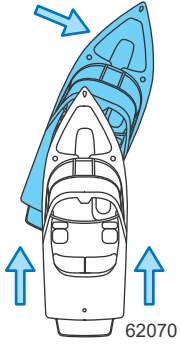

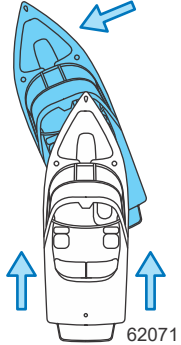

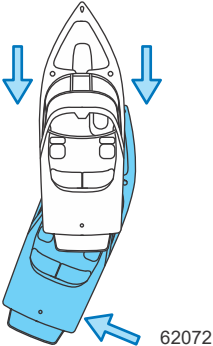

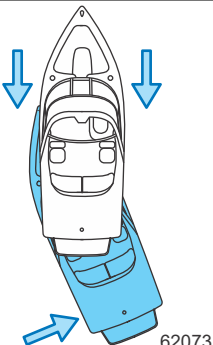
Linear Movement			
Joystick Input	Joystick Light Ring Action	Boat Response	Movement (white indicates starting position)
 60439	Left quadrant illuminates	Boat moves to port without rotating	 61677
 60433	Top right quadrant illuminates	Boat moves diagonally forward and to the starboard without rotating	 61693
 60434	Bottom right quadrant illuminates	Boat moves diagonally aft and to the starboard without rotating	 61694
 60435	Bottom left quadrant illuminates	Boat moves diagonally aft and to the port without rotating	 61695


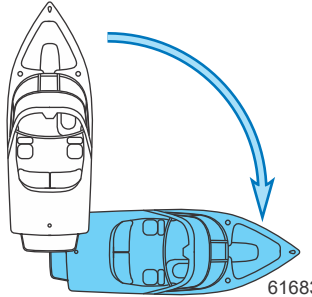

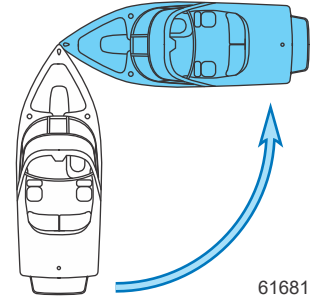

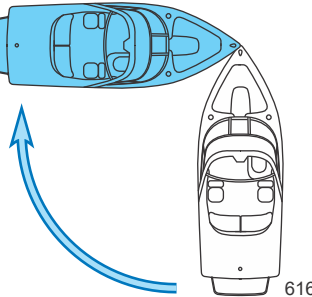

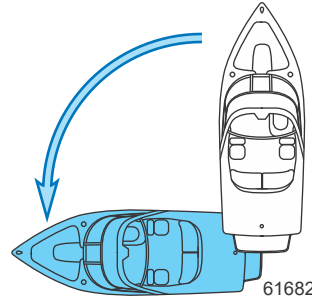
Linear Movement			
Joystick Input	Joystick Light Ring Action	Boat Response	Movement (white indicates starting position)
	Top left quadrant illuminates	Boat moves diagonally forward and to the port without rotating	

Rotational Movement			
Joystick Input	Joystick Light Ring Action	Boat Response	Movement (white indicates starting position)
	Light rotates clockwise about the ring NOTE: The light segment becomes larger as demand increases.	Boat rotates clockwise	
	Light rotates counterclockwise about the ring NOTE: The light segment becomes larger as demand increases.	Boat rotates counterclockwise	

Combination Maneuvers

These diagrams show approximate behavior only. Not all system/boat configurations will exhibit the same results. Experiment in calm, open waters to determine the boat's exact behavior.

Joystick Input	Boat Response	Movement (white indicates starting position)
 62062	Boat moves forward while rotating clockwise (bow moves toward starboard).	 62070
 62063	Boat moves forward while rotating counterclockwise (bow moves toward port).	 62071
 62064	Boat moves aft while rotating clockwise (stern moves toward port).	 62072
 62065	Boat moves aft while rotating counterclockwise (stern moves toward starboard).	 62073

Joystick Input	Boat Response	Movement (white indicates starting position)
 62066	Boat rotates clockwise about its stern.	 61683
 62067	Boat rotates counterclockwise about its bow.	 61681
 62068	Boat rotates clockwise about its bow.	 61680
 62069	Boat rotates counterclockwise about its stern.	 61682

NOTE: For systems equipped with thruster integration only. When the operator lets go of the joystick and the thruster is still running for up to five seconds, the light ring will indicate the direction of movement while the thruster is running. The operator can still grab the joystick and give additional inputs while this is happening.

Using the Adjust Button with the Joystick

During normal joystick operation, engine speed is limited to prevent excessive prop wash or unacceptable boat dynamics. Pressing the adjust button on the joystick trackpad reduces engine demand compared to standard joystick mode.



Adjust button and light segments with two lit segments



Adjust button and light segments with one lit segment

- Two lit segments indicate normal operation. The Thruster will function with the joystick (if equipped).
- One lit segment indicates reduced demand operation. The Thruster will not function with the joystick (if equipped).

Joystick Trim Assist

The Joystick Piloting system includes trim assist features that work with Skyhook station keeping and joystick operations. These features will trim the drives up or down to a position preset by the boat manufacturer.

Enabling the Joystick Trim Assist Features

The trim assist features are enabled whenever the ERC levers are moved into a gear and then back into neutral, or when the engines are started.

Joystick Trim Up Feature

When the operator assumes control of the boat with the joystick, the joystick piloting system will raise any engine or drive that is trimmed below the preset position to that preset position, provided that the trim assist feature has been enabled as described above. The system will similarly raise the engines or drives when Skyhook is engaged. Once the engines or drives have been trimmed up to the preset point, the trim assist feature is disabled and can only be enabled as described previously.

NOTE: On some models, the preset position is full-down. On those models, trim assist will not raise the drives. This is not a system malfunction.

Joystick Trim Down Feature

When the operator assumes control of the boat with the joystick and one or more engines or drives is trimmed above the preset position, a pop-up notice will appear on the Mercury-approved multifunction display. Similarly, if Skyhook is engaged with one or more engines or drives trimmed above the preset, the pop-up will appear. This notice will disappear after 10 seconds, but the operator is provided a full 15 seconds to initiate the trim down function.

To initiate the trim down function, briefly press the trim all down button on the ERC or trim pad. Any engine or drive trimmed above the preset position will be trimmed down to the preset position. To halt the trim down function of a particular engine or drive, push either trim button (up or down) for that engine or drive. To halt the trim down of all engines or drives, push either trim all up or trim all down.

IMPORTANT: The preset position for the trim feature is accurate to $\pm 3^\circ$, meaning that trim in either direction can overshoot by as much as 3° . If the trim assist feature trims one engine or drive up and trims the other engine or drive down, the engines or drives may be trimmed differently by as much as 6° . This is not a malfunction.

To bring the engines or drives to the same trim assist position:

1. With the engines off, but the key switches **ON**, trim the engines or drives to their full-down position. Hold the trim button for an additional three seconds.
2. Start the engines.
3. Enable the joystick trim assist features.
4. Engage the joystick or Skyhook. The engines or drives will all trim up to the same position.

Autopilot Features

Chartplotter Requirements

Many of the features and functions of autopilot use information from a chartplotter. However, not all chartplotters have the quality of information needed to allow these features to work properly. The chartplotter on the boat has been selected from an approved list created and maintained by Mercury Marine. These chartplotters use specific software to meet the stringent demands to properly interface with the autopilot and joystick.

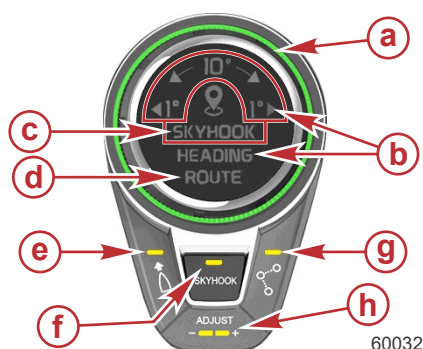
Poor quality or inaccurate information generated by unapproved chartplotters or software can cause the features to behave erratically, unexpectedly, or not function at all. Updating software to an unapproved version can also cause the system to not function correctly. See an authorized dealer or call Mercury Customer Service for a list of approved chartplotters.

IMPORTANT: When using autopilot, the chartplotter arrival zone must be changed to 0.05 nautical miles or less.

Autopilot Lights

The joystick includes several lights to indicate when the joystick is in use or when an autopilot mode is active (engaged). For descriptions of the behavior of the lights during joystick operation, refer to **Maneuvering with the Joystick**.

Pressing the button for auto heading, route (waypoint sequencing), or Skyhook will engage that mode, turning on both its respective light and the corresponding lighted textual indicator on the head of the joystick.



Ref	Description	Notes
a	Light ring	The light ring will illuminate, flash, pulse, or rotate, to indicate a large variety of states. Refer to the individual operation for specifics. The light ring will flash when an input error occurs.
b	Heading mode course adjustment indicators and textual indicator	<p>The course adjustment indicators illuminate when the system is in auto heading mode. They remind the operator that:</p> <ul style="list-style-type: none"> Twisting the joystick to the right will change the heading by 10° starboard Twisting the joystick to the left will change the heading by 10° port Bumping the joystick to the right will change the heading by 1° starboard Bumping the joystick to the left will change the heading by 1° port <p>The textual indicator illuminates whenever the auto heading mode is engaged.</p>
c	Skyhook mode indicators	Both the textual indicator SKYHOOK and the Skyhook icon illuminate when Skyhook mode is engaged.
d	Route textual indicator	Illuminates when the route (waypoint sequencing) mode is engaged.
Trackpad Lights		
e	Heading button light	Illuminates when the auto heading mode is engaged.
f	Skyhook button light	Illuminates when Skyhook is engaged.
g	Route (waypoint sequencing) button light	Illuminates when the route (waypoint sequencing) mode is engaged.
h	Adjust button lights	These two light segments illuminate to indicate the degree of fine-tuning applied to each function. Refer to the individual function description for details.

Autopilot Modes

⚠ WARNING

Avoid serious injury or death. Inattentive boat operation can result in a collision with other watercraft, obstacles, swimmers, or underwater terrain. The autopilot navigates a preset course, and does not automatically respond to hazards in the vicinity of the boat. The operator must stay at the helm, ready to evade hazards and warn passengers of course changes.

The autopilot includes several modes that can steer the boat to a specific compass heading or to destinations generated from a chartplotter and GPS unit. If using a device to generate course information, the operator must be familiar with the operation of that chartplotter and GPS unit before attempting to use the autopilot to steer the boat. The autopilot does not control speed, only direction, and it cannot sense hazards to navigation. These automatic modes do not relieve the operator of the responsibility to stay at the helm and keep a vigilant lookout for other boats, persons in the water, or hazards to navigation.

NOTE: Moving the steering wheel will always override the autopilot, and the operator will assume control of the boat. Shifting the electronic remote control (ERC) lever will also disable the autopilot mode.

When using the autopilot with a chartplotter and a GPS unit to navigate along a series of waypoints (a route), be aware that the boat will not travel to the precise location of the waypoint before initiating a turn to the next waypoint. The chartplotter establishes a zone called an arrival circle around the waypoint, and the autopilot will announce arrival at the waypoint when the boat enters that zone.

Skyhook Station Keeping

IMPORTANT: If the boat is equipped with the thruster integration kit, The thruster will not activate while the boat is in skyhook or any other advanced hook mode (bow/drift hook).

The boat may be equipped with the Skyhook station keeping feature. This system uses global positioning system (GPS) technology and an electronic compass to automatically control shifting, throttling, and steering to maintain heading and approximate position. This feature can be helpful when waiting for space near a fuel dock, waiting for bridges to open, or when the water is too deep for an anchor.

Skyhook does not maintain an exact fixed position, but rather will hold the boat in a fixed compass heading within an approximate area. The size of this area is affected by the accuracy of the global positioning satellite system, the satellite signal quality, the physical position of the satellites relative to the receiver, solar flares, and the proximity of the receiver on the boat to large structures (for example, bridges or buildings) and trees. Under some of these conditions Skyhook may be affected enough that the system will disengage. The operator must remain at the helm whenever Skyhook is engaged and be vigilant for changing conditions such as the presence of other boats or swimmers or the disengagement of Skyhook.

Under typical operating conditions, Skyhook is capable of holding the boat within a radius of 10 m (30 ft). However, this distance may sometimes increase to a radius of 30 m (100 ft). Because Skyhook holds the boat in an approximate position, not a precise one, it can cause the boat to collide with other objects close to the boat and cause damage. Do not use Skyhook when the boat is close to a dock, piling, bridge, another boat, or swimmers.

⚠ WARNING

Skyhook is an automatic system. Use of this system does not relieve the operator of the responsibility to remain at the helm and keep watch for changing conditions. The presence of swimmers or other vessels, or if Skyhook becomes disengaged, will require the operator to assume manual control of the vessel.

Important Safety Considerations

Activities in the water near the boat while Skyhook is engaged may result in injury. The operator should read and observe the warning labels on the boat, and instruct passengers how Skyhook operates before using the feature.

⚠ WARNING

Before activating Skyhook:

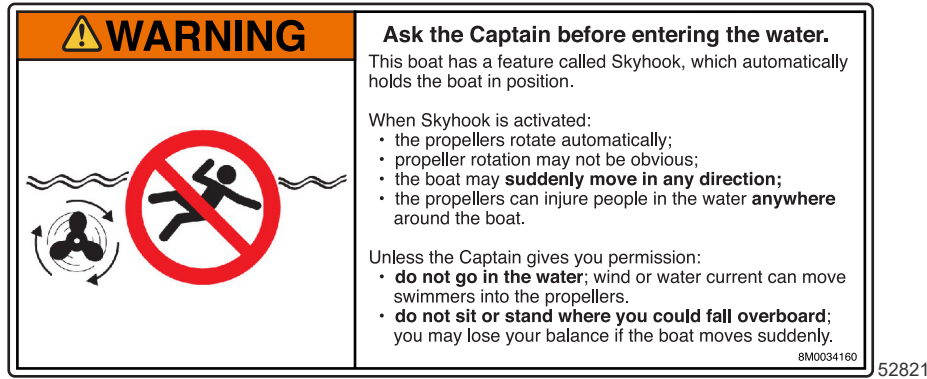
1. Check that no one is in the water.
2. Tell passengers not to enter water.

Skyhook makes the propellers spin.
This can injure swimmers.

8M0034159

52820

Label near the autopilot trackpad



Label in the vicinity of the transom boarding area

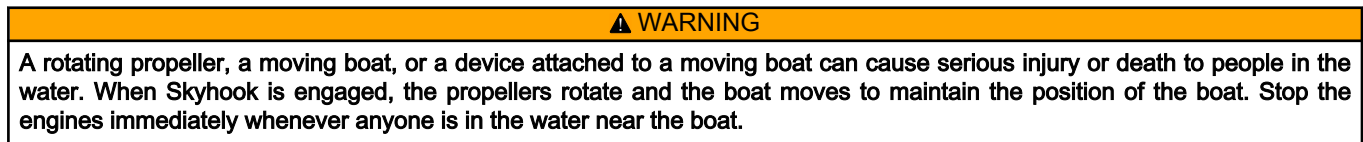
IMPORTANT: If either of these labels cannot be located or are not legible, they must be replaced before engaging Skyhook. For replacement labels, contact the manufacturer of the boat or a Mercury Marine authorized repair facility.

Before engaging (activating) Skyhook, the operator must:

1. Inform passengers how Skyhook operates, to stay out of the water and off the swim platform and boarding ladder, and to be alert for any sudden shifts in the boat position.
2. Inform passengers of any audible or visual warning systems that may be installed on the boat, and when they can expect them to be active.
3. Check to see that no one is near the back of the boat or anywhere in the water near the boat.

After engaging (activating) Skyhook, the operator must:

1. Remain at the helm and maintain a vigilant watch.
2. Disengage (deactivate) Skyhook if anyone enters the water or approaches the boat from the water.



Engaging Skyhook

Skyhook will not engage unless the joystick and control levers are in neutral.

1. Maneuver the boat to the desired position.
2. For Joystick Piloting for Sterndrive systems, ensure that both engines are operating.
3. For Joystick Piloting for Outboard or Zeus systems, ensure that at least two engines are operating:
 - For triple-engine applications, these must be the outer two engines.
 - For quad-engine applications, this must be at least one port and one starboard engine (in other words, both outers, both inners, port inner and starboard outer, or port outer and starboard inner). Skyhook will not operate with only the two starboard or the two port engines running.
4. Ensure that the ERC levers are in neutral.
5. Confirm that the area around the boat is clear of swimmers and obstacles.
6. Press the Skyhook button. Several indicators on the joystick will illuminate to indicate that the system accepted the command.

NOTE: A double horn beep sounds and the light ring on the joystick will flash, if the Skyhook mode does not engage.

7. Press the adjust button to switch between looser or tighter constraints on the drift area. Level 1 (single light segment) has looser constraints, allowing a larger drift area. Level 2 (two light segments) has tighter constraints, resulting in a smaller drift area. The system will engage the engines more often in level 2, in order to more tightly hold the boat's position.

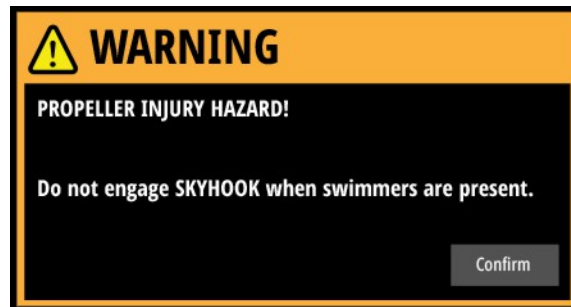


60021

Top view of the joystick showing illuminated indicators with Skyhook engaged

- a** - Light ring (around the base of the joystick); pulses blue whenever Skyhook is engaged
- b** - Skyhook icon (on the top of the joystick)
- c** - SKYHOOK textual indicator (on the top of the joystick)
- d** - Skyhook button and light (on the keypad at the base of the joystick)
- e** - Adjust button and lights: one segment indicates less constraint on the drift area, two segments indicate greater constraint. Press the adjust button to toggle between the two settings.

When the Skyhook button is pressed on the joystick, the Skyhook warning pop-up will appear on a Mercury-approved multifunction display (MFD).



60821

NOTE: After the warning has been acknowledged, some Mercury-approved multifunction displays (MFD) may indicate "Skyhook Active."

Disengaging Skyhook

Skyhook can be disengaged several different ways:

- Move the steering wheel.
- Press the Skyhook button on the joystick.
- Move the joystick and return to the original neutral position.
- Move the ERC levers.
- Turn off one or more engines.

Skyhook does not automatically resume when the steering wheel, levers, or joystick are returned to their original position. The Skyhook button must be pressed again to engage the feature.

Using Skyhook

IMPORTANT: On Joystick Piloting for Outboard or Zeus systems with triple-engine or quad-engine applications, Skyhook can operate with as few as two operating engines (refer to Engaging Skyhook). Never attempt to start a nonoperating engine with Skyhook already engaged.

Skyhook system response will change with wind and current conditions. The operator should be familiar with how best to position the boat regarding the speed and direction of wind and current. Practice with Skyhook to determine what works best for the boat in various situations.

In extreme weather and sea conditions, Skyhook may not be able to maintain a boat's heading and position. This is especially true if the boat's heading is perpendicular to the wind or current. If the wind or current forces the boat away from the position where Skyhook was set, Skyhook will start to turn the bow of the boat back to the original set point. As the boat is pushed further away, Skyhook will continue to rotate the bow to the set point until the bow eventually points directly at the set point.

- If at any time in this process Skyhook is able to overcome the conditions enough to hold a position, it will cease turning the bow.
- If the conditions lessen and Skyhook is able to maneuver the boat back toward the original set point, Skyhook will rotate the bow back to the original heading as it maneuvers the boat toward that set point.

- If the boat is forced far enough away from the set point, Skyhook will notify the operator that it is not able to maintain position. Skyhook will continue to attempt to return to the set point, unless the operator assumes control of the boat.

To minimize the effects of extreme conditions on the operation of Skyhook, Mercury Marine recommends adjusting the boat's heading so that its bow (or for some boats, its stern) faces into the wind or the current.

Skyhook can unexpectedly disengage due to a loss of engine power or GPS signal. If this happens Skyhook will sound an alarm, the engines will return to neutral, and the boat will drift with the wind and current. The operator should be ready to take control of the helm at all times.

Auto Heading

Auto heading allows the boat to automatically maintain a compass heading while the boat is underway.

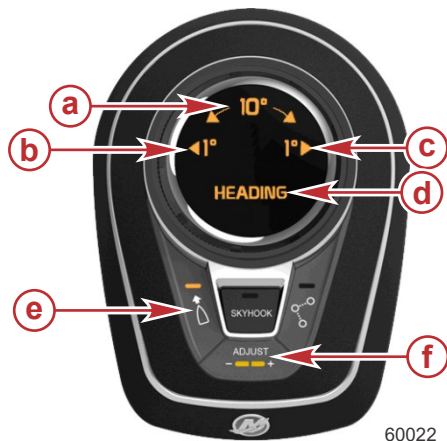
Engaging Auto Heading

IMPORTANT: If the boat is equipped with the thruster integration kit, The thruster will not activate while the boat is in autopilot or auto heading.

- Ensure that the starboard engine key switch is in the **RUN** position.
- Place at least one running engine in forward gear.

NOTE: Auto heading does not function with the ERC levers in neutral or reverse.

- Steer the boat to the desired compass heading.
- Press the auto heading button on the joystick keypad. The button light will turn on, the HEADING textual indicator will illuminate, and a single beep sounds acknowledging engagement. A double horn beep sounds and the light ring pulses, if the auto heading mode does not engage.



Top view of joystick, showing illuminated indicators with auto heading engaged

- a - 10° course adjustment indicator
- b - 1° to port course adjustment indicator
- c - 1° to starboard course adjustment indicator
- d - HEADING textual indicator
- e - Auto heading button with light
- f - Adjust button with two light segments

NOTE: Some Mercury-approved multifunction displays (MFD) may indicate "AP - Heading Locked." The MFD may also display the heading icon.



- To adjust the course while in auto heading mode, refer to **Course Adjustment**.
- To disengage auto heading mode, refer to **Disengaging Auto Heading**.

Course Adjustment

While in auto heading mode, the joystick can be used to change the set course heading.

- Rotate the joystick in the direction of the desired heading change to change the heading by 10°.
- Deflect and hold the joystick in the desired direction for one second to make small adjustments in the chosen heading. Each recognized movement adjusts the chosen heading by 1°.

Heading Precision

The precision with which the system keeps a prescribed heading can be changed by using the adjust button on the joystick keypad.

- Low precision: Indicated by a single light segment of the adjust button. Use the low precision setting in open waters, where maintaining an exact course is not critical. Course corrections are more subdued in this setting than in high precision.

- High precision: Indicated by both light segments of the adjust button. Use the high precision setting to keep the boat's heading closer to the desired course. Using the high precision setting can result in more abrupt course corrections than with low precision.

Disengaging Auto Heading

- Disengage the auto heading mode with any of the following actions:
 - Place the ERC handles for all engines in neutral.
 - Turn the steering wheel.
 - Press the auto heading button on the joystick.
- The auto heading button light and the HEADING textual indicator will turn off.

Auto Heading Control via MFD

On some systems, auto heading can be controlled via the multifunction display (MFD).



- a** - The heading that the boat is currently on
- b** - The desired, or target heading
- c** - 1° heading change to port
- d** - 1° heading change to starboard
- e** - 10° heading change to port
- f** - 10° heading change to starboard

Route Mode (Waypoint Sequencing)

⚠ WARNING

Avoid serious injury or death. Inattentive boat operation can result in a collision with other watercraft, obstacles, swimmers, or underwater terrain. The autopilot navigates a preset course, and does not automatically respond to hazards in the vicinity of the boat. The operator must stay at the helm, ready to evade hazards and warn passengers of course changes.

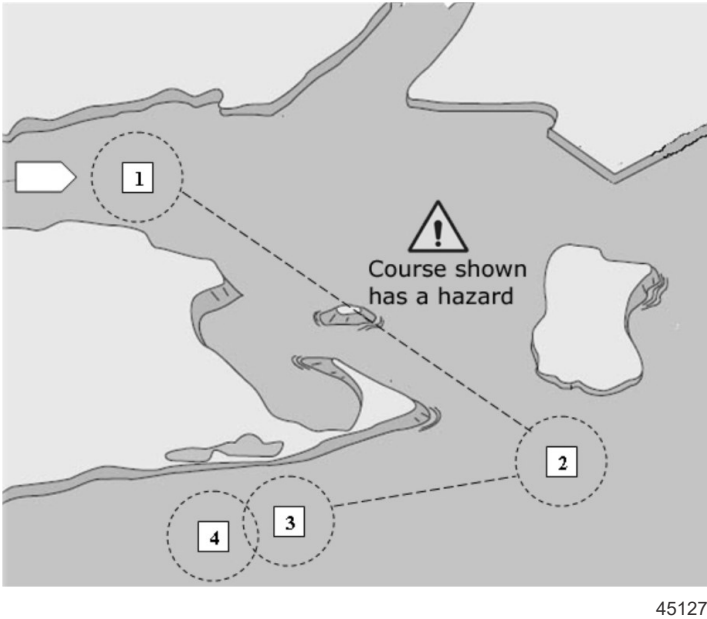
Route mode allows the boat to automatically navigate to a specific waypoint or sequence of waypoints, called a waypoint route. This feature is intended for use in open waters, free from obstructions above and below the waterline.

Using the example route shown in the following illustration:

- Waypoints are shown in numbered squares within the arrival circle (a dashed-line circle around the numbered square).
- A hazard is present between waypoints 1 and 2. If these waypoints are used for the route, the autopilot will attempt to navigate through the hazard. It is the captain's responsibility to select waypoints that avoid all hazards.
- Waypoint 4 is too close to 3 to be used in the same route. Waypoints must be far enough apart that the arrival circles do not intersect.

IMPORTANT: If the boat is equipped with the thruster integration kit, the thruster will not activate while the boat is in autopilot or auto heading.

- A route, including waypoints 1, 2, and 3, is represented by the straight dashed-line. The autopilot system will attempt to navigate this route. It is the responsibility of the captain to ensure that the route does not contain any hazards, and to keep watch while underway.



Example route

When the route mode is activated and the boat is put into operation:

- The operator must remain at the helm at all times. The feature is not designed to allow unattended operation of the boat.
- Do not use the route mode as the sole source of navigation.

IMPORTANT: Route mode can be used only with chartplotters approved by Mercury Marine.

Arrival Zones

- For most houseboat applications, the arrival zone size (arrival radius) must be set to 0.02 nautical miles.
- For all other applications, the arrival radius must be set to 0.05 nautical miles.

Refer to the multifunction display or chartplotter user manual for instructions on setting the arrival radius.

Waypoint Accuracy

The accuracy of the feature can be affected by environmental conditions and incorrect use. Observe the following information when using the track waypoint and waypoint sequencing feature.

Waypoint Data—Distance Settings	
Between waypoints	Greater than 1.0 nautical mile (1.15 mile)
Arrival alarms	No less than 0.1 nautical mile (0.12 mile)

Engaging Route Mode

IMPORTANT: Route mode will automatically turn the boat upon arrival at a plotted waypoint.

To engage the route mode:

- Turn on the chartplotter and select a waypoint route to be tracked.
- Place at least one ERC lever in forward gear. Route mode does not function if both levers are in neutral or reverse.
- Manually steer the boat to the direction of the first waypoint and hold the boat steady at a safe operating speed.

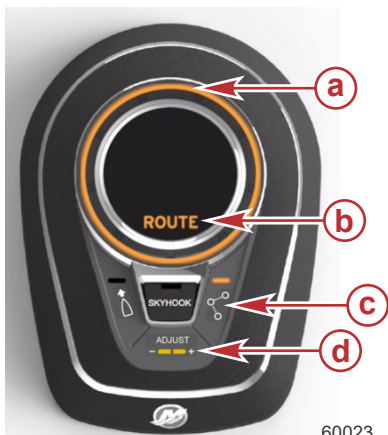
⚠ CAUTION

Avoid injury from unexpected turns at high speeds. Engaging the Track Waypoint or Waypoint Sequence feature while on plane can cause the boat to turn sharply. Confirm the direction of the next waypoint before engaging these autopilot features. When underway in Waypoint Sequence mode, be prepared to take appropriate action when reaching a waypoint.

- Press the route button on the joystick.
 - The route button light turns on, the ROUTE textual indicator illuminates, and a single beep sounds, indicating route mode is engaged.

NOTE: Two horn beeps sound and the light ring flashes if route mode does not engage.

- The autopilot tracks to the first waypoint on the chartplotter course.



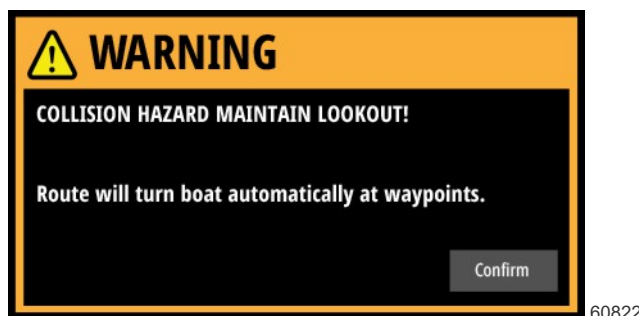
Top view of joystick, showing route mode engaged and approaching a waypoint

- a** - Light ring around base of joystick; flashes when the boat is approaching a waypoint
- b** - ROUTE textual indicator
- c** - Route button and light on the keypad at the base of the joystick
- d** - Adjust button and lights on the keypad at the base of the joystick; used to set the route precision

- The Mercury-approved multifunction display (MFD) will sound a beep.

NOTE: Some MFD models may also indicate "AP - Route."

- If the operator is in a waypoint arrival zone set by the chartplotter, route mode informs the autopilot it is okay to proceed to the next waypoint. The waypoint sequence mode acts as a waypoint acknowledge function, and the autopilot sounds a beep when in the zone.
- If the operator is not in a previously set waypoint arrival zone, route mode starts auto sequencing to the waypoints in the route. Acknowledge that the information is understood as presented in the MFD pop-up warning.



- Stay alert. The boat turns automatically in this mode. The operator must know if it is safe to turn when the boat is entering a waypoint arrival zone. Inform passengers that the boat automatically turns so that they can be prepared.

Route Precision

The precision with which the system maintains a plotted route can be changed by using the adjust button on the joystick keypad.

- Low precision: Indicated by a single light segment of the adjust button. Use the low precision setting in open waters, where maintaining an exact course is not critical. Course corrections, including changes made at an arrival zone, are more subdued in this setting than in high precision.
- High precision: Indicated by both light segments of the adjust button. Use the high precision setting to keep the boat's heading closer to the plotted course. Using the high precision setting can result in more abrupt course corrections than with low precision.

Disengaging Route Mode

Disengage the route mode by one of the following methods:

- Press the route button on the joystick pad when the boat is not in a waypoint arrival zone. The route button light and the ROUTE indicator text will turn off.
- Turn the steering wheel hard enough to overcome the force feedback.
- Move both ERC levers to neutral.
- Press the auto heading button on the joystick pad. The autopilot enters auto heading mode.
- Turn off the chartplotter.

Auto Heading Button in Route Mode

While in the route mode, pressing the auto heading button changes autopilot to auto heading mode.

Cruise Control

Mercury-approved multifunction displays (MFD) feature integrated throttle cruise control, which allows the operator to limit the peak RPM of choice below wide-open throttle (WOT). Refer to the operations manual provided with the MFD for operation instructions.

These additional notes are exclusive to the package:

- The operator can change or disengage cruise control through the screen at any time.
- Cruise control resets when the key is turned **OFF**.
- If the cruise limit is changed while the levers are at WOT, the setting gradually changes to the new speed.
- Cruise control does not disengage if the ERC levers are at a higher engine speed than the actual RPM. Bring the levers back to the forward detent to disengage.

Steering Wheel and Engine or Drive Position

The following descriptions define how the joystick piloting system positions the engines or drives during various operational transitions, depending on the position of the steering wheel.

Key Up

No action taken; the engines or drives do not move.

Engine Start Up

Depending on the steering wheel position relative to the true center, the engines or drives will move to the wheel position.

Exiting Joystick

The engines or drives will move to the center position and the wheel will take the current position as the new center. To return the wheel to its original (true) center, operate the boat and the system will gradually align the center position of the engines or drives to the original (true) center of the steering wheel.

Exiting Skyhook

The engines or drives will move to the center position and the wheel will take the current position as the new center. To return the wheel to its original (true) center, operate the boat and the system will gradually align the center position of the engines or drives to the original (true) center of the steering wheel.

Exiting Route Mode

The engines or drives will not move from their last position without steering input. The steering wheel position will not match the engine or drive position, but will steer the boat with any input to the wheel. Steering wheel movement will eventually align the steering wheel to the engines or drives to return the steering wheel to the steering wheel true center.

Section 3 - Troubleshooting

Table of Contents

Check the Multifunction Display First.....	40	Skyhook.....	42
Diagnosing DTS Problems.....	40	Steering System.....	42
Engine Guardian System.....	40	Warning Horn Sounds.....	42
Troubleshooting Charts.....	40	Thruster (if equipped).....	42
Troubleshooting Engine Related Problems.....	40	Audio Warning System.....	42
Autopilot.....	40	Caution	43
DTS Trackpad Features.....	40	Critical	43
Electronic Remote Controls.....	40	Nonconfigured Alarm	43
Joystick.....	41	Testing the Audio Warning System	43

Check the Multifunction Display First

The Mercury-approved multifunction display (MFD) is the primary information source for the various functions of the boat. Consult the MFD if something is suspected to be wrong. The MFD displays faults and other information that can be helpful in determining the current status of various systems that could be causing the concern and the solution to the problem.

Diagnosing DTS Problems

The Mercury Marine authorized dealer has the proper service tools for diagnosing problems on Digital Throttle and Shift (DTS) systems. The electronic control module (ECM)/propulsion control module (PCM) on these engines has the ability to detect problems with the system when they occur and store a trouble code in the memory of the control module. This code can then be read by a service technician using a special diagnostic tool.

Engine Guardian System

The Engine Guardian system monitors the engine sensors for any early indications of problems. The system will respond to a problem by emitting a warning horn and/or reducing engine power in order to provide engine protection.

If the guardian system has been activated, reduce throttle speed. The horn will turn off when throttle speed is within the allowable limit. Consult an authorized Mercury Marine dealer for assistance.

Troubleshooting Charts

Troubleshooting Engine Related Problems

Troubleshooting engine related problems may require information not found in these troubleshooting charts. Additional troubleshooting information can be found in the owner's manual for the engine. Refer to the appropriate Operation and Maintenance Manual provided with the engine.

Autopilot

Symptom	Remedy
Route mode is not working.	Verify that the chartplotter is on.
	Verify that the chartplotter has an active waypoint.
	Verify that the speed forward is greater than 2.6 knots (3 mph).
	Verify that the chartplotter is communicating through the NMEA® 2000 network. Compare waypoint names and distances with the Mercury-approved multifunction display. The names and distances should be the same.
	Turn the key OFF and place the ERC levers in WOT reverse for three seconds. Return the ERC levers to neutral and start the engines.

DTS Trackpad Features

NOTE: Refer to **Electronic Remote Controls** for more situations that also involve the ERC and trackpad.

Symptom	Remedy
The boat control is stuck in dock mode.	When trackpad features are engaged with the engines running, and one engine stalls or is turned off, the trackpad is locked into that feature. Start the engine and exit the feature.
The boat control is stuck in throttle-only mode.	
The boat control is stuck in single-lever mode.	

Electronic Remote Controls

Symptom	Remedy
The ERC lever is too hard or too easy to move out of the neutral detent.	Adjust the detent tension screw.
The ERC lever has too much or too little resistance through its range of motion.	Adjust the handle friction screw.

Symptom	Remedy
The ERC lever increases engine RPM, but the engines do not engage gears and the boat does not move.	Check the THROTTLE ONLY button. If the light is on, put the ERC levers in neutral and push the button to disengage.
	Turn OFF all engine key switches. Then turn them back on.
	Check the Mercury-approved multifunction display (MFD) for fault codes or popup warnings. Expand the fault code text to see if a course of action is required.
	Contact an authorized Mercury Marine dealer.
The ERC lever controls the engines, but they do not reach wide-open throttle.	If the engine reaches only 50% of available power, check the DOCK button (if equipped). If the light is on, put the handles in neutral and push the button to disengage.
	Check the Mercury-approved MFD to see if cruise control is enabled. Disable cruise control.
	Check for damage to the propeller, and change the propeller if damage is found. Contact an authorized Mercury Marine dealer for service on the damaged propeller.
	Check the Mercury-approved MFD for Guardian fault codes that indicate reduced engine power. If found, contact an authorized Mercury Marine dealer.
The ERC lever controls the engine but does not respond in a linear manner.	Check the TROLL button (if equipped). If the light is on, put the handles in neutral and push the troll button to disengage.
	Ensure that dock mode or cruise control are not engaged.
When one ERC lever is moved, all engines respond.	Check the 1 LEVER (single-lever) button. If the light is on, put the handles in neutral and push 1 LEVER to disengage.
The ERC control, joystick, and steering wheel do not function.	Press TRANSFER to restore helm control. (Multiple helm boats only.)
The boat moves forward, but will not move backwards quickly.	Trim the engines down.

Joystick

Symptom	Remedy
The joystick does not control the boat.	One or both ERC levers are not in neutral. Place the ERC levers into neutral position.
	Verify that at least two engines (one port and one starboard; refer to the NOTE, following) are running. Start the engine or engines.
Response to joystick input is erratic, or the joystick operates independent of input.	Ensure that there are no radios or other sources of electronic or magnetic interference near the joystick.
The joystick does not function properly and a fault code is set.	Check the Mercury-approved multifunction display for Guardian fault codes that indicate reduced engine power. If found, have the system checked by an authorized Mercury Marine dealer.
The joystick operates erratically.	Check trim position. Trim the engines down.
The joystick operates too aggressively.	Press the adjust button to reduce available power. Two lit segments indicates normal joystick operation; one lit segment indicates reduced power operation.

NOTE: In order for the joystick to control the boat, at least two engines must be running. For triple-engine applications, these must be the two outer engines. For quad-engine applications, any combination of one port and one starboard engine will work (in other words, both outer engines, both inner engines, the port inner and starboard outer, or the port outer and starboard inner).

Skyhook

Symptom	Remedy
Skyhook does not work.	Verify that the Mercury-approved multifunction display (MFD) is on. The MFD must be turned on for Skyhook to function.
	Verify that the GPS unit is working. If it is locked up, cycle the keys.
	Verify that at least two engines (one port and one starboard; refer to the NOTE, following) are running. Start the engine or engines.

NOTE: In order for Skyhook to operate, at least two engines must be running. For triple-engine applications, these must be the two outer engines. For quad-engine applications, any combination of one port and one starboard engine will work (in other words, both outer engines, both inner engines, the port inner and starboard outer, or the port outer and starboard inner).

Steering System

Symptom	Remedy
The steering wheel does not steer the boat.	Reduce speed and change to joystick for directional control. Check the Mercury-approved multifunction display for faults.
	Check all fuses on the engine, helm, and battery. Verify that all circuit breakers are closed and reset if necessary.
	Check the harness connectors in steering actuators.
	Check the steering fluid level and fill if necessary.
	Contact an authorized Mercury Marine dealer for service.
Steering works, but the boat response is sluggish.	Check the trim. Adjust it if necessary.
	Ensure that all engines are operating.
	Cycle the engine key switches OFF and ON .
	Check the steering fluid level and fill if necessary.
	Contact an authorized Mercury Marine dealer for service.

Warning Horn Sounds

IMPORTANT: Refer to Audio Warning System for definitions of the different warning horn states.

Situation	Remedy
The warning horn sounded.	Turn OFF the key switches, and then turn them back ON .

Thruster (if equipped)

Symptom	Remedy
Thruster does not function from Mercury joystick.	Verify thruster battery switch is turned on.
	Verify thruster battery bank is charged.
	Check to see if thruster can be operated from dash mounted thruster pad.
	Check Mercury MFD display and thruster dash pad for any faults or alarms.
	Contact an authorized Mercury Marine dealer for service.

Audio Warning System

IMPORTANT: The audio warning system alerts the operator that a problem has occurred. It does not protect the engine from damage.

Most faults cause the warning horn circuit to activate. How the warning horn activates depends on the severity of the problem.

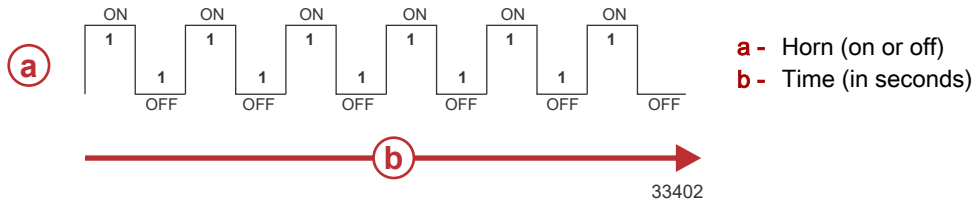
There are two warning horn states:

- Caution
- Critical

There is also an alarm that sounds if the helm has not been properly configured using the CDS G3 service tool.

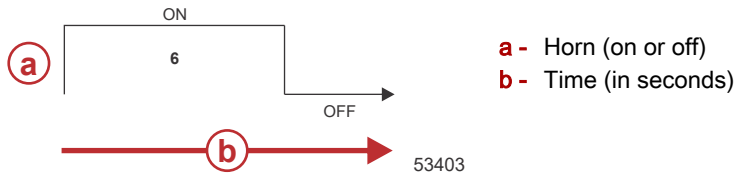
Caution

If a caution state is detected, the audio warning system will sound for six one-second intervals.



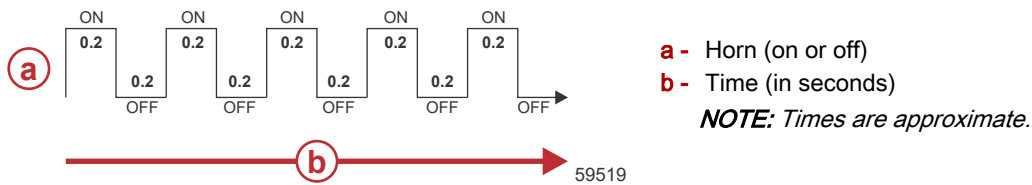
Critical

If a critical state is detected, the audio warning system sounds for six seconds and then turns off.



Nonconfigured Alarm

If the helm has not been properly configured using the CDS G3 service tool, the audio warning system will sound for five rapid intervals in less than two seconds.



Testing the Audio Warning System

1. Turn the key switch to the **ON** position without cranking the engine.
2. Listen for the audio alarm. The alarm will sound if the system is functioning correctly.

Notes:

Section 4 - Maintenance

Table of Contents

Operator Responsibilities.....	46	Anti-Collision Link Cables and Springs.....	46
Joystick Maintenance.....	46	Checking Power Steering Fluid.....	46
V8 and L6 Models.....	46	V12 Models.....	46



Operator Responsibilities

This manual covers only the joystick piloting system and does not address the maintenance of the engines, transmissions, or other boat components or systems. For information covering the engine and transmission, refer to the appropriate engine operation and maintenance manual. For all other information, refer to the boat operations manual.

It is the operator's responsibility to ensure that all safety checks are performed, ensure that all lubrication and maintenance instructions are complied with for safe operation, and return the boat to a Mercury Marine dealer or authorized repair facility for a periodic checkup. If there are any questions about how to perform these checks, consult the dealer or distributor for additional information. While many owners are capable of performing these checks, it is best to have all checks and maintenance performed by a trained service technician.

Normal maintenance, service, and replacement parts are the responsibility of the owner or operator and as such, are not considered defects in workmanship or material within the terms of the warranty. Individual operating habits and usage contribute to the need for maintenance service.

Proper maintenance and care of the joystick piloting system will ensure optimum performance and dependability and will keep the overall operating expenses at a minimum. See the Mercury dealer or authorized repair facility for parts and service.

Joystick Maintenance

The joystick is a sealed unit that requires only surface cleaning. Wipe the joystick with a clean cloth, dampened with water after each use to maintain appearance and gasket integrity. To avoid harming the surface finish, do not use a harsh or corrosive solvent.

V8 and L6 Models

Anti-Collision Link Cables and Springs

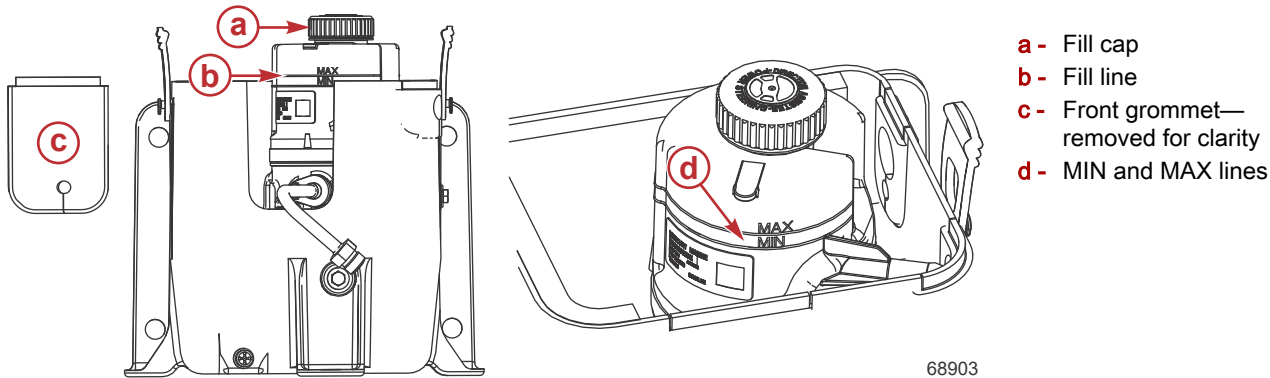
IMPORTANT: The anti-collision link cables and springs ensure that the engines do not collide with each other. To prevent cowl or engine damage, it is critical that the proper length cables be installed in the correct orientation and with the correct springs. Damage resulting from incorrect or improperly installed cables and springs is not covered under warranty. Mercury Marine highly recommends that this maintenance be referred to the local, authorized Mercury dealer.

The anti-collision link cables and springs must be replaced:

- Every two years of saltwater use
- Every five years of freshwater use

Checking Power Steering Fluid

Remove the power steering cover and the fill cap to check the fluid level. The fluid level should be between the MIN and MAX lines. Use SAE 0W-30 synthetic power steering fluid, if needed.



Description	Where Used	Part No.
Synthetic Power Steering Fluid SAE 0W-30	Power steering system	92-858077K01

V12 Models

V12 models have onboard (under cowl) electric steering. Refer to the engine's operation manual for all steering maintenance items, including checking power steering fluid.

Section 5 - Customer Assistance Information

Table of Contents

Service Assistance.....	48	Ordering Literature.....	48
Local Repair Service	48	United States and Canada	48
Service Away From Home	48	Outside the United States and Canada	49
Parts and Accessories Inquiries	48		
Contact Information for Mercury Marine Customer			
Service	48		

Service Assistance

Local Repair Service

If service is needed for a Mercury accessory, take it to an authorized dealer.

Service Away From Home

If the need arises for service while away from the local dealer, contact the nearest authorized dealer. If, for any reason, service cannot be obtained, contact the nearest Regional Service Center. Outside the United States and Canada, contact the nearest Marine Power International Service Center.

Parts and Accessories Inquiries

Direct any inquiries concerning genuine Mercury Precision Parts® or Quicksilver Marine Parts and Accessories® to a local authorized dealer. Dealers have the proper systems to order parts and accessories, if they are not in stock. **Engine model** and **serial number** are required to order correct parts.

Contact Information for Mercury Marine Customer Service

For assistance, call, fax, or write to the geographic office in the area. Please include the appropriate daytime telephone number with mail and fax correspondence.

United States, Canada		
Telephone	English +1 920 929 5040 Français +1 905 636 4751	Mercury Marine W6250 Pioneer Road P.O. Box 1939 Fond du Lac, WI 54936-1939
Fax	English +1 920 929 5893 Français +1 905 636 1704	
Website	www.mercurymarine.com	

Australia, Pacific		
Telephone	+61 3 9791 5822	Brunswick Asia Pacific Group 41-71 Bessemer Drive Dandenong South, Victoria 3175 Australia
Fax	+61 3 9706 7228	

Europe, Middle East, Africa		
Telephone	+32 87 32 32 11	Brunswick Marine Europe Parc Industriel de Petit-Rechain B-4800 Verviers, Belgium
Fax	+32 87 31 19 65	

Mexico, Central America, South America, Caribbean		
Telephone	+1 954 744 3500	Mercury Marine 11650 Interchange Circle North Miramar, FL 33025 U.S.A.
Fax	+1 954 744 3535	

Asia, Singapore, Japan		
Telephone	+65 68058100	Mercury Marine Singapore Pte Ltd 11 Changi South Street 3, #01-02 Singapore, 486122
Fax	+65 68058138	

Ordering Literature

Before ordering literature, have the following information about the power package available:

Model		Serial Number	
Horsepower		Year	

United States and Canada

For additional literature for the Mercury Marine power package, contact the nearest Mercury Marine dealer or contact:

Mercury Marine		
Telephone	Fax	Mail
(920) 929-5110	(920) 929-4894	Mercury Marine Attn: Publications Department P.O. Box 1939 Fond du Lac, WI 54936-1939

Outside the United States and Canada

Contact the nearest Mercury Marine authorized service center to order additional literature that is available for the particular power package.

Submit the following order form with payment to:	Mercury Marine Attn: Publications Department W6250 Pioneer Road P.O. Box 1939 Fond du Lac, WI 54936-1939			
Ship To: (Copy this form and print or type—This is your shipping label)				
Name				
Address				
City, State, Province				
ZIP or postal code				
Country				

Quantity	Item	Stock Number	Price	Total
			.	.
			.	.
			.	.
			.	.
			.	.
			Total Due	.

Notes:

Section 6 - Predelivery (PDI) and Customer Delivery (CDI) Checklists

Table of Contents

Predelivery Inspection (PDI).....	52	Customer Delivery Inspection (CDI).....	53
-----------------------------------	----	---	----

Predelivery Inspection (PDI)

IMPORTANT: This checklist is for packages equipped with joystick piloting. For engine packages not equipped with Joystick Piloting for Outboard, use the outboard PDI checklist located on the MercNET website.

Perform these tasks before the Customer Delivery Inspection (CDI).

N/A	Check/ Adjust	Check Before Running:
<input type="checkbox"/>	<input type="checkbox"/>	Verify completion of thruster integration kit commissioning procedure (if equipped).
	<input type="checkbox"/>	Direct customer to digital quick reference guide for bow thruster integration kit (if equipped).
	<input type="checkbox"/>	Service bulletin updates or repairs completed.
	<input type="checkbox"/>	Drain plug installed and drain valves closed.
	<input type="checkbox"/>	Engine mounts tight.
	<input type="checkbox"/>	Engine alignment
	<input type="checkbox"/>	Battery of proper rating, fully charged, secured, with protective covers in place.
	<input type="checkbox"/>	All electrical connections tight.
	<input type="checkbox"/>	All fuel connections tight.
	<input type="checkbox"/>	Correct propeller selected, installed, and tightened to specifications.
	<input type="checkbox"/>	Throttle, shift, and steering system fasteners tightened to specifications.
	<input type="checkbox"/>	Steering operation throughout range
	<input type="checkbox"/>	Crankcase oil level
	<input type="checkbox"/>	Power trim oil level
	<input type="checkbox"/>	Power steering fluid level
<input type="checkbox"/>	<input type="checkbox"/>	SmartCraft gauges calibrated.
	<input type="checkbox"/>	Warning system operation
	<input type="checkbox"/>	Trim limit operation if applicable
	<input type="checkbox"/>	Inspect the port hydraulic steering fluid reservoir level.
N/A	Check/ Adjust	Helm:
	<input type="checkbox"/>	Inspect the joystick (full movement in all directions).
	<input type="checkbox"/>	Inspect the steering wheel and tilt mechanism.
<input type="checkbox"/>	<input type="checkbox"/>	Inspect the MFD (powers up with either key switch), if equipped.
<input type="checkbox"/>	<input type="checkbox"/>	Inspect all trackpads (functional).

N/A	Check/ Adjust	On-the-Water Test:
	<input type="checkbox"/>	Neutral start safety switch operation
	<input type="checkbox"/>	Lanyard stop switch operation (all helms)
	<input type="checkbox"/>	Operation of instruments
	<input type="checkbox"/>	Fuel, oil, and water leaks
	<input type="checkbox"/>	Forward, neutral, and reverse gear operation
	<input type="checkbox"/>	Steering operation throughout range
	<input type="checkbox"/>	Acceleration from idle RPM is normal.
	<input type="checkbox"/>	WOT _____ RPM within specification (in forward gear)
	<input type="checkbox"/>	Power trim operation
<input type="checkbox"/>	<input type="checkbox"/>	Confirm vessel personality list.
	<input type="checkbox"/>	Ensure that the steering wheel returns to center position when turning on the starboard engine key switch.
	<input type="checkbox"/>	Maneuver the boat to port by moving the joystick to full port. Ensure that undesirable movement can be corrected by minimal operator joystick input.
	<input type="checkbox"/>	Maneuver the boat to starboard by moving the joystick to full starboard. Ensure that undesirable movement can be corrected by minimal operator joystick input.
	<input type="checkbox"/>	Ensure that the boat tracks a straight course at cruising speed. Perform drive alignment if required with CDS G3 service tool.
<input type="checkbox"/>	<input type="checkbox"/>	Enable the auto heading mode and drive for one minute at cruising speed ensuring that there is less than $\pm 5^\circ$ deviation to port or starboard.
	<input type="checkbox"/>	Check the steering response by steering the boat from port to starboard at different speeds, starting at idle and accelerating through cruising speed in 1000 RPM increments.
	<input type="checkbox"/>	Perform a hard starboard turn at in-gear idle while increasing to WOT while in turn. Ensure that boat steering remains responsive.
	<input type="checkbox"/>	Perform a hard starboard turn in gear at idle with all engines running. Turn the starboard engine off during the turn. Ensure that the boat steering remains responsive.
N/A	Check/ Adjust	After the On-the-Water Test:
	<input type="checkbox"/>	Propeller nut tightened to specification
	<input type="checkbox"/>	Fuel, oil, water, and fluid leaks
	<input type="checkbox"/>	Oil and fluid levels
	<input type="checkbox"/>	Apply Quicksilver Corrosion Guard to the engine package.
	<input type="checkbox"/>	Operation and Maintenance manual is in the boat.

Customer Delivery Inspection (CDI)

IMPORTANT: This inspection must take place in the presence of the customer.

This checklist is for packages equipped with outboard joystick. For engine packages not equipped with outboard joystick, use the outboard PDI checklist located on the MercNet website. Perform these tasks after the Predelivery Inspection (PDI).

N/A	Completed	Item
	<input type="checkbox"/>	Operation and maintenance manual—provide to and review with the customer. Emphasize the importance of safety warnings and Mercury engine testing procedures.
	<input type="checkbox"/>	Approve the external appearance of the product (paint, cowl, decals, etc.)
	<input type="checkbox"/>	Warranty—provide and explain the limited warranty to the customer. Explain your dealer services.
<input type="checkbox"/>	<input type="checkbox"/>	Explain the optional Mercury Product Protection Plan to the customer (North America only)
N/A	Completed	Operation of equipment—explain and demonstrate:
	<input type="checkbox"/>	E-stop switch/lanyard stop switch operation (all helms)
	<input type="checkbox"/>	Cause and effect of steering torque or pull; instruct the customer on using a firm steering grip; explain boat spin-out and how to trim for neutral steering
<input type="checkbox"/>	<input type="checkbox"/>	U.S. Coast Guard capacity plate
	<input type="checkbox"/>	Proper seating
	<input type="checkbox"/>	Importance of personal flotation devices (PFDs or life vests) and throwable PFDs (throw cushions)
<input type="checkbox"/>	<input type="checkbox"/>	Functions of SmartCraft accessories (if applicable)
	<input type="checkbox"/>	Off-season storage and maintenance schedule

Section 6 - Predelivery (PDI) and Customer Delivery (CDI) Checklists

N/A Completed Operation of equipment—explain and demonstrate:

- ☐ Engine (starting, stopping, shifting, using throttle)
- ☐ Boat (lights, battery switch location, fuses/breakers)
- ☐ Trailer (if applicable)

N/A Completed Safety:

- ☐ Enable throttle-only mode and demonstrate its ability to disable shifting of the electronic remote control and joystick while engines are running

N/A Completed Joystick and Trackpad:

- ☐ Demonstrate that the joystick requires all engines must be running to operate
- ☐ Rotate the joystick to port and starboard to demonstrate pivot capabilities
- ☐ Place the joystick to port to translate the boat while demonstrating the ability to compensate for current and wind by rotating the top of the joystick and inputting slight forward and reverse inputs. Repeat going starboard.
- ☐ Enable docking mode to demonstrate reduced throttle response for the joystick maneuvers
- ☐ Demonstrate thruster heading control and mention that it is normal for the thruster to run for five seconds after releasing the joystick.
- ☐ Demonstrate the use of the adjust button to disable bow thruster integration (if equipped).
- ☐ Demonstrate methods to enable and disable auto heading mode
- ☐ Demonstrate methods to enable and disable Skyhook
- ☐ Demonstrate methods to enable and disable autopilot waypoint sequencing

N/A Completed Maintenance:

- ☐ Explain hydraulic power steering fluid checks and the fluid required

N/A Completed Registration:

- ☐ Complete and submit the warranty registration. Provide the customer with a copy.