





Mercury, Mercury Marine, MerCruiser, Mercury MerCruiser, Mercury Racing, Mercury Precision Parts, Mercury Propellers, Mariner, Quicksilver, #1 On The Water, Alpha, Bravo, Pro Max, OptiMax, Sport-Jet, K-Planes, MerCathode, RideGuide, SmartCraft, Zero Effort, M with Waves logo, Mercury with Waves logo, and SmartCraft logo are all registered trademarks of Brunswick Corporation. Mercury Product Protection logo is a registered service mark of Brunswick Corporation.

200/225/250/275 VERADO 4-STROKE INSTALLATION MANUAL

Table of Contents

Notice to Installer	2	Junction Box (If Equipped).....	25
Avoiding Loss of Throttle and Shift Control	2	Non-Mercury Marine Provided Ignition Switch.....	25
Accessory Electric Fuel Pump/Fuel Line Primer Bulb	2	Wiring Accessories.....	26
Avoiding Fuel Flow Restriction	2	System Wiring Reference Points.....	26
Boat Horsepower Capacity	2	Battery Cable Size For Outboard Models.....	27
Selecting Accessories For Your Outboard	3	Connecting 14 Pin Data Harness - Single Engine.....	29
Fuel Tanks	3	Connecting 14 Pin Data Harness - Dual Engine	30
Portable Fuel Tank	3	Installing DTS Command Module and Harness - Single Engine.....	31
Permanent Fuel Tank	3	Installing DTS Command Module and Harness - Dual Engine/Single Helm.....	34
Determining Recommended Outboard Mounting Height	4	Battery Information.....	35
Installing Outboard	5	Connecting Battery Cables and DTS Power Harness.....	36
Installation Specifications.....	5	Connecting Fuel Tank And Speed Sensor	39
Maximum Outboard Mounting Height.....	5	Switched 12V Accessory Connection.....	41
Drilling Outboard Mounting Holes.....	6	DTS Wiring - Single Engine.....	42
Lifting Outboard.....	7	DTS Wiring - Dual Engine.....	44
Fastening Outboard.....	8	System Wiring Installation Checklist.....	45
Power Steering Installation	10	Propeller Installation	45
Power Steering System.....	10	Paddle Wheel Speed Sensor Installation (If Equipped)	47
Installation Procedure.....	10	Parts Provided	47
Connection of the Hydraulic Hoses to the Steering Helm.....	12	Selecting Location	47
Connection of the Hydraulic Hoses to the Power Steering Pump.....	14	Transom Angle Requirements	48
Connection of the Hydraulic Hoses to the Steering Cylinder.....	15	Installing Bracket	48
Electrical Connections to the Steering Pump. .	17	Routing the Cable	49
Filling Power Steering System with Engine Not Running.....	19	Installing and Removing the Paddle Wheel	50
Filling Power Steering System with Engine Running.....	21	Wiring Connections	50
Routing Connections Through the Cowl.....	22	Template - Paddle Wheel Speed Sensor	51
Fuel Hose Connection.....	23		
Wiring And Installation	24		
Wire Color Code Abbreviations.....	24		
Installation Guidelines for DTS System Components.....	24		
Data Harness Pulling Procedure.....	24		

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 94	Anti-Corrosion Grease	Propeller shaft splines	92-802867A1
 95	2-4-C Marine Lubricant with Teflon	Propeller shaft splines	92-802859A1

Notice to Installer

This Product Requires Electronic Calibration Before Use.

Installation of this product will require electronic calibration. This calibration must not be attempted by anyone other than the Original Equipment Manufacturer (OEM) or a Mercury technician trained in Digital Throttle and Shift systems (DTS) at an authorized Mercury dealership. Improper installation and calibration of the DTS product will result in a system which is inoperable or unsafe for use.

Avoiding Loss of Throttle and Shift Control

WARNING

To avoid the possibility of serious injury or death from loss of boat control, do not splice or probe into any wire insulation of the DTS system. Splicing or probing will damage the wire insulation allowing water to enter the wiring. Water intrusion may lead to wiring failure and loss of throttle and shift control.

Accessory Electric Fuel Pump/Fuel Line Primer Bulb

IMPORTANT: Do not install either an accessory electric fuel pump or a fuel line primer bulb into the fuel system of this engine.

Avoiding Fuel Flow Restriction

IMPORTANT: Adding components to the fuel supply system (filters, valves, fittings, etc.) may restrict the fuel flow. This may cause engine stalling at low speed, and/or a lean fuel condition at high RPM that could cause engine damage.

Boat Horsepower Capacity

WARNING

Using an outboard that exceeds the maximum horsepower limit of a boat can: 1) cause loss of boat control 2) place too much weight at the transom altering the designed flotation characteristics of the boat or 3) cause the boat to break apart particularly around the transom area. Overpowering a boat can result in serious injury, death or boat damage.

Do not overpower or overload your boat. Most boats will carry a required capacity plate indicating the maximum acceptable power and load as determined by the manufacturer following certain federal guidelines. If in doubt, contact your dealer or the boat manufacturer.

U.S. COAST GUARD CAPACITY	
MAXIMUM HORSEPOWER	XXX
MAXIMUM PERSON CAPACITY (POUNDS)	XXX
MAXIMUM WEIGHT CAPACITY	XXX

ob00306

Selecting Accessories For Your Outboard

Genuine Mercury Precision or Quicksilver Accessories have been specifically designed and tested for this outboard

Some accessories not manufactured or sold by Mercury Marine are not designed to be safely used with this outboard or outboard operating system. Acquire and read the installation, operation, and maintenance manuals for all selected accessories.

Fuel Tanks

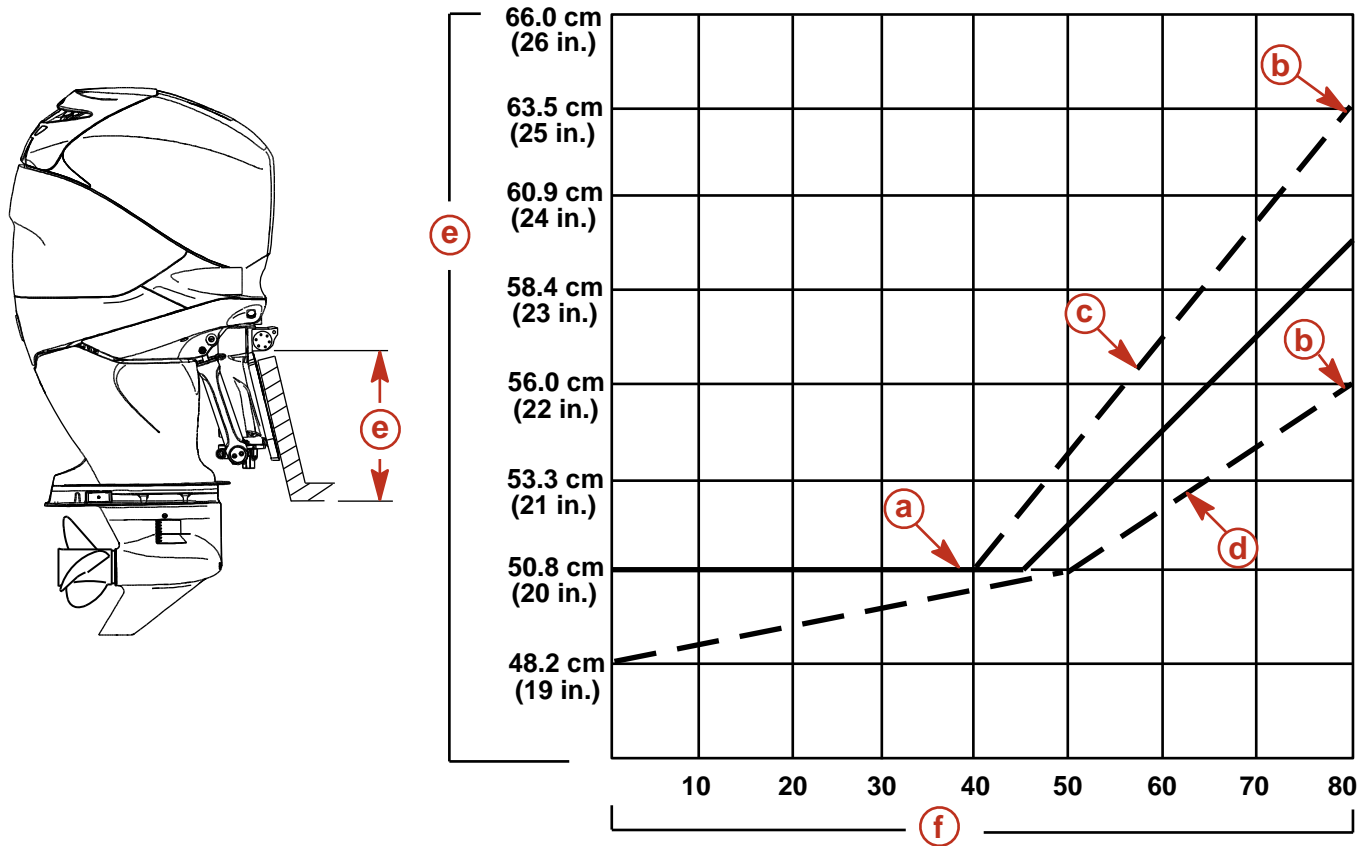
Portable Fuel Tank

Select a suitable location in the boat within the engine fuel line length limitations and secure the tank in place.

Permanent Fuel Tank

Permanent fuel tanks should be installed in accordance with industry and federal safety standards, which include recommendations applicable to grounding, anti-siphon protection, ventilation, etc.

Determining Recommended Outboard Mounting Height



ob01470

- a** - The solid line is recommended to determine the outboard mounting height.
- b** - The broken lines represent the extremes of known successful outboard mounting height dimensions.
- c** - The line may be preferred to determine outboard mounting height dimension, if maximum speed is the only objective.
- d** - The line may be preferred to determine outboard mounting height dimension for dual outboard installation.
- e** - Outboard mounting height (height from a point on the pedestal 48 mm [1-7/8 in.] above center of top mounting hole to the bottom of the boat transom). For heights over 56.0 cm (22 in.), a propeller designed for surfacing operation is usually preferred.
- f** - Maximum boat speed (m.p.h.) anticipated.

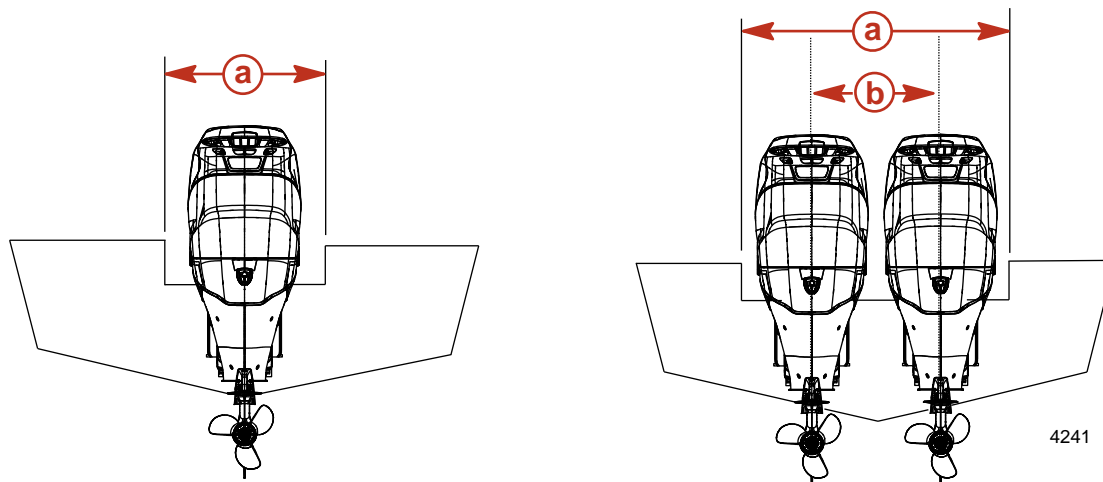
NOTICE	
<ul style="list-style-type: none"> The static waterline, with boat at rest, must be below the "MAX STATIC WATERLINE" mark on the idle relief grommet (located at the rear of the outboard), when the outboard is fully tilted in/down. If waterline is above "MAX STATIC WATERLINE" mark, adjust boat load forward or increase (raise) outboard mounting height to correctly place mark above waterline. Add 12.7 cm (5 in.) for XL models and 25.4 cm (10 in.) for XXL models to listed outboard mounting height. The mounting height of the outboard must not exceed 63.5 cm (25 in.) for XL models and 76.2 cm (30 in.) for XXL models. Mounting the outboard higher may cause damage to the gearcase components. 	

Increasing the mounting height will usually:

- Increase top speed
- Increase boat stability
- Cause propeller to break loose during planing or turning

Installing Outboard

Installation Specifications



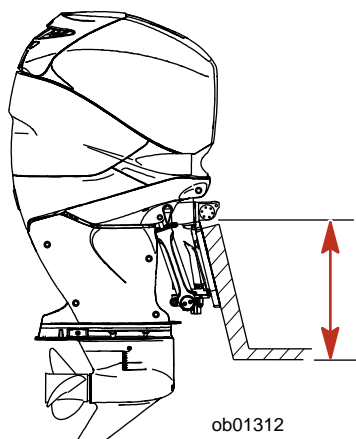
a - Minimum transom opening

b - Engine center line for dual engine - 66.0 cm (26 in.)

Minimum Transom Opening	
Single engine	99.0 cm (39 in.)
Dual engine	165.0 cm (65 in.)

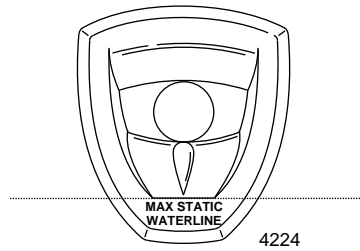
Maximum Outboard Mounting Height

The mounting height of the outboard must not exceed 63.5 cm (25 in.) for L models, 76.2 cm (30 in.) for XL models and 88.9 cm (35 in.) for XXL models. Mounting the outboard higher may cause damage to the gearcase components.



MAXIMUM STATIC WATERLINE

The static waterline, with boat at rest, must be below the "MAX STATIC WATERLINE" mark on the idle relief grommet (located at the rear of the outboard) when the outboard is fully tilted in/down. If waterline is above "MAX STATIC WATERLINE" mark, adjust boat load forward or increase (raise) outboard mounting height to correctly place mark above waterline.

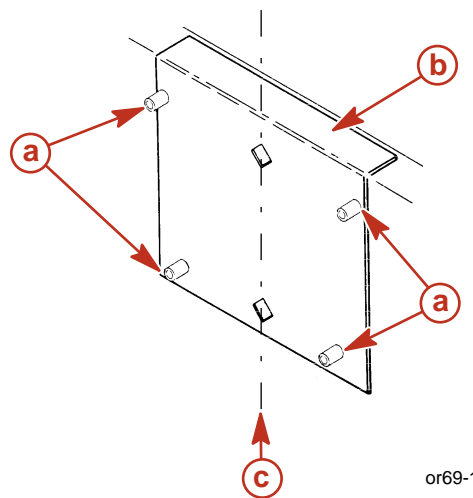


Drilling Outboard Mounting Holes

IMPORTANT: Before drilling any mounting holes, carefully read **Determining Recommended Outboard Mounting Height**. There is a 19 mm (0.75 in.) difference between the outboard mounting holes in the transom brackets.

⚠ WARNING
Avoid possible serious injury or death. Do not, under any circumstances, allow the upper outboard mounting bolts to be closer than 25.4 mm (1 in.) from the top of the boat transom. Never install the upper mounting bolts through shims.

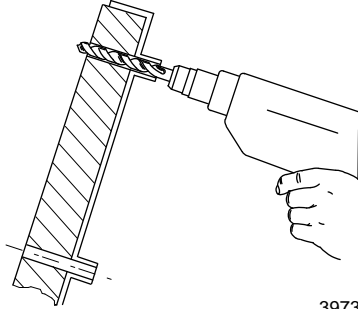
1. Mark four mounting holes on the transom using the transom drilling fixture.



- a** - Drill guide holes
- b** - Transom drilling fixture - not included
- c** - Transom centerline

Transom Drilling fixture	91-98234A2
--------------------------	------------

2. Place masking tape directly onto the boat where the mounting holes will be drilled to help keep the fiberglass from chipping.

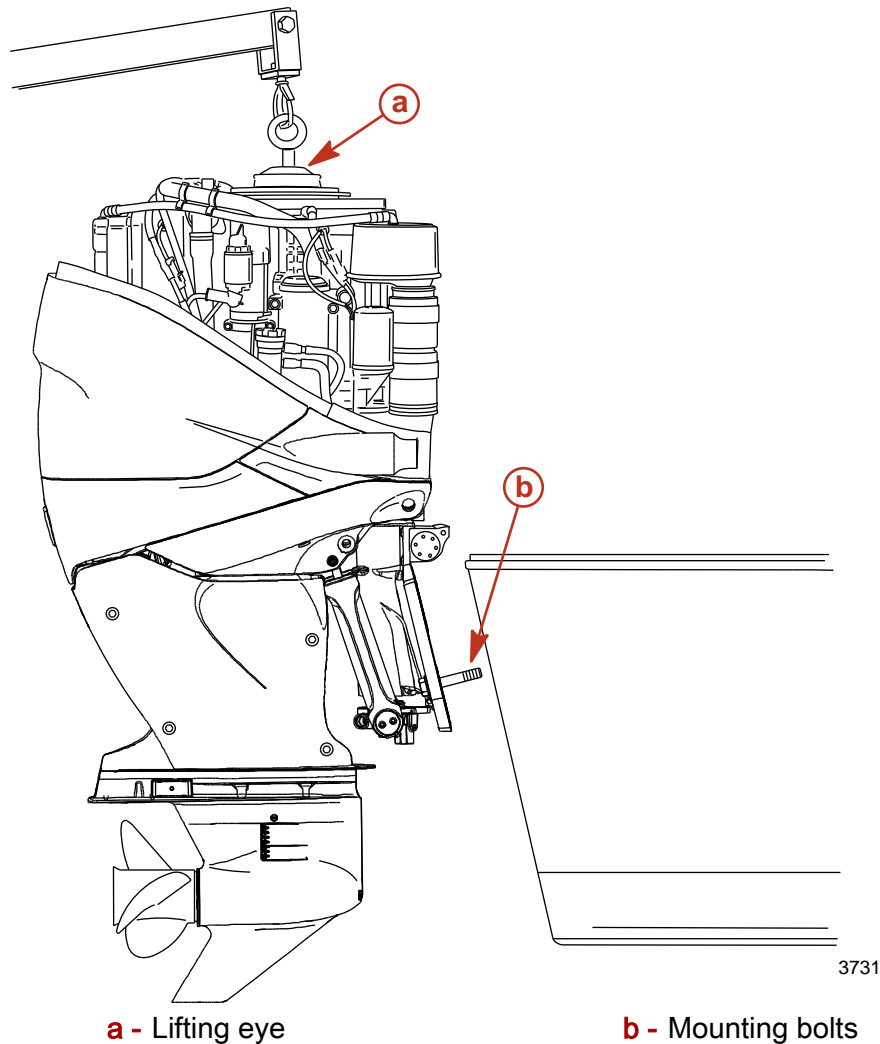


3. Using the drill guide holes on the transom drilling fixture, drill four 13 mm (17/32 in.) holes perpendicular to and through the transom.

Lifting Outboard

1. Remove top cowl and engine flywheel cover.
2. Install lifting ring/flywheel puller to flywheel. Tighten bolts securely.
3. Lift engine using engine lift with a minimum capacity of 450kg (1000 lb.).
4. Avoid interference by placing the lower mounting bolts into the lower mounting slots before placing outboard against the transom.

5. Refer to **Determining Recommended Outboard Mounting Height**, and install outboard to the nearest recommended mounting height.



Lifting Eye	91-895343T01
-------------	--------------

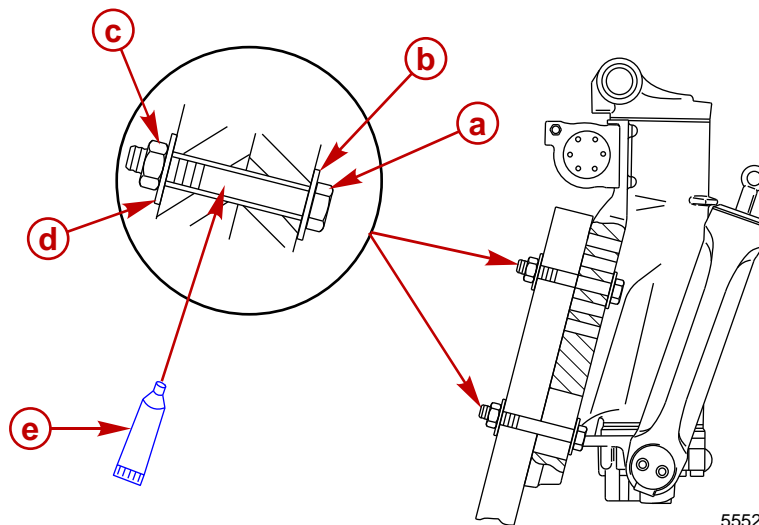
6. Fasten outboard with mounting hardware provided. Refer to **Fastening Outboard**.

Fastening Outboard

1. Place lower mounting bolts into mounting slots before placing outboard on transom.
2. Refer to **Determining Recommended Outboard Mounting Height**, and install outboard to the nearest recommended mounting height.
3. Fasten outboard with the stainless steel bolts, nylon insert locknuts and flat washers as shown.

⚠ CAUTION

To avoid loss of outboard, ensure that a minimum of two full threads of bolt extend beyond locknut after tightening locknut. Ensure mounting nut is tightened against transom, not the shank of the mounting bolt.



a - Transom bolts (1/2 x 20) (4)

b - Flat washers - outer (4)

c - Nylon insert locknuts (4)

d - Flat washers - inner (4)

e - Marine sealer - apply to shank of bolts, not threads

Outboard Transom Mounting Hardware - Supplied with Outboard

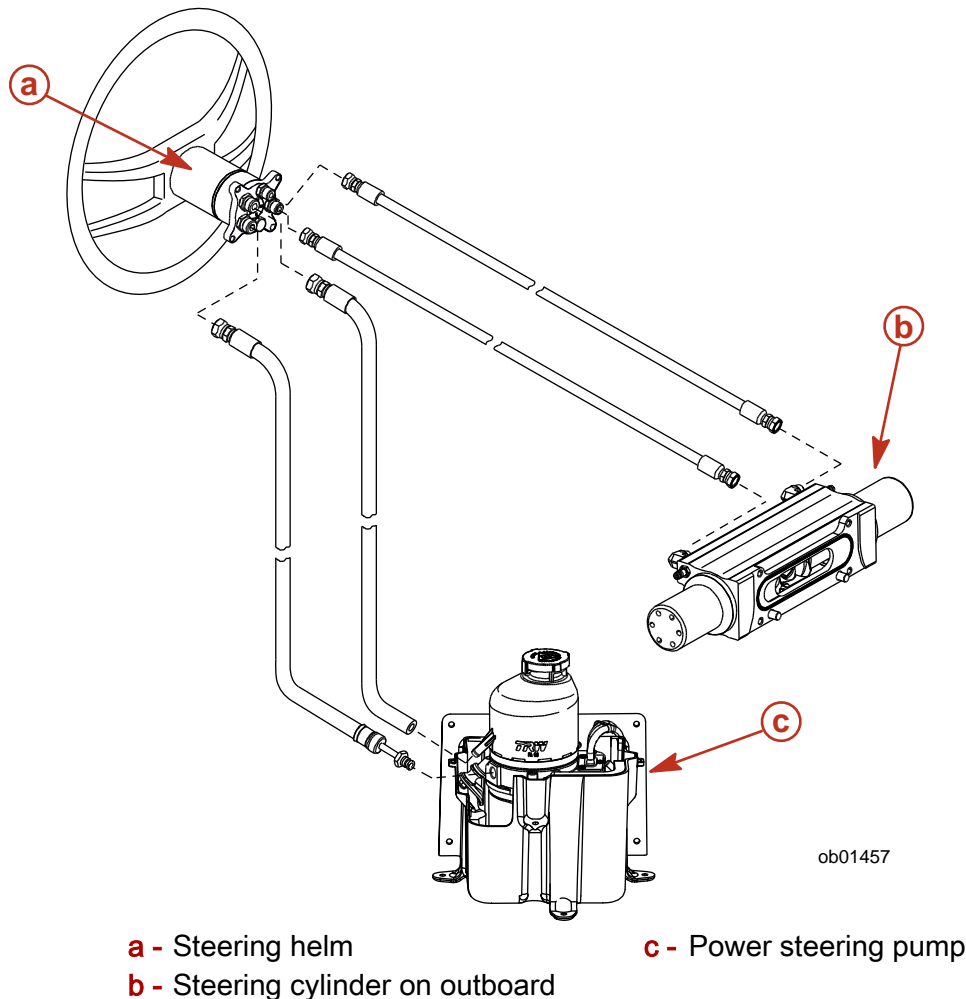
Part Number	Part Name	Description
10-67755003	Transom bolt	1/2 x 20 x 5.50 in. long (3.25 in. thread)
11-826711-17	Nylon insert locknut	1/2 x 20
12-28421	Washer - inner	0.516 in. ID x 1.50 in. OD
12-895062	Washer - outer	0.551 in. ID x 1.06 in. OD

Available Transom Mounting Bolts

Part Number	Part Name	Description
10-814259	Transom bolt	1/2 x 20 x 4.00 in. long (2.25 in. thread)
10-67755-1	Transom bolt	1/2 x 20 x 4.50 in. long (2.25 in. thread)
10-67755-2	Transom bolt	1/2 x 20 x 6.50 in. long (2.75 in. thread)

Power Steering Installation

Power Steering System



Installation Procedure

NOTE: On some large/heavy dual outboard boats the steering forces generated in extreme maneuvers may create loads that exceed the pump's pressure capacity. If the happens, the operator may feel intermittent periods of load feedback at the steering wheel. The steering wheel may feel hard to turn for brief periods during these extreme maneuvers. If this happens and steering performance is deemed unacceptable for the application, a second (accessory) cylinder may be rigged. When using a second steering cylinder the 40cc helm should be replaced with a 50cc helm.

SELECTING LOCATION FOR THE POWER STEERING PUMP

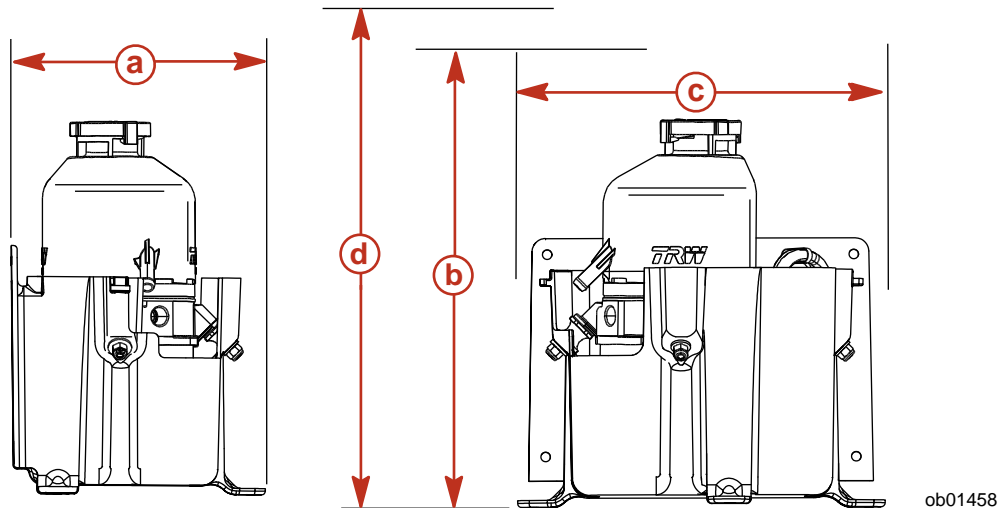
⚠ CAUTION

To ensure proper steering operation, hydraulic power steering system must be protected from contamination. Make hydraulic connection in a clean work area. Route hoses with the protective shipping caps in place. Remove protective shipping cap from hose and component fitting as each connection is made.

1. Select a mounting location (floor or side of internal bulkhead) for the installation of the power steering pump that meets the following requirements

- To reduce noise on aluminum or metal hulls, isolate steering hoses from hull with suitable non-abrasive hangers.
- Steering hoses from steering wheel helm must be free of twists or stress. Gently secure hose bundle together with a cable tie, located approximately 25.4 cm (10 in.) from the steering wheel helm.
- Do not mount pump on an angle greater than 15° from vertical position.
- The pump electrical wiring must be within reach of the auxiliary battery.
- Pump should be mounted in an area that allows sound enclosure, cover removal, and easy access to the fill cap.
- Install pump in an area where bilge water will not contaminate the pump.
- To reduce transmitted noise, mount pump on wood or fiberglass surface. Avoid mounting pump on aluminum or steel surfaces.

REQUIRED MOUNTING CLEARANCES FOR THE POWER STEERING PUMP

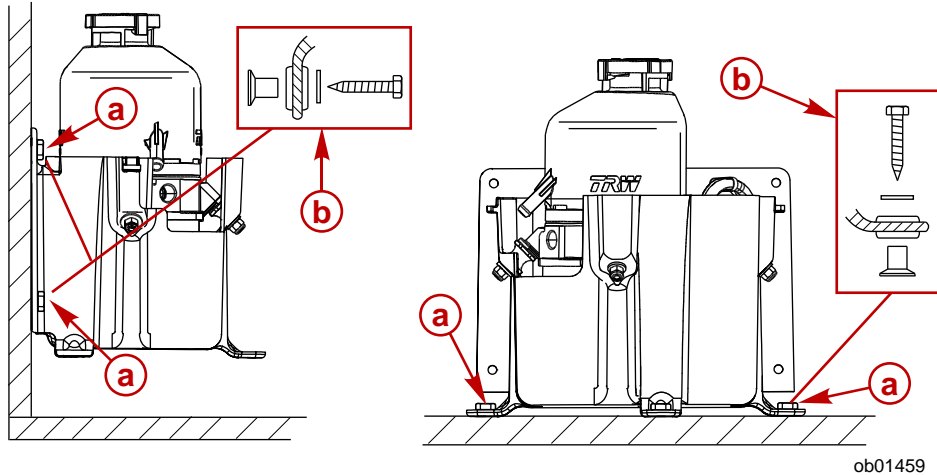


- a** - 215 mm (8 1/2 in.)
- b** - 310 mm (12 7/32 in.) to top cover (not shown)
- c** - 285 mm (11 1/4 in.)
- d** - 432 mm (17 in.) clearance required for cover removal

INSTALLING POWER STEERING PUMP

1. The power steering pump can be mounted two ways:
 - On a side of the internal bulkhead
 - Mounted on the floor

2. Mount the power steering pump at the selected location, using appropriate fastening hardware suitable for the type of material and thickness of the mounting surface.



Mounted on internal bulkhead

Mounted on floor

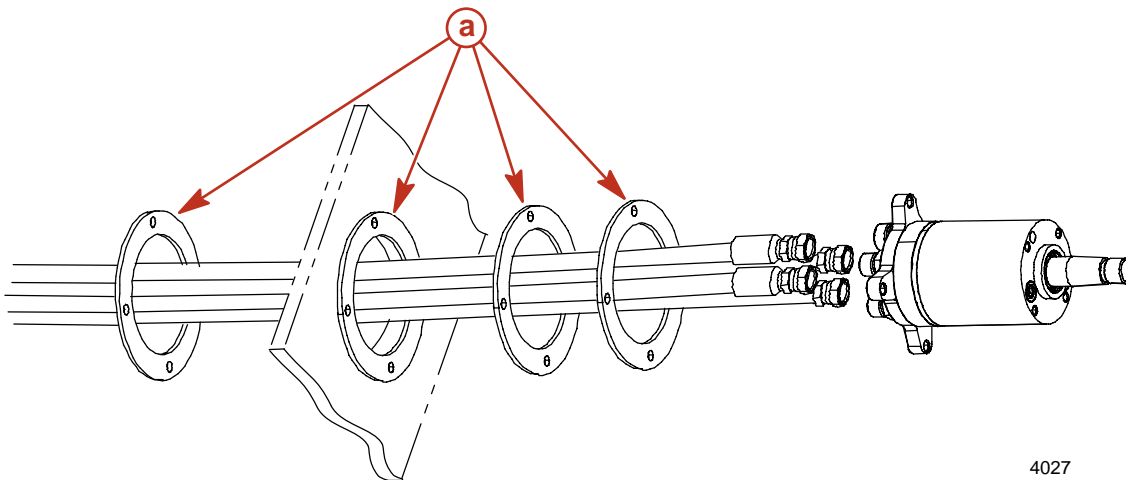
- a** - Lag screws or thru-bolts (3 or 4)
- b** - Mounting hardware

Connection of the Hydraulic Hoses to the Steering Helm

NOTE: Hoses must be routed up through steering helm opening in dash and secured to helm fittings prior to mounting the steering helm.

1. Place the steering hoses through one backing plate on the internal side of the dashboard. Route the steering hoses through the drilled opening, and place the required amount of backing plates on the hoses on the external side of the dashboard.

NOTE: The number of backing plates varies depending on helm displacement.

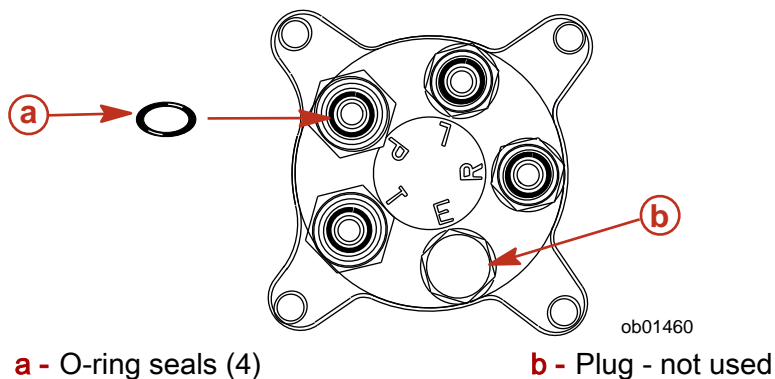


a - Backing plates

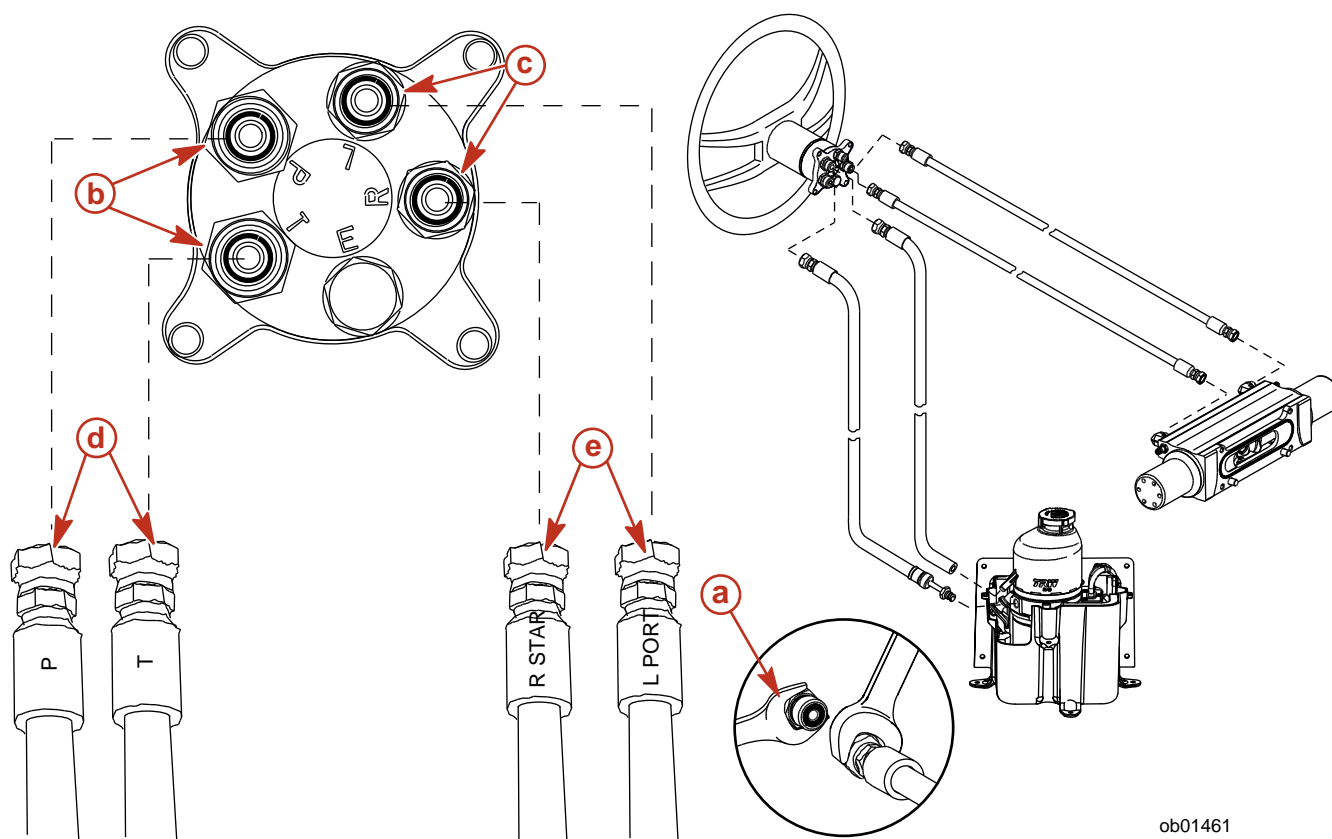
4027

2. Remove and discard the shipping caps from ends of the four fittings on the steering helm. Ensure the O-ring seals did not lift off with the shipping caps.

3. Ensure O-ring seals are in place on end of steering helm fittings.



4. Make the hose connections to the steering helm as shown. Use a thin wrench and hold the helm fittings from turning while tightening hoses. Do not over-tighten the hose connections.



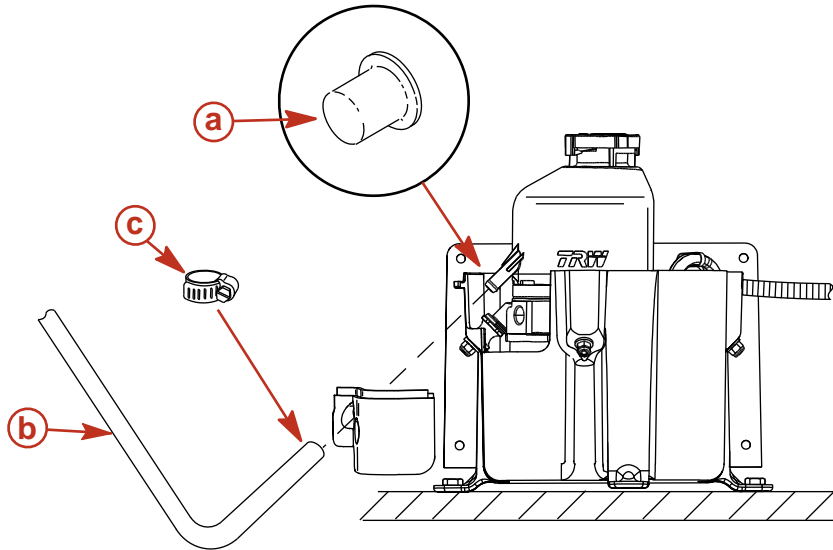
- a** - Thin wrench
- b** - Helm hex fitting wrench size (P & T) - 19 mm (3/4 in.)
- c** - Helm hex fitting wrench size (R & L) - 16 mm (5/8 in.)
- d** - Hydraulic hose hex fitting wrench size (P & T) - 21 mm (13/16 in.)
- e** - Hydraulic hose hex fitting wrench size (R STAR & L PORT) - 18 mm (11/16 in.)

Helm Fitting ID Mark	Hose ID Mark	Description
P	P	Pressure from pump to helm
T	T	Tank low pressure return to pump

Helm Fitting ID Mark	Hose ID Mark	Description
R	R-STAR	Hose connects to starboard side of steering cylinder
L	L-PORT	Hose connects to port side of steering cylinder

Connection of the Hydraulic Hoses to the Power Steering Pump

1. Remove and discard the yellow protector cap from end of tank low pressure fitting.
2. Connect the low pressure hydraulic hose from the steering helm to the low pressure fitting on the pump reservoir as shown. Fasten hose to fitting with constant tension spring clamp.

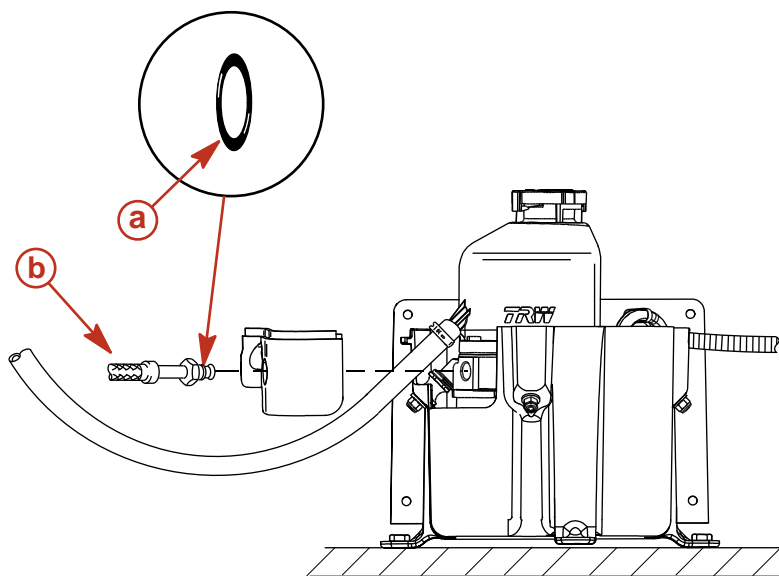


ob01462

- a** - Yellow protector cap (remove and discard)
- b** - Low pressure hydraulic hose from steering helm
- c** - Clamp

3. Ensure that O-ring seal is on end of hose.

4. Connect the high pressure hydraulic hose from the steering helm to the pump as shown.

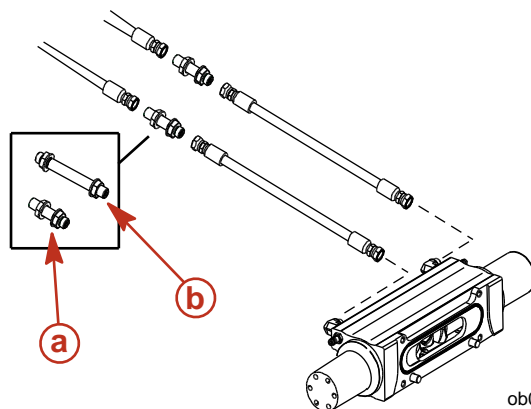


ob01463

a - O-ring**b** - High pressure hydraulic steering hose

Connection of the Hydraulic Hoses to the Steering Cylinder

1. Route the hydraulic hoses to the outboard steering cylinder. Bulkhead fittings are available if an opening does not exist in the engine well.

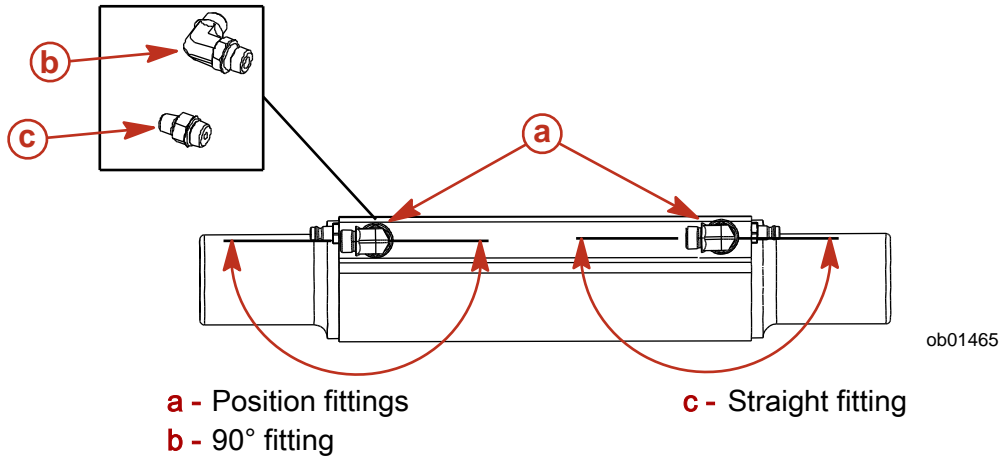


ob01464

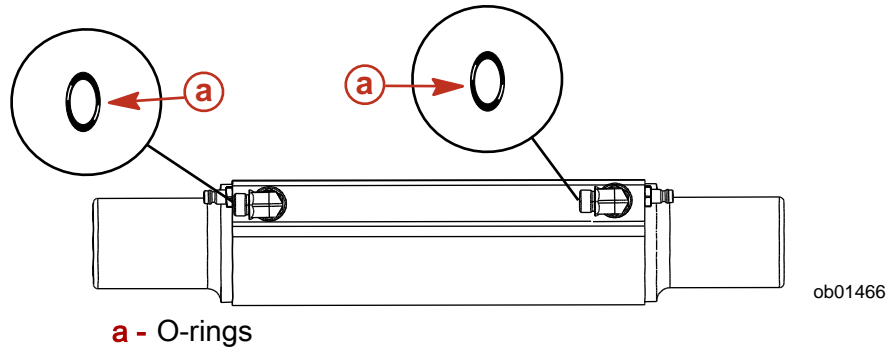
a - Bulkhead fitting - bulkhead thickness up to 1.9 cm (0.75 in.) (22-892517)**b** - Bulkhead fitting - bulkhead thickness up to 7.62 cm (3 in.) (22-892518)

NOTE: The 90° hose fittings on the steering cylinder can be rotated to align with hose routing. Straight hose fittings (22-892519) are also available.

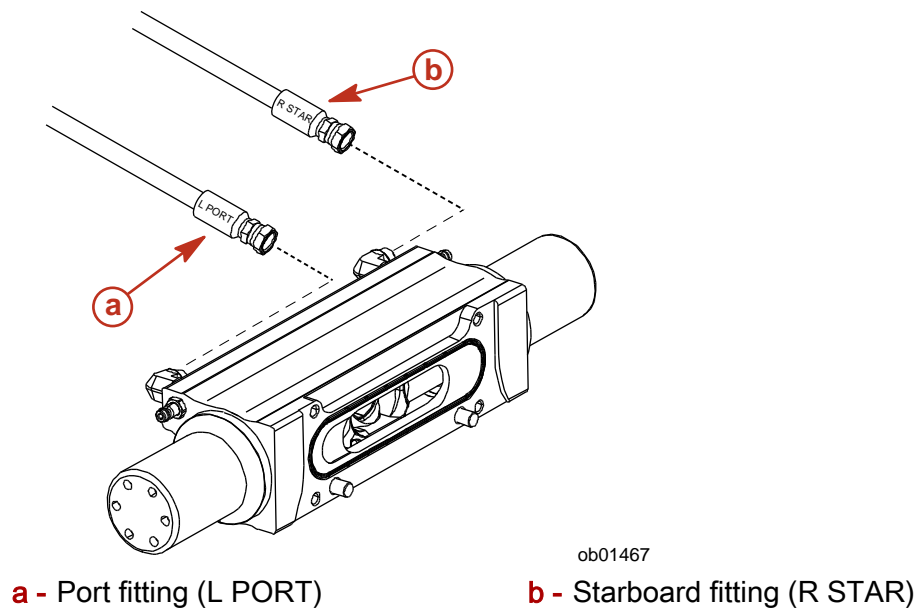
- Position the 90° hose fittings to the desired direction. Loosen fastening nuts in order to rotate. Position fittings and re-tighten fastening nuts.



- Remove and discard the shipping caps from the two fittings on the steering cylinder. Ensure O-ring seals did not lift off with shipping caps.
- Ensure O-ring seals are in place on end of each fitting.

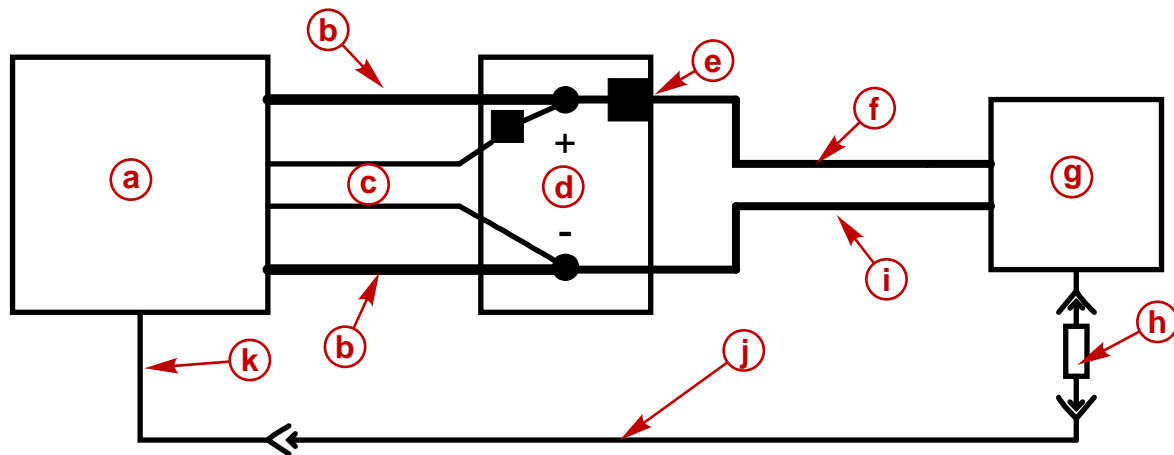


- Make the hydraulic steering hose connections to the steering cylinder as shown.



Electrical Connections to the Steering Pump

NOTE: For single engine installation, the power steering pump battery cables should be connected directly to the outboard starting battery.

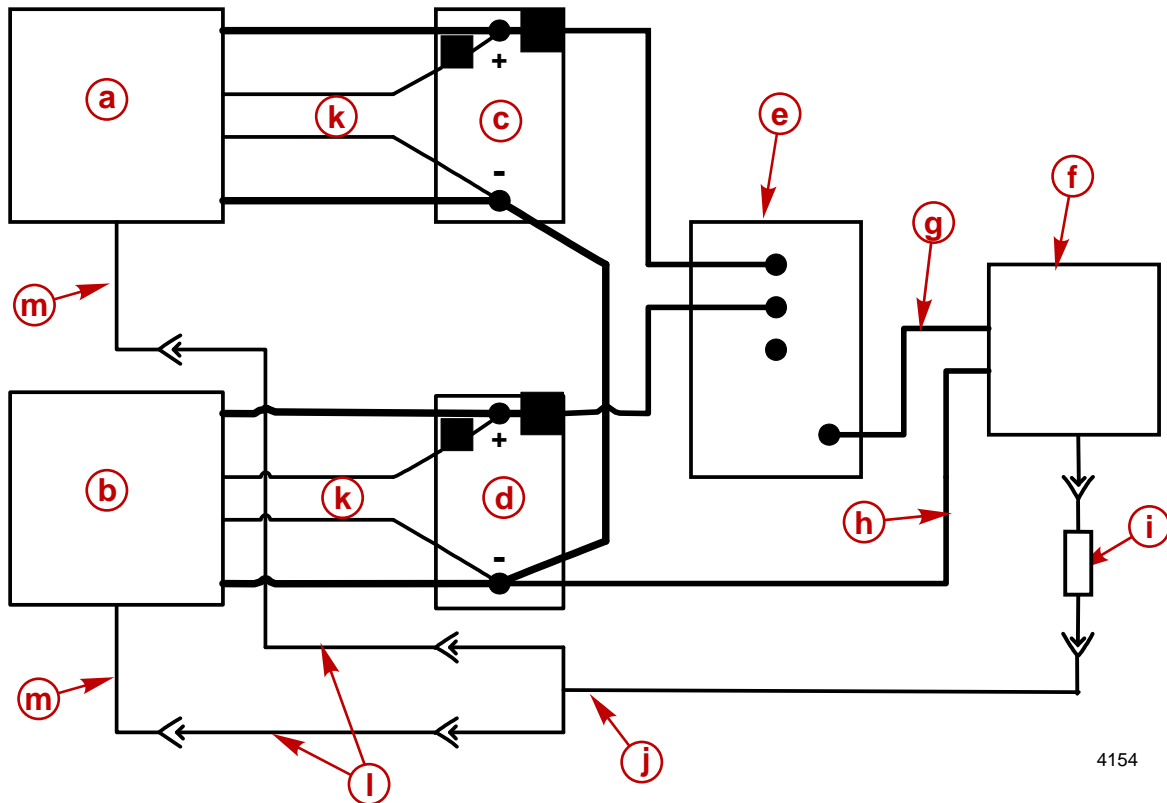


4250

Single Engine Application

- | | |
|---|---|
| a - Engine | g - Power steering pump |
| b - Battery cable | h - Driver module |
| c - DTS power harness | i - Power steering pump ground harness |
| d - Battery | j - Power steering signal harness |
| e - Power steering fuse - 90 Amp | k - Engine signal harness |
| f - Power steering pump 12V positive harness | |

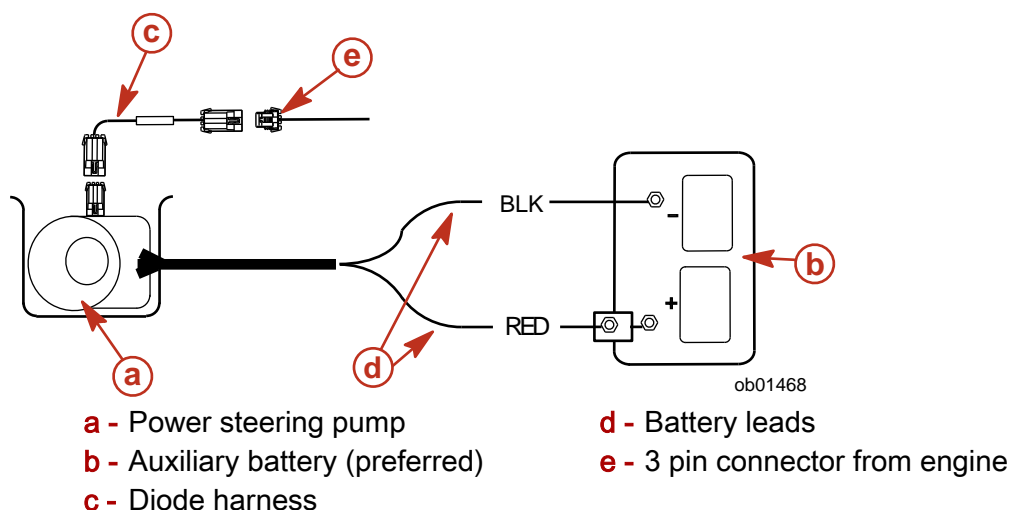
NOTE: On multiple installations, the Automatic Battery Switch (ABS) (87-895091K01), must be used to connect all outboard starting batteries to the power steering pump. The ABS allows battery voltage to be drawn from the starting battery with the highest state of charge.



Dual Engine Application

- | | |
|---|---|
| a - Port engine | h - Power steering pump ground harness |
| b - Starboard engine | i - Driver module |
| c - Port battery | j - Dual engine power steering adaptor |
| d - Starboard battery | k - DTS power harness |
| e - Automatic Power Switch (APS) | l - Power steering signal harness |
| f - Power Steering Pump | m - Engine signal harness |
| g - Power steering pump 12V positive harness | |

1. Make electrical connections to the pump as shown.

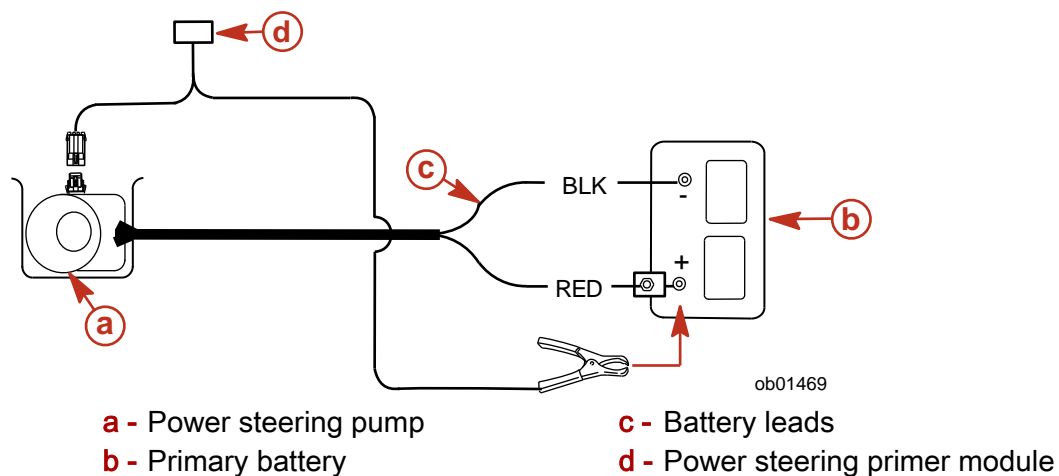


Filling Power Steering System with Engine Not Running

Use SAE 0W-30 Full Synthetic Power Steering Fluid in the power steering system. In an emergency, if recommended power steering fluid is not available, the use of any full synthetic engine oil can be temporarily used. The power steering fluid should then be drained and replaced with SAE 0W-30 Full Synthetic Power Steering Fluid as soon as possible, to avoid loss of performance in power steering system.

Fluid Type	Capacity	Mercury Part Number
SAE 0W-30 Full Synthetic Power Steering Fluid	1 - 2 liters (1 - 2 quarts) depending on length of steering hoses	92-858002K01

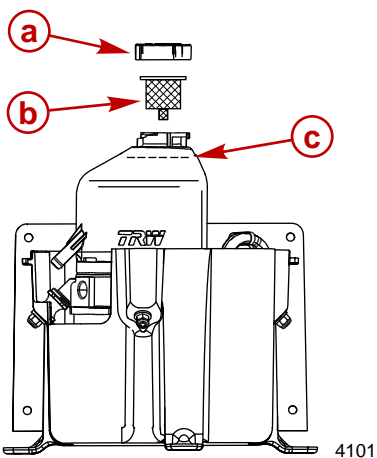
1. Disconnect power steering signal harness from engine signal harness.
2. Connect the Power Steering Primer Module Kit to the power steering pump and 12 volt positive power source as shown.



Power Steering Primer Module Kit	91-895040K01
----------------------------------	--------------

3. Remove the filler cap and filter from the power steering pump.

4. Fill the pump tank with recommended power steering fluid.



a - Fill cap
b - Filter

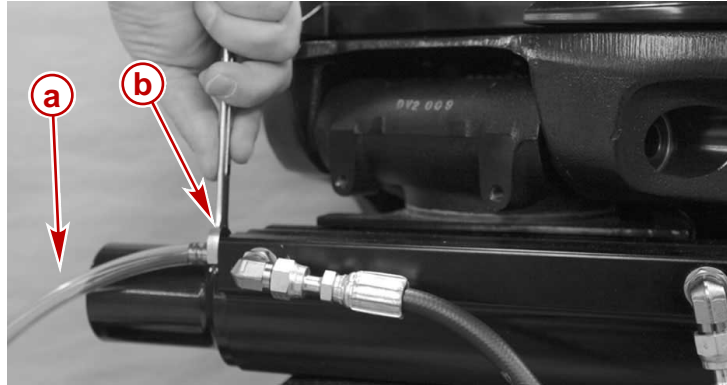
c - Full level

IMPORTANT: The power steering module primer has two switches, "POWER" - "ON" and "OFF", and "PUMP" - "ON" and "OFF". To power up and activate the power steering pump, there are two steps: 1) Turn the "POWER" switch to the "ON" position to power up pump, wait for two seconds, then, 2) Turn the "PUMP" switch to the "ON" position to activate pump.

IMPORTANT: Do not run pump out of fluid. If pump draws air during bleeding, the resulting re-bleeding will take two to three times longer than initial bleeding.

5. Power up and activate the pump until fluid drops halfway. Turn off both switches on the power steering primer module and refill the pump tank. Repeat this operation until pump tank stays full.
6. Power up and activate the pump while slowly turning the steering wheel towards the full lock position in one direction. Carefully monitor the fluid level until fluid drops halfway, stop turning the steering wheel and refill the pump tank. Repeat this operation turning the steering wheel from full lock to full lock 10 times until pump tank stays full.
7. For bleeding any air left in the steering system, power up and activate the pump. Turn the steering wheel in one direction until the full lock position is met.
8. Attach an 8 mm I.D. (5/16 in. I.D.) transparent bleed hose to the bleed valve on the end of the steering cylinder that the engine is pointing to. Route bleed hose into pump tank (do not bleed power steering fluid into a different container, this will only be pumping fluid out of the system that was just filled up).

9. Open bleed valve to release any remaining air in the power steering system. Allow adequate time, depending on length of power steering hose, for air to escape from system. Tighten bleed valve securely and remove bleed hose.



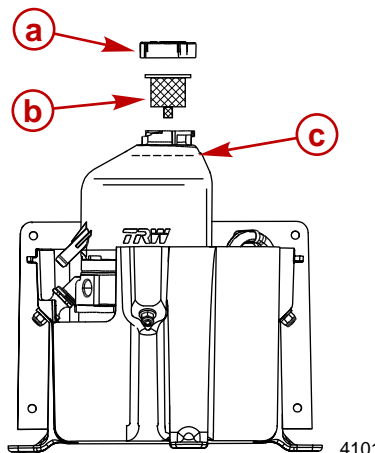
3640

a - Bleed hose**b** - Bleed valve in steering cylinder

10. Turn the steering wheel to opposite full lock position, and repeat steps 8 and 9.
11. Replace the filter and fill cap on the power steering pump.
12. If desired, the power steering system can be rechecked after sitting overnight to remove any air that may possibly be left in the system. Repeat steps for bleeding steering system, preceding.
13. Turn off both switches, remove the power steering primer module and reconnect the power steering signal harness from the engine to the pump.

Filling Power Steering System with Engine Running

1. Remove the filler cap and filter from the power steering pump.
2. Fill the pump tank with recommended power steering fluid.

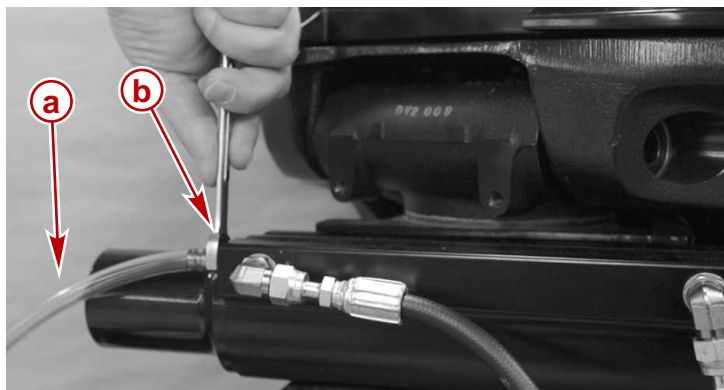


4101

a - Cap**b** - Filter**c** - Full level

3. Start and run the engine until the steering pump fluid drops halfway. Turn off the engine and refill the pump. Repeat this operation until pump stays full.
4. Start and run the engine while slowly turning the steering wheel towards the full lock position in one direction. Carefully monitor the fluid level until fluid drops halfway. Stop turning wheel, turn off engine, and refill the pump tank. Repeat this operation turning the steering wheel to full lock to full lock 10 times until pump tank stays full.

5. For bleeding any air left in the steering system, start and run the engine, and turn the steering wheel in one direction until the full lock position is met.
6. Attach an 8 mm (5/16 in.) I.D. transparent bleed hose to the bleed valve on the end of the steering cylinder that the engine is pointing to. Route bleed hose into pump tank (do not bleed power steering fluid into a different container, as this will only be pumping fluid out of the system that was just filled).
7. Open bleed valve to release any remaining air in the power steering system. Allow adequate time, depending on length of power steering hose, for air to escape from system. Tighten bleed valve securely and remove bleed hose.



a - Bleed hose

b - Bleed valve in steering cylinder

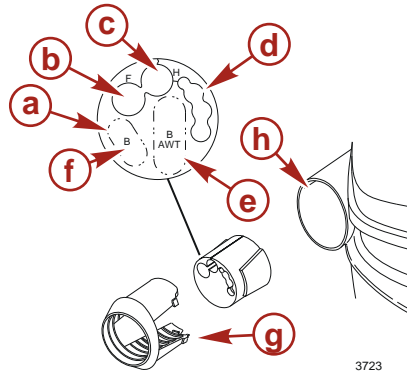
8. Turn the steering wheel to opposite full lock position, and repeat procedure for bleeding steering system.
9. Replace the filter and filler cap on the power steering pump.
10. If desired, the power steering system can be rechecked after sitting overnight to remove any air that may possibly be left in the system. Repeat steps for bleeding steering system, preceding.

Routing Connections Through the Cowl

IMPORTANT: Ensure that sufficient excess exists in the wiring harness and battery cables routed between the cowl fitting and the engine attachment point to relieve stress and prevent hoses from being kinked or pinched. Ensure that excess exists in all hoses and cables in full left and right turns and full tilt position.

NOTE: Mercury Marine suggests routing the wiring, cables and fuel hose through a rigging hose or flexible sleeve from the engine to the boat's gunnel or motor well. Follow the installation instructions included with the Rigging Hose or Flexible Sleeve Kit.

1. Pull out the grommet fitting from the front cowl opening. Route the wiring harnesses, battery cables, and fuel hose through the correct openings in the rubber grommet as shown.



- a** - Rubber grommet
- b** - Fuel hose
- c** - 14 pin data harness
- d** - DTS power harness, vessel sensor harness, power steering pump harness
- e** - Large diameter battery cables
- f** - Small diameter battery cables
- g** - Grommet fitting
- h** - Front cowl opening

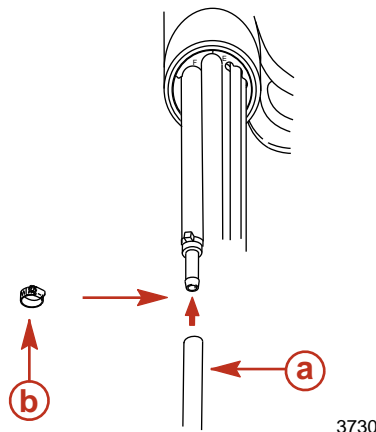
2. Insert rubber grommet into fitting and secure fitting in front cowl opening.

Fuel Hose Connection

FUEL HOSE SIZE

IMPORTANT: Fuel line inside diameter (I.D.) must be 10 mm (3/8 in.) with separate fuel line/fuel tank pickup for each engine.

Fasten remote fuel hose to fitting with hose clamp.



a - Remote fuel hose

b - Hose clamp

Wiring And Installation

Wire Color Code Abbreviations

Wire Color Abbreviations				
BLK	Black		BLU	Blue
BRN	Brown		GRY	Gray
GRN	Green		ORN or ORG	Orange
PNK	Pink		PPL or PUR	Purple
RED	Red		TAN	Tan
WHT	White		YEL	Yellow
LT or LIT	Light		DK or DRK	Dark

Installation Guidelines for DTS System Components

WARNING

To avoid the possibility of serious injury or death from loss of boat control, do not splice or probe into any wire insulation of the DTS system. Splicing or probing will damage the wire insulation allowing water to enter the wiring. Water intrusion may lead to wiring failure and loss of throttle and shift control.

DATA HARNESS

WARNING

To avoid the possibility of serious injury or death from loss on boat control, do not pull on cable connectors when pulling cable into boat. Observe correct pulling procedure. Pulling on connectors can loosen terminals resulting in open or poor electrical connections. Open or poor electrical connections may result in loss of throttle and shift control.

CONNECTORS

IMPORTANT: Connectors should never have to be forced into the receptacle. Ensure that connectors are free of any lubricant or dielectric grease before installation. When the connector is properly aligned, it will only take a small amount of pressure to insert it into the receptacle. Rotate the locking collar to secure the electrical connection.

NOTE: Connect only one data harness of the required length between the engine and helm. If a data harness is too short, do not connect multiple harnesses together to make up the required length. For installations requiring a data harness length longer than 12.2 m (40 ft.), contact Mercury Marine for more information.

Data Harness Pulling Procedure

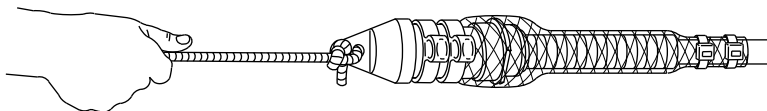
IMPORTANT: Do not route data harness near engine ignition components (coils, spark plug leads, and spark plugs), high power VHF coax or radios. An electrical field generated from these components could cause interference with data transmission.

IMPORTANT: Do not route data harness near sharp edges, hot surfaces or moving parts. Fasten cables away from any sharp edges, fasteners or objects that could wear into the harness.

IMPORTANT: Avoid sharp bends in the data harness. Minimum bend radius should be 7.6 cm (3 in.) for the final wiring installation.

1. Inspect the routing path to make sure surfaces are free of any sharp edges or burrs that could cut the harness.
2. Install cable pulling tool to data harness.
3. Secure pulling tool with 2 cable ties.

IMPORTANT: The cables ties must be tight to prevent any slipping during installation.



3836

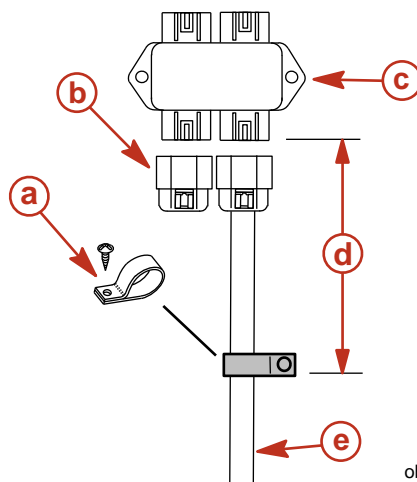
Data Cable Puller	91-888462A1
-------------------	-------------

IMPORTANT: Carefully inspect data harness pins to ensure all pins are securely fastened to data harness connector end following installation.

NOTE: Data harness should be secured with mounting clips or cable ties along the routing path.

Junction Box (If Equipped)

- Although the junction box connections are watertight, it is recommended that the junction box be mounted in an area that stays relatively dry.
- Mount in an area where the wiring connection will not get stepped on or disturbed.
- Mount in an area that is accessible for troubleshooting and servicing the system.
- Ensure the DTS command module harness will reach all the connection points.
- Fasten all junction box connections within 25.4 cm (10 in.) of the junction box.
- Seal all unused connections with weather caps.



ob01481

a - Clamp

b - Weather cap (859318T 2)

c - Junction box

d - 25.4 cm (10 in.)

e - DTS Command Module harness

Non-Mercury Marine Provided Ignition Switch

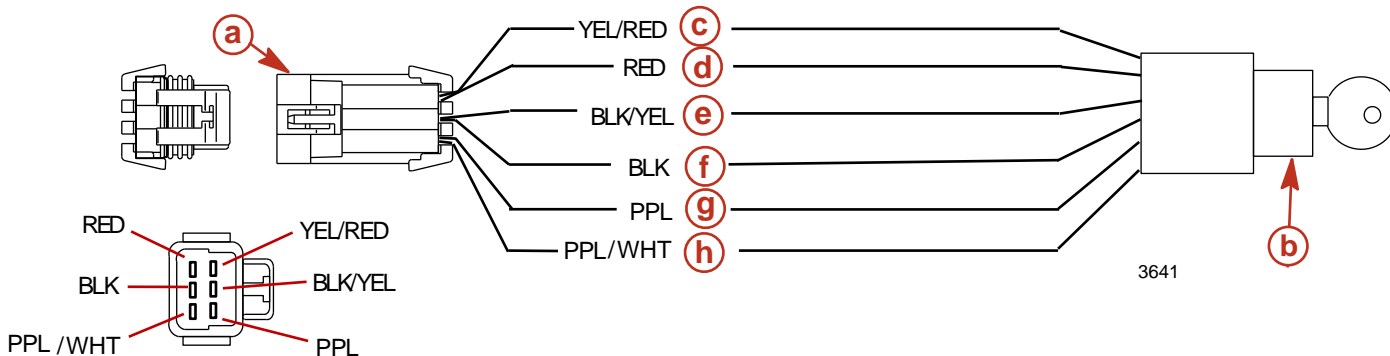
⚠ CAUTION

Prevent unexpected engine start-up. Non-Mercury Marine ignition switches may allow sufficient current leakage to cause engine to start unexpectedly.

IMPORTANT: Correct ignition key switch must be used. If a non-Mercury Marine ignition key switch is being used, make sure that the ignition switch being used meets the requirement listed.

IMPORTANT: Current leakage exceeding 5 mA at 12 volts could cause engine to start unexpectedly.

- Ignition key switch must pass ingress protection testing per IEC IP66 specification minimum. Switches that do not pass this specification could leak current.
- Switches must contain an emergency stop circuit.



4 Position Key Switch

- | | |
|---|--|
| a - Connector - Packard Metripack 150 Series Sealed™ (6 pin) | e - Lanyard stop |
| b - Ignition switch | f - Ground |
| c - Crank | g - Run |
| d - + 12V | h - Accessory - 4 position key switch |

Wiring Accessories

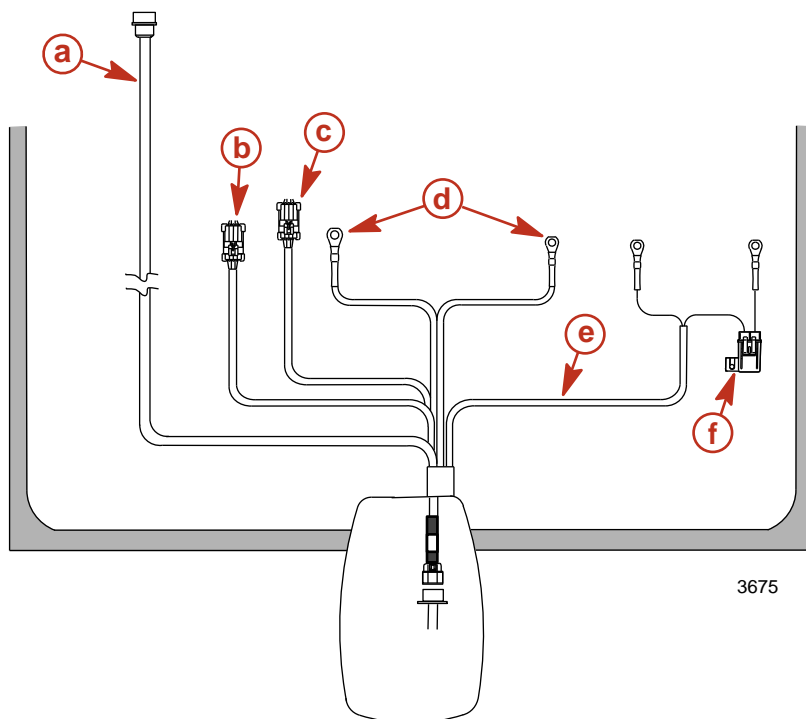
NOTE: Refer to Mercury Precision Parts Accessories Guide.

System Wiring Reference Points

FEATURES

- **DTS power harness** - Provides 12V power to the DTS system. Requires connection to the starting battery. If starting battery is located at the helm, DTS power harness accessory kit is required to minimize voltage drop. Use cable ties to secure power harness leads to battery cables, beginning within 15 cm (6 in.) of battery posts and continuing along the entire length of the harness.
- **Battery cables** - Connect to the starting battery.
- **Vessel sensor harness** - This harness connects to the main fuel tank sensor, auxiliary fuel tank and the paddle wheel speed/temperature sensor, if equipped.

- **14 pin data harness** - Connects between the command module harness and engine.

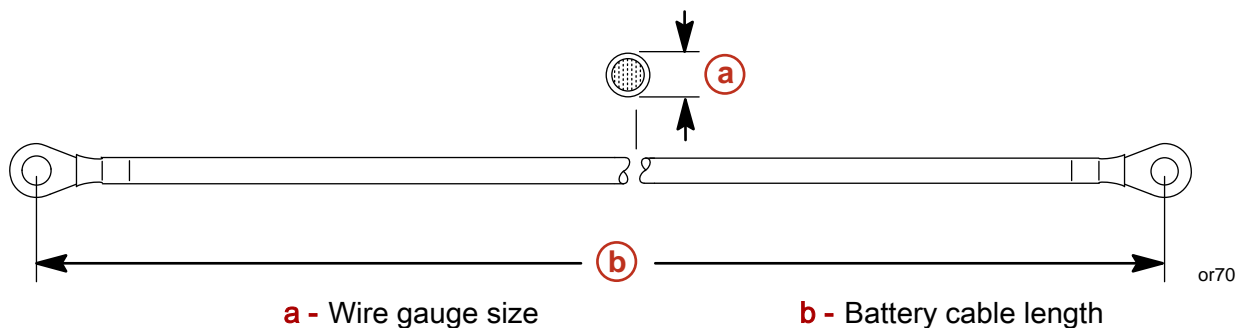


- a** - 14 pin data harness
- b** - Power steering pump harness
- c** - Vessel sensor harness
- d** - Battery cables
- e** - DTS power harness
- f** - 5 Amp fuse

Battery Cable Size For Outboard Models

IMPORTANT: Only use copper battery cables. Do not use aluminum cables for any outboard marine installations.

- If longer battery cables are required, the wire gauge size must increase. See chart following for correct wire gauge size.
- DTS L models are equipped with 3.7 m (12 ft.) cables. DTS XL and XXL models are not shipped with battery cables.



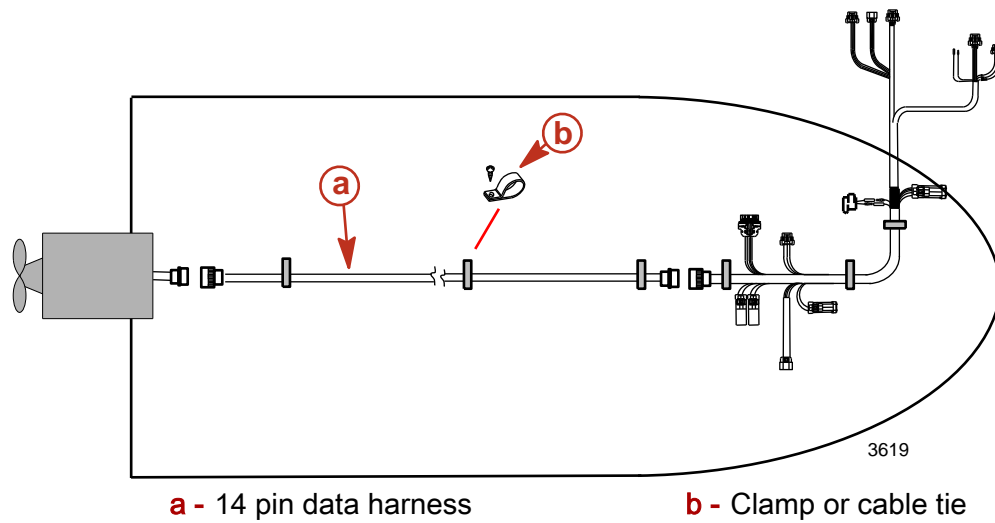
Copper Battery Cable Wire Gauge Size					
Wire Gauge Size Number SAE					
Models	6-25 hp	30-115 hp (except OptiMax)	125-250 hp (except OptiMax)	OptiMax/Verado	
Cable Length	2.4 m (8 ft.)	8 ¹ .	6 ¹ .	-	-
	2.7 m (9 ft.)	6	4	-	-
	3.0 m (10 ft.)	6	4	6 ¹ .	-
	3.4 m (11 ft.)	6	4	4	-
	3.7 m (12 ft.)	6	4	4	4 ¹ .
	4.0 m (13 ft.)	6	2	4	2
	4.3 m (14 ft.)	4	2	4	2
	4.6 m (15 ft.)	4	2	4	2
	4.9 m (16 ft.)	4	2	2	2
	5.2 m (17 ft.)	4	2	2	2
	5.5 m (18 ft.)	4	2	2	2
	5.8 m (19 ft.)	4	2	2	2
	6.1 m (20 ft.)	4	2	2	2
	6.4 m (21 ft.)	2	1	2	1
	6.7 m (22 ft.)	2	1	2	1
	7.0 m (23 ft.)	2	1	2	1
	7.3 m (24 ft.)	2	1	2	1
	7.6 m (25 ft.)	2	1	2	1
	7.9 m (26 ft.)	2	1/0	1	1/0
	8.2 m (27 ft.)	2	1/0	1	1/0
	8.5 m (28 ft.)	2	1/0	1	1/0
	8.8 m (29 ft.)	2	1/0	1	1/0
	9.1 m (30 ft.)	2	1/0	1	1/0
	9.4 m (31 ft.)	2	1/0	1	1/0
	9.8 m (32 ft.)	2	1/0	1	1/0
	10.1 m (33 ft.)	2	2/0	1/0	2/0
	10.4 m (34 ft.)	2	2/0	1/0	2/0
	10.7 m (35 ft.)	1	2/0	1/0	2/0
	11.0 m (36 ft.)	1	2/0	1/0	2/0
	11.3 m (37 ft.)	1	2/0	1/0	2/0
11.6 m (38 ft.)	1	2/0	1/0	2/0	
11.9 m (39 ft.)	1	2/0	1/0	2/0	
12.2 m (40 ft.)	1	2/0	1/0	2/0	

1. Standard (original) cable length and wire gauge size.

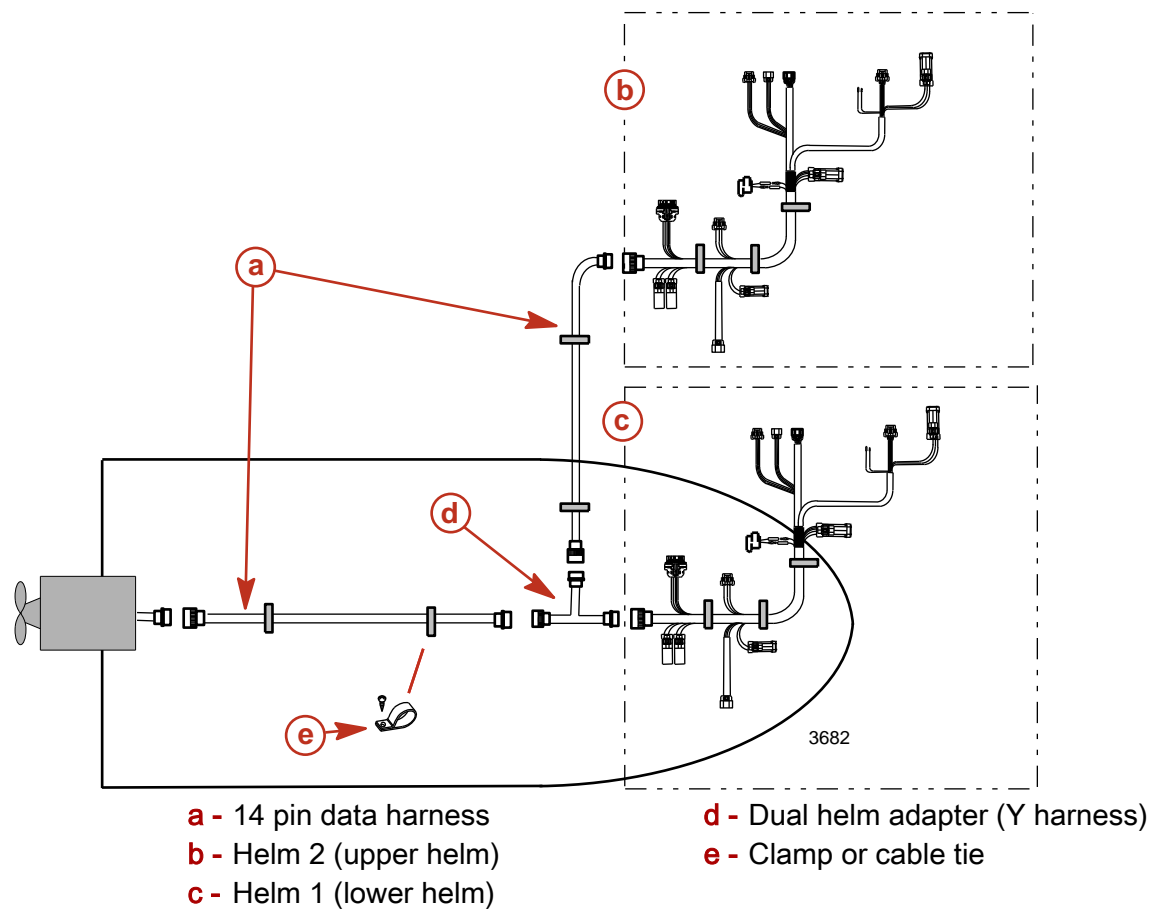
Connecting 14 Pin Data Harness - Single Engine

SINGLE HELM

IMPORTANT: Avoid sharp bends in the harness. Minimum bend radius should be 7.6 cm (3 in.).



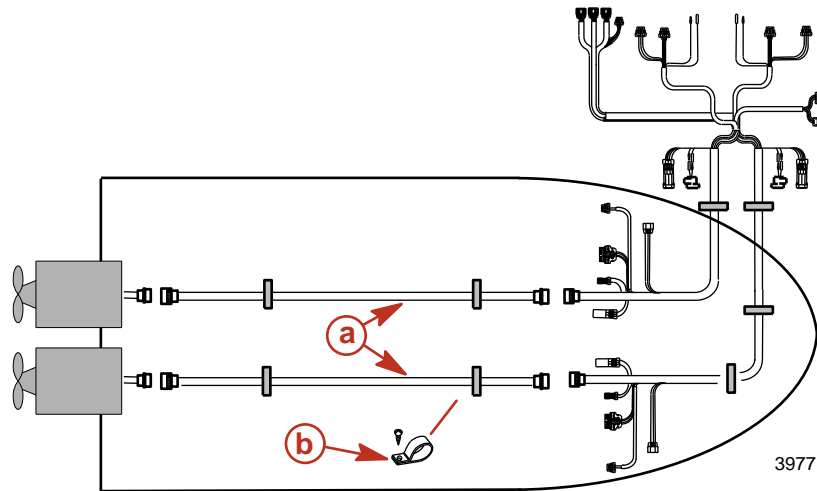
DUAL HELM



Connecting 14 Pin Data Harness - Dual Engine

SINGLE HELM

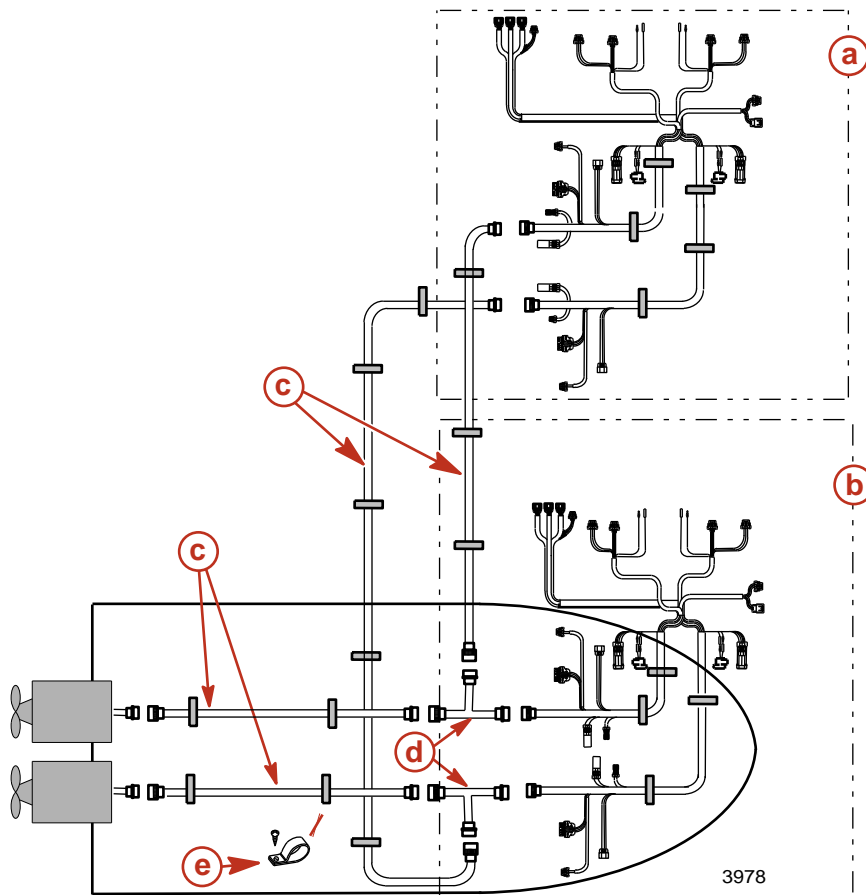
IMPORTANT: Avoid sharp bends in the harness. Minimum bend radius should be 7.6 cm (3 in.).



a - 14 pin data harness

b - Clamp or cable tie

DUAL HELM



a - Helm 2 (upper helm)

b - Helm 1 (lower helm)

c - 14 pin data harness

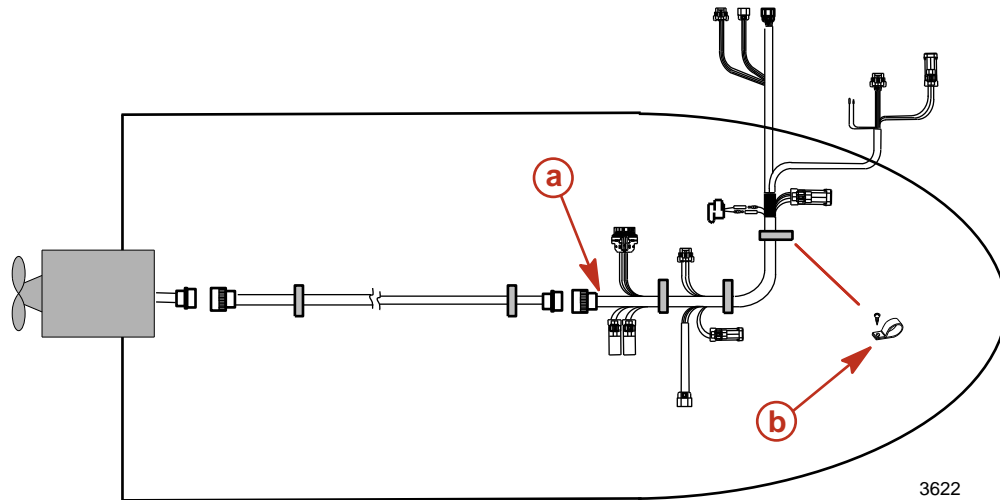
d - Dual helm adapter (Y harness)

e - Clamp or cable tie

Installing DTS Command Module and Harness - Single Engine

HARNESS INSTALLATION

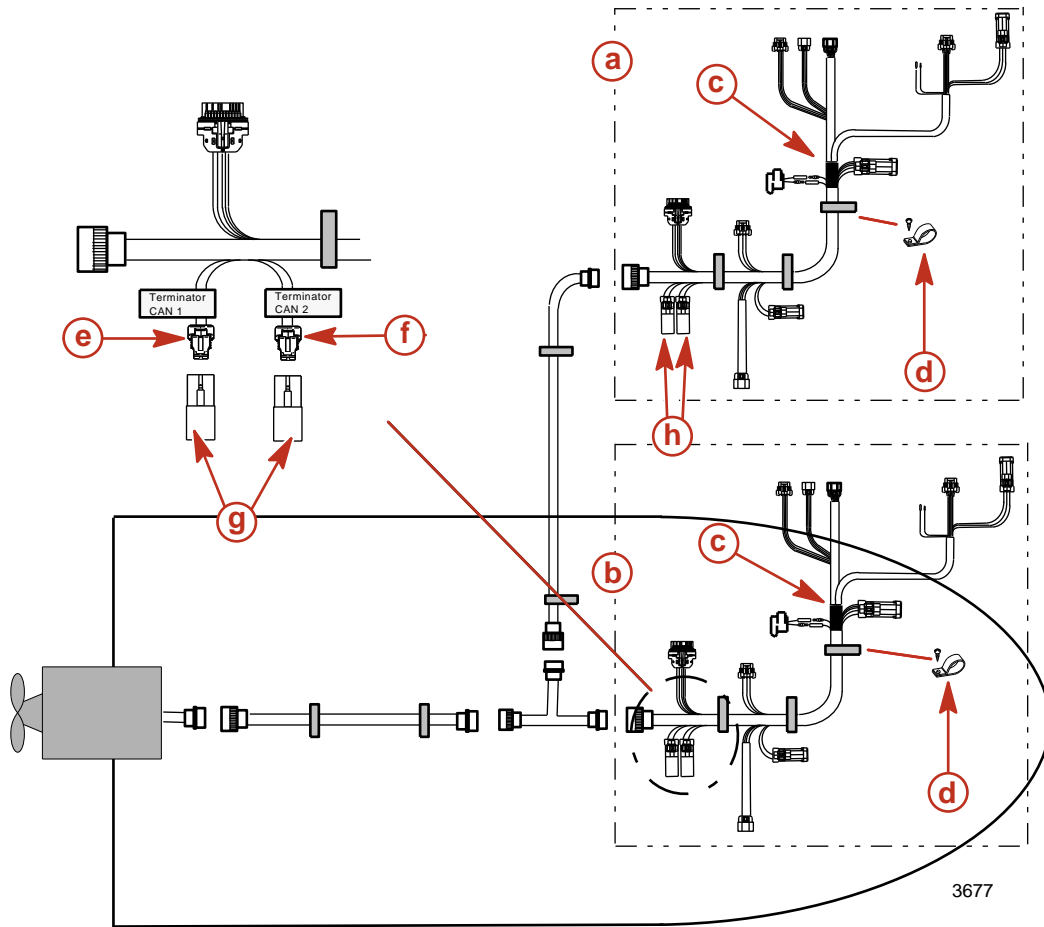
- Locate a routing path for the harness connections so they reach their installation points.
- Inspect the routing path to make sure surfaces are free of any sharp edges or burrs that could cut the harness.
- Fasten and support the harness with clamps or cable ties along the routing path.
- Make sure all connections are tight and seal all unused connectors with weather caps.



Single Helm Application

a - DTS command module harness **b** - Clamp or cable tie

NOTE: For dual helm application - Remove CAN 1 and CAN 2 terminator resistors from helm 1 (helm closest to the engine), and seal connectors with weather caps.



3677

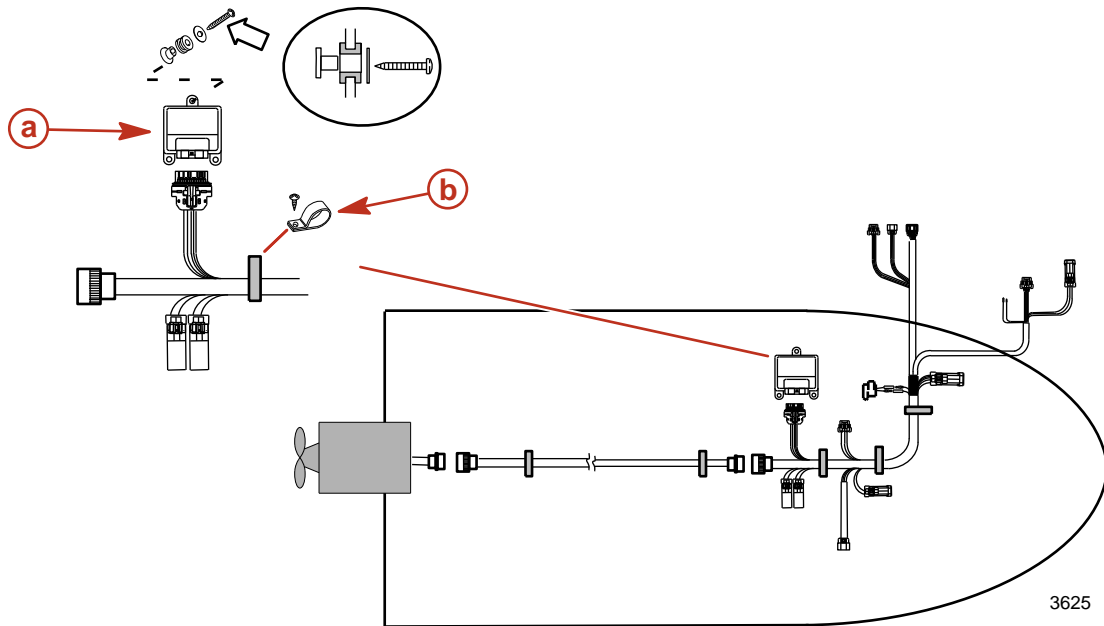
Dual Helm Application

- | | |
|---------------------------------------|---|
| a - Helm 2 (upper helm) | e - CAN 1 connector |
| b - Helm 1 (lower helm) | f - CAN 2 connector |
| c - DTS command module harness | g - Weather caps |
| d - Clamp or cable tie | h - Terminator resistors, blue (CAN1 & CAN2) |

MODULE INSTALLATION

- Although the Command Module connection is watertight, it is recommended that it be mounted in an area that stays relatively dry.
- Mount in an area where the wiring connection will not get stepped on or disturbed.
- Mount in an area that is accessible for troubleshooting and servicing the system.

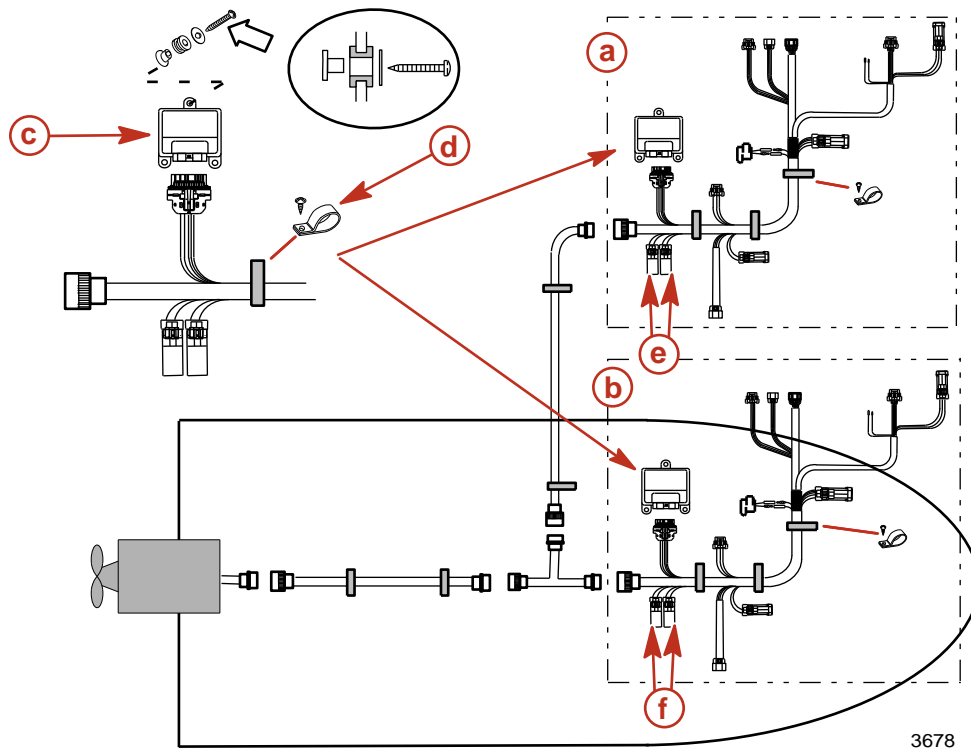
- Ensure the wiring harness connected to the command module will reach all the connection points.



Single Helm Application

a - DTS command module

b - Clamp or cable tie



Dual Helm Application

a - Helm 2

b - Helm 1

c - DTS command module

d - Clamp or cable tie

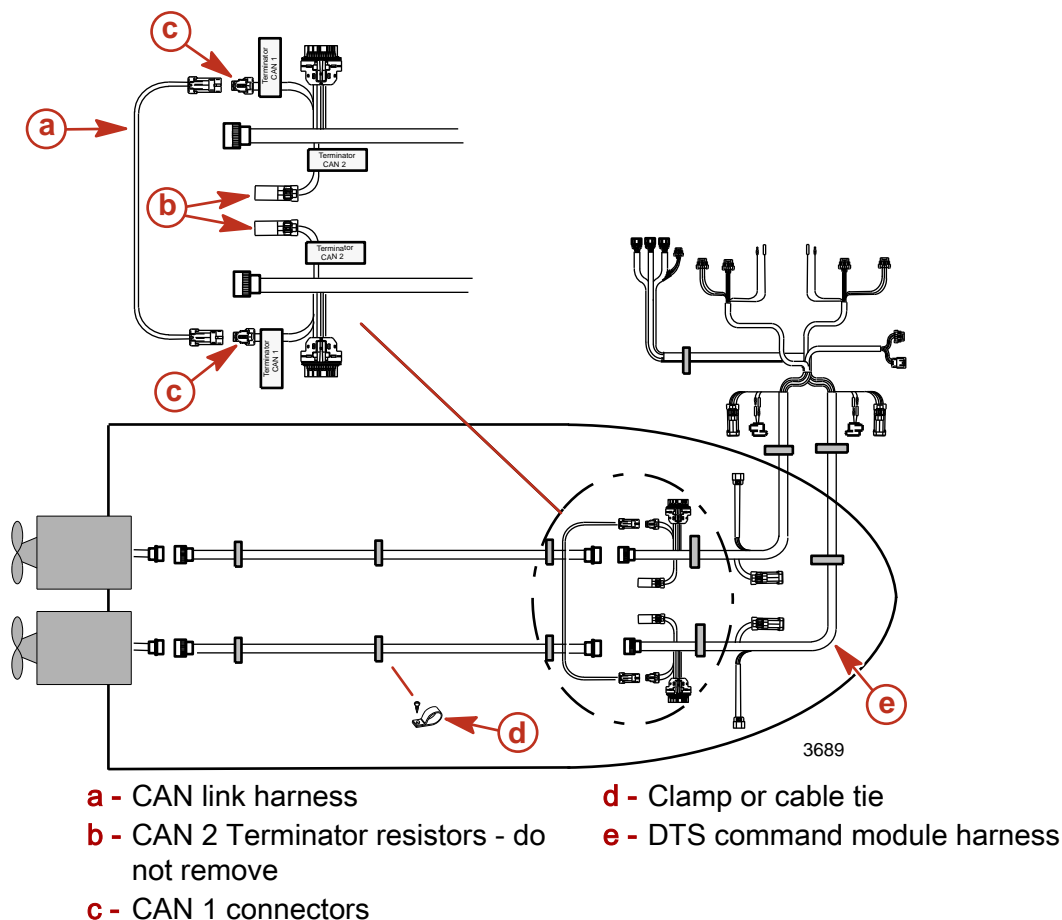
e - Terminator resistors, blue (CAN1 & CAN2)

f - Weather caps

Installing DTS Command Module and Harness - Dual Engine/Single Helm

HARNESS INSTALLATION

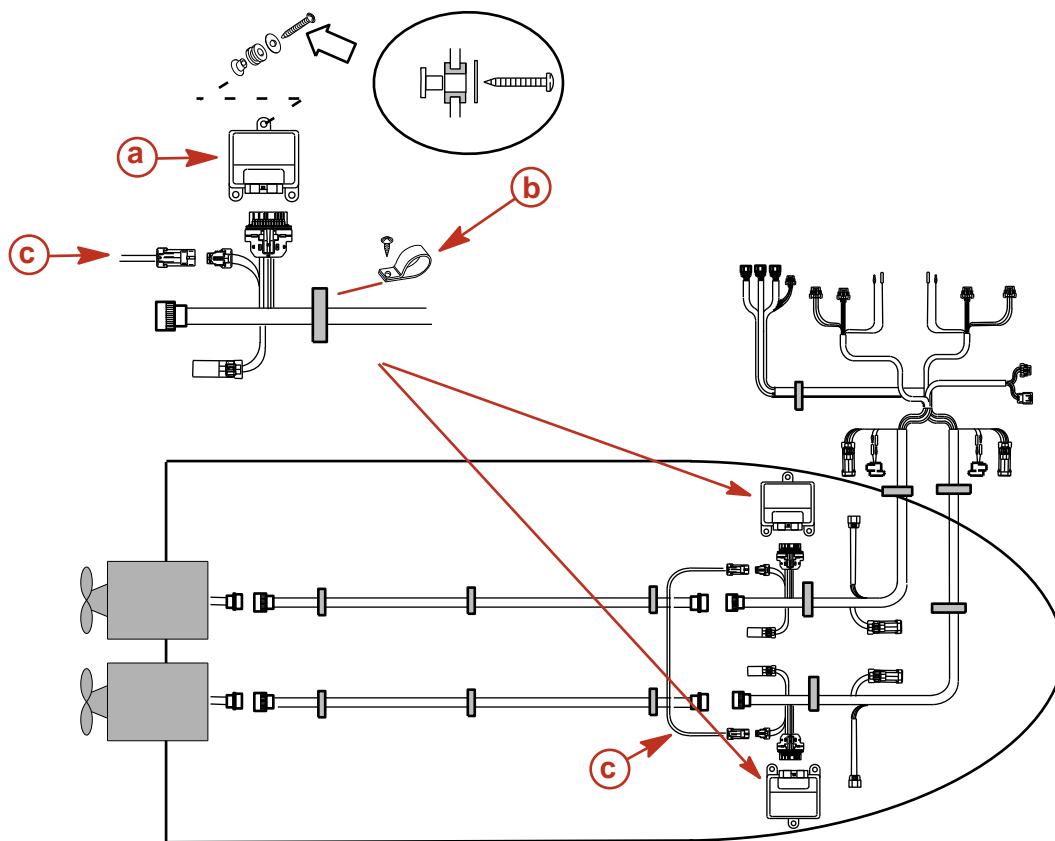
- Locate a routing path for the harness connections so they reach their installation points.
- Inspect the routing path to make sure surfaces are free of any sharp edges or burrs that could cut the harness.
- Fasten and support the harness with clamps or cable ties along the routing path.
- Make sure all connections are tight and seal all unused connectors with weather caps.



MODULE INSTALLATION

- Although the Command Module connection is watertight, it is recommended that it be mounted in an area that stays relatively dry.
- Mount in an area where the wiring connection will not get stepped on or disturbed.
- Mount in an area that is accessible for troubleshooting and servicing the system.

- Ensure the wiring harness connected to the command module will reach all the connection points.



a - DTS command module
b - Clamp or cable tie

c - CAN link harness

Battery Information

⚠ CAUTION

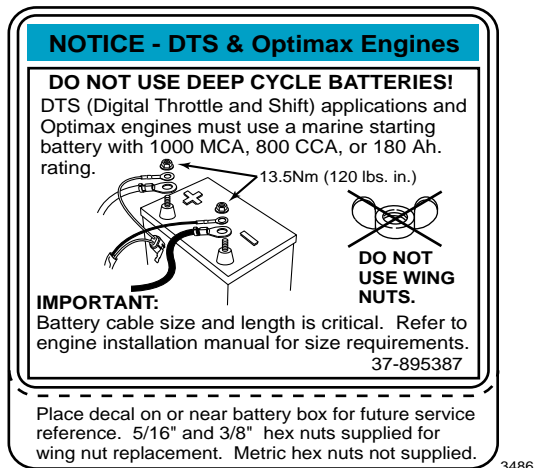
Hex nuts must be used to secure battery leads to battery posts to avoid loss of electrical power.

- Do not use deep cycle batteries. Engines must use a marine starting battery with 1000 MCA, 800 CCA or 180 Ah.
- When connecting engine battery, hex nuts must be used to secure battery leads to battery posts. Torque nuts to specification.

Description	Nm	lb. in.	lb. ft.
Hex nuts	13.5	120	

IMPORTANT: Battery cable size and length is critical. Refer to engine installation manual for size requirements.

Decal needs to be placed on or near battery box for future service reference. One 5/16 in. and one 3/8 in. hex nut are supplied per battery for wing nut replacement. Metric hex nuts are not supplied.



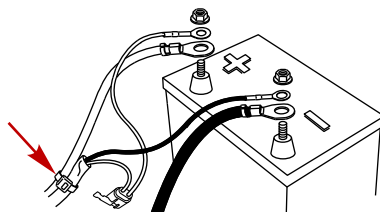
3486

Connecting Battery Cables and DTS Power Harness

⚠ CAUTION

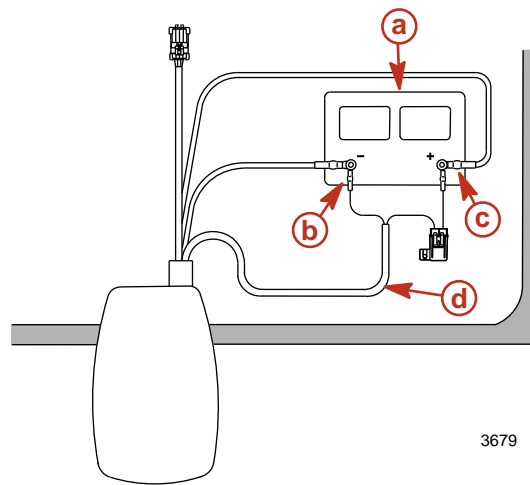
To avoid the possibility of loss of electrical power due to the DTS power harness connection being pulled off battery, fasten the DTS power harness to one of the battery cables near the battery with cable tie.

- Install DTS power harness directly to the starting battery only.
- Do not extend lead length of harness.
- See accessory manual for optional lead connection kit.



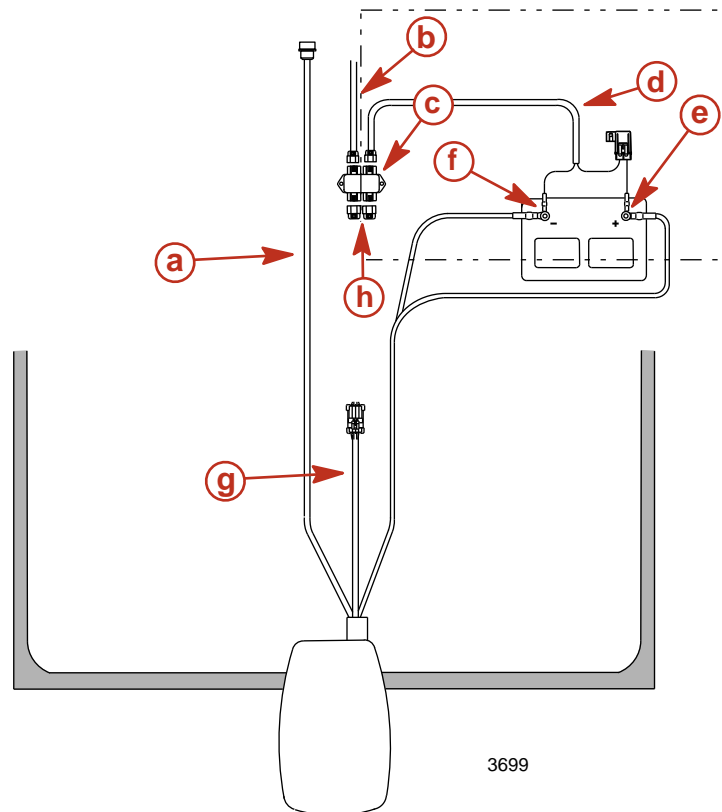
3711

SINGLE ENGINE - BATTERY AT STERN



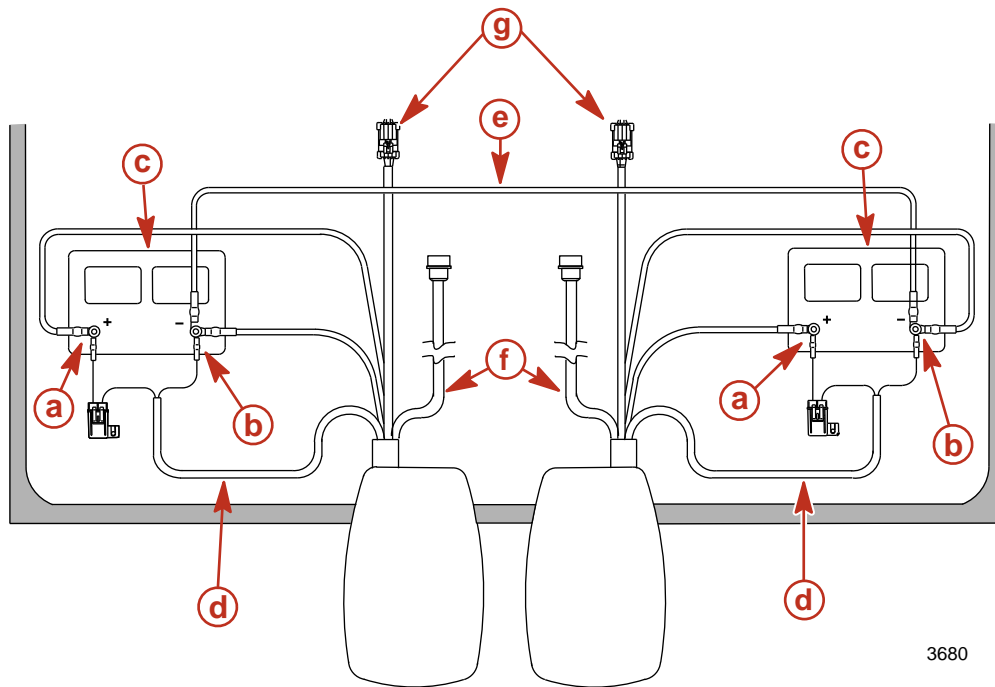
- a** - Battery
b - Black sleeve (negative)
c - Red sleeve (positive)
d - DTS power harness (provided)

SINGLE ENGINE - BATTERY AT HELM



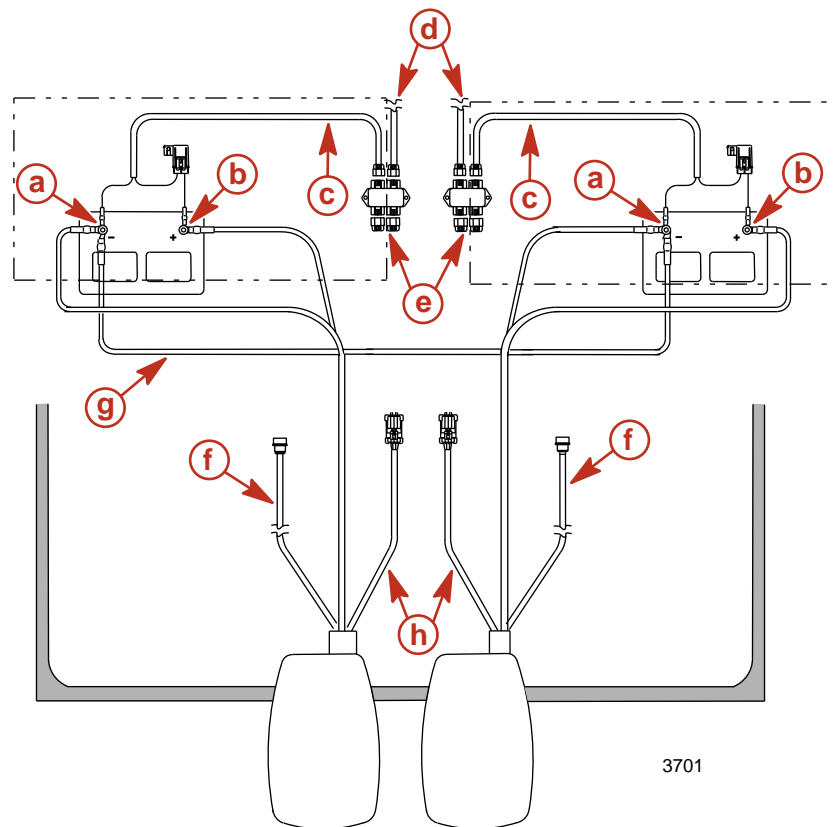
- a** - 14 pin data harness
b - DTS command module harness
c - Junction box
d - DTS power harness (optional)
e - Red sleeve (Positive)
f - Black sleeve (Negative)
g - Vessel sensor harness
h - Weather caps

DUAL ENGINE - BATTERY AT STERN



- a** - Red sleeve (positive)
- b** - Black sleeve (negative)
- c** - Battery
- d** - DTS power harness (provided)
- e** - Ground cable
- f** - Data cable
- g** - Vessel sensor harness

DUAL ENGINE - BATTERY AT HELM



3701

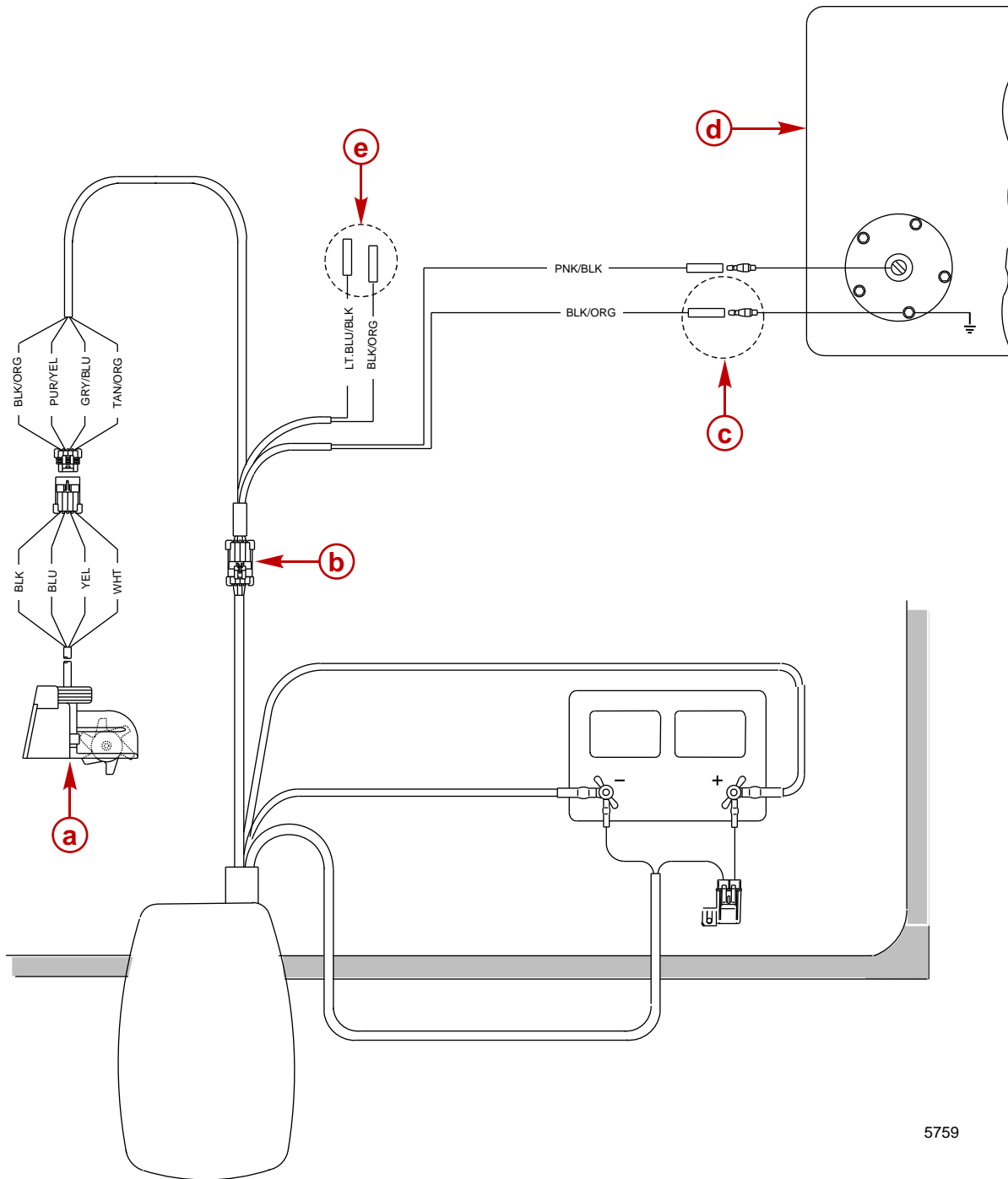
- | | |
|---|--------------------------------------|
| a - Black sleeve (negative) | e - Junction box weather caps |
| b - Red sleeve (positive) | f - 14 pin data harness |
| c - DTS power harness (optional) | g - Ground cable |
| d - DTS command module harness | h - Vessel sensor harness |

Connecting Fuel Tank And Speed Sensor

IMPORTANT: Do not connect the blk/orn wire (if equipped) to the fuel tank sensor when there is an engine battery ground strap connected to the fuel tank or sender assembly. If not used, plug the unused open bullet connector with rubber plug.

IMPORTANT: If fuel tank is plastic and fuel sensor mounting plate is not connected to battery ground, connect blk/orn wire (if equipped) to fuel sender mounting plate.

IMPORTANT: Metal fuel tanks must be grounded to hull or battery ground in accordance to coast guard regulations.

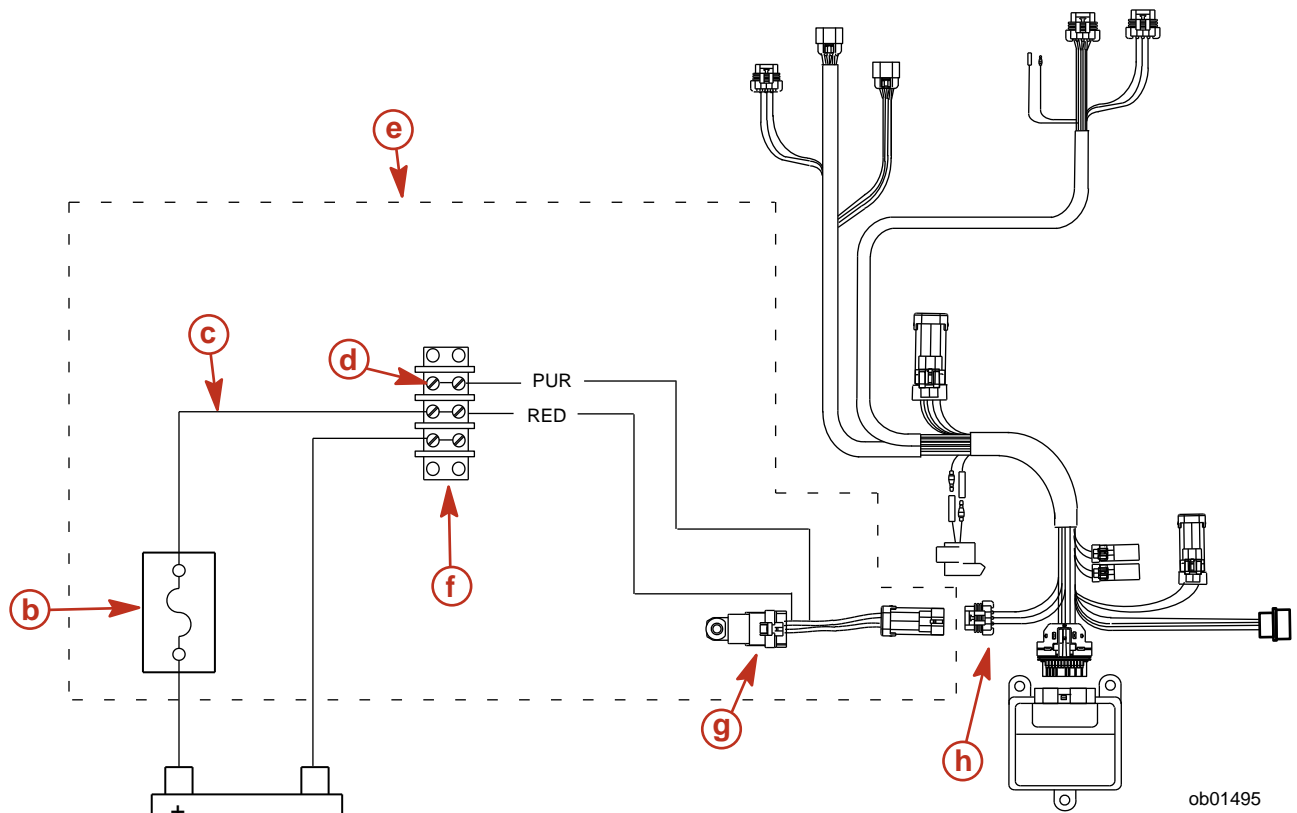


5759

- a** - Paddle wheel kit
- b** - Vessel harness
- c** - Black/orange wire connection, if equipped

- d** - Fuel tank
- e** - To second fuel tank

Switched 12V Accessory Connection

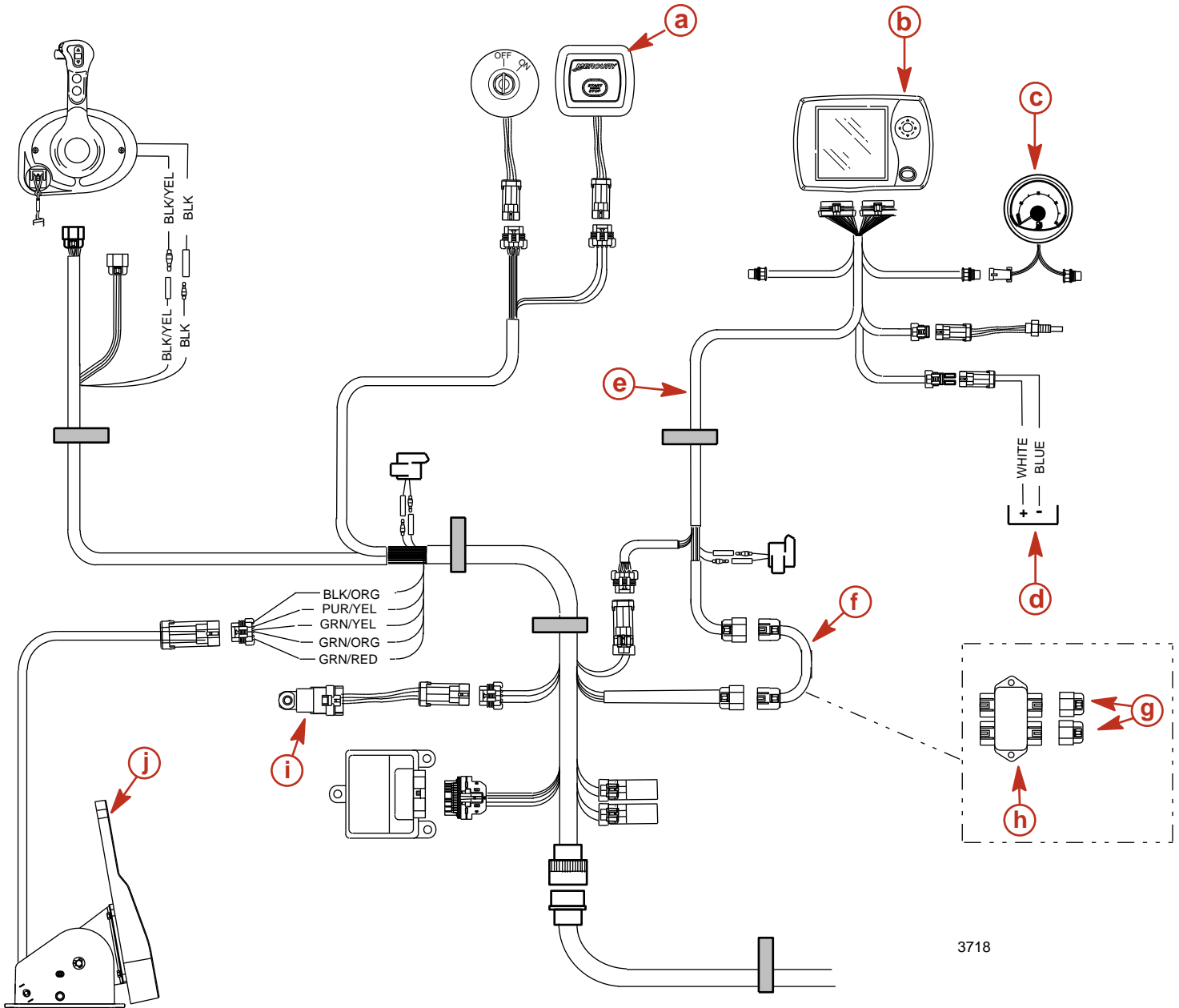


ob01495

- a** - Battery
- b** - Fuse - 40 Amp
- c** - Power harness with 40 Amp fuse
- d** - Switched 12V
- e** - Complete kit
- f** - Terminal block
- g** - Accessory power relay
- h** - DTS Command Module harness

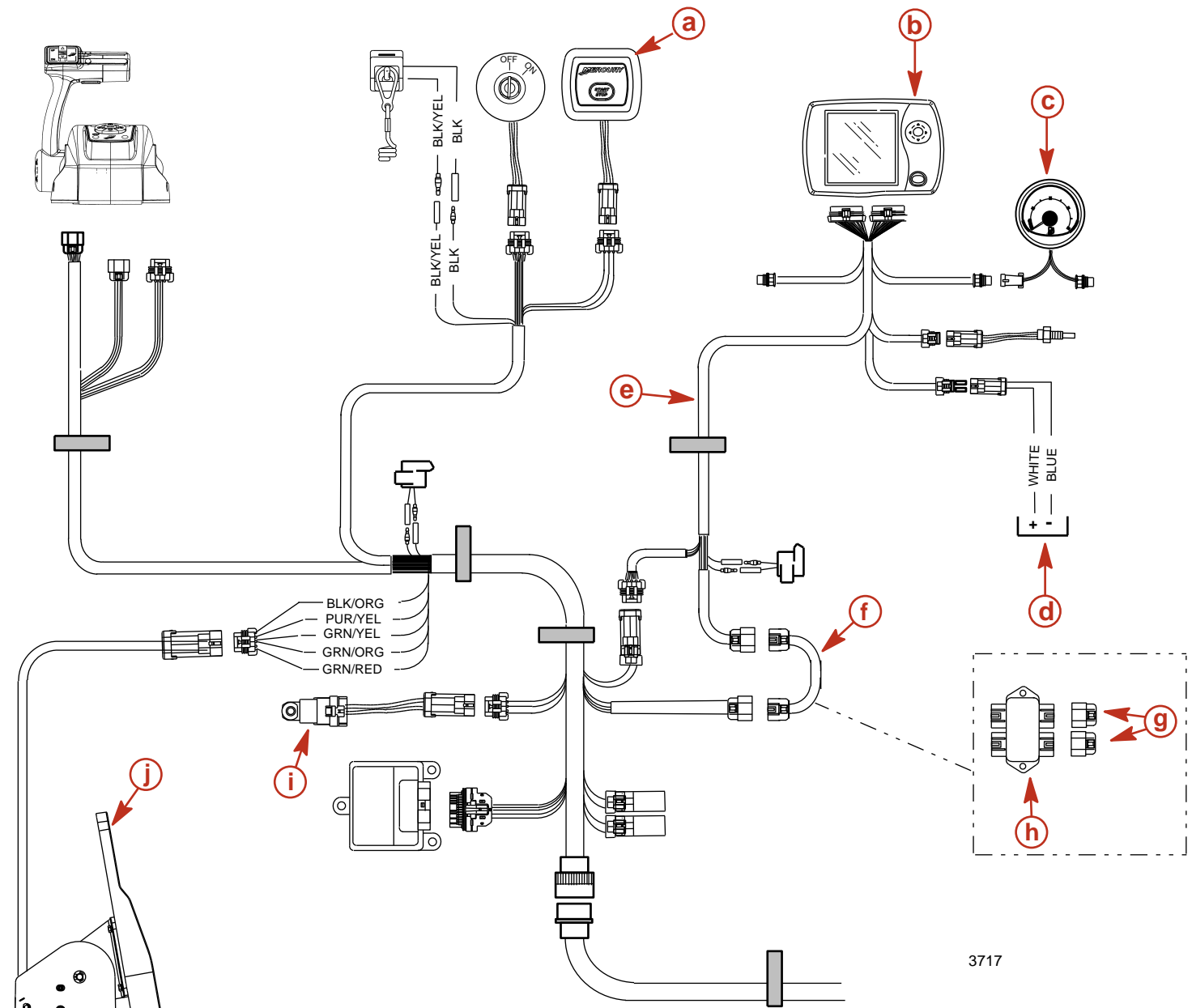
DTS Wiring - Single Engine

PANEL CONTROL



- a** - Start/stop switch (optional)
- b** - SmartCraft System View (optional)
- c** - SmartCraft Link Gauge (optional)
- d** - GPS connection
- e** - Displace harness
- f** - Cable adaptor (male to female)
- g** - Weather caps
- h** - Junction box (optional)
- i** - Accessory power relay (optional)
- j** - Foot throttle (optional)

CONSOLE CONTROL

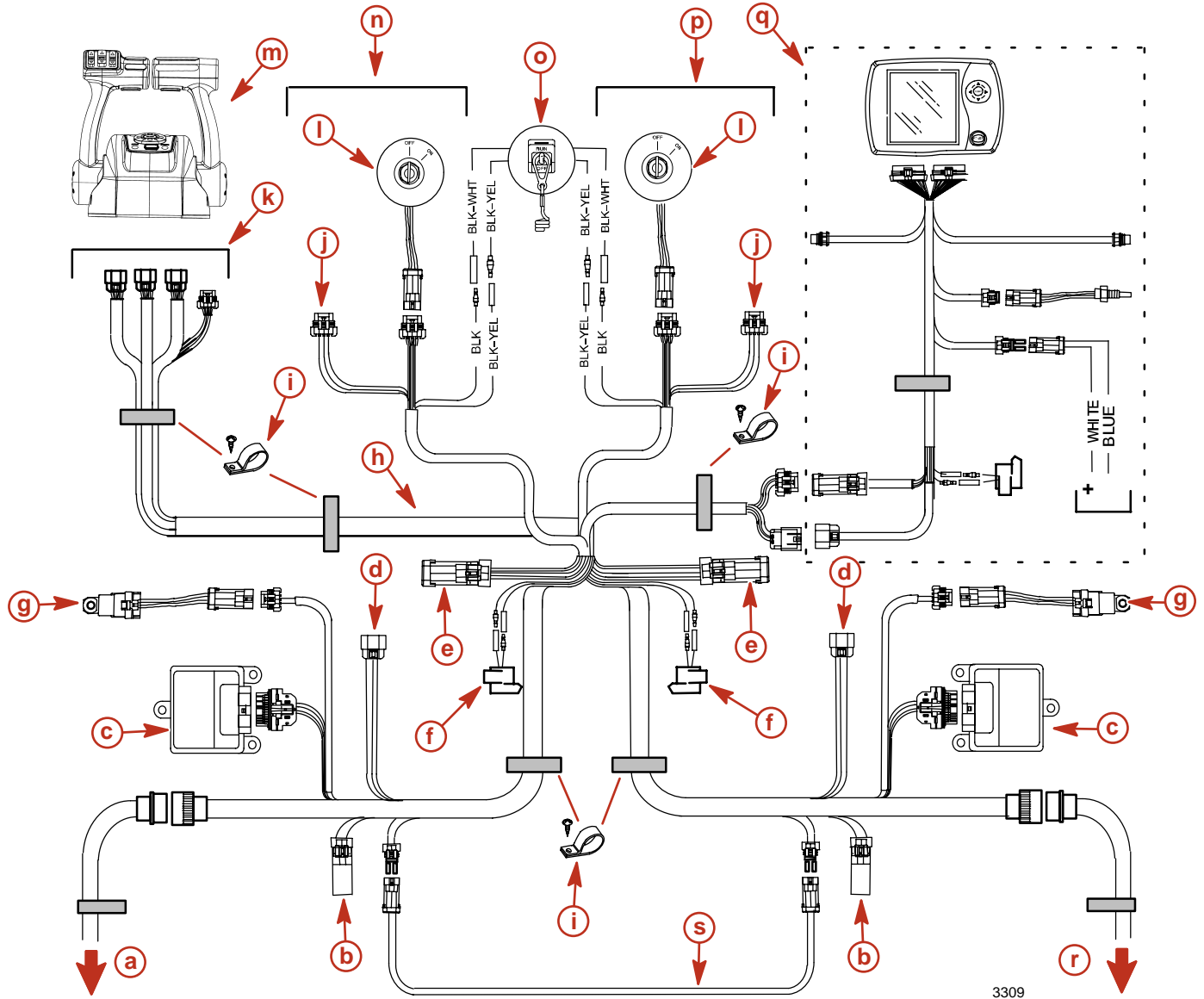


3717

- a** - Start/stop switch (optional)
- b** - SmartCraft System View (optional)
- c** - SmartCraft Link Gauge (optional)
- d** - GPS connection
- e** - Display harness
- f** - Cable adaptor (male to female)
- g** - Weather caps
- h** - Junction box
- i** - Accessory power relay (optional)
- j** - Foot throttle (optional)

DTS Wiring - Dual Engine

CONSOLE CONTROL



- | | |
|---|---------------------------------------|
| a - To port engine | k - Remote control connections |
| b - Terminator resistor | l - Key switch |
| c - DTS Command Module | m - Remote control |
| d - Junction box connection (optional) | n - To port engine |
| e - Connector - Zero Effort controls | o - Lanyard stop switch |
| f - Horn | p - To starboard engine |
| g - Accessory power relay (optional) | q - System View (optional) |
| h - DTS Command Module harness | r - To starboard engine |
| i - Clamp | s - CAN link harness |
| j - Connector - stop/start switch (optional) | |

System Wiring Installation Checklist

DATA CABLE

- Verify the data harness is not routed near sharp edges, hot surfaces or moving parts.
- Verify data harness is not routed near ignition components (coils, spark plug leads, and spark plugs), high power VHF coax or radios.

JUNCTION BOX (IF EQUIPPED)

- Verify the data harness is not routed near sharp edges, hot surfaces or moving parts.
- Ensure the harness connections are fastened within 25.4 cm (10 in.).
- Verify that all unused receptacles are covered with a weather cap.

NON-MERCURY MARINE SUPPLIED IGNITION KEY SWITCH

- If a non-Mercury Marine ignition key is used, verify that it passes the ingress protection testing per IEC IP66 specification minimum. Ignition switches must pass this specification.

ELECTRONIC REMOTE CONTROL

- Ensure Electronic Remote Control (ERC) connections are completed following ERC installation instructions prior to engine operation.

DTS COMMAND MODULE HARNESS

- Verify that all connectors are properly inserted and locked in their receptacle (remote control, key switch, command module, lanyard stop switch and junction box, if equipped).
- Verify that while moving the remote control handle (full forward and full reverse) the harness has unobstructed movement (moves freely).
- Verify that the lanyard stop switch is wired into the system correctly.
- Verify that the harness is fastened along the routing path.
- Verify that all unused connectors have weather caps to prevent corrosion.

BATTERY

- Verify that wing nuts have been replaced with hex nuts, provided.
- Verify that all engine battery cables are connected to the correct terminals.
- Verify that the DTS power harness leads are connected to the starting battery and secured with locknuts.
- Ensure the 5 Amp fuse for the DTS power harness is accessible.

LANYARD STOP SWITCH



- Verify that the switch is installed.
- Verify that the switch is connected to the DTS command module harness.

Propeller Installation

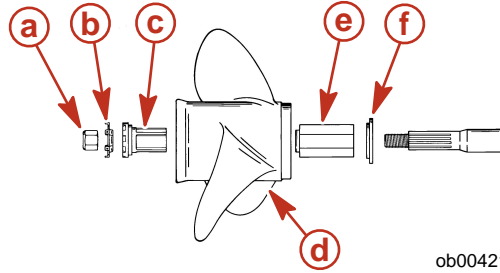
WARNING

When installing or removing propeller, ensure the remote control is in neutral position and the key switch is "OFF". Place a block of wood between the anti-cavitation plate and propeller to prevent accidental starting and to protect hands from propeller blades while removing or installing nut.

1. To aid in future removal of the propeller, liberally coat the propeller shaft splines with one of the following Mercury/Quicksilver products:

Tube Ref No.	Description	Where Used	Part No.
 94	Anti-Corrosion Grease	Propeller shaft splines	92-802867A1
 95	2-4-C Marine Lubricant with Teflon	Propeller shaft splines	92-802859A1

2. **Flo-Torq II Drive Propellers** - Install forward thrust hub, replaceable drive sleeve, propeller, thrust hub, propeller nut retainer, and propeller nut onto the shaft.



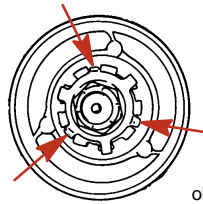
ob00421

- a** - Propeller nut
- b** - Propeller nut retainer
- c** - Thrust hub
- d** - Propeller
- e** - Replaceable drive sleeve
- f** - Forward thrust hub

3. Place a block of wood between gearcase and propeller and torque nut to specification.

Description	Nm	lb. in.	lb. ft.
Nut	75		55

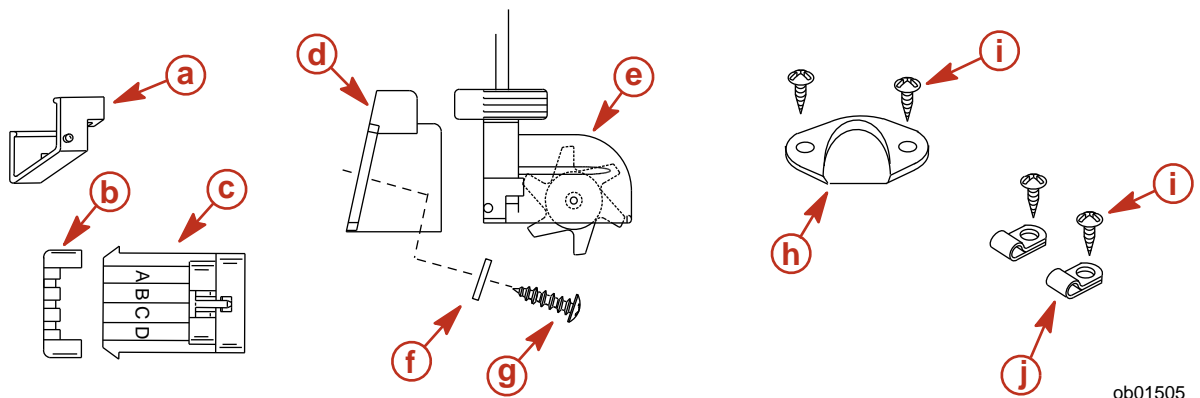
4. Secure propeller nut by bending three of the tabs into the thrust hub grooves.



ob00422

Paddle Wheel Speed Sensor Installation (If Equipped)

Parts Provided



ob01505

a - Spare pin yoke

b - Wire retainer

c - Connector

d - Bracket

e - Paddle wheel

f - Flat washer (2)

g - #10 - 19 mm (3/4 in.) screw (4)

h - Cable cap

i - #6 - 12 mm (1/2 in.) screw (4)

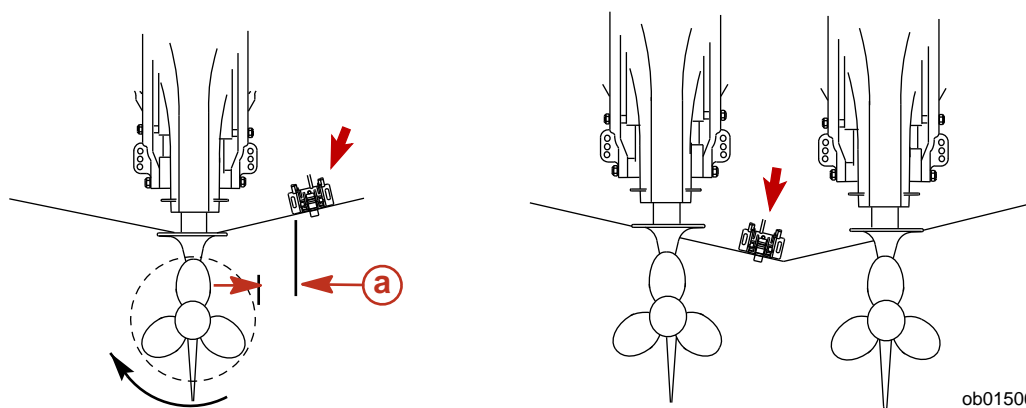
j - Clamp (2)

Selecting Location

Single engine installation - Mount paddle wheel on the transom where the propeller blade is rotating downward. Usually the right (starboard) side to minimize cavitation. If feasible, mount at least 50 mm (2 in.) beyond the swing radius of the propeller.

Dual engine installation - Mount the paddle wheel between the engines as close to the center line (keel) of the boat as possible. On slower, heavier displacement boats, however, positioning it farther from the keel is acceptable.

NOTE: Do not mount the paddle wheel directly behind any stakes, ribs, intakes or outlets for live wells or any protrusion that may cause turbulence or cavitation.

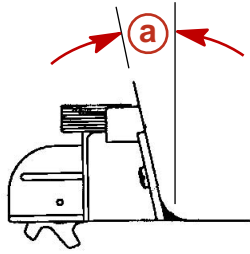


ob01506

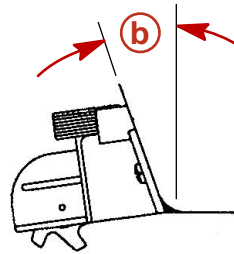
a - 50 mm (2 in.)

Transom Angle Requirements

Standard 13° to 20° transoms - No special adjustment required.



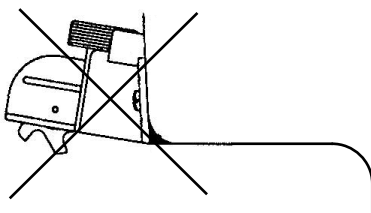
a - 13° transom angle



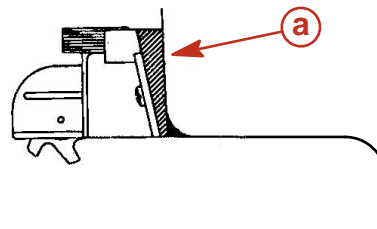
b - 20° transom angle

ob01507

Stepped or undercut transom with 3 angles - A small shim of tapered plastic, metal or wood must be fabricated and installed as shown. Mount the paddle wheel on the step for best performance.



a - Shim



ob01508

Installing Bracket

1. Cut out the template. At the location selected, tape the template to the transom. Make sure the black dotted line on the template is aligned with the transom bottom edge, as shown.

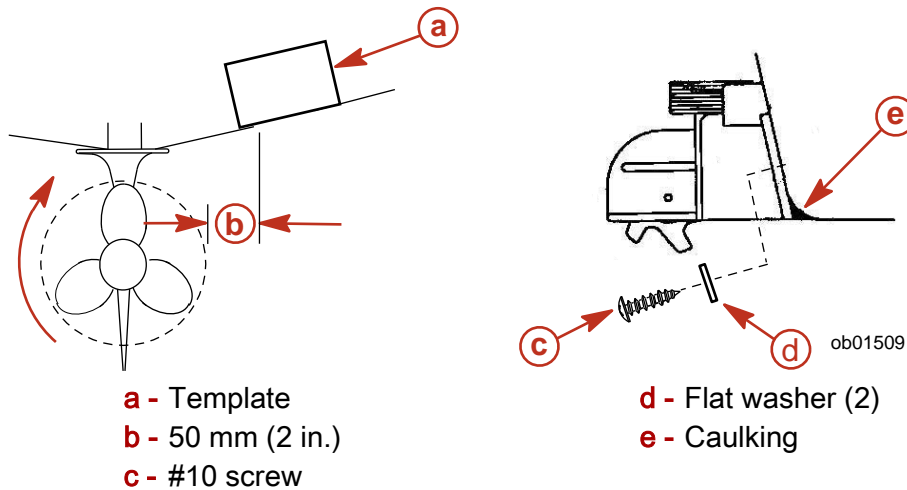
NOTE: The mounting template provided is located on the last page of this instruction sheet.

2. Using a #28 or 9/64 in. bit, drill two 22 mm (7/8 in.) deep holes where indicated on the template. To prevent drilling too deeply, wrap masking tape around the drill bit 22 mm (7/8 in.) from the point end of drill bit.

NOTE: In fiberglass hulls, first chamfer the gelcoat using a 6 mm (1/4 in.) drill; drilling about 15 mm (1/16 in.) deep to prevent surface cracks.

3. To prevent water seepage into the transom, apply a marine sealer (such as RTV) to the two #10 screws provided. Using the washer provided, attach and tighten the bracket to the hull making sure the bracket is flush with the underside of the hull.

4. Fill any gap between the housing and the transom with a caulking material, as shown. Using a putty knife, smooth the surface to ensure proper water flow.



Routing the Cable

DRILLING HOLE THROUGH TRANSOM (OPTIONAL)

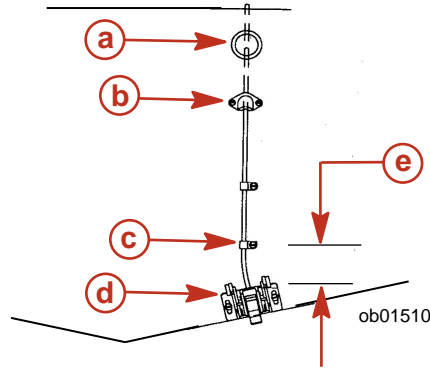
1. Select a transom location for the hole above the water line that does not interfere with other cables and controls.
2. Drill a 15 mm (5/8 in.) diameter hole.
3. Route the cable through the drilled hole. Seal the transom hole with silicone (RTV) or a comparable marine sealer after the cable has been routed through.

NOTE: The hole for the first clamp should be 25 mm (1 in.) above the paddle wheel. The hole for the second clamp should be positioned halfway between the first clamp and the cap covering the transom hole drilled for the cable.

4. Using a 2.8 mm (7/64 in.) bit, drill holes for the clamps and cap approximately 13 mm (1/2 in.) deep.
5. Apply silicone sealer (RTV) or a comparable marine sealer to the screw threads, install the cable clamps and feed the cable through cable cap.

WITHOUT DRILLING HOLE THROUGH TRANSOM (OPTIONAL)

Route the cable over the transom or through a drain hole that is above the water line.

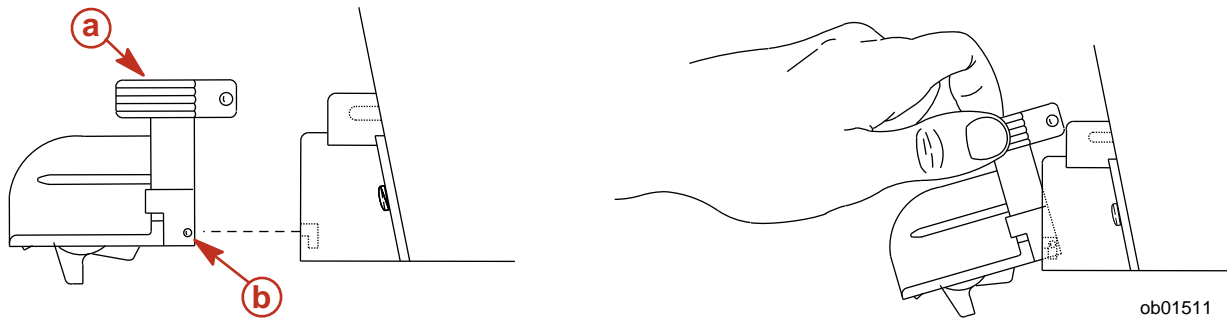


- a** - Splash well drain hole
- b** - Cable cap
- c** - Cable clamp
- d** - Paddle wheel assembly
- e** - Distance between first cable clamp and top of paddle wheel - 25.4 mm (1.0 in.)

Installing and Removing the Paddle Wheel

Installation - Slide the pins into the slots in the bracket and snap the tabs into place.

Removal - squeeze open (unlock) the tabs and pull on the paddle wheel.



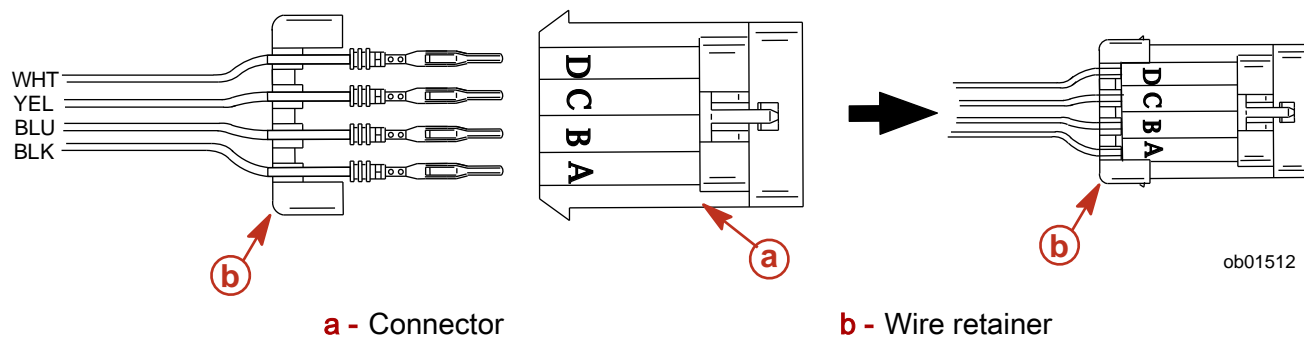
a - Tabs

b - Pins

Wiring Connections

IMPORTANT: Before making wire connections, make sure wires are routed through the transom.

NOTE: Wires can only be pushed into the connector one way. Align the wire terminal with the tabs inside the connector. Have the wiring routed through the transom. Push each wire terminal into its respective location in the connector. Push wire in until they snap into place. Secure wires into connector with the wire retainer.



Template - Paddle Wheel Speed Sensor

