

MERCURY

Service Manual



Remote Controls

Notice to Users of This Manual

Throughout this publication, dangers, warnings, cautions, and notices (accompanied by the International HAZARD Symbol ) are used to alert the mechanic to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. These safety alerts follow ANSI standard Z535.6-2006 for product safety information in product manuals, instructions, and other collateral materials. **Observe them 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.

DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

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.

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.

This manual has been written and published by the Service Department of Mercury Marine to aid our dealers' mechanics and company service personnel when servicing the products described herein. We reserve the right to make changes to this manual without prior notification.

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It is assumed that these personnel are familiar with marine product servicing procedures. Furthermore, it is assumed that they have been trained in the recommended service procedures of Mercury Marine Power Products, including the use of mechanics' common hand tools and the special Mercury Marine or recommended tools from other suppliers.

We could not possibly know of and advise the marine trade of all conceivable procedures and of the possible hazards and/or results of each method. Therefore, anyone who uses a service procedure and/or tool, which is not recommended by the manufacturer, first must completely satisfy himself that neither his nor the products safety will be endangered.

All information, illustrations, and specifications contained in this manual are based on the latest product information available at the time of publication. As required, revisions to this manual will be sent to all dealers contracted by us to sell and/or service these products. Refer to dealer service bulletins, operation maintenance and warranty manuals, and installation manuals for other pertinent information concerning the products described in this manual.

Precautions

It should be kept in mind, while working on the product, that the electrical and ignition systems are capable of violent and damaging short circuits or severe electrical shocks. When performing any work where electrical terminals could possibly be grounded or touched by the mechanic, the battery cables should be disconnected at the battery.

Any time the intake or exhaust openings are exposed during service they should be covered to protect against accidental entrance of foreign material into the cylinders which could cause extensive internal damage when the engine is started.

During any maintenance procedure, replacement fasteners must have the same measurements and strength as those removed. Numbers on the heads of the metric bolts and on the surfaces of metric nuts indicate their strength. American bolts use radial lines for this purpose, while most American nuts do not have strength markings. Mismatched or incorrect fasteners can result in damage or malfunction, or possibly personal injury. Therefore, fasteners removed should be saved for reuse in the same locations whenever possible. Where the fasteners are not satisfactory for reuse, care should be taken to select a replacement that matches the original.

Replacement Parts

Use of parts other than the recommended service replacement parts will void the warranty on those parts that are damaged as a result.

WARNING

Avoid fire or explosion hazard. Electrical, ignition, and fuel system components on Mercury Marine products comply with U.S. Coast Guard rules to minimize risk of fire or explosion. Do not use replacement electrical or fuel system components that do not comply with these rules. When servicing the electrical and fuel systems, properly install and tighten all components.

Cleanliness and Care of Product

A Mercury Marine Power Product is a combination of many machined, honed, polished, and lapped surfaces with tolerances measured in the ten thousands of an inch/mm. When any product component is serviced, care and cleanliness are important. It should be understood that proper cleaning and protection of machined surfaces and friction areas is a part of the repair procedure. This is considered standard shop practice even if not specifically stated.

Whenever components are removed for service, they should be retained in order. At the time of installation, they should be installed in the same locations and with the same mating surfaces as when removed.

Personnel should not work on or under an engine that is suspended. Engines should be attached to work stands, or lowered to ground as soon as possible.

Manual Outline

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A - Standard Single Lever Full Gear Shift Remote Control

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A - Side Mount Control 76334A10 through A40
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Special Information

1

Standard Single Lever Full Gear Shift Control

2

Side Mount Control

3

Commander Controls

4

Commander 4000/4500 Controls

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Foot Throttle Control

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Chrysler and Force Remote Controls

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Jet Drive Control

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Digital Throttle and Shift (DTS) Electronic Remote Controls

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Special Information

Section 1A - Throttle and Shift Cable



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Throttle and Shift Cable End Guide Replacement

Throttle and Shift Cable End Guide Removal

The engine side of the throttle and shift cable end guide, is affixed to the cable inner core wire with a staked pin. The following instructions outline the proper procedure for removing a staked end guide from the cable.

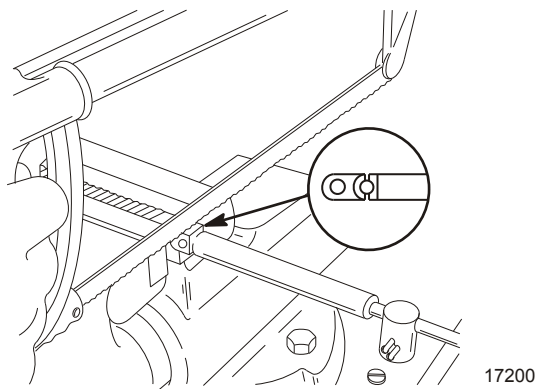
NOTE: The following parts must be ordered to make the repairs to the cable end guide.

Plastic guide	43433
Anchor	20007
Set screws (2)	10-20518

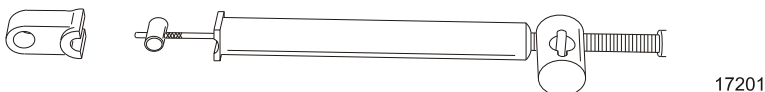
⚠ WARNING

To avoid the possibility of serious injury or death from loss of boat control, use extreme care to protect the inner core wire from damage when removing the staked pin from the end of the wire. A bend, scratch, cut, or nick to the inner core wire will damage the wire. A damaged inner core wire could break and lead to cable failure and loss of throttle or shift control.

1. Place the tip of the end guide into a vise as shown.
2. Use a hacksaw to saw the end of the cable guide off as shown.

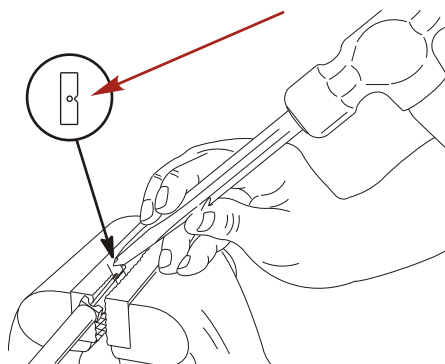


3. Separate the pieces of the end guide to expose the inner core wire and cable pin.



4. Secure the cable pin into a vise so the inner core wire is just above the jaws. Support the inner core wire to prevent bending.
5. Use a hammer and sharp chisel to notch the center of the pin as shown. Do not attempt to cut through to the core wire.
6. After cutting notch, use the hammer and chisel to hit the upper portion of the cable pin, bending it back until the pin breaks open at the inner core wire as shown.

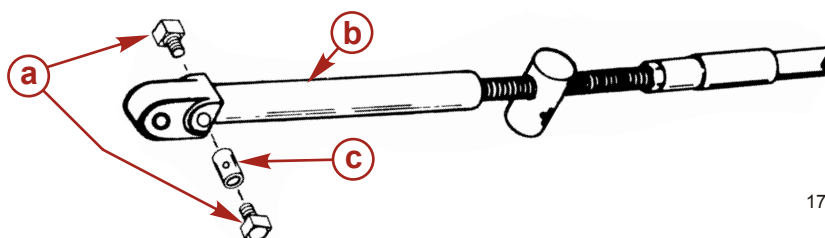
7. Slip wire out of the opened pin.



17202

Throttle and Shift Cable End Guide Installation

1. Place the wire anchor into the new end guide. Align the anchor cross hole with cross hole in the end of the guide.
2. Insert the inner core wire through the end guide and anchor until the inner core wire is flush with end of the guide.
3. Install one of the anchor set screws and tighten until resistance is felt indicating the set screw has contacted the inner core wire. Install the other anchor set screw and tighten to the specified torque.



17203

a - Anchor set screw

b - Replacement end guide

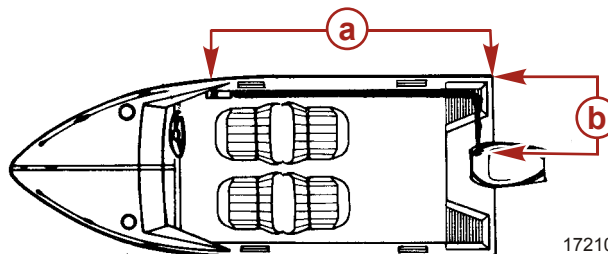
c - Wire anchor

Description	Nm	lb. in.	lb. ft.
Anchor set screw	2.3	20	

Measuring Control Cable Length

MEASURING FOR OUTBOARD THROTTLE/SHIFT CABLES

1. Add boat measurements **(a)** and **(b)**. Add 457 mm (18.0 inches) to the total. Dimension **(a)** represents the distance from the remote control location measured along the gunwale to the transom. In dual engine installations, dimension **(b)** is measured from the gunwale to each engine center line.



17210

a - Distance from remote control to transom

b - Distance from gunwale to each engine

2. Divide by 305 mm (12 in.) to obtain the length of the cables.
3. For a port side remote control installation, follow the same measuring procedure on the opposite side of the boat.

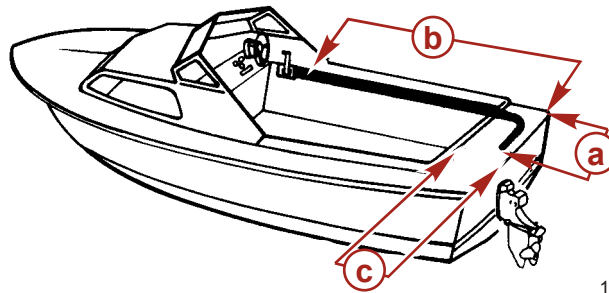
NOTE: Allow for clearance of cables directly behind the panel mount remote control and under console mount remote control. Commander Style panel mount remote control mounting surface must not exceed 25.4 mm (1 in.) thickness. The cable radius at any one point must not be less than 203 mm (8 in.).

NOTE: On boats with considerable freeboard drop, or unusual routing of cables, it may be necessary to increase the length of the cables to properly route them.

NOTE: Depending on the mounting, cables must be allowed unrestricted space to move directly behind or under control.

MEASURING FOR MERCURISER THROTTLE AND SHIFT CABLES

1. Add measurements (a), (b) and (c). Dimension (b) represents the distance from the remote control location measured along the gunwale to the transom. The c dimension represents the distance from the transom, forward to the throttle attaching point. In dual engine installation, dimension (a) is measured from the gunwale to each engine center line.



17213

- a** - Distance from the gunwale to each engine center line
- b** - Distance from the remote control to the transom
- c** - Distance from transom to the throttle attaching point

2. Divide by 305 mm (12 in.) to obtain the length of the cable.
3. For port side remote control installation, follow the same measuring procedure on the opposite side of the boat.

Standard Single Lever Full Gear Shift Control

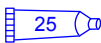
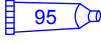
Section 2A - Standard Single Lever Full Gear Shift Remote Control

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Standard Single Lever Full Gear Shift Control Components.....	2A-4	Wire Color Code Abbreviations.....	2A-11
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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Remote control wire harness solder joints inside the control box	92-25711-3
 95	2-4-C with Teflon	Throttle cam roller mounting stud	92-802859A1
		Control housing, wave washer	
		Neutral warm-up lever thrust plate, face cam bushing	
		Shift cam bushing, face cam bushing	
		End of the shift cable when fully extended	
		End of the throttle cable when fully extended	
		Entire face cam	

Notes:



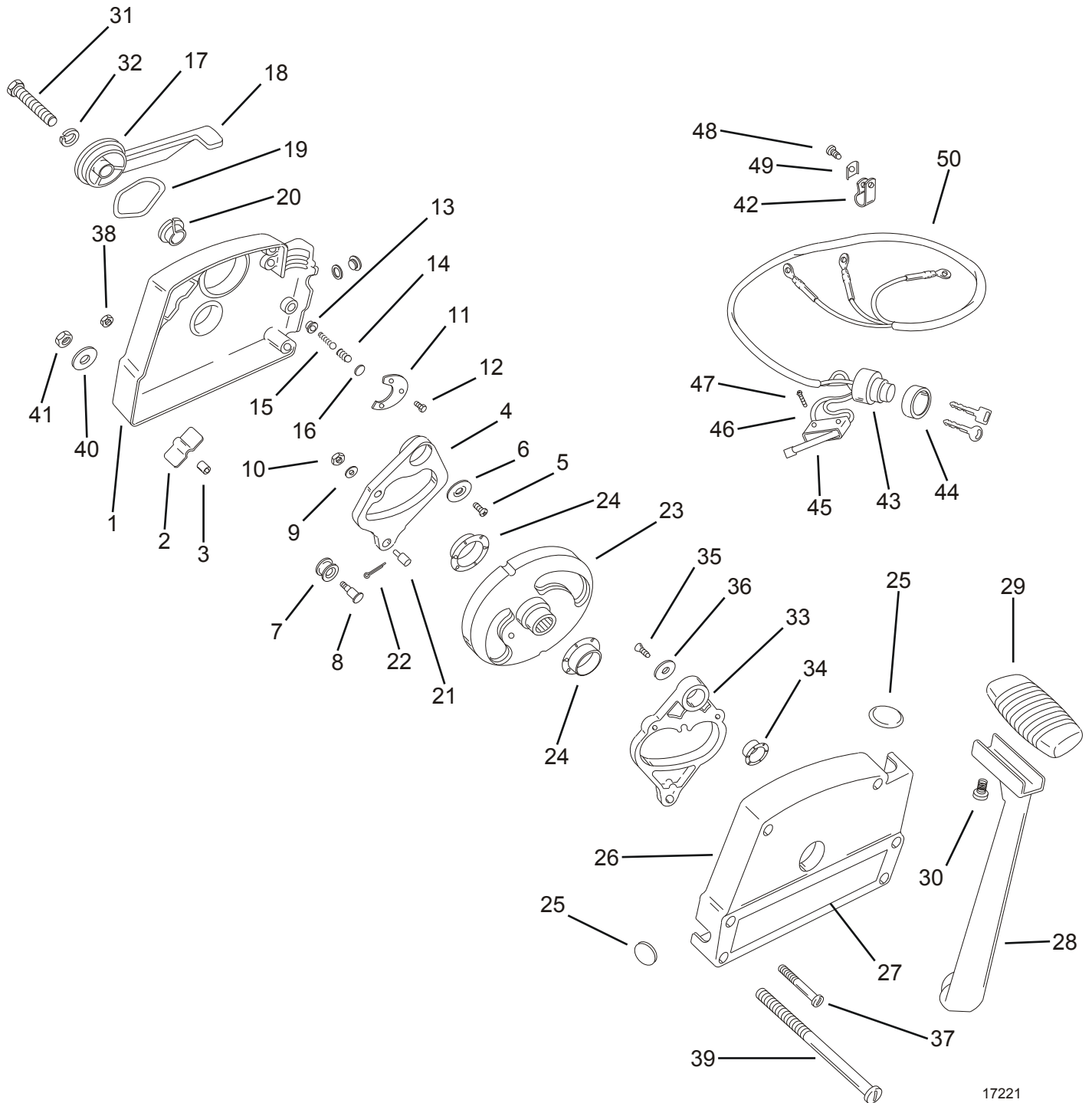
Standard Single Lever Full Gear Shift Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Starboard housing			
2	2	Spring			
3	1	Detent roller			
4	1	Throttle cam			
5	1	Screw	10	88.5	
6	1	Washer			
7	1	Cam roller			
8	1	Throttle cam roller mounting stud			
9	1	Washer			
10	1	Nut	10	88.5	
11	1	Thrust plate			
12	3	Screw	7	62	
13	1	Detent pin			
14	1	Spring			
15	1	Spring			
16	1	Welch plug			
17	1	Warm-up lever			
18	1	Decal			
19	1	Wave washer			
20	1	Bushing			
21	2	Pin			
22	2	Cotter pin			
23	1	Face cam			
24	2	Bushing			
25	2	Plug			
26	1	Port housing			
27	1	Decal			
28	1	Lever			
29	1	Grip			
30	2	Screw	10	88.5	
31	1	Screw	15	132.7	
32	1	Lock washer			
33	1	Shift cam			
34	1	Bushing			
35	1	Screw	7	62	
36	1	Washer			
37	4	Screw	15	132.7	
38	4	Nut			
39	2	Screw	Drive tight		
40	2	Washer			

Standard Single Lever Full Gear Shift Remote Control

Ref. No.	Qty.	Description	Torque		
			Nm	lb. In.	lb. ft.
41	2	Nut			
42	2	Clamp			
43	1	Switch			
44	1	Bezel			
45	1	Neutral start safety switch			
46	2	Sleeve			
47	2	Screw	7	62	
48	1	Screw	7	62	
49	1	Retainer			
50	1	Cable assembly			

Standard Single Lever Full Gear Shift Control Components



17221

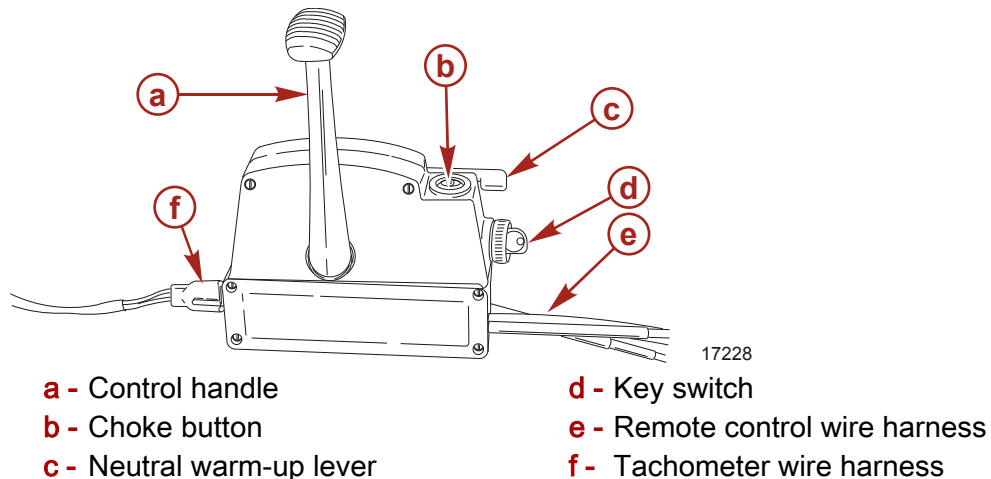
Standard Single Lever Full Gear Shift Remote Control Disassembly and Assembly

Standard Single Lever Full Gear Shift Remote Control Disassembly

⚠ CAUTION

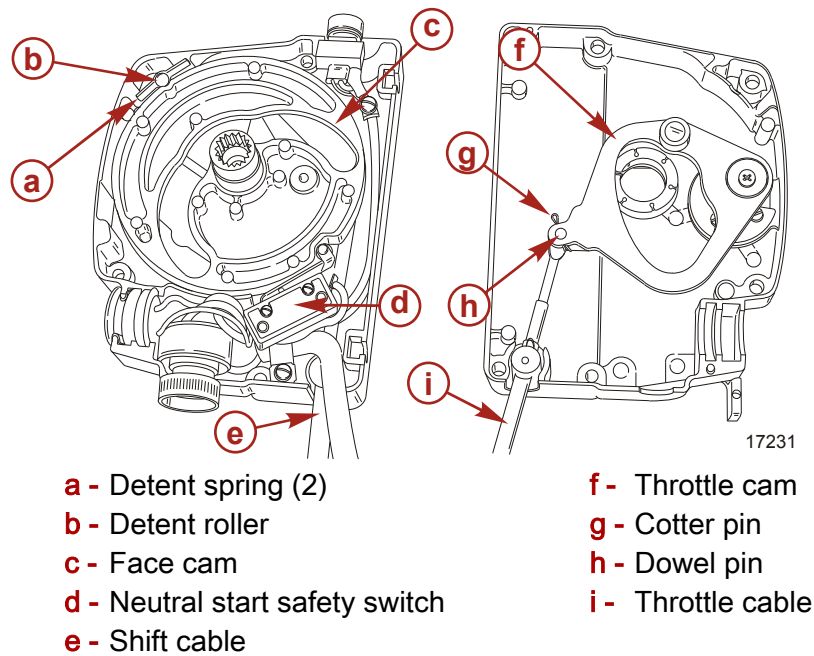
Always disconnect the battery cables from the battery before working around electrical system components to prevent injury and damage to the electrical system if a wire should accidentally cause a short circuit.

1. Turn the ignition key to the "OFF" position and remove the key from the switch.
2. Disconnect the battery cables from the battery.
3. Disconnect the remote control wiring harness from the engine.
4. Disconnect the spark plug high tension leads from the spark plugs.
5. Disconnect the tachometer wiring harness if equipped.



6. Remove the mounting nuts, flat washers, and bolts that extend through the control housing and the mounting panel.
7. Place the control handle in the neutral detent position.
8. Place the neutral warm-up lever all the way down.
9. Remove the control handle retainer screw and lockwasher from the control housing. Pull the control handle from the splined hub of the control housing.
10. Remove the four screws and nuts securing both halves of the control housing together.
11. Carefully separate the control housings. Retain the four screws for reassembly and discard the nuts.

12. Remove the cotter pin, and dowel pin from the throttle cam.



13. Move the throttle lever away from the throttle cable, and lift the throttle cable out of the control housing.

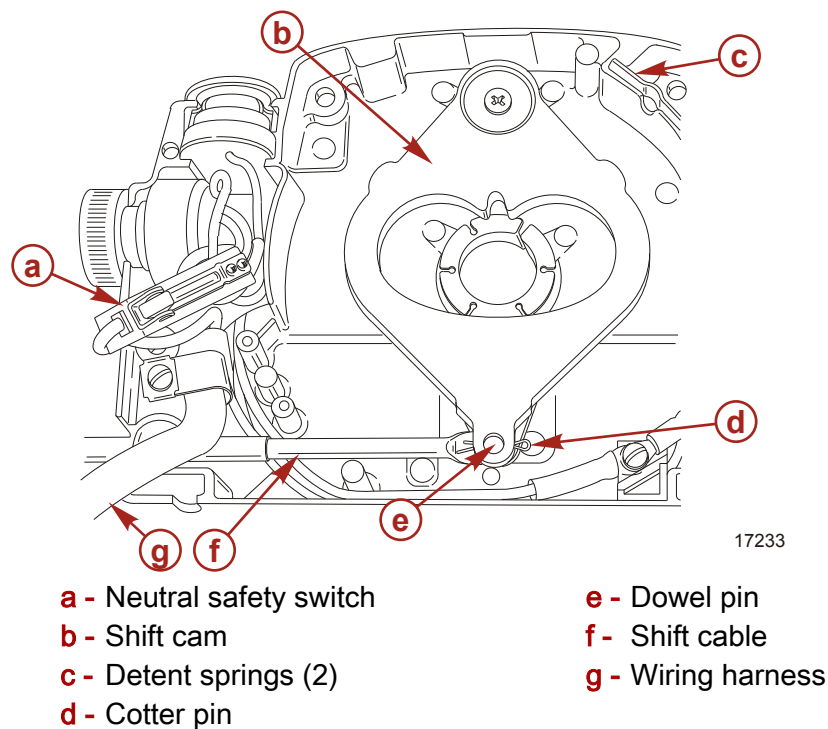
14. Remove the face cam, detent roller, and two detent springs from the control housing.

15. Remove and retain the two screws securing the neutral safety switch to the control housing. Move the switch to one side.

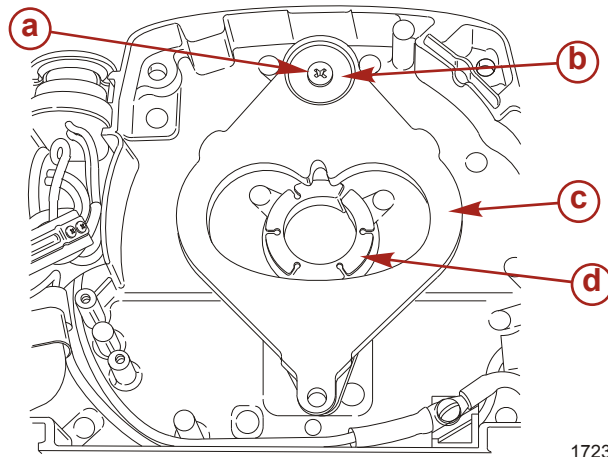
16. Lift the wiring harness out of the shift cable barrel recess.

17. Remove the cotter pin, and dowel pin from the shift cam.

18. Move the shift cam away from the shift cable. Lift the shift cable out of the control housing.

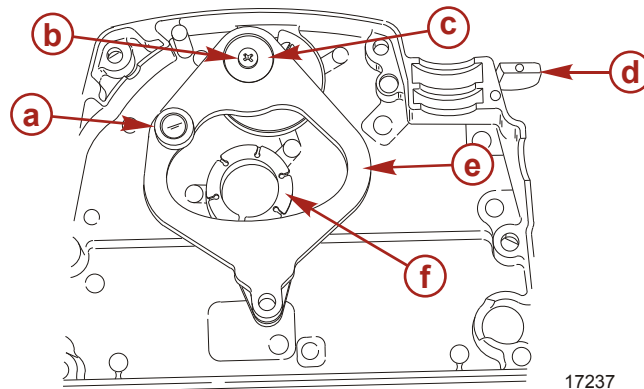


19. Remove the shift cam anchor screw, and retainer washer.
20. Remove the shift cam, and the shift cam bushing from the control housing. Replace the shift cam bushing if it shows signs of wear.
21. Remove the face cam nylon bushing. Replace the face cam bushing if it shows signs of wear.



- | | |
|-----------------------------------|-----------------------------|
| a - Shift cam anchor screw | c - Shift cam |
| b - Retainer washer | d - Face cam bushing |

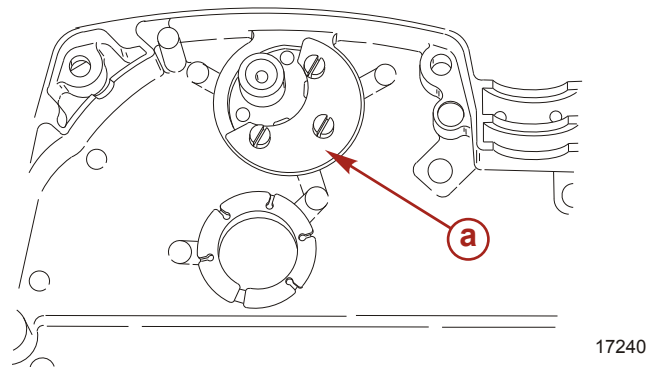
22. Remove the throttle cam anchor screw, and retainer washer.
23. Remove the throttle cam, and nylon bushing from the control housing. Replace the throttle cam nylon bushing if worn.
24. Remove the face cam nylon bushing from the control housing. Replace the nylon face cam bushing if worn.



- | | |
|-----------------------------|----------------------------------|
| a - Cam roller | d - Neutral warm-up lever |
| b - Anchor screw | e - Throttle cam |
| c - Retaining washer | f - Face cam bushing |

25. Remove the three screws securing the neutral warm-up lever thrust plate to the neutral warm-up lever. Remove the thrust plate.

26. Remove the neutral warm-up lever, and wave washer from the control housing.



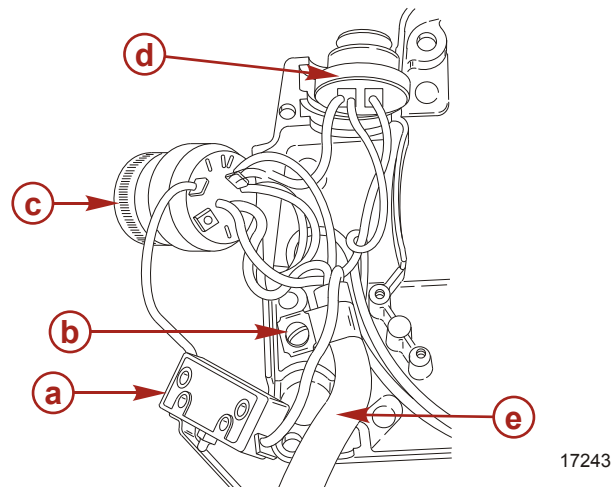
a - Thrust plate

27. Remove the screw securing the remote control harness to the control housing.

28. Loosen the key switch retaining nut.

29. Remove the choke button from the control housing.

30. Remove the remote control wire harness from the control housing.



a - Neutral safety switch

d - Choke button

b - Screw securing remote control harness

e - Harness

c - Key switch retaining nut

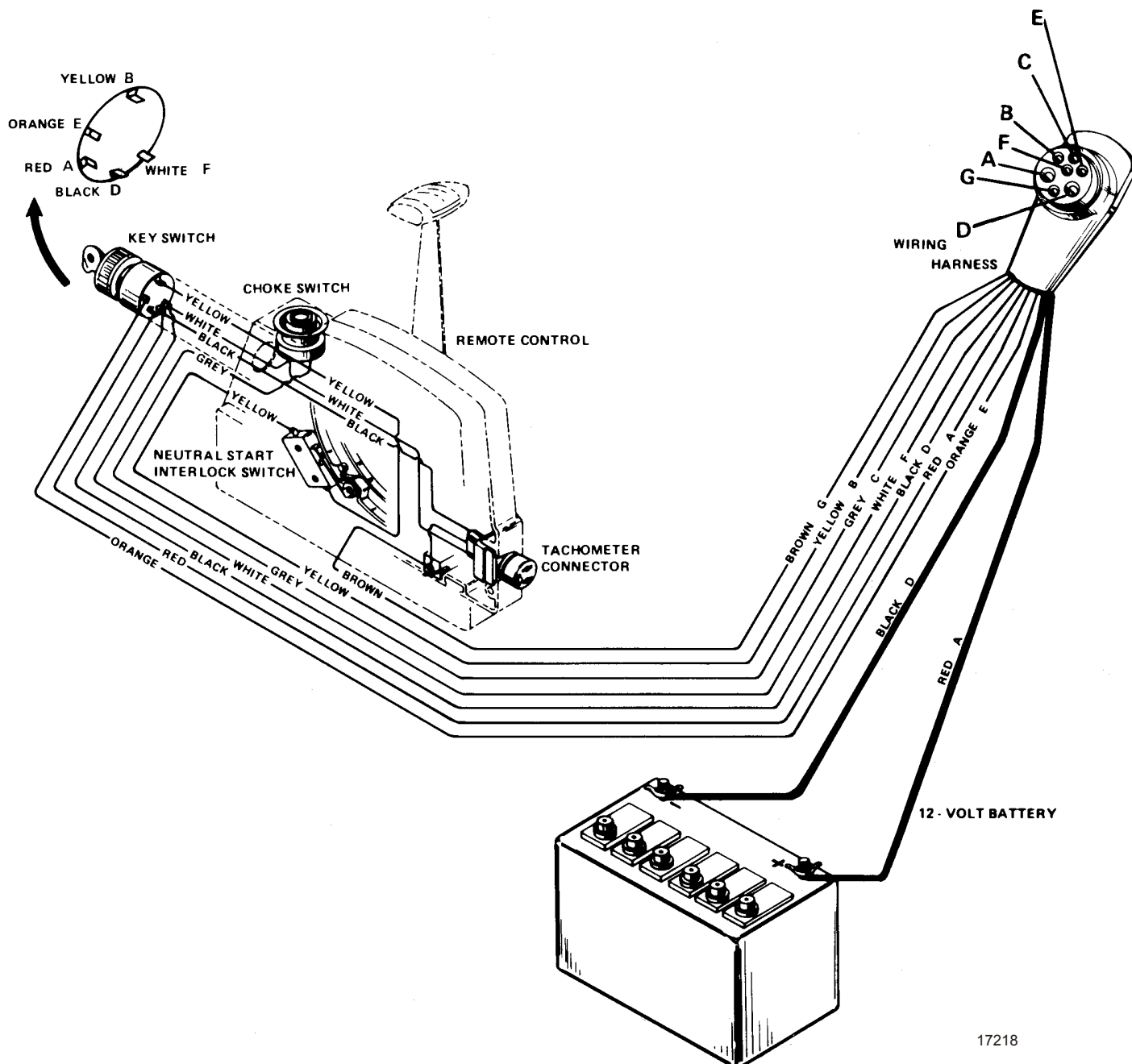
Wire Color Code Abbreviations

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

Standard Single Lever Full Gear Shift Remote Control Assembly

1. Solder the wire harness to the key switch, choke switch, neutral start interlock switch. Apply Liquid Neoprene onto all of the wire harness solder joints that are located inside the control box.
2. Secure the wire harness brown wire to the terminal block with a screw. Tighten the screw securely.

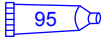
NOTE: Refer to the following graphic illustration for the wire harness connections.



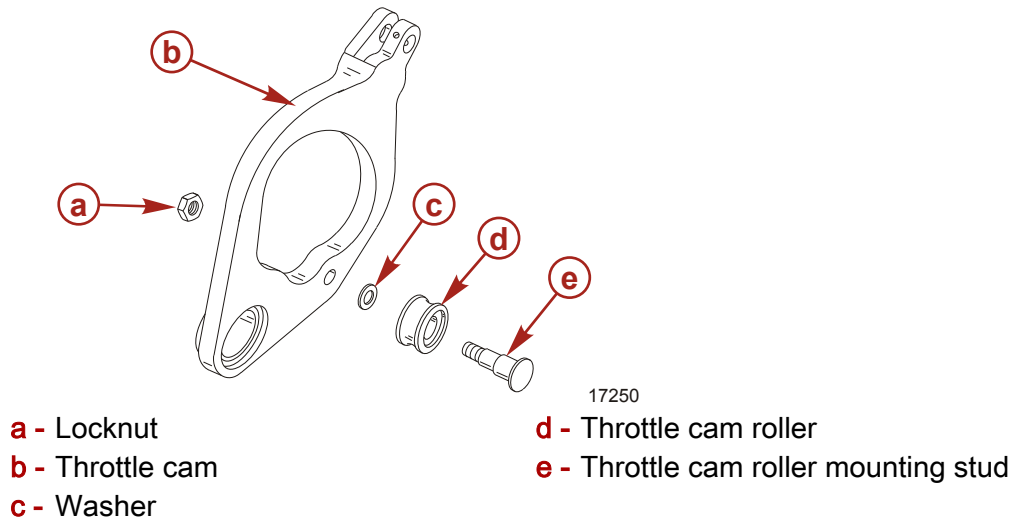
17218

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Remote control wire harness solder joints inside the control box	92-25711-3

3. Lubricate the throttle cam roller mounting stud with 2-4-C with Teflon.

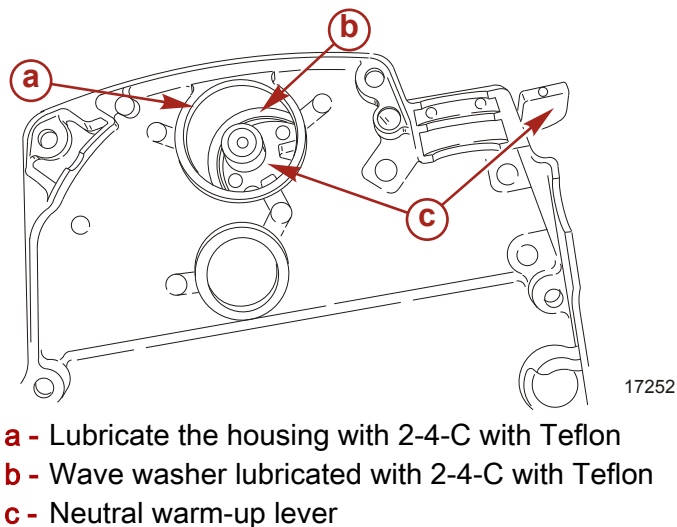
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle cam roller mounting stud	92-802859A1

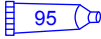
4. Install the throttle cam roller onto the throttle cam roller stud. Secure the throttle cam roller with the mounting stud, washer, and locknut. Tighten the locknut to the specified torque.



Description	Nm	lb. in.	lb. ft.
Locknut	10	88.5	

5. Lubricate the neutral warm-up lever wave washer with 2-4-C with Teflon.
6. Lubricate the control housing neutral warm-up lever bore with 2-4-C with Teflon.
7. Place the wave washer onto the neutral warm-up lever.
8. Install the neutral warm-up lever into the control housing.



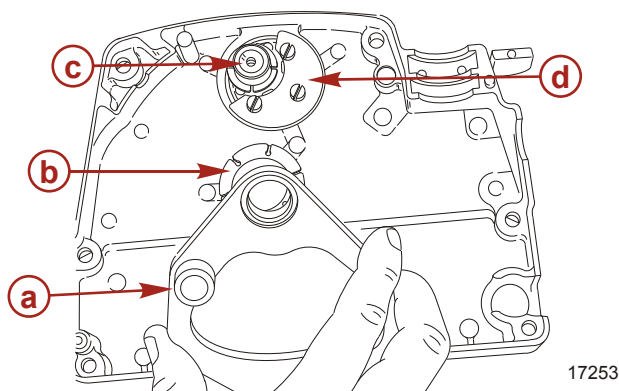
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control housing, wave washer	92-802859A1

9. Lubricate the thrust plate with 2-4-C with Teflon.
10. Install the thrust plate to the neutral warm-up lever. Secure with three screws. Tighten screws to the specified torque.

Description	Nm	lb. in.	lb. ft.
Thrust plate screw (3)	7	62	

11. Lubricate the face cam bushing with 2-4-C with Teflon and install onto the control housing.

12. Install the throttle cam onto the bushing.



a - Throttle cam

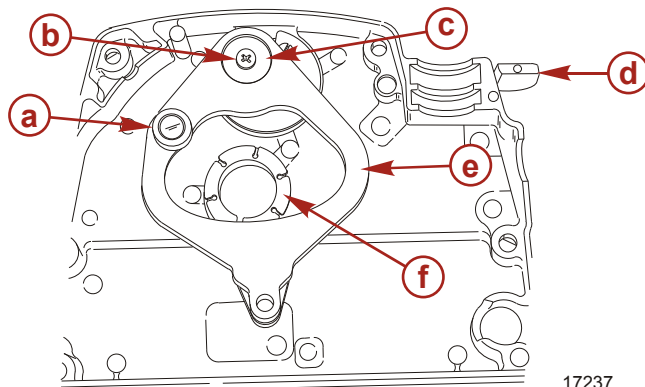
b - Throttle cam bushing

c - Neutral warm-up lever

d - Neutral warm-up lever thrust plate

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Neutral warm-up lever thrust plate, face cam bushing	92-802859A1

13. Secure the throttle cam to the control housing with a retaining washer and screw. Tighten the screw to the specified torque.



a - Cam roller

b - Anchor screw

c - Retaining washer

d - Neutral warm-up lever

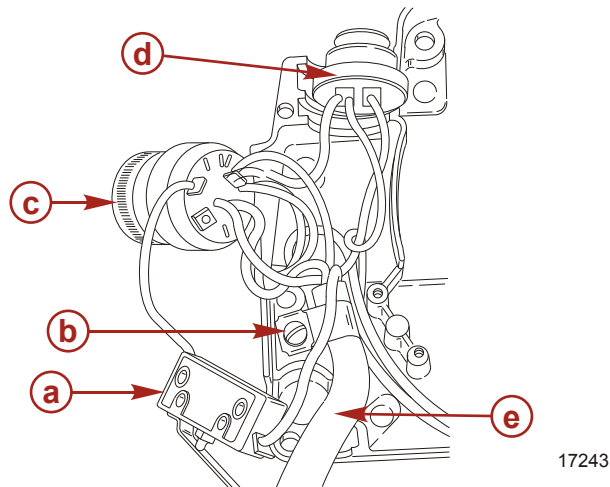
e - Throttle cam

f - Face cam bushing

Description	Nm	lb. in.	lb. ft.
Anchor screw	10	88.5	

14. Install the choke button, and key switch to the control housing.

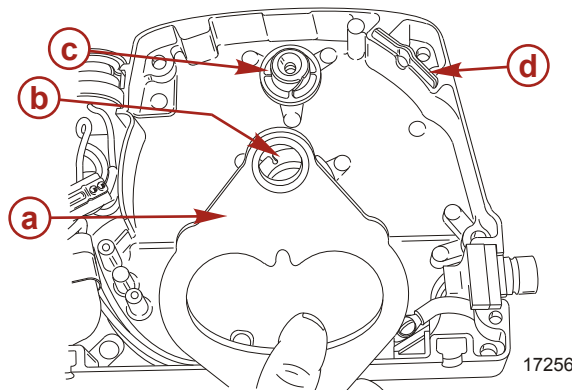
15. Secure the remote control harness with a clamp, retainer, and screw. Tighten the screw to the specified torque. Do not secure the neutral start safety switch to the control housing at this time.



- a** - Neutral start safety switch
b - Screw securing remote control harness
c - Key switch retaining nut
d - Choke button
e - Harness

Description	Nm	lb. in.	lb. ft.
Screw	7	62	

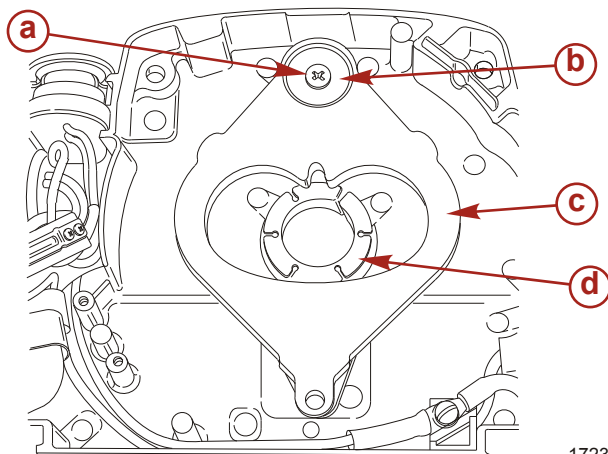
16. Lubricate the shift cam bushing with 2-4-C with Teflon. Install the bushing onto the control housing.
17. Lubricate the face cam bushing with 2-4-C with Teflon. Install the face cam bushing onto the control housing.
18. Install the two detent springs onto the control housing.
19. Install the shift cam onto the control housing.



- a** - Shift Cam
b - Face cam bushing
c - Shift cam bushing
d - Detent spring (2)

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Shift cam bushing, face cam bushing	92-802859A1

20. Secure the shift cam with a retainer washer, and anchor screw. Tighten the anchor screw to the specified torque.



a - Shift cam anchor screw
b - Retainer washer

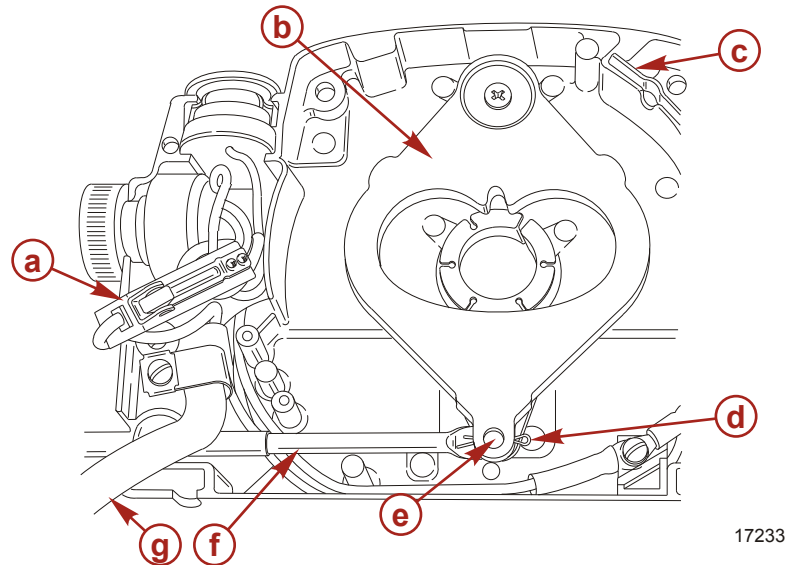
c - Shift cam
d - Face cam bushing

Description	Nm	lb. in.	lb. ft.
Anchor screw	10	88.5	

INSTALLING REMOTE CONTROL CABLES

1. Pull the end of the shift cable out of the cable housing to the end of its travel. Apply a light coat of 2-4-C with Teflon onto the extended portion of the cable.
2. Position the shift cable in the control housing so the barrel on the cable is anchored under the wiring harness.
3. Insert the dowel pin through the shift cam, and the hole in the end of the shift cable.

4. Secure the shift cable to the shift cam by aligning the cotter pin hole in the dowel pin with the holes in the shift cam. Insert a cotter pin through the shift cam and dowel pin so the head of the cotter pin is toward the forward end of the control housing. Bend back both ends of the cotter pin.



- a** - Neutral start safety switch
b - Shift cam
c - Detent spring (2)
d - Cotter pin
e - Dowel pin
f - Shift cable
g - Wiring harness

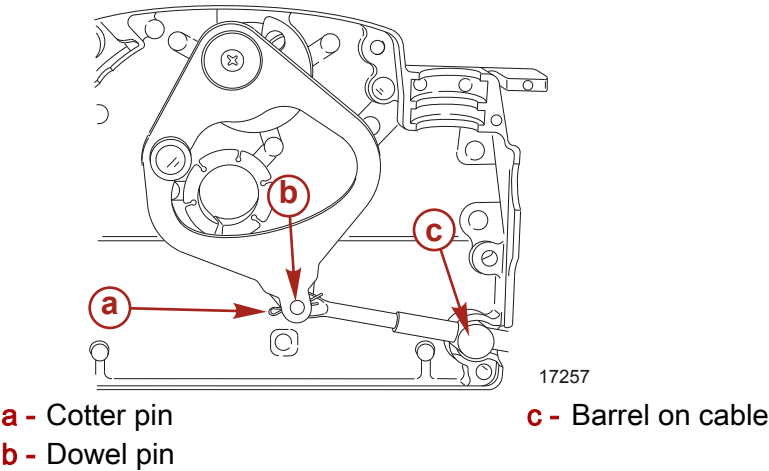
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	End of the shift cable when fully extended	92-802859A1

5. Pull the end of the throttle cable out of the cable housing to the end of its travel. Apply a light coat of 2-4-C with Teflon onto the extended portion of the control cable.

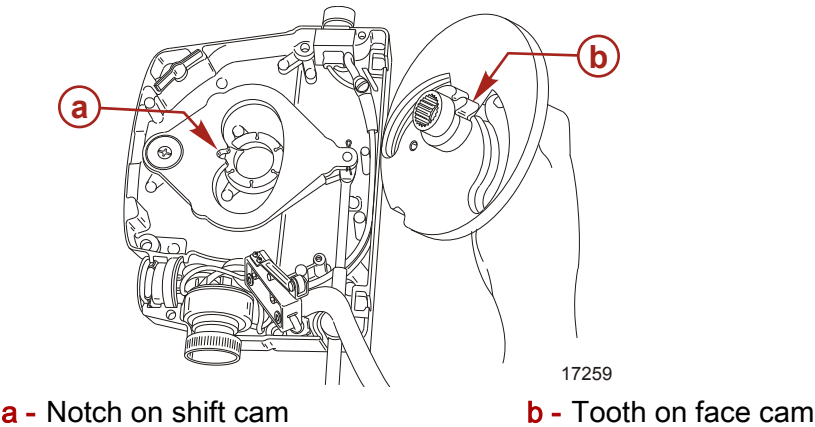
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	End of the throttle cable when fully extended	92-802859A1

6. Position the throttle cable in the control housing so the barrel on the cable is anchored in the control housing.
7. Insert a dowel pin through the throttle cam and the hole in the end of the throttle cam.

8. Secure the throttle cable to the throttle cam by aligning the cotter pin hole in the dowel pin with the holes in the throttle cam. Insert a cotter pin through the throttle cam and dowel pin so the head of the cotter pin is toward the forward end of the control half. Bend back both ends of the cotter pin.



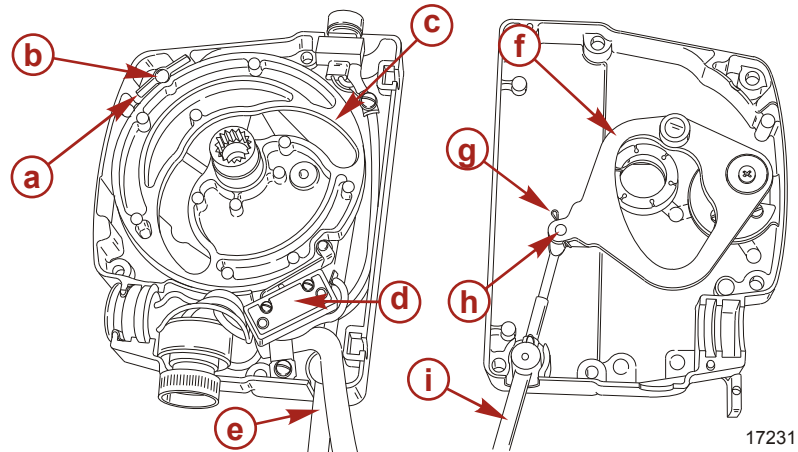
9. Apply a light coat of 2-4-C with Teflon onto the entire face cam. Install the face cam over the shift cam so the tooth on the face cam fits into the notch in the shift cam.
10. Rotate the face cam until the letters "TDC" (top dead center) on the face cam are at the top of the control housing.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Entire face cam	92-802859A1

11. Install the detent roller.

12. Secure the neutral start safety switch to the control housing with two screws. Tighten the screws to the specified torque.



- a** - Detent spring (2)
b - Detent roller
c - Face cam
d - Neutral safety switch
e - Shift cable
f - Throttle cam
g - Cotter pin
h - Dowel pin
i - Throttle cable

Description	Nm	lb. in.	lb. ft.
Neutral start safety switch screw	7	62	

13. Ensure the face cam is positioned so the letters "TDC" (top dead center) on the face cam are at the top of the control housing.
14. Place the control housing halves together. If the halves do not fit together tight, raise and lower the neutral warm-up lever so the cam roller will align with the face cam slot.
15. Secure the control housing halves with four screws and new locknuts. Tighten screws to the specified torque.

Description	Nm	lb. in.	lb. ft.
Control housing screw (4)	15	132.7	

16. Place the control handle into the splined hub of the control housing. Move the handle back and forth until the neutral detent position is located. Reset the control handle so the handle is in a vertical position.
17. Retain the control handle to the control housing with a lockwasher and screw. Tighten the control handle retainer screw to specification.

Description	Nm	lb. in.	lb. ft.
Control handle retainer screw	15	132.7	

Notes:

Side Mount Control

Section 3A - Side Mount Control 76334A10 through A40

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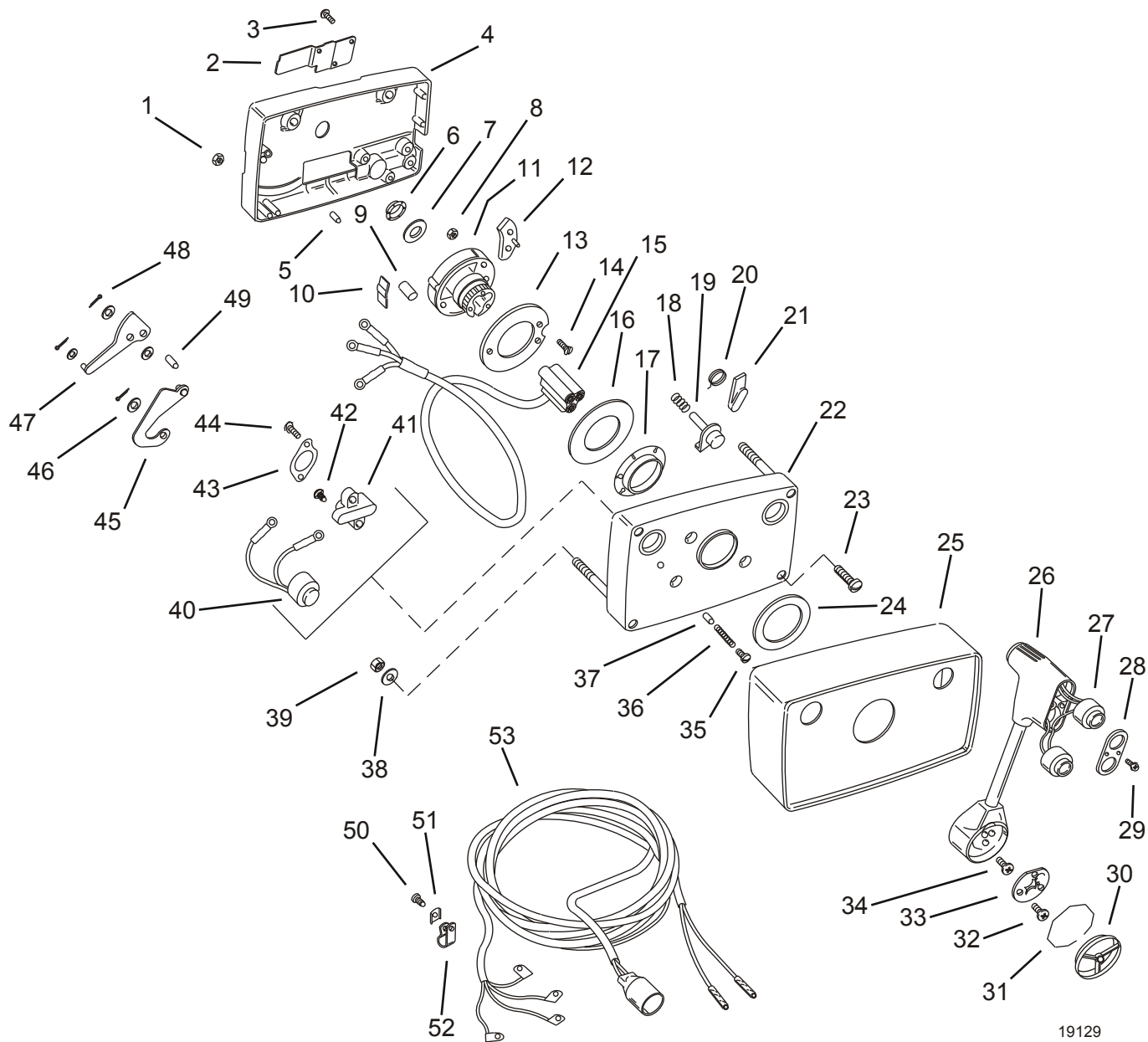
Side Mount Control Mechanical Shift Components	3A-4	Remote Control Housing Components Installation	3A-14
Side Mount Control Electric Shift Components	3A-8	Remote Control Wire Harness and Switches Removal.....	3A-20
Side Mount Control Disassembly.....	3A-10	Remote Control Wire Harness and Switches Installation.....	3A-22
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Remote Control Housing Disassembly...	3A-11		

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Slotted hex head screws (2), round-head self-tapping screws (2), shift lever screw	92-809819
 25	Liquid Neoprene	Trim wire connections	92-25711-3
		Trim switch solder joint	
		Trailer switch solder joints	
		Neutral start safety switch solder joints	
		Choke switch solder joint	
		Ignition key switch solder joints	
 94	Anti-Corrosion Grease	Neutral start safety switch	92-802867A1
 95	2-4-C with Teflon	Control hub washer	92-802859A1
		Nylon control hub bushing, nylon throttle shaft bushing, trim wire harness retainer plate	
		Plastic washer, throttle shaft, throttle pinion gear	
		Shift pinion gear, shift pinion gear nylon bushing, shift gear, detent assembly roller	
		Plastic flat washer	
		Extended portion of the control cables, shift and throttle actuating pin	

Notes:

Side Mount Control Mechanical Shift Components



19129

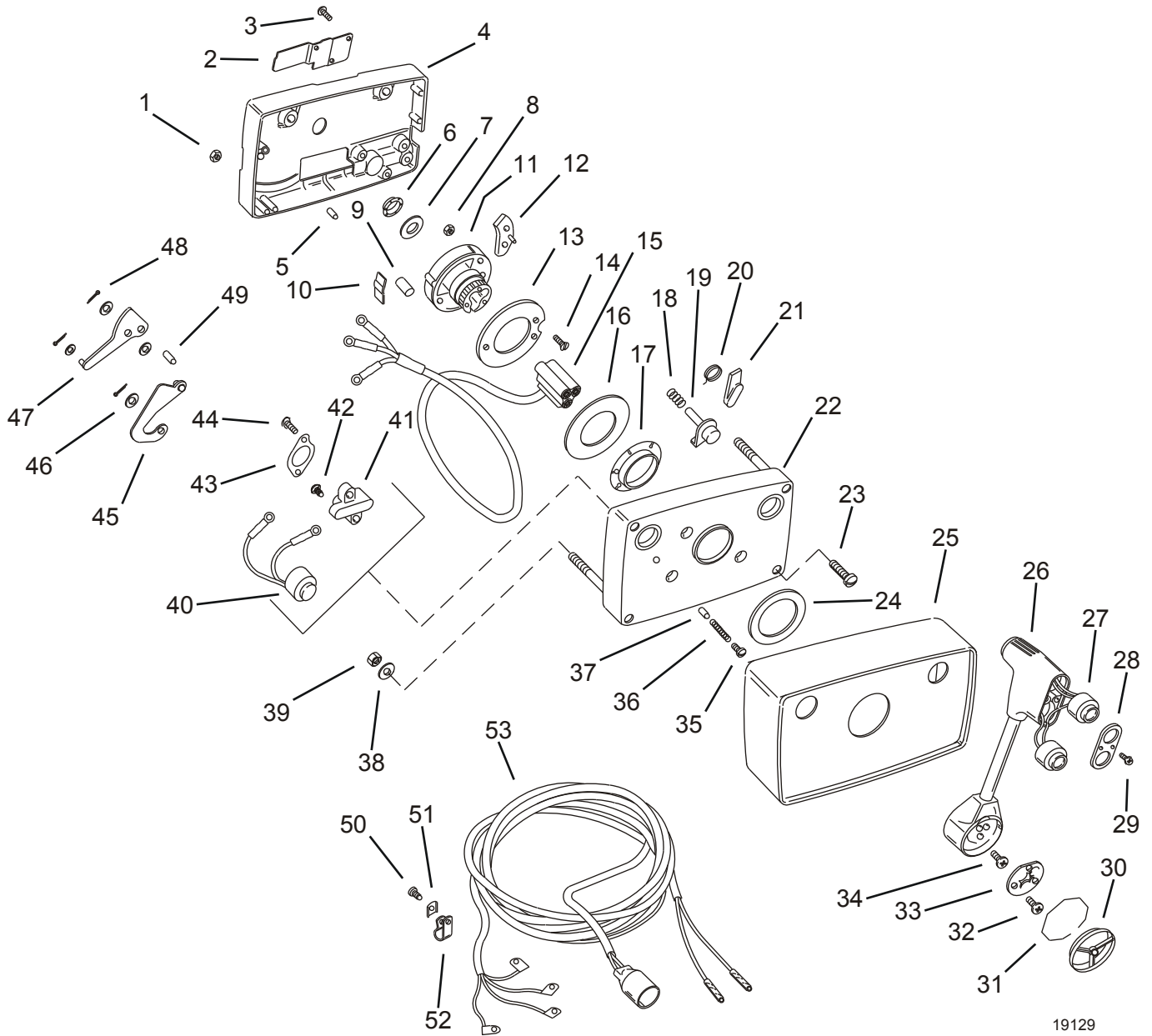
Side Mount Control Mechanical Shift Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Nut			
2	1	Cover			
3	3	Screw			
4	1	Back cover			
5	1	Detent pin			
6	1	Bushing			
7	1	Washer			
8	1	Nut			
9	1	Detent pin			
10	2	Detent spring			
11	1	Cam			
12	1	Insert			
13	1	Plate			
14	3	Screw			
15	1	Trim disconnect harness			
16	1	Plate			
17	1	Bushing			
18	1	Spring			
19	1	Button assembly			
20	1	Spring			
21	1	Lever			
22	1	Housing assembly			
23	4	Screw			
24	1	Washer			
25	1	Front cover			
26	1	Control handle			
27	1	Trim switch assembly			
28	1	Trim switch retainer			
29	2	Screw			
30	1	Cover			
31	1	Retainer			
32	3	Allen screw			
33	1	Plate			
34	2	Screw			
35	1	Screw			
36	1	Spring			
37	1	Detent pin			
38	2	Washer			
39	2	Nut			
40	1	Trailer switch			

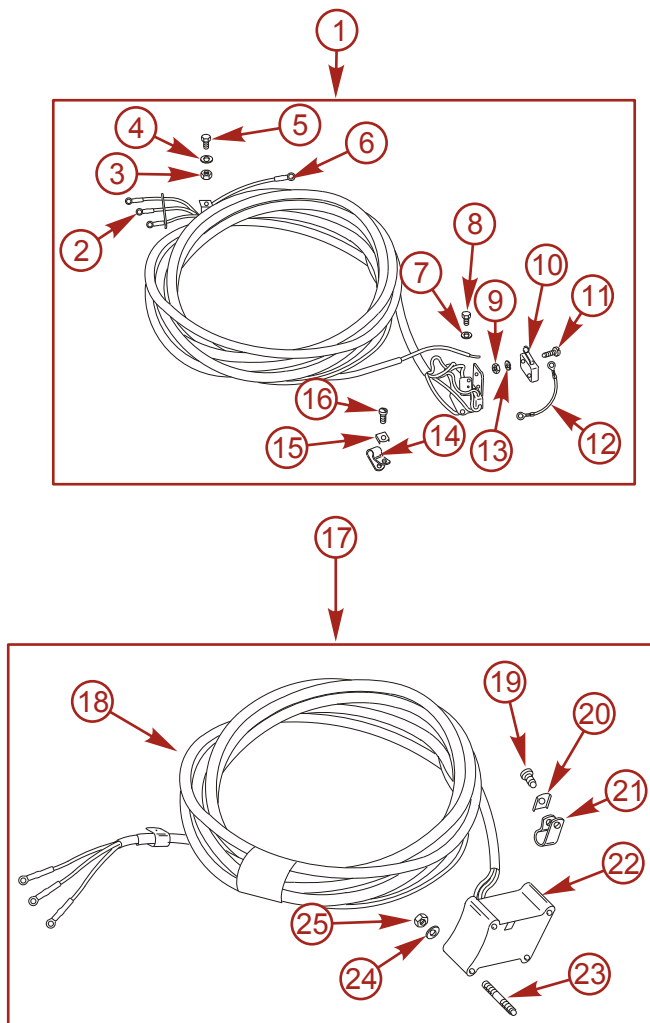
Side Mount Control 76334A10 through A40

Ref. No.	Qty.	Description	Torque		
			Nm	lb. In.	lb. ft.
41	1	Terminal block			
42	2	Screw			
43	1	Retainer			
44	2	Screw			
45	1	Link			
46	4	Washer			
47	1	Lever			
48	3	Cotter pin			
49	1	Pivot pin			
50	1	Screw			
51	1	"D" washer			
52	1	Clip			
53	1	Trim harness			

Side Mount Control Mechanical Shift Components



Side Mount Control Electric Shift Components



19133

Side Mount Control Electric Shift Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	TR-II shift harness components			
2	1	Shift harness			
3	1	Nut			
4	1	Washer			
5	1	Screw			
6	1	Cable			
7	2	Washer			
8	2	Screw			
9	2	Nut			
10	2	Micro switch			
11	2	Screw			
12	1	Cable			
13	2	Lockwasher			
14	1	Clip			
15	1	D washer			
16	1	Screw			
17	1	215 Electric shift harness components			
18	1	Harness			
19	1	Screw			
20	1	D washer			
21	1	Clip			
22	1	Switch assembly			
23	4	Stud			
24	4	Washer			
25	4	Nut			

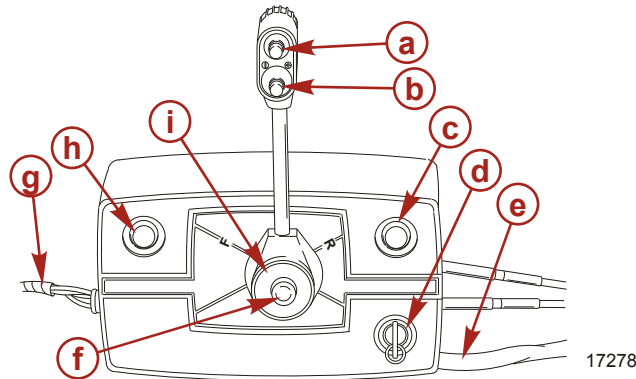
Side Mount Control Disassembly

Removing Control Cables

⚠ CAUTION

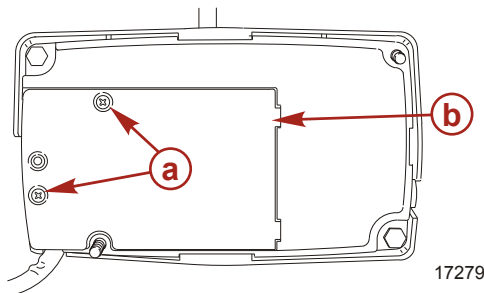
Always disconnect the battery cables from the battery before working around electrical system components to prevent injury and damage to the electrical system if a wire should accidentally cause a short circuit.

1. Turn the ignition key to the "Off" position and remove the key from the ignition switch. Disconnect the remote control wiring harness from the engine wiring harness.
2. Disconnect the battery cables from the battery.
3. Disconnect the spark plug high tension leads from the spark plugs.
4. Disconnect the tachometer wiring harness from the remote control housing.
5. Remove and retain the two nuts and flat washers from the mounting studs on the back side of the control housing.
6. Pull the remote control housing from the mounting panel.
7. Place the remote control handle in neutral position.



- | | |
|--|--------------------------------------|
| a - Trim up button | f - Neutral warm-up button |
| b - Trim down button | g - Tachometer wiring harness |
| c - Choke button | h - Trailing button |
| d - Key switch | i - Control handle cover |
| e - Remote control wire harness | |

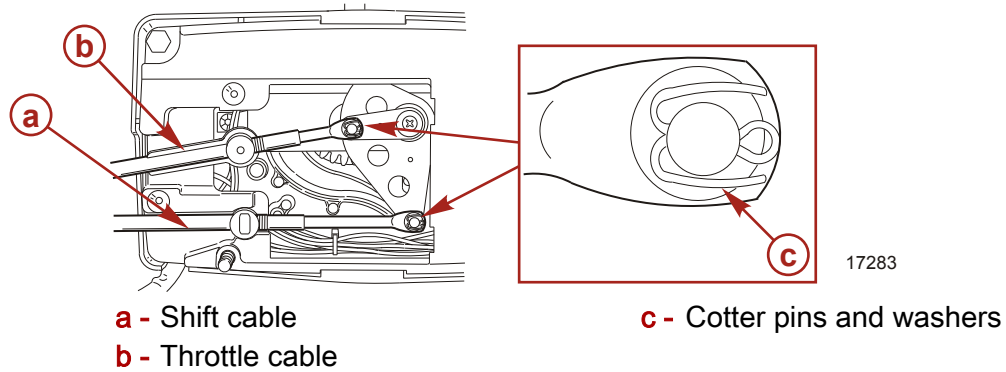
8. Remove and retain the two screws securing the cover, and lift the cover off.



- | | |
|----------------------|------------------|
| a - Screw (2) | b - Cover |
|----------------------|------------------|

9. Remove the cotter pins and washers securing the shift and throttle cables. Discard the cotter pins. Retain the flat washers.

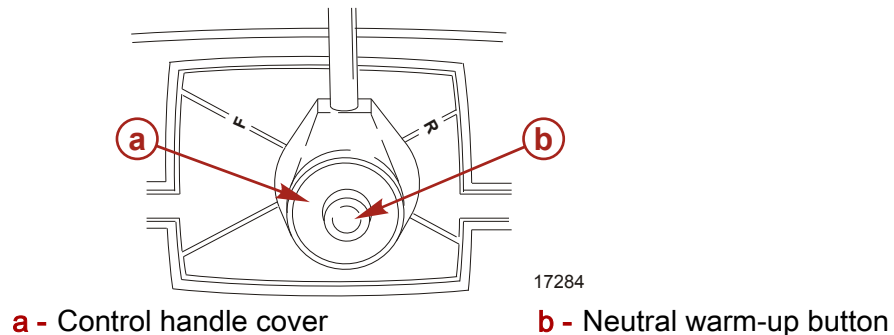
10. Lift the throttle cable and shift cable from the remote control housing.



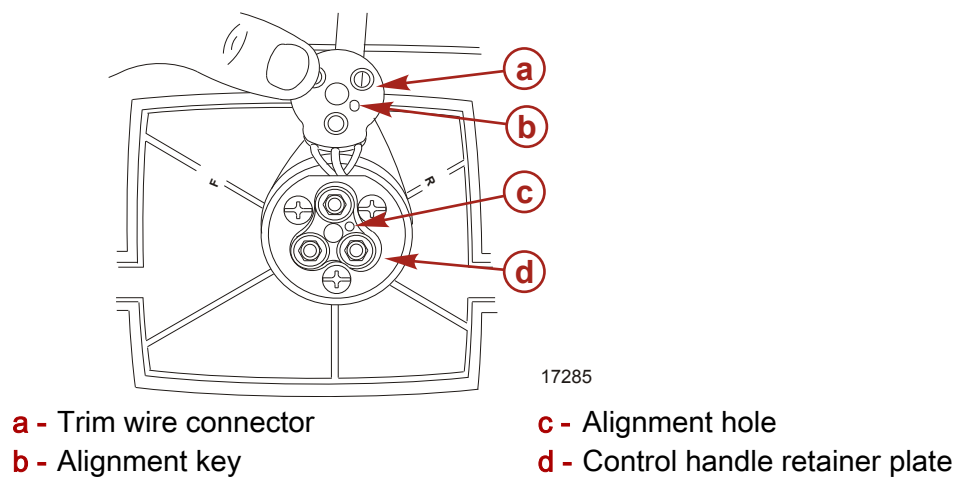
NOTE: The throttle cable is the top cable and the shift cable is the bottom cable.

Remote Control Housing Disassembly

1. Remove the control handle cover. The cover snaps in place.
2. Remove the neutral warm-up button attached to the shaft in the middle of the control handle hub. The button can be removed by pulling on it.

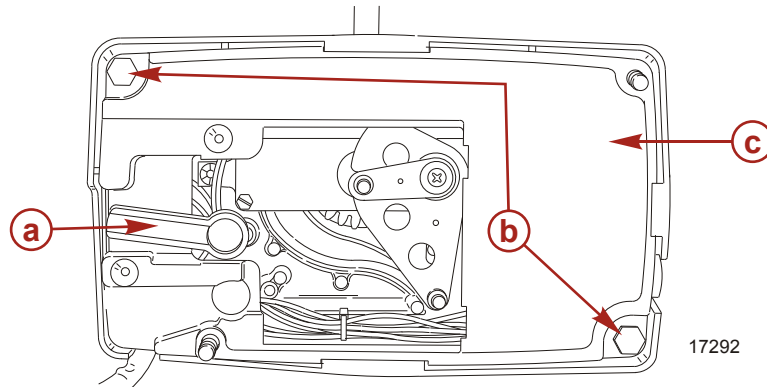


3. Remove the three screws securing the trim wire connector to the trim wire plug located in the center of the control handle.
4. Lift the trim wire connector up and remove the three screws securing the control handle retainer plate. Remove the retainer plate and control handle from the splined control shaft.



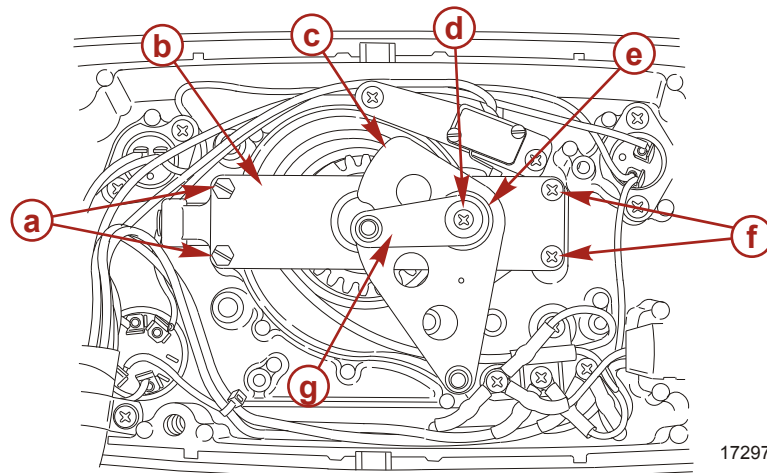
NOTE: Support the control housing so the weight of the housing is not on the control shaft.

5. Remove the two bolts which secure the back cover to the control housing. Remove the cover from the control housing.



- a** - Throttle cable anchor guide
b - Rear cover bolt (2)
c - Rear cover

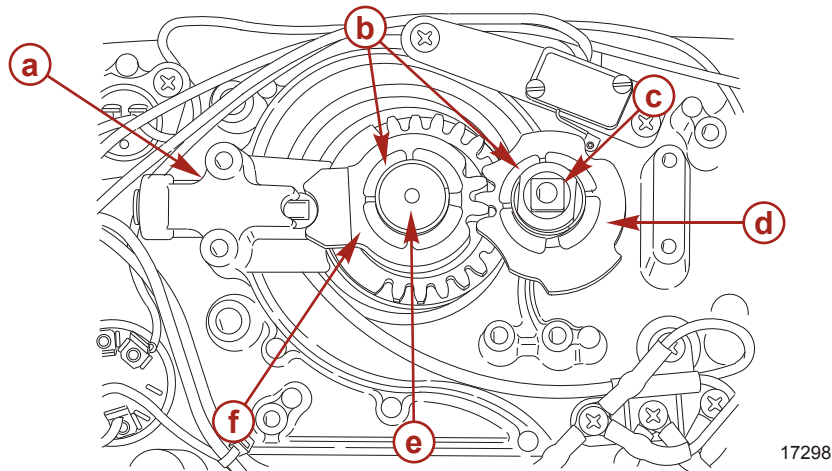
6. Remove the phillips head screw and washer securing the shift and throttle levers to the control housing.
7. Remove the throttle lever, plastic washer under the throttle lever and shift lever from the control housing.
8. The slotted hex head screws are secured with a threadlocker compound. Remove the screws from control housing. If the screws are difficult to remove, use a heat gun to aid in the screw removal.
9. Remove the two phillips head screws securing the control shaft support plate to the control housing. Remove the plate from the housing.



- a** - Slotted hex head screw (2)
b - Control shaft support plate
c - Shift lever
d - Screw and washer securing throttle lever
e - Plastic washer
f - Phillips head screw (2)
g - Throttle lever

10. Remove the detent assembly from the control housing.
11. Remove the nylon bushings from the control shaft hub, and shift pinion gear.
12. Remove the shift gear from the control shaft hub.

13. Remove the shift pinion gear from the throttle shaft.



a - Detent assembly

b - Nylon bushings

c - Throttle shaft

d - Shift pinion gear

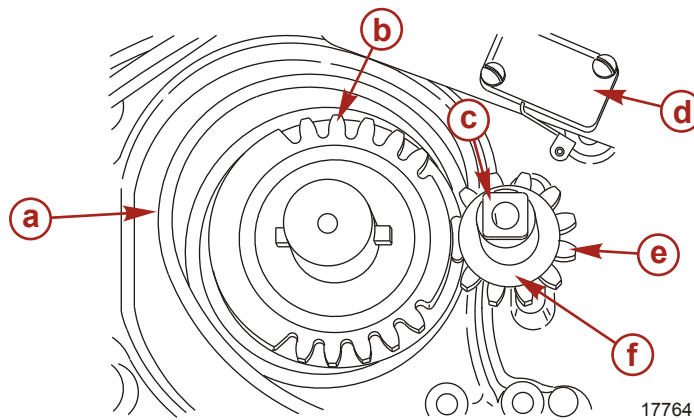
e - Control shaft hub

f - Shift gear

14. Pull the throttle shaft with the attached throttle pinion gear, and plastic washer from the control housing.

15. Remove the nylon bushing from the throttle shaft.

16. Pull up on the control shaft hub, and remove the trim wire plug with the attached trim wires from the hub. After the trim wire plug is removed from control shaft hub, the trim wires can be disconnected from the terminal block for replacement of the trim wire plug.



a - Trim switch wiring harness

b - Throttle gear

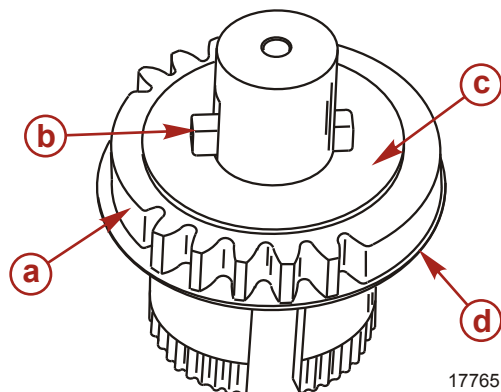
c - Throttle shaft

d - Neutral start safety switch

e - Throttle pinion gear

f - Plastic washer

17. Disassemble the control hub assembly by removing the control hub key. Remove the control hub pin and spring from inside of the control hub, the nylon washer, throttle gear and control hub washer. Do not loose the control hub pin and spring when removing the control hub key.

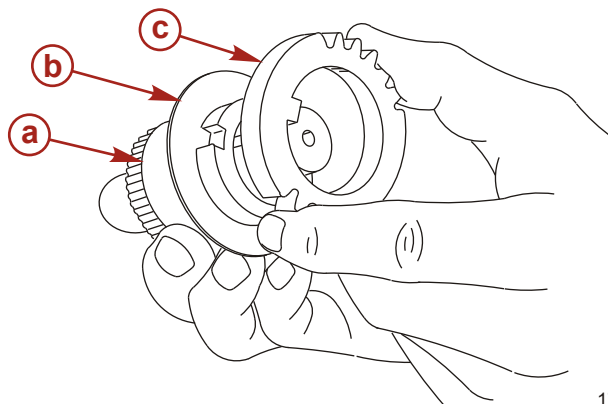


a - Throttle gear
b - Control hub key

c - Nylon washer
d - Control hub washer

Remote Control Housing Components Installation

1. Lubricate the control hub washer with 2-4-C with Teflon.
2. Install the control hub washer onto the control hub.
3. Install the throttle gear onto the control hub.



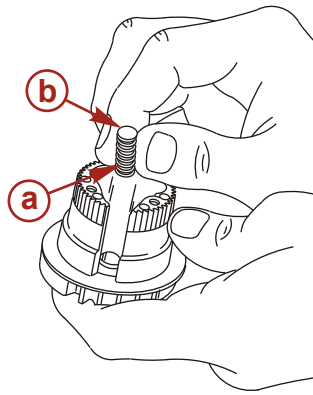
a - Control hub
b - Control hub washer

c - Throttle gear

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control hub washer	92-802859A1

4. Lubricate the control hub pin and spring with 2-4-C with Teflon.
5. Insert the control hub pin into the control hub spring.

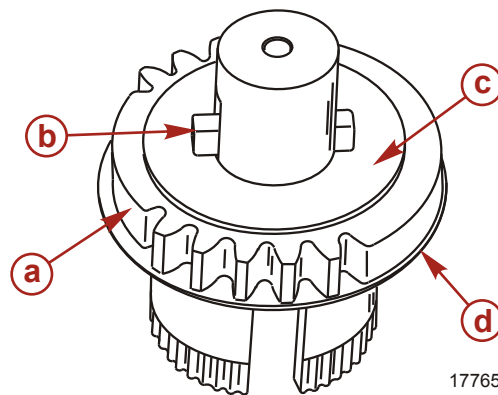
6. Insert the control hub pin and spring into the center of the control hub.



17768

a - Control hub spring**b** - Control hub pin

7. Lubricate the control hub nylon washer.
8. Compress the control hub pin and spring inside of the control hub.
9. Install the control hub nylon washer.
10. Insert the control hub key into the control hub. Ensure the control hub key is centered in the control hub.

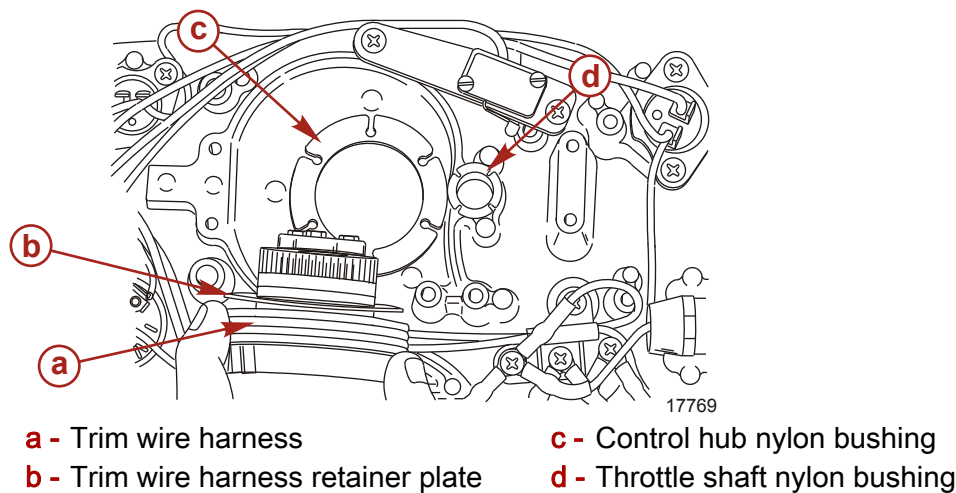


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a - Throttle gear**b** - Control hub key**c** - Nylon washer**d** - Control hub washer

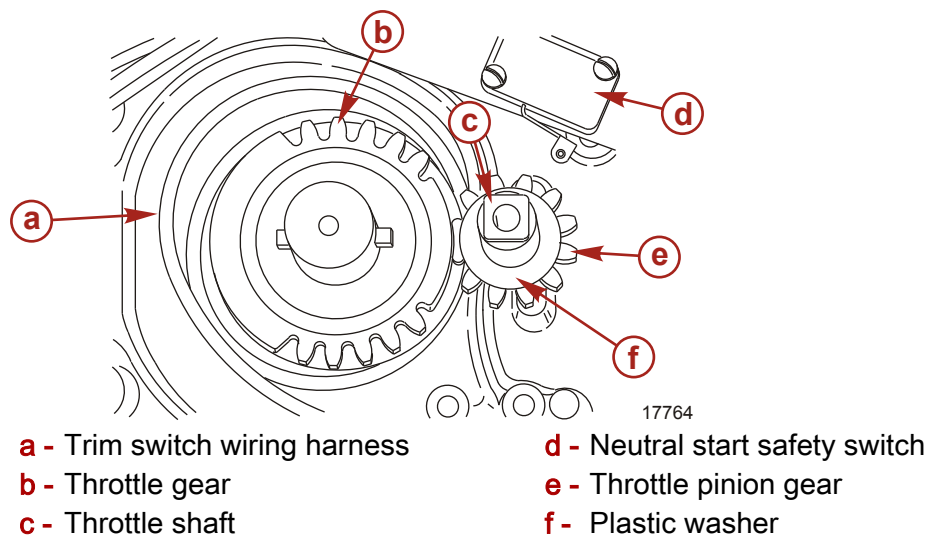
11. Lubricate the nylon control hub bushing and the nylon throttle shaft bushing with 2-4-C with Teflon.
12. Install the nylon control hub bushing and the nylon throttle shaft bushing into the control housing.
13. Insert the trim wire plug with the attached trim wires, into the control hub so the trim wires are against the control hub washer.
14. Coil the trim wire harness counterclockwise around the control hub.
15. Lubricate both sides of the trim wire harness retainer plate. Install the trim wire harness retainer plate onto the control hub so it is up against the trim wire harness.

16. Install the control hub assembly into the control housing.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Nylon control hub bushing, nylon throttle shaft bushing, trim wire harness retainer plate	92-802859A1

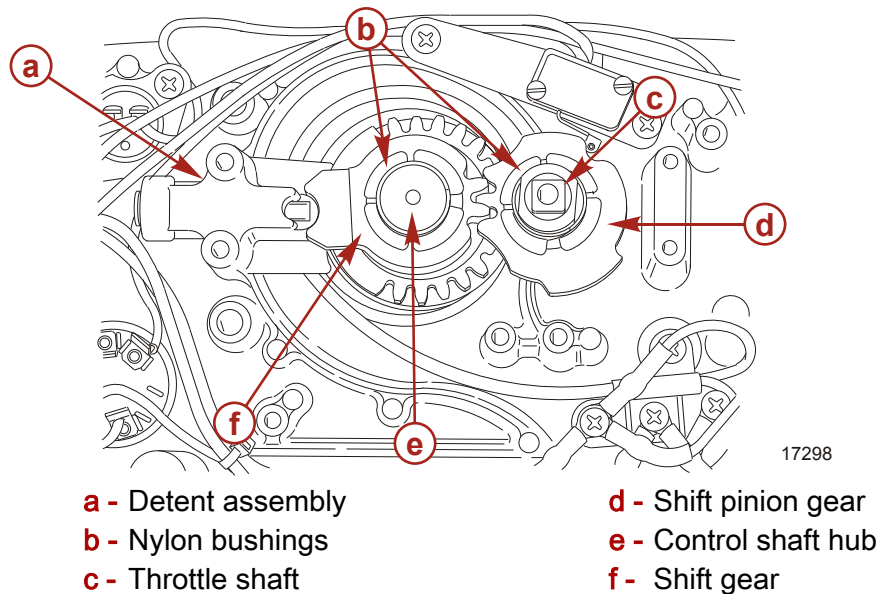
- 17. Lubricate the throttle shaft and throttle pinion gear with 2-4-C with Teflon.
- 18. Install the throttle pinion gear onto the throttle shaft.
- 19. Install the throttle shaft and throttle pinion gear assembly into the control housing.
- 20. Lubricate the plastic washer with 2-4-C with Teflon.
- 21. Install the plastic washer onto the throttle shaft. Ensure the plastic washer is contacting the pinion gear.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Plastic washer, throttle shaft, throttle pinion gear	92-802859A1

- 22. Lubricate the shift pinion gear with 2-4-C with Teflon.
- 23. Install the shift pinion gear onto the throttle shaft.
- 24. Lubricate the shift pinion gear nylon bushing with 2-4-C with Teflon. Install the shift pinion gear nylon bushing onto the throttle shaft.

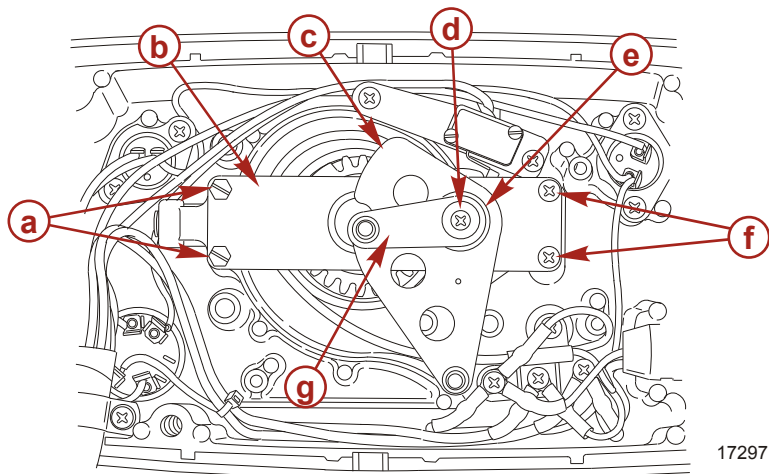
25. Lubricate the entire shift gear with 2-4-C with Teflon and install onto the control hub.
26. Lubricate the detent assembly roller with 2-4-C with Teflon and position the detent assembly onto the control housing.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Shift pinion gear, shift pinion gear nylon bushing, shift gear, detent assembly roller	92-802859A1

27. Position the control shaft support plate over the control hub assembly, throttle shaft assembly, and detent assembly.
28. Apply Loctite 271 Threadlocker onto the threads of the two (10 - 32 x 1.5 in.) slotted hex head screws.
29. Insert the slotted hex head screws through the support plate and detent assembly. Thread the slotted hex head screws into the control housing. Tighten the slotted hex head screws to the specified torque.
30. Apply Loctite 271 Threadlocker onto the threads of two (10 - 16 x 0.437 in.) round-head, self-tapping screws.
31. Insert the round-head, self-tapping screws through the support plate. Thread the round-head, self-tapping screws into the control housing. Tighten the round-head, self-tapping screws to the specified torque.
32. Lubricate the plastic flat washer with 2-4-c with Teflon.
33. Install the shift lever, plastic flat washer and the throttle lever onto throttle shaft.

34. Apply Loctite 271 Threadlocker onto the threads of the (0.190 - 32 x 0.5 in.) screw. Thread the screw with a flat washer into throttle shaft to secure the shift and throttle levers. Tighten the screw to the specified torque.



- a** - Slotted hex head screw (2)

b - Control shaft support plate

c - Shift lever

d - Screw and washer securing throttle lever
- e** - Plastic flat washer

f - Phillips screw (2)

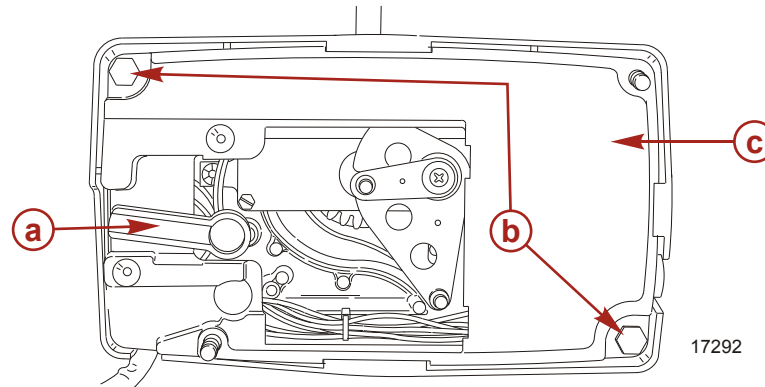
g - Throttle lever

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Plastic flat washer	92-802859A1

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Slotted hex head screws (2), round-head self-tapping screws (2), shift lever screw	92-809819

Description	Nm	lb. in.	lb. ft.
Slotted hex head screw (2) (10 - 32 x 1.5 in.)	3.4	30	
Round-head, self-tapping screw (2) (10 - 1 6 x 0.437 in.)	3.4	30	
Screw (0.190 - 32 x 0.5 in.)	2.8	25	

35. Install and secure the back cover of the control housing with two bolts. Tighten the bolts to the specified torque.



a - Throttle cable anchor guide
b - Rear cover bolt (2)

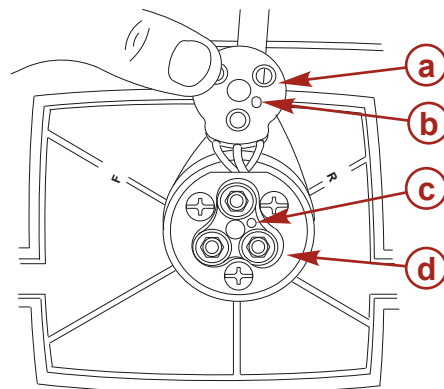
c - Rear cover

Description	Nm	lb. in.	lb. ft.
Rear cover bolt (2)	11.3	100	

36. Install the control handle onto the splined hub of the control shaft. Move the handle back and forth to locate the neutral detent position. Reset the control handle to a vertical position.
37. Position the control handle retainer plate in the center of the control handle. Secure the control handle with the control handle retainer plate to the splined control hub with three self-locking screws. Tighten screws to the specified torque.

Description	Nm	lb. in.	lb. ft.
Self-locking screw (3)	2.8	25	

38. Position the trim wire connector over the trim wire plug so the alignment key is inserted into the hole in the trim wire plug.



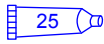
a - Trim wire connector
b - Alignment key

c - Alignment hole

d - Control handle retainer plate

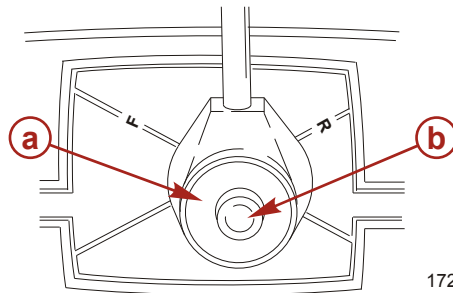
39. Secure the connector to the plug with three phillips head screws. Tighten the screws to the specified torque. Apply Liquid Neoprene onto the trim wire connection.

Description	Nm	lb. in.	lb. ft.
Phillips head screw (3)	1.2	10.5	

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Trim wire connections	92-25711-3

40. Install the neutral warm-up button with the neutral warm-up shaft attached, into the hole in the center of the control hub.

41. Install the control handle cover onto the center of the control handle.



17284

a - Control handle cover

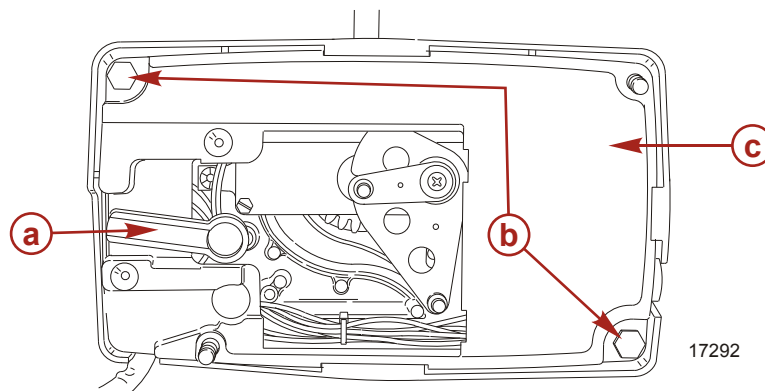
b - Neutral warm-up button

Remote Control Wire Harness and Switches Removal

⚠ CAUTION

Always disconnect the battery cables from the battery before working around electrical system components to prevent injury and damage to the electrical system if a wire should accidentally cause a short circuit.

1. Remove the control cables. Refer to **Removing Control Cables**.
2. Remove the two bolts which secure the back cover to the control housing. Remove the cover from the control housing.



17292

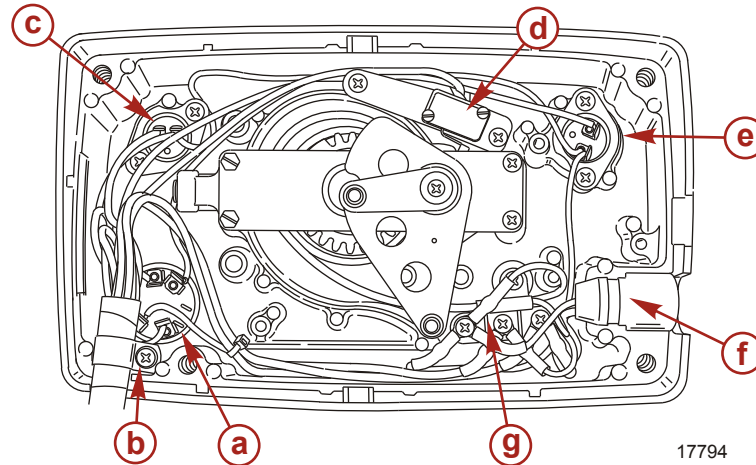
a - Throttle cable anchor guide

c - Rear cover

b - Rear cover bolt (2)

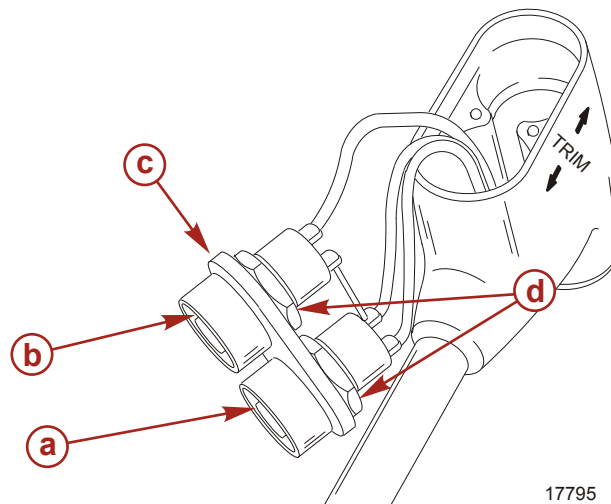
3. Remove the nut securing the ignition key switch to the control housing.
4. Remove the screw and J clamp securing the wiring harness to the control housing.
5. Unsolder the seven wires on the ignition key switch. Remove the ignition key switch.
6. Unsolder the three wires on the choke switch.
7. Remove the two screws securing the choke switch to the control housing. Remove the choke switch.
8. Remove the two screws securing the neutral start safety switch mounting plate to the control housing.

9. Unsolder the two wires on the neutral start safety switch.
10. Remove the two screws and locknuts securing the neutral start safety switch to the mounting plate.
11. Unsolder the three wires on the trailer switch.
12. Remove the two screws securing the trailer switch to the control housing. Remove the trailer switch.



- | | |
|--|----------------------------------|
| a - Ignition key switch | e - Trailer switch |
| b - Screw and J clamp securing wire harness | f - Tachometer receptacle |
| c - Choke switch | g - Terminal block |
| d - Neutral start safety switch | |

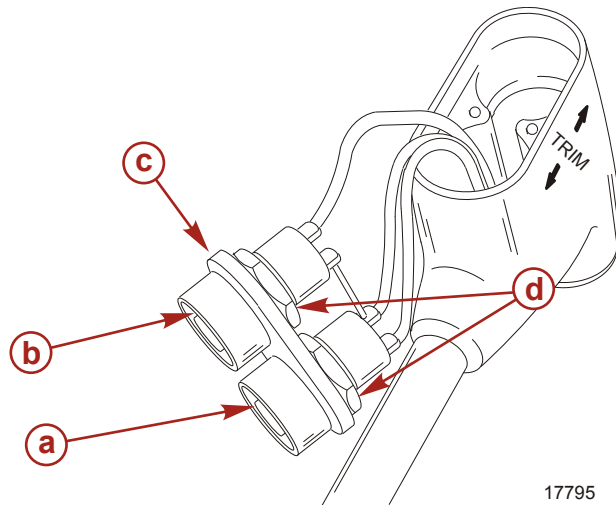
13. Remove the two screws securing the trim up and trim down switches to the control handle.
14. Pull the trim switches out of the control handle.
15. Unsolder the three wires on the trim down switch.
16. Unsolder the two wires on the trim up switch.
17. Remove the two trim switch retaining nuts. Remove the trim switches from the mounting retainer.



- | | |
|-----------------------------|------------------------------|
| a - Trim down switch | c - Mounting retainer |
| b - Trim up switch | d - Nut (2) |

Remote Control Wire Harness and Switches Installation

1. Install the trim switches into the mounting retainer.
2. Secure switches with the two trim switch retaining nuts.
3. Solder the trim wires to the trim switch.
4. After soldering the wires to the trim switches, apply Liquid Neoprene to the solder joints.
5. Secure the trim switches to the control handle with two screws. Tighten the screws securely.



a - Trim down switch
b - Trim up switch

c - Mounting retainer
d - Nut (2)

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Trim switch solder joint	92-25711-3

6. Install the trailer switch to the control housing.
7. Secure the trailer switch to the control housing with a retainer and two screws. Tighten the screws securely.
8. Solder the white wire from the wire harness and the white wire from the tachometer harness onto either trailer switch terminal.
9. Solder the blue wire from the wire harness onto the remaining trailer switch terminal.
10. Apply Liquid Neoprene to the trailer switch solder joints.

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Trailer switch solder joints	92-25711-3

11. Secure the neutral start safety switch to the mounting plate with two screws and locknuts. Tighten the screws and locknuts securely.
12. Position the neutral start safety switch mounting plate in the control housing and secure with two screws. Do not tighten the screws at this time.
13. Solder the yellow wire from the ignition key switch, to the normally closed (NC) terminal on neutral start safety switch.

NOTE: If the yellow wire is not soldered to the correct terminal on the neutral start safety switch, the neutral start safety switch will not operate properly.

14. Solder the yellow wire from the wiring harness to the common terminal (identified "COM") on the neutral start safety switch.

NOTE: If the yellow wire is not soldered to the correct terminal on the neutral start safety switch, the neutral start safety switch will not operate properly.

15. Apply Liquid Neoprene to the neutral start safety switch solder joints.

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch solder joints	92-25711-3

16. Apply a thin coat of Anti-Corrosion Grease to the entire neutral safety switch.

Tube Ref No.	Description	Where Used	Part No.
 94	Anti-Corrosion Grease	Neutral start safety switch	92-802867A1

17. Shift the control into the reverse gear position.

18. Position a 0.025 cm (0.010 in.) feeler gauge between the roller on the neutral start safety switch and the cam on the shift gear.

19. Apply a slight pressure on the neutral start safety switch toward the shift gear on the mounting plate. Tighten the mounting plate screws securely.

20. Install the choke switch into the control housing. Secure the choke switch to the housing with a retainer and two screws. Tighten the screws securely.

21. Solder the white wire from the ignition key switch, and the white wire from the trailer switch, onto one of the terminals on the choke switch.

22. Solder the gray wire from the wiring harness onto the remaining choke switch terminal.

23. Apply Liquid Neoprene to the choke switch solder joint.

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Choke switch solder joint	92-25711-3

24. Position the ignition key switch into the control housing so the terminal marked "E" is toward the choke switch.

25. Secure the ignition key switch to the control housing with a nut. Tighten the nut securely.

26. Solder the black wire from the wire harness and the black wire from the tachometer harness, onto the ignition key switch terminal marked "D".

27. Solder the red wire from the wire harness onto the ignition key switch terminal marked "A".

28. Solder the orange wire from the wire harness to the ignition key switch terminal marked "E".

29. Solder the yellow wire from the neutral start safety switch normally closed (identified "NC") terminal, to the ignition key switch terminal marked "B".

30. Solder the whiter wire from the wire harness and the white wire from the choke switch, to the ignition key switch terminal marked "F".

31. Apply Liquid Neoprene to all the ignition key switch solder joints.

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Ignition key switch solder joints	92-25711-3

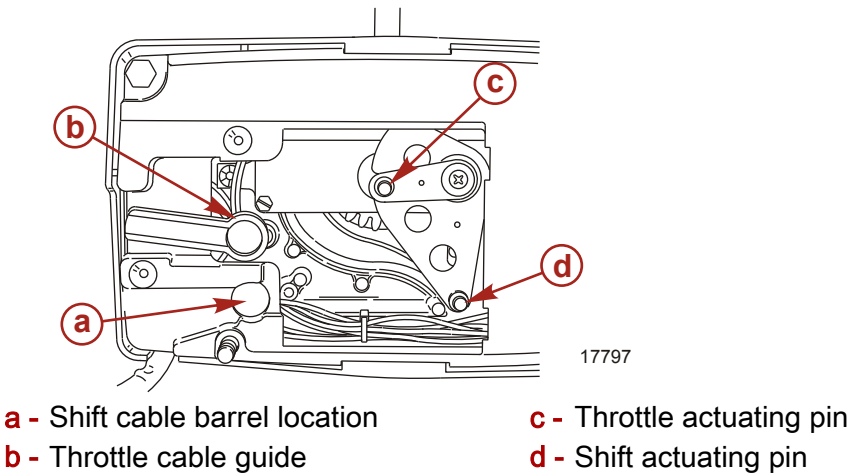
32. Secure the wire harness to control housing with a J clamp, flat washer and screw. Tighten the screw securely.

33. Install the back cover onto the control housing. Secure back cover to the housing with two bolts. Tighten the back cover bolts to the specified torque.

Description	Nm	lb. in.	lb. ft.
Back cover bolt (2)	11.3	100	

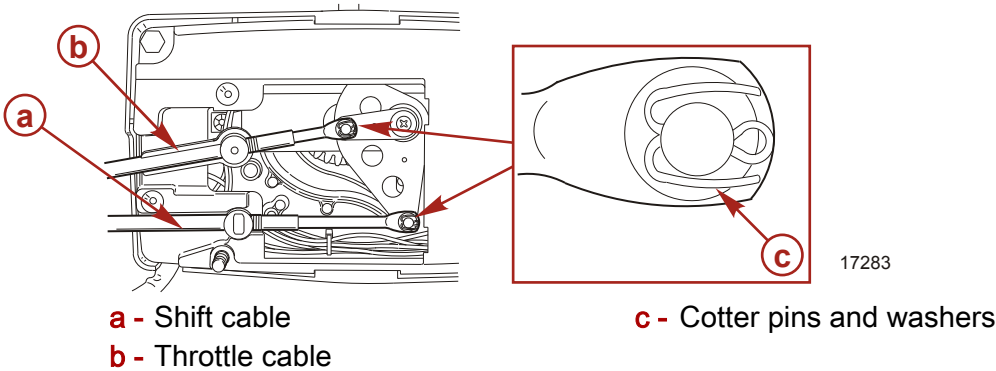
Installing Control Cables

- 1. Ensure the control handle is in the neutral position.
- 2. Ensure the throttle cable guide is installed into the control housing.
- 3. Pull the ends of the control cables out of the cable housing to the end of the cable travel.
- 4. Apply a light coat of 2-4-C with Teflon onto the extended portion of the control cables.
- 5. Apply a light coat of 2-4-C with Teflon onto the shift actuating pin and the throttle actuating pin.

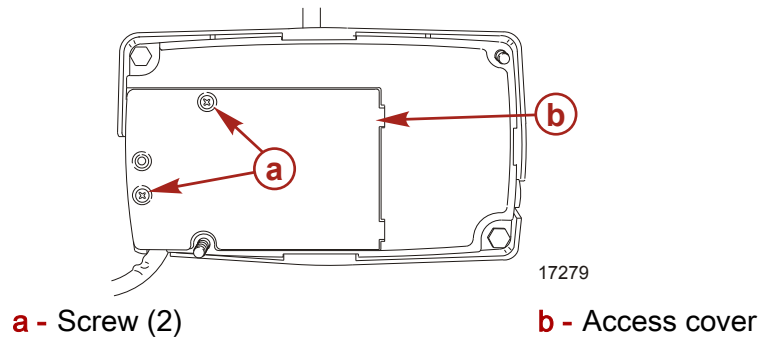


Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Extended portion of the control cables, shift and throttle actuating pin	92-802859A1

- 6. Install the shift cable onto the shift actuating pin and the shift cable barrel retainer.
- 7. Secure the shift cable to the shift actuating pin with a cotter pin. Bend the end of the cotter pin to retain the shift cable onto the shift actuating pin.
- 8. Install the throttle cable onto the throttle actuating pin and the throttle cable guide.
- 9. Secure the throttle cable to the throttle actuating pin with a cotter pin. Bend the end of the cotter pin to retain the throttle cable onto the throttle actuating pin.



10. Install the access cover and secure with two screws.



Notes:

Side Mount Control

Section 3B - Side Mount Mercury MerCruiser 55722A2 (215E), 63063A1 (225 II-TR and 255 II-TR) Electric Remote Control

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Lubricant, Sealant, Adhesives

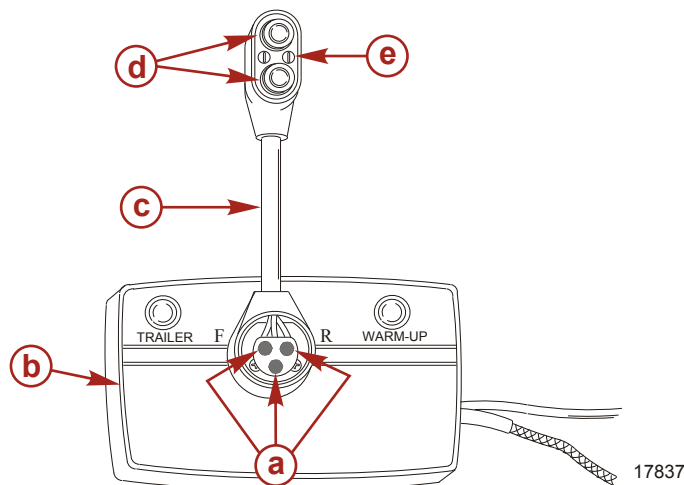
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle retaining screw threads	92-809819
 25	Liquid Neoprene	Trim switch solder joint	92-25711-3
 95	2-4-C with Teflon	Large bushing, and plate without holes	92-802859A1
		Small washer, and small bushing	
		Detent pin	

Side Mount Mercury MerCruiser 55722A2 (215E), 63063A1 (225 II-TR and 255 II-TR) Electric Remote Control Disassembly

⚠ CAUTION

Always disconnect the battery cables from the battery before working around electrical system components to prevent injury and damage to the electrical system if a wire should accidentally cause a short circuit.

1. Ensure the control handle is in the neutral position. Remove the handle cover.
2. Remove the three allen head screws securing the plate to the control handle. Remove the plate.
3. Remove the three screws securing the control handle to the control housing assembly.
4. Scribe an alignment mark on the lever and shaft. Pull the control handle off.

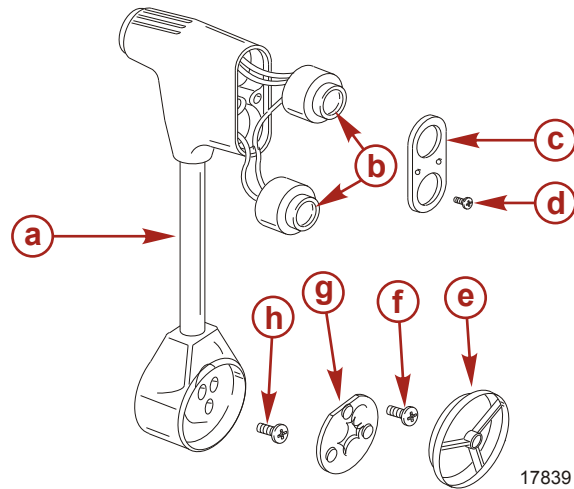


a - Allen head screws (3)
b - Control housing cover
c - Control handle

d - Trim switch (2)
e - Screw securing trim switches (2)

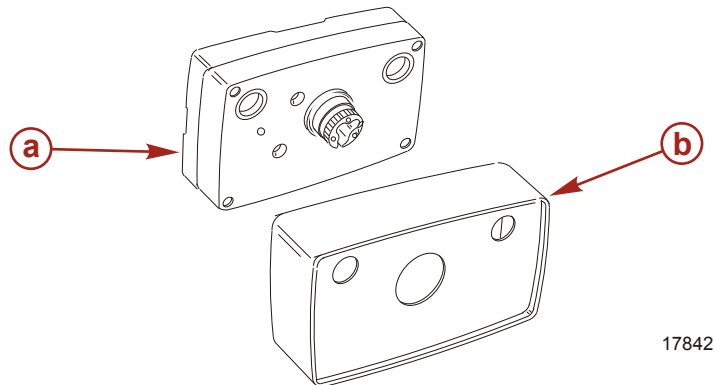
5. Remove the two screws securing the trim switch retainer to the control handle.
6. Pull the trim switches and switch retainer out of the control handle.

7. Unsolder the trim switches if replacement of the trim switches are required.



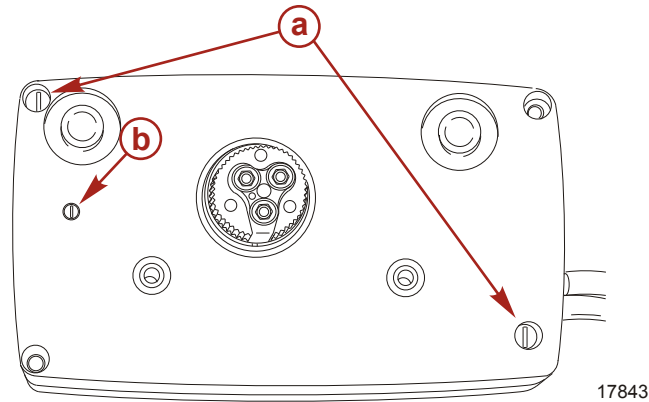
- | | |
|---|-------------------------------------|
| a - Control handle | e - Control handle cover |
| b - Trim switch (2) | f - Screw (3) |
| c - Trim switch retainer | g - Plate |
| d - Trim switch retainer screw (2) | h - Control handle screw (2) |

8. Carefully pry the control housing cover from the control housing assembly.



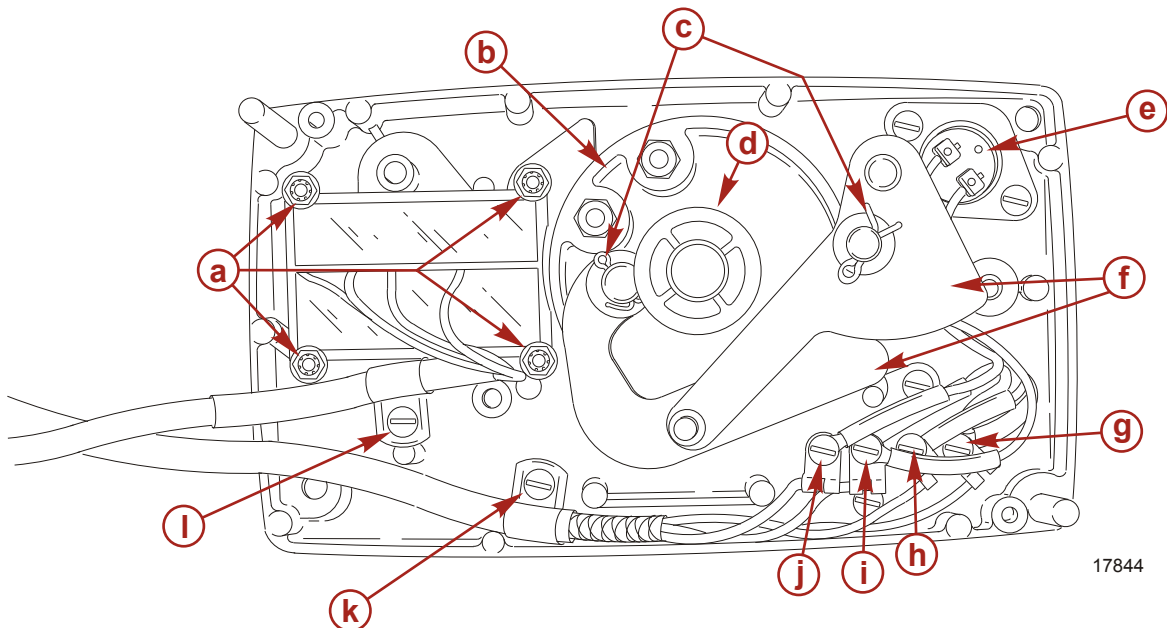
- | | |
|-----------------------------------|---|
| a - Remote control housing | b - Remote control housing cover |
|-----------------------------------|---|

9. Remove the two screws securing the control housing halves together. Separate the control housing halves.



- | |
|---|
| a - Screws securing control housing halves (2) |
| b - Throttle friction adjustment screw |

- 10. Remove the two cotter pins securing the throttle levers. Remove the throttle levers.
- 11. Remove the wires from the terminal block.
- 12. Remove the four locknuts and washers securing the shift switch assembly.
- 13. Remove the shift switch assembly and the throttle cam assembly simultaneously.
- 14. Remove the screws securing the throttle cam together.
- 15. Remove the two screws securing the trailer switch retainer plate to the control housing half. Remove the trailer switch.
- 16. Unsolder the trailer switch if replacement of the trailer switch is required.
- 17. Remove the screw securing the trim harness to the control housing half. Remove the trim harness.



- a** - Locknuts and washers securing shift switch assembly (4)

b - Throttle cam assembly

c - Cotter pin (2)

d - Spacer on cam

e - Trailer switch

f - Throttle levers
- g** - Green wire

h - Purple wire

i - Red wire

j - Blue wire

k - Screw and clip securing trim harness

l - Screw and clip securing shift harness

Side Mount Mercury MerCruiser 55722A2 (215E), 63063A1 (225 II-TR and 255 II-TR) Electric Remote Control Assembly

- 1. Lubricate the large bushing and the plate without holes with 2-4-C with Teflon. Install the large bushing and plate onto the control housing half.

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Large bushing, and plate without holes	92-802859A1

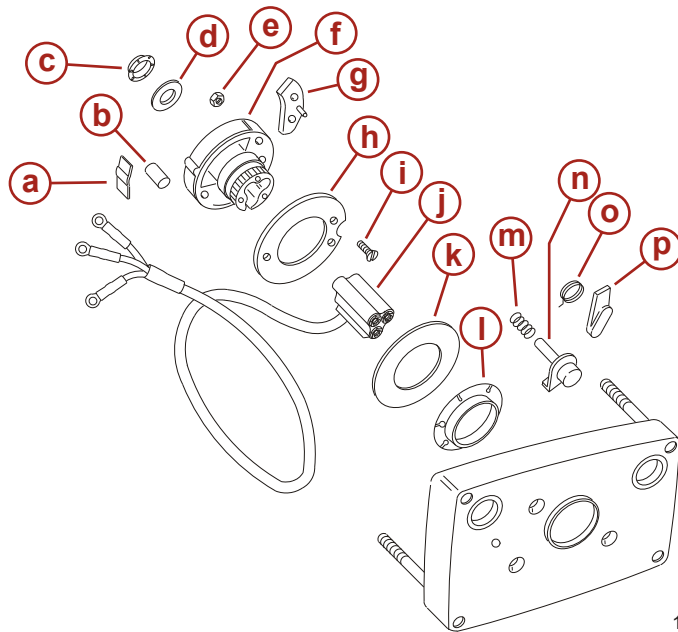
- 2. Install the trim disconnect harness, plate with holes, and the insert to the cam. Secure the plate with holes, and the insert to the cam with three screws and nuts. Tighten the screws and nuts securely.

3. Install the throttle only button, throttle only spring, lever, and lever spring to the control housing.
4. Install the cam assembly to the control housing.
5. Lubricate the small washer and small bushing with 2-4-C with Teflon.

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Small washer, and small bushing	92-802859A1

6. Install the small washer onto the cam assembly. Install the small bushing on top of the small washer.
7. Install the detent spring and detent pin onto the control housing. Lubricate the detent pin with 2-4-C with Teflon.

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Detent pin	92-802859A1

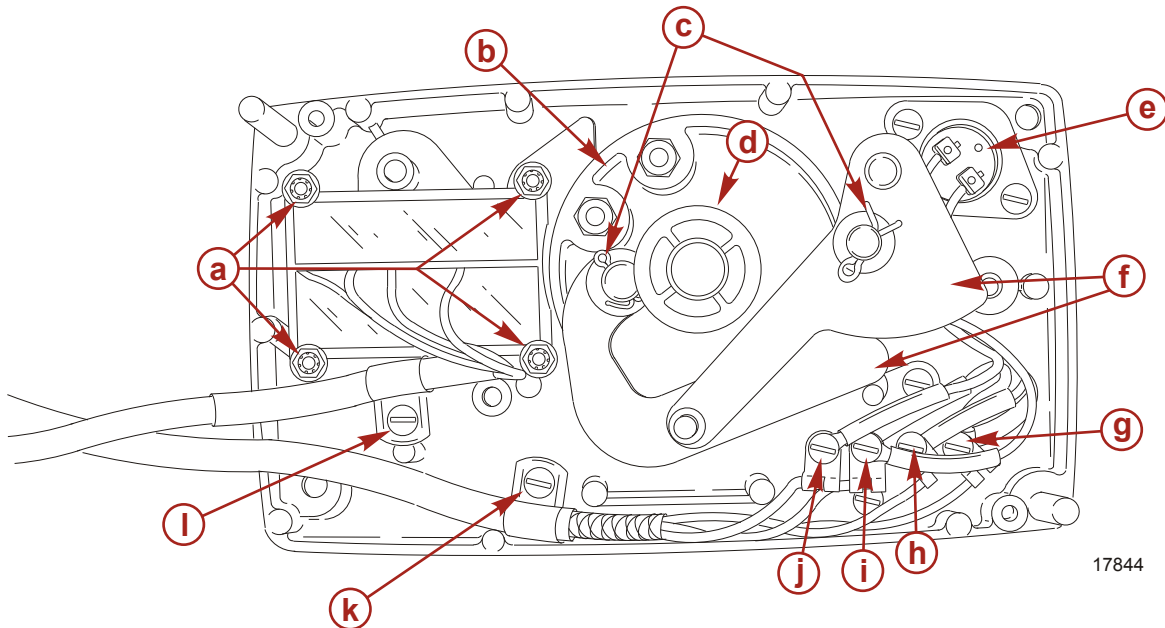


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- | | |
|--------------------------|------------------------------------|
| a - Detent spring | i - Screw (3) |
| b - Detent pin | j - Trim disconnect harness |
| c - Small bushing | k - Plate without holes |
| d - Small washer | l - Bushing |
| e - Nut (3) | m - Throttle only spring |
| f - Cam | n - Neutral warm-up button |
| g - Insert | o - Lever spring |
| h - Plate | p - Lever |

8. Install the shift switch assembly to the housing with four washers and nuts. Tighten the nuts securely.
9. Secure the shift switch harness to the housing with a clip, D washer, and screw. Tighten the screw securely.
10. Install the trailer switch to the housing. Secure the trailer switch to the housing with a retainer, and two screws. Tighten the screws securely.

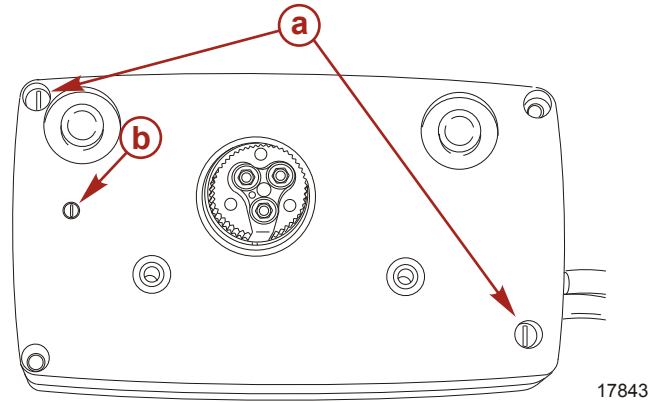
11. Install the throttle levers to the control housing assembly. Retain the throttle levers with washers and cotter pins. Secure the throttle levers by bending the ends of the cotter pins.
12. Connect the trailer switch wires, trim disconnect harness, and the trim harness leads to the terminal block. Secure the trim wires with screws. Tighten the screws securely
13. Secure the trim harness with a clip, D washer and screw. Tighten the screw securely.
14. Install the spacer onto the cam.



- | | |
|--|--|
| a - Locknuts and washers securing shift switch assembly (4) | g - Green wire |
| b - Throttle cam assembly | h - Purple wire |
| c - Cotter pin (2) | i - Red wire |
| d - Spacer on cam | j - Blue wire |
| e - Trailer switch | k - Screw and clip securing trim harness |
| f - Throttle levers | l - Screw and clip securing shift harness |

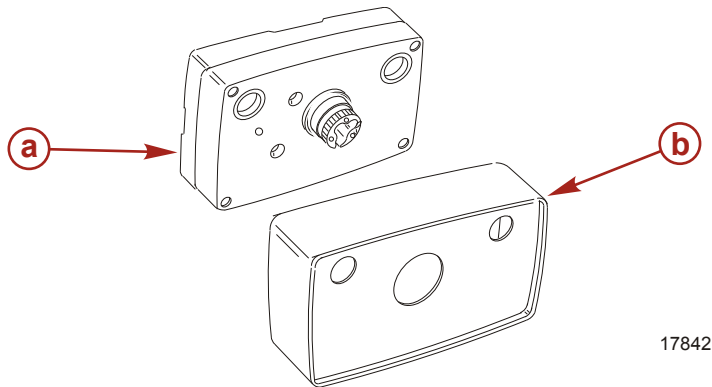
15. Install the back control housing half to the half with the components installed.

16. Secure the control housing halves together with two screws. Tighten the screws securely.



- a** - Screws securing control housing halves (2)
b - Throttle friction adjustment screw

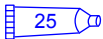
17. Snap the remote control housing cover onto the remote control housing.



- a** - Remote control housing
b - Remote control housing cover

18. Solder the trim wires to the trim switch.

19. After soldering the wires to the trim switches, apply Liquid Neoprene to the solder joints.

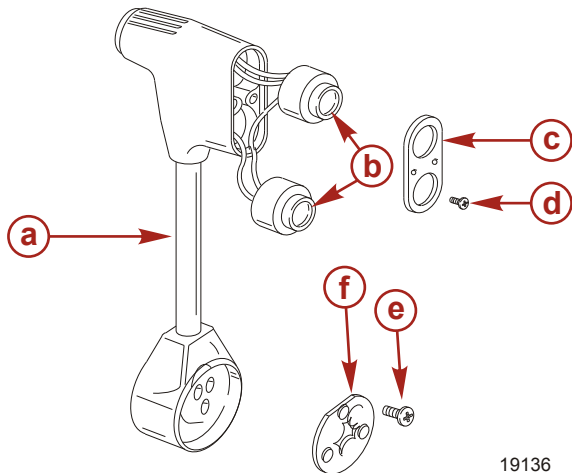
Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Trim switch solder joint	92-25711-3

20. Secure the trim switches to the control handle with a retainer and two screws. Tighten the screws securely.

21. Install the control handle to the control housing assembly. Ensure the control handle is in the neutral position.

22. Apply Loctite 271 Threadlocker to the threads of the three screws.

23. Secure the control handle the to control housing shaft with a plate and three screws. Tighten the screws to the specified torque.

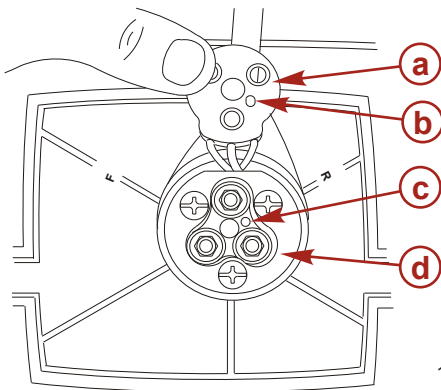


- a** - Control handle
- b** - Trim switch (2)
- c** - Trim switch retainer
- d** - Trim switch retainer screw (2)
- e** - Screw (3)
- f** - Plate

Description	Nm	lb. in.	lb. ft.
Screw (3)	2.8	25	

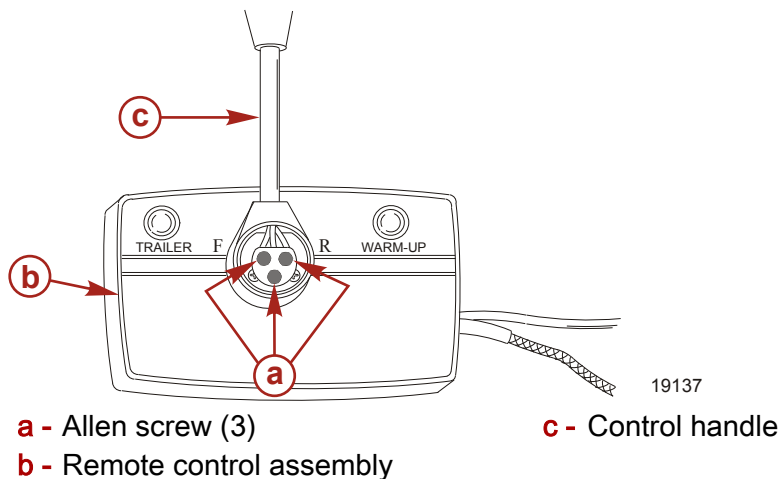
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle retaining screw threads	92-809819

24. Align the trim wire connector key with the alignment hole on the control handle retainer plate.



- a** - Trim wire connector
- b** - Alignment key
- c** - Alignment hole
- d** - Control handle retainer plate

25. Secure the trim wire connector with three allen screws. Tighten the allen screws securely.



26. Install the control handle cover.

Notes:

Side Mount Control

Section 3C - Side Mount Mercury MerCruiser 55722A2, 63063A1 Electric Remote Control Electrical Tests

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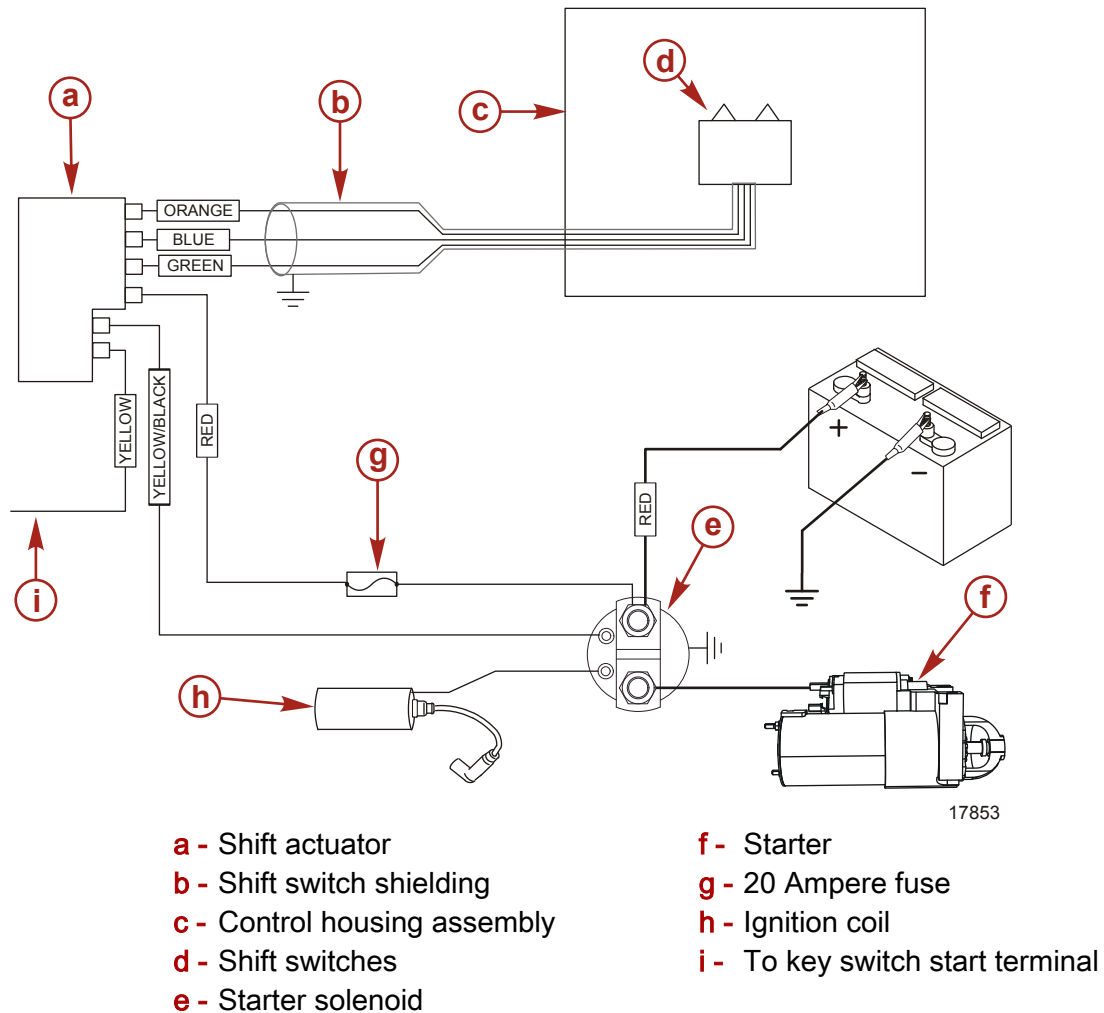
3
C

Remote Control Electrical Test Procedure For 55722A2

Disconnect the battery before performing the following checks.

1. Disconnect the shift harness from the shift actuator.
2. Connect an ohmmeter between the green wire, and ground.
3. Shift the control handle to neutral.
4. The ohmmeter should indicate open circuit.
5. If the ohmmeter indicates a closed circuit, the shift switch or the harness has a short.
6. Shift the control handle to forward.
7. The ohmmeter should indicate a closed circuit.
8. If the ohmmeter indicates an open circuit, the cam follower is stuck, or the shift switch harness has an open circuit.
9. Connect the ohmmeter between the blue wire and ground.
10. Shift the control handle to neutral.
11. The ohmmeter should indicate an open circuit.
12. If the ohmmeter indicates a closed circuit, the cam follower is stuck, or the shift switch harness has a short.
13. Shift the control handle to forward.
14. The ohmmeter should indicate an open circuit.
15. If the ohmmeter indicates a closed circuit, the cam follower is stuck, or the shift switch harness has a short.
16. Shift the control handle to reverse.
17. The ohmmeter should indicate a closed circuit.
18. If the ohmmeter indicates an open circuit, the shift switch or the harness has an open circuit.
19. Connect the shift harness to the actuator box and the actuator box to the battery. Reconnect the battery cables.
20. Connect a voltmeter between the orange terminal and ground.
21. With the control handle in neutral, the voltmeter should read zero.

22. If the voltmeter reads above zero, the switch is defective.



Remote Control Electrical Test Procedure For 63063A1

Disconnect the battery before performing the following checks.

1. Disconnect the control shift harness white lead at the instrumentation, and the control shift harness leads from the shift motor.
2. Connect the ohmmeter between the remote control white lead and the metal of the control box (ground).
3. Ensure the control handle is in neutral. The ohmmeter should indicate no continuity.
4. Shift the control handle into forward. The ohmmeter should indicate no continuity.
5. Shift the control handle into reverse. The ohmmeter should indicate no continuity.
6. If the ohmmeter indicates high resistance or continuity, the shift switches or the shift switch harness is grounded.
7. Connect the ohmmeter between the remote control white lead and blue lead.
8. Shift the control handle into neutral.
9. The ohmmeter should indicate no continuity.
10. Shift the control handle into forward.
11. The ohmmeter should indicate no continuity.
12. Shift the control handle into reverse.

13. The ohmmeter should indicate continuity.
14. Connect the ohmmeter between the remote control white lead and orange lead.
15. Shift the control handle into neutral.
16. The ohmmeter should indicate continuity.
17. Shift the control handle into forward.
18. The ohmmeter should indicate no continuity.
19. Shift the control handle into reverse.
20. The ohmmeter should indicate no continuity.
21. Connect ohmmeter between the remote control white lead and green lead.
22. Shift the control handle into neutral.
23. The ohmmeter should indicate no continuity.
24. Shift the control handle into forward.
25. The ohmmeter should indicate continuity.
26. Shift the control handle into reverse.
27. The ohmmeter should indicate no continuity.

MerControl 63064A1 (Only)

1. Push in the warm-up button, and move the control handle to the full forward position. The button must stay engaged.
2. Connect the ohmmeter to the remote control white lead, and the other ohmmeter lead alternately to the blue, orange, and green wires. The ohmmeter should indicate no continuity.
3. With one meter lead still on the remote control white lead, connect the other ohmmeter lead to the metal of the control box (ground). The ohmmeter should indicate no continuity.

Commander Controls

Section 4A - Commander Panel Mount Controls

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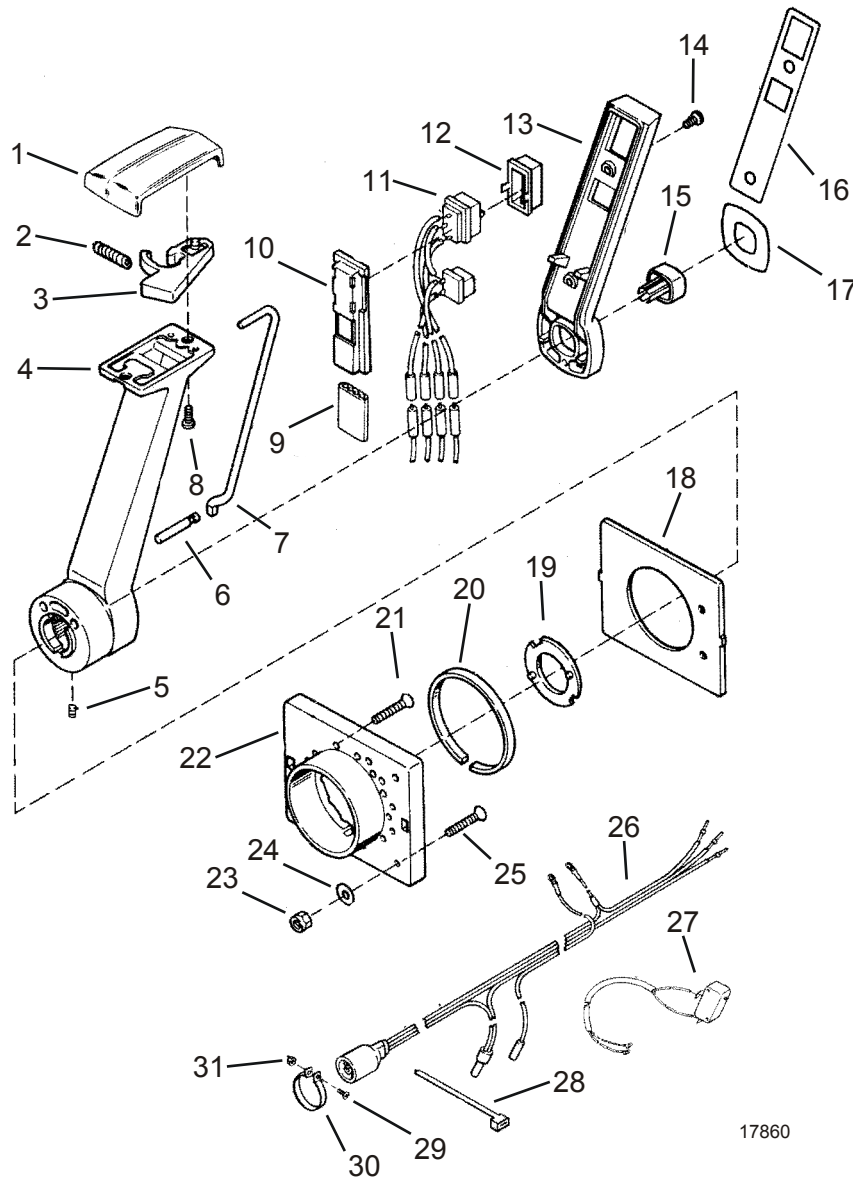
Commander Classic Panel Mount Control Bezel and Handle Components.....	4A-4	Commander Control Module Disassembly	4A-9
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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
	2-4-C with Teflon	Stepped washer, throttle-only shaft, and barrel	92-802859A1
		Throttle-only shaft pin, shift gear ball	
		Shift gear pin, shift gear, shift pinion gear, and bushing	
		Recess of control module housing; control shaft bushing	
		Areas of the control module housing outlined in light gray	
		Control module housing, shift gear ball/nylon plug and spring	
		Throttle link assembly	
		Control module assembly back cover	
		Throttle and shift cable ends	
		Neutral lock ring	

Notes:

Commander Classic Panel Mount Control Bezel and Handle Components

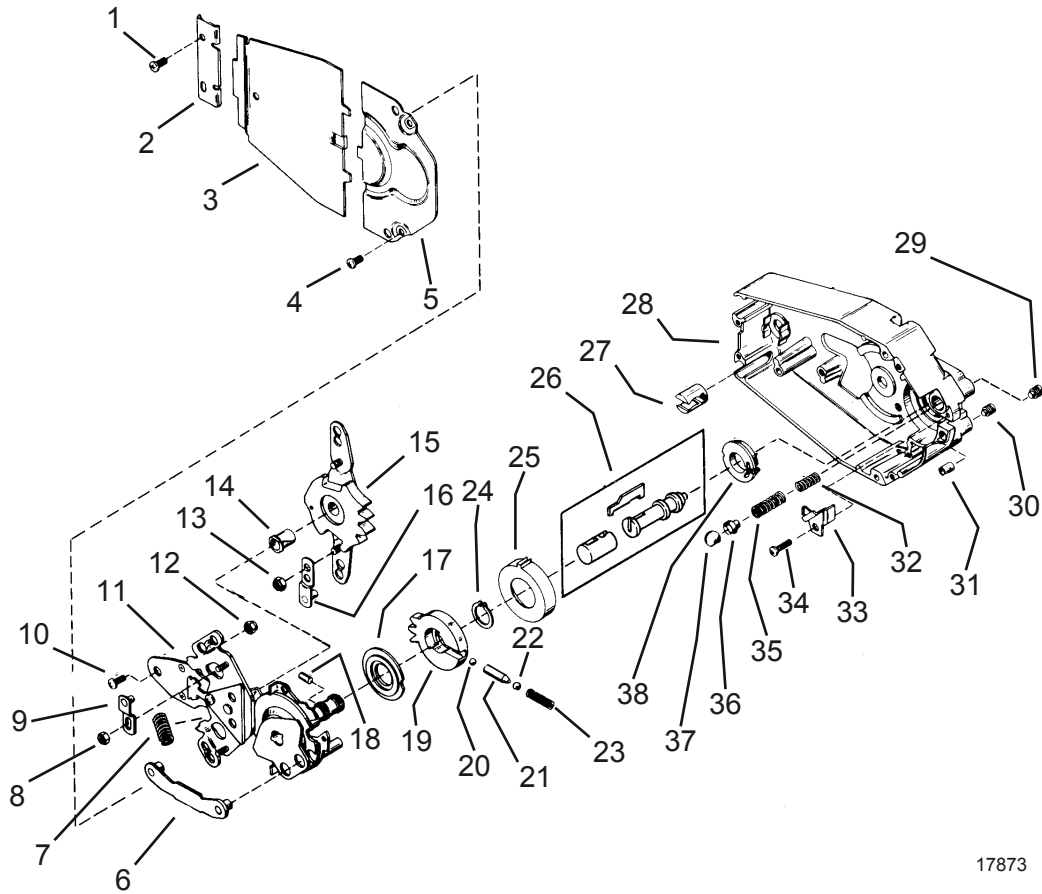


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Commander Classic Panel Mount Control Bezel and Handle Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Control handle cap			
2	1	Control handle tension spring			
3	1	Trigger			
4	1	Control handle			
5	1	Control handle set screw	8	71	
6	1	Lock pin			
7	1	Lock rod			
8	2	Control handle cap screw			
9	1	Wire harness retainer			
10	1	Switch assembly retainer			
11	1	Trim switch assembly			
12	1	Trim button retainer			
13	1	Control handle cover			
14	2	Control handle cover screw	3.4	30	
15	1	Throttle-only button			
16	1	Upper control handle decal			
17	1	Lower control handle decal			
18	1	Bezel cover			
19	1	Neutral lock ring			
20	1	Bezel bushing			
21	4	Bezel screw	7	60	
22	1	Panel mount bezel			
23	4	Nut			
24	4	Washer			
25	4	Screw	7	60	
26	1	Trim control wire harness			
27	1	Neutral start switch assembly			
28	1	Cable tie			
29	1	Trim control wire harness clip screw			
30	1	Trim control wire harness clip			
31	1	Trim control wire harness clip nut			

Control Housing Module Components



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Control Housing Module Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Retainer attaching screw	7	60	
2	1	Cable retainer			
3	1	Access cover			
4	2	Back cover attaching screw	7	60	
5	1	Back cover			
6	1	Throttle link assembly			
7	1	Throttle lever compression spring			
8	1	Throttle cable fastener nut			
9	1	Throttle cable fastener			
10	3	Bearing plate assembly screw			
11	1	Bearing plate assembly			
12	2	Neutral start switch nut			
13	1	Shift cable fastener nut			
14	1	Shift pinion bearing			
15	1	Shift lever assembly			
16	1	Shift cable fastener			
17	1	Shift gear stepped washer			
18	1	Throttle-only shaft pin			
19	1	Shift gear			
20	1	Inner shift gear ball			
21	1	Shift gear pin			
22	1	Outer shift gear ball			
23	1	Shift gear spring			
24	1	Bearing plate retainer			
25	1	Trim wire harness retainer			
26	1	Throttle-only shaft assembly			
27	2	Control housing grommet			
28	1	Control housing			
29	1	Throttle friction screw			
30	1	Shift detent friction screw			
31	1	Friction pad			
32	1	Outer detent compression spring			
33	1	Trim wire harness retainer			
34	1	Trim wire harness retainer screw			
35	1	Spring			
36	1	Throttle-only plug			
37	1	Throttle-only ball (early models)			
38	1	Control shaft bushing			

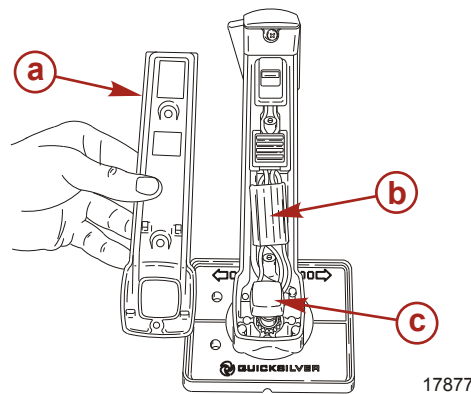
Commander Classic Panel Mount Control

Panel Mount Control Handle and Bezel Removal

⚠ CAUTION

Always disconnect the battery cables from the battery before working around electrical system components to prevent injury and damage to the electrical system if a wire should accidentally cause a short circuit.

1. Disconnect the remote control power trim wire harness from the trim pump harness.
2. Disconnect the remote control neutral start switch leads.
3. Ensure the control handle is in the neutral detent position.
4. Remove the two screws securing the control handle cover, and trim buttons to the control handle.
5. Lift the control handle cover off the control handle.
6. Unsnap, and remove the trim wire harness retainer.
7. Unplug the trim wires from the trim switches in the control handle. Remove the trim switches.
8. Pull the throttle-only button off the throttle-only shaft.

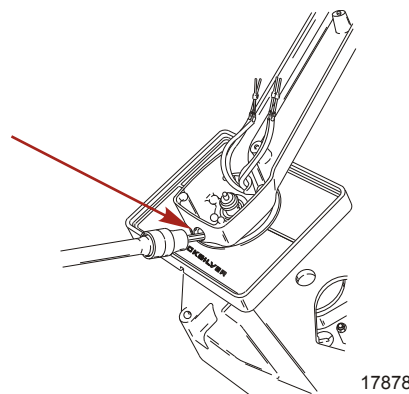


a - Control handle cover

b - Trim wire harness retainer

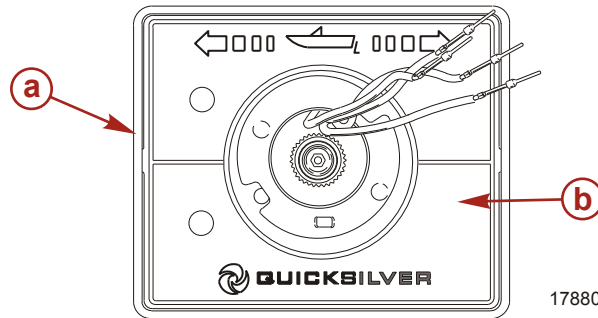
c - Throttle-only button

9. Loosen the control handle set screw several turns to allow removal of the control handle. Remove the control handle from the control shaft.



10. Straighten the trim wires so they protrude straight-out from the control handle hub.

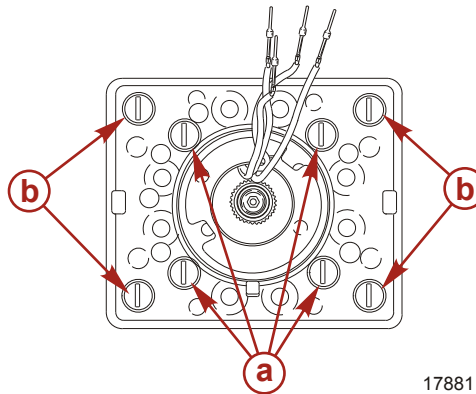
11. Unsnap the bezel cover from the panel mount bezel.



a - Panel mount bezel

b - Bezel cover

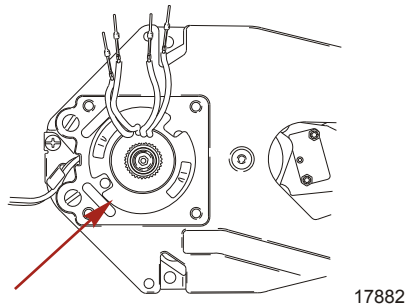
12. Remove the four screws securing the panel mount bezel to the control module housing assembly.



a - Screws securing the panel mount bezel to the control module housing assembly

b - Screws securing the panel mount bezel to the panel

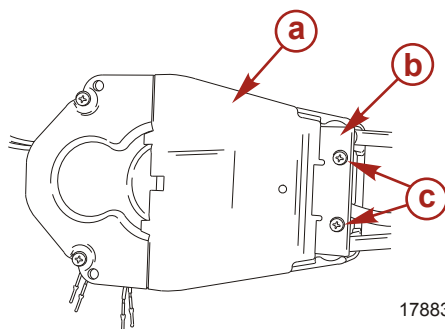
13. Remove the neutral lock ring from the module.



Commander Control Module Disassembly

1. Remove the two screws securing the cable retainer to the control housing. Retain the two screws for reassembly.

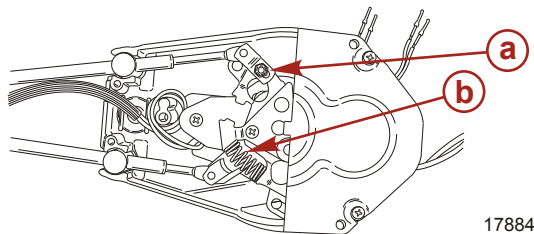
2. Remove the cable retainer, and the access cover from the housing.



a - Access cover
b - Cable retainer

c - Cable retainer screws

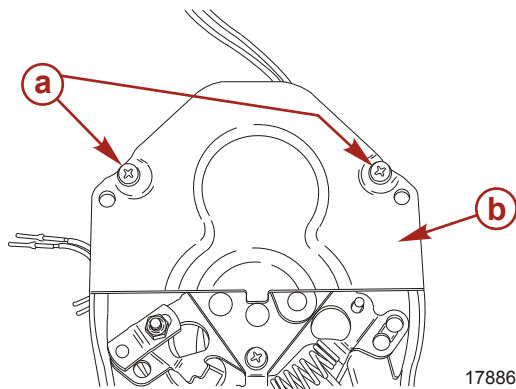
3. Loosen the nuts securing the shift and throttle cables to the remote control housing.



a - Nut securing the throttle cable

b - Nut securing the shift cable (hidden under the spring)

4. Remove the two screws securing the back cover to the control module assembly.
Remove the back cover from the control module assembly.

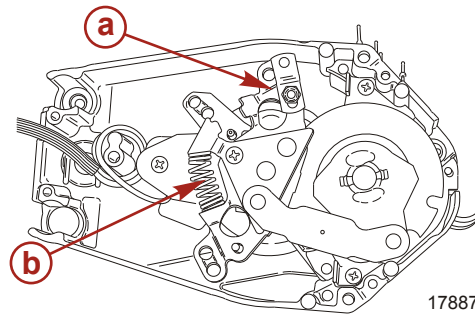


a - Screws securing the back cover (2)

b - Back cover

5. Temporarily install the control handle onto the splined control shaft.
6. Position the control handle into full forward. Remove the control handle.

7. Remove the throttle lever compression spring from the throttle lever.



a - Throttle lever

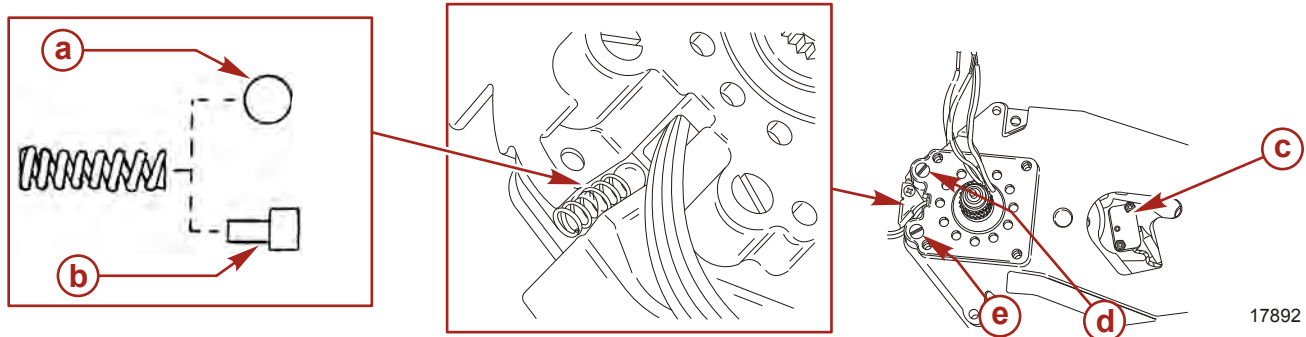
b - Throttle lever compression spring

8. Thread the shift detent adjustment screw and the control handle friction screw out until they are flush with the control module casting.

NOTE: It is not necessary to remove the shift detent adjustment screw or the control handle friction screw, unless replacement of the screws is required.

9. Remove the two locknuts securing the neutral start safety switch to the bearing plate assembly. Pull the neutral start safety switch away from the bearing plate assembly.
10. Remove the screw securing the retaining clip to the control module. Remove the retaining clip, gear shift spring, and throttle-only plug from the control module.

NOTE: Early models will have a throttle-only ball bearing instead of a throttle-only plug.



a - Throttle-only ball bearing (early models)

b - Throttle-only plug

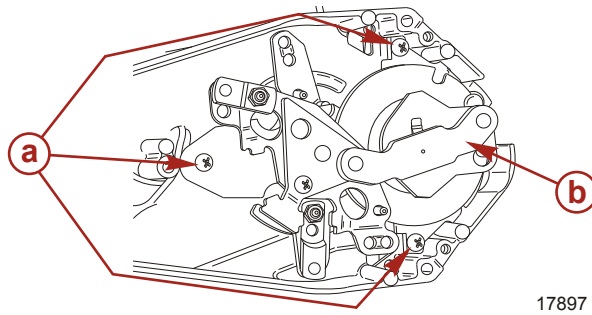
c - Neutral start safety switch

d - Detent adjustment screw

e - Control handle friction adjustment screw

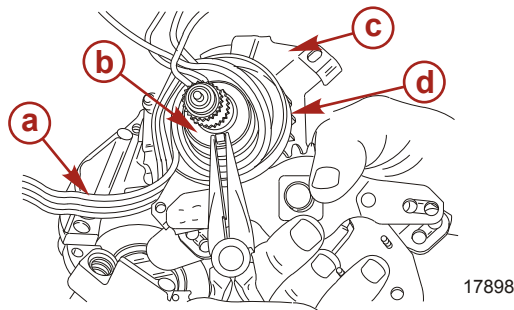
11. Temporarily install the control handle onto the splined control shaft.
12. Ensure the control module housing assembly is in the neutral detent position. Remove the control handle.
13. Pull the throttle link off the module.

14. Remove the three screws securing the bearing plate assembly to the control module housing.



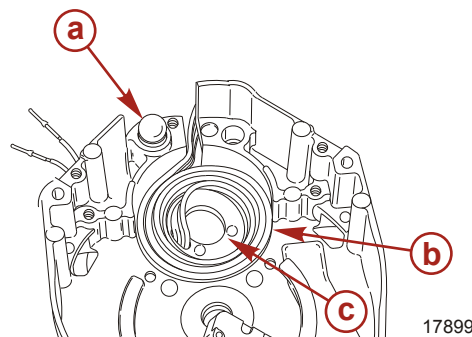
- a** - Screws securing the bearing plate assembly (3)
b - Throttle link

15. Lift the bearing plate assembly out of the control module housing.
16. Remove the trim wires, trim wire retainer, and the control shaft bushing from the bearing plate assembly.



- a** - Trim wires
b - Control shaft bushing
c - Bearing plate assembly
d - Trim wire retainer

17. If the trim wires, trim wire retainer, and the control shaft bushing remained in the control module housing, remove the trim wires, trim wire retainer, and the control shaft bushing from the control module housing.
18. Remove the detent ball, detent ball follower, and two compression springs located beneath the detent ball follower.

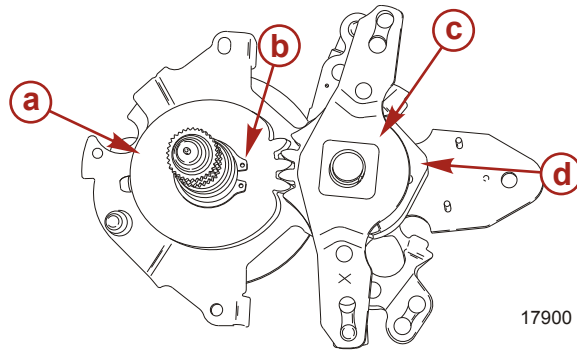


- a** - Detent ball, detent ball follower, and two compression springs
b - Trim wire retainer
c - Control shaft bushing

19. Lift the shift pinion gear with the attached shift lever from the bearing plate.

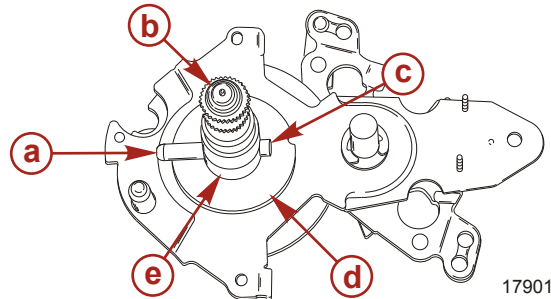
NOTE: The shift lever is pressed onto the shift pinion gear. If the shift lever or shift pinion gear is damaged, replace as an assembly.

20. Remove the bearing plate retainer securing the shift gear to the control shaft. Remove the shift gear from control shaft.
21. Remove the shift lever from the bearing plate assembly.



- | | |
|-----------------------------------|------------------------------|
| a - Shift gear | c - Shift lever |
| b - Bearing plate retainer | d - Shift pinion gear |

22. Remove the shift gear pin, inner shift gear ball, throttle-only shaft pin, and the throttle-only shaft from the control shaft.

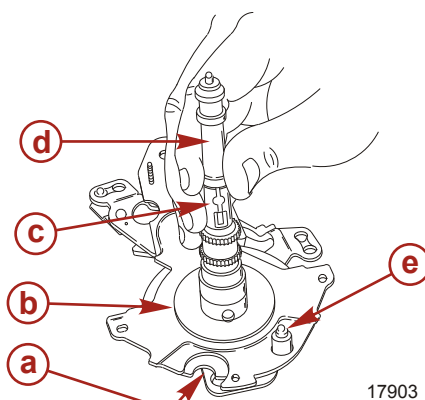


- | | |
|------------------------------------|---|
| a - Shift gear pin | d - Stepped washer |
| b - Throttle-only shaft | e - Inner shift gear ball (hidden) |
| c - Throttle-only shaft pin | |

Commander Control Module Assembly

1. Apply 2-4-C with Teflon onto the stepped washer, and install the stepped washer over the control shaft. The steps of the washer should be against the bearing plate.
2. Rotate the control shaft until the neutral detent notch is at the position shown.
3. Apply 2-4-C with Teflon onto the throttle-only shaft and barrel. Install the throttle-only shaft onto the barrel.

4. Install the throttle-only shaft and barrel assembly into the control shaft. The wide slot in the barrel must be on the same side as the neutral detent notch and control handle friction pad.



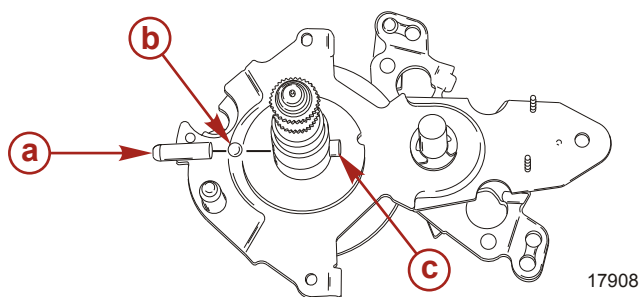
- a - Neutral detent notch
- b - Stepped washer
- c - Wide slot on barrel
- d - Throttle-only shaft
- e - Control handle friction pad

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Stepped washer, throttle-only shaft, and barrel	92-802859A1

5. Apply 2-4-C with Teflon onto the throttle-only shaft. Insert the throttle-only shaft pin into the control shaft and the hole in the barrel.

NOTE: The throttle-only shaft pin is properly installed when the throttle-only shaft cannot be removed.

6. Apply 2-4-C with Teflon onto the smallest of the three balls removed during the disassembly process.
7. Insert the shift gear ball into the control shaft and the hole in the barrel.
8. Apply 2-4-C with Teflon onto the shift gear pin and insert the shift gear pin into the control shaft. The rounded end of the shift gear pin should be facing away from the control shaft.

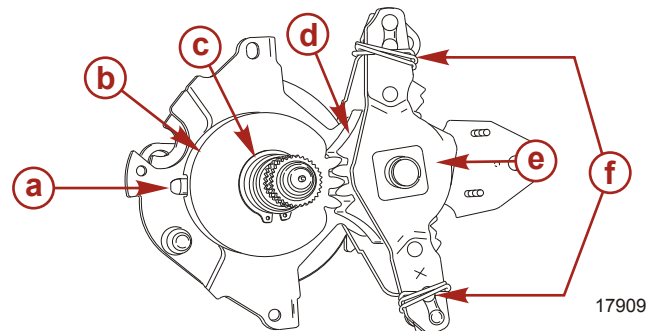


- a - Shift gear pin
- b - Shift gear ball
- c - Throttle-only shaft pin

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle-only shaft pin, shift gear ball	92-802859A1

9. Apply 2-4-C with Teflon onto the entire shift gear.

10. Install the shift gear onto the control shaft and secure in place with the bearing plate retainer.
11. Apply 2-4-C with Teflon onto the entire shift pinion gear and bushing.
12. Install the bushing into the gear, and the gear onto the bearing plate.
13. Use two rubber bands to hold the shift pinion gear in place on the bearing plate.

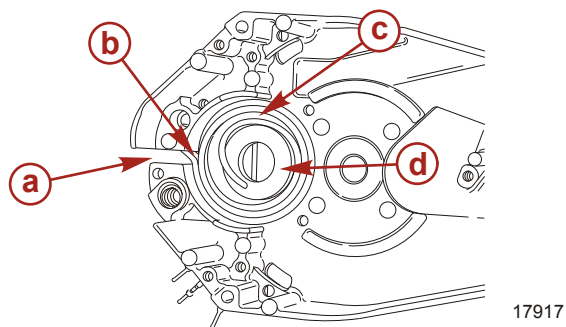


- a - Shift gear pin
- b - Shift gear
- c - Bearing plate retainer
- d - Shift pinion gear and bushing
- e - Shift lever
- f - Rubber bands

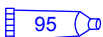
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Shift gear pin, shift gear, shift pinion gear, and bushing	92-802859A1

14. Apply 2-4-C with Teflon into the recess of the control module housing where the trim harness will be positioned.
15. Insert the end of the trim harness through the control shaft bushing.
16. Apply 2-4-C with Teflon onto the entire control shaft bushing. Install the control shaft bushing into the control module housing.
17. Coil the trim harness inside of the control module housing in a clockwise direction.

IMPORTANT: The black line that is across the trim harness must be positioned at the control module housing slot.

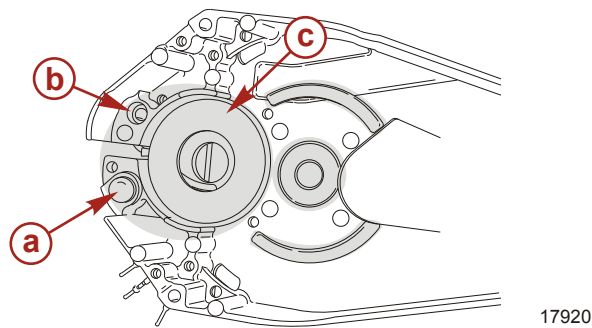


- a - Control module housing slot
- b - Black line across the trim harness
- c - Trim harness
- d - Control shaft bushing

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Recess of control module housing; control shaft bushing	92-802859A1

18. Install the two detent springs, follower, and detent ball into the control module housing.

- 19. Install the trim harness retainer over the trim harness.
- 20. Apply 2-4-C with Teflon onto the areas of the control module housing outlined in light gray.

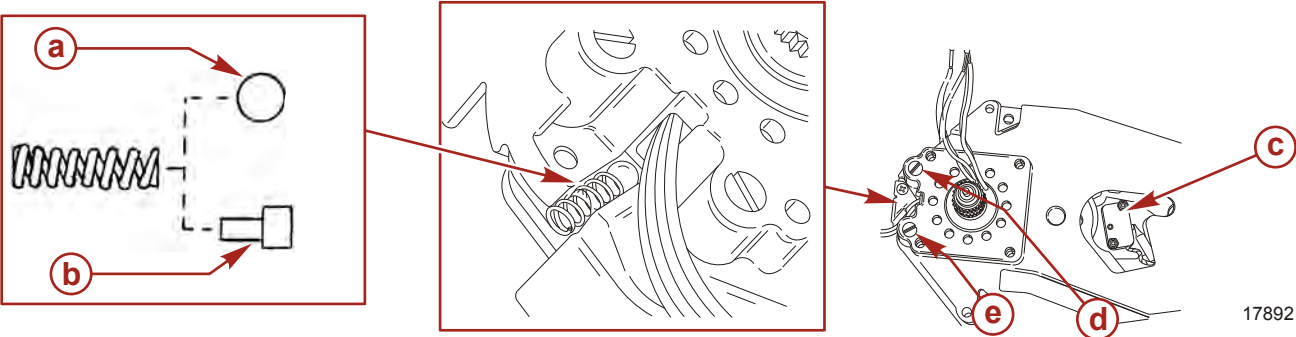


Gray area to be lubricated

- a - Detent ball, follower, and springs
- b - Control handle friction pad
- c - Trim harness retainer

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Areas of the control module housing outlined in light gray	92-802859A1

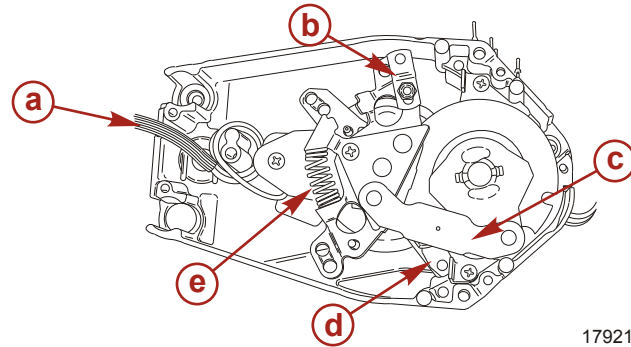
- 21. Install the bearing plate assembly into the control module housing and secure with three screws. Remove the rubber bands.
- 22. Apply 2-4-C with Teflon onto the shift gear ball/nylon plug and spring.
- 23. Turn the control module over and position the shift gear ball/nylon plug and spring into the control module.
- 24. Secure the shift gear ball, spring, and trim wire harness to the control module with a retaining clip. Secure the retaining clip with a screw. Tighten the screw securely.
- 25. Install the neutral start safety switch onto the bearing plate assembly with two self-locking nuts. Do not overtighten the self-locking nuts.



- a - Throttle-only ball bearing (early models)
- b - Throttle-only plug
- c - Neutral start safety switch
- d - Detent adjustment screw
- e - Control handle friction adjustment screw

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control module housing, shift gear ball/nylon plug and spring	92-802859A1

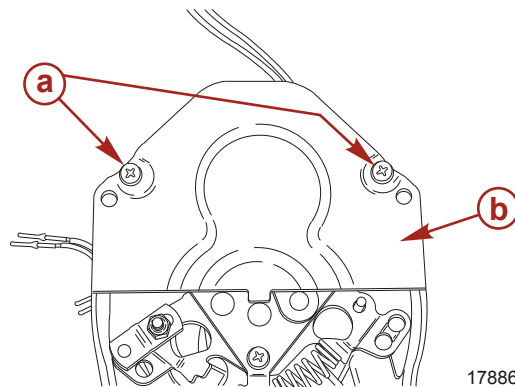
26. Temporarily install the control handle onto the control shaft.
27. Move the handle to ensure the control module assembly is in the forward detent position. Remove the control handle.
28. Apply 2-4-C with Teflon onto the throttle link assembly and install the throttle link assembly into the control module.
29. Install the compression spring into the control module assembly.



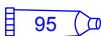
- a** - Neutral start safety switch wire harness
- b** - Throttle lever
- c** - Throttle link assembly
- d** - Shift lever
- e** - Compression spring

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle link assembly	92-802859A1

30. Temporarily install the control handle onto the control shaft.
31. Move the handle to ensure the control module assembly is in the neutral detent position. Remove the handle.
32. Apply 2-4-C with Teflon onto the inside half of the control module assembly back cover.
33. Install the back cover onto the control module, and secure with two screws. Tighten the screws to the specified torque.



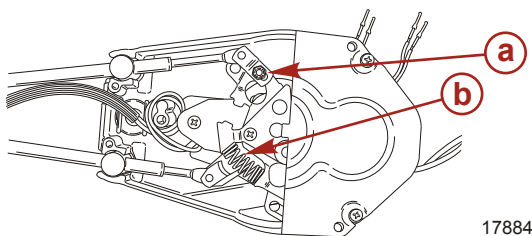
- a** - Screws securing back cover
- b** - Back cover

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control module assembly back cover	92-802859A1

Description	Nm	lb. in.	lb. ft.
Screw (2)	7	60	

34. Lubricate the throttle and shift cable ends with 2-4-C with Teflon.

35. Install the throttle and shift cables. Secure cable ends to the control module assembly with a nut. Tighten the nuts securely.



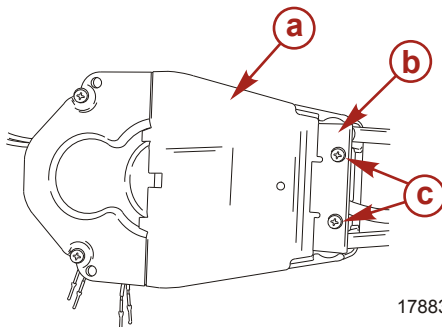
17884

a - Nut securing throttle cable

b - Nut securing shift cable (hidden under the spring)

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle and shift cable ends	92-802859A1

36. Install the cable retainer. Secure with two screws. Tighten the screws to the specified torque.



17883

a - Bottom cover

b - Cable retainer

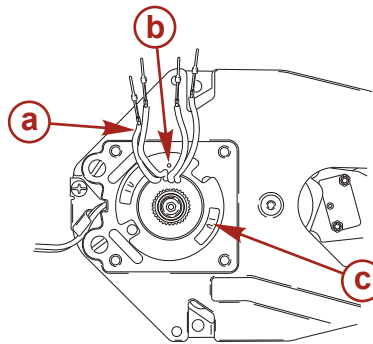
c - Cable retainer screw (2)

Description	Nm	lb. in.	lb. ft.
Cable retainer screw	7	60	

Panel Mount Control Handle and Bezel Installation

1. For a standard positioning of the control handle straight up when in neutral, install the neutral lock ring so the dot is facing up.

2. Apply 2-4-C with Teflon onto the entire neutral lock ring.

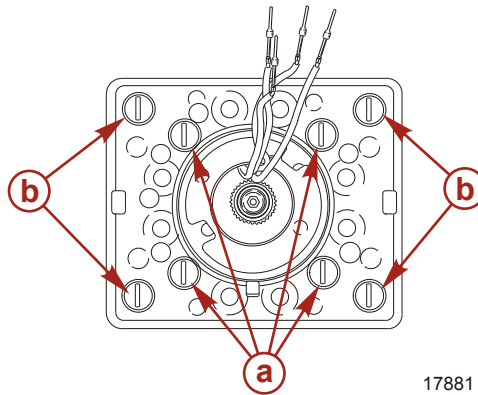


a - Trim harness wires
b - Dot on lock ring

c - Neutral lock ring

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Neutral lock ring	92-802859A1

3. Secure the control module housing assembly to the mounting panel with the bezel.
4. Secure the control module housing assembly to the bezel with four screws. Tighten the screws to the specified torque.

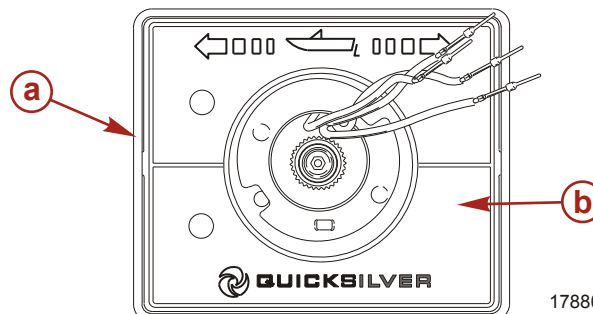


a - Screws securing the panel mount bezel to the control module housing assembly

b - Screws securing the panel mount bezel to the panel

Description	Nm	lb. in.	lb. ft.
Screws securing control module housing assembly (4)	7	60	

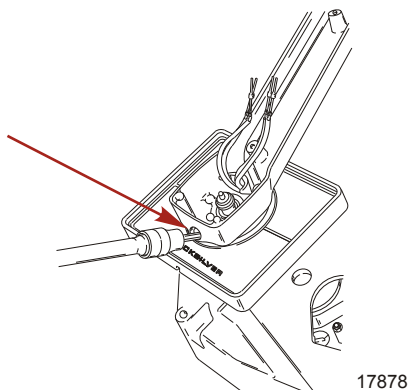
5. Snap the bezel cover into the bezel.



a - Panel mount bezel

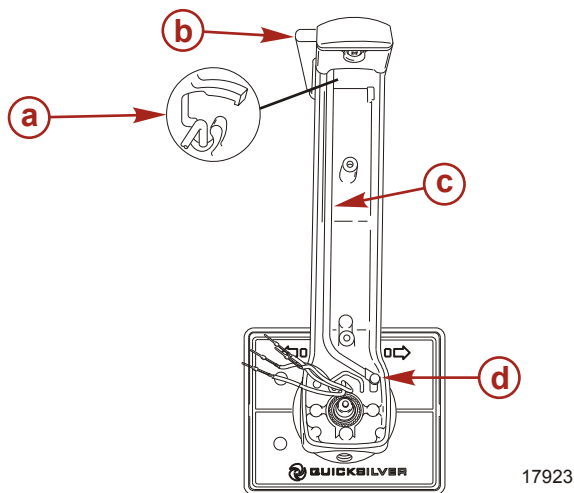
b - Bezel cover

6. Ensure the control module housing assembly is in the neutral detent position.
7. Route the trim wires through the control handle.
8. Install the control handle onto the splined shaft. Ensure the control handle neutral lock pin hole is in alignment with the notch in the neutral lock ring.
9. Push down on the hub of control handle. Tighten the set screw to the specified torque.



Description	Nm	lb. in.	lb. ft.
Control handle set screw	8	71	

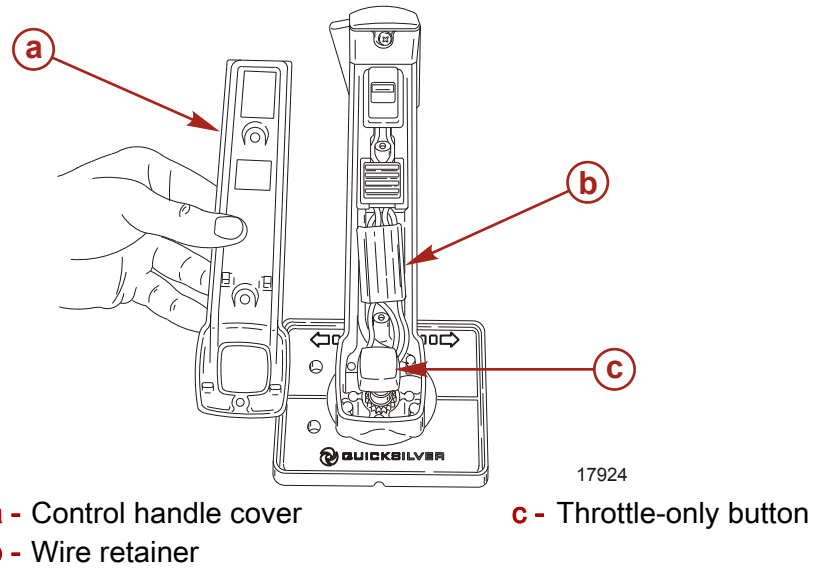
10. Install the neutral lock rod, and the neutral lock pin into the control handle.



- a** - Neutral lock rod hooked on the neutral lock release
b - Trigger
c - Neutral lock rod
d - Neutral lock pin

11. Connect the trim button wires to the trim harness wires.
12. Secure the trim wire harness connection with the wire retainer.
13. Install the trim button assembly into the handle.
14. Install the throttle-only button onto the throttle-only shaft.

15. Install the control handle cover to the control handle. Secure with two screws. Tighten the screws to the specified torque.



Description	Nm	lb. in.	lb. ft.
Throttle handle cover screw	3.4	30	

Notes:

Commander Controls

Section 4B - Commander Side Mount Control

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Commander Side Mount Remote Control External Identification.....	4B-8		

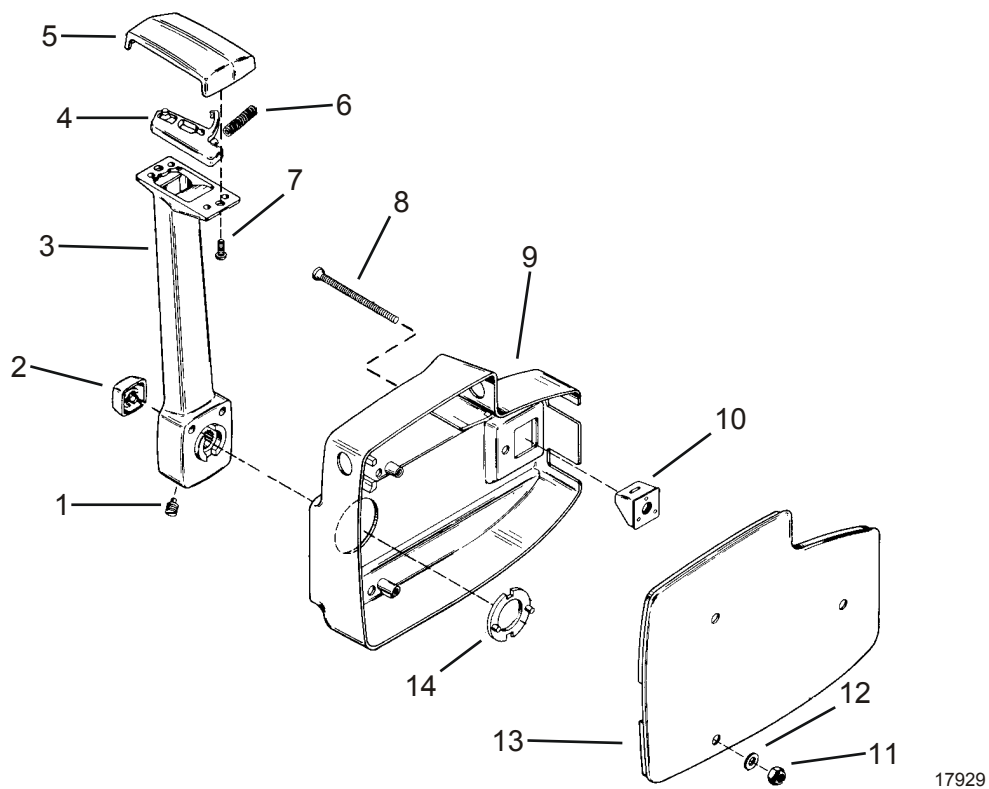
4
B

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
	2-4-C with Teflon	Stepped washer, throttle-only shaft, and barrel	92-802859A1
		Throttle-only shaft pin, shift gear ball, shift gear pin	
		Shift gear, shift pinion gear, and bushing	
		Recess of the control module housing, control shaft bushing	
		Areas of control module housing that is outlined in light gray	
		Shift gear ball/nylon plug and spring	
		Throttle link assembly	
		Inside half of the control module back cover	
		Surface of the neutral lockring	

Notes:

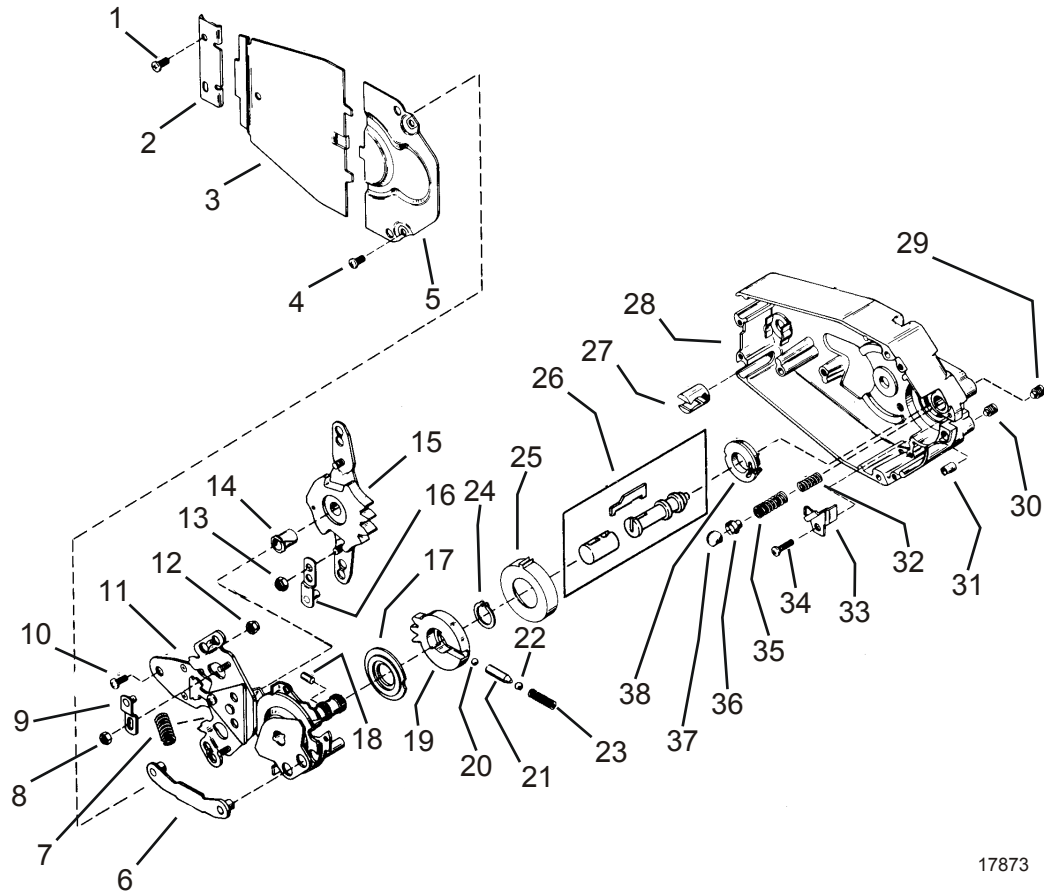
Commander Side Mount Control External Components



Commander Side Mount Control External Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Set screw	8	71	
2	1	Throttle-only button			
3	1	Control handle			
4	1	Neutral lock trigger			
5	1	Control handle cap			
6	1	Compression spring			
7	1	Screw			
8	3	Screw 89 mm (3.5 in.)			
9	1	Control module cover			
10	1	Toggle switch cover			
11	3	Nut			
12	3	Washer			
13	1	Cover			
14	1	Lock ring			

Control Housing Module Components

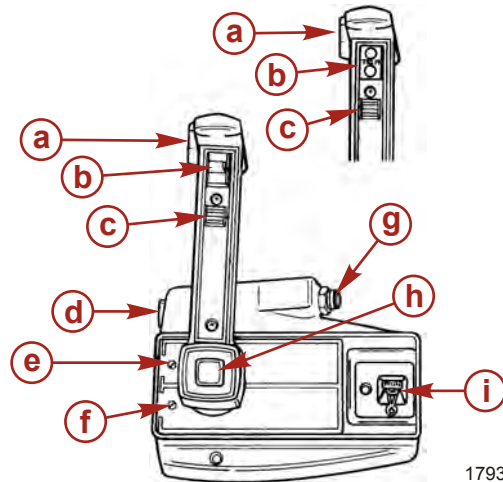


17873

Control Housing Module Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. In.	lb. ft.
1	2	Retainer attaching screw	7	60	
2	1	Cable retainer			
3	1	Access cover			
4	2	Back cover attaching screw	7	60	
5	1	Back cover			
6	1	Throttle link assembly			
7	1	Throttle lever compression spring			
8	1	Throttle cable fastener nut			
9	1	Throttle cable fastener			
10	3	Bearing plate assembly screw			
11	1	Bearing plate assembly			
12	2	Neutral start switch nut			
13	1	Shift cable fastener nut			
14	1	Shift pinion bearing			
15	1	Shift lever assembly			
16	1	Shift cable fastener			
17	1	Shift gear stepped washer			
18	1	Throttle-only shaft pin			
19	1	Shift gear			
20	1	Inner shift gear ball			
21	1	Shift gear pin			
22	1	Outer shift gear ball			
23	1	Shift gear spring			
24	1	Bearing plate retainer			
25	1	Trim wire harness retainer			
26	1	Throttle-only shaft assembly			
27	2	Control housing grommet			
28	1	Control housing			
29	1	Throttle friction screw			
30	1	Shift detent friction screw			
31	1	Friction pad			
32	1	Outer detent compression spring			
33	1	Trim wire harness retainer			
34	1	Trim wire harness retainer screw			
35	1	Spring			
36	1	Throttle-only plug			
37	1	Throttle-only ball (early models)			
38	1	Control shaft bushing			

Commander Side Mount Remote Control External Identification



- | | |
|---|-----------------------------------|
| a - Neutral lock trigger | f - Friction tension screw |
| b - Trim switch | g - Key switch |
| c - Trailer switch | h - Throttle-only button |
| d - Tachometer harness connector | i - Lanyard safety switch |
| e - Detent tension screw | |

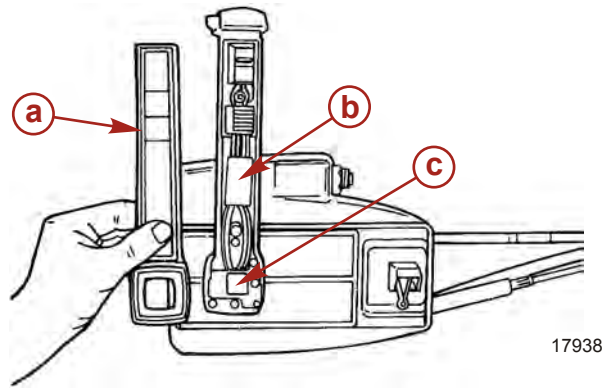
Commander Side Mount Remote Control Disassembly

⚠ CAUTION

Always disconnect the battery cables from the battery before working around electrical system components to prevent injury and damage to the electrical system if a wire should accidentally cause a short circuit.

1. Disconnect the remote control wiring harness from the engine, and the trim pump.
2. Ensure the control handle is in the neutral position.
3. Disconnect the tachometer wiring harness from the remote control housing assembly.
4. Remove the remote control housing assembly from the mounting panel.
5. Remove the two screws securing the control handle cover.
6. Remove the wire retainer. Unplug the trim wires.

7. Pull the throttle-only button off the throttle-only shaft.

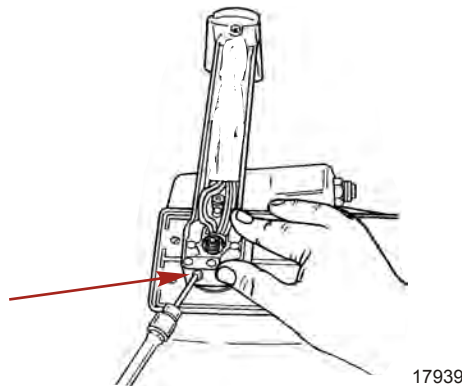


a - Control handle cover

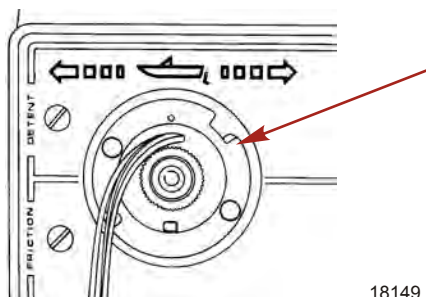
b - Wire retainer

c - Throttle-only button

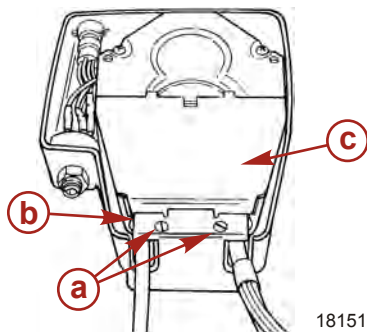
8. Loosen the control handle set screw several turns out, and remove the control handle.



9. Straighten the trim wires to extend straight out from the control handle hub. Remove the neutral lock ring from the control module housing assembly.

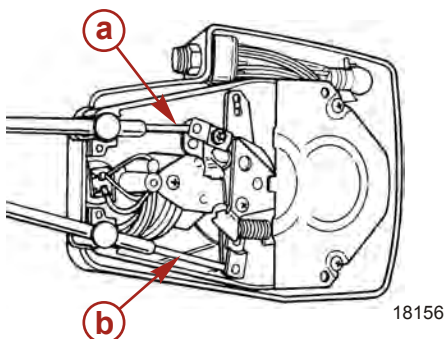


10. Remove the two screws securing the cable retainer. Remove the cable retainer and access cover.



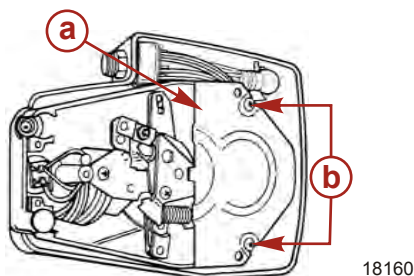
- a** - Screws securing the cable retainer (2)
b - Cable retainer
c - Access cover

11. Loosen the nuts securing the throttle and shift cable to the control module assembly. Remove the throttle and shift cable.



- a** - Throttle cable
b - Shift cable

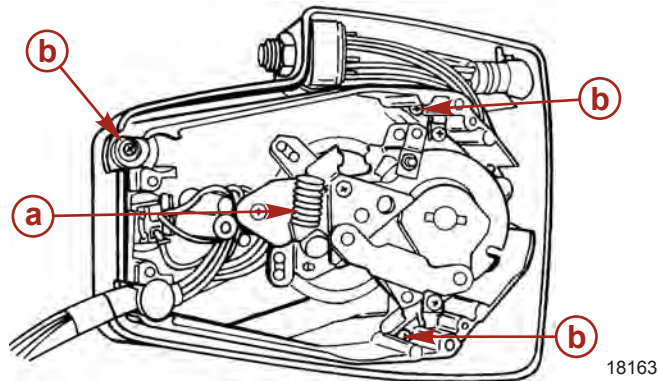
12. Remove the two screws securing the back cover to the control assembly.



- a** - Back cover
b - Screws securing the back cover (2)

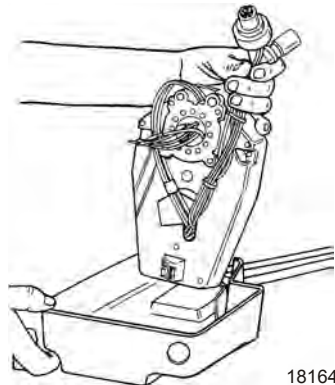
13. Temporarily install the control handle onto the splined control shaft. Position the control into full forward, and remove the control handle.
14. Remove the compression spring from the throttle lever.

15. Remove the three screws securing the control module cover to the control module housing assembly.

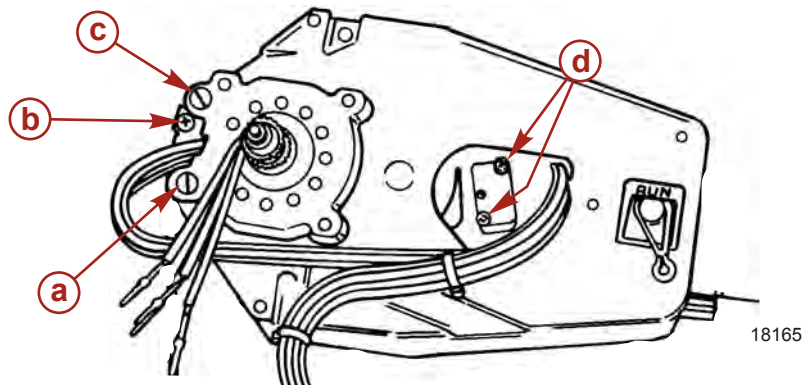


- a** - Compression spring
b - Screws securing the control module cover (3)

16. Remove the ignition switch, and tachometer plug from the control housing plastic cover.
17. Lift the control module housing, ignition switch, and tachometer harnesses out of the control module plastic cover.

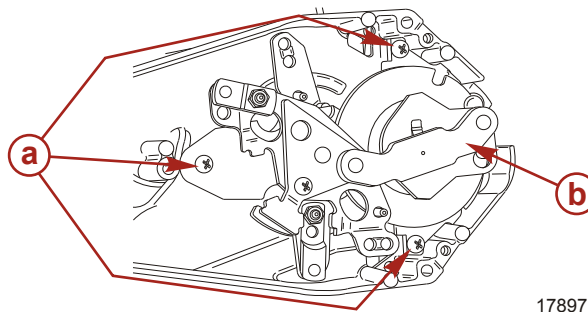


18. Thread the detent adjustment screw until it is flush with the control module housing.
19. Thread the control handle friction screw until it is flush with the control module housing.
20. Remove the screw retaining the gear shift spring clip to the control module housing.
21. Remove the two nuts securing the neutral start safety switch to the control module housing.



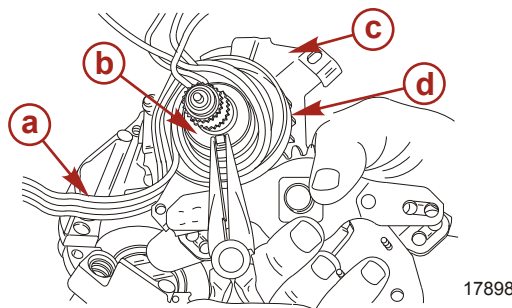
- a** - Control handle friction screw
b - Screw retaining the gear shift spring clip
c - Detent adjustment screw
d - Nuts securing the neutral start safety switch

22. Temporarily install the control handle onto the splined control shaft.
23. Position the control module into neutral. Remove the control handle.
24. Remove the throttle link assembly from the module.
25. Remove three screws securing the bearing plate assembly to the control module housing.



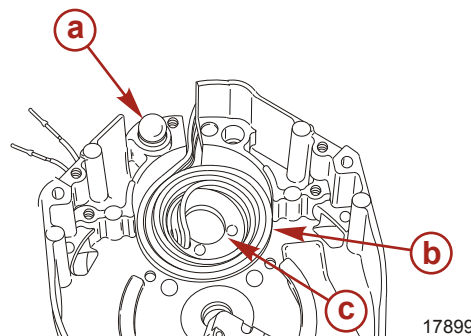
- a** - Screws securing the bearing plate assembly (3)
b - Throttle link

26. Lift the bearing plate assembly out of the control module housing.
27. Remove the trim wires, trim wire retainer, and the control shaft bushing from the bearing plate assembly.



- a** - Trim wires
b - Control shaft bushing
c - Bearing plate assembly
d - Trim wire retainer

28. If the trim wires, trim wire retainer, and the control shaft bushing remained in the control module housing, remove the trim wires, trim wire retainer, and the control shaft bushing from the control module housing.
29. Remove the detent ball, detent ball follower, and two compression springs located beneath the follower.

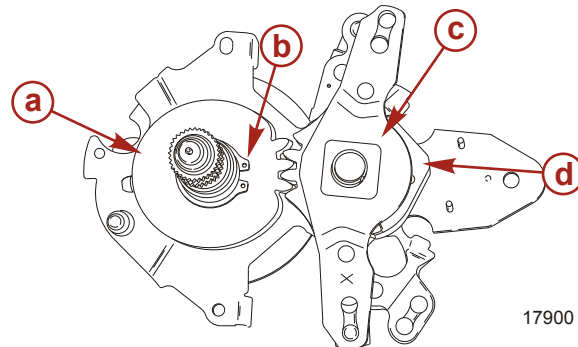


- a** - Detent ball, detent ball follower, and two compression springs
b - Trim wire retainer
c - Control shaft bushing

30. Lift the shift pinion gear with the attached shift lever from the bearing plate.

NOTE: The shift lever is pressed onto the shift pinion gear. If the shift lever or shift pinion gear is damaged, replace as an assembly.

31. Remove the bearing plate retainer securing the shift gear to the control shaft. Remove the shift gear from the control shaft.



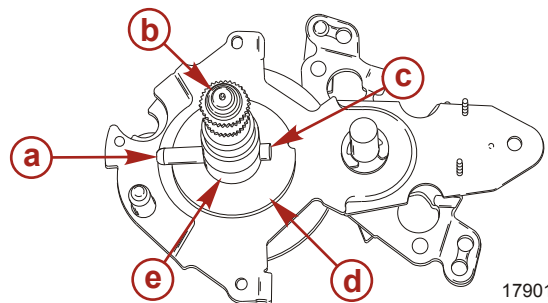
a - Shift gear

b - Bearing plate retainer

c - Shift lever

d - Shift pinion gear

32. Remove the shift gear pin, inner shift gear ball, throttle-only shaft pin, and the throttle-only shaft from the control shaft.



a - Shift gear pin

b - Throttle-only shaft

c - Throttle-only shaft pin

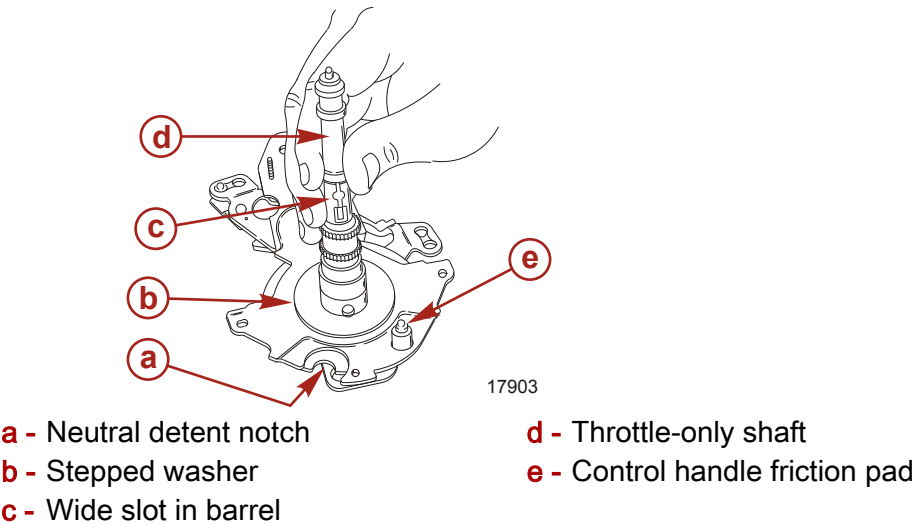
d - Stepped washer

e - Inner shift gear ball (hidden)

Commander Side Mount Remote Control Assembly

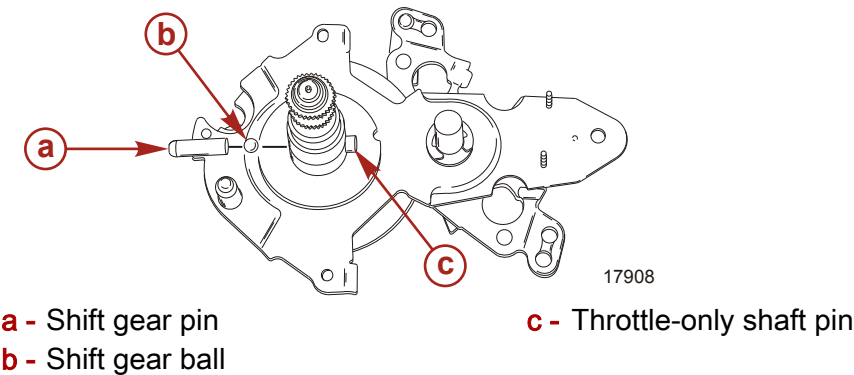
1. Apply 2-4-C with Teflon onto the stepped washer, and install the stepped washer over the control shaft. The steps of the washer are against the bearing plate.
2. Rotate the control shaft until the neutral detent notch is at the position shown.
3. Apply 2-4-C with Teflon onto the throttle-only shaft and barrel. Install the throttle-only shaft onto the barrel.

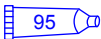
4. Install the throttle-only shaft and barrel assembly into the control shaft. The wide slot in the barrel must be on the same side as the neutral detent notch, and control handle friction pad.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Stepped washer, throttle-only shaft, and barrel	92-802859A1

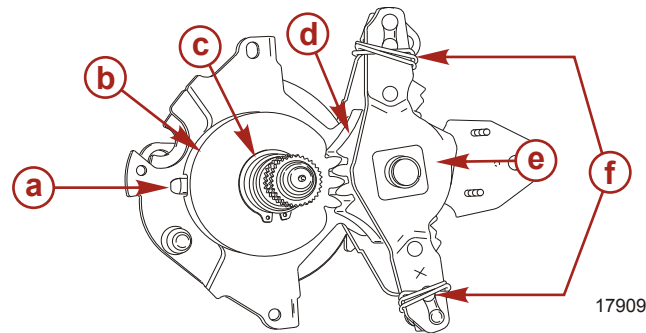
5. Apply 2-4-C with Teflon onto the throttle-only shaft pin. Insert the throttle-only shaft pin into the control shaft and into the hole in barrel.
- NOTE:** The throttle-only shaft pin is properly installed when the throttle-only shaft cannot be removed.
6. Apply 2-4-C with Teflon onto the smallest of the three balls which was removed during the disassembly process.
7. Insert the shift gear ball into the control shaft and the hole in the barrel.
8. Apply 2-4-C with Teflon onto the shift gear pin, and insert the shift gear pin into the control shaft. The rounded end of the shift gear pin is facing away from the control shaft.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle-only shaft pin, shift gear ball, shift gear pin	92-802859A1

9. Apply 2-4-C with Teflon onto the entire shift gear.
10. Install the shift gear onto the control shaft, and secure in place with the bearing plate retainer.

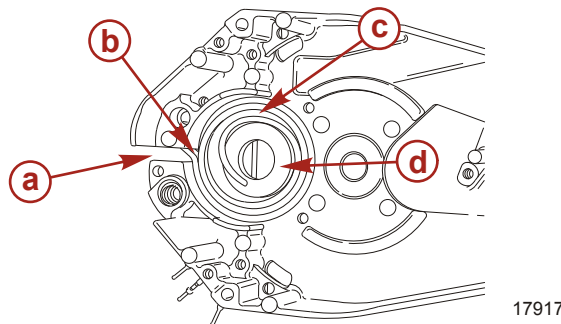
11. Apply 2-4-C with Teflon onto the entire shift pinion gear, and bushing.
12. Install the bushing into the gear, and the gear onto the bearing plate.
13. Use two rubber bands to hold the shift pinion gear in place onto the bearing plate.



- | | |
|-----------------------------------|--|
| a - Shift gear pin | d - Shift pinion gear and bushing |
| b - Shift gear | e - Shift lever |
| c - Bearing plate retainer | f - Rubber bands |

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Shift gear, shift pinion gear, and bushing	92-802859A1

14. Apply 2-4-C with Teflon into the recess of the control module housing where the trim harness will be positioned.
 15. Insert the end of the trim harness through the control shaft bushing.
 16. Apply 2-4-C with Teflon onto the entire control shaft bushing. Install the control shaft bushing into the control module housing.
 17. Coil the trim harness inside of the control module housing with a clockwise direction.
- IMPORTANT: The black line that is across the trim harness must be positioned at the control module housing slot.**

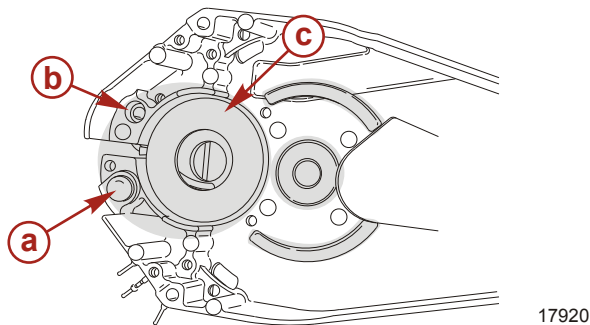


- | | |
|---|----------------------------------|
| a - Control module housing slot | c - Trim harness |
| b - Black line across the trim harness | d - Control shaft bushing |

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Recess of the control module housing, control shaft bushing	92-802859A1

18. Install the two detent springs, the follower, and the detent ball into the control module housing.
19. Install the trim harness retainer over the trim harness.

20. Apply 2-4-C with Teflon onto the areas of control module housing that is outlined in light gray color.

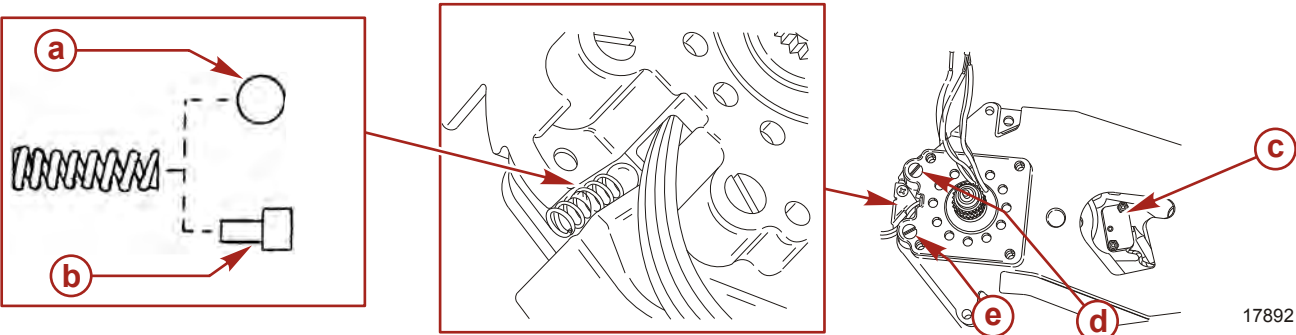


Gray area to be lubricated

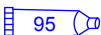
- a - Detent ball, follower and springs
- c - Trim harness retainer
- b - Control handle friction

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Areas of control module housing that is outlined in light gray	92-802859A1

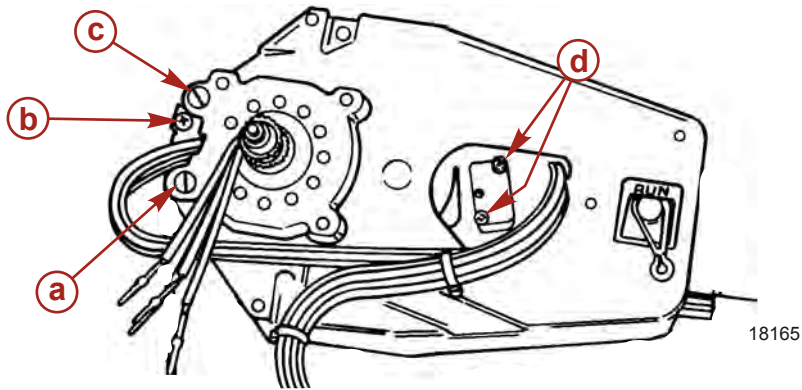
21. Install the bearing plate assembly into the control module housing, and secure with three screws. Tighten the screws securely.
22. Remove the rubber bands.
23. Apply 2-4-C with Teflon onto the shift gear ball/nylon plug and spring.
24. Turn the control module over, and position the shift gear ball/nylon plug and spring into the control module.
25. Secure the shift gear ball, spring, and trim wire harness to the control module with a retaining clip. Secure the retaining clip with a screw. Tighten the screw securely.
26. Install the neutral start safety switch onto the bearing plate assembly. Secure the neutral start safety switch with two self-locking nuts. Do not overtighten the self-locking nuts securing the neutral start safety switch to the bearing plate.



- a - Throttle-only ball bearing (early models)
- b - Throttle-only plug
- c - Neutral start safety switch
- d - Detent adjustment screw
- e - Control handle friction adjustment screw

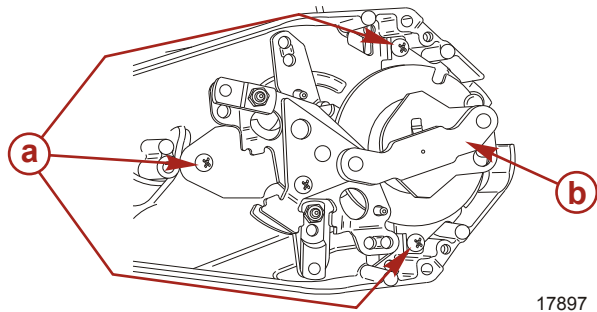
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Shift gear ball/nylon plug and spring	92-802859A1

27. Route the tachometer harness connector, and the key switch through the large opening in the control housing.
28. Install the bearing plate assembly onto the control housing.
- IMPORTANT:** Use caution when installing the bearing plate assembly to the control housing. Ensure you do not damage the neutral start safety switch when installing the bearing plate assembly to the control housing.



- a** - Control handle friction screw
- b** - Screw retaining the gear shift spring clip
- c** - Detent adjustment screw
- d** - Nuts securing the neutral start safety switch

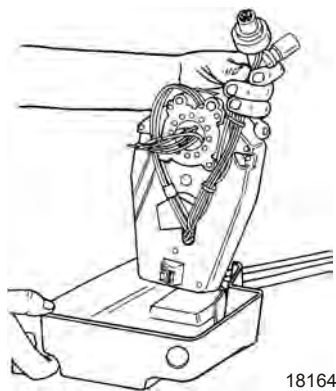
29. Secure the bearing plate assembly to the control housing with three screws. Tighten the screws securely.
30. Temporarily install the control handle onto the control shaft.
31. Move the handle into the full forward position. Remove the control handle.
32. Apply 2-4-C with Teflon onto the throttle link assembly.
33. Install the throttle link assembly into the bearing plate assembly.



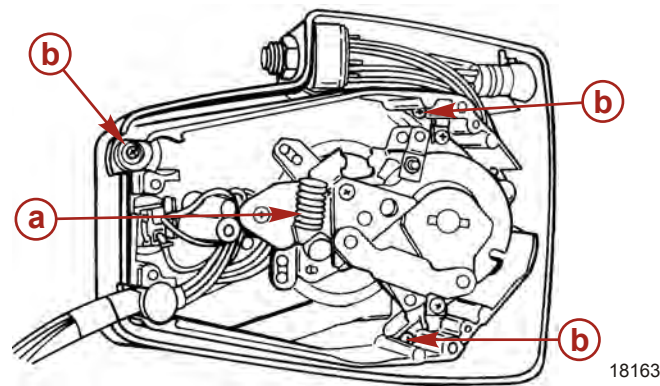
- a** - Screws securing the bearing plate assembly (3)
- b** - Throttle link

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle link assembly	92-802859A1

34. Install the control module assembly onto the control module cover. Ensure that no wires are pinched between the control module assembly and the control module cover.

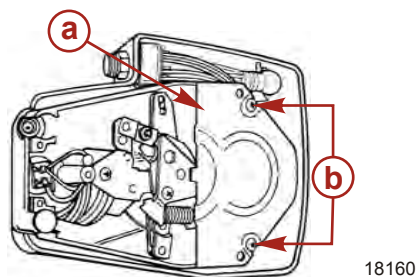


35. Install the tachometer harness connector into the control module cover.
36. Install and secure the ignition key switch to the control module cover. Tighten the key switch nut securely.
37. Retain the control module assembly to the control module cover with three screws. Tighten the screws securely.
38. Install the compression spring onto the bearing plate assembly.



- a** - Compression spring
- b** - Screws securing the control module cover (3)

39. Apply 2-4-C with Teflon to the inside half of the control module back cover.
40. Install the control module back cover to the control module assembly, and secure with two screws. Tighten the screws to the specified torque.

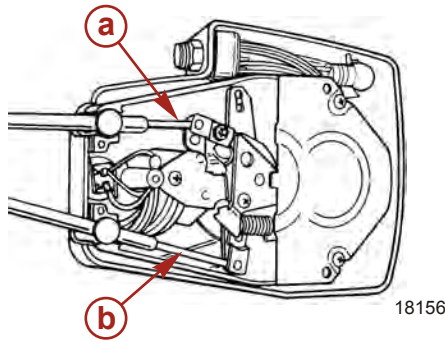


- a** - Back cover
- b** - Screws securing the back cover (2)

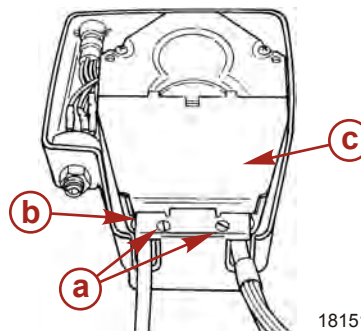
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Inside half of the control module back cover	92-802859A1

Description	Nm	lb. in.	lb. ft.
Back cover screw (2)	7	60	

41. Temporarily install the shift handle onto the splined control shaft. Ensure the control module assembly is in the neutral detent position. Remove the control handle.
42. Install the throttle and shift cables to the control module assembly. Secure the throttle and shift cables to the control module assembly with the throttle and shift clip assemblies and locknuts. Tighten the locknuts securely.

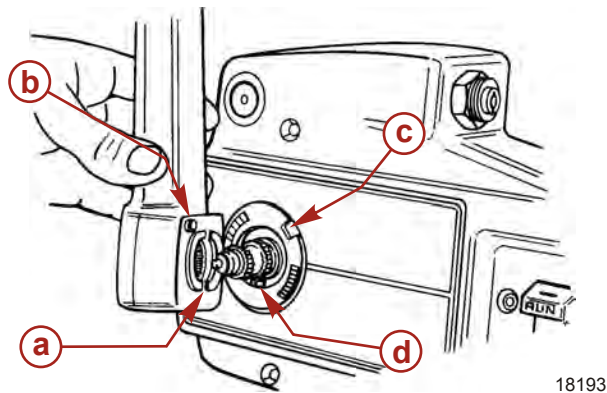
**a** - Throttle cable**b** - Shift cable

43. Install the access cover, and the cable retainer onto the control module assembly. Secure the access cover, and the cable retainer with two screws. Tighten the screws securely.

**a** - Screws securing the cable retainer (2)**b** - Cable retainer**c** - Access cover

44. Locate the dot on the neutral locking. Position the neutral locking dot facing up, and referencing the neutral detent handle position.
45. Apply 2-4-C with Teflon onto the entire surface of the neutral locking.
46. Insert the trim wires through the control handle opening.

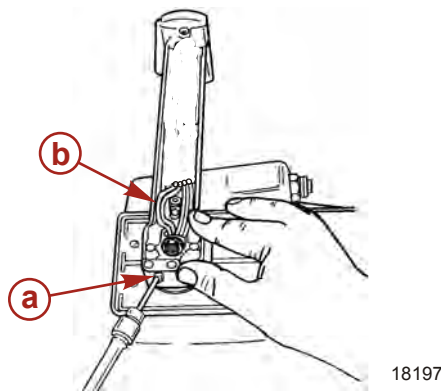
47. Install the control handle onto the splined control shaft. Ensure to align the control shaft bushing tab with the notch on the bottom of the control handle. Ensure the neutral locking tab, and the control handle neutral lock pin opening are also in alignment.



- a - Notch on the bottom of the control handle
- b - Control handle neutral lock pin opening
- c - Neutral locking tab
- d - Control shaft bushing tab

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Surface of the neutral locking	92-802859A1

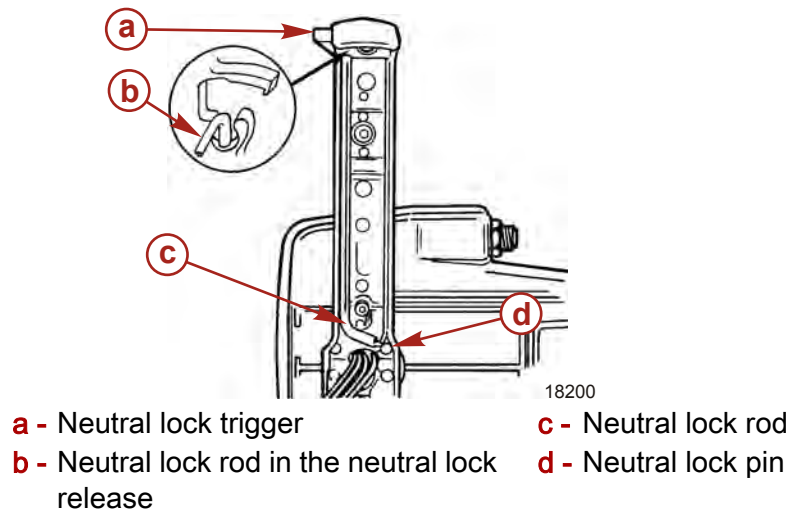
48. Push the control handle tight against the splined control shaft, and tighten the control handle set screw to the specified torque.



- a - Set screw
- b - Trim harness wires

Description	Nm	lb. in.	lb. ft.
Control handle set screw	8	71	

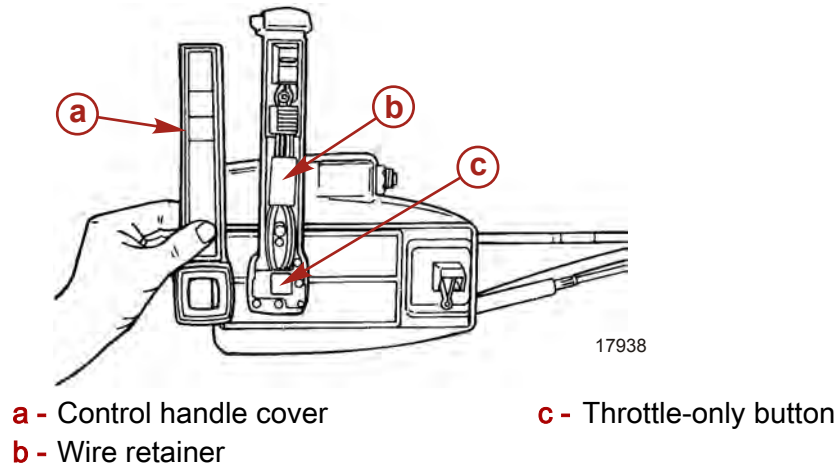
49. Install the neutral lock rod, and the neutral lock pin into the control handle.



50. Connect the trim wire with the trailer and trim switches. Secure the trim wires with a wire retainer.

51. Install the throttle-only button onto the control shaft.

52. Install the control handle cover to secure the trailer/trim switches, and the throttle-only button. Secure the control handle cover with two screws. Tighten the screws securely.



Notes:

Commander Controls

Section 4C - Commander 2000 Side Mount Control

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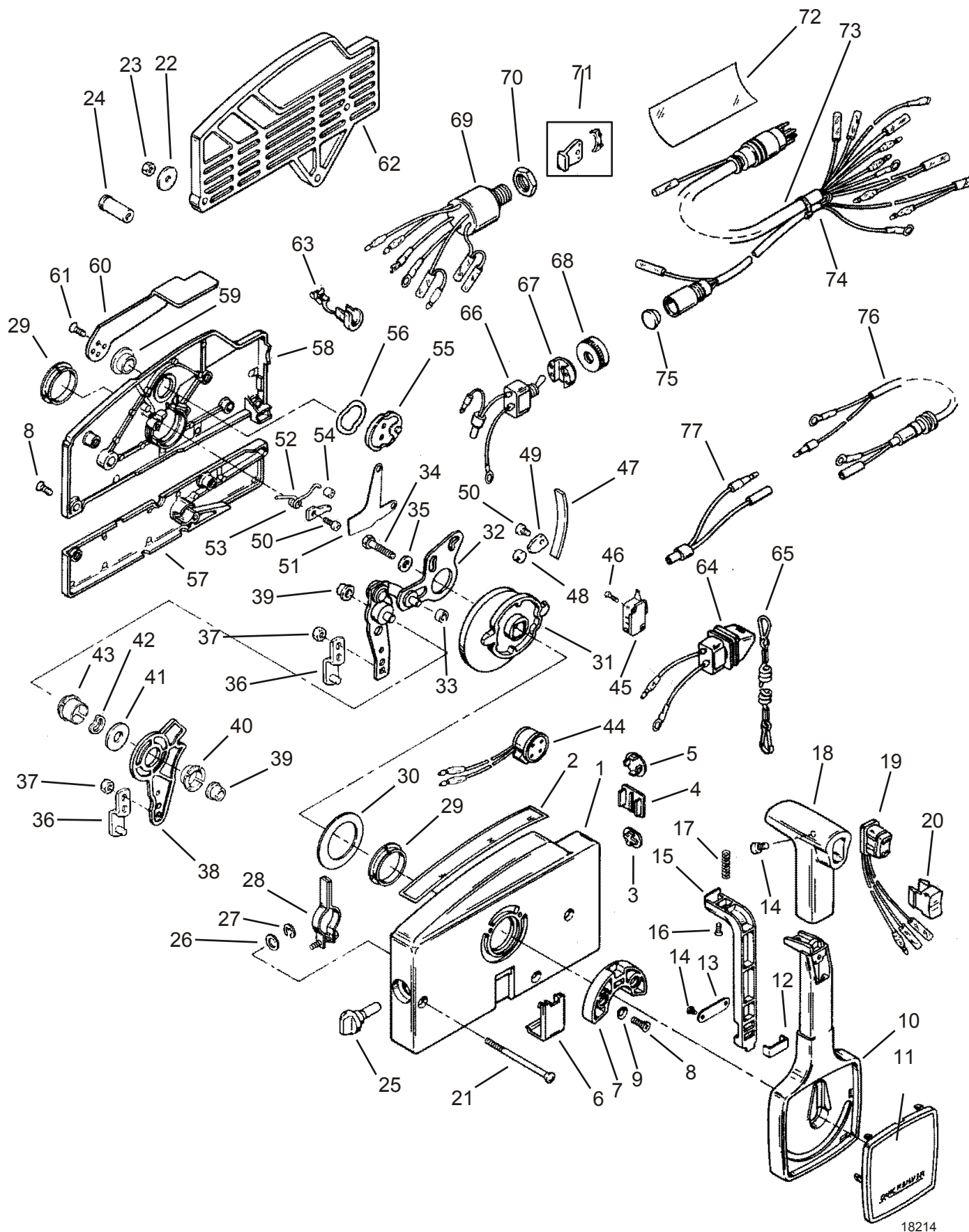


Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
	2-4-C with Teflon	Control housing bushings	92-802859A1
		Drum assembly, and wave washer	
		Detent roller	
		Throttle friction knob shaft	
		Bushing area of control handle	
		Gear shift arm and washer	
		Control cam and washer	
		Shift lever roller, bushing, and wave washer	
		Pin on the shift cable fastener	
		Pin on the throttle cable fastener	

Notes:

Commander 2000 Side Mount Control Components



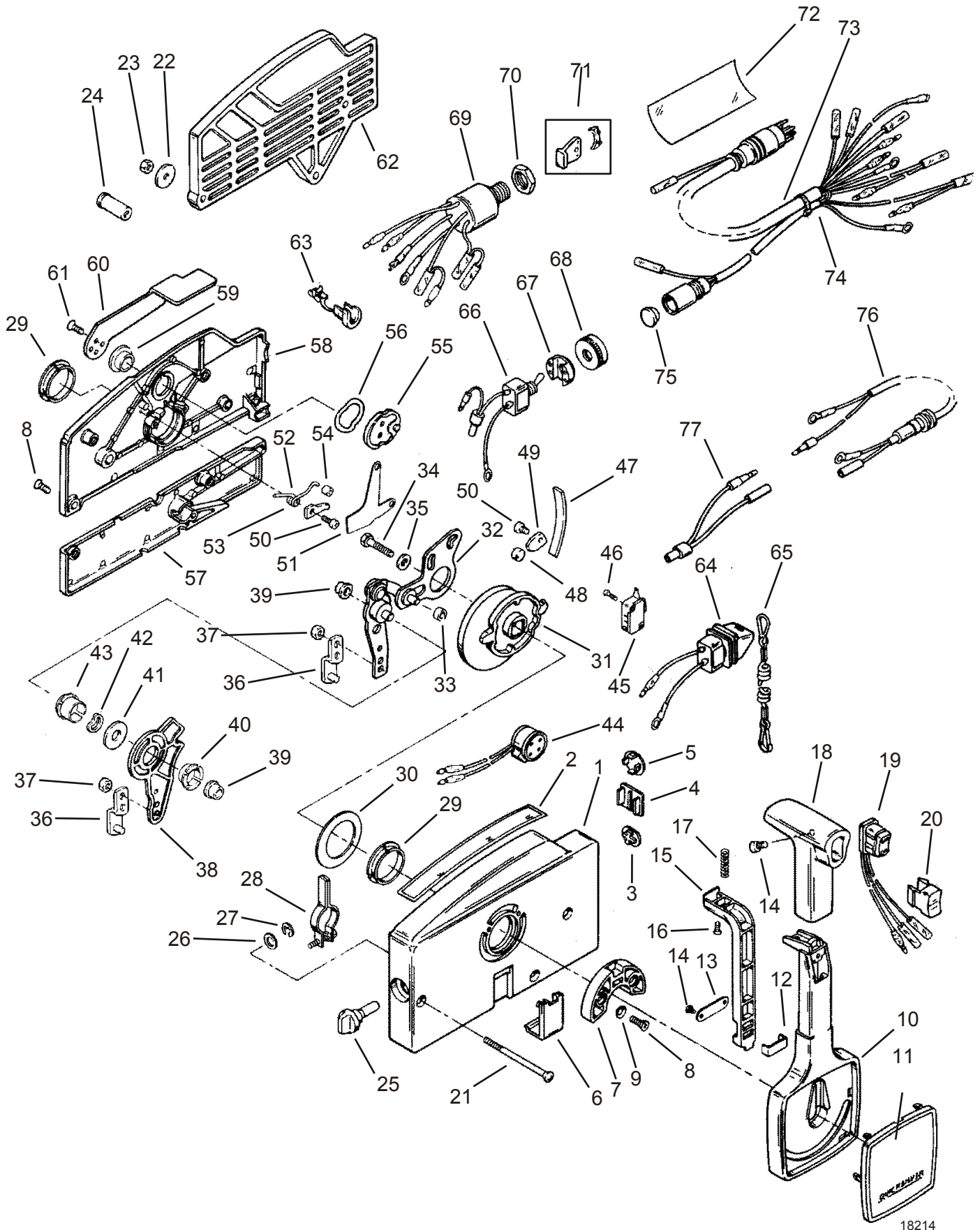
Commander 2000 Side Mount Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Front housing			
2	1	Decal set			
3	1	Key switch plug			
4	1	Stop switch plug			
5	1	Harness plug			
6	1	Cover			
7	1	Neutral lock holder			
8	6	Screw	3.4	35	
9	1	Washer			
10	1	Hand lever			
11	1	Cap assembly			
12	1	Clip			
13	1	Neutral lock lever retainer			
14	3	Screw			
15	1	Neutral lock lever			
16	1	Screw			
17	1	Neutral lock lever spring			
18	1	Grip			
19	1	Switch harness			
20	1	Grip plug			
21	2	Screw			
22	2	Washer			
23	2	Nut			
24	2	Wellnut			
25	1	Throttle friction knob			
26	1	Washer			
27	1	E-ring			
28	1	Throttle friction clamp			
29	1	Bushing 4.4 cm (1.75 in.)			
30	1	Washer			
31	1	Control cam			
32	1	Throttle arm assembly			
33	1	Cam roller			
34	1	Screw	11	97	
35	1	Washer			
36	2	Clip assembly			
37	2	Nut			
38	1	Gear shift			
39	2	Bushing 9 mm (0.36 in.)			
40	1	Bushing 1.9 cm (0.75 in.)			

Commander 2000 Side Mount Control

Ref. No.	Qty.	Description	Torque		
			Nm	lb. In.	lb. ft.
41	1	Washer			
42	1	Wave washer			
43	1	Bushing 2.2 cm (0.87 in.)			
44	1	Warning horn assembly			
45	1	Switch			
46	2	Screw			
47	1	Detent spring			
48	1	Detent roller			
49	1	Detent clip			
50	1	Screw			
51	1	Separator			
52	1	Spring			
53	1	Detent roller clip			
54	1	Roller			
55	1	Drum assembly			
56	1	Wave washer			
57	1	Lower housing cover			
58	1	Top housing cover			
59	1	Bushing 2 cm (0.81 in.)			
60	1	Lever assembly			
61	2	Screw			
62	1	Spacer			
63	1	Bushing			
64	1	Stop switch			
65	1	Lanyard cord			
66	1	Run/Off switch			
67	1	Bushing			
68	1	Bezel			
69	1	Switch with cover			
70	1	Nut			
71	1	Key cover assembly			
72	1	Neoprene sheet			
73	1	Harness			
74	1	Cable tie			
75	1	Plug			
76	1	Harness assembly			
77	1	Harness assembly			

Commander 2000 Side Mount Control Components



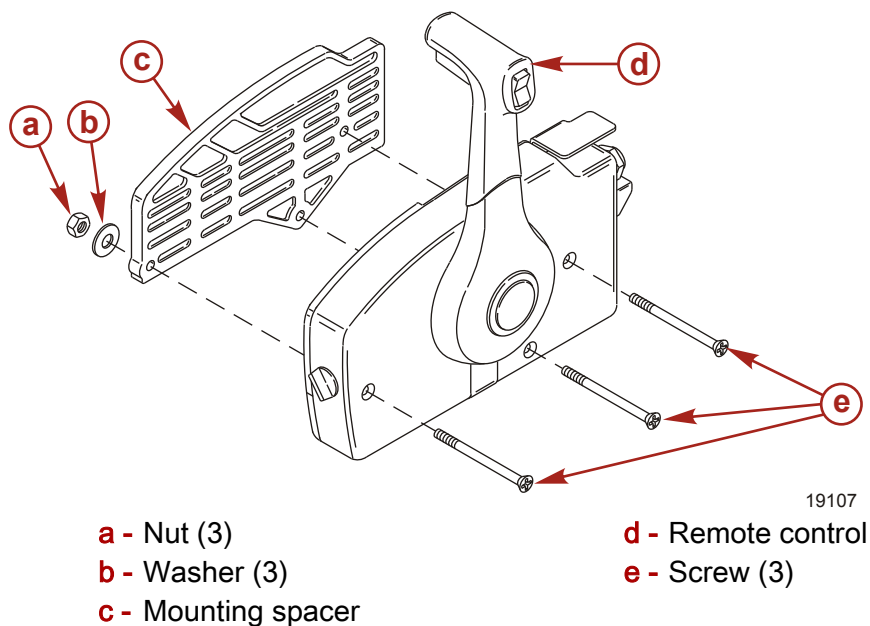
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Commander 2000 Removal

1. Remove the three screws, nuts, and washers securing the mounting spacer (if required) and remote control from the boat.

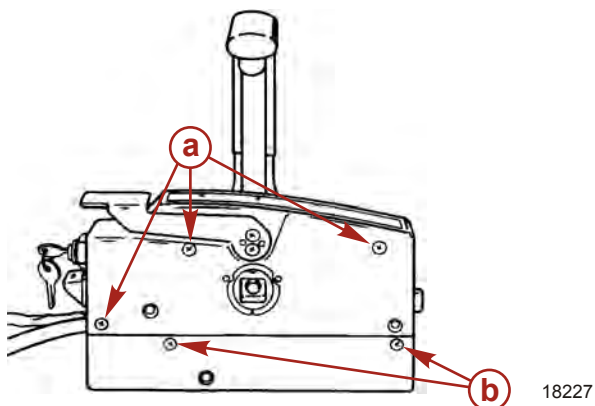
NOTE: The nuts and washers may be replaced with wellnuts.

2. Retain the three screws, nuts, and washers for reassembly.

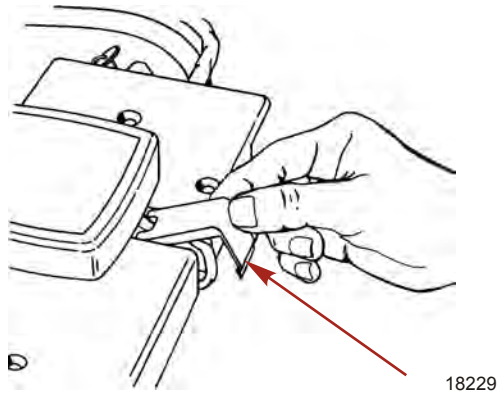


Commander 2000 Side Mount Disassembly

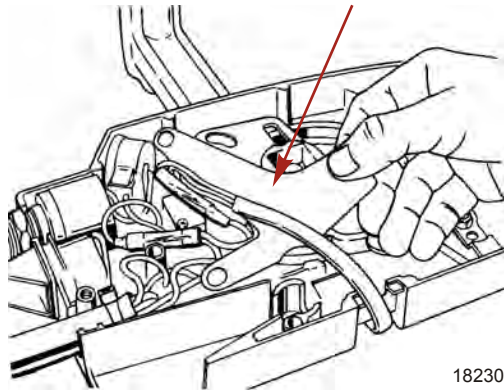
1. Remove five screws securing the upper and lower back panels.



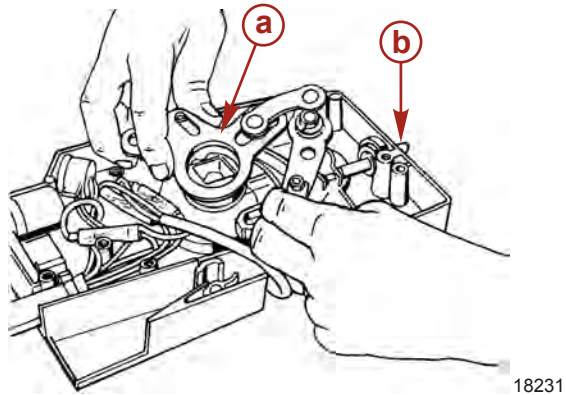
2. Remove the wire cover.



3. Remove the wire separator.

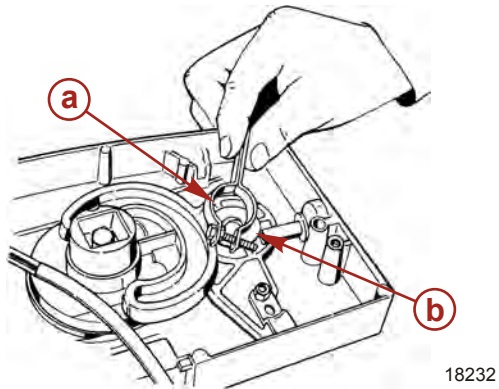


4. Loosen the throttle friction knob. Remove the throttle arm assembly.



- a** - Throttle arm assembly
- b** - Throttle friction knob

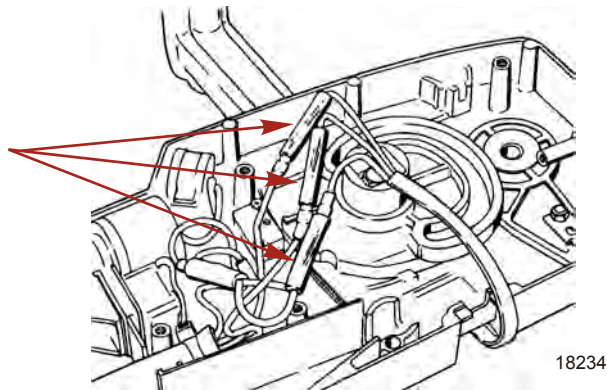
5. Remove the throttle friction clamp and washer.



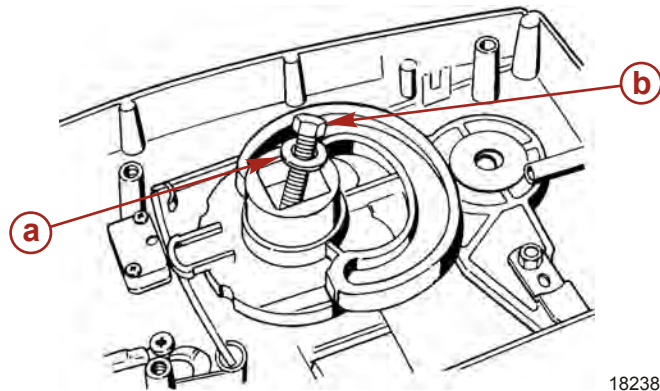
a - Throttle friction clamp

b - Washer

6. Disconnect the three trim switch connectors.



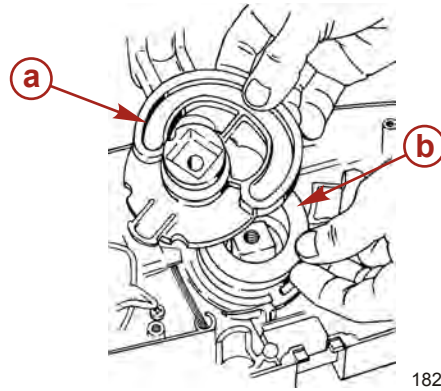
7. Remove the throttle/shift handle retaining bolt and washer.



a - Washer

b - Throttle/shift handle retaining bolt

8. Remove the control cam and washer.

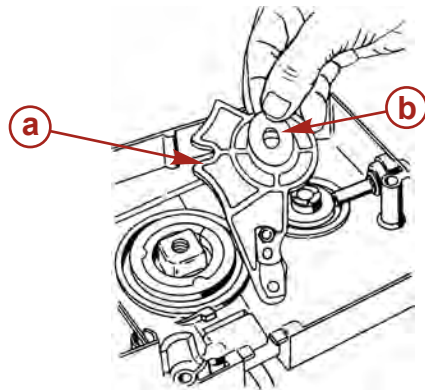


18239

a - Control cam

b - Washer

9. Remove the gear shift arm and washer.

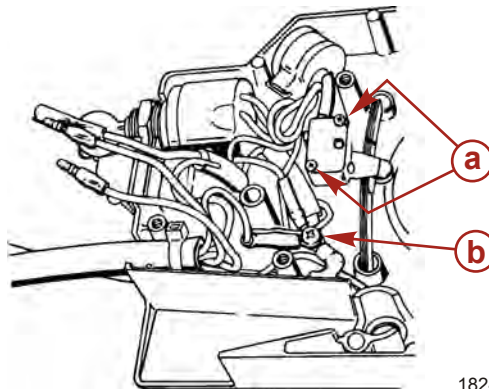


18240

a - Gear shift arm

b - Washer

10. Remove the remote control harness ground screw.
11. Remove the two screws securing the neutral start safety switch.
12. Remove the key switch, horn, emergency stop switch, and the control harness.

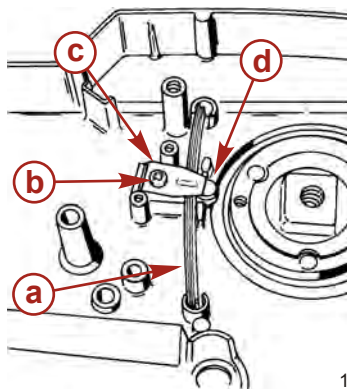


18241

a - Screws securing the neutral start safety switch (2)

b - Remote control harness ground screw

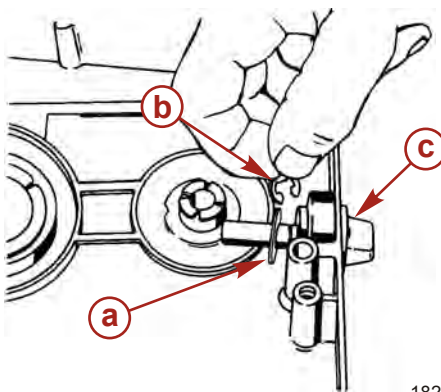
13. Remove the screw securing the detent spring and the detent clip.



18242

- a** - Detent spring
- b** - Screw
- c** - Detent clip
- d** - Detent roller

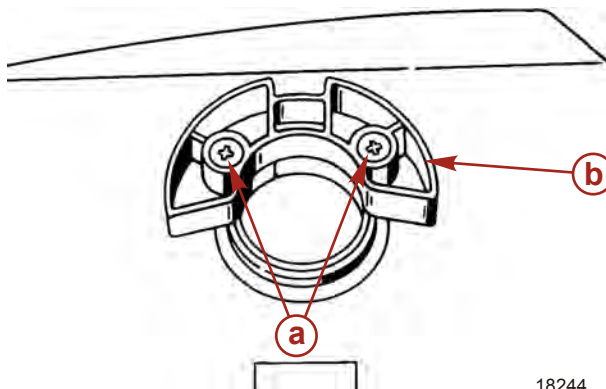
14. Remove the E-ring, wave washer, and throttle friction knob.



18243

- a** - Wave washer
- b** - E-ring
- c** - Throttle friction knob

15. Remove the two screws securing the neutral lock holder. Remove the neutral lock holder.

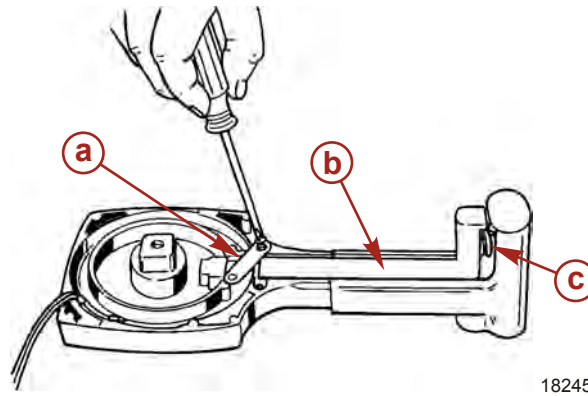


18244

- a** - Screws securing the neutral lock holder (2)
- b** - Neutral lock holder

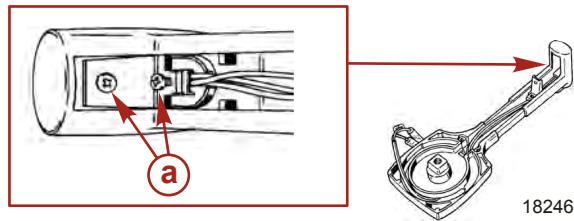
16. Remove the two screws securing the neutral lock lever retainer. Remove the lock lever, and neutral lock lever spring.

NOTE: The neutral lock lever is spring loaded and may eject quickly.



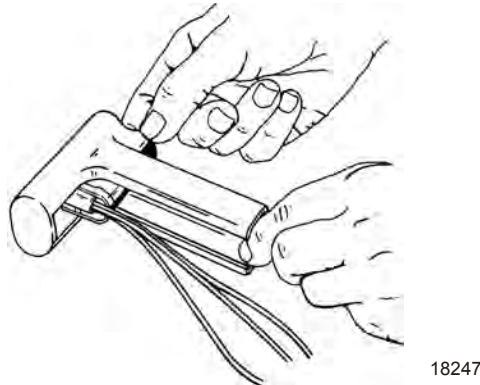
- a** - Neutral lock lever retainer
- b** - Neutral lock lever
- c** - Neutral lock lever spring

17. Remove the two screws securing the grip to the control handle. Remove the grip.



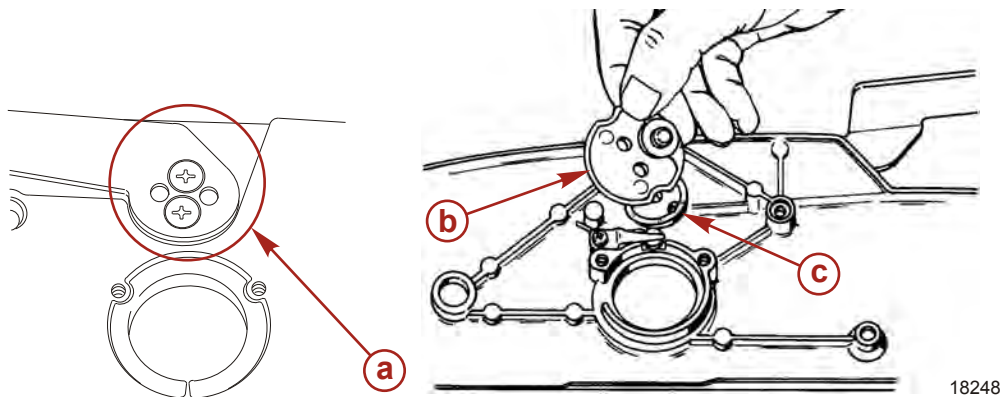
- a** - Screw securing the grip and the trim switch to the handle (2)

18. Push in the trim switch to remove it from the control handle.



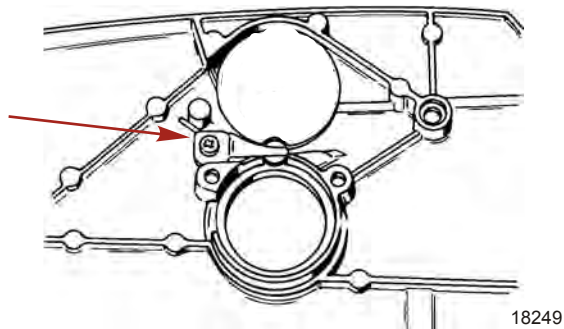
19. Remove the two screws securing the cold start lever to the drum assembly.

20. Remove the cold start lever, drum assembly, and wave washer.

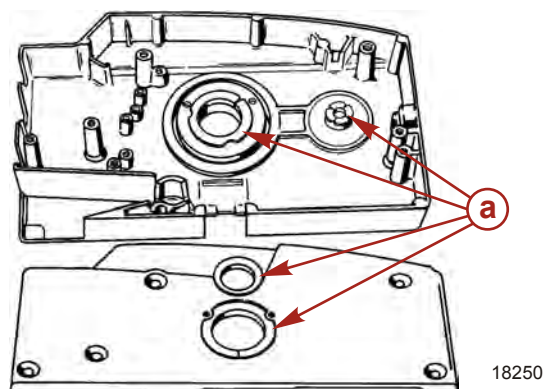


- a** - Screws retaining the cold start lever (2)
- b** - Drum assembly
- c** - Wave washer

21. Remove the screw securing the detent roller clip to the control housing. Remove the detent roller and spring.



22. Remove the control housing bushings.

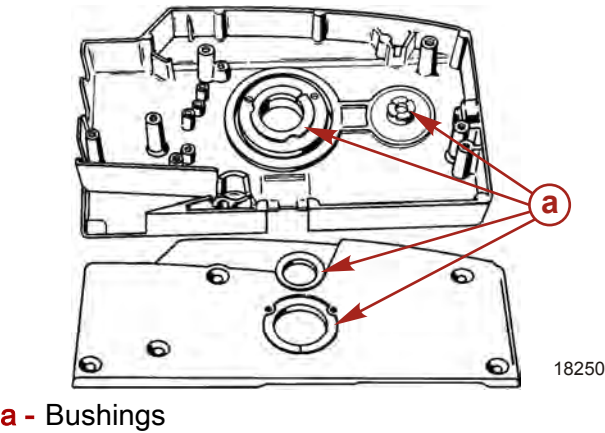


- a** - Bushings

Commander 2000 Side Mount Assembly

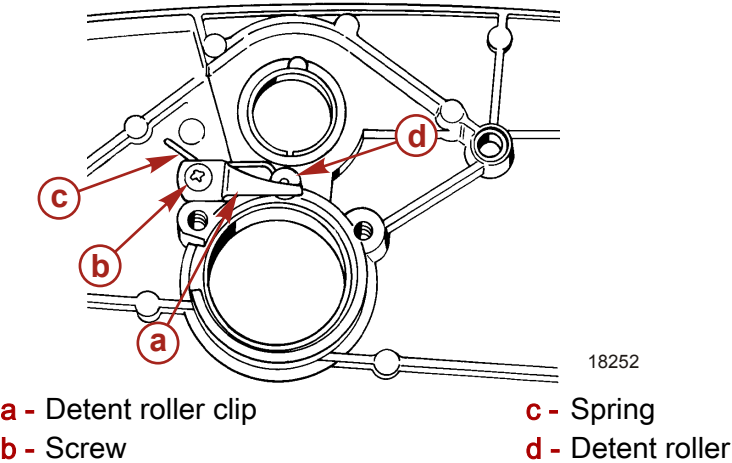
1. Lubricate the control housing bushings with 2-4-C with Teflon.

2. Install the bushings onto the remote control inside and outside housing.



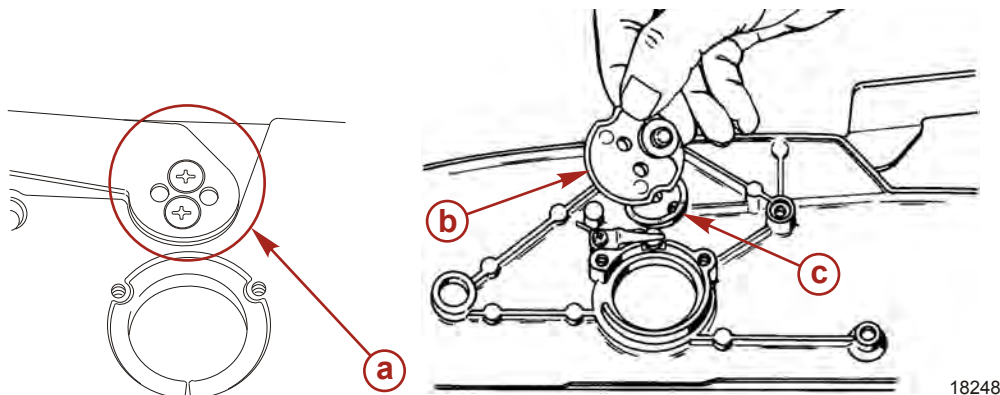
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control housing bushings	92-802859A1

3. Install the detent roller and spring. Retain the detent roller and spring with the detent roller clip. Secure the detent roller clip with a screw. Tighten the screw securely.



4. Lubricate the drum assembly and wave washer with 2-4-C with Teflon. Install the wave washer, and the drum assembly onto the control housing.

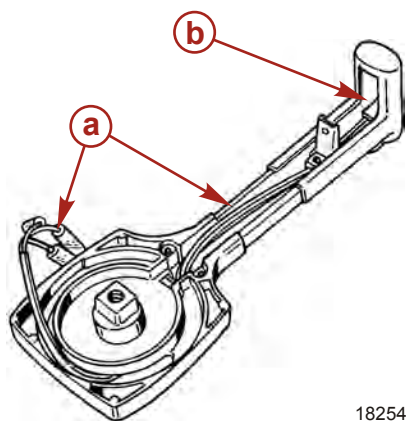
5. Install the cold start lever onto the drum assembly. Secure the cold start lever to the drum assembly with two screws. Tighten the screws securely.



- a** - Screws retaining the cold start lever (2)
- b** - Drum assembly
- c** - Wave washer

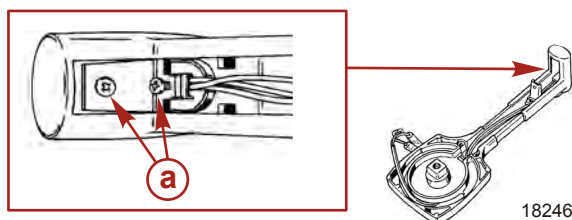
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Drum assembly, and wave washer	92-802859A1

6. Install the trim switch into the control handle, and route the wires through the handle.



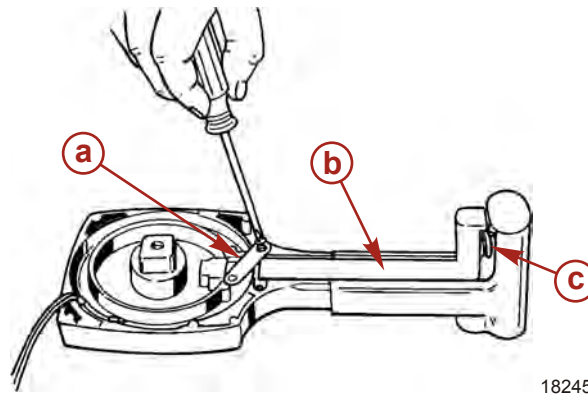
- a** - Trim wires
- b** - Trim switch

7. Install the handle grip onto the handle.
8. Secure the grip to the handle with a screw. Tighten the screw securely. Do not overtighten this screw, or damage to the grip will result.
9. Tighten the trim switch screw to prevent the trim switch from dislodging from the control handle. Do not overtighten this screw, or damage to the trim switch will result.



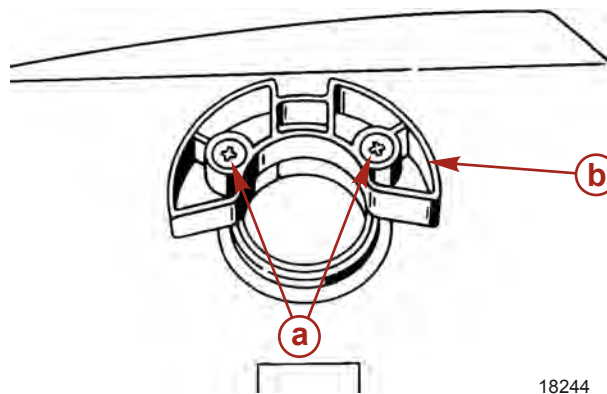
- a** - Screws retaining the grip, and trim switch to the handle (2)

10. Install the neutral lock lever spring, and neutral lock lever onto the control handle.
11. Secure the neutral lock lever to the handle with the neutral lock lever retainer and two screws. Tighten the screws securely.



- a** - Neutral lock lever retainer
- b** - Neutral lock lever
- c** - Neutral lock lever spring

12. Install the neutral lock holder, and secure with two screws. Tighten the screws to the specified torque.

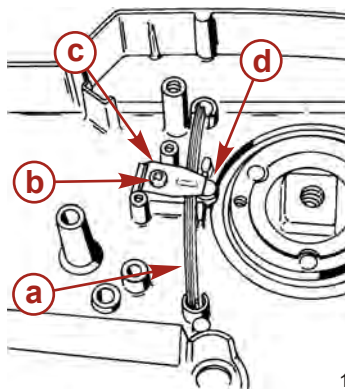


- a** - Screws securing the neutral lock holder (2)
- b** - Neutral lock holder

Description	Nm	lb. in.	lb. ft.
Neutral lock holder screw (2)	3.4	35	

13. Install the detent roller, and the detent spring. Retain the detent roller, and the detent spring with the detent clip and screw. Tighten the screw securely.

14. Lubricate the detent roller with 2-4-C with Teflon.



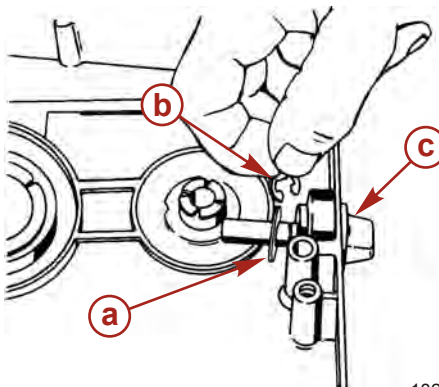
18242

- a** - Detent spring
- b** - Screw
- c** - Detent clip
- d** - Detent roller

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Detent roller	92-802859A1

15. Lubricate the throttle friction knob shaft with 2-4-C with Teflon.

16. Install the throttle friction knob into the control housing and retain with a wave washer and E-ring.

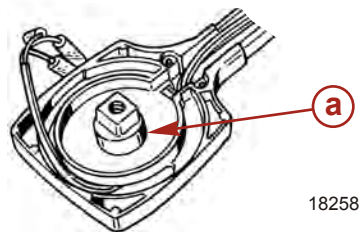


18243

- a** - Wave washer
- b** - E-ring
- c** - Throttle friction knob

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle friction knob shaft	92-802859A1

17. Lubricate the bushing area of the control handle with 2-4-C with Teflon.

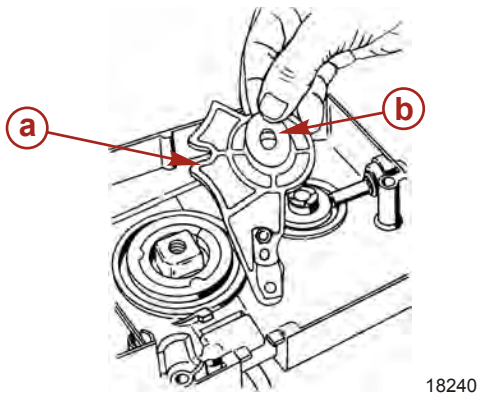


a - Lubricate with 2-4-C with Teflon

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Bushing area of control handle	92-802859A1

18. Install the control handle into the control housing.

19. Lubricate the gear shift arm, and the washer with 2-4-C with Teflon. Install the gear shift arm, and the washer onto the control housing.



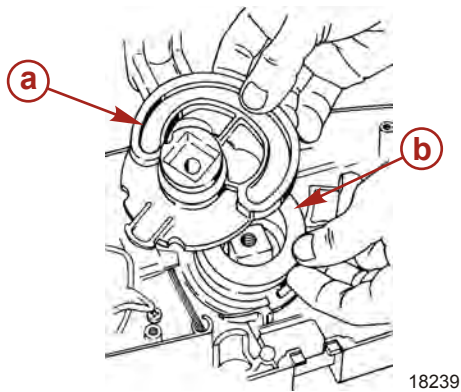
a - Gear shift arm
b - Washer

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Gear shift arm and washer	92-802859A1

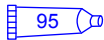
20. Lubricate the control cam and washer with 2-4-C with Teflon.

21. Install the washer onto the control handle.

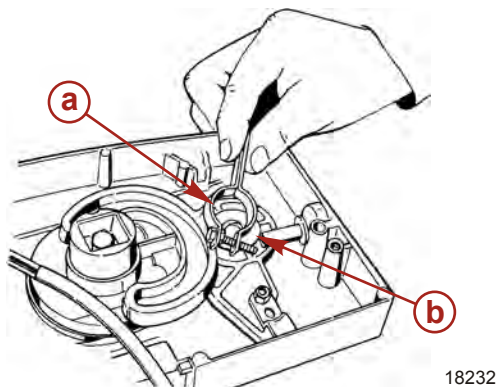
22. Install the control cam on top of the washer.



a - Control cam
b - Washer

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control cam and washer	92-802859A1

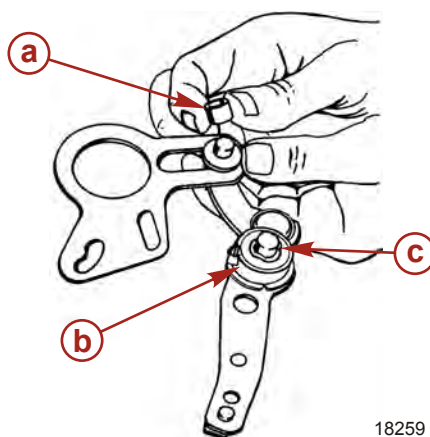
23. Thread the throttle friction clamp screw into the throttle friction knob three turns.



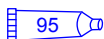
- a** - Throttle friction clamp
- b** - Washer

24. Lubricate the roller, bushing, and wave washer with 2-4-C with Teflon.

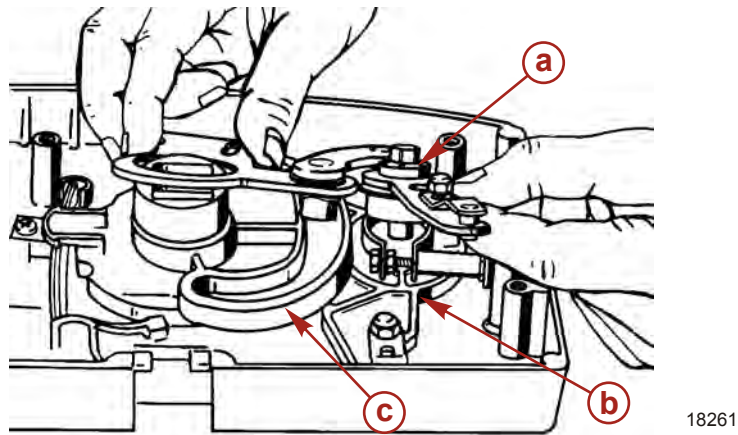
25. Install the roller, bushing, and wave washer onto the shift lever assembly.



- a** - Roller
- b** - Bushing
- c** - Wave washer

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Shift lever roller, bushing, and wave washer	92-802859A1

26. Install the shift lever assembly onto the throttle arm, and control cam.

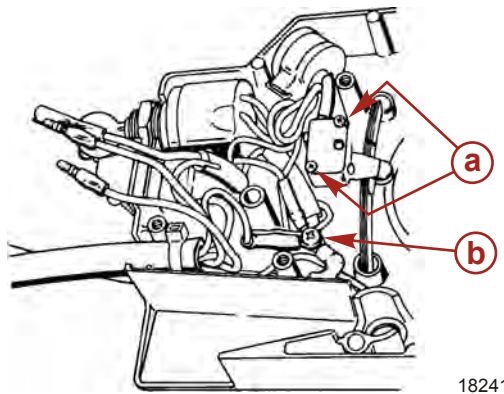


- a** - Throttle arm assembly
- b** - Gear shift
- c** - Control cam

27. Install the neutral start safety switch, and secure with two screws. Tighten the screws securely.

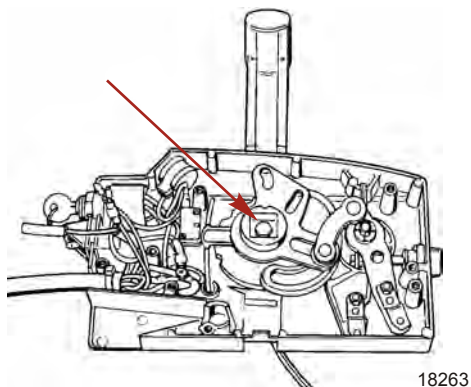
28. Install the key switch. Secure the key switch with the key switch nut.

29. Secure the ground wires to the control box with a screw. Tighten the screw securely.



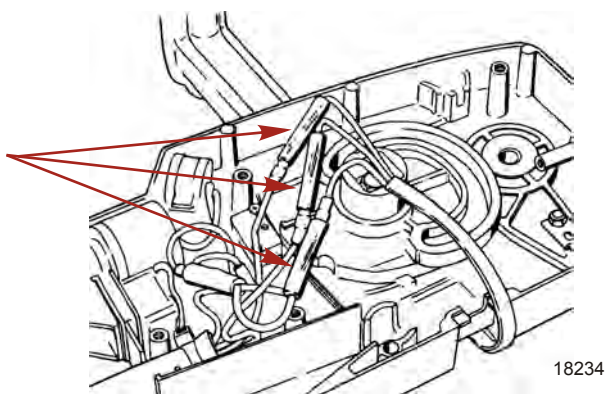
- a** - Screws securing the neutral start safety switch (2)
- b** - Remote control harness ground screw

30. Secure the control handle to the control cam with a bolt and washer. Tighten the bolt to the specified torque.

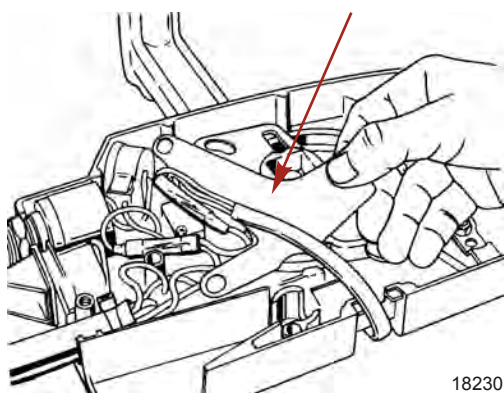


Description	Nm	lb. in.	lb. ft.
Control handle bolt	11	97	

31. Connect the trim switch wire connectors to the control harness wires.

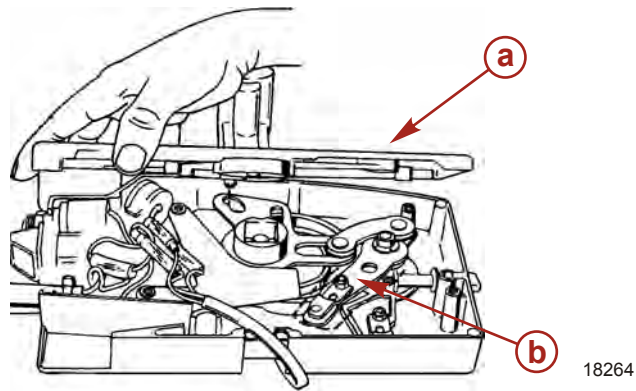


32. Install the wire separator.



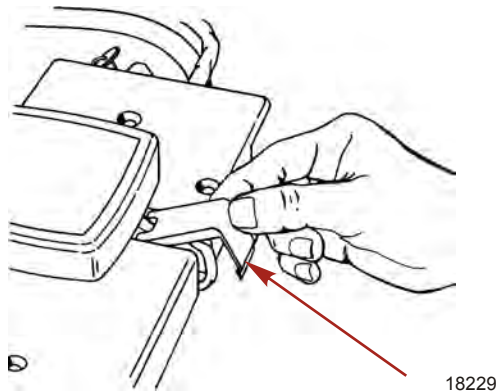
33. Use the control handle to position the throttle lever assembly into the idle position.

34. Install the top housing cover. Secure with three screws. Tighten the screws securely.



- a** - Top housing cover
- b** - Throttle lever assembly idle position

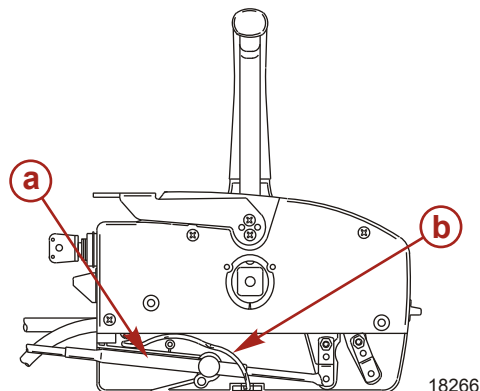
35. Install the wire cover.



Shift and Throttle Cable Installation

1. Insert the shift cable barrel into the control housing.

IMPORTANT: The shift cable and the throttle cable must be routed under the trim switch wires.

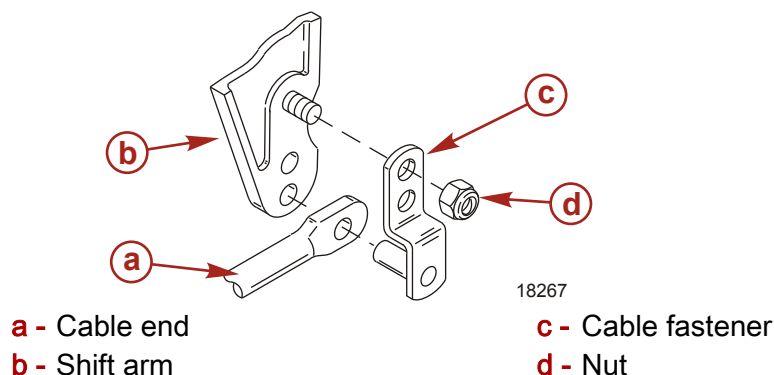


- a** - Shift cable
- b** - Trim switch wires

2. Loosen the cable fastener nut to install the cable end.

NOTE: The nut and cable retainer do not need to be completely removed for the cable end installation.

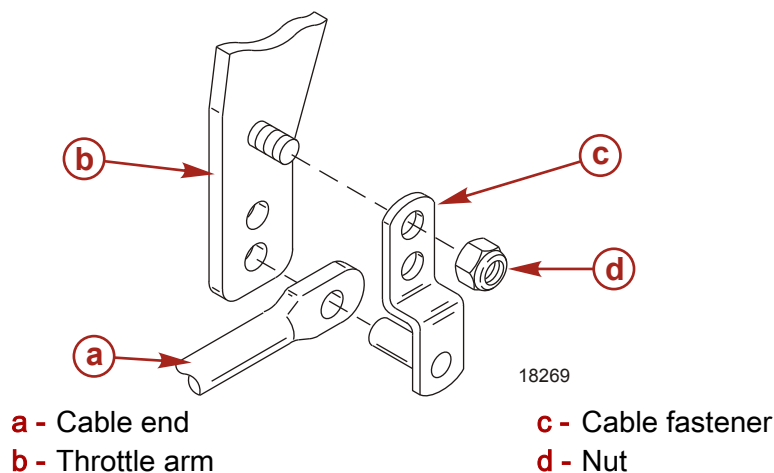
3. Lubricate the pin on the shift cable fastener with 2-4-C with Teflon.
4. Insert the pin on the end of the cable fastener through the hole in the cable end. Secure the shift cable end to the shift arm with the cable fastener nut. Tighten the nut to the specified torque.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Pin on the shift cable fastener	92-802859A1

Description	Nm	lb. in.	lb. ft.
Cable fastener nut	4.8	43	

5. Lubricate the pin on the throttle cable fastener with 2-4-C with Teflon.
6. Insert the pin on the end of the cable fastener through the hole in the cable end.
7. Insert the throttle cable into the bottom hole on the throttle arm.
8. Secure the throttle cable end to the throttle arm with the cable fastener nut. Tighten the nut to the specified torque.

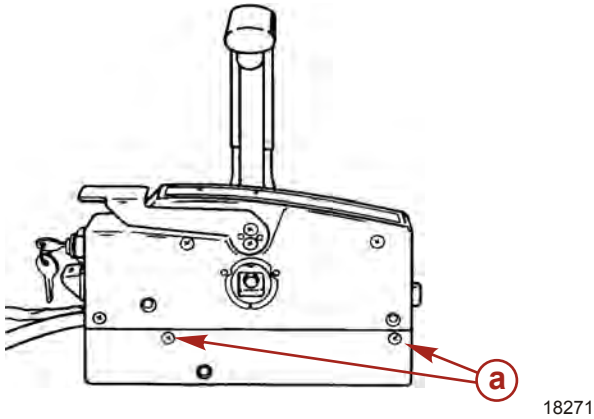


Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Pin on the throttle cable fastener	92-802859A1

Description	Nm	lb. in.	lb. ft.
Cable fastener nut	4.8	43	

9. Install the throttle cable barrel into the lower housing cover.

10. Secure the lower housing cover to the control box assembly with two screws. Tighten the screws to the specified torque.



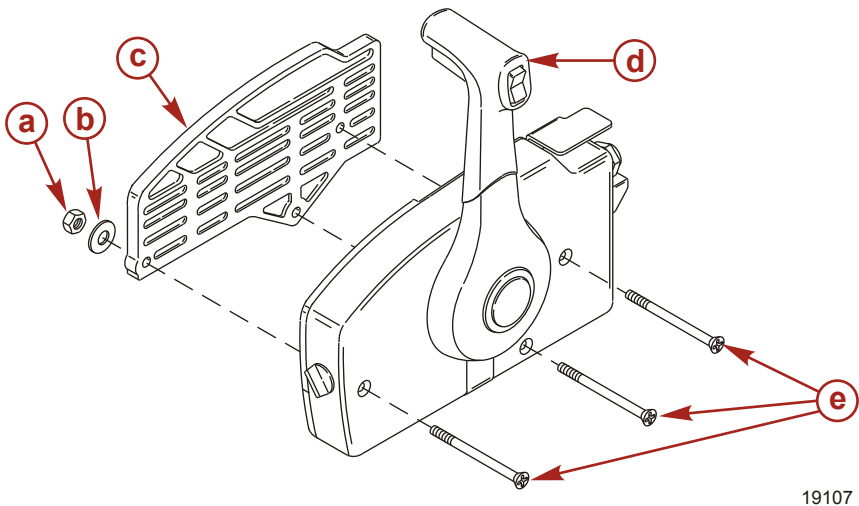
a - Lower housing cover screws (2)

Description	Nm	lb. in.	lb. ft.
Lower housing cover screw (2)	4	35	

Commander 2000 Installation

1. Insert the three screws through the control box
2. Install the mounting spacer onto the three screws if required.
3. Install the remote control onto the mounting platform.
4. Secure the remote control to the mounting platform with three washers and nuts. Tighten the nuts securely.

NOTE: The nuts and washers can be substituted with well nuts.

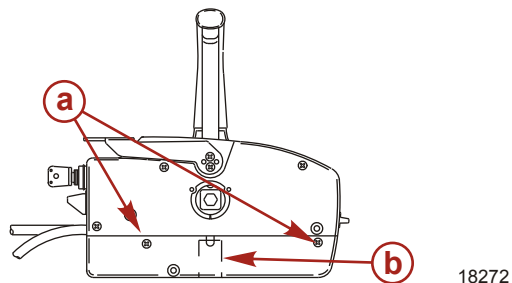


a - Nut (3)
b - Washer (3)
c - Mounting spacer

d - Remote control
e - Screw (3)

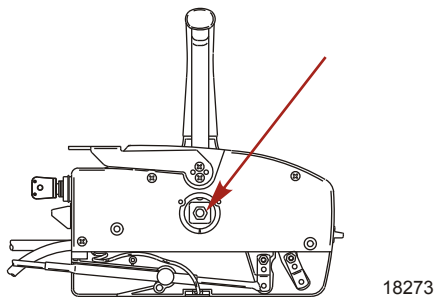
Control Handle Port Side Mounting Conversion

1. Remove the lower housing cover and the wire cover.

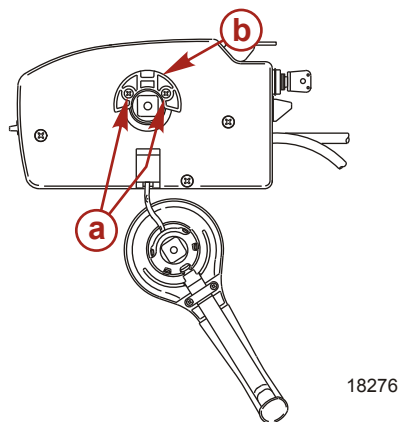


- a** - Screws securing the lower housing cover (2)
b - Wire cover

2. Loosen the control handle bolt four turns, and tap on the bolt to dislodge the control handle from the control cam.
3. Remove and retain the bolt and washer from the control handle. Remove the control handle.



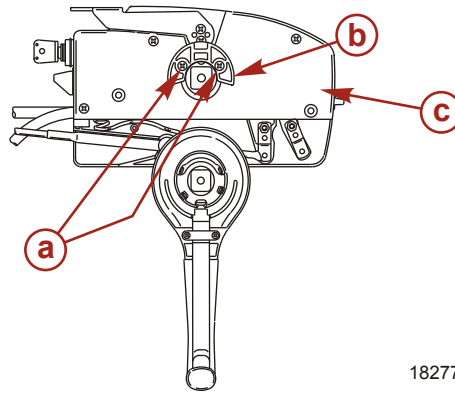
4. Remove and retain the two screws, and lockwashers securing the neutral lock holder to the control assembly.



- a** - Screws securing the neutral lock holder (2)
b - Neutral lock holder

5. Install the neutral lock holder on the opposite side of the control box.

6. Secure with two lockwashers and screws. Tighten the screws to the specified torque.

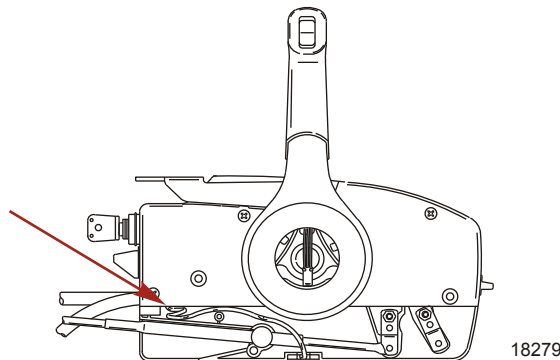


18277

- a** - Screw securing the neutral lock holder (2)
- b** - Neutral lock holder
- c** - Upper back cover

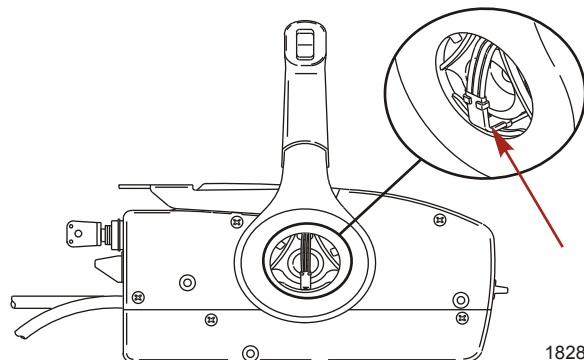
Description	Nm	lb. in.	lb. ft.
Screw securing the neutral lock holder (2)	3.4	35	

7. Install the control handle onto the control housing assembly. Retain the control handle with a lockwasher and bolt. Do not tighten the bolt at this time.
8. Pry the control handle cover off to access the trim switch wires.
9. Route the excess trim wires as shown to prevent interference with the shift and throttle cables.



18279

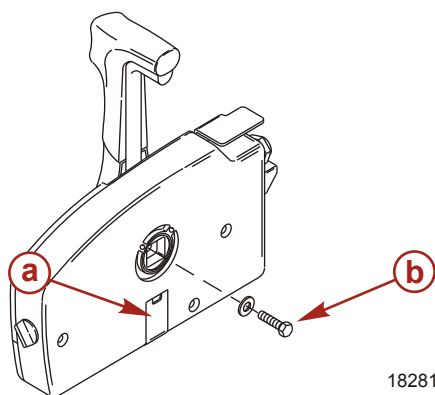
10. Install the lower housing cover. Secure with two screws. Tighten the screws securely. **IMPORTANT: The trim wires must pass through a slot at the top of the lower back cover. The wire protector inside the control handle must be bent at 90° as shown.**



18280

11. Install the wire cover.

12. Tighten the control handle bolt to the specified torque.



a - Wire cover

b - Control handle bolt

Description	Nm	lb. in.	lb. ft.
Control handle bolt	11	97	

Commander Controls

Section 4D - Commander Console Mount Control

Table of Contents

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Removing Trim Switch from the Control Handle.....	4D-9	Commander Console Mount Control Handle and Trim Switch Installation.....	4D-20

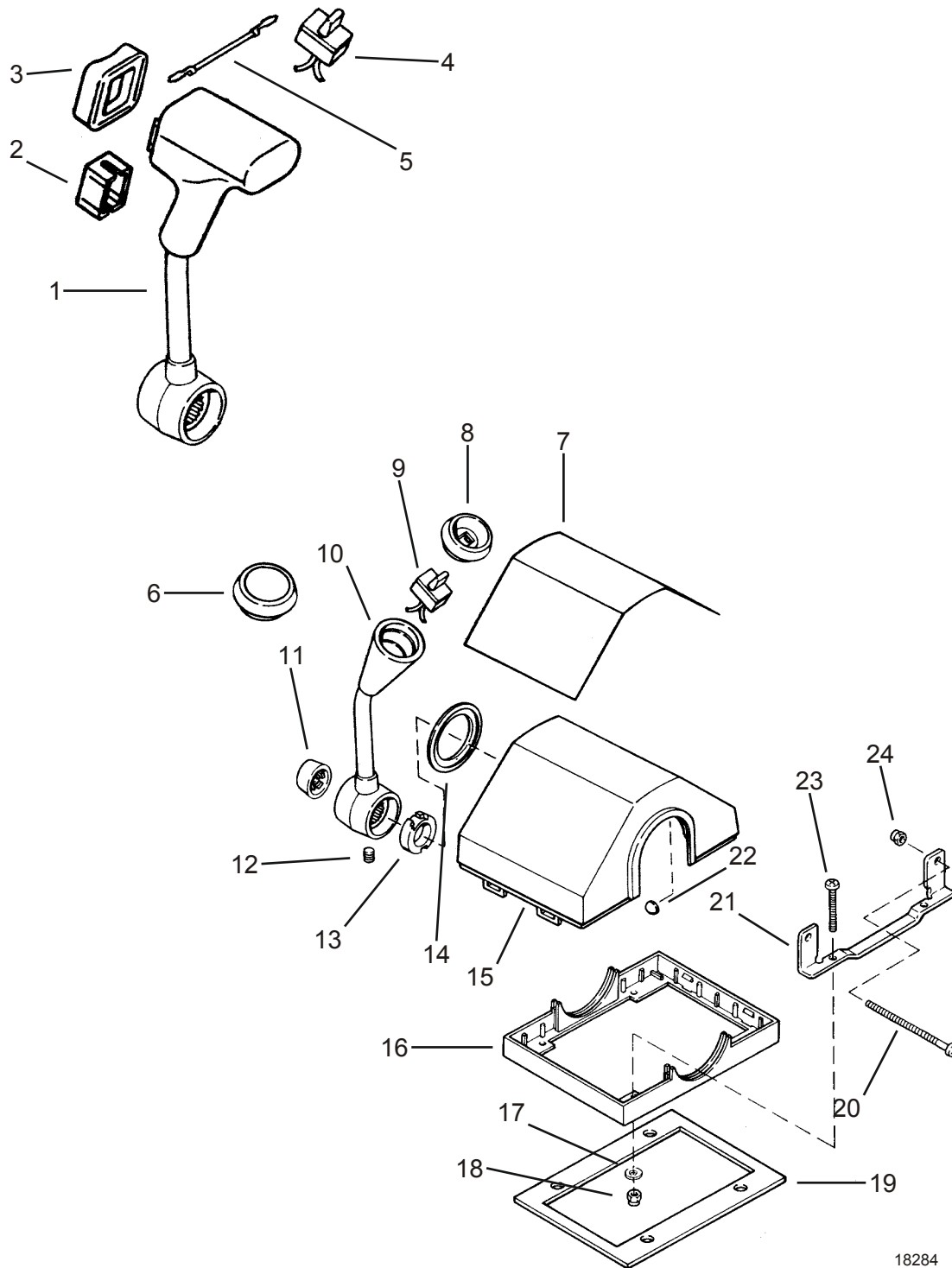


Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Trim switch wire solder joint	92-25711-3
 62	Cyanacrylate Adhesive	Trim switch cover	Obtain Locally
 95	2-4-C with Teflon	Stepped washer, throttle-only shaft, and barrel	92-802859A1
		Throttle-only shaft pin, shift gear ball	
		Shift gear pin, shift gear, shift pinion gear, and bushing	
		Recess of control module housing; control shaft bushing	
		Areas of the control module housing outlined in light gray	
		Control module housing, shift gear ball/nylon plug and spring	
		Throttle link assembly	
		Control module assembly back cover	
		Throttle and shift cable ends	

Notes:

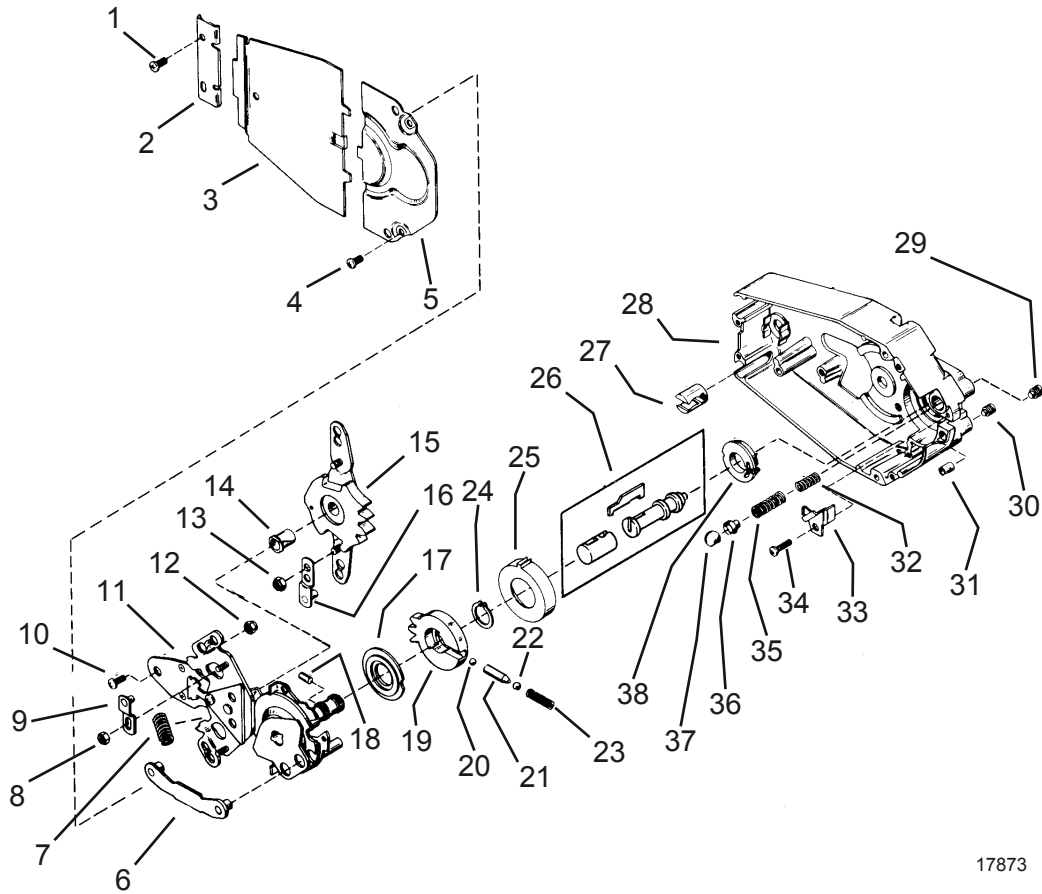
Commander Console Mount Control Components



Commander Console Mount Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Control handle			
2	1	Non-trim insert			
3	1	Cover			
4	1	Trim switch			
5	1	Red wire			
6	1	Knob insert			
7	1	Decal			
8	1	Cover			
9	1	Trim switch			
10	1	Control handle			
11	1	Throttle-only button			
12	1	Set screw	8	71	
13	1	Rotor			
14	1	Adapter disc			
15	1	Control cover			
16	1	Base			
17	4	Washer			
18	4	Nut	Tighten securely		
19	1	Gasket			
20	2	Screw	4	35	
21	1	Control mounting bracket			
22	2	Control cover bumper			
23	4	Screw	Tighten securely		
24	2	Nut	4	35	

Control Housing Module Components



17873

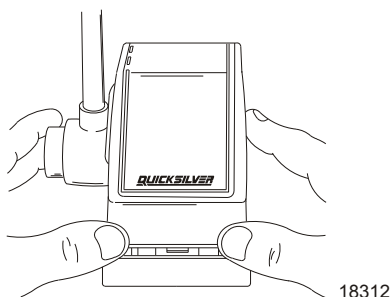
Control Housing Module Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Retainer attaching screw	7	60	
2	1	Cable retainer			
3	1	Access cover			
4	2	Back cover attaching screw	7	60	
5	1	Back cover			
6	1	Throttle link assembly			
7	1	Throttle lever compression spring			
8	1	Throttle cable fastener nut			
9	1	Throttle cable fastener			
10	3	Bearing plate assembly screw			
11	1	Bearing plate assembly			
12	2	Neutral start switch nut			
13	1	Shift cable fastener nut			
14	1	Shift pinion bearing			
15	1	Shift lever assembly			
16	1	Shift cable fastener			
17	1	Shift gear stepped washer			
18	1	Throttle-only shaft pin			
19	1	Shift gear			
20	1	Inner shift gear ball			
21	1	Shift gear pin			
22	1	Outer shift gear ball			
23	1	Shift gear spring			
24	1	Bearing plate retainer			
25	1	Trim wire harness retainer			
26	1	Throttle-only shaft assembly			
27	2	Control housing grommet			
28	1	Control housing			
29	1	Throttle friction screw			
30	1	Shift detent friction screw			
31	1	Friction pad			
32	1	Outer detent compression spring			
33	1	Trim wire harness retainer			
34	1	Trim wire harness retainer screw			
35	1	Spring			
36	1	Throttle-only plug			
37	1	Throttle-only ball (early models)			
38	1	Control shaft bushing			

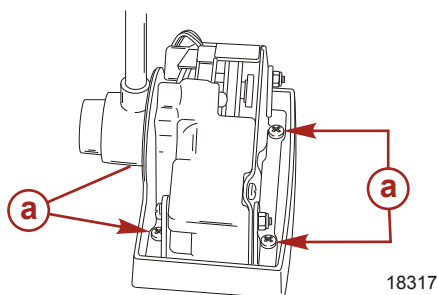
Commander Console Mount Control Handle and Trim Switch Removal

NOTE: The following procedure will show the single and dual handle console mounted controls.

1. Remove the control console cover.

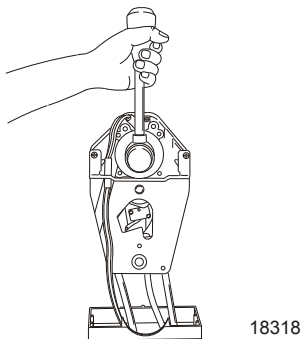


2. Remove the four screws securing the control module assembly to the console.

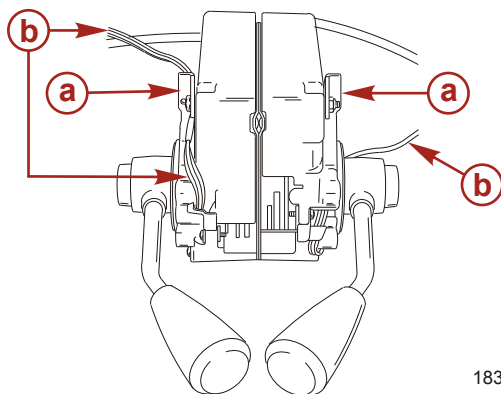


a - Screws (4) securing control to console

3. Lift the control module assembly from the console mounting area.



4. Remove the mounting brackets from the control module assembly.



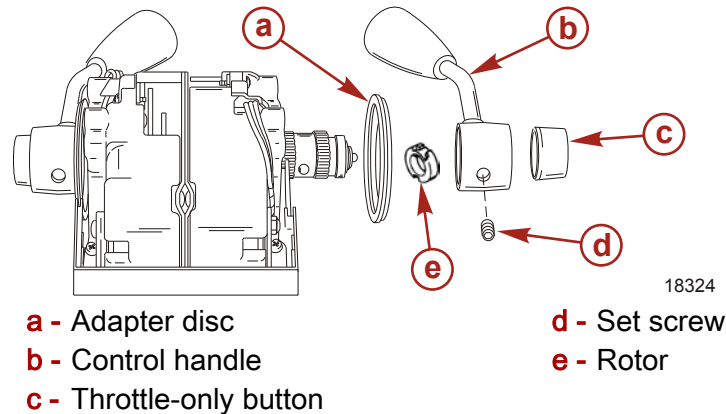
a - Mounting brackets

b - Trim switch wires

5. Position the control handle into full forward.
6. Pry the throttle-only button from the control handle.
7. Loosen the control handle set screw several turns out. Slide the control handle off the splined control shaft.

NOTE: If a trim switch is mounted in the control handle, the trim wires can be removed from the control module after the control module has been partially disassembled.

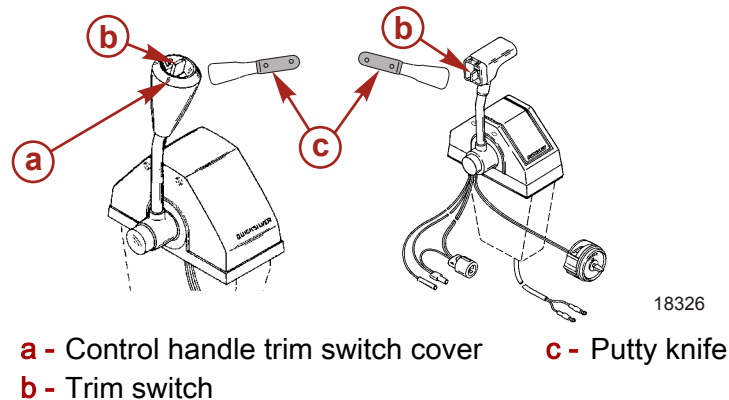
8. Remove the rotor and adapter disc.



Removing Trim Switch from the Control Handle

NOTE: The control handle trim switch cover is glued onto the control handle, and should not be removed unless the trim switch has failed. Removal of the control handle trim switch cover will damage the cover and will require the part to be replaced.

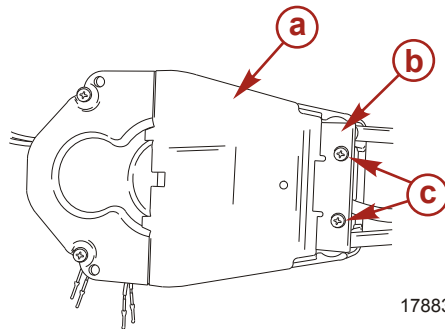
1. Use a putty knife, or utility knife, to pry and remove the control handle trim switch cover.
2. Lift the trim switch out of the control handle, and cut the trim switch wires close to the trim switch. The trim switch wires can be pulled out the bottom of the control handle.



Commander Control Module Disassembly

1. Remove the two screws securing the cable retainer to the control housing. Retain the two screws for reassembly.

2. Remove the cable retainer, and the access cover from the housing.

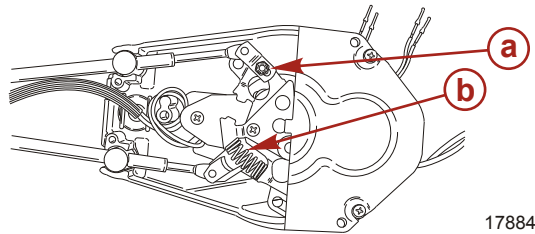


a - Access cover

b - Cable retainer

c - Cable retainer screws

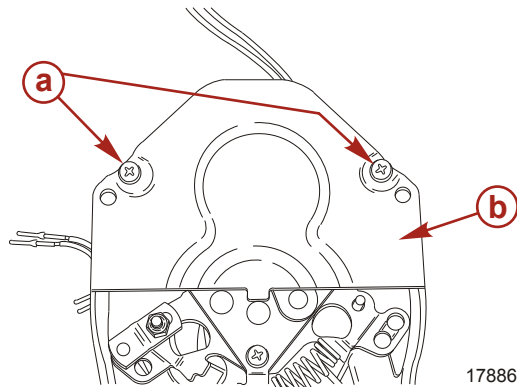
3. Loosen the nuts securing the shift and throttle cables to the remote control housing.



a - Nut securing the throttle cable

b - Nut securing the shift cable (hidden under the spring)

4. Remove the two screws securing the back cover to the control module assembly.
Remove the back cover from the control module assembly.

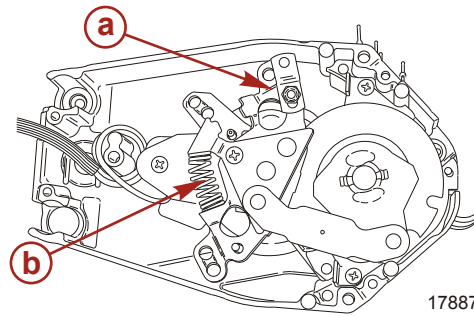


a - Screws securing the back cover (2)

b - Back cover

5. Temporarily install the control handle onto the splined control shaft.
6. Position the control handle into full forward. Remove the control handle.

7. Remove the throttle lever compression spring from the throttle lever.



a - Throttle lever

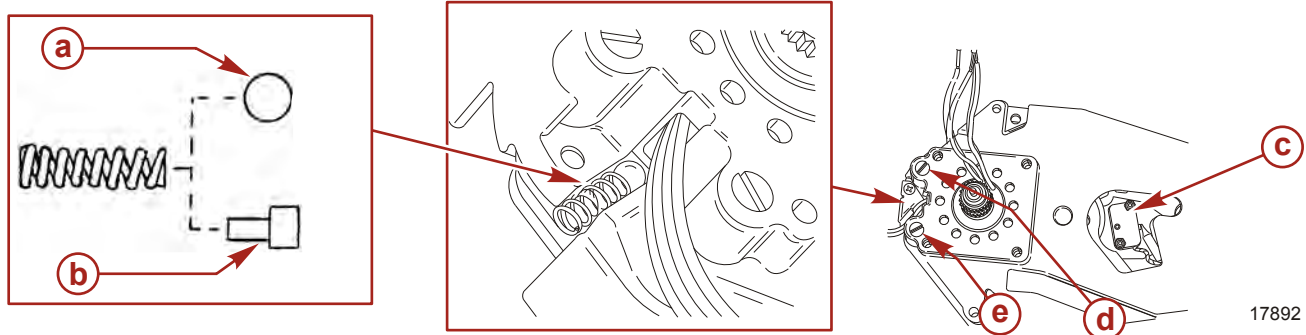
b - Throttle lever compression spring

8. Thread the shift detent adjustment screw and the control handle friction screw out until they are flush with the control module casting.

NOTE: It is not necessary to remove the shift detent adjustment screw or the control handle friction screw, unless replacement of the screws is required.

9. Remove the two locknuts securing the neutral start safety switch to the bearing plate assembly. Pull the neutral start safety switch away from the bearing plate assembly.
10. Remove the screw securing the retaining clip to the control module. Remove the retaining clip, gear shift spring, and throttle-only plug from the control module.

NOTE: Early models will have a throttle-only ball bearing instead of a throttle-only plug.



a - Throttle-only ball bearing (early models)

b - Throttle-only plug

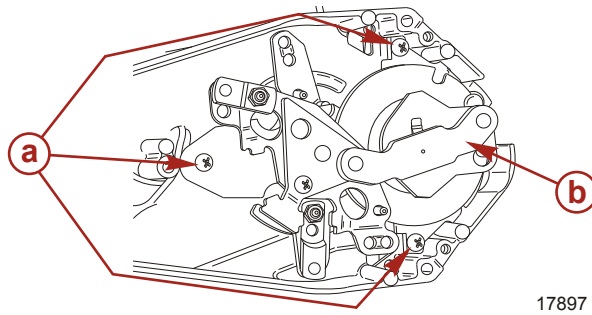
c - Neutral start safety switch

d - Detent adjustment screw

e - Control handle friction adjustment screw

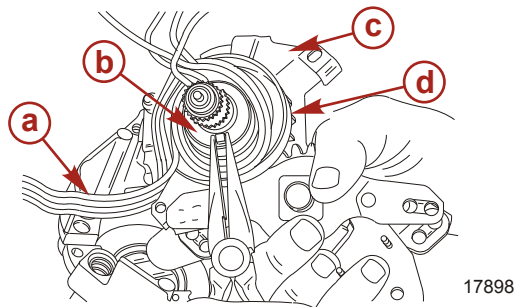
11. Temporarily install the control handle onto the splined control shaft.
12. Ensure the control module housing assembly is in the neutral detent position. Remove the control handle.
13. Pull the throttle link off the module.

14. Remove the three screws securing the bearing plate assembly to the control module housing.



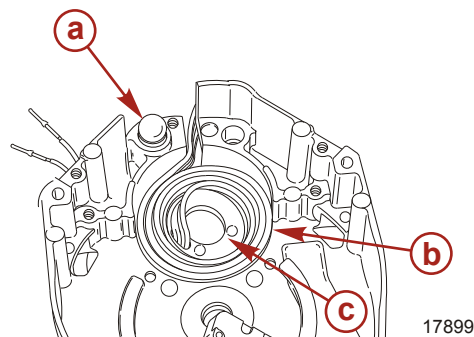
- a** - Screws securing the bearing plate assembly (3)
b - Throttle link

15. Lift the bearing plate assembly out of the control module housing.
16. Remove the trim wires, trim wire retainer, and the control shaft bushing from the bearing plate assembly.



- a** - Trim wires
b - Control shaft bushing
c - Bearing plate assembly
d - Trim wire retainer

17. If the trim wires, trim wire retainer, and the control shaft bushing remained in the control module housing, remove the trim wires, trim wire retainer, and the control shaft bushing from the control module housing.
18. Remove the detent ball, detent ball follower, and two compression springs located beneath the detent ball follower.

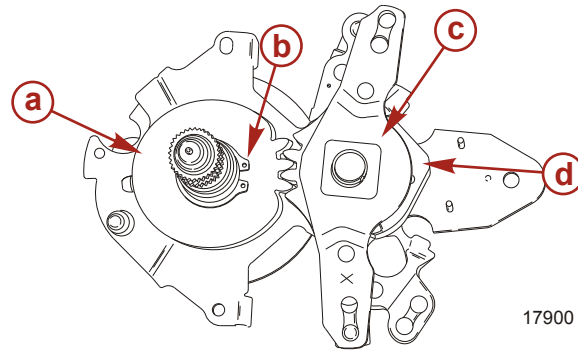


- a** - Detent ball, detent ball follower, and two compression springs
b - Trim wire retainer
c - Control shaft bushing

19. Lift the shift pinion gear with the attached shift lever from the bearing plate.

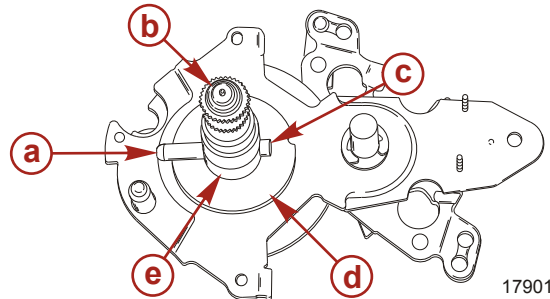
NOTE: The shift lever is pressed onto the shift pinion gear. If the shift lever or shift pinion gear is damaged, replace as an assembly.

20. Remove the bearing plate retainer securing the shift gear to the control shaft. Remove the shift gear from control shaft.
21. Remove the shift lever from the bearing plate assembly.



- | | |
|-----------------------------------|------------------------------|
| a - Shift gear | c - Shift lever |
| b - Bearing plate retainer | d - Shift pinion gear |

22. Remove the shift gear pin, inner shift gear ball, throttle-only shaft pin, and the throttle-only shaft from the control shaft.

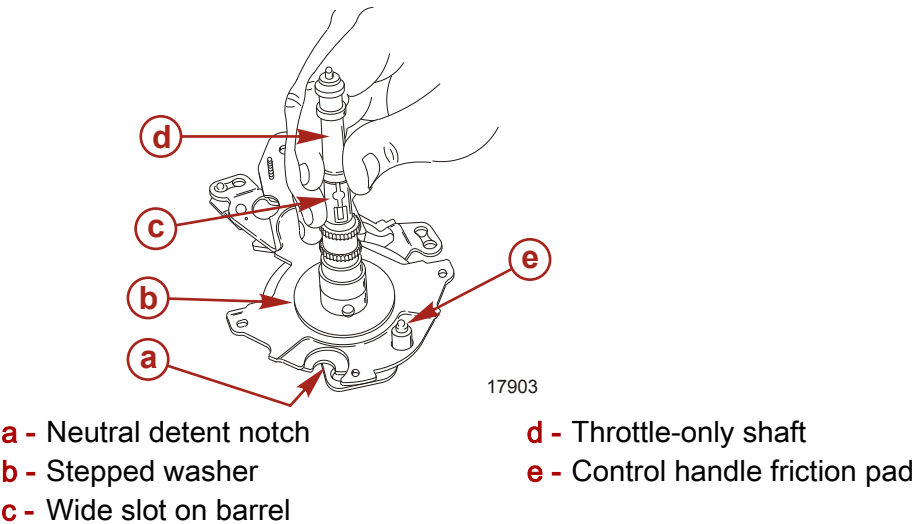


- | | |
|------------------------------------|---|
| a - Shift gear pin | d - Stepped washer |
| b - Throttle-only shaft | e - Inner shift gear ball (hidden) |
| c - Throttle-only shaft pin | |

Commander Control Module Assembly

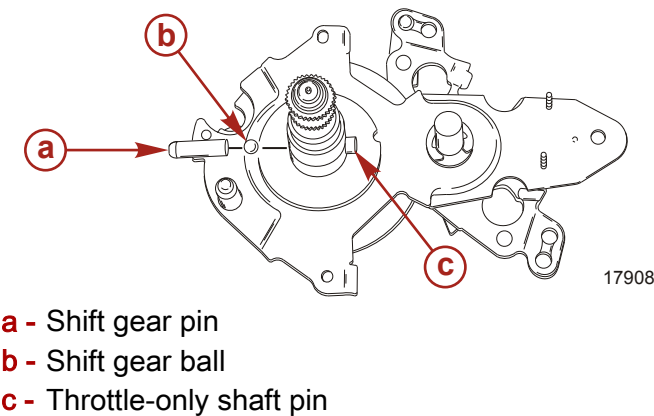
1. Apply 2-4-C with Teflon onto the stepped washer, and install the stepped washer over the control shaft. The steps of the washer should be against the bearing plate.
2. Rotate the control shaft until the neutral detent notch is at the position shown.
3. Apply 2-4-C with Teflon onto the throttle-only shaft and barrel. Install the throttle-only shaft onto the barrel.

4. Install the throttle-only shaft and barrel assembly into the control shaft. The wide slot in the barrel must be on the same side as the neutral detent notch and control handle friction pad.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Stepped washer, throttle-only shaft, and barrel	92-802859A1

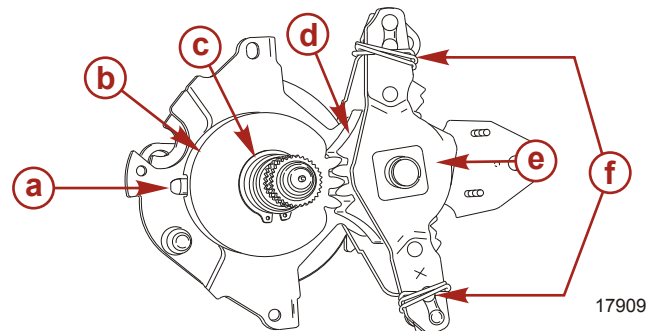
5. Apply 2-4-C with Teflon onto the throttle-only shaft. Insert the throttle-only shaft pin into the control shaft and the hole in the barrel.
- NOTE:** The throttle-only shaft pin is properly installed when the throttle-only shaft cannot be removed.
6. Apply 2-4-C with Teflon onto the smallest of the three balls removed during the disassembly process.
7. Insert the shift gear ball into the control shaft and the hole in the barrel.
8. Apply 2-4-C with Teflon onto the shift gear pin and insert the shift gear pin into the control shaft. The rounded end of the shift gear pin should be facing away from the control shaft.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle-only shaft pin, shift gear ball	92-802859A1

9. Apply 2-4-C with Teflon onto the entire shift gear.

10. Install the shift gear onto the control shaft and secure in place with the bearing plate retainer.
11. Apply 2-4-C with Teflon onto the entire shift pinion gear and bushing.
12. Install the bushing into the gear, and the gear onto the bearing plate.
13. Use two rubber bands to hold the shift pinion gear in place on the bearing plate.

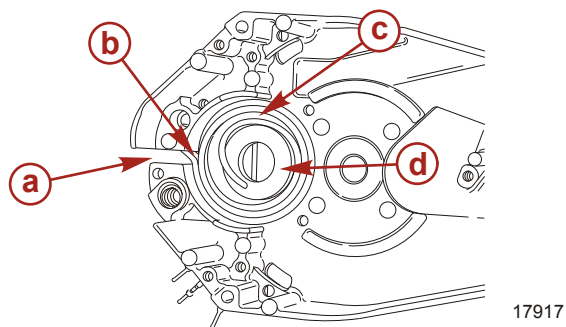


- a - Shift gear pin
- b - Shift gear
- c - Bearing plate retainer
- d - Shift pinion gear and bushing
- e - Shift lever
- f - Rubber bands

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Shift gear pin, shift gear, shift pinion gear, and bushing	92-802859A1

14. Apply 2-4-C with Teflon into the recess of the control module housing where the trim harness will be positioned.
15. Insert the end of the trim harness through the control shaft bushing.
16. Apply 2-4-C with Teflon onto the entire control shaft bushing. Install the control shaft bushing into the control module housing.
17. Coil the trim harness inside of the control module housing in a clockwise direction.

IMPORTANT: The black line that is across the trim harness must be positioned at the control module housing slot.

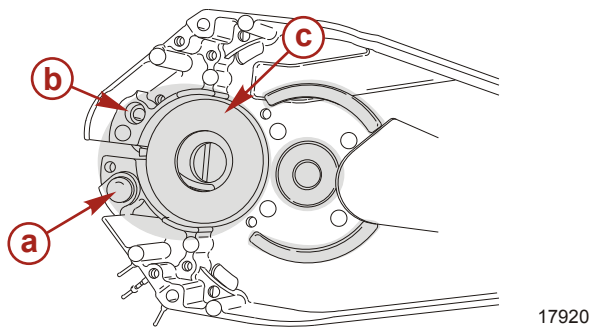


- a - Control module housing slot
- b - Black line across the trim harness
- c - Trim harness
- d - Control shaft bushing

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Recess of control module housing; control shaft bushing	92-802859A1

18. Install the two detent springs, follower, and detent ball into the control module housing.

- 19. Install the trim harness retainer over the trim harness.
- 20. Apply 2-4-C with Teflon onto the areas of the control module housing outlined in light gray.

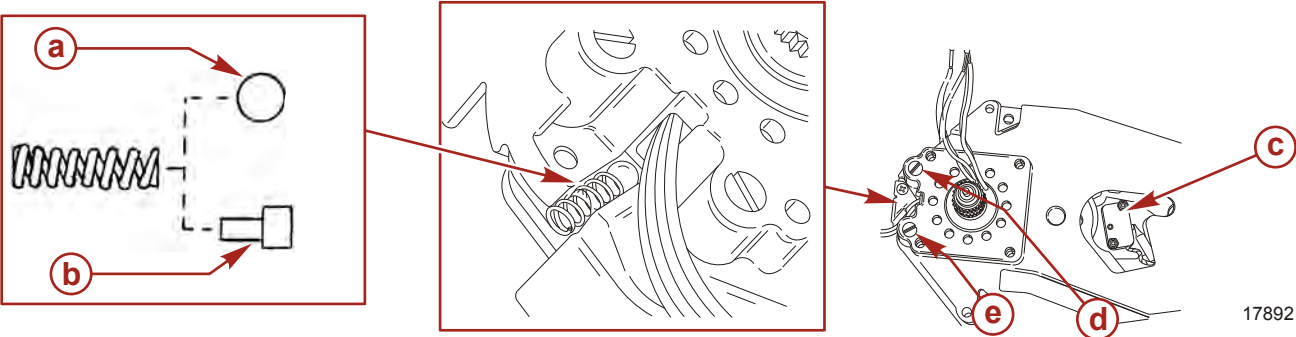


Gray area to be lubricated

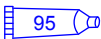
- a - Detent ball, follower, and springs
- b - Control handle friction pad
- c - Trim harness retainer

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Areas of the control module housing outlined in light gray	92-802859A1

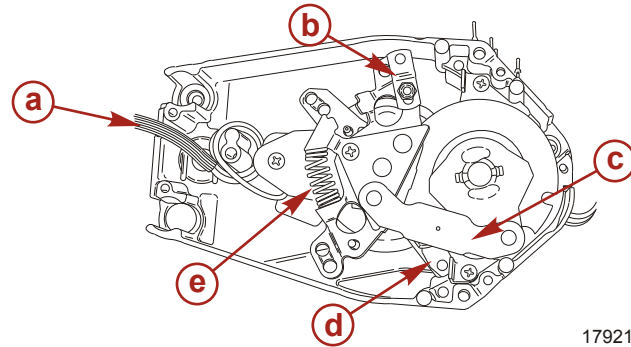
- 21. Install the bearing plate assembly into the control module housing and secure with three screws. Remove the rubber bands.
- 22. Apply 2-4-C with Teflon onto the shift gear ball/nylon plug and spring.
- 23. Turn the control module over and position the shift gear ball/nylon plug and spring into the control module.
- 24. Secure the shift gear ball, spring, and trim wire harness to the control module with a retaining clip. Secure the retaining clip with a screw. Tighten the screw securely.
- 25. Install the neutral start safety switch onto the bearing plate assembly with two self-locking nuts. Do not overtighten the self-locking nuts.



- a - Throttle-only ball bearing (early models)
- b - Throttle-only plug
- c - Neutral start safety switch
- d - Detent adjustment screw
- e - Control handle friction adjustment screw

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control module housing, shift gear ball/nylon plug and spring	92-802859A1

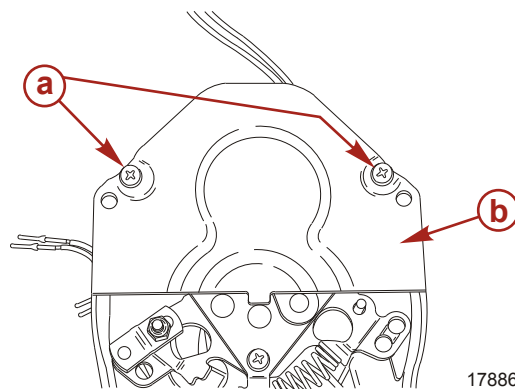
26. Temporarily install the control handle onto the control shaft.
27. Move the handle to ensure the control module assembly is in the forward detent position. Remove the control handle.
28. Apply 2-4-C with Teflon onto the throttle link assembly and install the throttle link assembly into the control module.
29. Install the compression spring into the control module assembly.



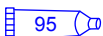
- a** - Neutral start safety switch wire harness
- b** - Throttle lever
- c** - Throttle link assembly
- d** - Shift lever
- e** - Compression spring

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle link assembly	92-802859A1

30. Temporarily install the control handle onto the control shaft.
31. Move the handle to ensure the control module assembly is in the neutral detent position. Remove the handle.
32. Apply 2-4-C with Teflon onto the inside half of the control module assembly back cover.
33. Install the back cover onto the control module, and secure with two screws. Tighten the screws to the specified torque.



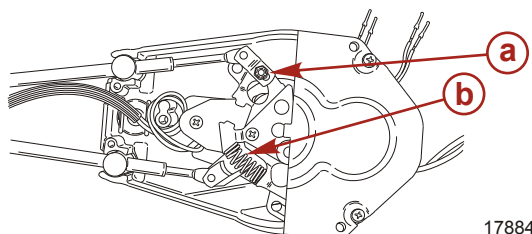
- a** - Screws securing back cover
- b** - Back cover

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control module assembly back cover	92-802859A1

Description	Nm	lb. in.	lb. ft.
Screw (2)	7	60	

34. Lubricate the throttle and shift cable ends with 2-4-C with Teflon.

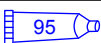
35. Install the throttle and shift cables. Secure cable ends to the control module assembly with a nut. Tighten the nuts securely.



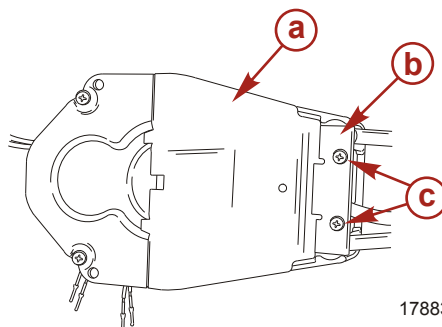
17884

a - Nut securing throttle cable

b - Nut securing shift cable (hidden under the spring)

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle and shift cable ends	92-802859A1

36. Install the cable retainer. Secure with two screws. Tighten the screws to the specified torque.



17883

a - Bottom cover

b - Cable retainer

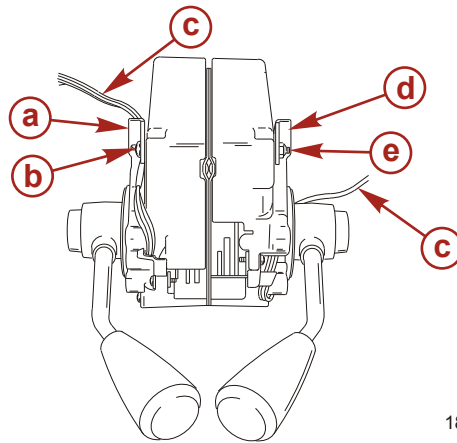
c - Cable retainer screw (2)

Description	Nm	lb. in.	lb. ft.
Cable retainer screw	7	60	

Control Module Assembly Installation

1. Place the modules back to back.
2. Position a mounting bracket onto each module, and insert two 51 mm (4 in.) screws through the brackets and control module assemblies.

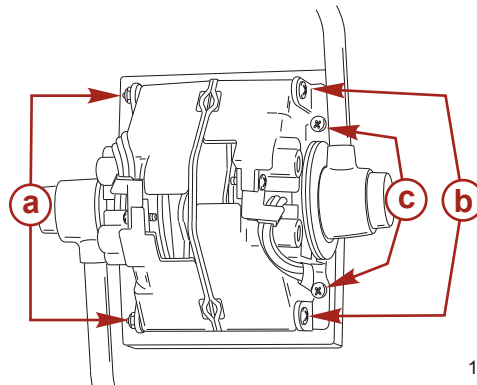
3. Secure the brackets to the modules with two nuts. Do not tighten the nuts.



18382

- a** - Bracket (2)
- b** - Screw (2)
- c** - Trim wire harness
- d** - Nut (2)

4. Install the control module assembly onto the control mounting base.
5. Install the four screws through the mounting brackets and into the mounting base. Tighten the screws securely.
6. Move the control handles in opposite directions, full forward and full reverse.
7. Apply a light amount of downward pressure on each of the control handles to align the control modules.
8. Ensure the plastic sleeves on the trim wire harness is positioned between the mounting bracket and the control module assembly.
9. Tighten the two 51 mm (4 in.) screws and nuts to the specified torque.



18383

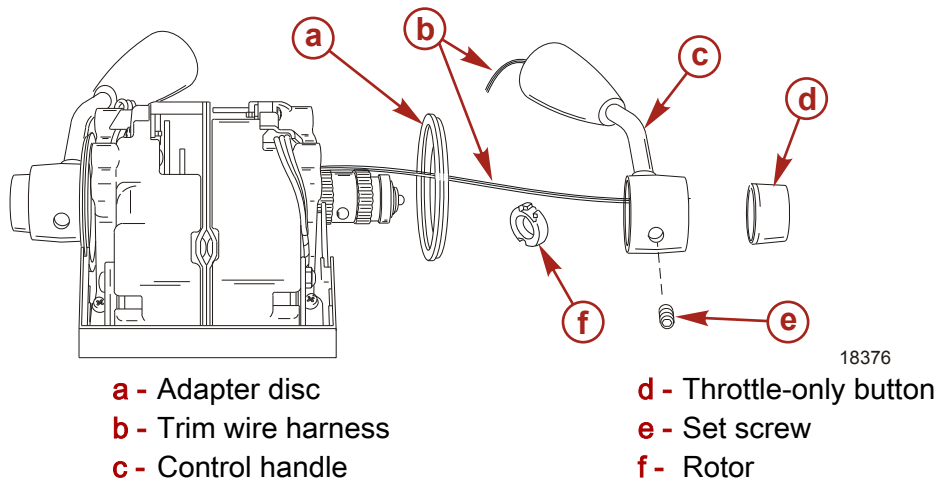
- a** - Nuts (2)
- b** - Screws (2) (51 mm [4 in.])
- c** - Screws (4)

Description	Nm	lb. in.	lb. ft.
Screws (2) and nuts holding control modules together	4	35	

10. Install the cover over the control module assemblies.

Commander Console Mount Control Handle and Trim Switch Installation

- 1. Guide the trim wire harness through the adapter disc, and the control handle.
- 2. Insert the rotor into the control handle. Ensure the notch in the rotor captures the trim wire harness inside the control handle.
- 3. Install the control handle onto the splined control shaft while pulling the trim wires through the top of the control handle. Ensure the control module assembly is in the neutral position and the control handle is correctly orientated.
- 4. Secure the control handle to the splined control shaft with the set screw. Tighten the set screw to the specified torque.
- 5. Push the throttle-only button onto the splined control shaft.



Description	Nm	lb. in.	lb. ft.
Control handle set screw	8	71	

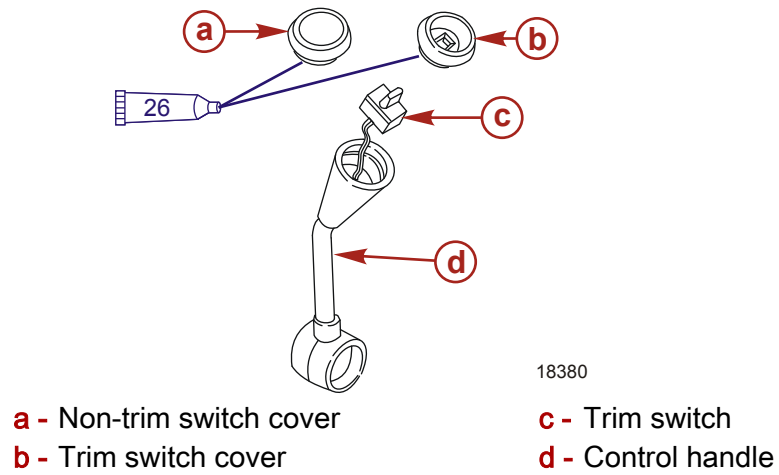
- 6. Solder the trim switch onto the trim wires. Protect the solder joint from corrosion. Cover the solder joint with Liquid Neoprene.

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Trim switch wire solder joint	92-25711-3

- 7. Apply Cyanacrylate adhesive to the trim switch cover.

Tube Ref No.	Description	Where Used	Part No.
 62	Cyanacrylate Adhesive	Trim switch cover	Obtain Locally

8. Secure the trim switch to the control handle with the trim switch cover.



18380

Notes:

Commander Controls

Section 4E - Commander Two Lever Recessed Console Control

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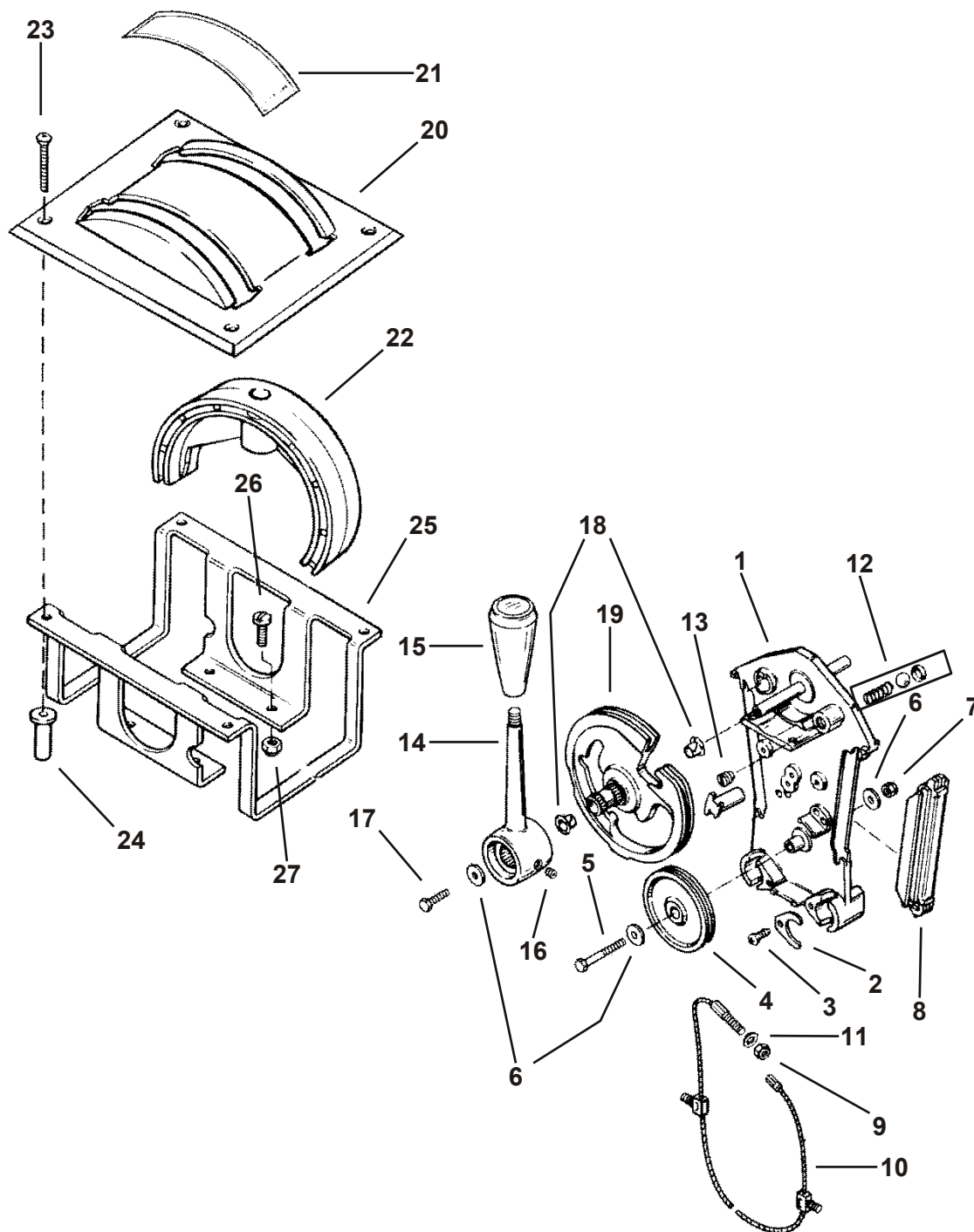
Commander Two Lever Recessed Console Control Components.....	4E-4	Neutral Start Safety Switch Adjustment	4E-10
Commander Two Lever Console Control Disassembly.....	4E-6	Commander Two Lever Console Control Cable Installation.....	4E-12
Commander Two Lever Console Control Assembly	4E-6	Attaching Control Cable Configurations	4E-13

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
	2-4-C with Teflon	Control body assembly lower cable pulley mounting shaft	92-802859A1
		Control arm disc bushings	
		Control arm disc bushings, detent ball, detent follower	
		Cable guide grooves	
		Exposed control cable and cable end	

Notes:

Commander Two Lever Recessed Console Control Components



18398

Commander Two Lever Recessed Console Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Control body assembly			
2	1	Cable retainer			
3	1	Screw	6.8	60	
4	2	Lower cable pulley			
5	1	Pulley screw			
6	3	Washer			
7	1	Pulley screw nut			
8	2	Cable guide			
9	2	Nut			
10	2	Control cable assembly			
11	1	Control cable washer			
12	1	Shift detent spring kit			
13	1	Throttle friction kit			
14	2	Control handle			
15	2	Knob			
16	2	Set screw	8	71	
17	2	Handle screw			
18	4	Bushing			
19	2	Control arm disc			
20	1	Cover assembly			
21	1	Decal			
22	1	Slide			
23	4	Cover screw			
24	4	Wellnut			
25	1	Mounting bracket			
26	4	Bracket screw			
27	4	Bracket screw nut			

Commander Two Lever Console Control Disassembly

CAUTION

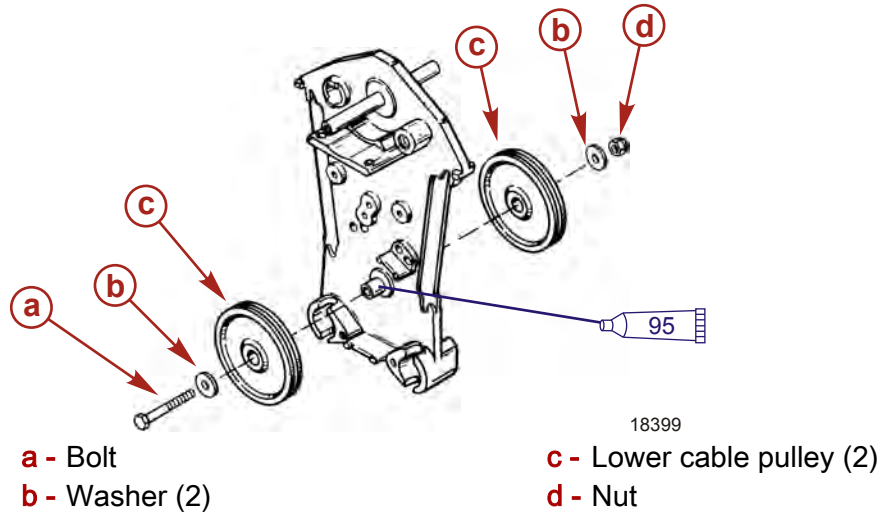
Always disconnect the battery cables from the battery before working around electrical system components to prevent injury and damage to the electrical system if a wire should accidentally cause a short circuit.

1. Ensure the ignition key is turned to the off position.
2. Ensure the control is in neutral.
3. Remove the four screws securing the remote control to the console.
4. Remove the throttle, and shift knobs from the control handles.
5. Remove the mounting cover.
6. Remove the control body assembly, and mounting bracket from the console.
7. Remove the throttle, and shift cables from the control cable assembly.
8. Remove the four screws, and nuts securing the mounting bracket to the control body assembly.
9. Loosen the set screw securing the control handles to the control arm disc. Remove the control handles.
10. Loosen the detent, and friction screws.
11. Loosen the control cable assembly nut. It is not necessary to remove the control cable assembly nut from the control cable assembly.
12. Remove the control cable assembly from the control body assembly.
13. Remove the cable guides from the control body assembly.
14. Remove the neutral start safety switch, and harnesses if equipped.
15. Remove the bolts, and washers securing the control arm disc to the control body assembly.
16. Remove the screw holding the detent spring, follower, and detent ball.
17. Remove the friction screw and friction pad.
18. Remove the bolt, washers, and nut securing the lower cable pulley to the control body assembly.

Commander Two Lever Console Control Assembly

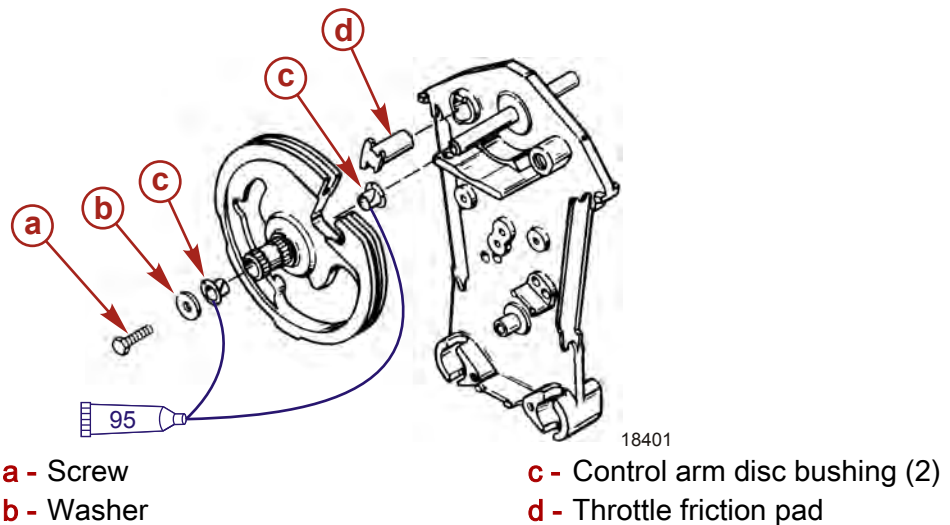
1. Lubricate the control body assembly lower cable pulley mounting shafts with 2-4-C with Teflon.
2. Install the lower cable pulleys to the mounting shafts.

3. Secure the lower cable pulleys to the control body assembly with a bolt, two washers, and nut. Tighten the bolt and nut securely.



Tube Ref No.	Description	Where Used	Part No.
95	2-4-C with Teflon	Control body assembly lower cable pulley mounting shaft	92-802859A1

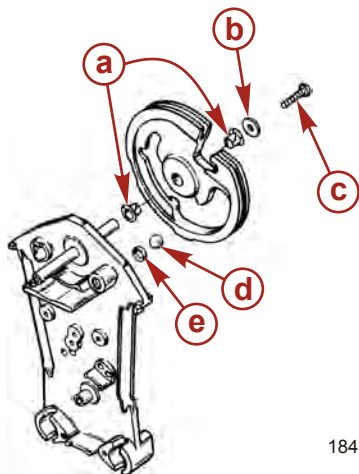
4. Install the throttle friction pad onto the control body assembly.
5. Lubricate the two control arm disc bushings with 2-4-C with Teflon, and install onto the control arm disc.
6. Install the control arm disc onto the control body assembly side with the friction pad installed.
7. Secure the control arm disc with a screw and washer. Tighten the screw securely.



Tube Ref No.	Description	Where Used	Part No.
95	2-4-C with Teflon	Control arm disc bushings	92-802859A1

8. Lubricate the detent follower, and detent ball with 2-4-C with Teflon.
9. Install the detent follower into the control body assembly.
10. Install the detent ball into the control body assembly.

- 11. Lubricate the two control arm disc bushings with 2-4-C with Teflon, and install onto the control arm disc.
- 12. Install the control arm disc onto the control body assembly side with the detent follower, and detent ball installed.
- 13. Secure the control arm disc with a screw and washer. Tighten the screw securely.

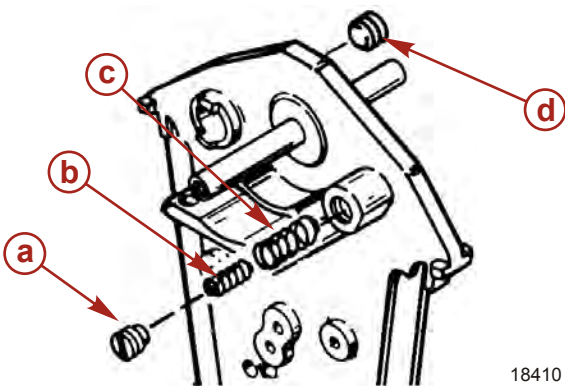


18405

- a - Control arm disc bushing (2)
- b - Washer
- c - Screw
- d - Detent ball
- e - Detent follower

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control arm disc bushings, detent ball, detent follower	92-802859A1

- 14. Install the detent spring, and detent follower into the control body assembly.
- 15. Install the detent adjustment screw into the control body assembly.
- 16. Install the throttle friction adjustment screw into the control body assembly.
- 17. Do not tighten the detent adjustment screw or the throttle friction adjustment screw at this time.

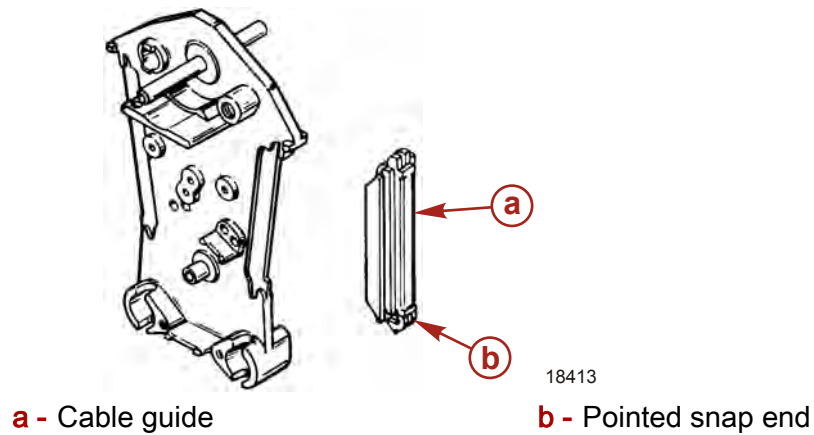


18410

- a - Detent adjustment screw
- b - Detent follower
- c - Detent spring
- d - Throttle friction adjustment screw

- 18. Install the cable guides onto the control body assembly with the pointed snap end towards the bottom of the control body assembly.

19. Lubricate the grooves of the cable guide with 2-4-C with Teflon.

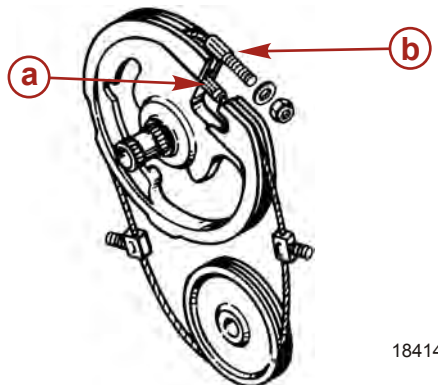


Tube Ref No.	Description	Where Used	Part No.
95	2-4-C with Teflon	Cable guide grooves	92-802859A1

20. Install the control cable assembly non-threaded end into the opening in the control arm disc.

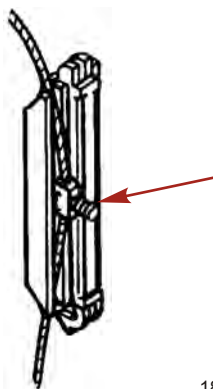
21. Route the control cable assembly around the lower cable pulley groove, and around the control arm disc.

22. Install the threaded end of the control cable assembly onto the groove of the control arm disc. Do not tighten the control cable assembly nut.



23. Ensure the control cable assembly studs are in the cable guide grooves.

24. Tighten the control cable assembly nut until the control cable assembly mounting stud, when placed in the center of the cable guide, can be deflected 1.5 mm (0.06 in.) when pulled out with 2.26 kg (5 lb. ft.) of force.

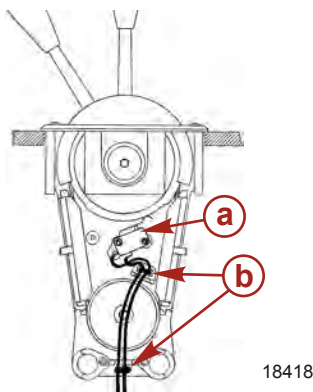


18416

25. Position the control cable assembly mounting studs directly across for each other.
26. Install the handles in a straight up position. Secure the handle to the control arm disc with a washer and screw. Tighten the handle set screw to the specified torque.

Description	Nm	lb. in.	lb. ft.
Handle set screw	8	71	

27. Install the mounting bracket to the control body assembly. Secure the mounting bracket to the control body assembly with four screws and locknuts. Tighten the four screws and locknuts securely.
28. Install the neutral start safety switch to the control body assembly. Secure with two screws and washers. Tighten the screws securely.
29. Secure the neutral start safety switch wire to the control body assembly in two locations with cable ties through the control body assembly, and around the neutral start safety switch wires.



18418

a - Neutral start safety switch

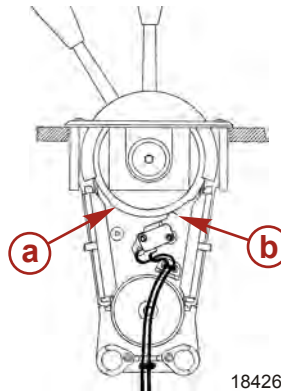
b - Cable tie (2)

Neutral Start Safety Switch Adjustment

IMPORTANT: The following procedure must be completed to ensure the minimum and maximum allowable operation of the neutral start safety switch.

1. On Mercury MerCruiser engines, remove the ignition coil wire from the engine distributor and ground the ignition coil wire to the engine block. On outboard engines, remove and isolate all the spark plug leads from the spark plugs.
2. Place the shift handle into the forward gear position.

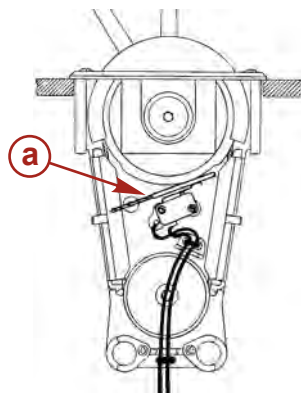
3. Turn the key switch to the start position. The engine should not turn over.
4. If the engine turns over, turn the key switch to the off position.
5. Adjust the neutral start safety switch spring lever by bending it slightly away from the control arm disc.



a - Control arm disc

b - Neutral start safety switch spring lever

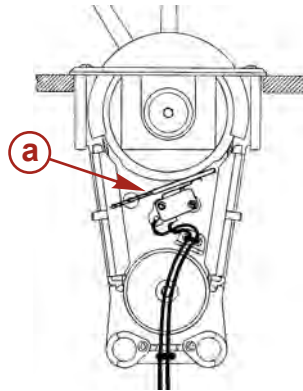
6. Attempt to start the engine again. The engine should not turn over.
7. If the engine turns over, turn the key switch to the off position.
8. Adjust the neutral start safety switch spring lever by bending it slightly away from the control arm disc.
9. Attempt to start the engine again. The engine should not turn over.
10. Continue this operation until the engine will not turn over. This is the primary check on the operation of the neutral start safety switch.
11. Insert a 0.8 mm (1/32 in.) drill bit between the neutral start safety switch spring lever and the control arm disc.
12. Turn the key switch to the start position. The engine should not turn over.



a - 0.8 mm (1/32 in.) drill bit

13. If the engine turns over, turn the key switch to the off position.
14. Adjust the neutral start safety switch spring lever by bending it slightly away from the control arm disc.
15. Attempt to start the engine again. The engine should not turn over.
16. Insert a 2.4 mm (3/32 in.) drill bit between the neutral start safety switch spring lever and the control arm disc.
17. Turn the key switch to the start position. The engine should turn over.

18. If the engine does not turn over, adjust the neutral start safety switch spring lever accordingly.



18427

a - 2.4 mm (3/32 in.) drill bit

Commander Two Lever Console Control Cable Installation

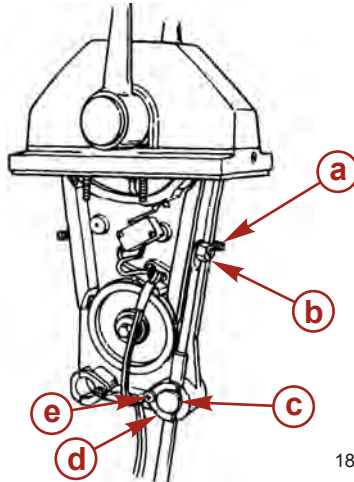
IMPORTANT: The black shift lever is located on the side of the console control with the neutral start safety switch. The commander two lever console control should be mounted with the neutral start safety switch on the port (left) side.

1. Pull on the remote control cable end so the cable is fully extended.
2. Lubricate the exposed cable and the cable end with 2-4-C with Teflon.

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Exposed control cable and cable end	92-802859A1

3. Install the throttle and shift control cables on the appropriate stud of the console control according to the installed application. Refer to **Attaching Control Cable Configurations**.
4. Position the cable barrels into the control housing and secure the control cable to the stud with a nut. Tighten the nut to 5.6 Nm (50 lb. in.) then back nut off 1/4 turn.

5. Secure the cable barrel to the control housing with the retaining clip and a screw. Tighten the screw to the specified torque.



18445

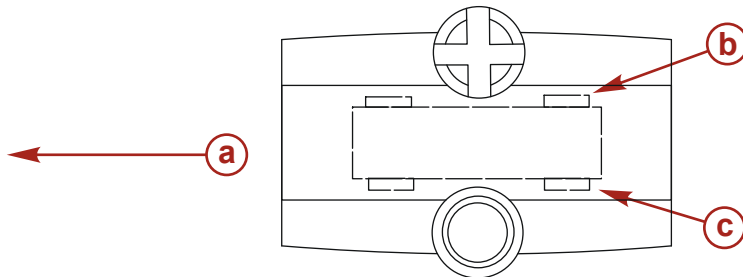
a - Stud
b - Nut
c - Cable barrel

d - Clip
e - Screw

Description	Nm	lb. in.	lb. ft.
Control cable nut (torque to specification then back off 1/4 turn)	5.6	50	
Retaining clip screw	6.8	60	

Attaching Control Cable Configurations

SINGLE STATION CONFIGURATION

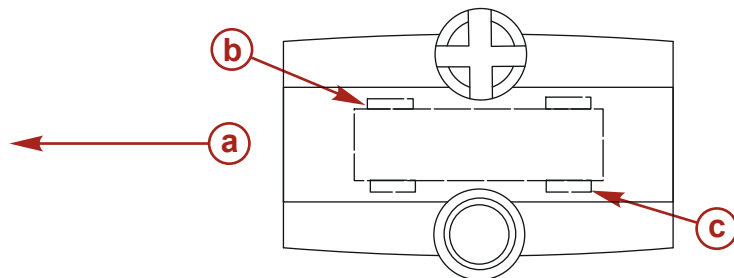


18447

All models except; 18 through 25, 300, 3.4 Liter outboards and MIE 470, 230, 260 and 340

a - Bow of boat
b - Throttle cable

c - Shift cable

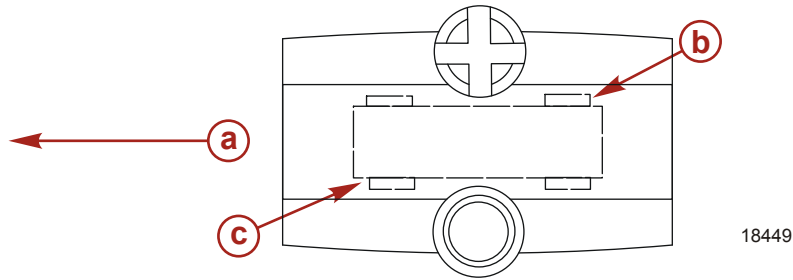


18448

18 through 25

a - Bow of boat
b - Throttle cable

c - Shift cable



Outboard 300, 3.4 Liter, MIE 470, 230, 260, 340

a - Bow of boat

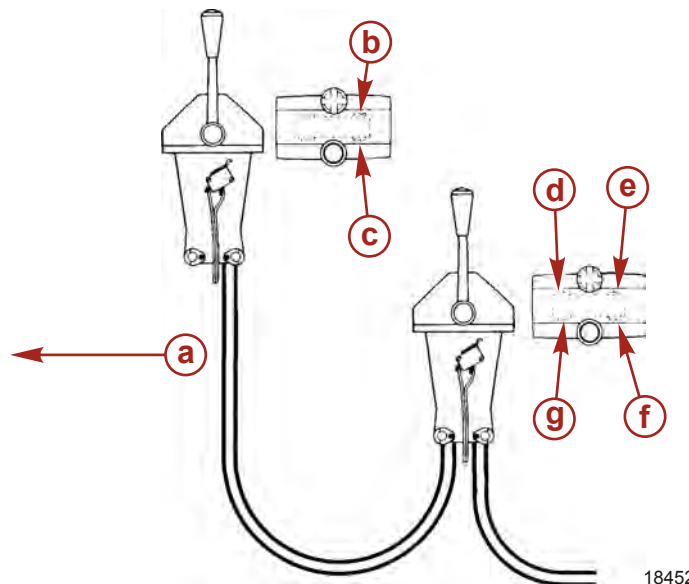
c - Shift cable

b - Throttle cable

IMPORTANT: On early Mercury MerCruiser MIE models equipped with the cable barrel anchored to the transmission shift lever, install the control cables per the previous graphic illustration entitled All models except; 18 through 25, 300, 3.4 Liter outboards and MIE 470, 230, 260 and 340.

TWO STATION CONFIGURATION

1. Install the non-adjustable ends of the two-station connector cables onto the upper station control.
2. Route the two-station connector cables to the lower station.
3. Adjust the cable anchor barrels to ensure both throttle levers (upper and lower) are against the idle stop and the shift levers is in the neutral detent. Install the cables into the lower station control.



All models except; 18 through 25, 300, 3.4 Liter outboards and MIE 470, 230, 260 and 340

a - Bow of boat

b - Upper station throttle cable

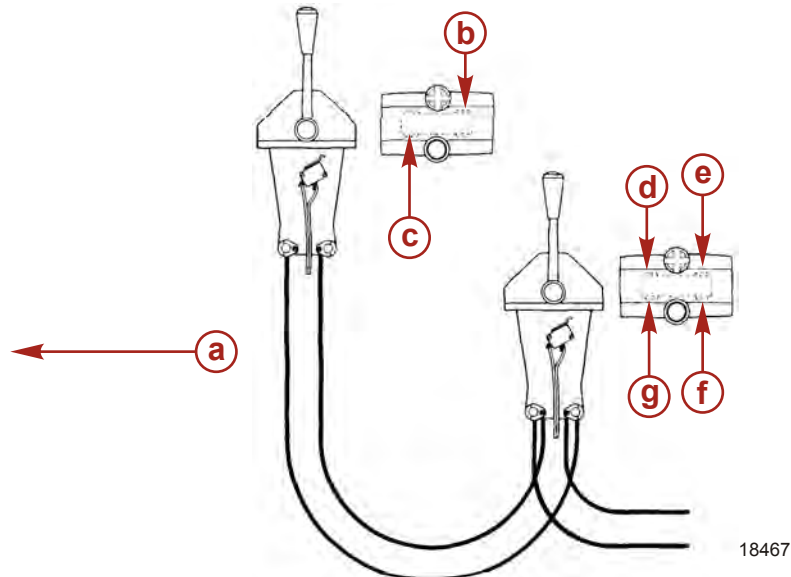
c - Upper station shift cable

d - Upper station to lower station
throttle cable

e - Lower station to engine throttle
cable

f - Lower station to engine shift cable

g - Upper station to lower station shift
cable



Outboard 300, 3.4 Liter, MIE 470, 230, 260, 340

- | | |
|--|---|
| a - Bow of boat | e - Lower station to engine throttle cable |
| b - Upper station throttle cable | f - Lower station to engine shift cable |
| c - Upper station shift cable | g - Upper station to lower station shift cable |
| d - Upper station to lower station throttle cable | |

IMPORTANT: On early Mercury MerCruiser MIE models equipped with the cable barrel anchored to the transmission shift lever, install the control cables per the previous graphic illustration entitled All models except; 18 through 25, 300, 3.4 Liter outboards and MIE 470, 230, 260 and 340.

IMPORTANT: On Mercury MerCruiser MIE models equipped with dual cable attaching studs on the engine and transmission, route the throttle and shift cables from the upper and lower control stations in parallel. Do not use two-station control cables.

Notes:

Commander Controls

Section 4F - Commander Two Lever Console Control

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Commander Two Lever Console Control Disassembly.....	4F-6	Attaching Control Cable Configurations	4F-13
Commander Two Lever Console Control Assembly	4F-6	Commander Two Lever Console Control Electric Shift Diagrams.....	4F-16
Neutral Start Safety Switch Adjustment	4F-10		

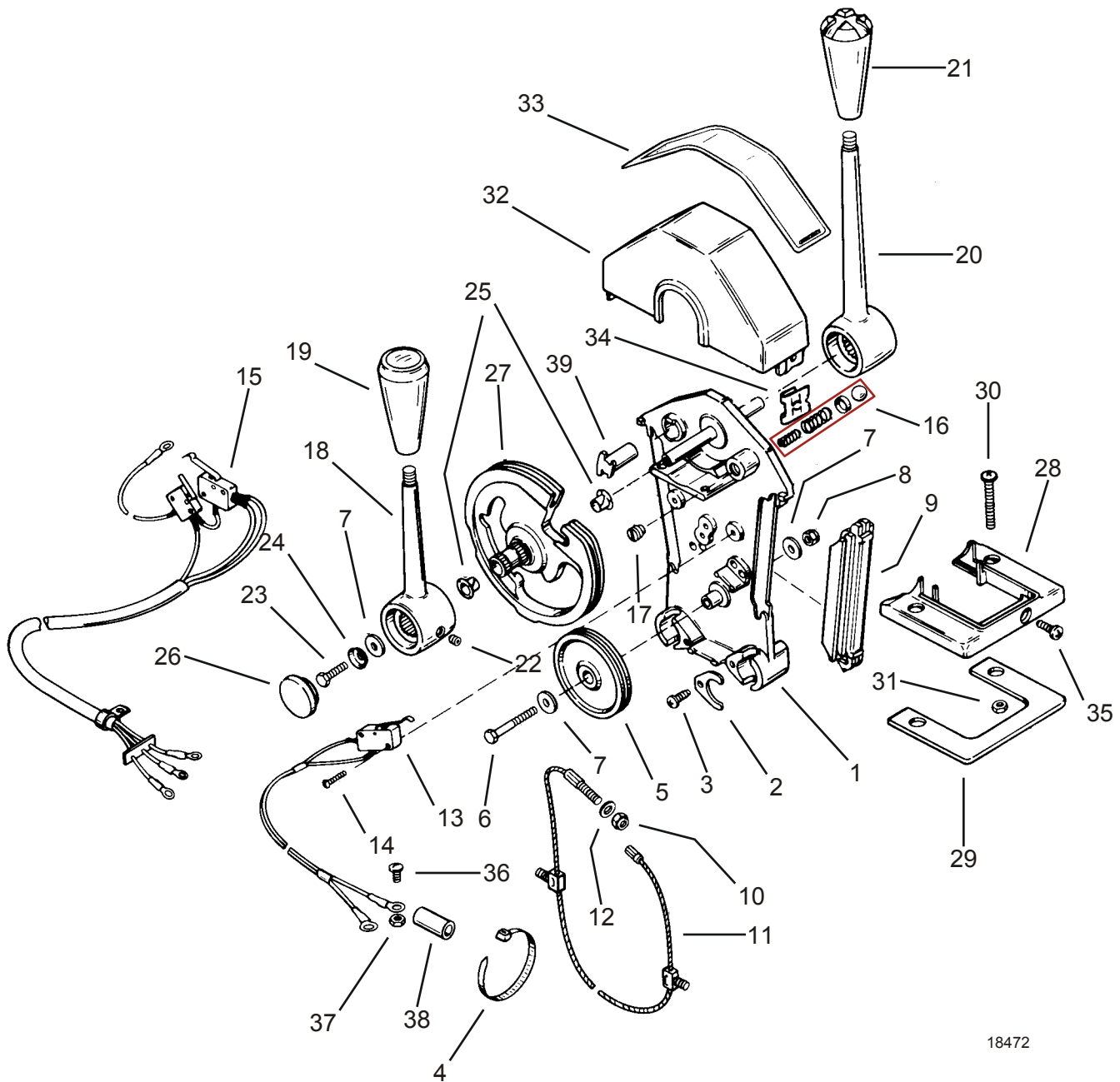


Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
	2-4-C with Teflon	Control body assembly lower cable pulley mounting shaft	92-802859A1
		Control arm disc bushings	
		Control arm disc bushings, detent ball, detent follower	
		Cable guide grooves	
		Exposed control cable and cable end	

Notes:

Commander Two Lever Console Control Components



18472

Commander Two Lever Console Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Control body assembly			
2	2	Cable retainer			
3	2	Screw	6.8	60	
4	1	Cable tie			
5	2	Pulley			
6	1	Bolt			
7	3	Washer			
8	2	Nut			
9	2	Cable guide			
10	2	Nut			
11	2	Control cable assembly			
12	2	Washer			
13	1	Neutral start safety switch (manual shift)			
14	2	Screw			
15	1	Micro switches and harness (electric shift)			
16	1	Shift detent kit			
17	1	Throttle friction kit			
18	1	Shift handle			
19	1	Shift knob			
20	1	Throttle handle			
21	1	Throttle knob			
22	2	Set screw	8	71	
23	2	Screw			
24	2	Washer			
25	4	Bushing			
26	1	Button			
27	2	Control arm disc			
28	1	Base			
29	1	Base gasket			
30	4	Screw			
31	4	Nut			
32	1	Cover			
33	1	Decal			
34	1	Retaining clip			
35	1	Screw			
36	2	Screw			
37	2	Nut			
38	2	Insulator			
39	1	Throttle friction pad			

Commander Two Lever Console Control Disassembly

CAUTION

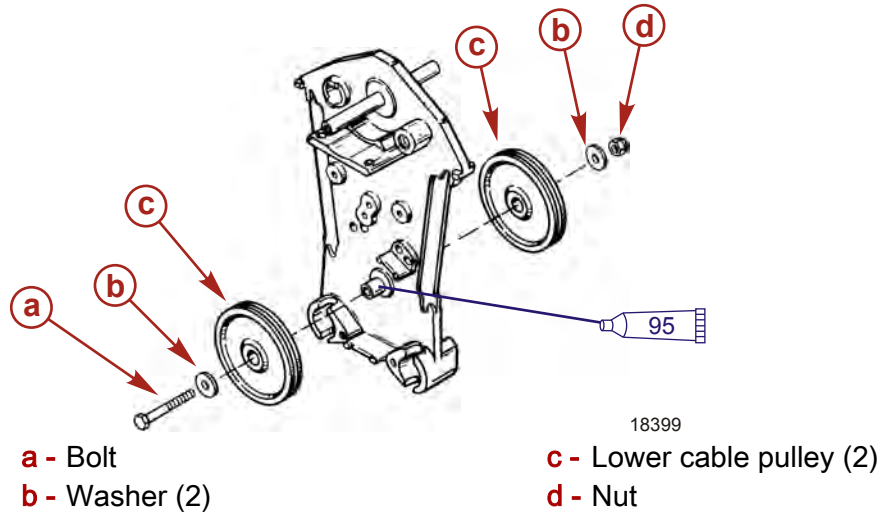
Always disconnect the battery cables from the battery before working around electrical system components to prevent injury and damage to the electrical system if a wire should accidentally cause a short circuit.

1. Ensure the ignition key is turned to the off position.
2. Ensure the control is in neutral.
3. Remove the four screws securing the remote control to the console.
4. Remove the throttle, and shift knobs from the control handles.
5. Remove the mounting cover.
6. Remove the control body assembly, and mounting bracket from the console.
7. Remove the throttle, and shift cables from the control cable assembly.
8. Remove the four screws, and nuts securing the mounting bracket to the control body assembly.
9. Loosen the set screw securing the control handles to the control arm disc. Remove the control handles.
10. Loosen the detent, and friction screws.
11. Loosen the control cable assembly nut. It is not necessary to remove the control cable assembly nut from the control cable assembly.
12. Remove the control cable assembly from the control body assembly.
13. Remove the cable guides from the control body assembly.
14. Remove the neutral start safety switch, and harnesses if equipped.
15. Remove the bolts, and washers securing the control arm disc to the control body assembly.
16. Remove the screw holding the detent spring, follower, and detent ball.
17. Remove the friction screw and friction pad.
18. Remove the bolt, washers, and nut securing the lower cable pulley to the control body assembly.

Commander Two Lever Console Control Assembly

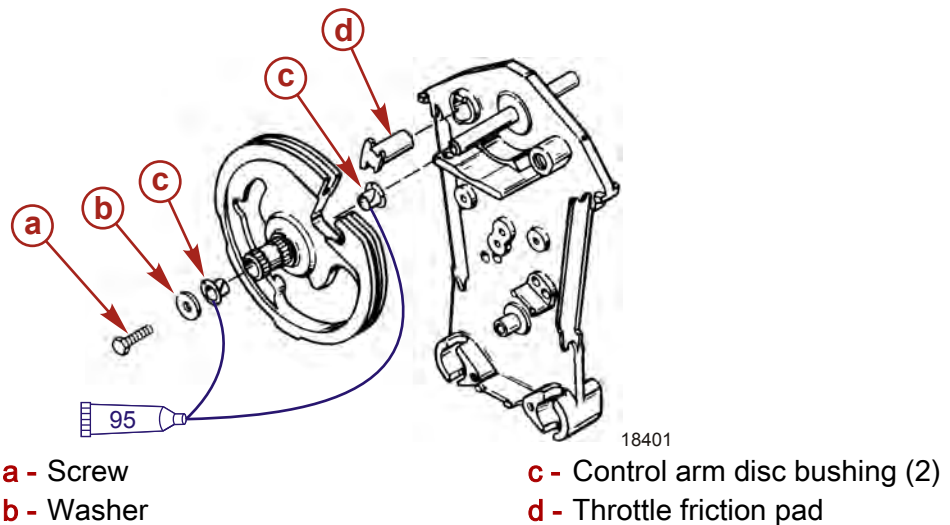
1. Lubricate the control body assembly lower cable pulley mounting shafts with 2-4-C with Teflon.
2. Install the lower cable pulleys to the mounting shafts.

3. Secure the lower cable pulleys to the control body assembly with a bolt, two washers, and nut. Tighten the bolt and nut securely.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control body assembly lower cable pulley mounting shaft	92-802859A1

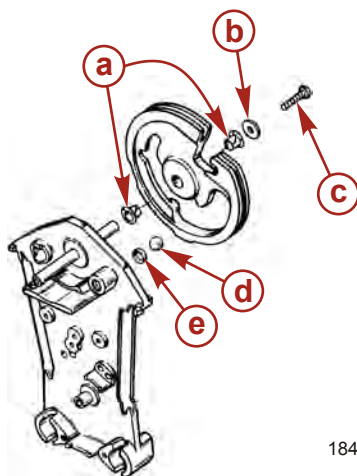
4. Install the throttle friction pad onto the control body assembly.
5. Lubricate the two control arm disc bushings with 2-4-C with Teflon, and install onto the control arm disc.
6. Install the control arm disc onto the control body assembly side with the friction pad installed.
7. Secure the control arm disc with a screw and washer. Tighten the screw securely.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control arm disc bushings	92-802859A1

8. Lubricate the detent follower, and detent ball with 2-4-C with Teflon.
9. Install the detent follower into the control body assembly.
10. Install the detent ball into the control body assembly.

11. Lubricate the two control arm disc bushings with 2-4-C with Teflon, and install onto the control arm disc.
12. Install the control arm disc onto the control body assembly side with the detent follower, and detent ball installed.
13. Secure the control arm disc with a screw and washer. Tighten the screw securely.

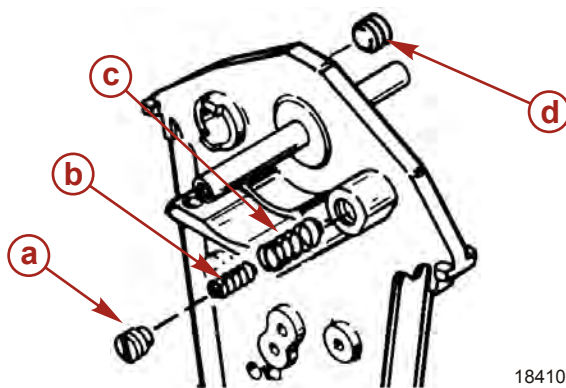


18405

- a** - Control arm disc bushing (2)
- b** - Washer
- c** - Screw
- d** - Detent ball
- e** - Detent follower

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control arm disc bushings, detent ball, detent follower	92-802859A1

14. Install the detent spring, and detent follower into the control body assembly.
15. Install the detent adjustment screw into the control body assembly.
16. Install the throttle friction adjustment screw into the control body assembly.
17. Do not tighten the detent adjustment screw or the throttle friction adjustment screw at this time.

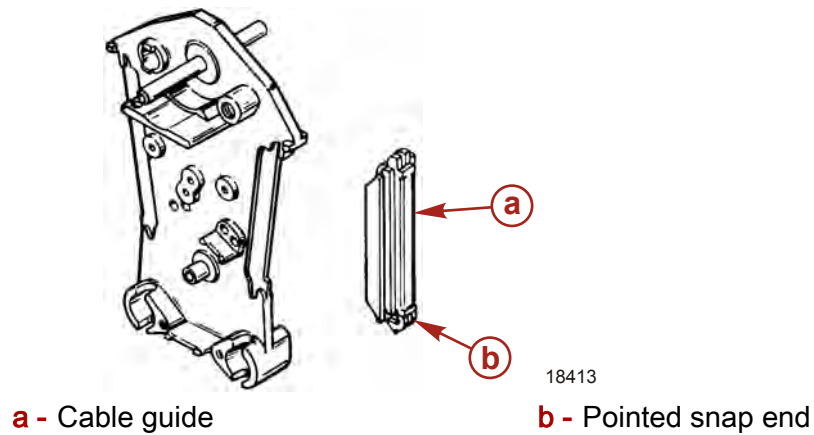


18410

- a** - Detent adjustment screw
- b** - Detent follower
- c** - Detent spring
- d** - Throttle friction adjustment screw

18. Install the cable guides onto the control body assembly with the pointed snap end towards the bottom of the control body assembly.

19. Lubricate the grooves of the cable guide with 2-4-C with Teflon.

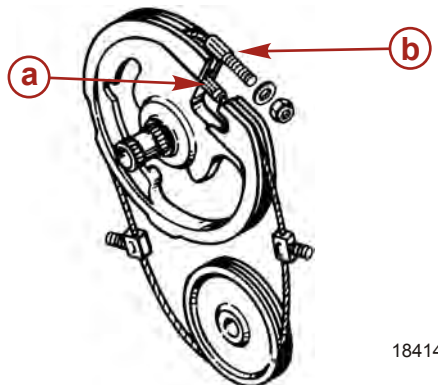


Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Cable guide grooves	92-802859A1

20. Install the control cable assembly non-threaded end into the opening in the control arm disc.

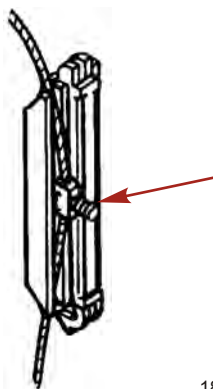
21. Route the control cable assembly around the lower cable pulley groove, and around the control arm disc.

22. Install the threaded end of the control cable assembly onto the groove of the control arm disc. Do not tighten the control cable assembly nut.



23. Ensure the control cable assembly studs are in the cable guide grooves.

24. Tighten the control cable assembly nut until the control cable assembly mounting stud, when placed in the center of the cable guide, can be deflected 1.5 mm (0.06 in.) when pulled out with 2.26 kg (5 lb. ft.) of force.

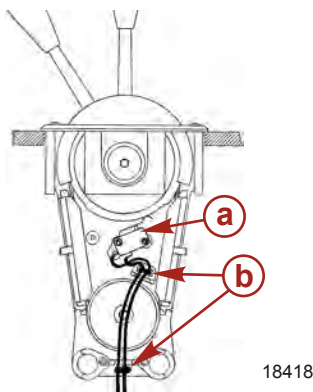


18416

25. Position the control cable assembly mounting studs directly across for each other.
26. Install the handles in a straight up position. Secure the handle to the control arm disc with a washer and screw. Tighten the handle set screw to the specified torque.

Description	Nm	lb. in.	lb. ft.
Handle set screw	8	71	

27. Install the mounting bracket to the control body assembly. Secure the mounting bracket to the control body assembly with four screws and locknuts. Tighten the four screws and locknuts securely.
28. Install the neutral start safety switch to the control body assembly. Secure with two screws and washers. Tighten the screws securely.
29. Secure the neutral start safety switch wire to the control body assembly in two locations with cable ties through the control body assembly, and around the neutral start safety switch wires.



18418

a - Neutral start safety switch

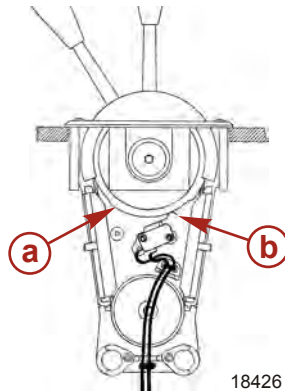
b - Cable tie (2)

Neutral Start Safety Switch Adjustment

IMPORTANT: The following procedure must be completed to ensure the minimum and maximum allowable operation of the neutral start safety switch.

1. On Mercury MerCruiser engines, remove the ignition coil wire from the engine distributor and ground the ignition coil wire to the engine block. On outboard engines, remove and isolate all the spark plug leads from the spark plugs.
2. Place the shift handle into the forward gear position.

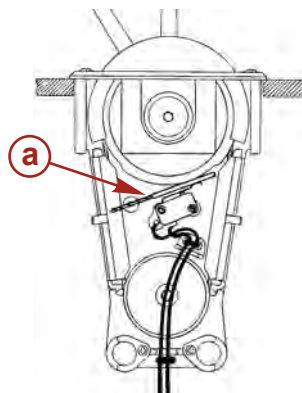
3. Turn the key switch to the start position. The engine should not turn over.
4. If the engine turns over, turn the key switch to the off position.
5. Adjust the neutral start safety switch spring lever by bending it slightly away from the control arm disc.



a - Control arm disc

b - Neutral start safety switch spring lever

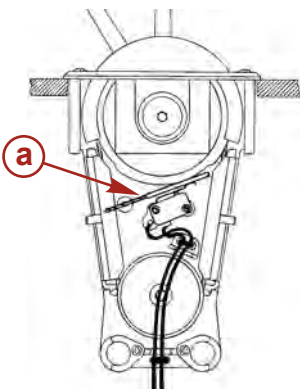
6. Attempt to start the engine again. The engine should not turn over.
7. If the engine turns over, turn the key switch to the off position.
8. Adjust the neutral start safety switch spring lever by bending it slightly away from the control arm disc.
9. Attempt to start the engine again. The engine should not turn over.
10. Continue this operation until the engine will not turn over. This is the primary check on the operation of the neutral start safety switch.
11. Insert a 0.8 mm (1/32 in.) drill bit between the neutral start safety switch spring lever and the control arm disc.
12. Turn the key switch to the start position. The engine should not turn over.



a - 0.8 mm (1/32 in.) drill bit

13. If the engine turns over, turn the key switch to the off position.
14. Adjust the neutral start safety switch spring lever by bending it slightly away from the control arm disc.
15. Attempt to start the engine again. The engine should not turn over.
16. Insert a 2.4 mm (3/32 in.) drill bit between the neutral start safety switch spring lever and the control arm disc.
17. Turn the key switch to the start position. The engine should turn over.

18. If the engine does not turn over, adjust the neutral start safety switch spring lever accordingly.



18427

a - 2.4 mm (3/32 in.) drill bit

Commander Two Lever Console Control Cable Installation

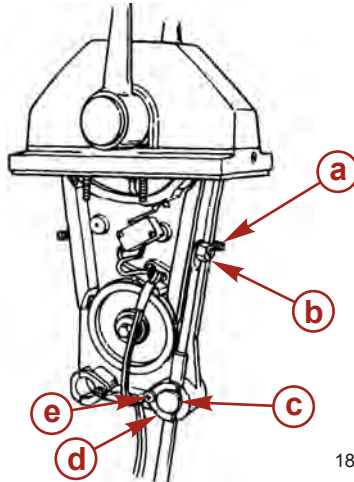
IMPORTANT: The black shift lever is located on the side of the console control with the neutral start safety switch. The commander two lever console control should be mounted with the neutral start safety switch on the port (left) side.

1. Pull on the remote control cable end so the cable is fully extended.
2. Lubricate the exposed cable and the cable end with 2-4-C with Teflon.

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Exposed control cable and cable end	92-802859A1

3. Install the throttle and shift control cables on the appropriate stud of the console control according to the installed application. Refer to **Attaching Control Cable Configurations**.
4. Position the cable barrels into the control housing and secure the control cable to the stud with a nut. Tighten the nut to 5.6 Nm (50 lb. in.) then back nut off 1/4 turn.

5. Secure the cable barrel to the control housing with the retaining clip and a screw. Tighten the screw to the specified torque.



18445

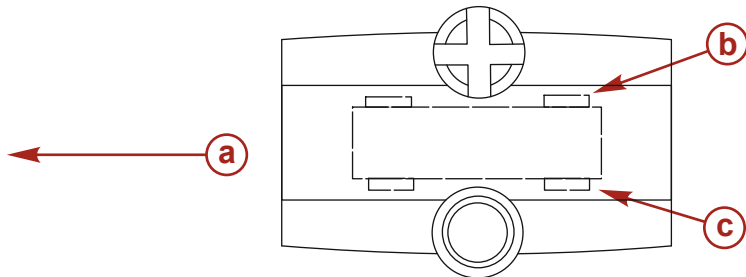
a - Stud
b - Nut
c - Cable barrel

d - Clip
e - Screw

Description	Nm	lb. in.	lb. ft.
Control cable nut (torque to specification then back off 1/4 turn)	5.6	50	
Retaining clip screw	6.8	60	

Attaching Control Cable Configurations

SINGLE STATION CONFIGURATION

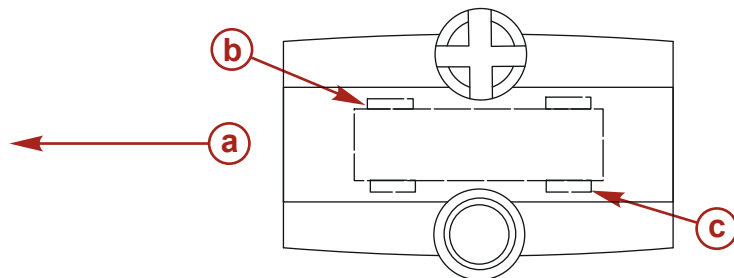


18447

All models except; 18 through 25, 300, 3.4 Liter outboards and MIE 470, 230, 260 and 340

a - Bow of boat
b - Throttle cable

c - Shift cable

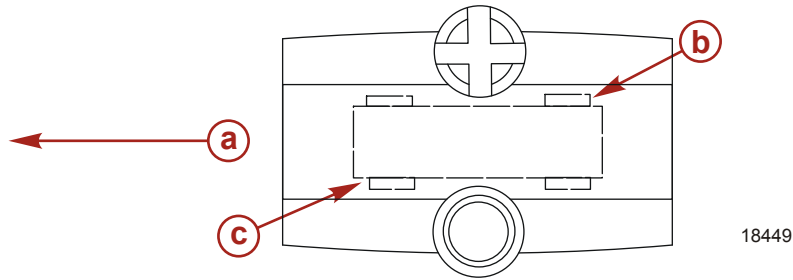


18448

18 through 25

a - Bow of boat
b - Throttle cable

c - Shift cable



Outboard 300, 3.4 Liter, MIE 470, 230, 260, 340

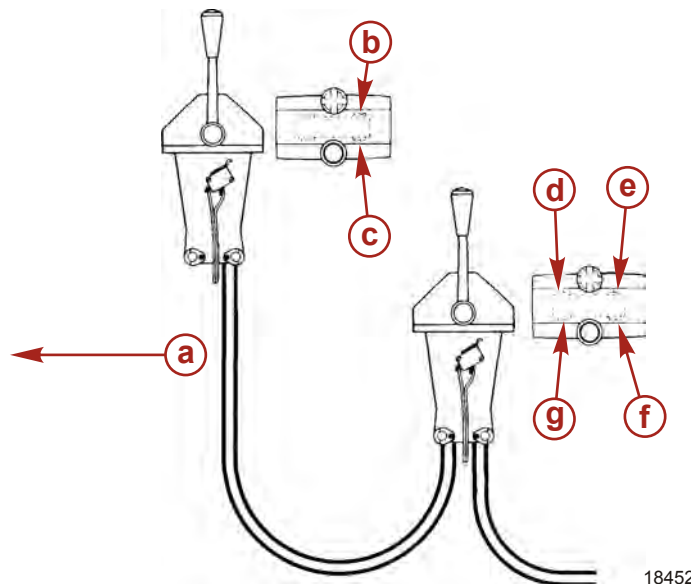
a - Bow of boat
b - Throttle cable

c - Shift cable

IMPORTANT: On early Mercury MerCruiser MIE models equipped with the cable barrel anchored to the transmission shift lever, install the control cables per the previous graphic illustration entitled All models except; 18 through 25, 300, 3.4 Liter outboards and MIE 470, 230, 260 and 340.

TWO STATION CONFIGURATION

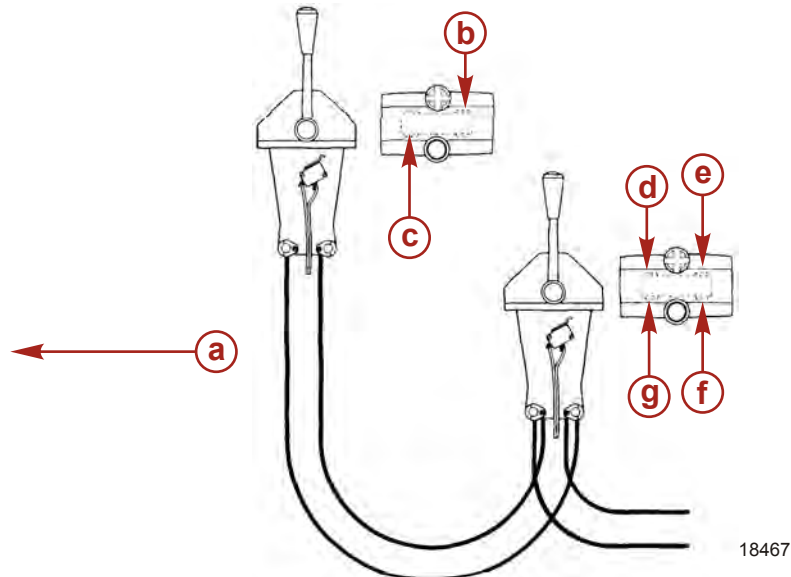
1. Install the non-adjustable ends of the two-station connector cables onto the upper station control.
2. Route the two-station connector cables to the lower station.
3. Adjust the cable anchor barrels to ensure both throttle levers (upper and lower) are against the idle stop and the shift levers is in the neutral detent. Install the cables into the lower station control.



All models except; 18 through 25, 300, 3.4 Liter outboards and MIE 470, 230, 260 and 340

a - Bow of boat
b - Upper station throttle cable
c - Upper station shift cable
d - Upper station to lower station throttle cable

e - Lower station to engine throttle cable
f - Lower station to engine shift cable
g - Upper station to lower station shift cable



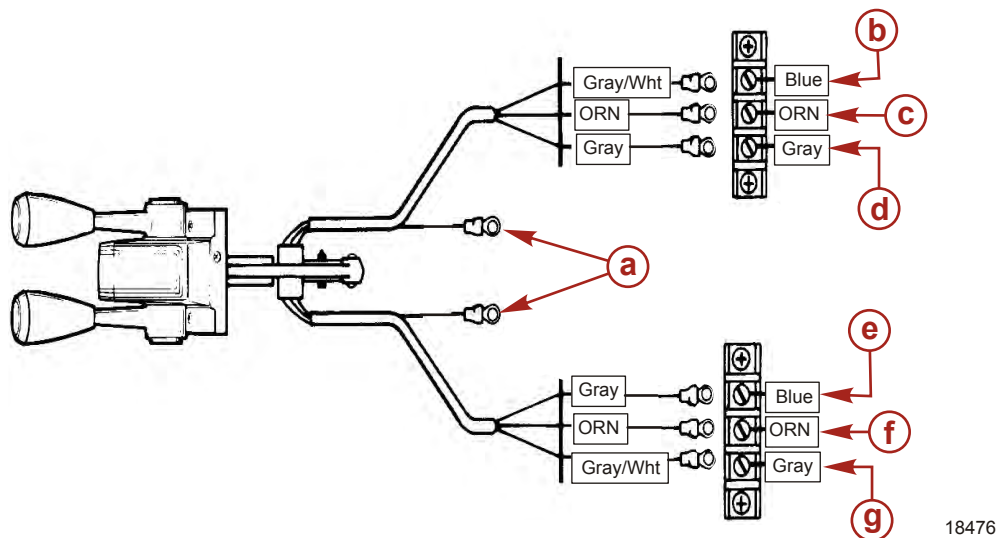
Outboard 300, 3.4 Liter, MIE 470, 230, 260, 340

- | | |
|--|---|
| a - Bow of boat | e - Lower station to engine throttle cable |
| b - Upper station throttle cable | f - Lower station to engine shift cable |
| c - Upper station shift cable | g - Upper station to lower station shift cable |
| d - Upper station to lower station throttle cable | |

IMPORTANT: On early Mercury MerCruiser MIE models equipped with the cable barrel anchored to the transmission shift lever, install the control cables per the previous graphic illustration entitled All models except; 18 through 25, 300, 3.4 Liter outboards and MIE 470, 230, 260 and 340.

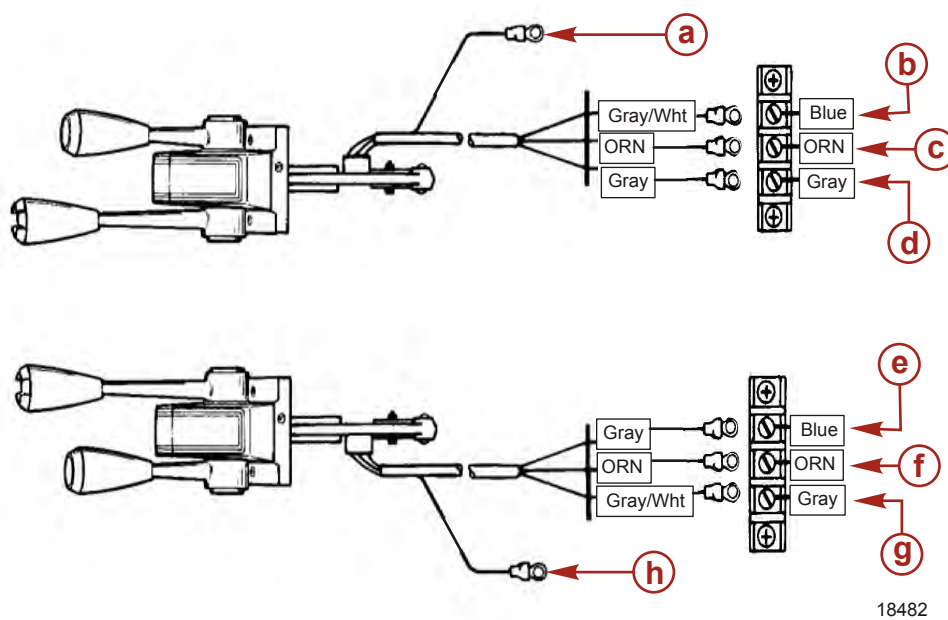
IMPORTANT: On Mercury MerCruiser MIE models equipped with dual cable attaching studs on the engine and transmission, route the throttle and shift cables from the upper and lower control stations in parallel. Do not use two-station control cables.

Commander Two Lever Console Control Electric Shift Diagrams



Dual engine single console shift control

- a** - Key switch 12 volt power source
- b** - Starboard reverse gear harness connection
- c** - Starboard neutral gear harness connection
- d** - Starboard forward gear harness connection
- e** - Port reverse gear harness connection
- f** - Port neutral gear harness connection
- g** - Port forward gear harness connection



Dual engine dual console shift control

- a** - Starboard key switch 12 volt power source
- b** - Starboard reverse gear harness connection
- c** - Starboard neutral gear harness connection
- d** - Starboard forward gear harness connection
- e** - Port reverse gear harness connection
- f** - Port neutral gear harness connection
- g** - Port forward gear harness connection
- h** - Port key switch 12 volt power source

Notes:

Commander Controls

Section 4G - Commander 3000 Series

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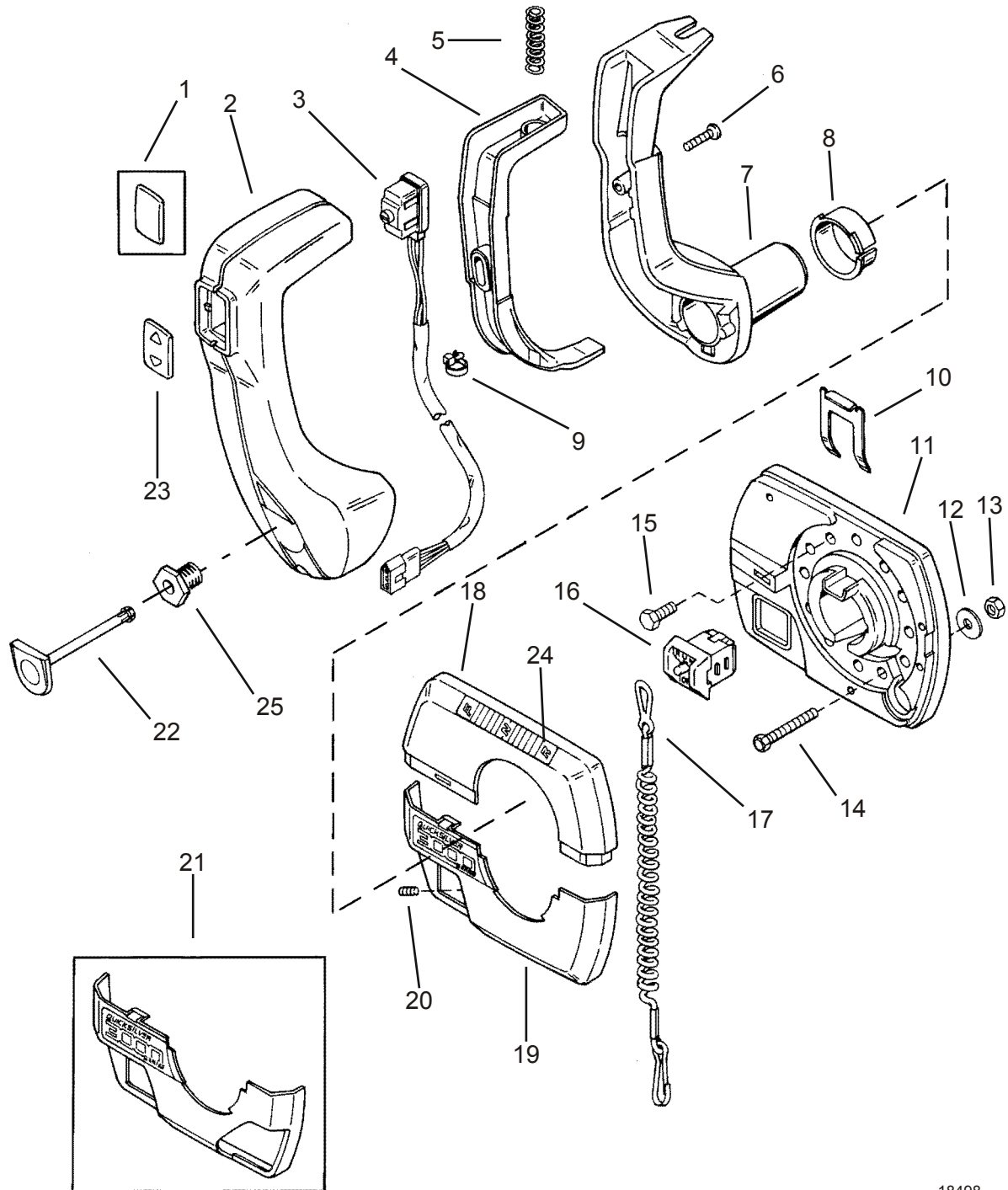
Commander 3000 Panel Mount Handle and Bezel Components.....	4G-4	Commander 3000 Classic Panel Mount Handle and Bezel Disassembly.....	4G-28
Commander 3000 Classic Panel Mount Handle and Bezel Components.....	4G-6	Commander 3000 Classic Panel Mount Handle and Bezel Assembly.....	4G-32
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Commander 3000 Classic Panel Mount Control	4G-28	Commander 3000 Remote Control Module Design III Assembly.....	4G-70
		Shift and Throttle Cable Installation.....	4G-77

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
	Loctite 271 Threadlocker	Threads of control handle retaining bolt	92-809819
		Control cable fastener screws	
		Threads of shoulder screw	
		Screws securing shift and throttle cable	
		Screws securing the shift cable and throttle cable	
	Liquid Neoprene	Neutral start safety switch connection	92-25711-3
		Neutral start safety switch harness connection	
	2-4-C with Teflon	Control handle bushing	92-802859A1
		Inside diameter of the control handle bushing	
		Throttle-only shaft and spring	
		Gear shift pin	
		Control handle shaft steel ball hole	
		Shift gear	
		Control handle shaft bore of the control module housing, roller and bushing	
		Gear teeth on shift arm assembly	
		Control handle shaft support assembly and shift arm assembly	
		Throttle arm assembly	
		Square drive pin	
		Control handle shaft, shift gear and lock ring	
		Control handle shaft assembly bore, shift arm assembly bushing, and roller	
		Control handle shaft assembly and shift arm assembly	

Notes:

Commander 3000 Panel Mount Handle and Bezel Components

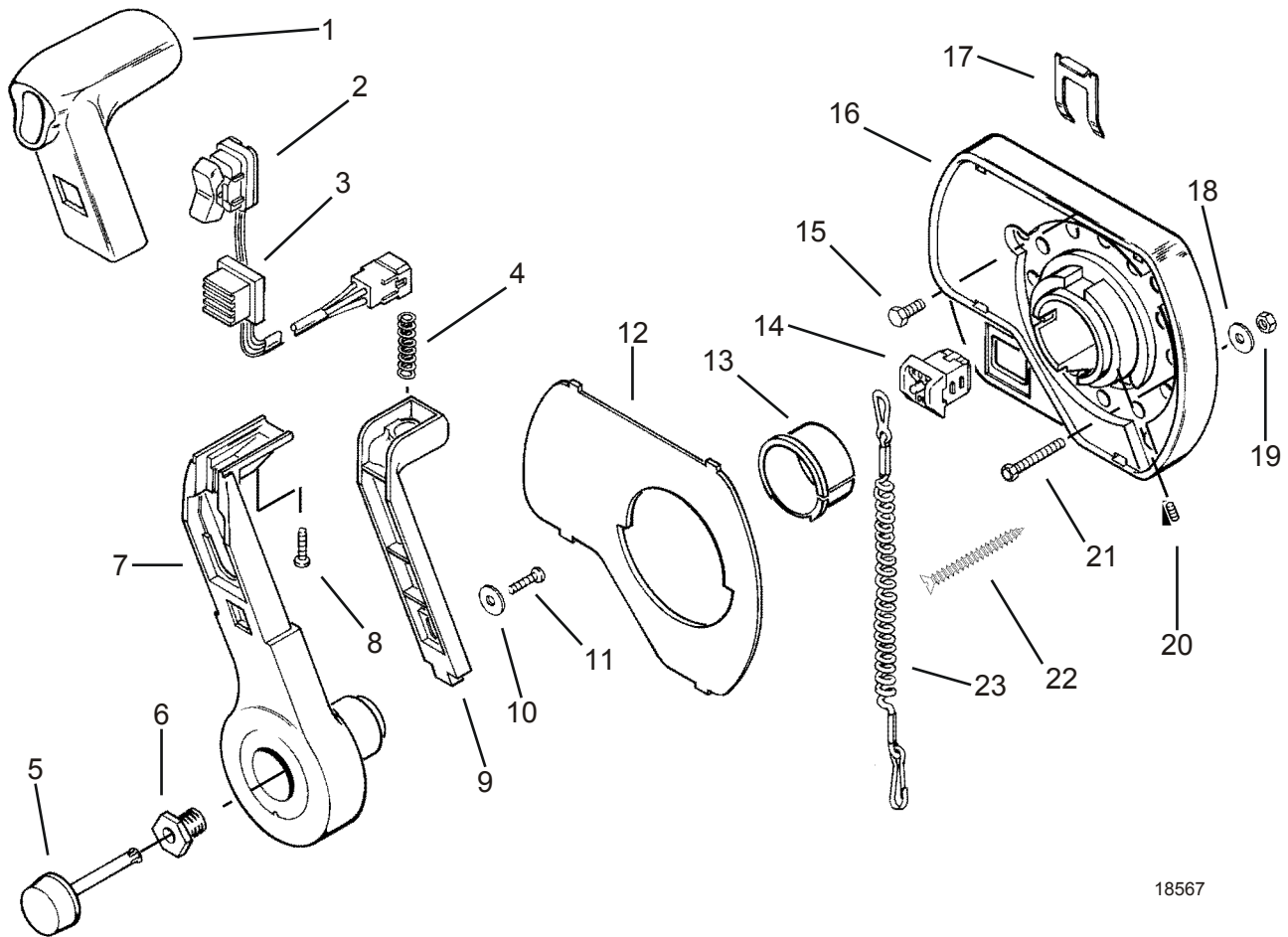


18498

Commander 3000 Panel Mount Handle and Bezel Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Plug			
2	1	Cover			
3	1	Trim switch			
4	1	Release lever			
5	1	Spring			
6	1	Screw			
7	1	Control handle			
8	1	Bushing			
9	1	Cable tie			
10	1	Lanyard retainer			
11	1	Bezel plate			
12	3	Washer			
13	3	Nut	11.3	100	
14	3	Screw	11.3	100	
15	3	Screw	2.8	25	
16	1	Lanyard stop switch			
17	1	Lanyard cord			
18	1	Upper bezel cover			
19	1	Lower bezel cover			
20	1	Friction screw			
21	1	Lower bezel cover with trailer switch cut out			
22	1	Throttle-only button			
23	1	Trim switch cap			
24	1	Decal			
25	1	Control handle retaining bolt	17	150	

Commander 3000 Classic Panel Mount Handle and Bezel Components

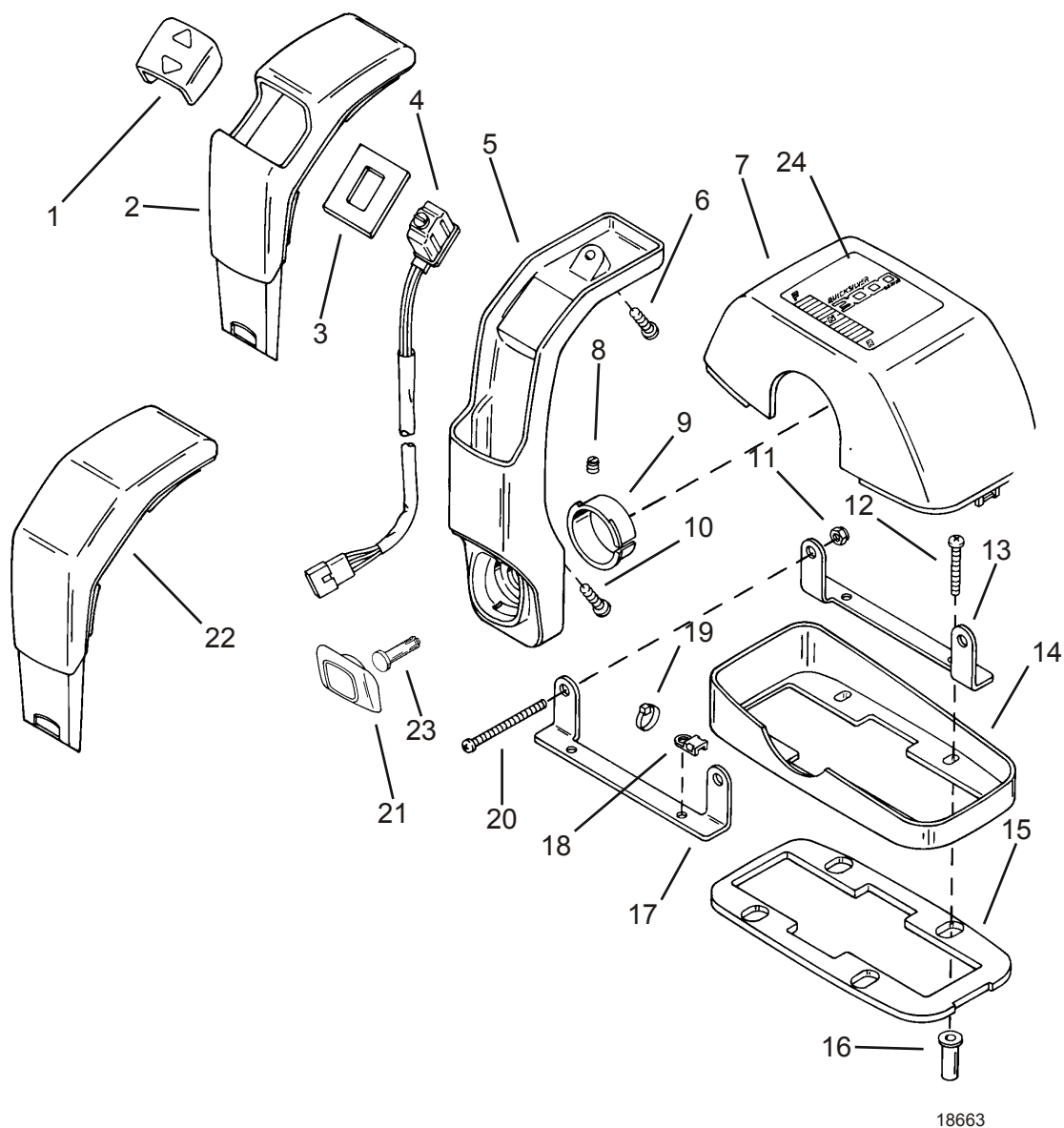


18567

Commander 3000 Classic Panel Mount Handle and Bezel Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Handle cover			
2	1	Trim switch			
3	1	Trailer switch			
4	1	Spring			
5	1	Throttle-only button			
6	1	Control handle retaining bolt	17	150	
7	1	Control handle			
8	1	Screw	6	53	
9	1	Shift release			
10	1	Washer			
11	1	Screw			
12	1	Bezel cover			
13	1	Bushing			
14	1	Lanyard stop switch			
15	3	Screw	2.8	25	
16	1	Bezel			
17	1	Lanyard retainer			
18	3	Washer			
19	3	Nut	11.3	100	
20	1	Friction screw			
21	3	Screw	11.3	100	
22	3	Screw			
23	1	Lanyard cord			

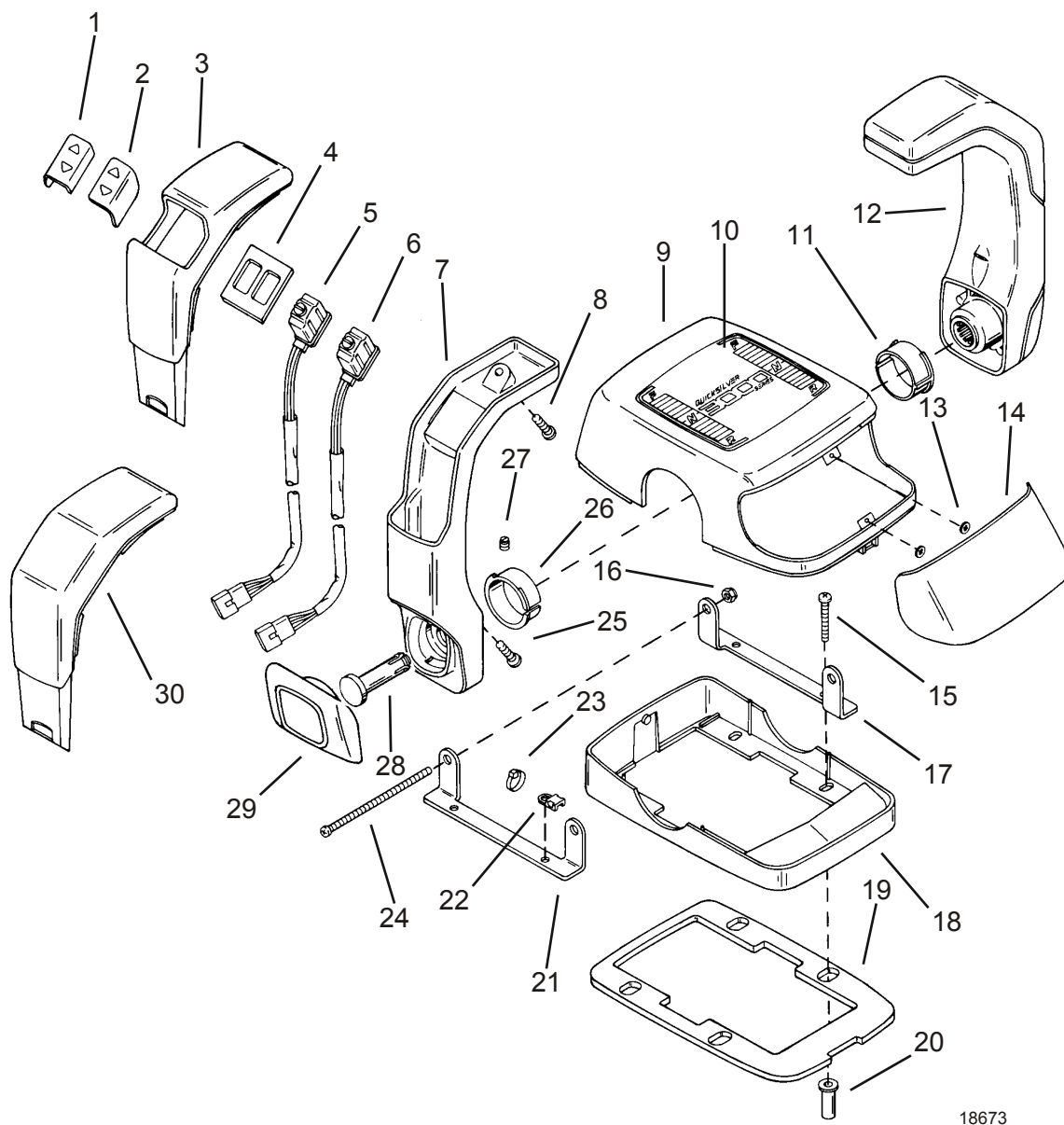
Commander 3000 Console Mount Single Handle Components



Commander 3000 Console Mount Single Handle Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Trim switch cap			
2	1	Grip			
3	1	Carrier			
4	1	Trim switch			
5	1	Control handle			
6	1	Screw			
7	1	Cover			
8	1	Friction screw			
9	1	Bushing			
10	1	Screw			
11	2	Nut	4	35	
12	4	Screw			
13	1	Mounting bracket			
14	1	Base			
15	1	Gasket			
16	4	Wellnut			
17	1	Mounting bracket			
18	1	Anchor			
19	AR	Cable tie			
20	2	Screw	4	35	
21	1	Throttle-only button			
22	1	Grip (non trim)			
23	1	Throttle-only shaft			
24	1	Decal			

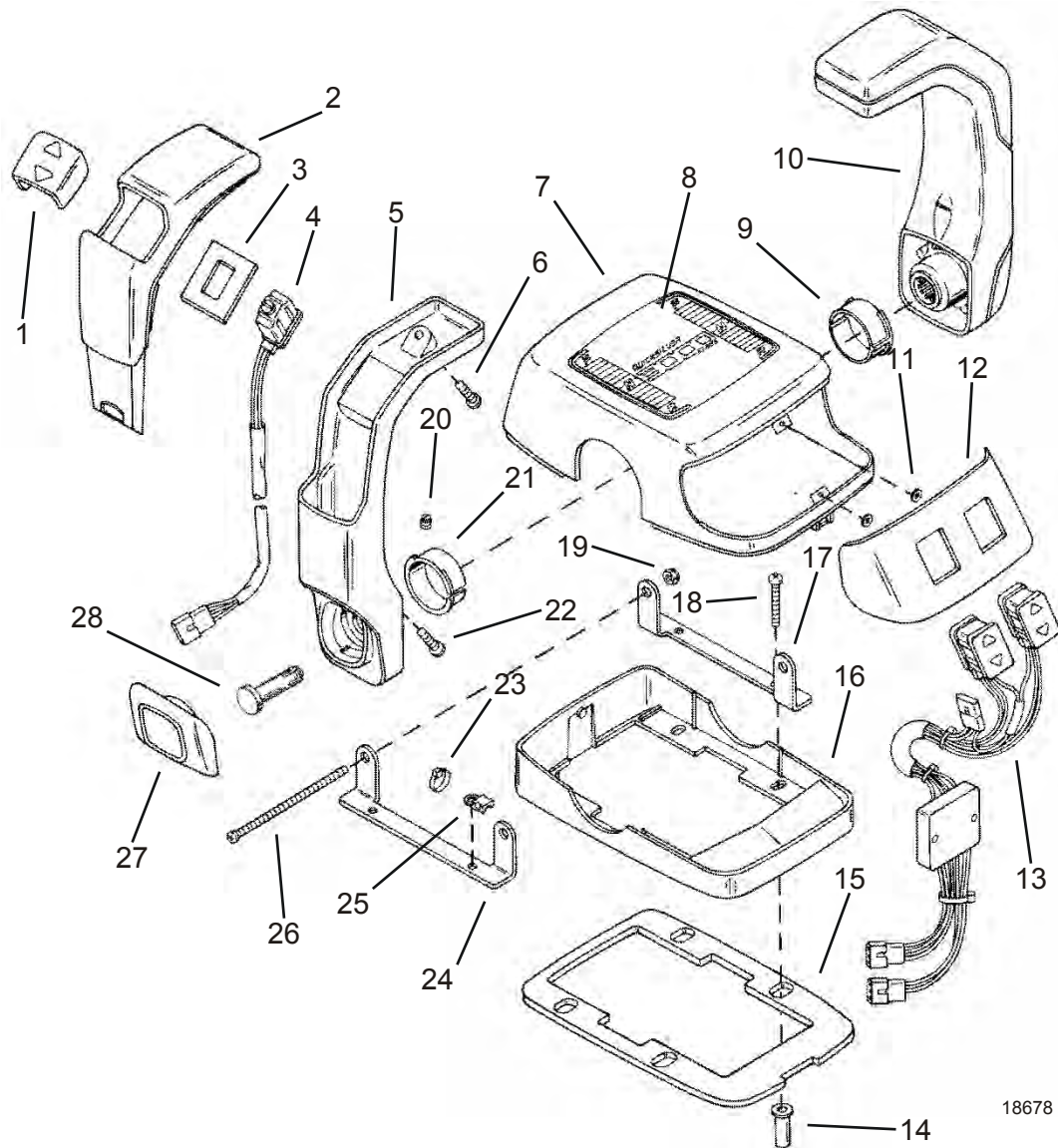
Commander 3000 Console Mount Dual Handle Components



Commander 3000 Console Mount Dual Handle Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Front trim switch cap			
2	1	Rear trim switch cap			
3	1	Grip			
4	1	Carrier			
5	1	Front trim switch			
6	1	Rear trim switch			
7	1	Control handle			
8	1	Screw			
9	1	Cover			
10	1	Decal			
11	1	Bushing			
12	1	Control handle			
13	2	Retainer			
14	1	Cover mask			
15	4	Screw			
16	2	Nut	4	35	
17	1	Bracket			
18	1	Base			
19	1	Gasket			
20	4	Wellnut			
21	1	Bracket			
22	1	Anchor			
23	AR	Cable tie			
24	2	Screw	4	35	
25	1	Screw			
26	1	Bushing			
27	2	Friction screw			
28	2	Throttle-only shaft			
29	2	Throttle-only button			
30	1	Grip			

Commander 3000 Dual Handle, Three Trim Button Components



Commander 3000 Dual Handle, Three Trim Button Components

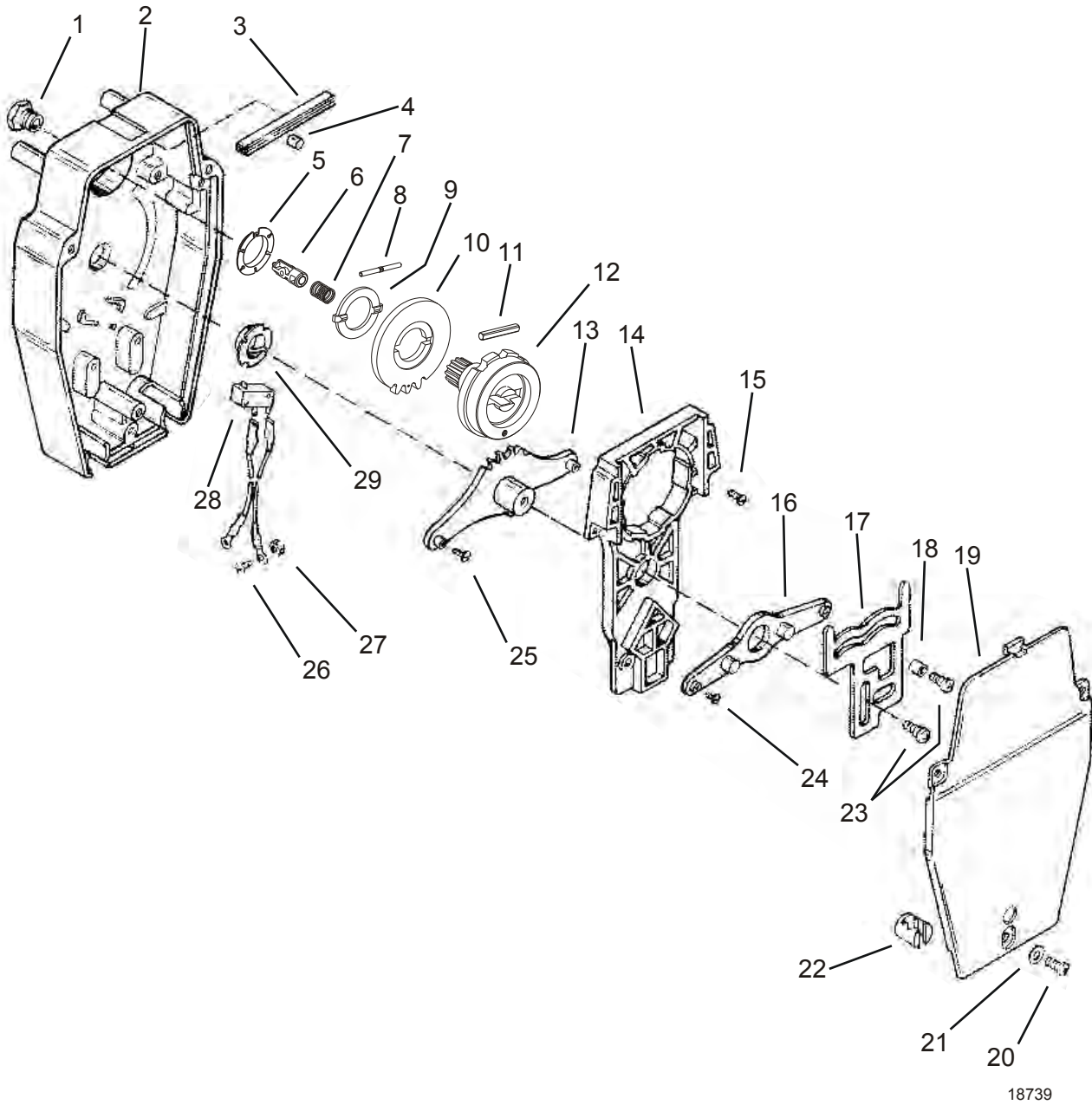
Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Trim switch cap			
2	1	Grip			
3	1	Carrier			
4	1	Trim switch			
5	1	Control handle			
6	2	Screw			
7	1	Cover			
8	1	Decal			
9	1	Bushing			
10	1	Control handle			
11	2	Retainer			
12	1	Cover mask			
13	1	Trim harness assembly			
14	2	Well-nut			
15	1	Gasket			
16	1	Base			
17	1	Bracket			
18	4	Screw			
19	2	Nut	4	35	
20	2	Friction screw			
21	1	Bushing			
22	2	Screw			
23	AR	Cable tie			
24	1	Bracket			
25	1	Anchor			
26	2	Screw	4	35	
27	2	Throttle-only button			
28	2	Throttle-only shaft			



Commander 3000 Remote Control Module Design II Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Control housing			
2	1	Control handle retaining bolt	17	150	
3	1	Detent spring			
4	1	Roller			
5	1	Gear shift pin			
6	1	Throttle-only shaft			
7	1	Spring			
8	1	Shift gear			
9	1	Retaining ring			
10	2	Steel ball			
11	1	Handle shaft			
12	1	Shift arm assembly			
13	1	Shaft support assembly			
14	4	Screw	4	35	
15	1	Throttle arm assembly			
16	1	Plate			
17	1	Throttle plate roller			
18	2	Shoulder screw			
19	3	Screw	1.1	10	
20	3	Washer			
21	2	Grommet			
22	1	Back cover			
23	1	Screw	2.8	25	
24	1	Screw	2.8	25	
25	2	Screw			
26	2	Nut			
27	1	Neutral start safety switch			
28	1	Bushing			

Commander 3000 Remote Control Module Design III Components



Commander 3000 Remote Control Module Design III Components

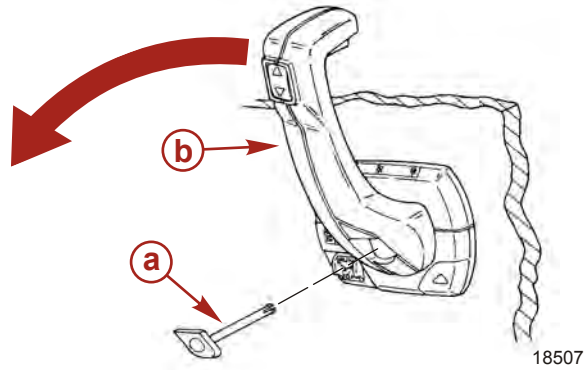
Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Control handle retaining bolt	17	150	
2	1	Control housing			
3	1	Detent springs			
4	1	Roller			
5	1	Bushing			
6	1	Throttle only shaft			
7	1	Spring			
8	1	Lock pin			
9	1	Lock ring			
10	1	Shift gear			
11	1	Drive pin			
12	1	Handle shaft			
13	1	Shift arm assembly			
14	1	Shaft support assembly			
15	4	Screw	2.8	25	
16	1	Throttle arm assembly			
17	1	Plate			
18	1	Throttle plate roller			
19	1	Back cover			
20	3	Screw	4	35	
21	1	Washer			
22	2	Grommet			
23	2	Shoulder bolt	5	45	
24	1	Screw	2.8	25	
25	1	Screw	2.8	25	
26	2	Screw			
27	2	Nut			
28	1	Neutral start safety switch			
29	1	Bushing			

Commander 3000 Panel Mount Remote Control

Commander 3000 Panel Mount Handle and Bezel Disassembly

1. Push the throttle-only button in and place the control handle in a throttle-only position.
2. Use a small screwdriver to remove the throttle-only button.

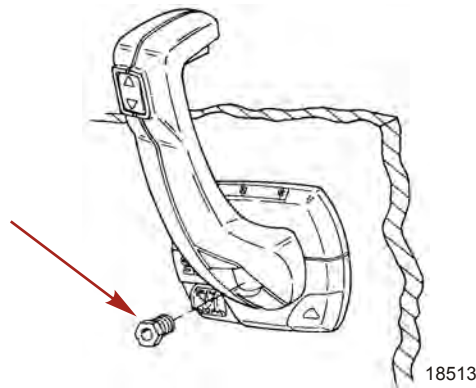
NOTE: The throttle-only button can only be removed when the control is in the throttle-only position.



a - Throttle-only button

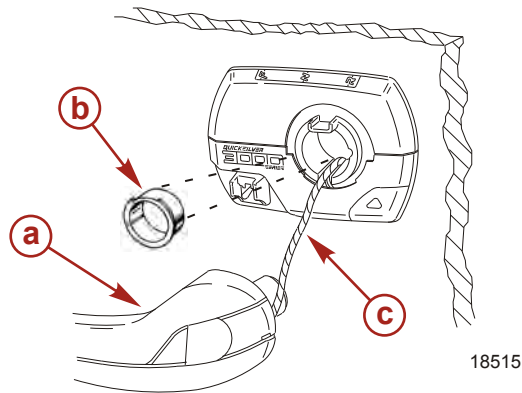
b - Move control handle to the throttle-only position

3. Remove the nut securing the control handle to the control module assembly.



4. Pull the control handle off the control module assembly and disconnect the trim switch wire harness connector.

5. Remove the bushing.

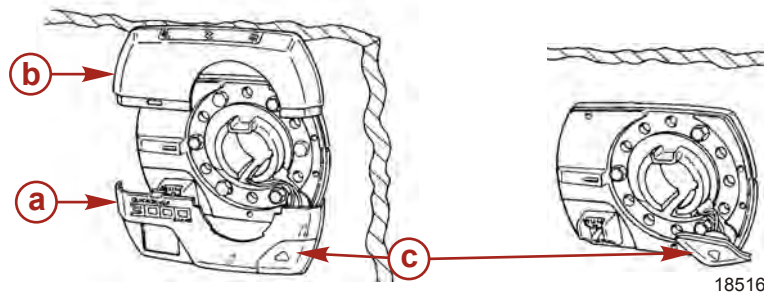


- a** - Control handle
- b** - Bushing
- c** - Trim switch wire harness

6. Gently pry the lower bezel cover off.

NOTE: If the lower bezel cover has a trailer switch installed, gently twist the trailer switch out of the bezel pocket.

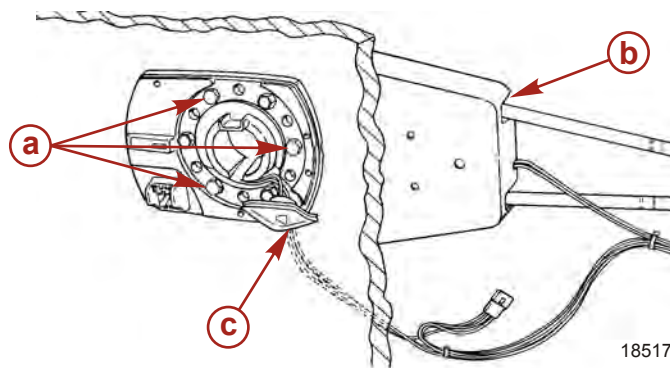
7. Remove the upper bezel cover.



- a** - Lower bezel cover (remove first)
- b** - Upper bezel cover
- c** - Trailer switch

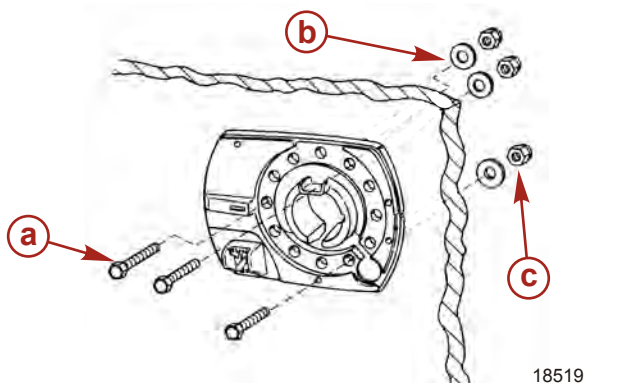
8. Remove the three screws securing the control module assembly to the bezel.

NOTE: If the bezel has a trailer switch, slide the trailer switch through the bezel control handle opening while removing the control module from the bezel.



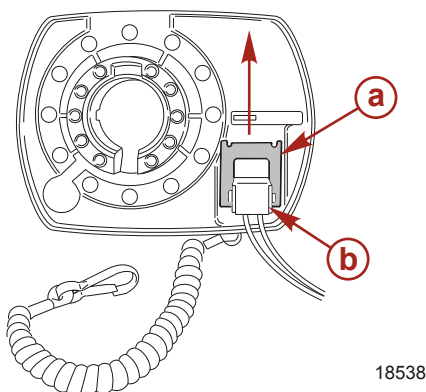
- a** - Screws securing control module assembly to the bezel (3)
- b** - Control module assembly
- c** - Trailer switch

9. Remove the three screws, nuts, and washers securing the bezel to the control mounting panel.



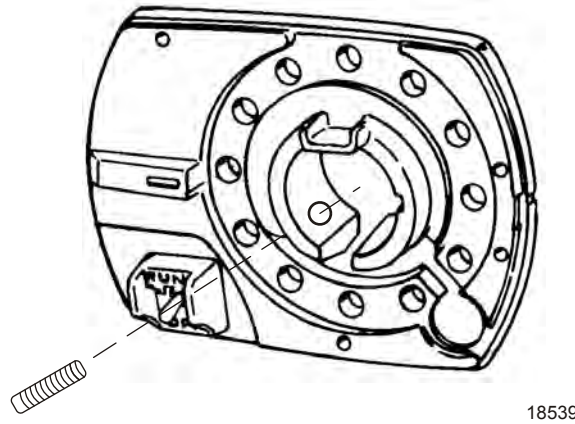
- a** - Screw (3)
- b** - Washer (3)
- c** - Nut (3)

10. Push the lanyard retainer up on the back side of the bezel to remove the lanyard switch from the bezel.

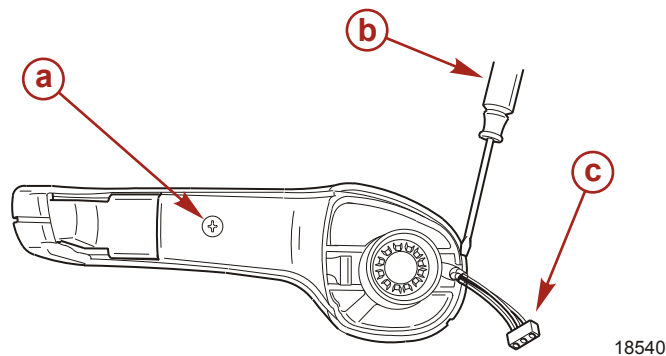


- a** - Lanyard retainer
- b** - Lanyard switch

11. Remove the friction screw from the bezel.

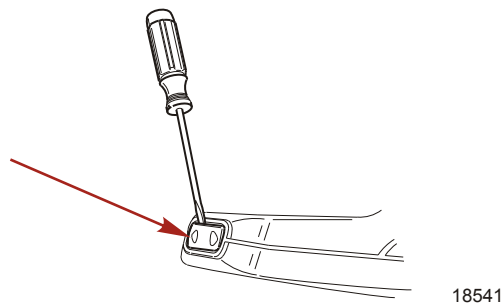


12. Remove the screw securing the control handle cover to the control handle and pry off the cover.



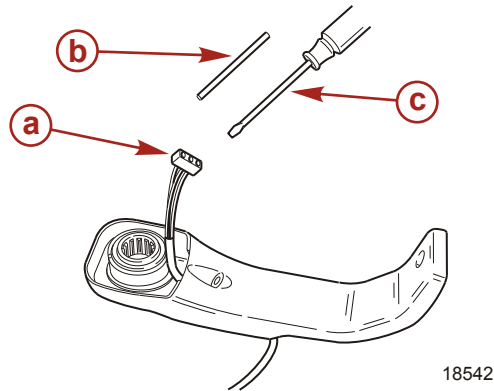
- a** - Screw securing control handle cover
- b** - Screwdriver
- c** - Trim switch harness

13. Gently pry the trim switch off the cover with a small screwdriver. Push the trim switch out of the handle.



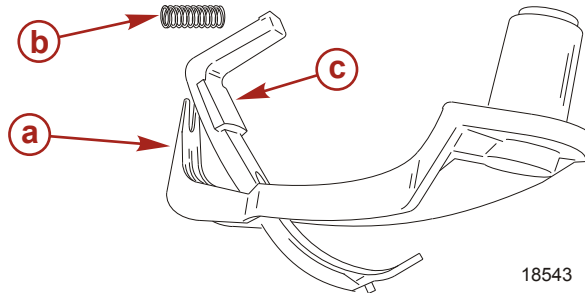
14. Use a small screwdriver or a pin extraction tool to compress the pin tabs prior to removing the trim wires from the harness connector.

NOTE: The trim switch wire harness connector must be removed from the trim wires to extract the trim switch from the control handle. Remove the trim switch wire harness connector only if the trim switch has failed and must be replaced.



- a** - Trim harness connector
- b** - Pin extraction tool (obtain locally)
- c** - Screwdriver

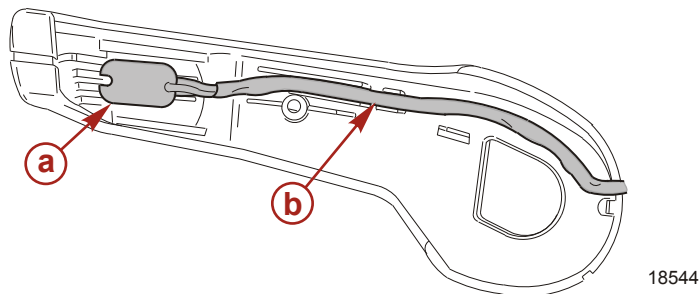
15. Remove the handle spring and slide the release lever out the back side of the handle.



- a** - Control handle
- b** - Spring
- c** - Release lever

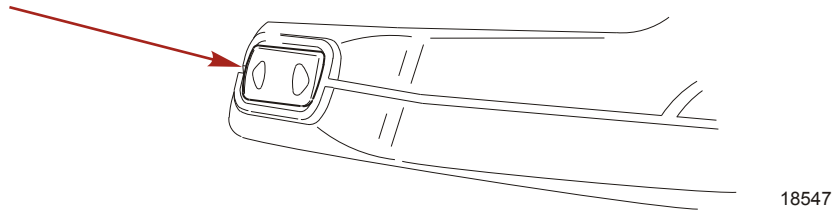
Commander 3000 Panel Mount Handle and Bezel Assembly

1. Install the trim switch into the control handle cover and route the trim switch wire harness along the side of the control handle cover.

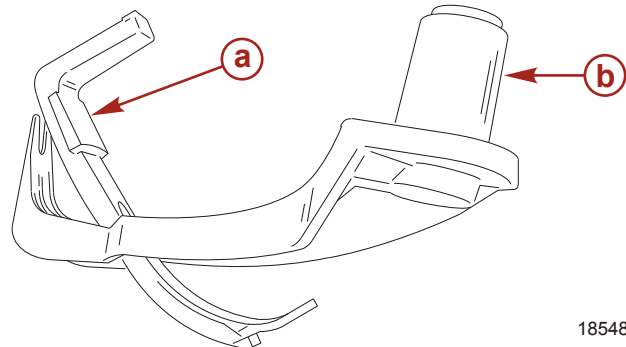


- a** - Trim switch
- b** - Trim switch wire harness

2. Snap the trim switch cap into the switch installed in the control handle. The cap will secure the trim switch in the control handle.

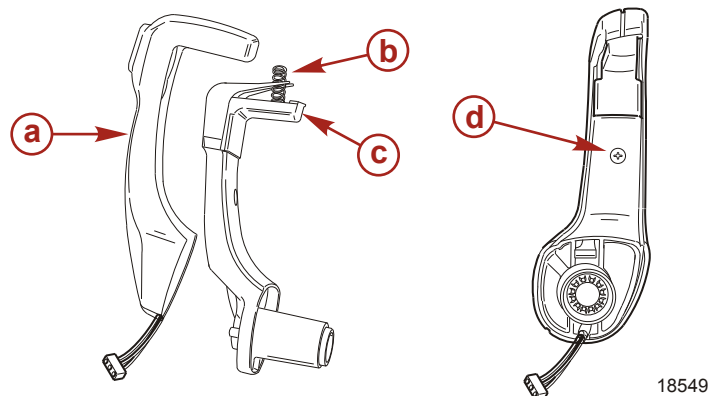


3. Guide the release lever through the control handle.



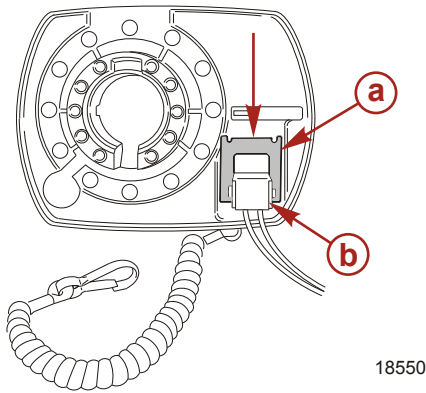
- a** - Release lever
- b** - Control handle

4. Install the spring onto the round boss on the release lever and allow the spring to rest on the control handle slot.
5. Guide the spring on the control handle to the inside of the control handle cover.
6. Guide the trim wires out the bottom of the control handle opening.
7. Snap the control handle cover onto the control handle and secure with a screw. Tighten the screw securely.



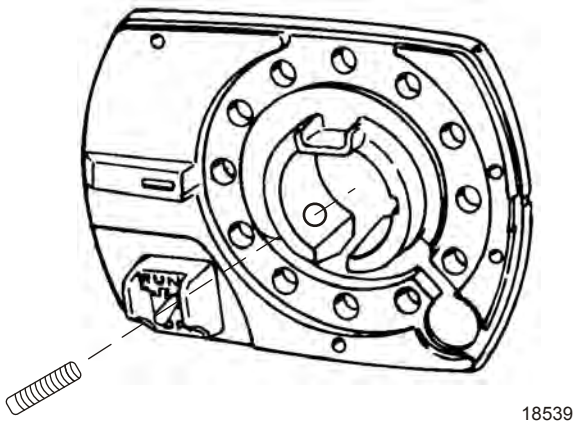
- a** - Control handle cover
- b** - Spring
- c** - Release lever
- d** - Screw securing control handle cover

8. Install the lanyard switch into the bezel and secure with the lanyard retainer.

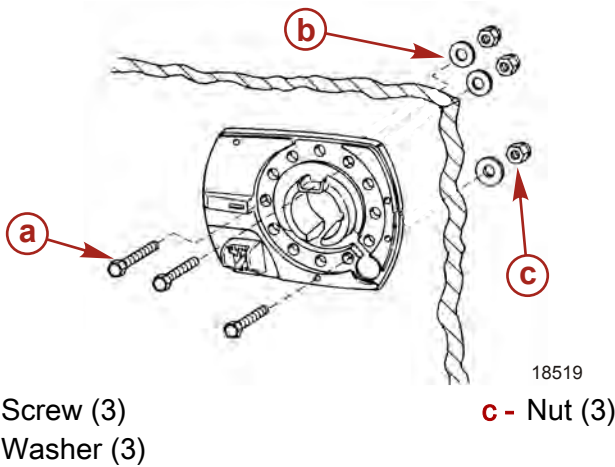


- a - Lanyard retainer
- b - Lanyard switch

9. Install the friction screw into the bezel. Ensure the friction screw is flush with the center bore of the bezel.

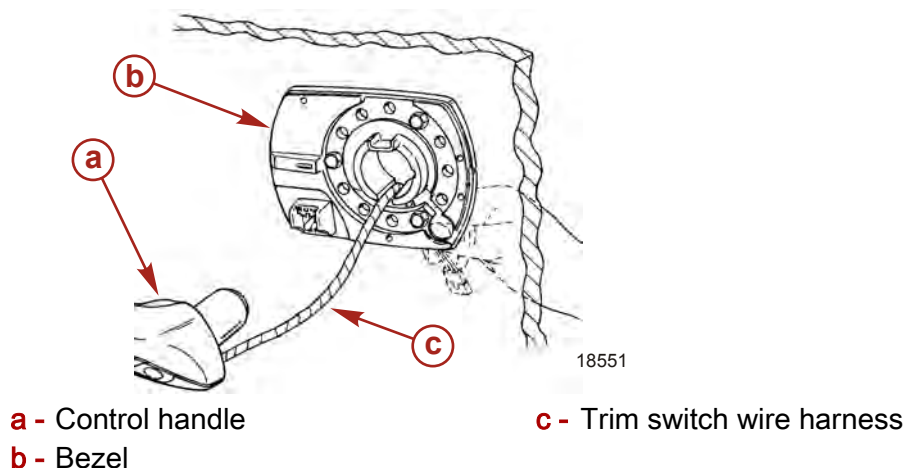


10. Install the bezel onto the panel of the boat and secure with three screws, washers, and nuts. Tighten the screws and nuts to the specified torque.

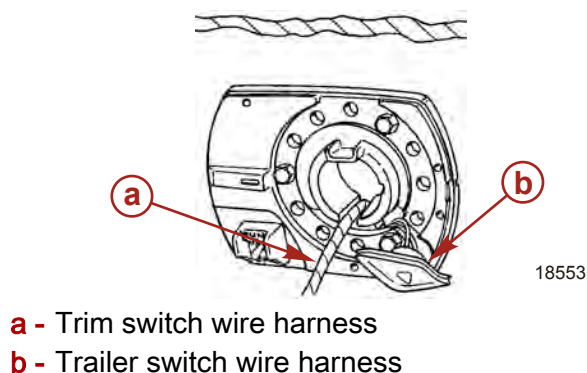


Description	Nm	lb. in.	lb. ft.
Screw, washer, and nut (3)	11.3	100	

11. Route the trim wire harness on the control handle through the center bore of the bezel.



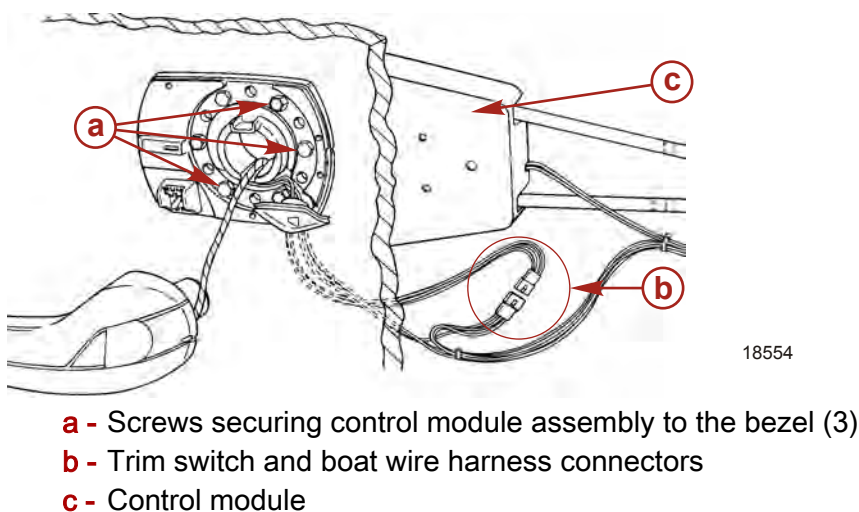
12. Route the trailer switch, if equipped, through the center bore of the bezel.



13. With the control cables installed, secure the remote control module assembly to the bezel with three screws. Tighten the screws to the specified torque.

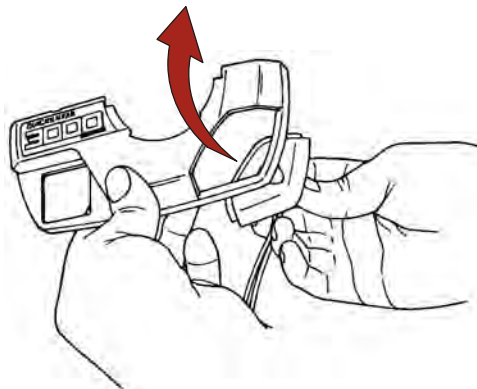
IMPORTANT: Ensure the trim wire harness from the control handle, is not pinched between the bezel and the control module assembly.

14. Connect the trim switch wire harness connector to the boat wire harness connector.



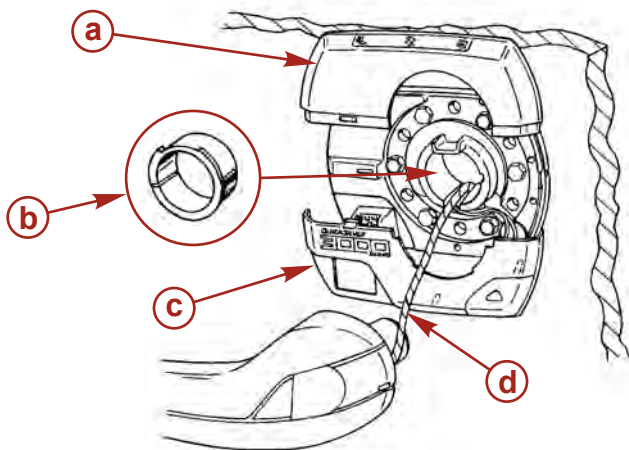
Description	Nm	lb. in.	lb. ft.
Screws securing control module assembly to the bezel (3)	2.8	25	

15. Install the trailer switch to the lower bezel cover if equipped. The switch will snap into the lower bezel cover.



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16. Install and snap into place the upper and lower bezel covers onto the bezel.
17. Lubricate the inside diameter of the control handle bushing with 2-4-C with Teflon.
18. Install the control handle bushing into the bezel.



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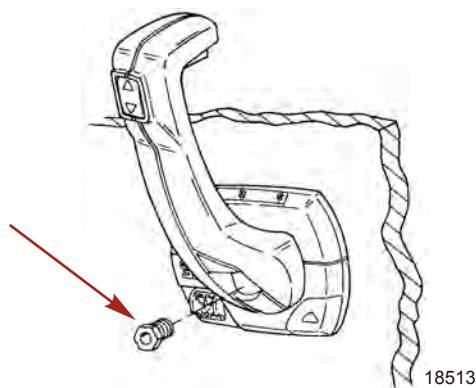
- a** - Upper bezel cover (install first)
b - Bushing
c - Lower bezel cover
d - Trim switch wire harness

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle bushing	92-802859A1

19. Install the control handle onto the remote control module control shaft. Ensure the location of the control handle is in the proper position for neutral.
20. Apply Loctite 271 Threadlocker onto the threads of the control handle retaining bolt.
21. Secure the control handle to the control module assembly with the control handle retaining bolt. Tighten the control handle retaining bolt to the specified torque.

⚠ WARNING

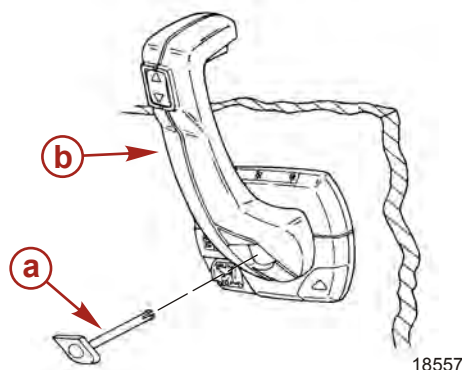
Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The control handle retaining bolt must be properly torqued and retained with Loctite Threadlocker to prevent the control handle retaining bolt from loosening, thus resulting in disengagement of the control handle.



Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Threads of control handle retaining bolt	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle retaining bolt	17	150	

22. Install the throttle-only button.



- a** - Throttle-only button
b - Control handle

23. Install the rubber sleeves or shrink tubing onto the neutral start safety switch leads.

24. Secure the neutral start safety switch leads from the control module to the boat harness with two screws, washers, and nuts. Tighten the screws and nuts securely.

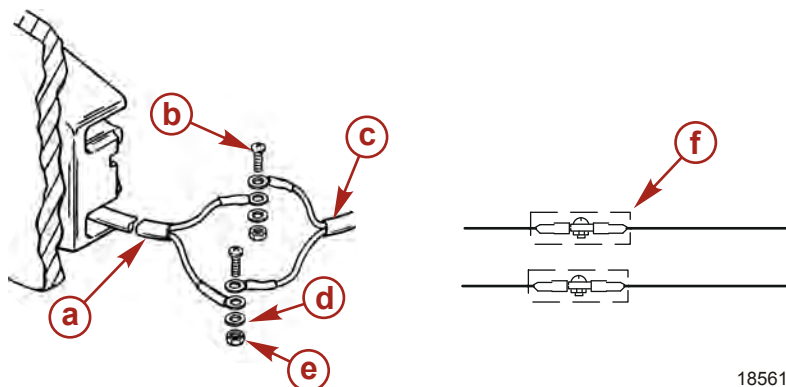
⚠ WARNING

Avoid serious injury or death from a sudden unexpected acceleration when starting the engine. The neutral start safety switch must be correctly connected to prevent engine startup when in gear. Refer to wiring diagrams for correct wiring connections.

25. Coat the neutral start safety switch leads with Liquid Neoprene and allow to dry.

26. Slide the rubber sleeves over the neutral start safety switch wire connections.

NOTE: Some remote control models have bullet connectors instead of ring terminals.



18561

- a** - Control module neutral start safety switch wire harness
- b** - Screw (2)
- c** - Boat wire harness neutral start safety switch wire harness
- d** - Washer
- e** - Nut
- f** - Rubber sleeve

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch connection	92-25711-3

27. Adjust the control handle friction.



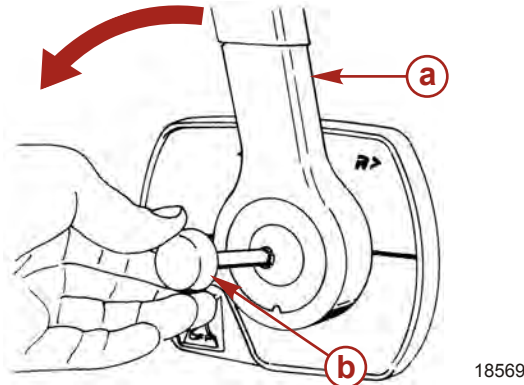
18563

Commander 3000 Classic Panel Mount Control

Commander 3000 Classic Panel Mount Handle and Bezel Disassembly

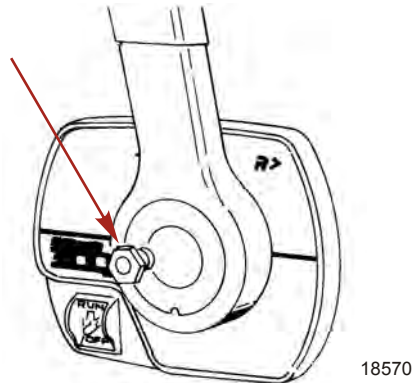
1. Push the throttle-only button in and place the control handle in a throttle-only position.
2. Use a small screwdriver to remove the throttle-only button.

NOTE: The throttle-only button can only be removed when the control is in the throttle-only position.

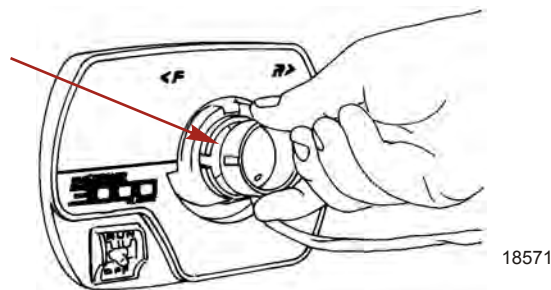


- a** - Move control handle to the throttle-only position
- b** - Throttle-only button

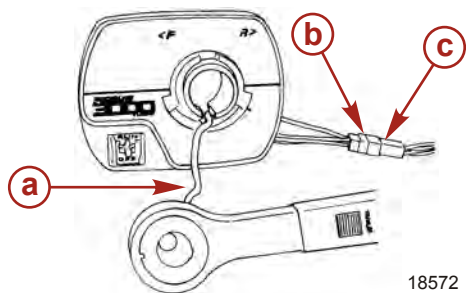
3. Remove the control handle retaining bolt securing the control handle to the control module assembly.



4. Pull the control handle off the control module assembly.
5. Remove the bushing.



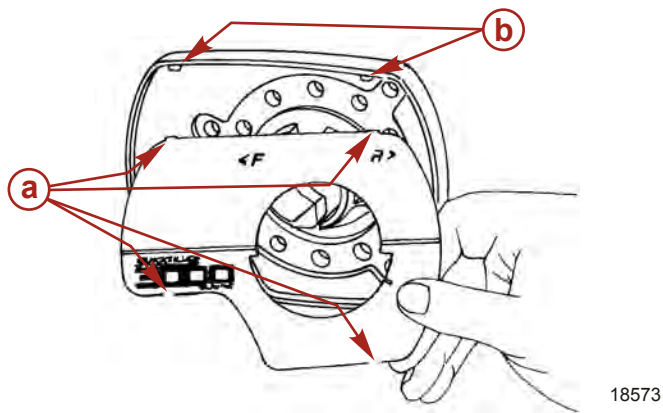
6. Disconnect the trim switch wire harness connector.



- a** - Trim switch wire harness
- b** - Trim switch wire harness connector
- c** - Boat wire harness connector

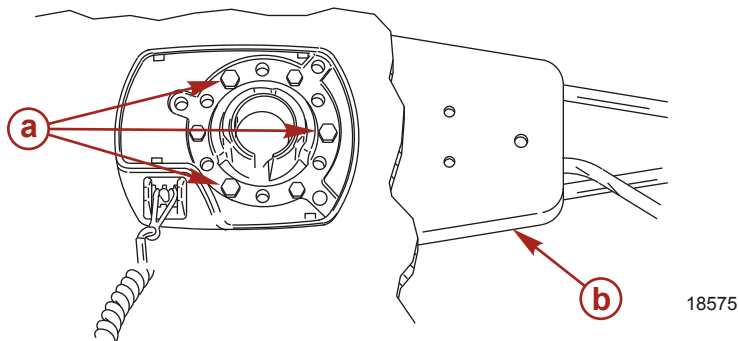
7. Gently pry the bezel cover off with a small screwdriver.

NOTE: Pry the bezel cover at the top or the bottom to extract the bezel cover tabs from the notches in the bezel.



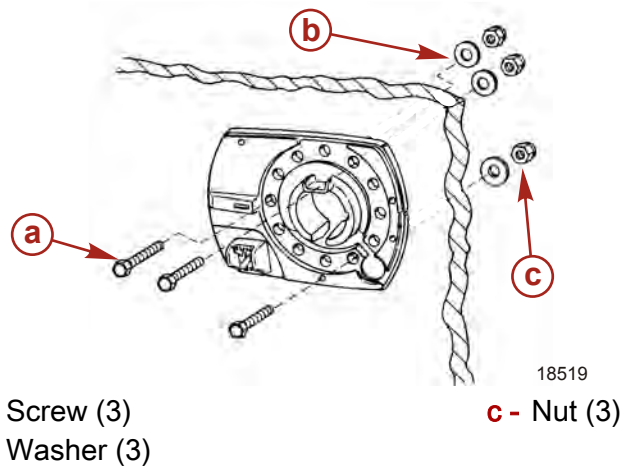
- a** - Bezel cover tabs
- b** - Bezel notches

8. Remove the three screws securing the control module assembly to the bezel. Remove the control module assembly.

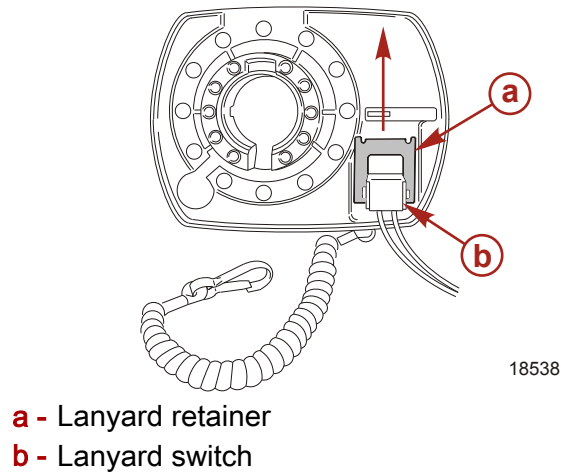


- a** - Screws securing the control module assembly to the bezel (3)
- b** - Control module assembly

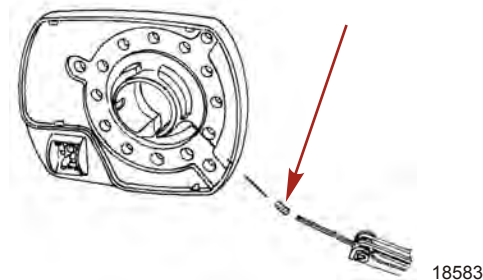
9. Remove the three screws, nuts, and washers securing the bezel to the control mounting panel.



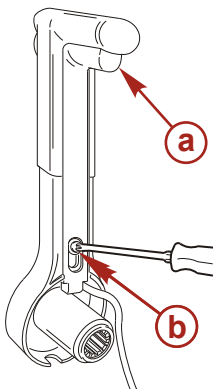
10. Push the lanyard retainer up on the back side of the bezel to remove the lanyard switch from the bezel. Unplug the lanyard switch from the boat wire harness.



11. Remove the friction screw from the bezel.

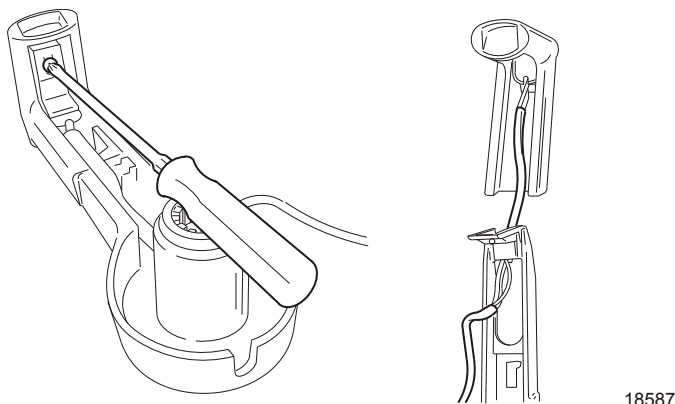


12. Remove the screw and washer securing the shift release to the control handle. Remove the shift release and spring.

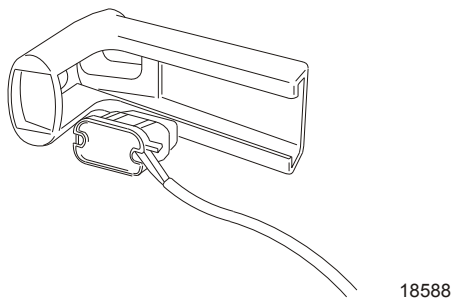


- a** - Shift release
b - Screw and washer securing shift release

13. Remove the screw securing the control handle cover to the control handle and slide the cover from the control handle.

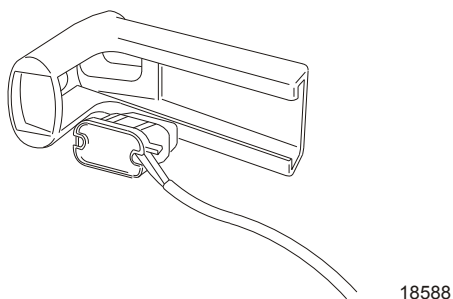


14. Push the trim switch and trailer switch (if equipped) out of the handle cover.

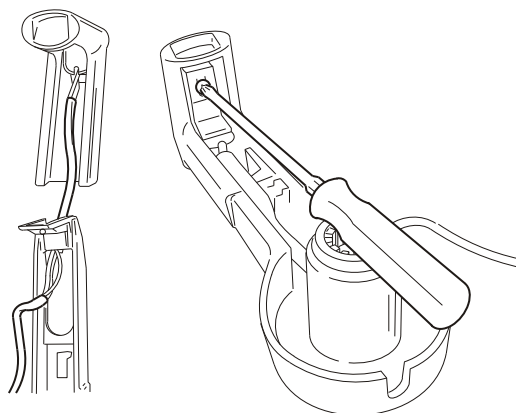


Commander 3000 Classic Panel Mount Handle and Bezel Assembly

1. Install the trim switch into the control handle cover.



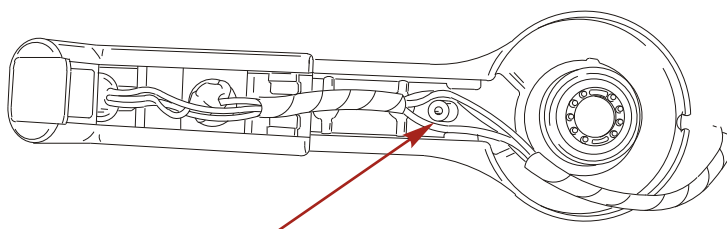
2. Route the trim switch wires through the control handle.
3. Slide the control handle cover onto the control handle. Be careful not to pinch the trim switch wires.
4. Secure the control handle cover to the control handle with a screw. Tighten the screw to the specified torque.



18602

Description	Nm	lb. in.	lb. ft.
Screw securing handle cover	6	53	

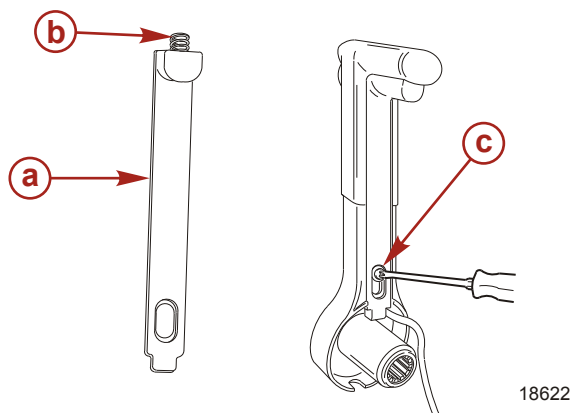
5. Divide the trim switch and trailer switch (if equipped) wires around the screw boss in the control handle.



18621

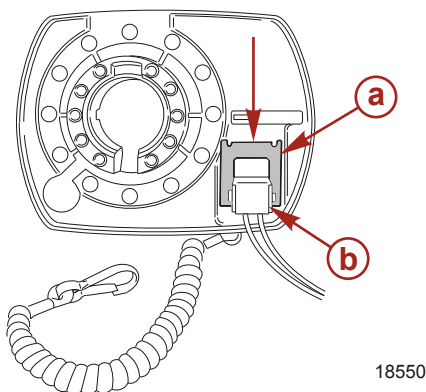
6. Install the spring onto the round boss on top of the shift release.
7. Attach the shift release with the spring to the control handle by positioning the spring over the handle grip screw.

8. Push the shift lever up and into the control handle until the screw boss on the control handle is located in the shift lever slot. Secure the shift lever with a screw and washer. Tighten the screw securely.



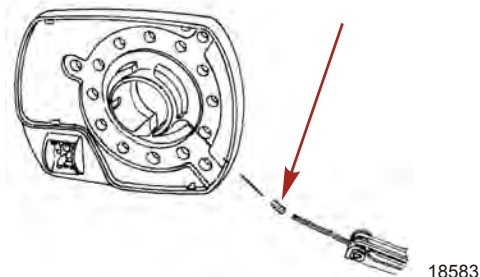
- a** - Shift release
b - Spring
c - Screw and washer securing shift release

9. Install the lanyard switch into the bezel and secure the with the lanyard retainer.

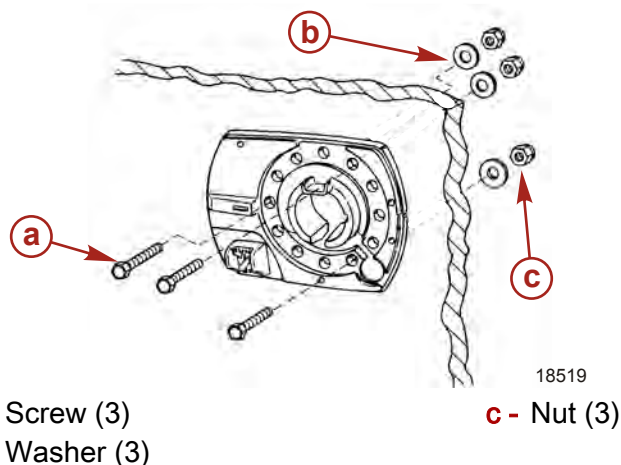


- a** - Lanyard retainer
b - Lanyard switch

10. Install the friction screw into the bezel. Ensure the friction screw is flush with the center bore of the bezel.

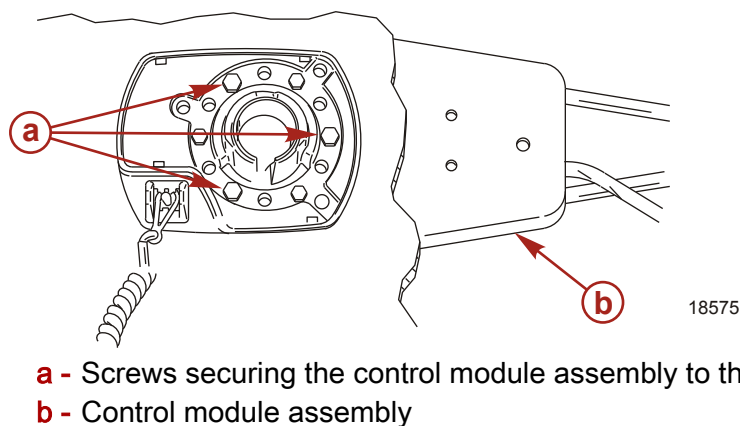


11. Install the bezel to the boat and secure with three screws, washers, and nuts. Tighten the screws and nuts to the specified torque.



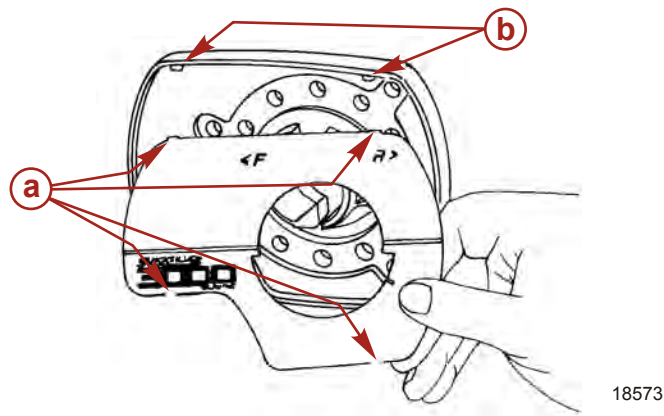
Description	Nm	lb. in.	lb. ft.
Screw, washer, and nut (3)	11.3	100	

12. Install the control module assembly to the bezel and secure with three screws. Tighten the screws to the specified torque.



Description	Nm	lb. in.	lb. ft.
Screws securing control module assembly (3)	2.8	25	

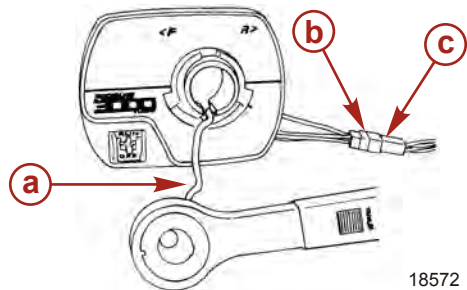
13. Install the bezel cover onto the bezel.



- a - Bezel cover tabs
- b - Bezel notches

14. Route the trim switch and trailer switch wires on the control handle through the bezel opening.

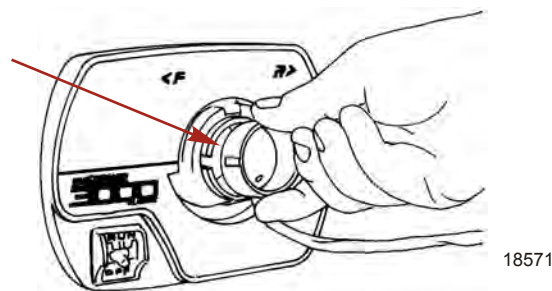
15. Connect the trim and trailer wire harness connector to the boat wire harness connector.



- a - Trim switch wire harness
- b - Trim switch wire harness connector
- c - Boat wire harness connector

16. Lubricate the inside diameter of the control handle bushing with 2-4-C with Teflon.

17. Install the control handle bushing into the bezel.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle bushing	92-802859A1

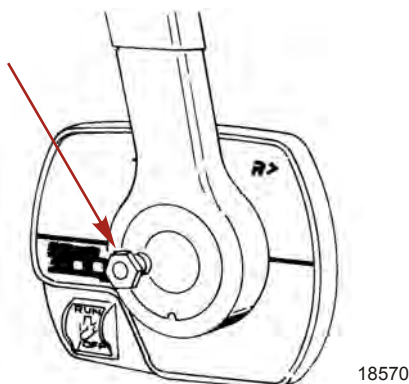
18. Install the control handle onto the module control shaft. Ensure the location of the control handle is in the proper position for neutral.

19. Apply Loctite 271 Threadlocker onto the threads of the control handle retaining bolt.

20. Secure the control handle to the control module assembly with the control handle retaining bolt. Tighten the control handle retaining bolt to the specified torque.

⚠ WARNING

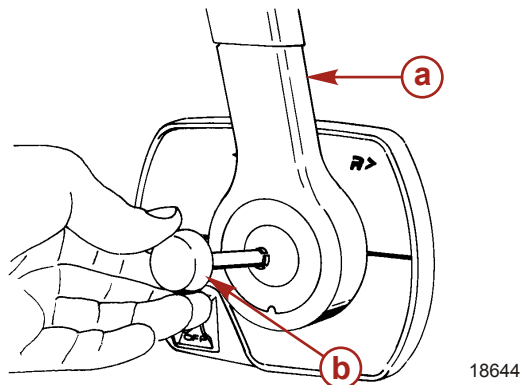
Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The control handle retaining bolt must be properly torqued and retained with Loctite Threadlocker to prevent the control handle retaining bolt from loosening, thus resulting in disengagement of the control handle.



Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Threads of control handle retaining bolt	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle retaining bolt	17	150	

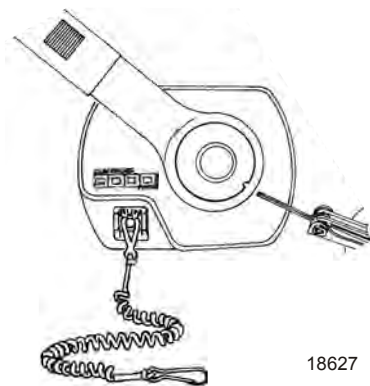
21. Install the throttle-only button.



- a** - Control handle
b - Throttle-only button

22. Connect the safety lanyard stop switch wire connectors to the boat wiring harness connector.
23. Move the control handle to an approximate 45° angle to expose the handle tension adjusting screw.

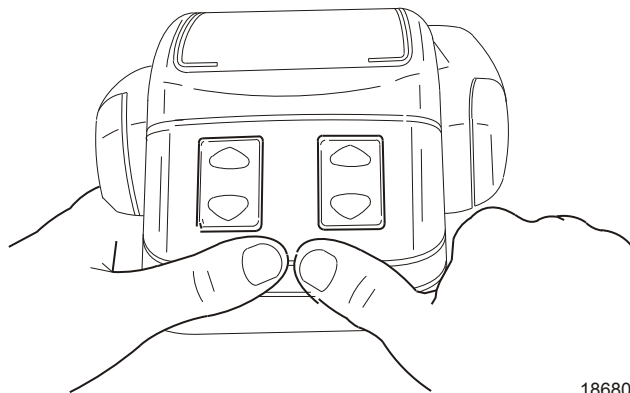
24. Tighten the tension adjusting screw to the desired resistance.



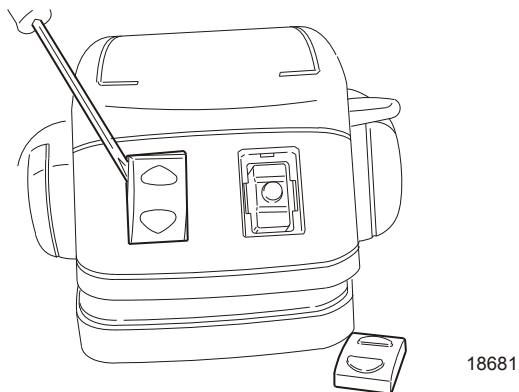
Commander 3000 Single and Dual Handle Console Mount Controls

Commander 3000 Single and Dual Handle Disassembly

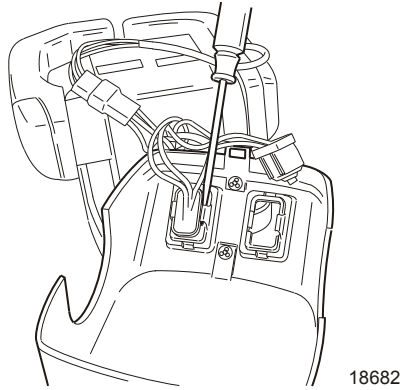
1. Remove the cover assembly by pushing in and up on the lower portion of the cover mask.



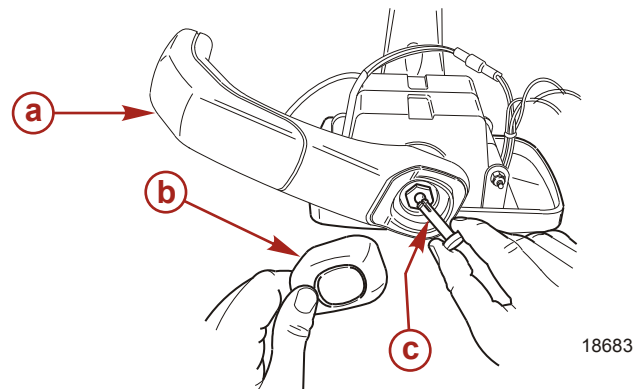
2. Remove the trim switch covers.



3. On back side of the cover mask, use a small screwdriver to work each switch out of the cover mask.

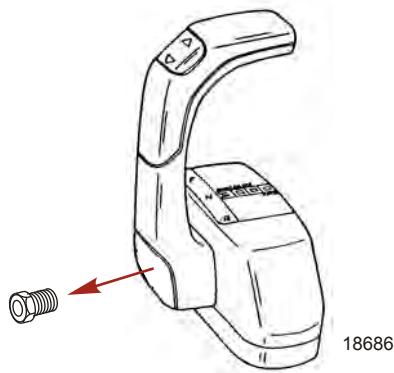


4. Ensure the control handles are in the throttle-only position. Pull the throttle-only button off the throttle-only shaft.
5. Pull the throttle-only shaft out of the control module assembly.

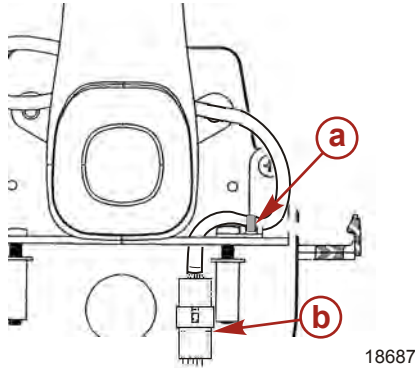


- a** - Control handle in throttle-only position
- b** - Throttle-only button
- c** - Throttle-only shaft

6. Remove the control handle retaining bolt securing the control handle to the control module.

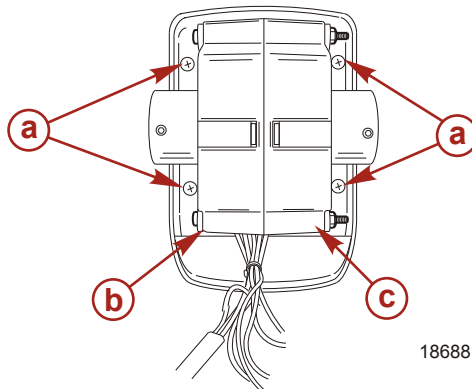


7. Cut the cable tie securing the trim switch wire harness to the base. Disconnect the trim switch harness connector.



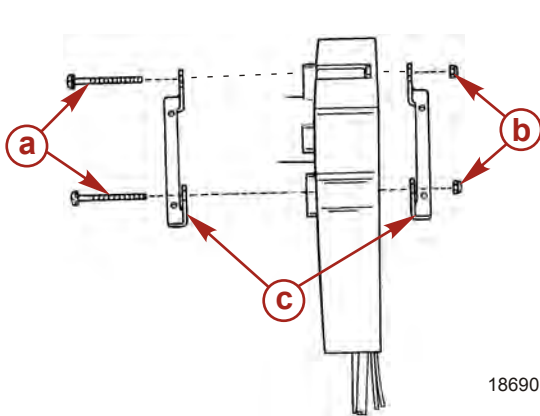
- a** - Cable tie securing trim switch wire harness to base
- b** - Trim switch harness connector

8. Remove the four screws securing the control module brackets to the console. Pull the control module assembly up to remove them from the console.



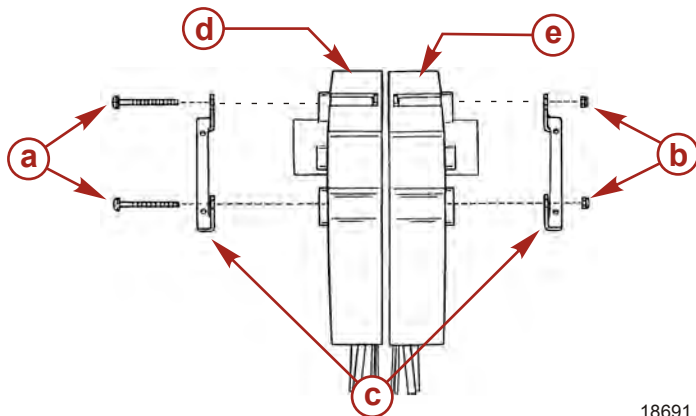
- a** - Four screws securing control module brackets to console
- b** - Port engine control module
- c** - Starboard engine control module

9. Remove the two nuts and screws securing the module to the mounting bracket.



Single handle

- a** - Screw (2)
- b** - Nut (2)
- c** - Bracket (2)

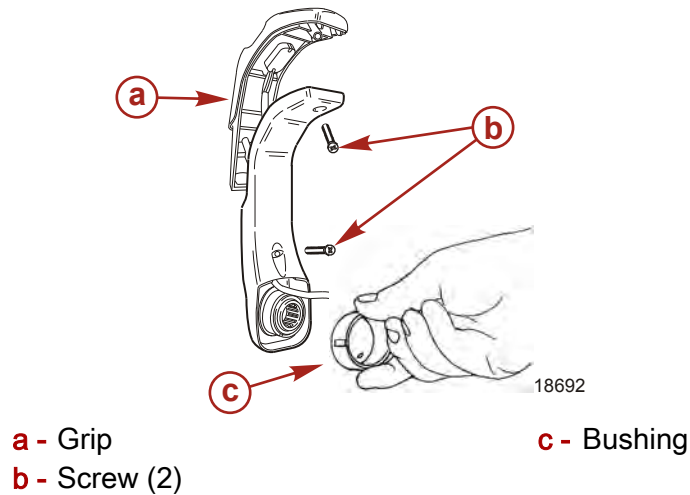


Dual handle

- d** - Port engine control module
- e** - Starboard engine control module

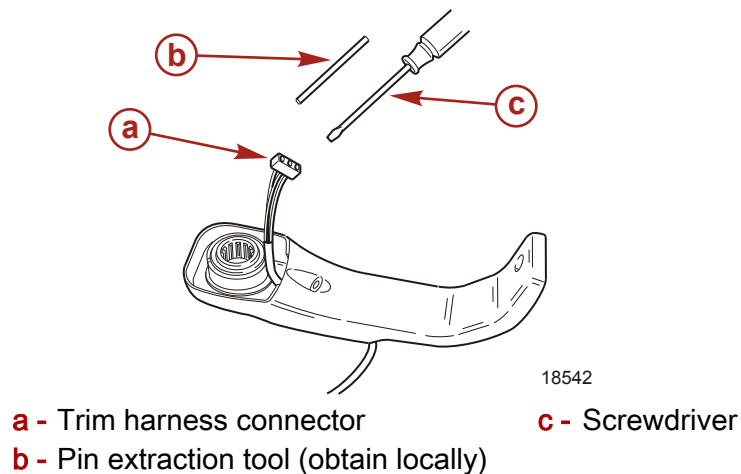
10. If the control handle bushing is on the control handle, remove the bushing.

11. Remove the two screws on the back side of the control handle. Pull the grip up.

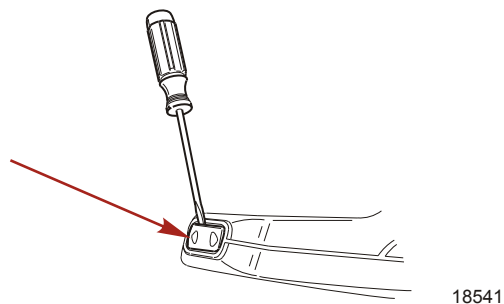


12. Use a small screwdriver or a pin extraction tool to compress the pin tabs prior to removing the trim wires from the harness connector

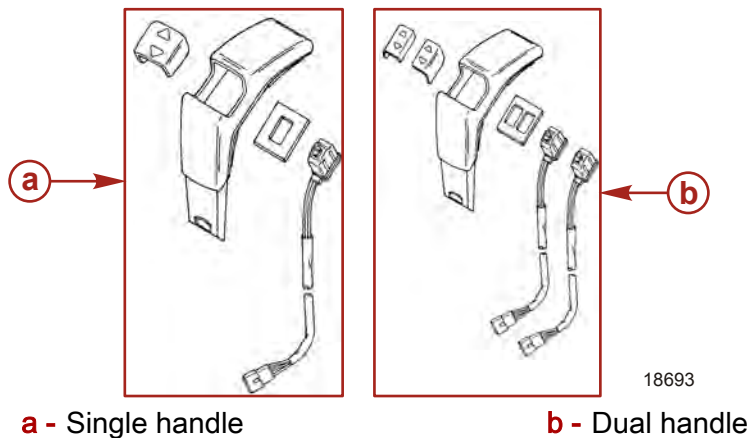
NOTE: The trim switch wire harness connector must be removed from the trim wires to extract the trim switch from the control handle. Remove the trim switch wire harness connector only if the trim switch has failed and must be replaced.



13. Gently pry the trim switch off the cover with a small screwdriver. Push the trim switch out of the handle.

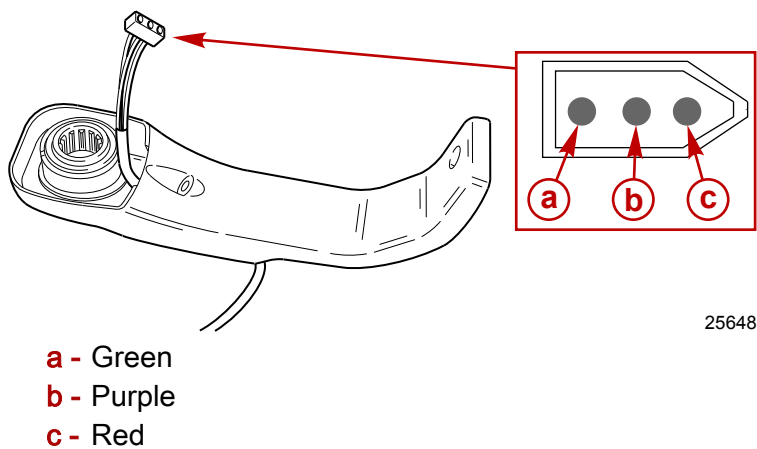


14. With the trim switch cover removed, the trim switch and carrier may be removed from the control handle.

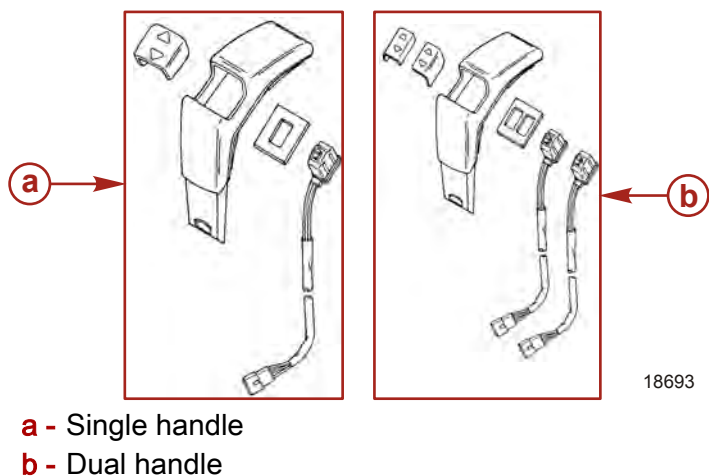


Commander 3000 Single and Dual Handle Assembly

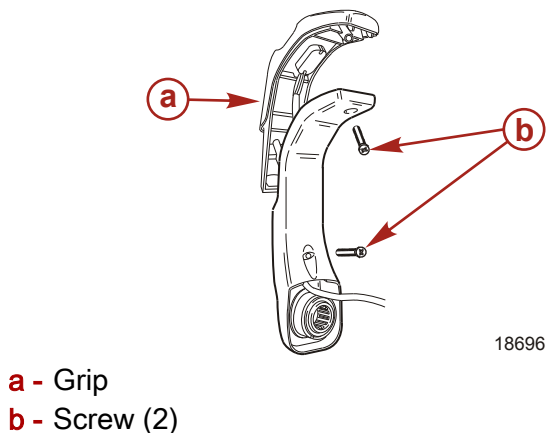
1. Guide the power trim switch wires through the control handle.
2. Install the trim switch wires into the harness connector.



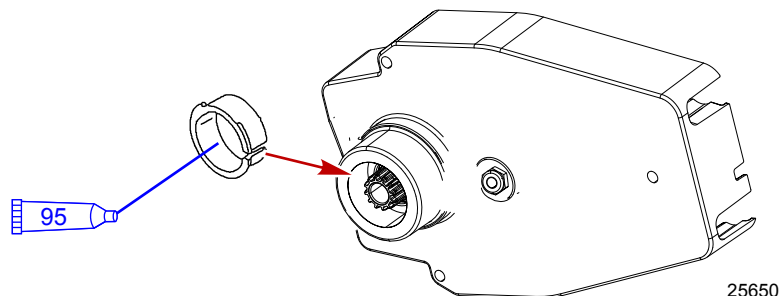
3. Install the carrier, then the trim switch, onto the back side of the grip.
4. Secure the trim switch to the grip with the trim switch cap.



5. Slide the grip onto the control handle. Secure the grip to the control handle with two screws. Tighten the screws securely.



6. Lubricate the inside diameter of the control handle bushing with 2-4-C with Teflon. Install the control handle bushing into the control module assembly.



Tube Ref No.	Description	Where Used	Part No.
	2-4-C with Teflon	Inside diameter of the control handle bushing	92-802859A1

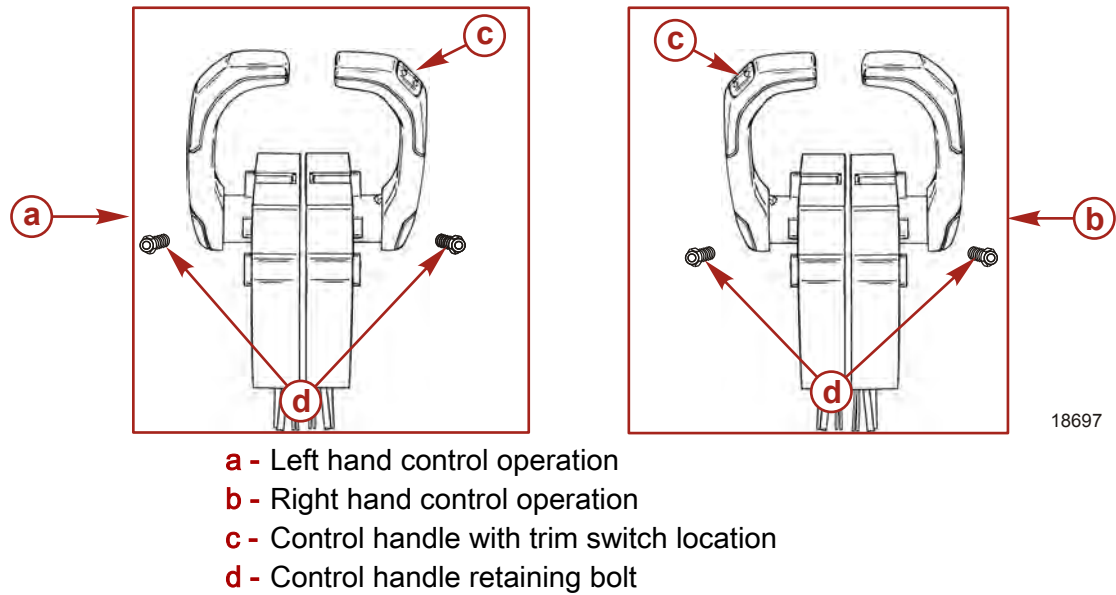
7. Install the control handle onto the remote control module control shaft. Ensure the location of the control handle is in the proper position for neutral.

NOTE: On dual handle control applications, install the control handle with the trim switches on the port side module for a right hand operation, and on the starboard side for a left hand operation of the controls.

8. Apply Loctite 271 Threadlocker onto the threads of the control handle retaining bolt.
9. Secure the control handle with the retaining bolt. Tighten the retaining bolt to the specified torque.

WARNING

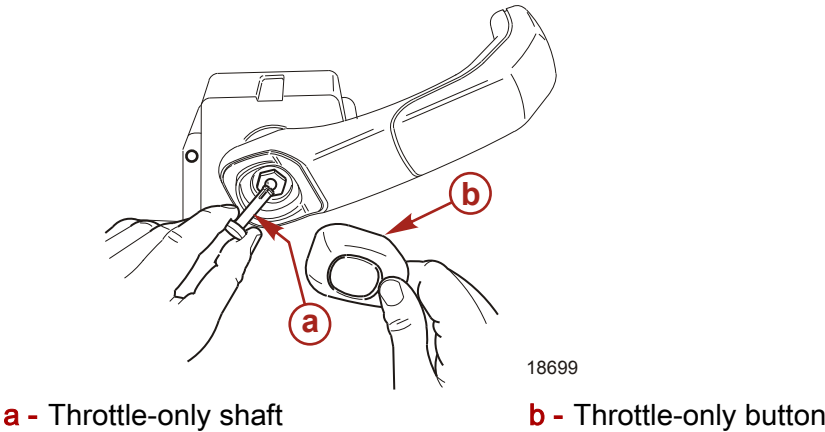
Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The control handle retaining bolt must be properly torqued and retained with Loctite Threadlocker to prevent the control handle retaining bolt from loosening, thus resulting in disengagement of the control handle.



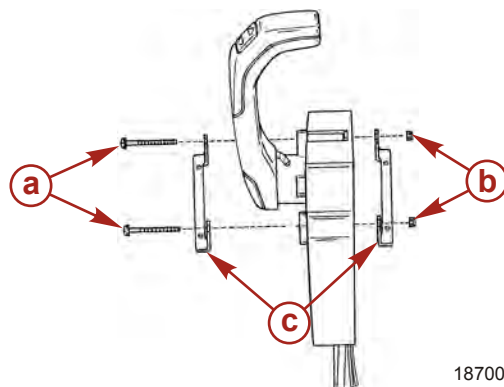
Tube Ref No.	Description	Where Used	Part No.
	Loctite 271 Threadlocker	Threads of control handle retaining bolt	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle retaining bolt	17	150	

10. Install the throttle-only button to the throttle-only shaft.
11. Insert the throttle-only assembly into the center of the control handle retaining bolt. Push the throttle-only button in and secure the throttle-only button to the control handle.



12. Install the mounting bracket to the single handle remote control. Secure the mounting brackets with two screws and nuts. Tighten the screws and nuts to the specified torque.



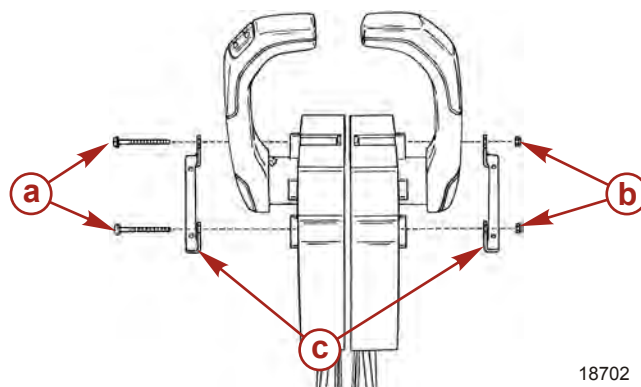
Single Engine

a - Screw (2)
b - Nut (2)

c - Bracket (2)

Description	Nm	lb. in.	lb. ft.
Screws and nuts securing mounting brackets	4	35	

13. Place the two console remote controls back to back.
14. Secure the mounting brackets to the two console remote controls with two screws and nuts. Tighten the screws and nuts to the specified torque.



Dual Engine

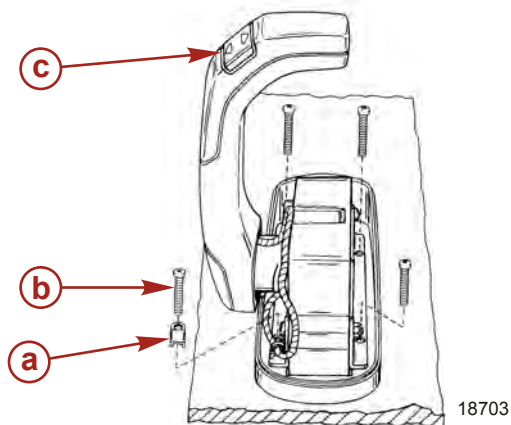
a - Screw (2)
b - Nut (2)

c - Bracket (2)

Description	Nm	lb. in.	lb. ft.
Screws and nuts securing mounting brackets	4	35	

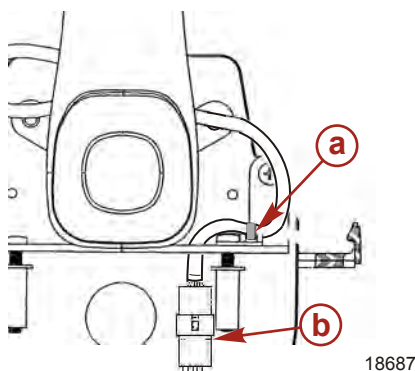
15. Align the bracket mounting holes with the wellnuts in the console.
16. Install the anchor to one of the console mounting screws.
17. Install the screw with the anchor on the same side the trim switches are mounted in the control handle.

18. Ensure the trim wires and neutral start safety switch wires are not pinched under the brackets. Tighten the screws securely.



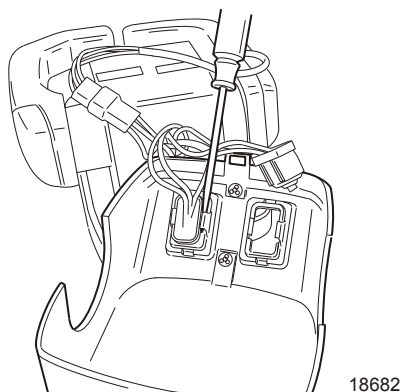
- a** - Anchor
b - Screw (4)
c - Trim switches

19. Secure the trim switch wire harness to the cable tie anchor with a cable tie. Connect the trim switch harness connector to the boat wire harness connector.

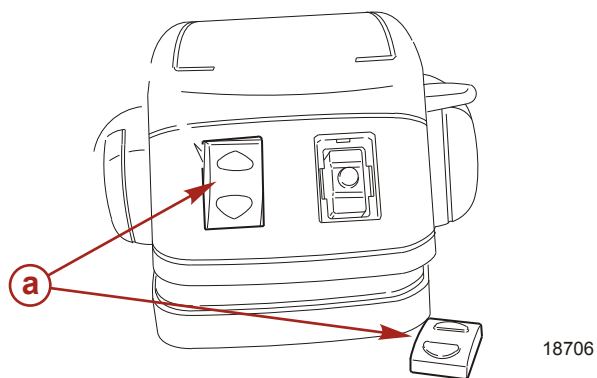


- a** - Cable tie
b - Trim switch harness connector

20. Ensure the trim switches are correctly orientated for port and starboard, up and down control before snapping the trim switches into place from the inside of the cover mask. Use a small screwdriver to ensure the installation of the trim switches to the cover mask.

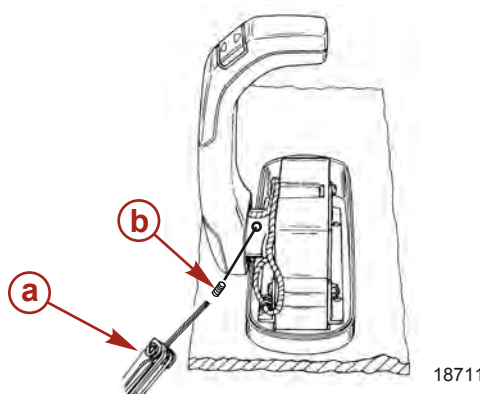


21. Snap the caps on the trim switches.



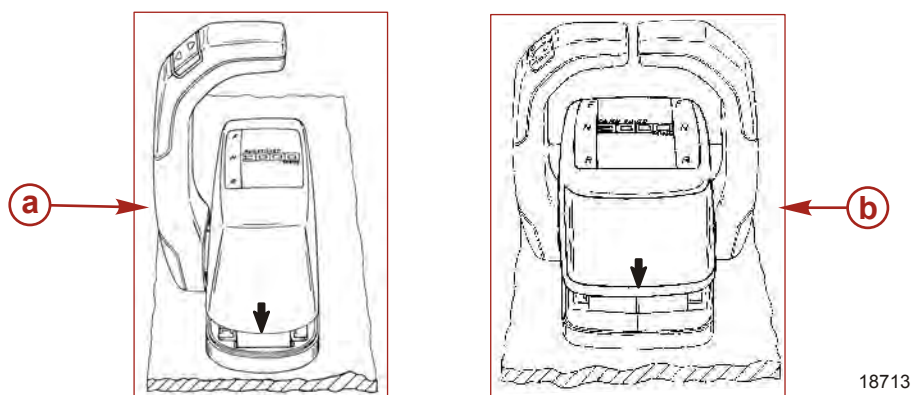
a - Cap

22. Adjust the friction screw to the desired resistance.



a - Allen wrench
b - Friction screw

23. Snap the cover onto the control base.



a - Single handle cover
b - Dual handle cover

Shift and Throttle Cable Installation

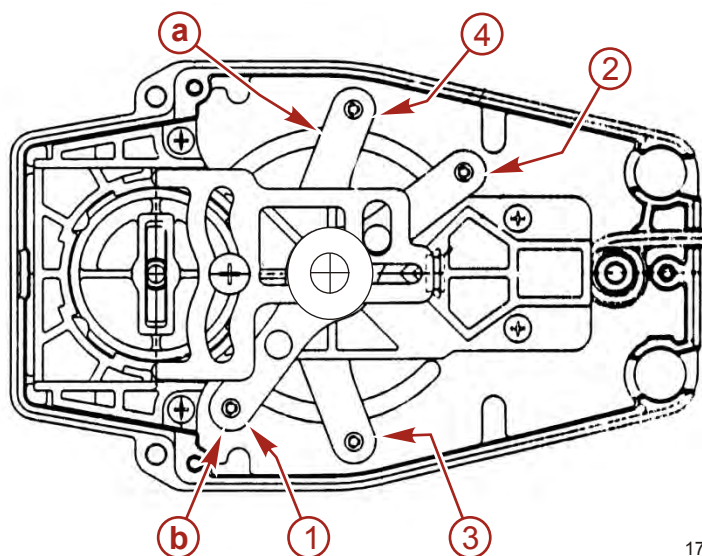
OUTBOARD MODELS

Outboard Models (U.S. and Belgium Models Only)	Starboard Mount Control		Port Mount Control	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Force Outboards and L-Drive (except 9.9 and 15)	4	2	3	2
Mariner and Mercury Outboards (Standard Rotation Models) - All Models through 225 HP (With Pull Throttle) includes 1994-1/2 20/25	4	2	3	2
Mariner and Mercury Outboards - 18 HP, 20 HP, 25 HP (U.S. Origin) (With Push Throttle Cable)	4	1	3	1
Mariner and Mercury Outboards (Counter Rotation Gearcase) - All Models through 225 HP	3	2	4	2
Mariner and Mercury Outboards (Standard Rotation Gearcase) - 250 HP/275 HP	3	2	4	2
Mariner and Mercury Outboards (Counter Rotation Gearcase) - 250 HP/275 HP	4	2	3	2
Mercury Outboards (Standard Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2
Mercury Outboards (Counter Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2

IMPORTANT: The shift cable must be correctly installed at the remote control assembly for the appropriate gear housing rotation (standard or counter). Determine the type of rotation prior to cable installation.

NOTE: For 3.0 Liter EFI GEN II and OptiMax GEN II outboard units, refer to the instructions for standard rotation control cable installation.

NOTE: The base assembly gasket and the base assembly must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.



17705

- a** - Shift arm
b - Throttle arm

MERCURY MERCUISER MODELS

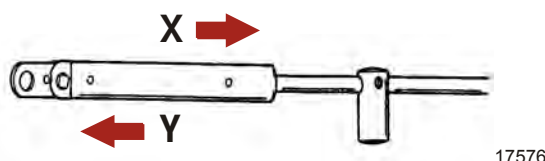
IMPORTANT: The shift cable must be correctly installed at the remote control assembly for the appropriate drive unit rotation (standard or counter). Determine the type of drive unit rotation prior to cable installation.

NOTE: For Bravo Three and Blackhawk drive units, refer to the instructions for standard rotation control cable installation.

NOTE: The base assembly gasket and the base assembly must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.

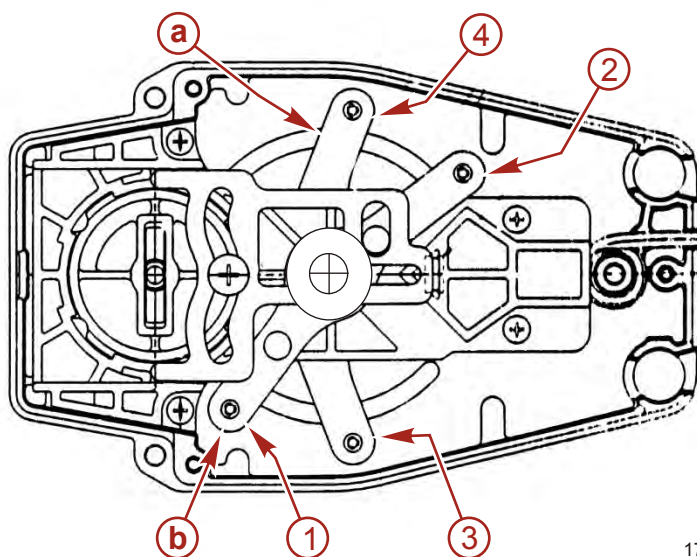
Mercury MerCruiser Models Standard Rotation - The control cable will have to be installed in the remote control so the cable end will move in direction X when shift handle is placed in the forward position.

Mercury MerCruiser Models Counter Rotation - The control cable must be installed in the remote control so the cable end will move in the direction Y when the shift handle is placed in the forward position.



Direction of arrow (Viewed at shift plate)

Mercury MerCruiser Models	Standard Rotation		Counter Rotation	
Starboard Mount Mechanical Control	Anchor Attachment Points		Anchor Attachment Points	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Direction of arrow	X	X	Y	X
Lever number	4	2	3	2



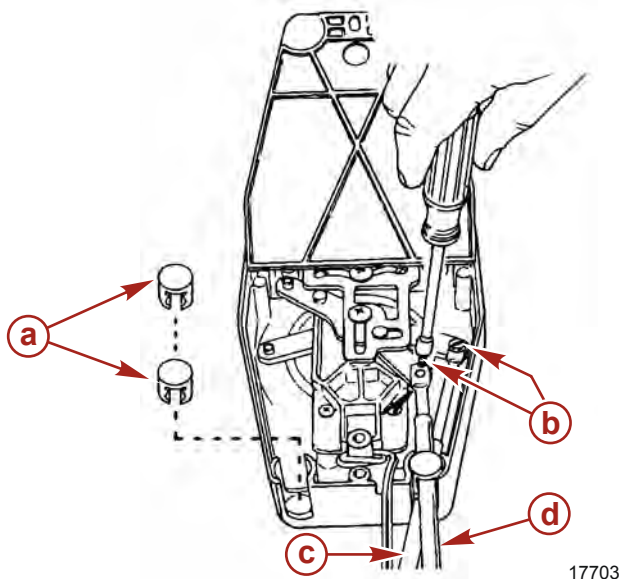
- a - Shift arm
b - Throttle arm

TYPICAL SHIFT AND THROTTLE CABLE INSTALLATION, OUTBOARD AND MERCURY MERCUISER

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. Control cable fastener screws must be properly torqued and retained with Loctite Threadlocker to prevent control cable fastener screws from loosening, thus allowing the cable ends to disconnect.

1. Apply Loctite 271 Threadlocker to the threads of the cable fastener screws.
2. Install the control cables in the appropriate arm in the remote control module.
3. Tighten the cable fastener screws to specified torque.



- a** - Filler grommet
- b** - Screw (2) (10-32)
- c** - Shift cable
- d** - Throttle cable

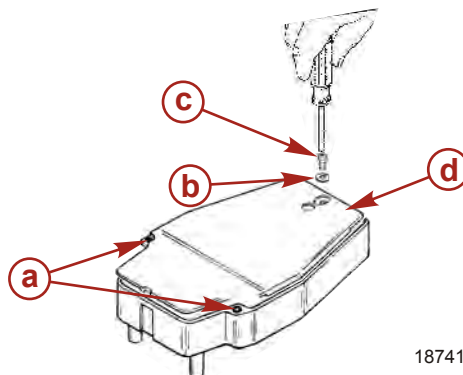
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control cable fastener screws	92-809819

Description	Nm	lb. in.	lb. ft.
Control cable fastener screws	2.8	25	

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The back plate must be fastened to the control with washer and screw to prevent the back cover from loosening, thus resulting in the control cables slipping out of the mounting slots at the rear of the control.

4. After installing the control cables, secure the back cover with a washer and three screws. Tighten the screws to the specified torque.

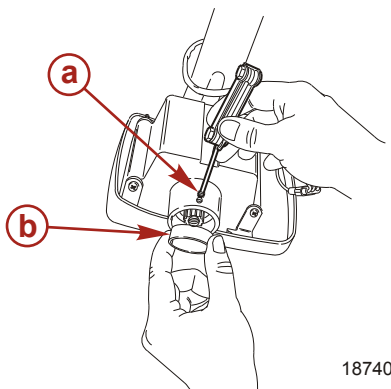


- a** - Screw (2)
- b** - Washer
- c** - Screw
- d** - Back cover

Description	Nm	lb. in.	lb. ft.
Back cover screws (3)	4.4	39	

Commander 3000 Remote Control Module Design II Disassembly

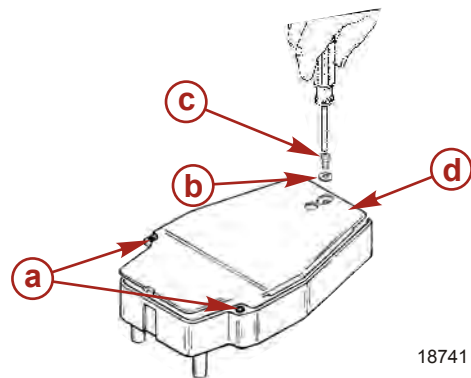
1. Disconnect the neutral start safety switch wire harness from the boat wire harness.
2. Remove the friction screw on the control module assembly.
3. Remove the control handle bushing.



- a** - Friction screw
- b** - Control handle bushing

4. Remove the two screws without washers, and one screw with a washer, securing the back cover to the control module housing.

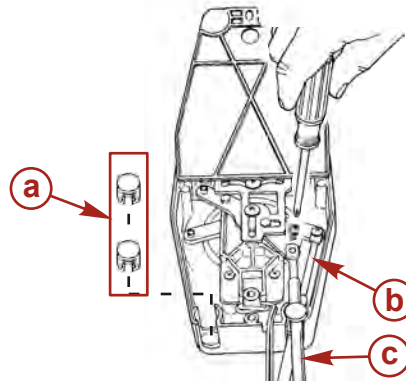
5. Remove the back cover.



18741

- a** - Screw securing back cover
b - Washer
c - Screw
d - Back cover

6. Remove the screws securing the shift cable and throttle cable to the shift arm and throttle arm assemblies.
7. Remove the two grommets.

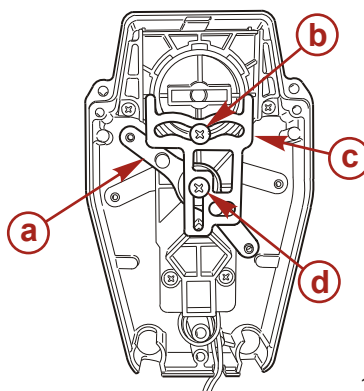


18743

- a** - Grommet (2)
b - Shift cable
c - Throttle cable

8. Remove the two shoulder screws securing the plate to the remote control module assembly. One of the shoulder screws secures a roller to the control handle shaft assembly.

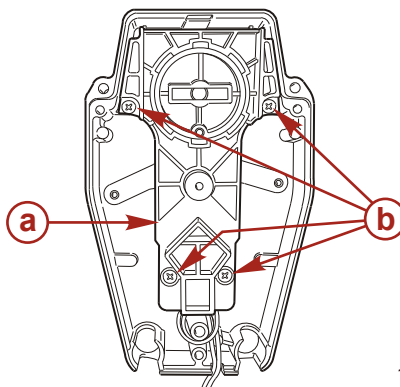
9. Remove the plate and the throttle arm assembly.



18744

- a** - Throttle arm assembly
- b** - Shoulder screw with roller installed on control handle shaft
- c** - Plate
- d** - Shoulder screw securing plate and throttle arm assembly

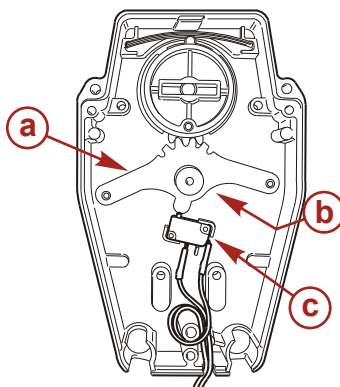
10. Remove the four screws securing the shaft support assembly to the control module housing. Remove the shaft support assembly.



18745

- a** - Shaft support assembly
- b** - Screws (4)

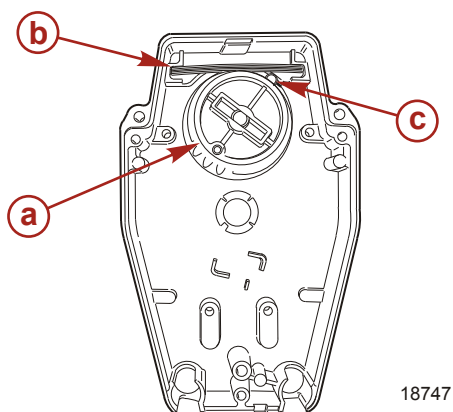
11. Remove the shift arm assembly and the bushing from the control module housing.
12. Remove the neutral start safety switch from the control module housing.



18746

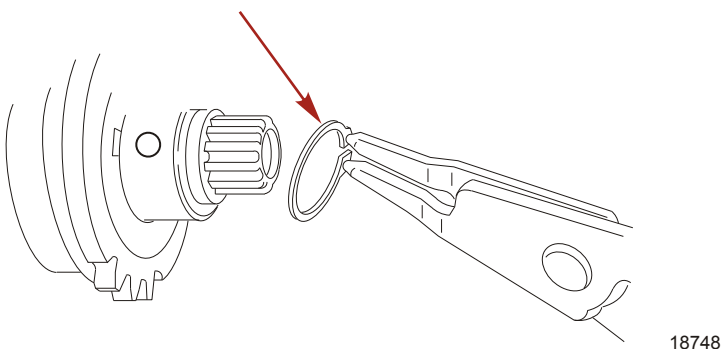
- a** - Shift arm assembly
- b** - Bushing (located under shift arm assembly)
- c** - Neutral start safety switch

13. Remove the detent springs and roller from the control module housing.
14. Remove the shift gear and the throttle shaft assembly by pushing on the control handle shaft.

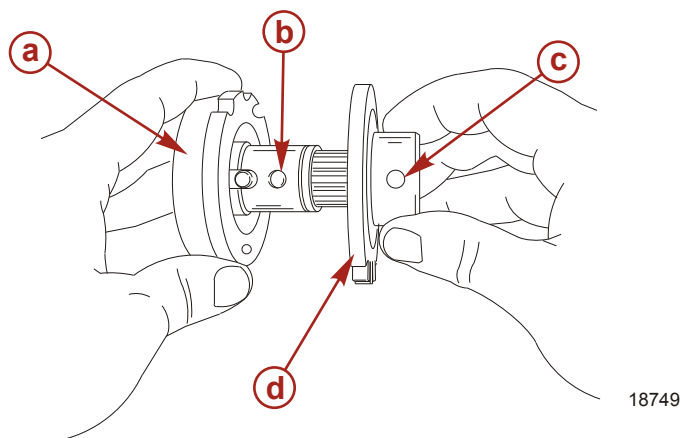


- a** - Shift gear and throttle shaft assembly
- b** - Detent springs
- c** - Roller

15. Remove the snap ring from the control handle shaft.

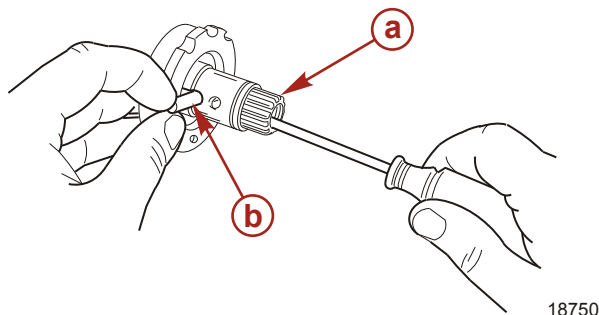


16. Slide the shift gear off the control handle shaft.
17. Remove the steel ball in the control handle shaft and shift gear.



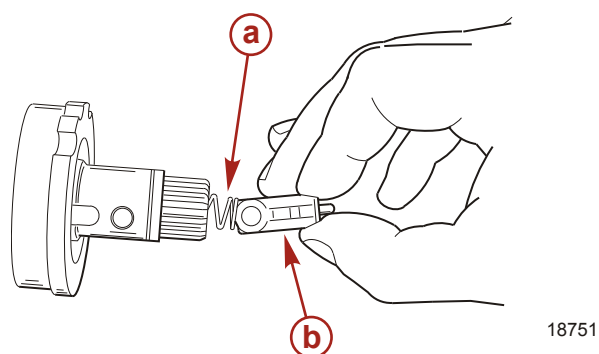
- a** - Control handle shaft
- b** - Steel ball in control handle shaft
- c** - Steel ball in shift gear
- d** - Shift gear

18. Push on the throttle-only shaft on the inside of the control handle shaft to remove the gear shift pin from the control handle shaft.



- a** - Control handle shaft
b - Gear shift pin

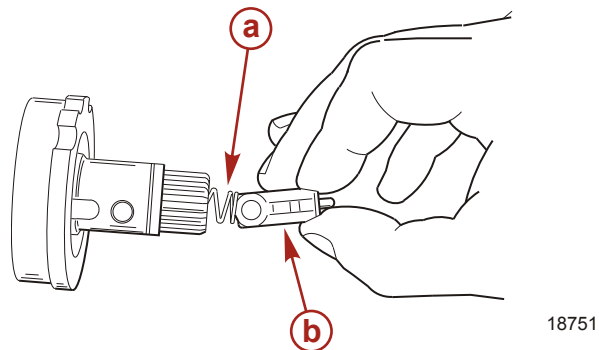
19. Remove the throttle-only shaft and spring from the handle shaft.



- a** - Spring
b - Throttle-only shaft

Commander 3000 Remote Control Module Design II Assembly

1. Apply 2-4-C with Teflon to the spring and throttle-only shaft.
2. Ensure the hole in the throttle-only shaft is aligned with the hole in the control handle shaft. Install the spring and throttle-only shaft into the control handle shaft.

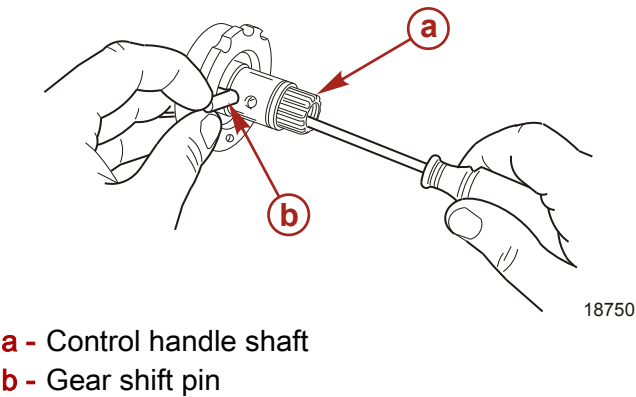


- a** - Spring
b - Throttle-only shaft

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle-only shaft and spring	92-802859A1

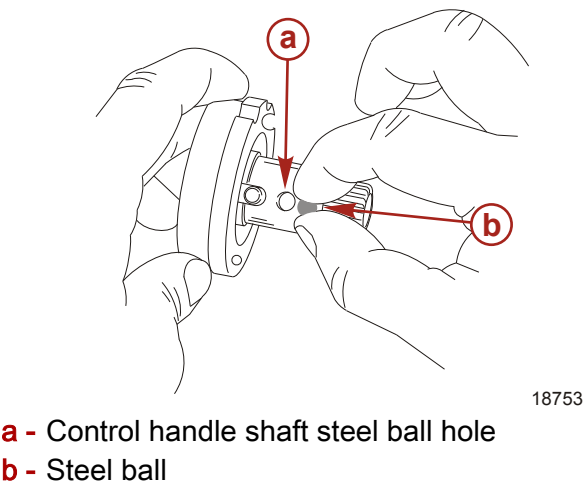
3. Lubricate the gear shift pin with 2-4-C with Teflon.

4. Push the throttle-only shaft in to align the hole of the control handle shaft and the throttle-only shaft. Insert the gear shift pin into the control handle shaft hole and through the throttle-only shaft.



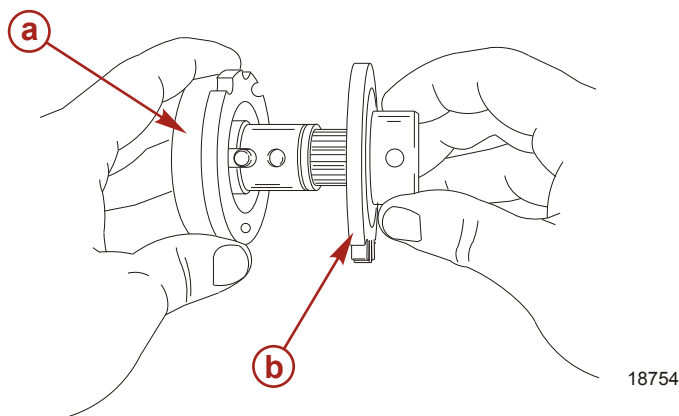
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Gear shift pin	92-802859A1

5. Apply 2-4-C with Teflon to the steel ball hole in the control handle shaft. Install the steel ball into the control handle shaft hole.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle shaft steel ball hole	92-802859A1

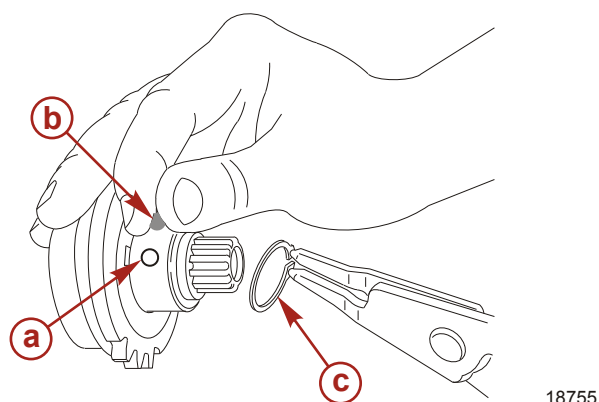
6. Lubricate the entire shift gear with 2-4-C with Teflon and slide the shift gear over the control handle shaft.



- a** - Control handle shaft
b - Shift gear

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Shift gear	92-802859A1

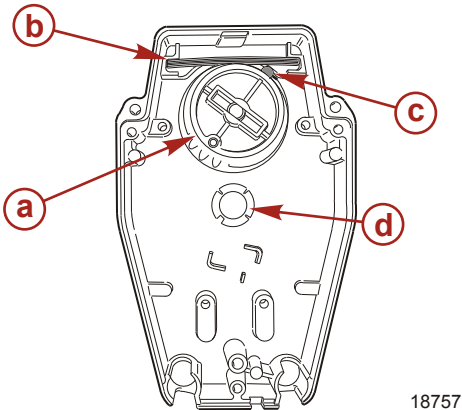
7. Install the retaining ring to secure the shift gear to the control handle shaft.
8. Install the steel ball into the hole in the shift gear.



- a** - Hole in shift gear
b - Steel ball
c - Retaining ring

9. Lubricate the control handle shaft assembly bore of the control module housing with 2-4-C with Teflon. Install the control handle shaft assembly into the control module housing.
10. Lubricate the shift arm assembly bushing with 2-4-C with Teflon. Install the shift arm assembly bushing onto the control module housing.
11. Install the detent springs onto the control module housing.

12. Lubricate the roller with 2-4-C with Teflon. Install the roller between the detent springs, and the control handle shaft.



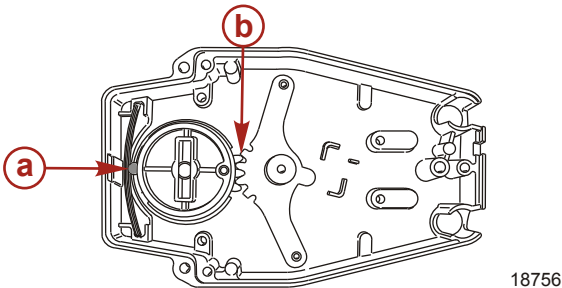
- a** - Shift gear and throttle shaft assembly
- b** - Detent spring
- c** - Roller
- d** - Shift arm assembly bushing

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle shaft bore of the control module housing, roller and bushing	92-802859A1

13. Turn the control handle shaft so the roller is centered on the detent springs.

14. Lubricate the gear teeth on the shift arm assembly with 2-4-C with Teflon.

15. Install the shift arm assembly to the control module housing. Ensure the gear teeth of the shift arm assembly mesh with the teeth on the control handle shift assembly.

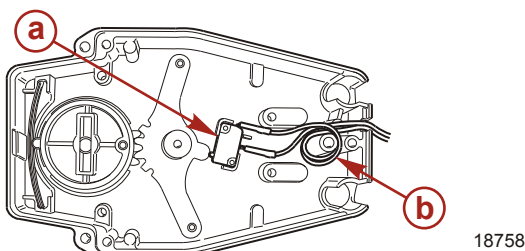


- a** - Roller centered on detent springs
- b** - Gear teeth meshing together

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Gear teeth on shift arm assembly	92-802859A1

16. Install the neutral start safety switch onto the square area of the control module housing.

17. Loop the neutral start safety switch wires around the control module post.

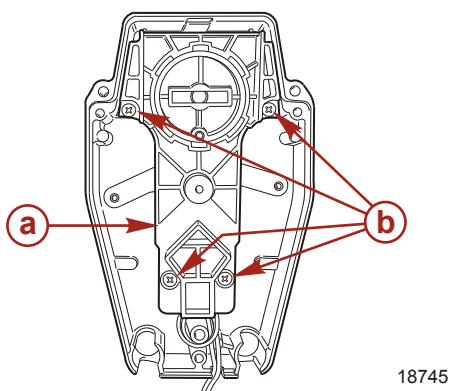


a - Neutral start safety switch

b - Wires looped around control module post

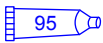
18. Lubricate the control handle shaft assembly and shift arm assembly with 2-4-C with Teflon. Install the control handle shaft support assembly.

19. Secure the control handle shaft support assembly to the control module housing assembly with four screws. Tighten the screws to the specified torque.



a - Control handle shaft support assembly

b - Screws (4)

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle shaft support assembly and shift arm assembly	92-802859A1

Description	Nm	lb. in.	lb. ft.
Screw securing the control handle shaft support assembly (4)	4	35	

20. Lubricate the throttle arm assembly with 2-4-C with Teflon and install the throttle arm assembly onto the shift arm assembly shaft.

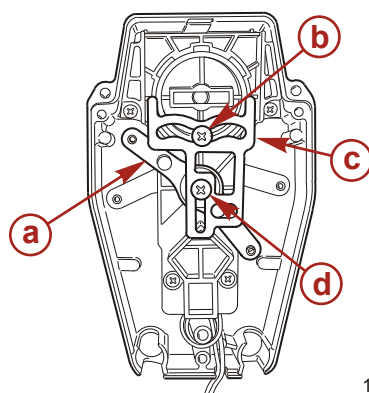
21. Align the plate with the throttle arm assembly and control handle shaft.

22. Install the roller onto one of the shoulder screws.

23. Apply Loctite 271 Threadlocker to the threads of the shoulder screw with the roller installed.

24. Secure the plate with the shoulder screw and roller into the control handle shaft. Tighten the shoulder screw with the roller to the specified torque.

25. Install the shoulder screw into the shift arm assembly.



18744

- a** - Throttle arm assembly
- b** - Shoulder screw with roller installed on control handle shaft
- c** - Plate
- d** - Shoulder screw securing plate and throttle arm assembly to shift arm assembly

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle arm assembly	92-802859A1
 7	Loctite 271 Threadlocker	Threads of shoulder screw	92-809819

Description	Nm	lb. in.	lb. ft.
Shoulder screw (2)	4	35	

26. Install the shift cable to the shift arm assembly.

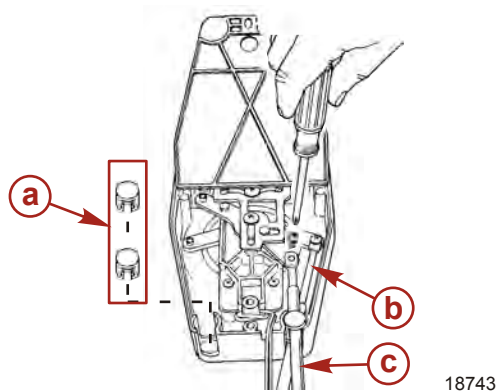
27. Apply Loctite 271 Threadlocker to the screw which secures the shift cable to the shift arm assembly.

28. Secure the shift cable to the shift arm assembly with the screw. Tighten the screw to the specified torque.

29. Apply Loctite 271 Threadlocker to the screw which secures the throttle cable to the throttle arm assembly.

30. Secure the throttle cable to the throttle arm assembly with the screw. Tighten the screw to the specified torque.

31. Install the two grommets.

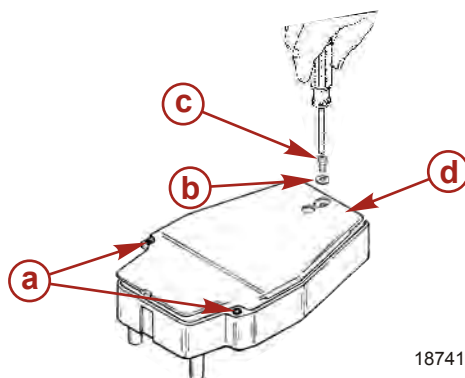


- a** - Grommet (2)
- b** - Shift cable
- c** - Throttle cable

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Screws securing shift and throttle cable	92-809819

Description	Nm	lb. in.	lb. ft.
screw securing shift cable and throttle cable	2.8	25	

32. Install the back cover with three screws and one washer. Tighten the three screws to the specified torque.

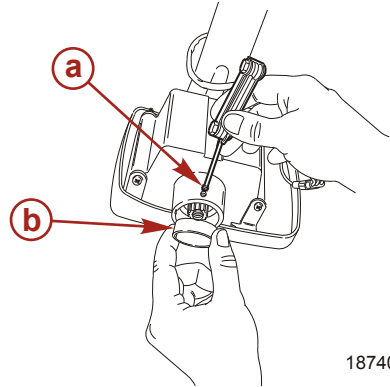


- a** - Screw securing back cover
- b** - Washer
- c** - Screw
- d** - Back cover

Description	Nm	lb. in.	lb. ft.
Back cover screws (3)	4	35	

33. Insert the control handle bushing into the control module assembly.

34. Install the friction screw into the control module assembly. Do not thread the friction screw in beyond flush with the center bore of the control module assembly housing.



a - Friction screw

b - Control handle bushing

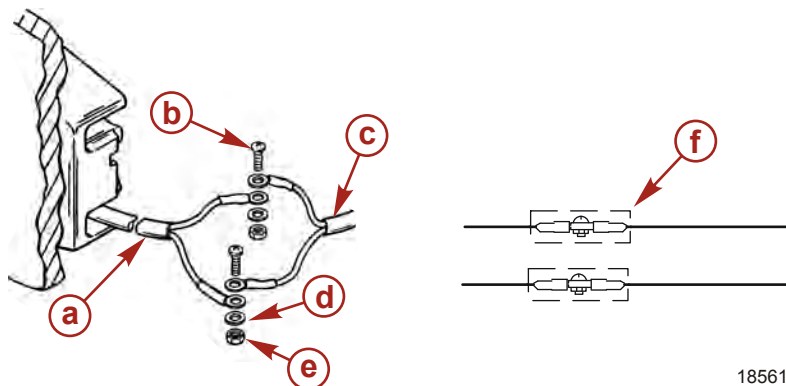
35. Install the rubber sleeves or shrink tubing onto the neutral start safety switch leads.
36. Secure the neutral start safety switch leads from the control module to the boat harness with two screws and nuts. Tighten the screws and nuts securely.

⚠ WARNING

Avoid serious injury or death from a sudden unexpected acceleration when starting the engine. The neutral start safety switch must be correctly connected to prevent engine startup when in gear. Refer to wiring diagrams for correct wiring connections.

37. Coat the neutral start safety switch leads with Liquid Neoprene and allow to dry.
38. Slide the rubber sleeve over each neutral start safety switch connection.

NOTE: Some remote control modules have bullet connectors instead of ring terminals.



a - Control module neutral start safety switch wire harness

b - Screw (2)

c - Boat wire harness neutral start safety switch wire harness

d - Washer

e - Nut

f - Rubber sleeve

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch harness connection	92-25711-3

Shift and Throttle Cable Installation

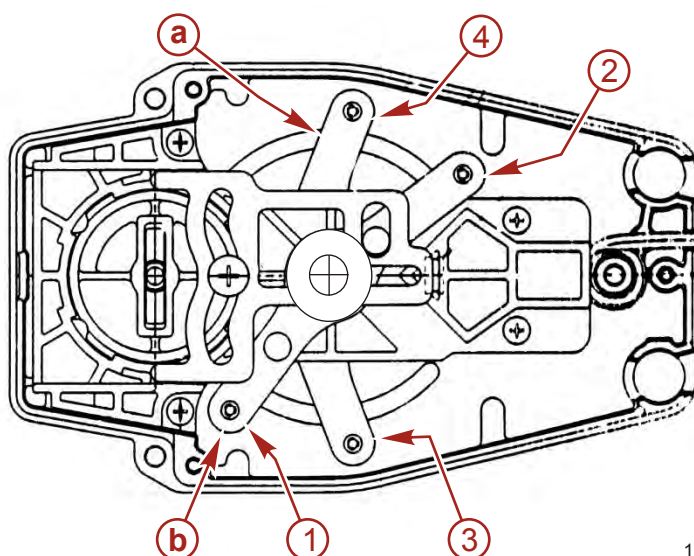
OUTBOARD MODELS

Outboard Models (U.S. and Belgium Models Only)	Starboard Mount Control		Port Mount Control	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Force Outboards and L-Drive (except 9.9 and 15)	4	2	3	2
Mariner and Mercury Outboards (Standard Rotation Models) - All Models through 225 HP (With Pull Throttle) includes 1994-1/2 20/25	4	2	3	2
Mariner and Mercury Outboards - 18 HP, 20 HP, 25 HP (U.S. Origin) (With Push Throttle Cable)	4	1	3	1
Mariner and Mercury Outboards (Counter Rotation Gearcase) - All Models through 225 HP	3	2	4	2
Mariner and Mercury Outboards (Standard Rotation Gearcase) - 250 HP/275 HP	3	2	4	2
Mariner and Mercury Outboards (Counter Rotation Gearcase) - 250 HP/275 HP	4	2	3	2
Mercury Outboards (Standard Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2
Mercury Outboards (Counter Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2

IMPORTANT: The shift cable must be correctly installed at the remote control assembly for the appropriate gear housing rotation (standard or counter). Determine the type of rotation prior to cable installation.

NOTE: For 3.0 Liter EFI GEN II and OptiMax GEN II outboard units, refer to the instructions for standard rotation control cable installation.

NOTE: The base assembly gasket and the base assembly must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.



17705

- a** - Shift arm
- b** - Throttle arm

MERCURY MERCUISER MODELS

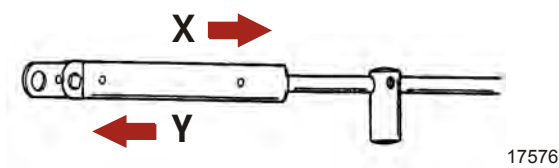
IMPORTANT: The shift cable must be correctly installed at the remote control assembly for the appropriate drive unit rotation (standard or counter). Determine the type of drive unit rotation prior to cable installation.

NOTE: For Bravo Three and Blackhawk drive units, refer to the instructions for standard rotation control cable installation.

NOTE: The base assembly gasket and the base assembly must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.

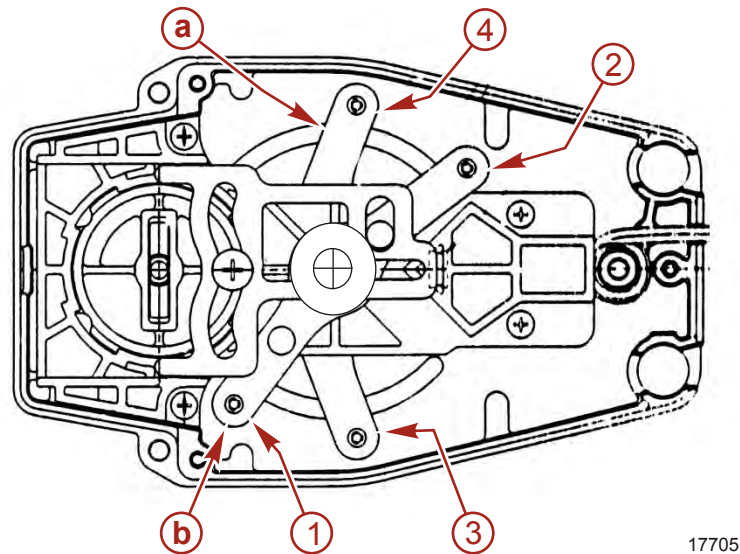
Mercury MerCruiser Models Standard Rotation - The control cable will have to be installed in the remote control so the cable end will move in direction X when shift handle is placed in the forward position.

Mercury MerCruiser Models Counter Rotation - The control cable must be installed in the remote control so the cable end will move in the direction Y when the shift handle is placed in the forward position.



Direction of arrow (Viewed at shift plate)

Mercury MerCruiser Models	Standard Rotation		Counter Rotation	
Starboard Mount Mechanical Control	Anchor Attachment Points		Anchor Attachment Points	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Direction of arrow	X	X	Y	X
Lever number	4	2	3	2



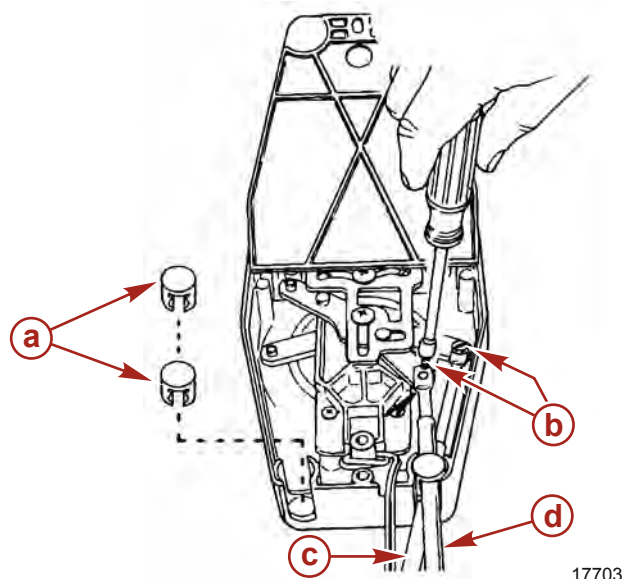
- a - Shift arm
- b - Throttle arm

TYPICAL SHIFT AND THROTTLE CABLE INSTALLATION, OUTBOARD AND MERCURY MERCURUISER

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. Control cable fastener screws must be properly torqued and retained with Loctite Threadlocker to prevent control cable fastener screws from loosening, thus allowing the cable ends to disconnect.

1. Apply Loctite 271 Threadlocker to the threads of the cable fastener screws.
2. Install the control cables in the appropriate arm in the remote control module.
3. Tighten the cable fastener screws to specified torque.



- a** - Filler grommet
b - Screw (2) (10-32)
c - Shift cable
d - Throttle cable

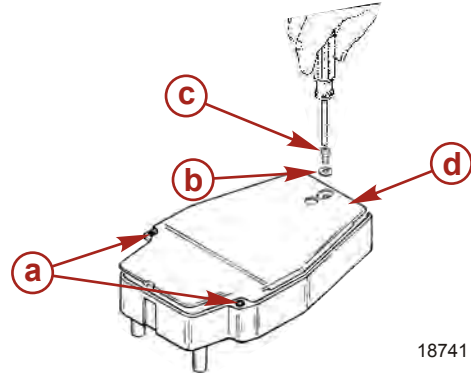
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control cable fastener screws	92-809819

Description	Nm	lb. in.	lb. ft.
Control cable fastener screws	2.8	25	

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The back plate must be fastened to the control with washer and screw to prevent the back cover from loosening, thus resulting in the control cables slipping out of the mounting slots at the rear of the control.

4. After installing the control cables, secure the back cover with a washer and three screws. Tighten the screws to the specified torque.

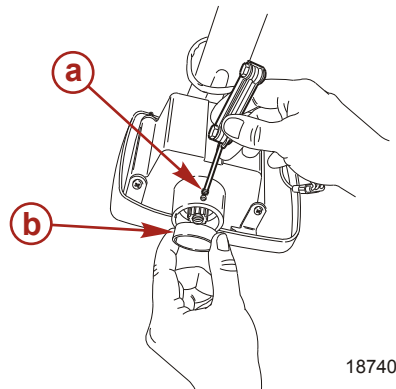


- a** - Screw (2)
- b** - Washer
- c** - Screw
- d** - Back cover

Description	Nm	lb. in.	lb. ft.
Back cover screws (3)	4.4	39	

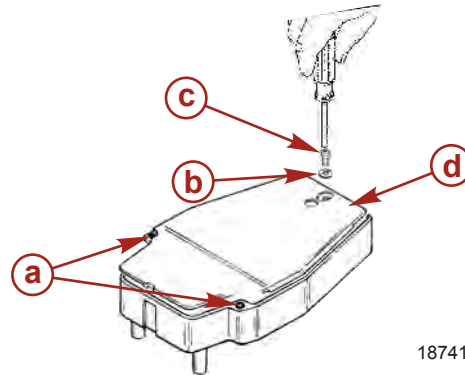
Commander 3000 Remote Control Module Design III Disassembly

1. Remove the friction screw on the control module assembly.
2. Remove the control handle bushing.



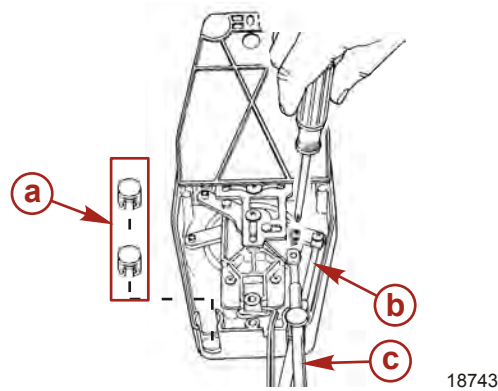
- a** - Friction screw
- b** - Control handle bushing

3. Remove the two screws without washers, and one screw with a washer, securing the back cover to the control module housing. Remove the back cover.



- a** - Screw securing back cover
- b** - Washer
- c** - Screw
- d** - Back cover

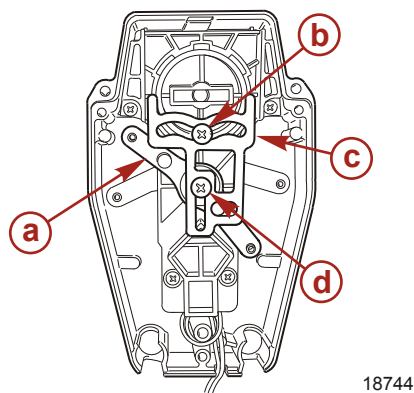
4. Remove the screws securing the shift cable and throttle cables to the shift and throttle arm assemblies. Remove the two grommets.



- a** - Grommet (2)
- b** - Shift cable
- c** - Throttle cable

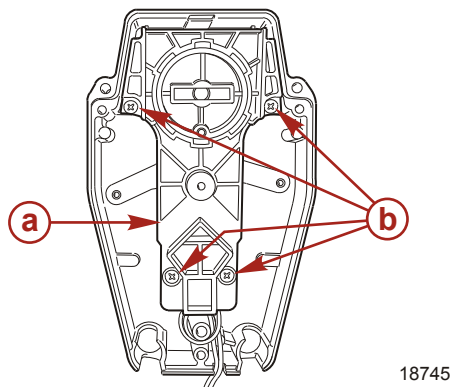
5. Remove the two shoulder screws securing the plate to the remote control module assembly. One of the shoulder screws secures a roller to the control handle shaft assembly.

6. Remove the plate and the throttle arm assembly.



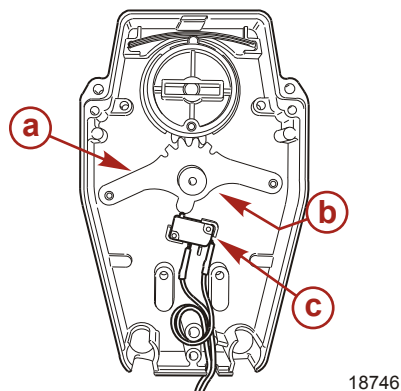
- a** - Throttle arm assembly
- b** - Shoulder screw with roller installed on control handle shaft
- c** - Plate
- d** - Shoulder screw securing plate and throttle arm assembly

7. Remove the four screws securing the control handle shaft support assembly to the control module housing. Remove the control handle shaft support assembly.



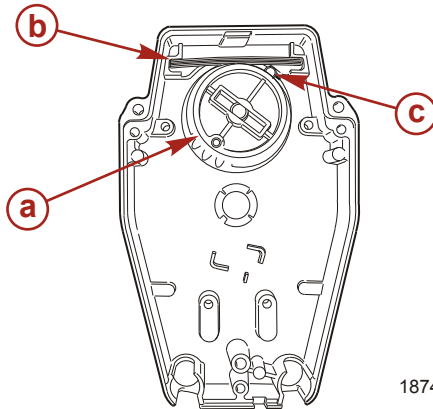
- a** - Control handle shaft support assembly
- b** - Screws (4)

8. Remove the shift arm assembly and the bushing from the control module housing.
9. Remove the neutral start safety switch from the control module housing.



- a** - Shift arm assembly
- b** - Bushing (located under shift arm assembly)
- c** - Neutral start safety switch

10. Remove the detent springs and roller from the control module housing.
11. Push on the control handle shaft and remove the shift gear and throttle shaft assembly.

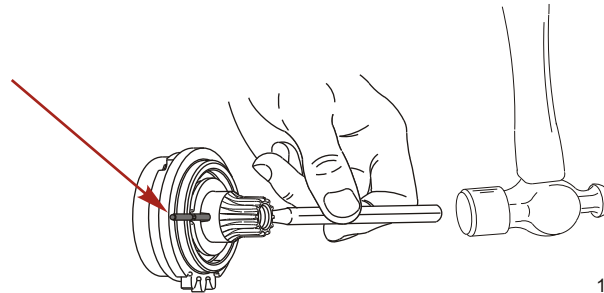


a - Shift gear and throttle shaft assembly
b - Detent springs

18747

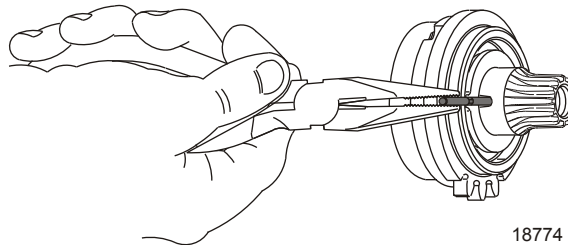
c - Roller

12. Use a hammer and a punch to push the round lock pin out of the control handle shaft.



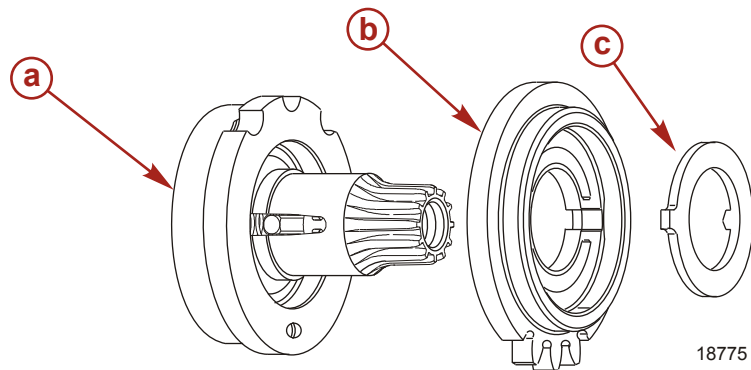
18773

13. Use a pair of pliers to remove the round lock pin from the control handle shaft.



18774

14. Remove the shift gear and lock ring from the control handle shaft.

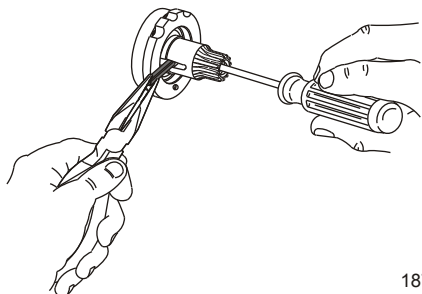


a - Control handle shaft
b - Shift gear

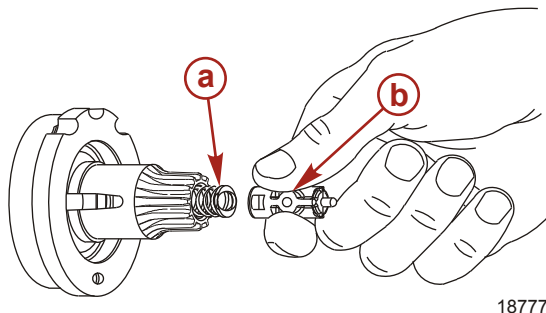
c - Lock ring

18775

15. Push on the throttle-only shaft on the inside of the control handle shaft to remove the gear shift pin from the control handle shaft.



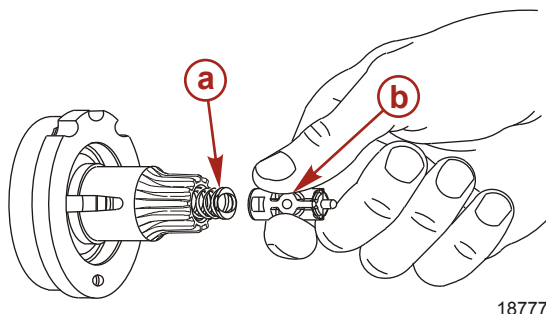
16. Remove the throttle-only shaft and spring from the control handle shaft.



- a** - Spring
b - Throttle-only shaft

Commander 3000 Remote Control Module Design III Assembly

1. Apply 2-4-C with Teflon to the spring and the throttle-only shaft.
2. Ensure the hole in the throttle-only shaft is aligned with the hole in the control handle shaft. Install the spring and the throttle-only shaft into the control handle shaft.

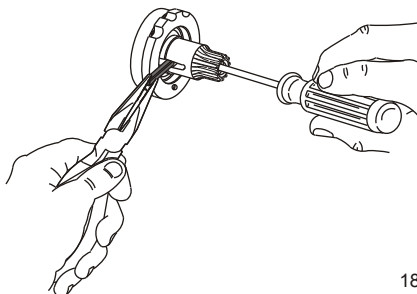


- a** - Spring
b - Throttle-only shaft

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle-only shaft and spring	92-802859A1

3. Lubricate the square drive pin with 2-4-C with Teflon.

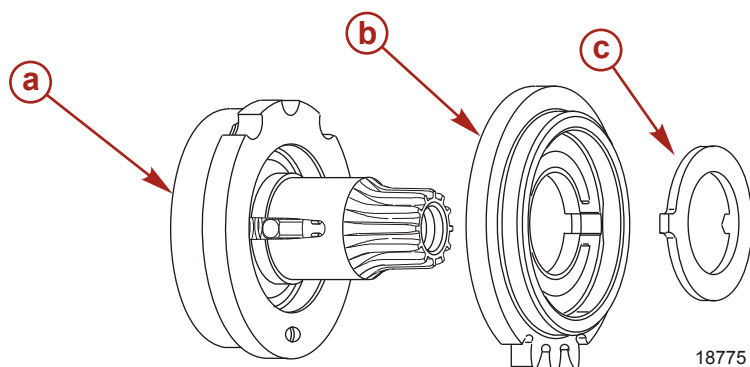
4. Push the throttle-only shaft in to align the holes on the control handle shaft and the throttle-only shaft. Insert the square drive pin into the holes.



18776

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Square drive pin	92-802859A1

5. Lubricate the control handle, entire shift gear, and lock ring with 2-4-C with Teflon. Slide the shift gear and lock ring onto the control handle shaft.



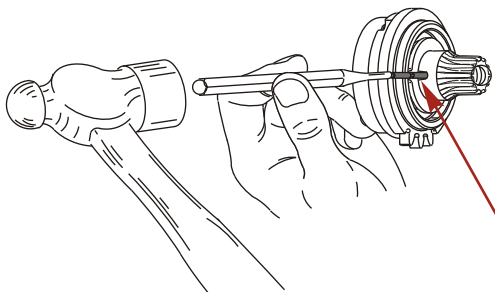
18775

a - Control handle shaft
b - Shift gear

c - Lock ring

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle shaft, shift gear and lock ring	92-802859A1

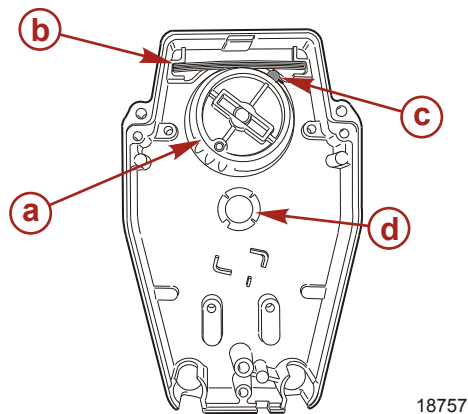
6. Install the round lock pin into the control handle shaft with a hammer and punch. Ensure the round lock pin is centered in the control handle shaft.



18784

7. Lubricate the control handle shaft assembly bore with 2-4-C with Teflon and install the into the control module housing.
8. Lubricate the shift arm assembly bushing with 2-4-C with Teflon and install onto the control module housing.
9. Install the detent springs onto the control module housing.

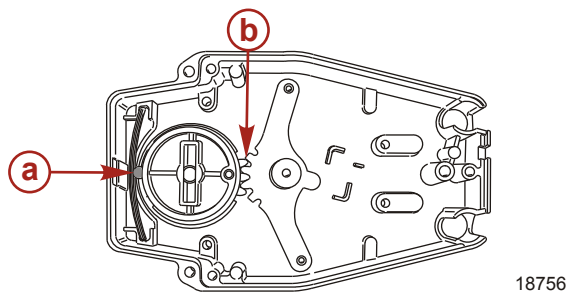
10. Lubricate the roller with 2-4-C with Teflon. Install the roller between the detent spring, and the control handle shaft.



- a** - Shift gear and throttle shaft assembly
- b** - Detent spring
- c** - Roller
- d** - Shift arm assembly bushing

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle shaft assembly bore, shift arm assembly bushing, and roller	92-802859A1

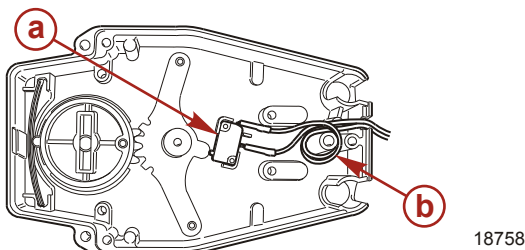
11. Turn the handle shaft so the roller is centered on the detent springs.
12. Lubricate the gear teeth on the shift arm assembly with 2-4-C with Teflon.
13. Install the shift arm assembly to the control module housing. Ensure the gear teeth of the shift arm assembly mesh with the teeth on the control handle shaft assembly.



- a** - Roller centered on detent springs
- b** - Gear teeth meshing together

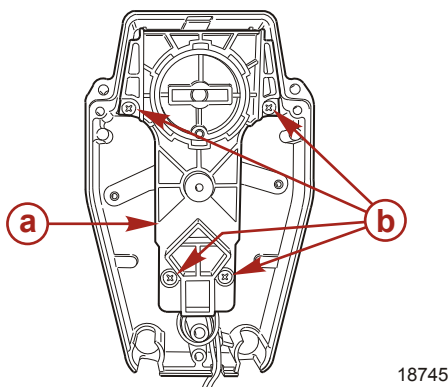
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Gear teeth on shift arm assembly	92-802859A1

14. Install the neutral start safety switch onto the squared area of the control module housing. Loop the neutral start safety switch wires around the control module post.

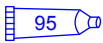


- a** - Neutral start safety switch
b - Wires looped around control module post

15. Lubricate the control handle shaft assembly and shift arm assembly with 2-4-C with Teflon.
16. Install the control handle shaft support assembly onto the control module housing assembly and secure with four screws. Tighten the screws to the specified torque.



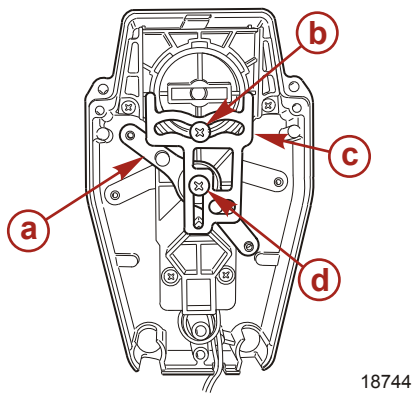
- a** - Control handle shaft support assembly
b - Screws (4)

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle shaft assembly and shift arm assembly	92-802859A1

Description	Nm	lb. in.	lb. ft.
Screw securing shaft support assembly (4)	4	35	

17. Lubricate the throttle arm assembly with 2-4-C with Teflon and install onto the shift arm assembly shaft.
18. Align the plate with the throttle arm assembly and control handle shaft.
19. Install the roller onto one of the shoulder screws and apply Loctite 271 Threadlocker to the threads of the shoulder screw with the roller installed.
20. Secure the plate with the shoulder screw and roller into the control handle shaft. Tighten the shoulder screw with the roller to the specified torque.

21. Install the shoulder screw into the shift arm assembly.

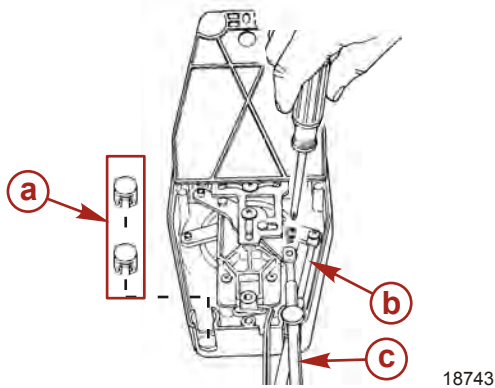


- a - Throttle arm assembly
- b - Shoulder screw with roller installed on control handle shaft
- c - Plate
- d - Shoulder screw securing plate and throttle arm assembly to shift arm assembly

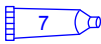
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle arm assembly	92-802859A1
 7	Loctite 271 Threadlocker	Threads of shoulder screw	92-809819

Description	Nm	lb. in.	lb. ft.
Shoulder screw (2)	4	45	

22. Install the shift cable to the shift arm assembly. Apply Loctite 271 Threadlocker to the screw securing the shift cable to the shift arm assembly.
23. Secure the shift cable to the shift arm assembly with the screw. Tighten the screw to the specified torque.
24. Apply Loctite 271 Threadlocker to the screw securing the throttle cable to the throttle arm assembly. Secure the throttle cable to the throttle arm assembly with the screw. Tighten the screw to the specified torque.
25. Install the two grommets.

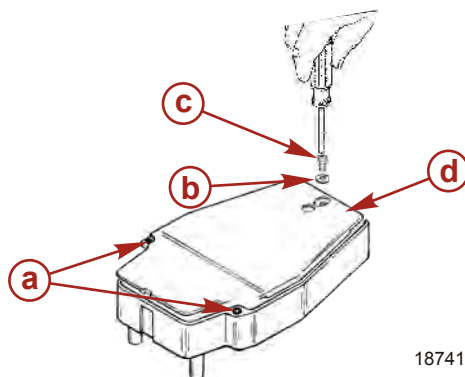


- a - Grommet (2)
- b - Shift cable
- c - Throttle cable

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Screws securing the shift cable and throttle cable	92-809819

Description	Nm	lb. in.	lb. ft.
Screws securing shift and throttle cable	2.8	25	

26. Install the back cover with three screws and one washer. Tighten the three screws to the specified torque.

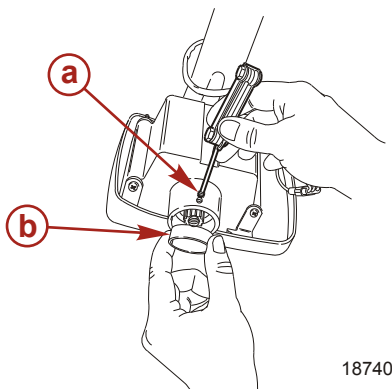


- a** - Screw securing back cover
- b** - Washer
- c** - Screw
- d** - Back cover

Description	Nm	lb. in.	lb. ft.
Back cover screw (3)	4	35	

27. Insert the control handle bushing into the control module assembly.

28. Install the friction screw into the control module assembly. Do not thread the friction screw beyond flush with the center bore of the control module assembly housing.



- a** - Friction screw
- b** - Control handle bushing

29. Install the rubber sleeves or shrink tubing onto the neutral start safety switch leads.

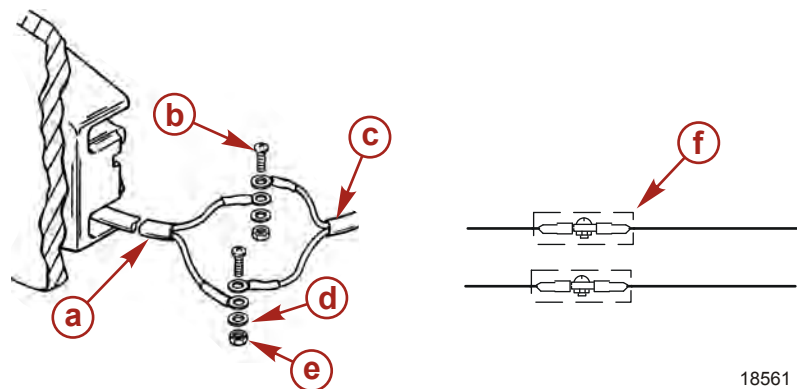
30. Secure the neutral start safety switch leads from the control module to the boat harness with two screws and nuts. Tighten the screws and nuts securely.

⚠ WARNING

Avoid serious injury or death from a sudden unexpected acceleration when starting the engine. The neutral start safety switch must be correctly connected to prevent engine startup when in gear. Refer to wiring diagrams for correct wiring connections.

31. Coat the neutral start safety switch leads with Liquid Neoprene and allow to dry.
32. Slide the rubber sleeve or shrink tubing over each neutral start safety switch connection.

NOTE: Some remote control models use bullet connectors instead of ring terminals.



- a - Control module neutral start safety switch wire harness
- b - Screw (2)
- c - Boat wire harness neutral start safety switch wire harness
- d - Washer
- e - Nut
- f - Rubber sleeve

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch harness connection	92-25711-3

Shift and Throttle Cable Installation

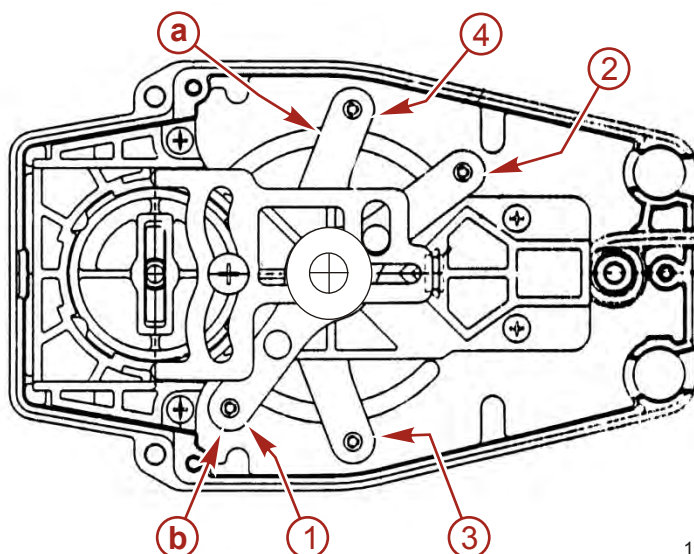
OUTBOARD MODELS

Outboard Models (U.S. and Belgium Models Only)	Starboard Mount Control		Port Mount Control	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Force Outboards and L-Drive (except 9.9 and 15)	4	2	3	2
Mariner and Mercury Outboards (Standard Rotation Models) - All Models through 225 HP (With Pull Throttle) includes 1994-1/2 20/25	4	2	3	2
Mariner and Mercury Outboards - 18 HP, 20 HP, 25 HP (U.S. Origin) (With Push Throttle Cable)	4	1	3	1
Mariner and Mercury Outboards (Counter Rotation Gearcase) - All Models through 225 HP	3	2	4	2
Mariner and Mercury Outboards (Standard Rotation Gearcase) - 250 HP/275 HP	3	2	4	2
Mariner and Mercury Outboards (Counter Rotation Gearcase) - 250 HP/275 HP	4	2	3	2
Mercury Outboards (Standard Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2
Mercury Outboards (Counter Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2

IMPORTANT: The shift cable must be correctly installed at the remote control assembly for the appropriate gear housing rotation (standard or counter). Determine the type of rotation prior to cable installation.

NOTE: For 3.0 Liter EFI GEN II and OptiMax GEN II outboard units, refer to the instructions for standard rotation control cable installation.

NOTE: The base assembly gasket and the base assembly must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.



17705

- a** - Shift arm
b - Throttle arm

MERCURY MERCUISER MODELS

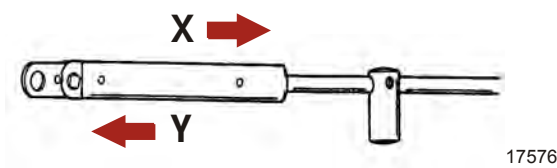
IMPORTANT: The shift cable must be correctly installed at the remote control assembly for the appropriate drive unit rotation (standard or counter). Determine the type of drive unit rotation prior to cable installation.

***NOTE:** For Bravo Three and Blackhawk drive units, refer to the instructions for standard rotation control cable installation.*

***NOTE:** The base assembly gasket and the base assembly must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.*

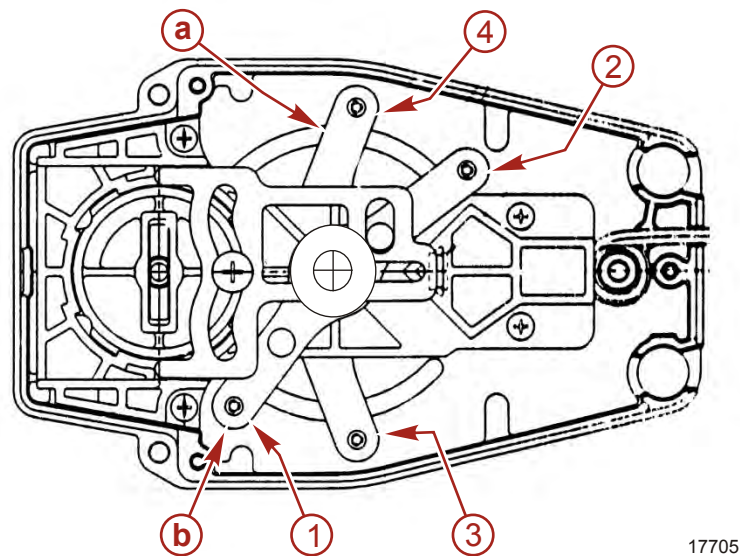
Mercury MerCruiser Models Standard Rotation - The control cable will have to be installed in the remote control so the cable end will move in direction X when shift handle is placed in the forward position.

Mercury MerCruiser Models Counter Rotation - The control cable must be installed in the remote control so the cable end will move in the direction Y when the shift handle is placed in the forward position.



Direction of arrow (Viewed at shift plate)

Mercury MerCruiser Models	Standard Rotation		Counter Rotation	
Starboard Mount Mechanical Control	Anchor Attachment Points		Anchor Attachment Points	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Direction of arrow	X	X	Y	X
Lever number	4	2	3	2



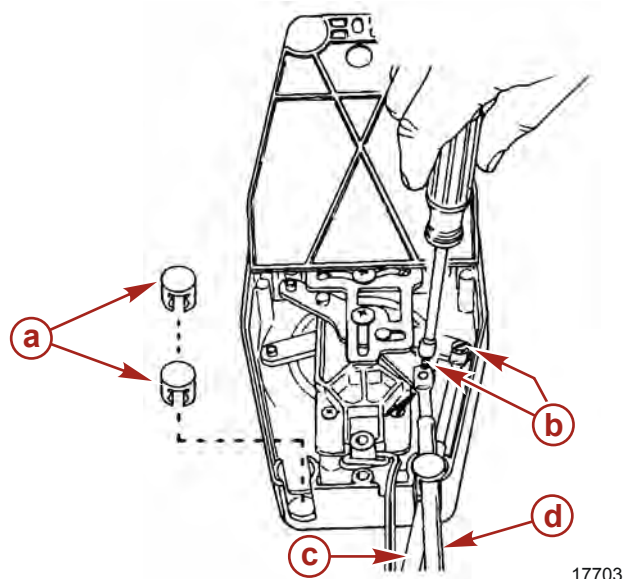
- a - Shift arm
- b - Throttle arm

TYPICAL SHIFT AND THROTTLE CABLE INSTALLATION, OUTBOARD AND MERCURY MERCURUISER

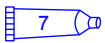
⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. Control cable fastener screws must be properly torqued and retained with Loctite Threadlocker to prevent control cable fastener screws from loosening, thus allowing the cable ends to disconnect.

1. Apply Loctite 271 Threadlocker to the threads of the cable fastener screws.
2. Install the control cables in the appropriate arm in the remote control module.
3. Tighten the cable fastener screws to specified torque.



- a** - Filler grommet
b - Screw (2) (10-32)
c - Shift cable
d - Throttle cable

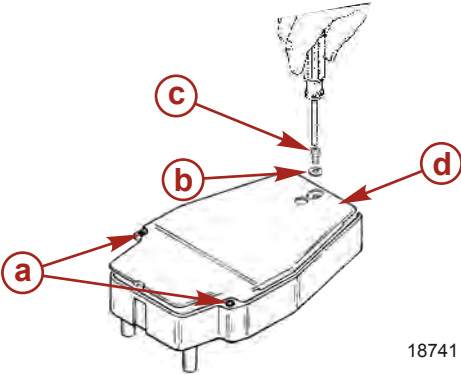
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control cable fastener screws	92-809819

Description	Nm	lb. in.	lb. ft.
Control cable fastener screws	2.8	25	

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The back plate must be fastened to the control with washer and screw to prevent the back cover from loosening, thus resulting in the control cables slipping out of the mounting slots at the rear of the control.

4. After installing the control cables, secure the back cover with a washer and three screws. Tighten the screws to the specified torque.



- a** - Screw (2)
- b** - Washer
- c** - Screw
- d** - Back cover

Description	Nm	lb. in.	lb. ft.
Back cover screws (3)	4.4	39	

Commander 4000/4500 Controls

Section 5A - Commander 4000 Series Remote Control

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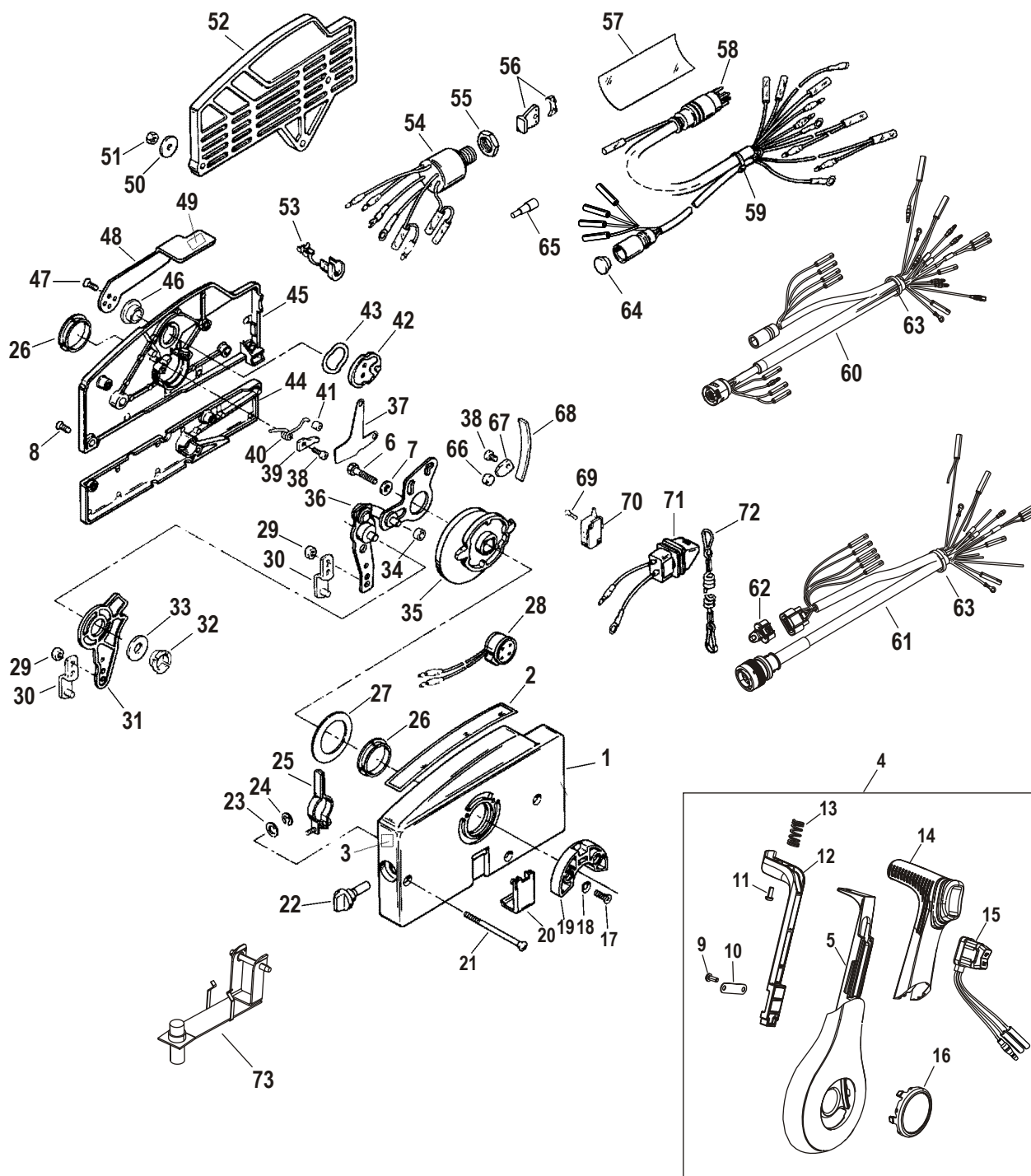
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Commander 4000 Panel Mount Remote Control Components.....	5A-8	Commander 4000 Gen II Pistol Grip Panel Mount Remote Control Removal.....	5A-50
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Commander 4000 Gen II Pistol Grip Panel Mount Remote Control Components.....	5A-14	Commander 4000 Gen II Lock Bar Panel Mount Remote Control Removal.....	5A-62
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Commander 4000 Pistol Grip Panel Mount Remote Control Installation.....	5A-44	Commander 4000 Remote Control Module Gen II Assembly.....	5A-105

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
	Loctite 271 Threadlocker	Detent roller clip screw	92-809819
		Neutral lock lever retainer screws	
		Neutral start safety switch screw	
		Control cable fastener screws	
		Control handle retaining bolt	
		Control handle retaining bolt threads	
		Threads of shoulder screw with roller	
		Screws securing the shift, and throttle cables	
	Liquid Neoprene	Neutral start safety switch wire connection	92-25711-3
	2-4-C with Teflon	Control housing bushings	92-802859A1
		Drum assembly and wave washer	
		Detent roller	
		Throttle friction knob shaft	
		Bushing area of control handle	
		Gear shift arm and washer	
		Control cam and washer	
		Shift lever roller, bushing, and wave washer	
		Pin on the shift cable fastener	
		Pin on the throttle cable fastener	
		Control handle bushing	
		Inside diameter of the module assembly bushing	
		Handle shaft bushing	
		Throttle-only shaft and spring	
		Square drive pin	
		Handle shaft, shift gear and lock ring	
		Handle shaft bore of control module housing, roller, and bushing	
		Gear teeth on shift arm assembly	
		Handle shaft assembly, shift arm assembly, throttle arm bushing, and throttle arm washer	
		Handle shaft assembly, shift gear and lock ring	
		Handle shaft bore of control module housing, detent roller and bushing	

Notes:

Commander 4000 Remote Control Side Mount Components



14731

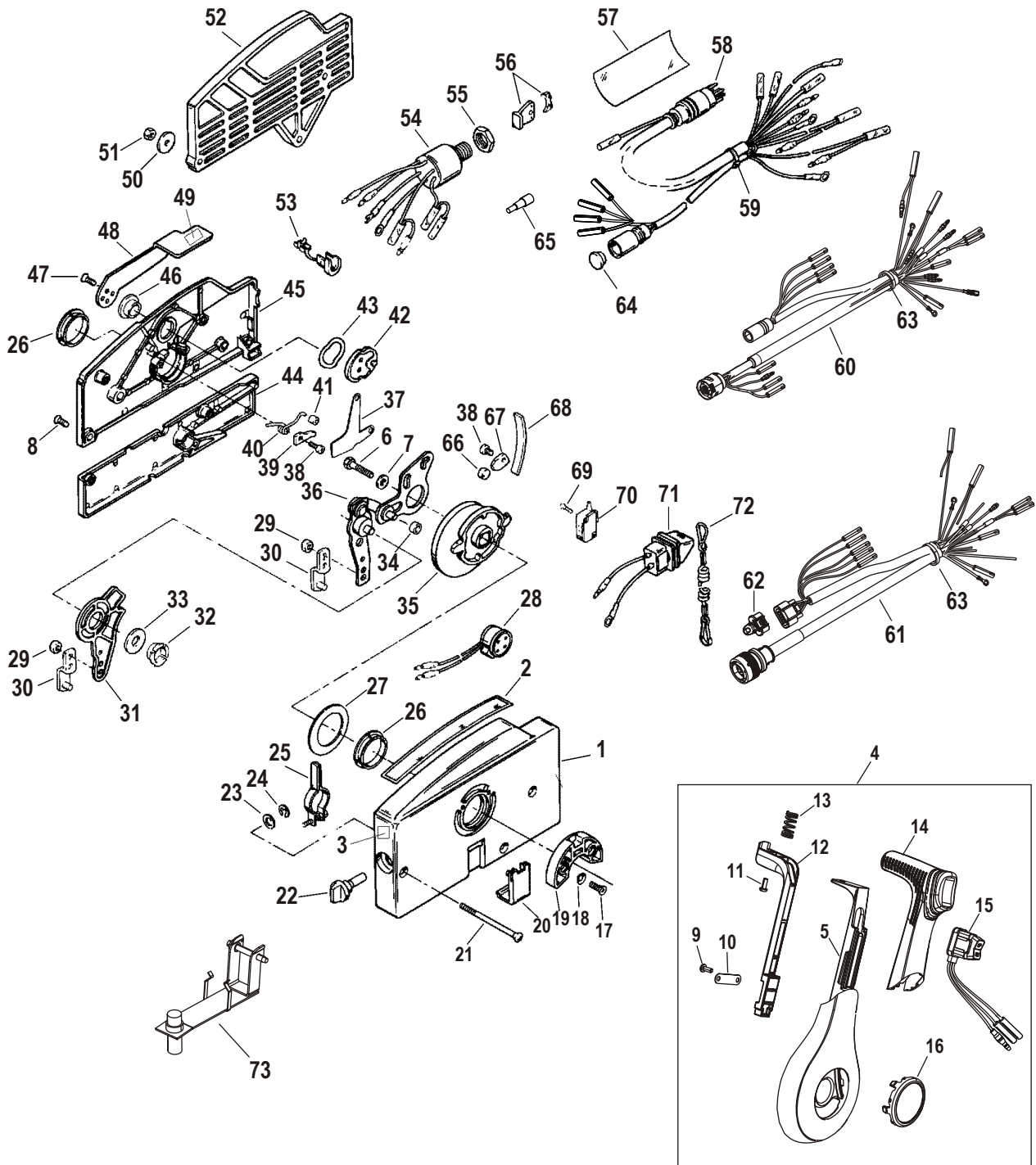
Commander 4000 Remote Control Side Mount Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Control housing			
2	1	Decal			
3	1	Decal			
4	1	Handle kit			
5	1	Handle hub			
6	1	Control handle screw (M8 x 30)	11	97	
7	1	Washer			
8	5	Screw (M5 x 18)	4	35	
9	2	Screw (M4 x 10)	1.4	12	
10	1	Neutral lock lever retainer			
11	1	Screw (M4 x 10)	1.4	12	
12	1	Neutral lock lever			
13	1	Spring			
14	1	Grip			
15	1	Trim switch assembly			
16	1	Decal			
17	2	Screw (M5 x 18)	4	35	
18	2	Lockwasher			
19	1	Neutral lock holder			
20	1	Cover			
21	3	Screw (M6 x 110)	Tighten securely		
22	1	Throttle friction knob			
23	1	Washer			
24	1	E ring			
25	1	Throttle friction clamp			
26	2	Bearing			
27	1	Washer			
28	1	Warning horn			
29	2	Nut (M5)	4.8	43	
30	2	Clip assembly			
31	1	Gear shift assembly			
32	1	Bearing			
33	1	Washer			
34	1	Cam roller			
35	1	Control cam			
36	1	Throttle arm assembly			
37	1	Separator			
38	2	Screw (M4 x 6)	1.4	12	
39	1	Detent roller clip			
40	1	Spring			

Commander 4000 Series Remote Control

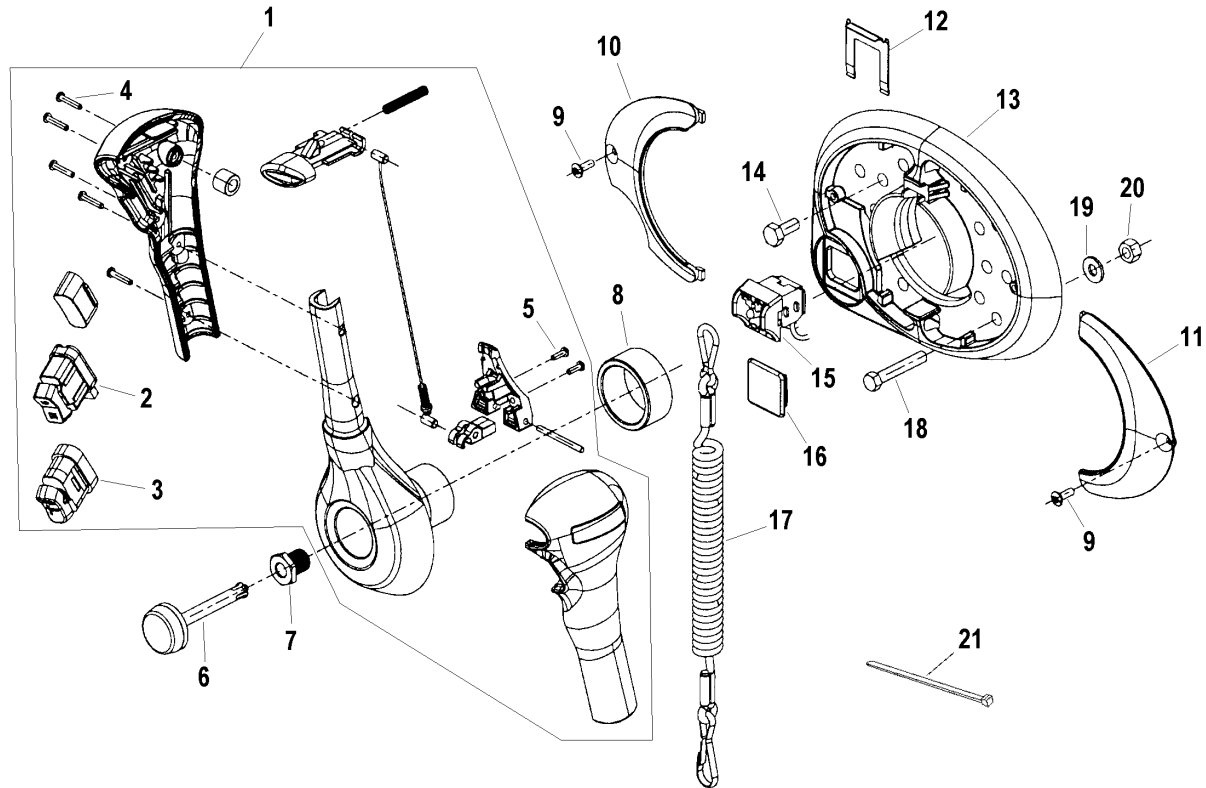
Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
41	1	Roller			
42	1	Drum assembly			
43	1	Wave washer			
44	1	Lower back cover			
45	1	Upper back cover			
46	1	Bearing			
47	2	Screw (M5 x 12)	1.4	12	
48	1	Lever assembly			
49	1	Decal			
50	3	Washer			
51	3	Nut (M6)	Tighten securely		
52	1	Spacer			
53	1	Bushing			
54	1	Ignition switch assembly			
55	1	Nylon nut			
56	1	Key cover assembly			
57	1	Neoprene sheet			
58	1	Harness assembly			
59	AR	Cable tie			
60	1	Harness assembly (12 wire)			
61	1	Harness assembly (14 wire)			
62	1	10 pin cap			
63	1	Cable tie			
64	1	Plug			
65	AR	Male plug			
66	1	Detent roller			
67	1	Detent clip			
68	5	Detent spring			
69	2	Screw (M3 x 16)	1.4	12	
70	1	Neutral start safety switch assembly			
71	1	Stop switch			
72	1	Lanyard			
73	1	Shift load indicator tool			

Commander 4000 Remote Control Side Mount Components



14731

Commander 4000 Panel Mount Remote Control Components

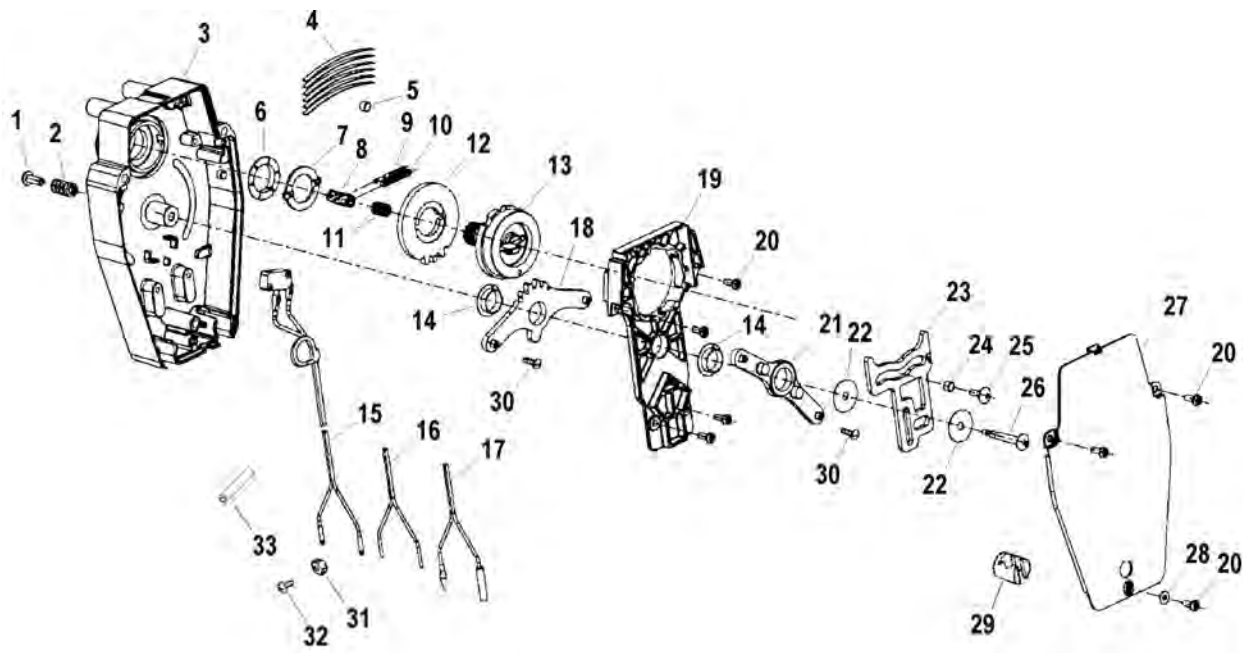


15597

Commander 4000 Panel Mount Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Handle assembly			
2	1	Trim switch assembly (Outboard)			
3	1	Trim switch assembly (MerCruiser)			
4	5	Screw	1.1	10	
5	2	Screw	1.4	12	
6	1	Throttle only button			
7	1	Control handle retaining bolt	17	150	
8	1	Handle bushing			
9	2	Bezel screw	Tighten securely		
10	1	Front cover			
11	1	Back cover			
12	1	Switch retainer			
13	1	Bezel			
14	3	Screw (0.250 - 20 x 0.625 in.)	5.6	50	
15	1	Stop switch			
16	1	Stop switch hole plug			
17	1	Lanyard			
18	3	Screw (0.250 - 20 x 1.5 in.)	11.3	100	
19	3	Washer			
20	3	Nut	11.3	100	
21	1	Cable tie			

Commander 4000 Control Module Components

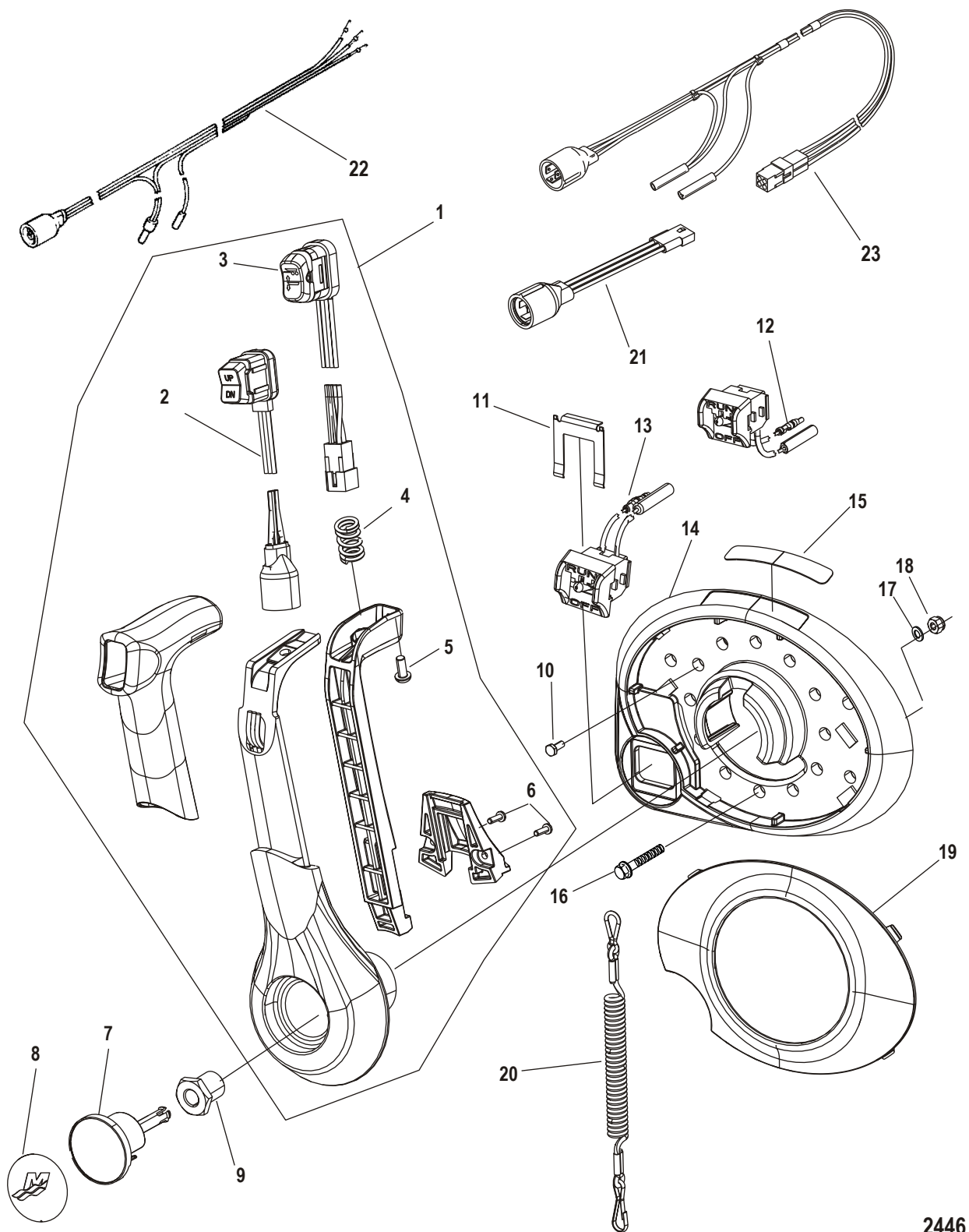


15574

Commander 4000 Control Module Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Friction adjustment nut			
2	1	Throttle friction spring			
3	1	Control housing			
4	6	Detent spring			
5	1	Detent roller			
6	1	Bushing			
7	1	Throttle only lock			
8	1	Throttle only shaft			
9	1	Round lock pin			
10	1	Square lock pin			
11	1	Spring			
12	1	Shift gear			
13	1	Handle shaft assembly			
14	2	Bushing			
15	1	Neutral start safety switch (two ring terminals)			
16	1	Neutral start safety switch (no terminals)			
17	1	Neutral start safety switch (bullet terminals)			
18	1	Shift arm assembly			
19	1	Shaft support assembly			
20	7	Screw	4.4	39	
21	1	Throttle arm assembly			
22	2	Plastic washer			
23	1	Plate			
24	1	Roller			
25	1	Shoulder bolt	4.4	39	
26	1	Shoulder bolt	4	35	
27	1	Back cover			
28	1	Washer			
29	2	Grommet			
30	2	Screw	2.8	25	
31	2	Nut with lock washer	Tighten securely		
32	2	Screw	Tighten securely		
33	2	Insulator			

Commander 4000 Gen II Lock Bar Panel Mount Control Components

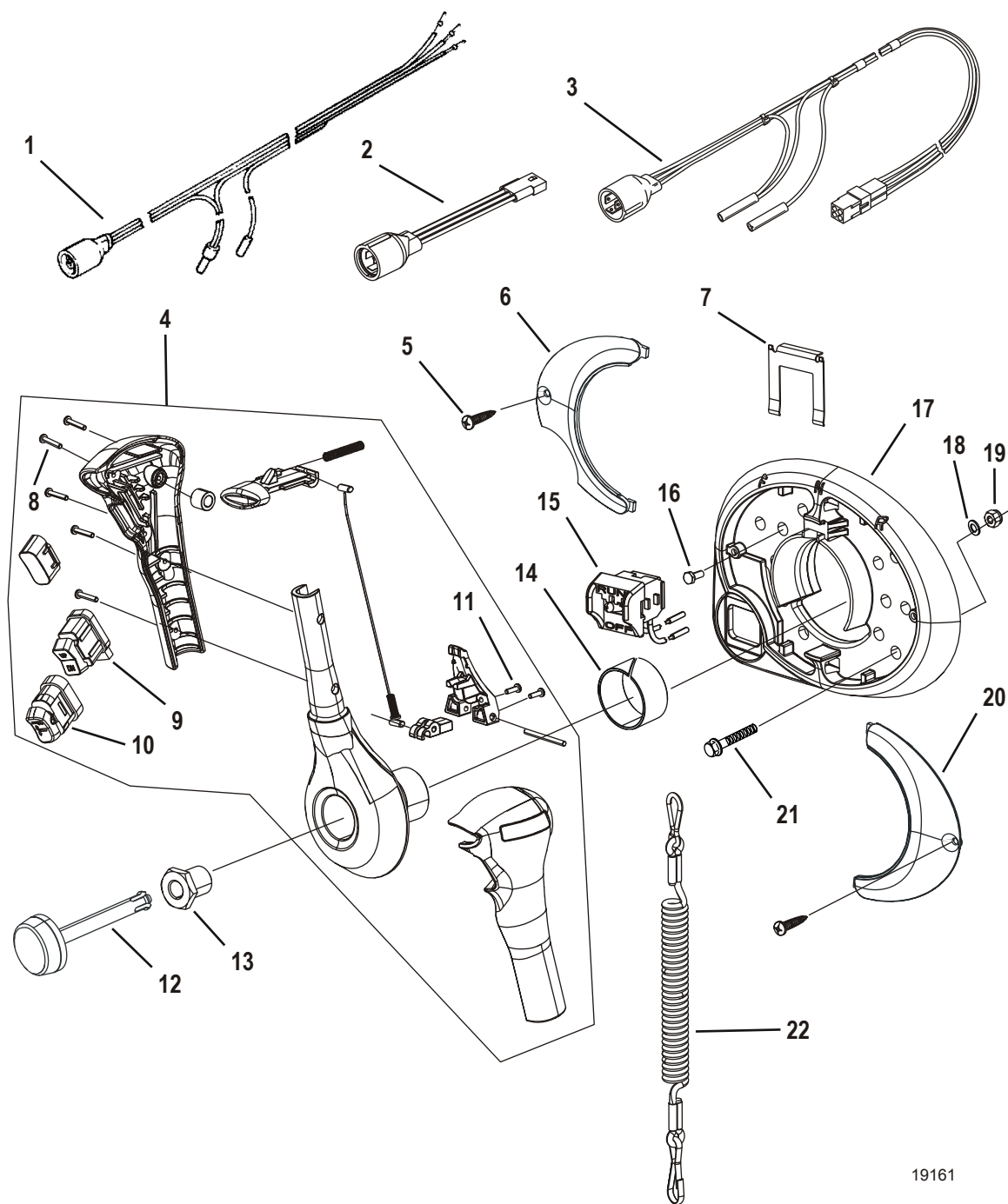


2446

Commander 4000 Gen II Lock Bar Panel Mount Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Handle assembly			
2	1	Trim switch assembly (Outboard)			
3	1	Trim switch assembly (MerCruiser)			
4	1	Handle spring			
5	1	Screw (4 x 10)	1.1	10	
6	2	Screw (# 8)	1.4	12	
7	1	Throttle button assembly			
8	1	Emblem			
9	1	Control handle retaining bolt	17	150	
10	3	Screw (0.250 - 20 x 0.625 in.)	5.6	50	
11	1	Retainer			
12	1	Stop switch (Outboard)			
13	1	Stop switch (MerCruiser)			
14	1	Bezel			
15	1	Decal			
16	3	Screw (0.250 - 20 x 1.5 in.)	5.6	50	
17	3	Washer			
18	3	Nut (0.250 - 20 in.)	5.6	50	
19	1	Cover			
20	1	Lanyard			
21	1	Adapter harness			
22	1	Trim harness assembly [MerCruiser 4.9 m (16.0 ft.)]			
23	1	Trim harness assembly [MerCruiser 7.3 m (24.0 ft.)]			

Commander 4000 Gen II Pistol Grip Panel Mount Remote Control Components

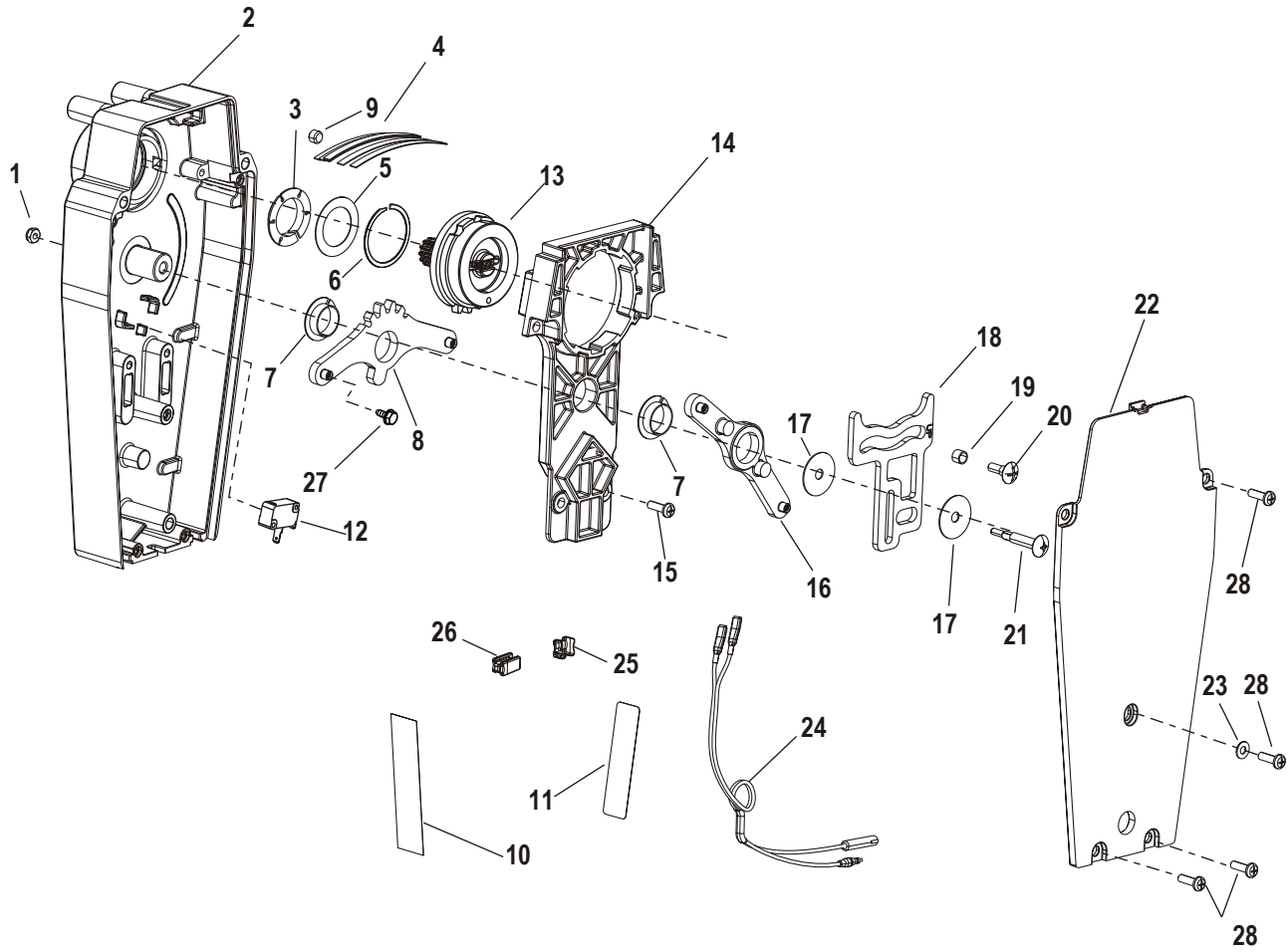


19161

Commander 4000 Gen II Pistol Grip Panel Mount Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Trim harness assembly 4.8 m (16 ft.)			
2	1	Trim switch harness adapter assembly			
3	1	Trim harness assembly 7.3 m (24 ft.)			
4	1	Handle assembly			
5	2	Bezel screw	Tighten securely		
6	1	Front cover			
7	1	Retainer			
8	5	Screw	1.1	10	
9	1	Trim switch assembly (Outboard)			
10	1	Trim switch assembly (MerCruiser)			
11	2	Screw	1.4	12	
12	1	Throttle only button			
13	1	Control handle retaining bolt	17	150	
14	1	Handle bushing			
15	1	Stop switch			
16	3	Screw (0.250 - 20 x 0.625 in.)	5.6	50	
17	1	Bezel assembly			
18	3	Washer			
19	3	Nut (0.250 - 20)	5.6	50	
20	1	Back cover			
21	3	Screw (0.250 - 20 x 1.5 in.)	5.6	50	
22	1	Lanyard			

Commander 4000 Gen II Control Module Components



20456

Commander 4000 Gen II Control Module Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Friction adjustment nut			
2	1	Panel mount housing			
3	1	Bushing			
4	6	Detent spring			
5	1	Washer			
6	1	Retaining ring			
7	1	Nyliner			
8	1	Shift arm assembly			
9	1	Detent roller			
10	1	Decal			
11	1	Decal			
12	1	Neutral start safety switch			
13	1	Handle shaft assembly			
14	1	Support shaft			
15	4	Screw (10 - 32)	4.4	39	
16	1	Throttle arm assembly			
17	2	Washer			
18	1	Plate			
19	1	Roller			
20	1	Shoulder screw (10 - 32)	4.4	39	
21	1	Shoulder screw	4	35	
22	1	Back cover			
23	1	Washer			
24	1	Stop switch cable assembly			
25	AR	Spacer (single)			
26	AR	Spacer (double)			
27	2	Screw (8 - 32)	2.8	25	
28	3	Screw (10 - 32)	4.4	39	

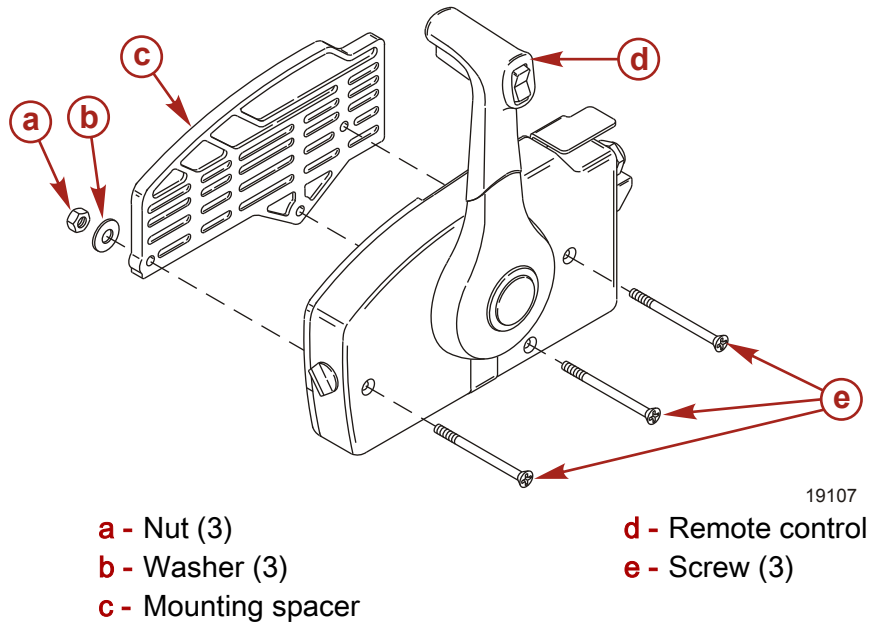
Commander 4000 Side Mount Removal, Disassembly, Assembly, and Installation

Commander 4000 Side Mount Remote Control Removal

1. Remove the three screws, nuts and washers securing the mounting spacer (if installed), and remote control to the mounting platform.

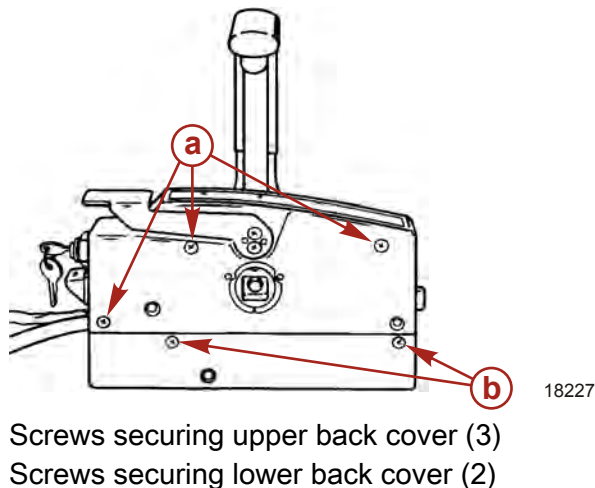
NOTE: The nuts and washers may be replaced with well-nuts.

2. Retain the three screws, nuts and washers for reassembly.

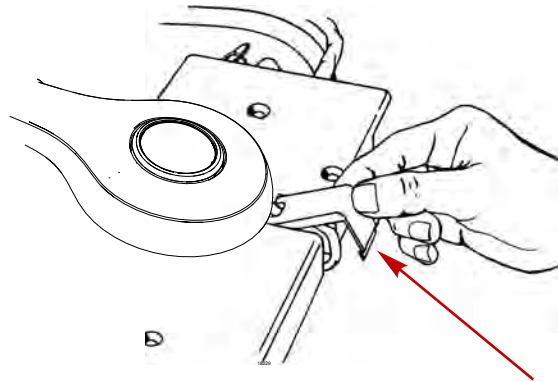


Commander 4000 Side Mount Remote Control Disassembly

1. Remove two screws securing the lower back cover to the remote control.
2. Remove three screws securing the upper back cover to the remote control.

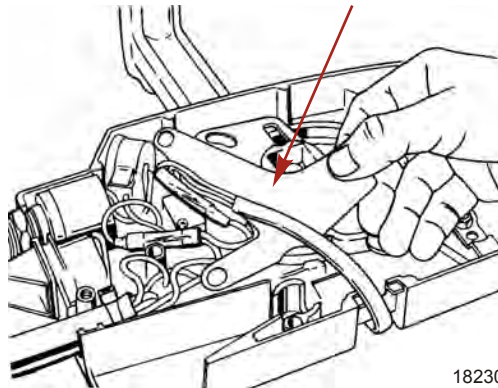


3. Remove the wire cover.



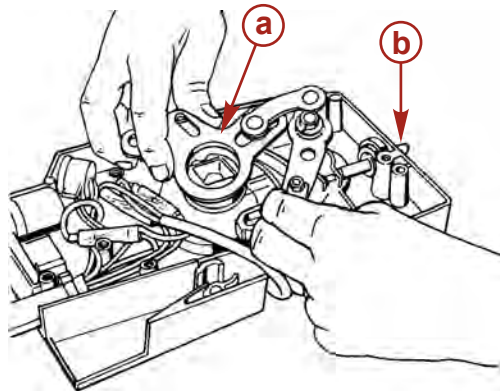
24825

4. Remove the wire separator.



18230

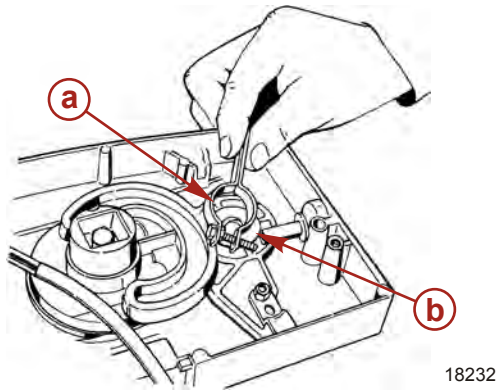
5. Loosen the throttle friction knob. Remove the throttle arm assembly.



18231

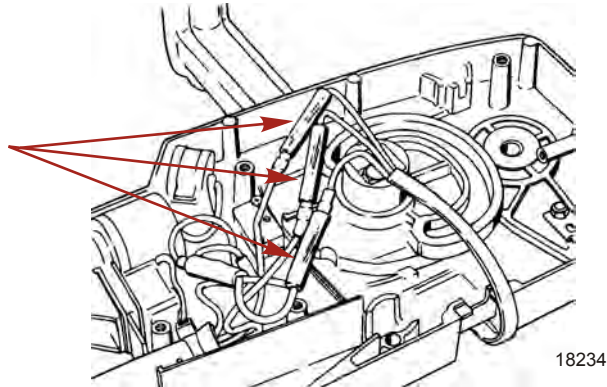
- a** - Throttle arm assembly
- b** - Throttle friction knob

6. Remove the throttle friction clamp and washer.

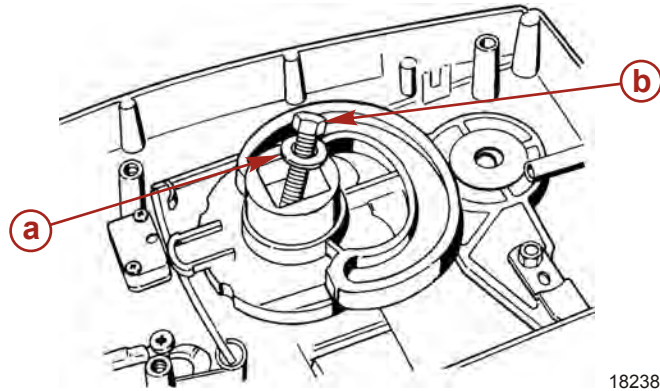


- a** - Throttle friction clamp
b - Washer

7. Disconnect the three trim switch connectors.

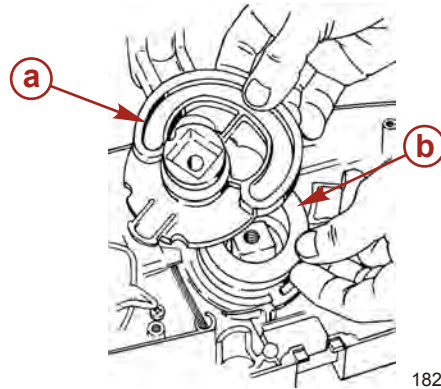


8. Remove the control handle screw and washer.



- a** - Washer
b - Control handle screw

9. Remove the control cam and washer.

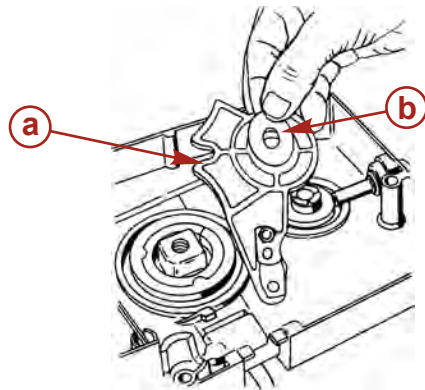


18239

a - Control cam

b - Washer

10. Remove the gear shift assembly and washer.



18240

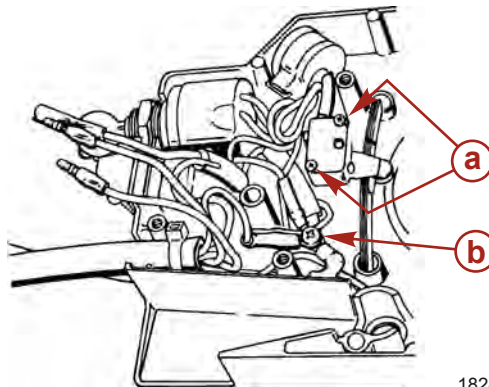
a - Gear shift assembly

b - Washer

11. Remove the remote control harness ground screw.

12. Remove the two screws securing the neutral start safety switch.

13. Remove the key switch, horn, emergency stop switch and the control harness.

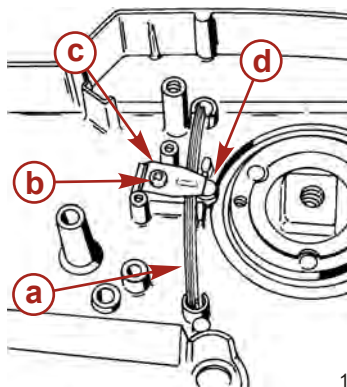


18241

a - Screw securing neutral start safety switch (2)

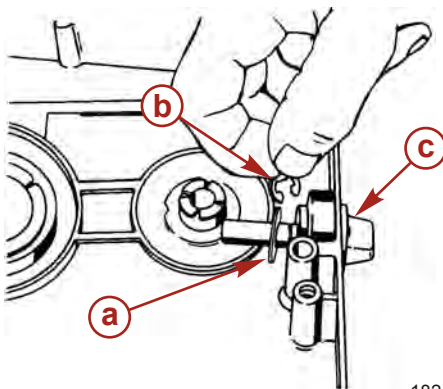
b - Remote control harness ground screw

14. Remove the screw securing the detent clip and the detent springs. Remove the detent roller.



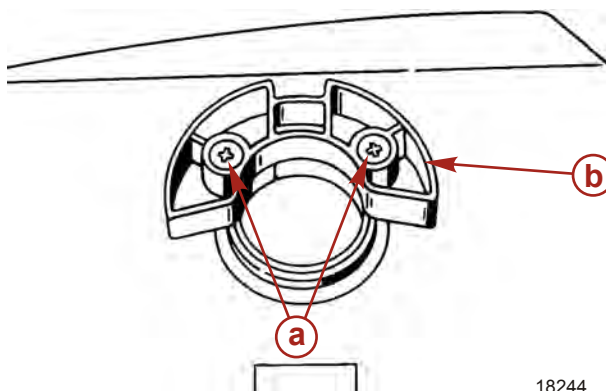
- a** - Detent spring
- b** - Screw
- c** - Detent clip
- d** - Detent roller

15. Remove the E ring, wave washer, and throttle friction knob.



- a** - Wave washer
- b** - E ring
- c** - Throttle friction knob

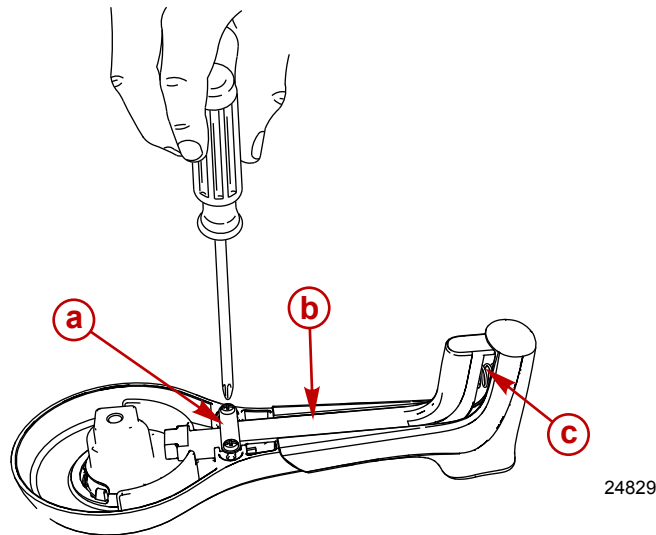
16. Remove the two screws securing the neutral lock holder. Remove the neutral lock holder.



- a** - Screw securing neutral lock holder (2)
- b** - Neutral lock holder

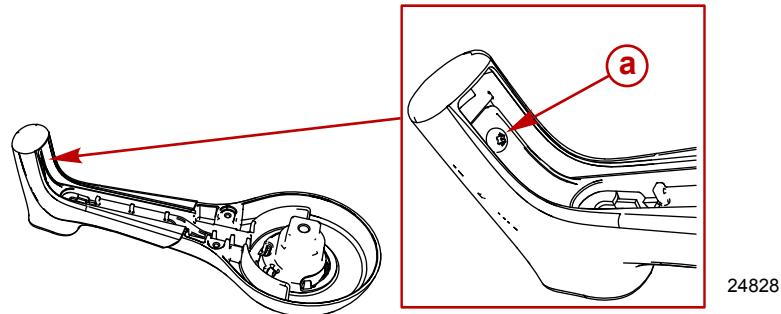
17. Remove the two screws securing the the neutral lock lever retainer. Remove the lock lever and spring.

NOTE: The neutral lock lever is spring loaded and may eject quickly.



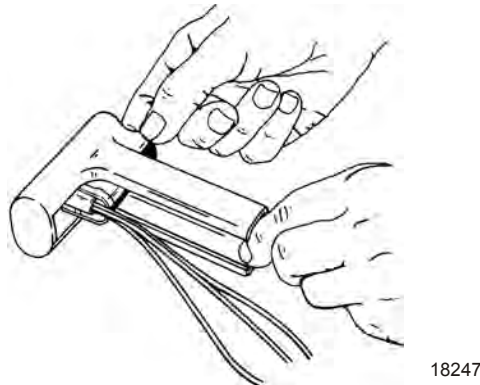
- a** - Neutral lock lever retainer
- b** - Neutral lock lever
- c** - Spring

18. Remove the screw securing the grip to the control handle. Remove the grip.



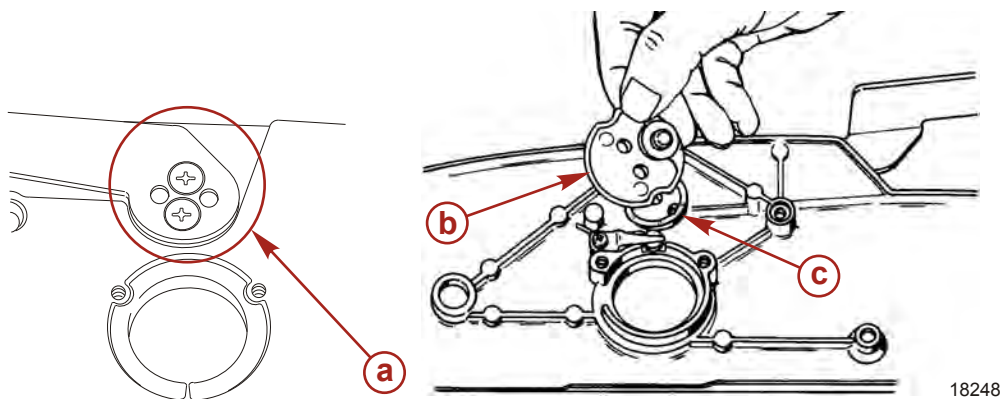
- a** - Screw retaining grip to handle

19. Push in the trim switch to remove it from the control handle.



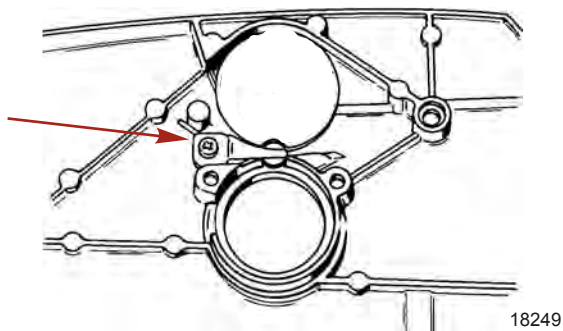
20. Remove the two screws securing the cold start lever to the drum assembly.

21. Remove the cold start lever, drum assembly, and wave washer.

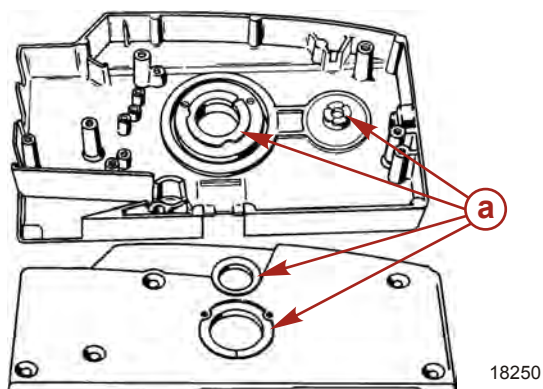


- a** - Screw retaining cold start lever (2)
- b** - Drum assembly
- c** - Wave washer

22. Remove the screw securing the detent roller clip to the control housing. Remove the spring and detent roller.



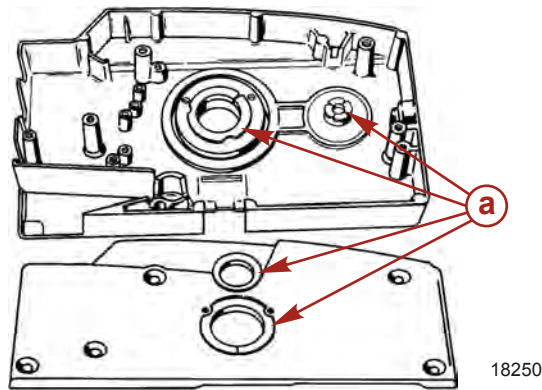
23. Remove the control housing bushings.



- a** - Bushings

Commander 4000 Side Mount Remote Control Assembly

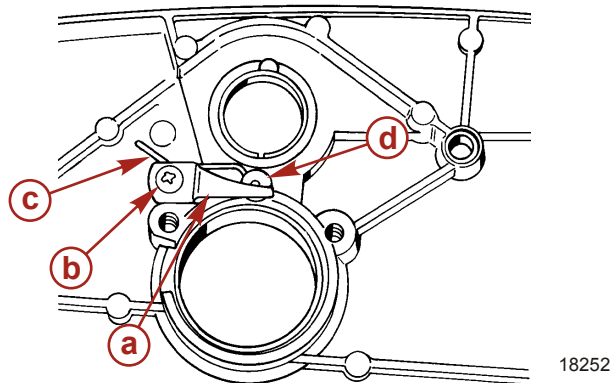
1. Lubricate the control housing bushings with 2-4-C with Teflon. Install the bushings onto the control housing and upper back cover.



a - Bushings

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control housing bushings	92-802859A1

2. Apply Loctite 271 Threadlocker to the detent roller clip screw.
3. Install the detent roller and spring. Secure the detent roller clip with a screw. Tighten the screw to the specified torque.



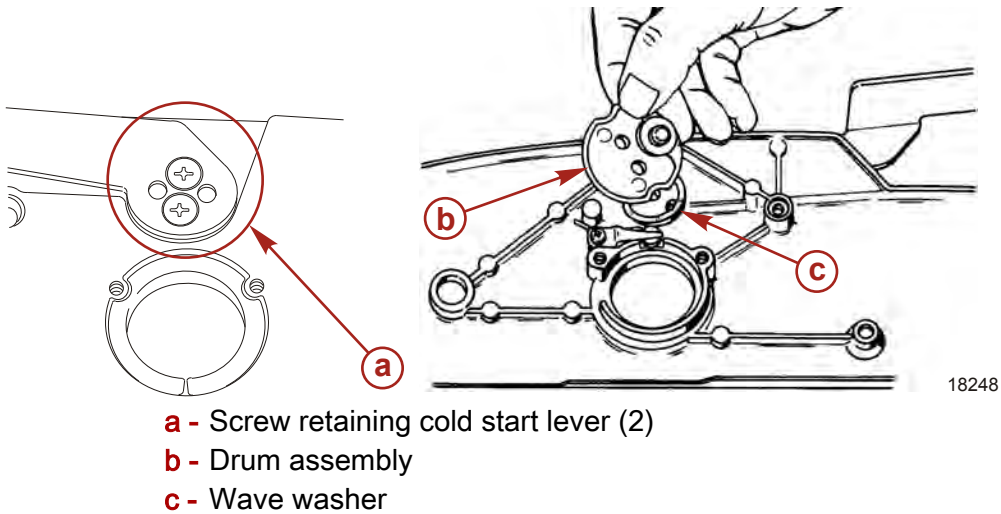
a - Detent roller clip
b - Screw
c - Spring
d - Detent roller

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Detent roller clip screw	92-809819

Description	Nm	lb. in.	lb. ft.
Detent roller clip screw	1.4	12	

4. Lubricate the drum assembly and wave washer with 2-4-C with Teflon. Install the wave washer and drum assembly onto the control housing.

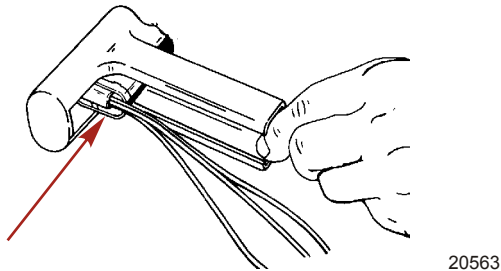
5. Install the cold start lever onto the drum assembly. Secure the cold start lever to the drum assembly with two screws. Tighten the cold start lever screws to the specified torque.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Drum assembly and wave washer	92-802859A1

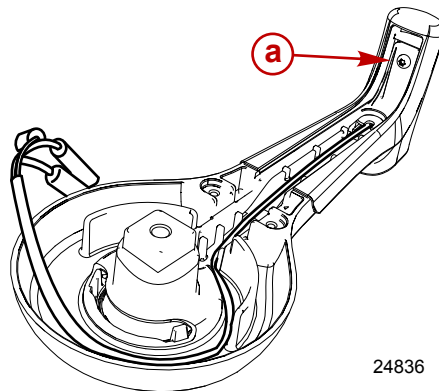
Description	Nm	lb. in.	lb. ft.
Cold start lever screw	1.4	12	

6. Install the trim switch into the control handle grip.



7. Install the control handle grip onto the control handle. Route the trim switch wires through the control handle.

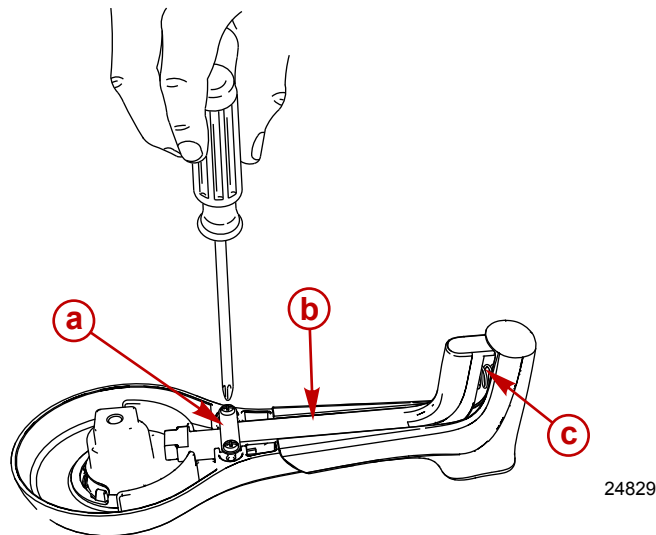
8. Secure the control handle grip to the control handle with a screw. Tighten the handle screw to the specified torque. Do not over tighten this screw or damage to the grip will result.



a - Screw retaining control handle grip

Description	Nm	lb. in.	lb. ft.
Handle screw	1.4	12	

9. Install the neutral lock lever spring and neutral lock lever onto the control handle.
10. Apply Loctite 271 Threadlocker to the neutral lock lever retainer screws.
11. Secure the neutral lock lever to the handle with the neutral lock lever retainer and two screws. Tighten the screws to the specified torque.

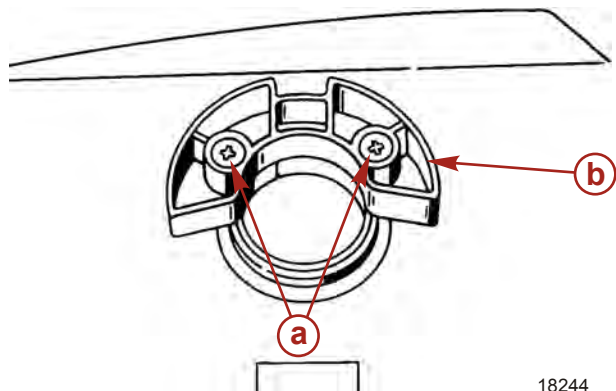


a - Neutral lock lever retainer
b - Neutral lock lever
c - Neutral lock lever spring

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Neutral lock lever retainer screws	92-809819

Description	Nm	lb. in.	lb. ft.
Neutral lock lever retainer screws (2)	1.4	12	

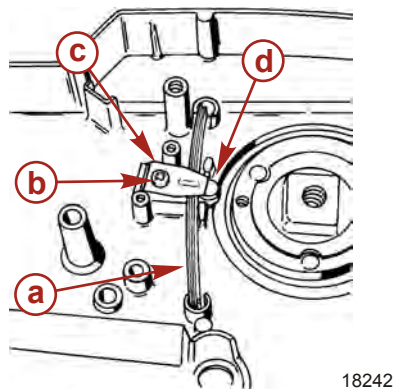
12. Install the neutral lock holder and secure with two lockwasher and screws. Tighten the screws to the specified torque.



- a - Screw securing neutral lock holder (2)
- b - Neutral lock holder

Description	Nm	lb. in.	lb. ft.
Neutral lock holder screw (2)	3.4	35	

13. Install the detent roller and detent springs. Retain the detent roller and the detent spring with the detent clip.
14. Apply Loctite 271 Threadlocker to the threads of the detent clip screw.
15. Secure the detent clip with a screw. Tighten the detent clip screw to the specified torque.
16. Lubricate the detent roller with 2-4-C with Teflon.



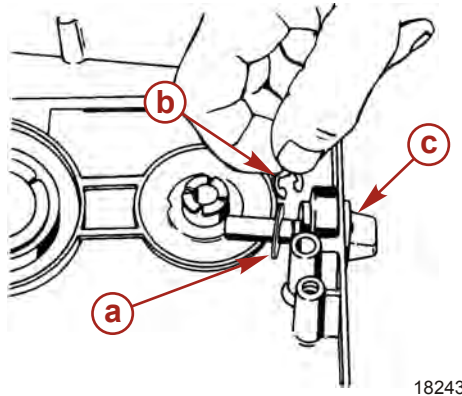
- a - Detent spring
- b - Screw
- c - Detent clip
- d - Detent roller

Description	Nm	lb. in.	lb. ft.
Screw	1.4	12	

Tube Ref No.	Description	Where Used	Part No.
95	2-4-C with Teflon	Detent roller	92-802859A1

17. Lubricate the throttle friction knob shaft with 2-4-C with Teflon.

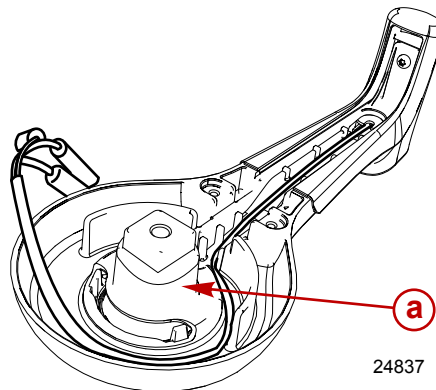
18. Install the throttle friction knob into the control housing and retain with a wave washer and E ring.



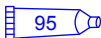
- a** - Wave washer
b - E ring
c - Throttle friction knob

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle friction knob shaft	92-802859A1

19. Lubricate the bushing area of the control handle with 2-4-C with Teflon.

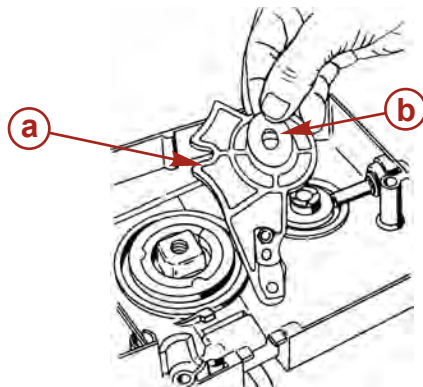


- a** - Lubricate with 2-4-C with Teflon

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Bushing area of control handle	92-802859A1

20. Install the control handle into the control housing.

21. Lubricate the gear shift assembly and washer with 2-4-C with Teflon. Install the gear shift assembly and washer onto the control housing.



18240

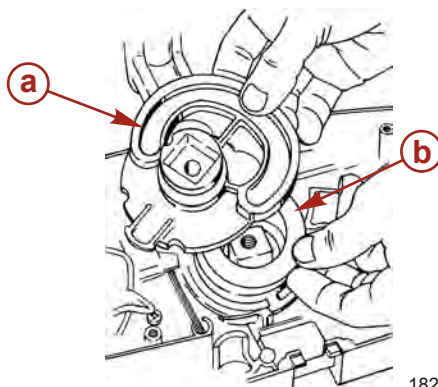
- a** - Gear shift assembly
b - Washer

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Gear shift arm and washer	92-802859A1

22. Lubricate the control cam and washer with 2-4-C with Teflon.

23. Install the washer onto the control handle.

24. Install the control cam on top of the washer.

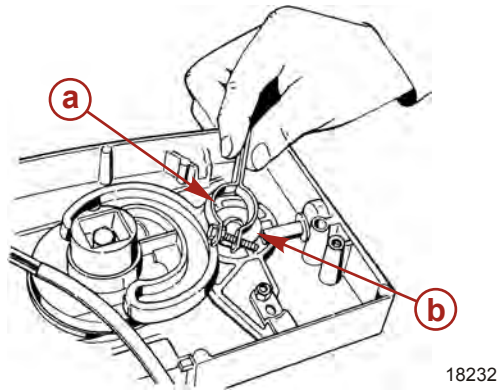


18239

- a** - Control cam
b - Washer

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control cam and washer	92-802859A1

25. Thread the throttle friction clamp screw into the throttle friction knob three turns.

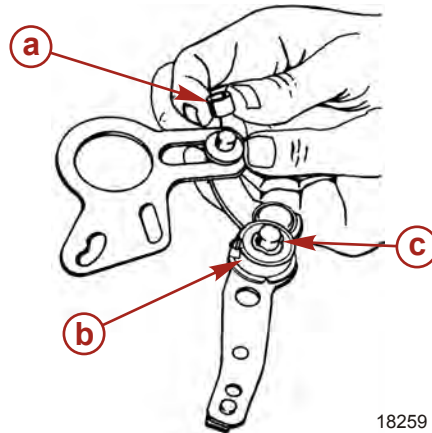


a - Throttle friction clamp

b - Washer

26. Lubricate the roller, bushing, and wave washer with 2-4-C with Teflon.

27. Install the roller, bushing, and wave washer onto the throttle arm assembly.



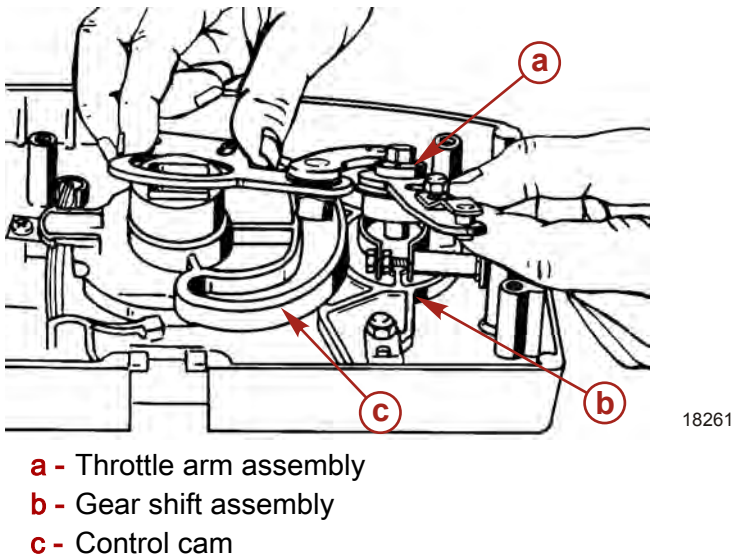
a - Roller

b - Bushing

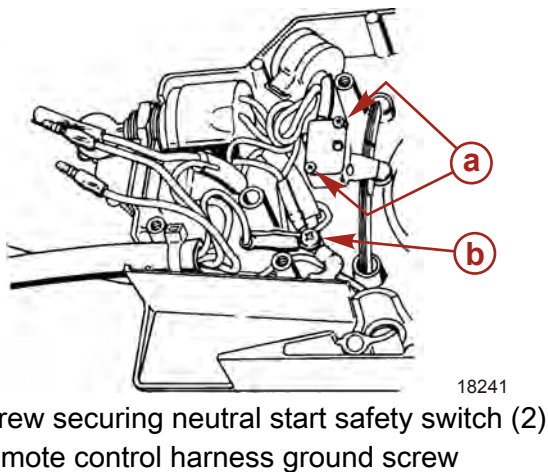
c - Wave washer

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Shift lever roller, bushing, and wave washer	92-802859A1

28. Install the throttle arm assembly onto the gear shift assembly and control cam.



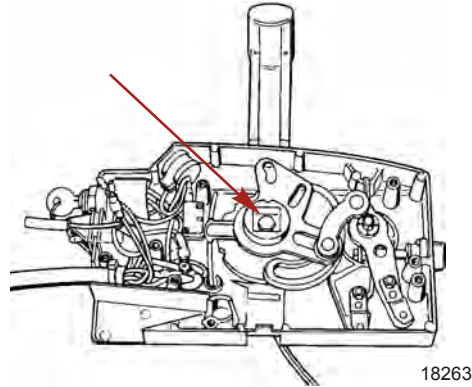
29. Apply Loctite 271 Threadlocker to the threads on the neutral start safety switch screws.
30. Install the neutral start safety switch and retain with two screws. Tighten the screws to the specified torque.
31. Install the key switch. Secure the key switch with the key switch nut.
32. Secure the ground wires to the control box with a screw. Tighten the ground wire screw to the specified torque.



Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Neutral start safety switch screw	92-809819

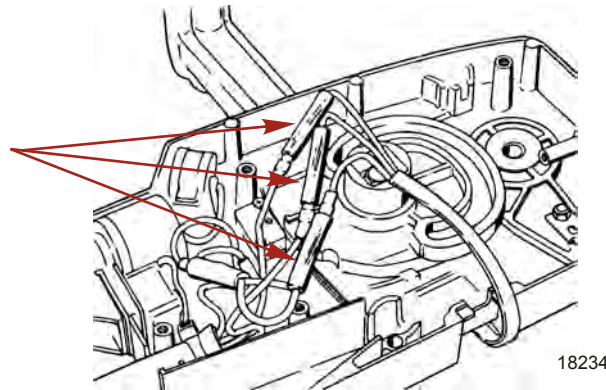
Description	Nm	lb. in.	lb. ft.
Neutral start safety switch screw (2)	1.4	12	
Ground wire screw	1.4	12	

33. Secure the control handle to the control cam with a screw and washer. Tighten the screw to the specified torque.

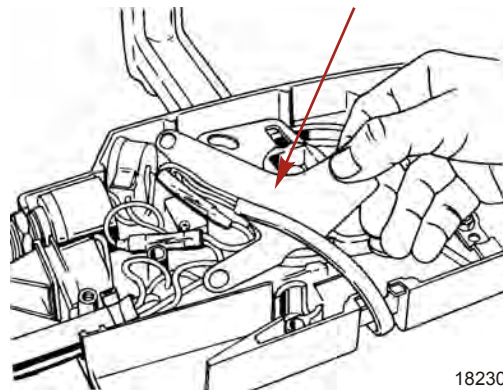


Description	Nm	lb. in.	lb. ft.
Control handle screw	11	97	

34. Connect the trim switch wire connectors to the control harness wires.

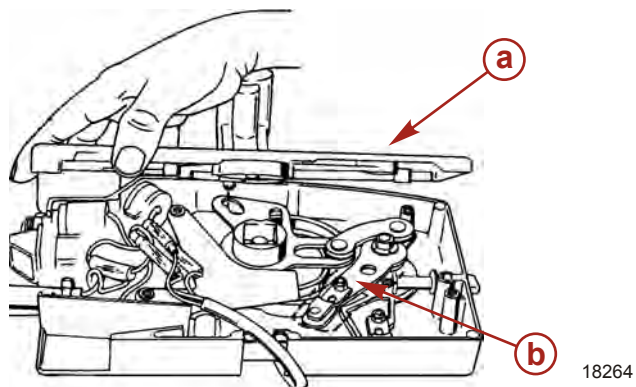


35. Install the wire separator.



36. Use the control handle to position the throttle lever assembly into the idle position.

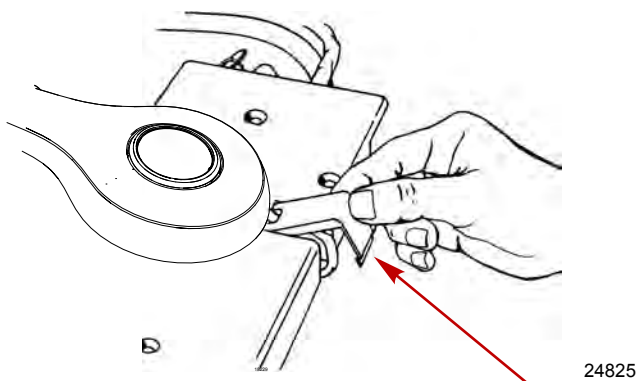
37. Install the upper back cover. Secure the upper back cover with three screws. Tighten the screws to the specified torque.



- a** - Upper back cover
b - Throttle lever assembly idle position

Description	Nm	lb. in.	lb. ft.
Upper back cover screw (3)	4	35	

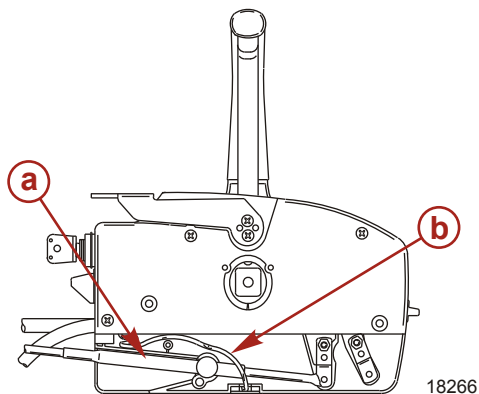
38. Install the wire cover.



Shift and Throttle Cable Installation

1. Insert the shift cable barrel into the control housing.

IMPORTANT: The shift cable and the throttle cable must be routed under the trim switch wires.

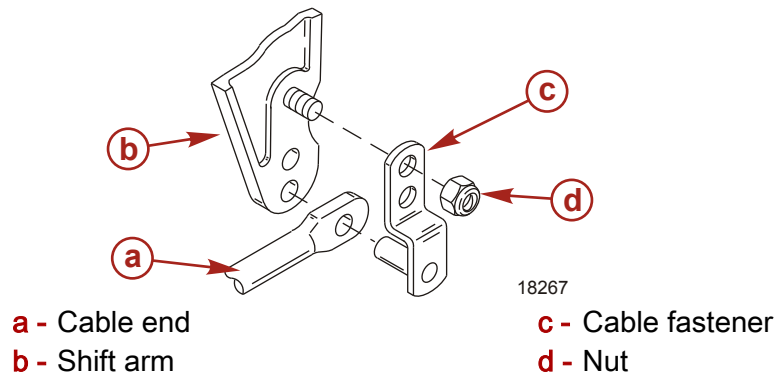


- a** - Shift cable
b - Trim switch wires

2. Loosen the cable fastener nut to install the cable end.

NOTE: The nut and cable retainer do not need to be completely removed for the cable end installation.

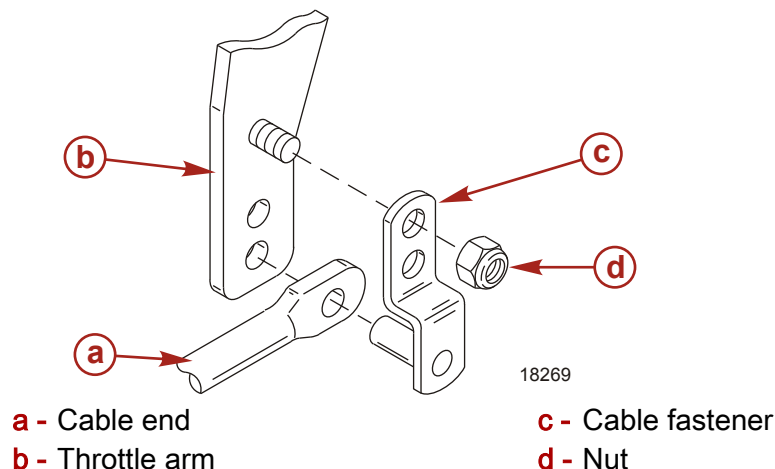
3. Lubricate the pin on the shift cable fastener with 2-4-C with Teflon.
4. Insert the pin on the end of the cable fastener through the hole in the cable end. Secure the shift cable end to the shift arm with the cable fastener nut. Tighten the nut to the specified torque.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Pin on the shift cable fastener	92-802859A1

Description	Nm	lb. in.	lb. ft.
Cable fastener nut	4.8	43	

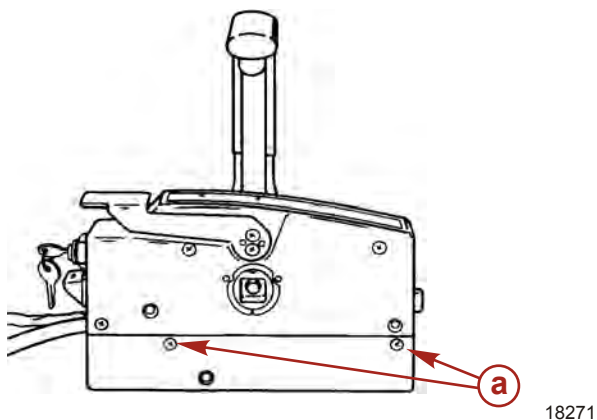
5. Lubricate the pin on the throttle cable fastener with 2-4-C with Teflon.
6. Insert the pin on the end of the cable fastener through the hole in the cable end.
7. Insert the throttle cable into the bottom hole on the throttle arm.
8. Secure the throttle cable end to the throttle arm with the cable fastener nut. Tighten the nut to the specified torque.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Pin on the throttle cable fastener	92-802859A1

Description	Nm	lb. in.	lb. ft.
Cable fastener nut	4.8	43	

9. Install the throttle cable barrel into the lower housing cover.
10. Secure the lower housing cover to the control box assembly with two screws. Tighten the screws to the specified torque.

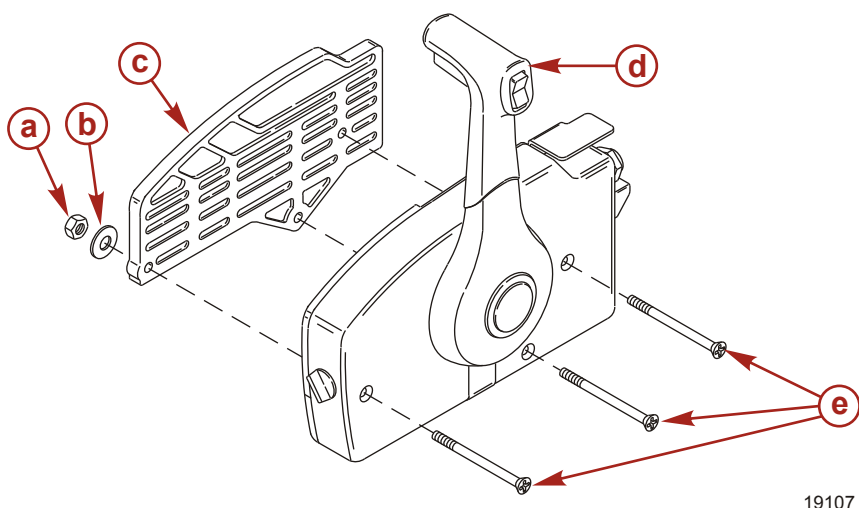


a - Lower housing cover screws (2)

Description	Nm	lb. in.	lb. ft.
Lower housing cover screw (2)	4	35	

Commander 4000 Side Mount Installation

1. Insert the three long screws through the control housing assembly.
2. Install the spacer if required.
3. Install the control housing assembly to the side mount panel.
4. Secure the control housing assembly to the side mount with three washers and nuts. Tighten the three screws and nuts securely.



a - Nut (3)

b - Washer (3)

c - Mounting spacer

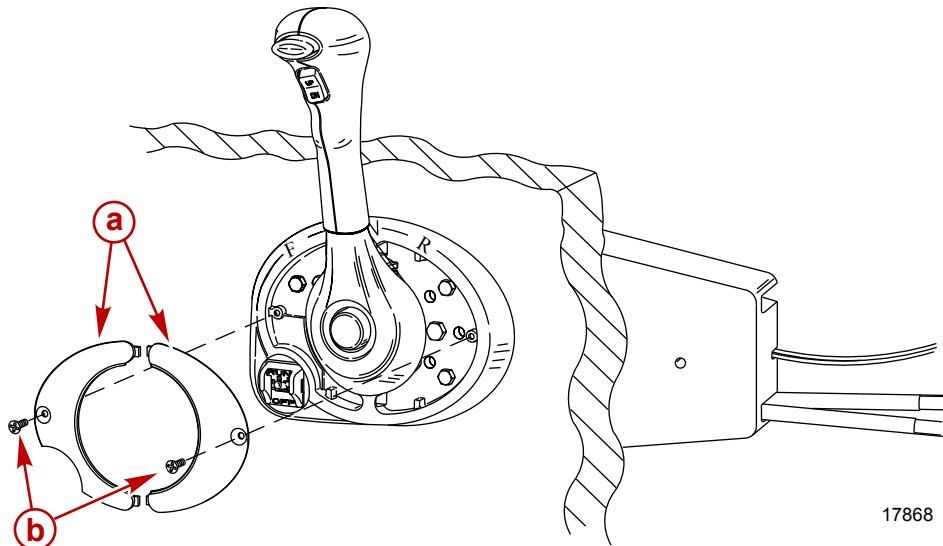
d - Remote control

e - Screw (3)

Commander 4000 Pistol Grip Remote Control Removal and Installation

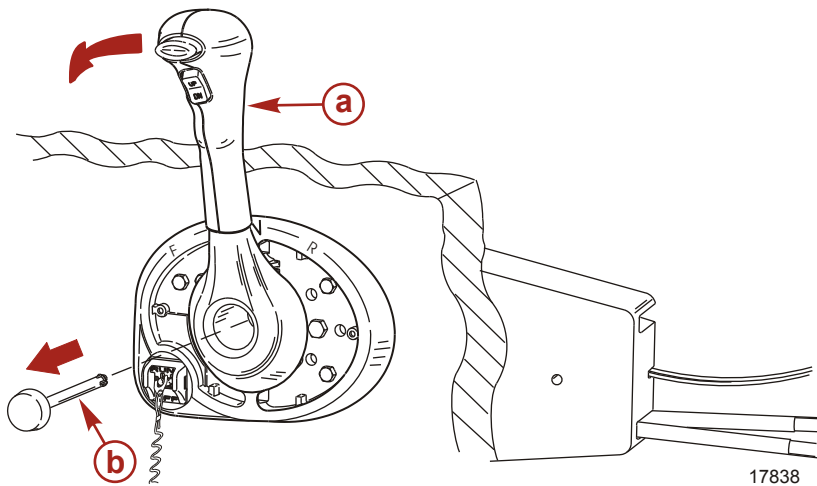
Commander 4000 Pistol Grip Panel Mount Remote Control Removal

1. Remove the two screws securing the bezel covers to the bezel.



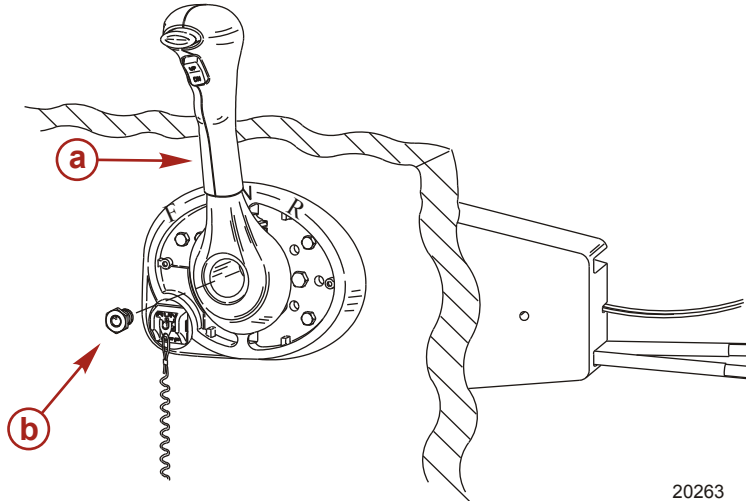
- a** - Bezel covers
- b** - Bezel screws (2)

2. Ensure the control handle is in the neutral position.
3. Push the throttle-only button in and advance the control handle forward.
4. Use a flat blade screwdriver to pry the throttle-only button out of the control handle.



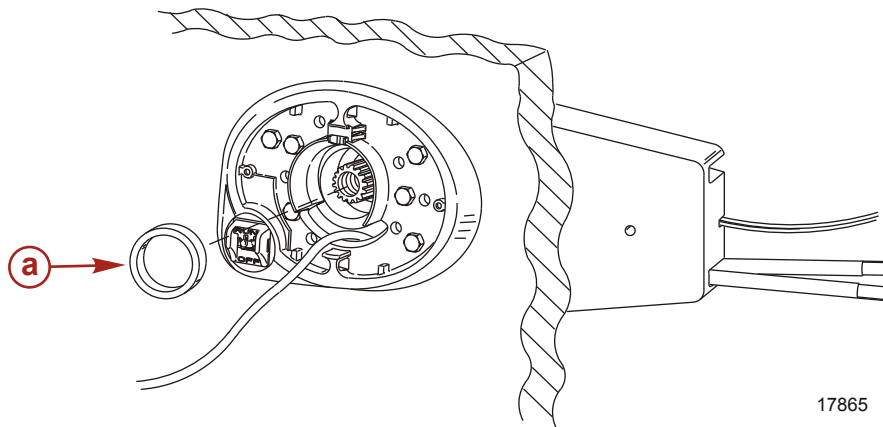
- a** - Control handle
- b** - Throttle-only button

5. Remove the control handle retaining bolt. Remove the control handle from the control module splined shaft.



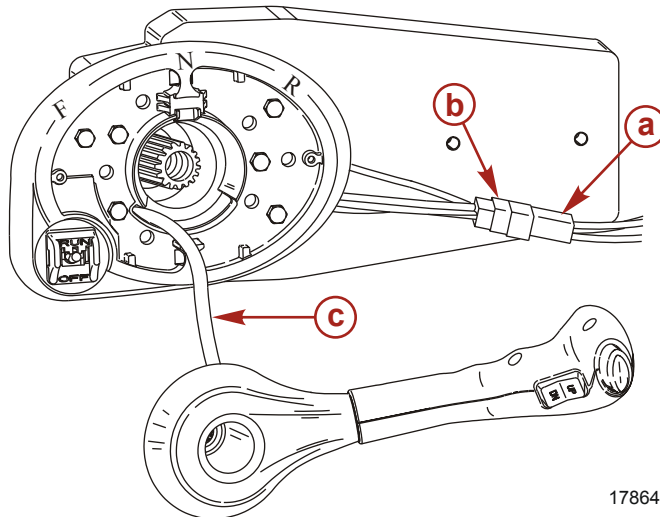
- a** - Control handle
b - Control handle retaining bolt

6. Remove the control handle bushing.



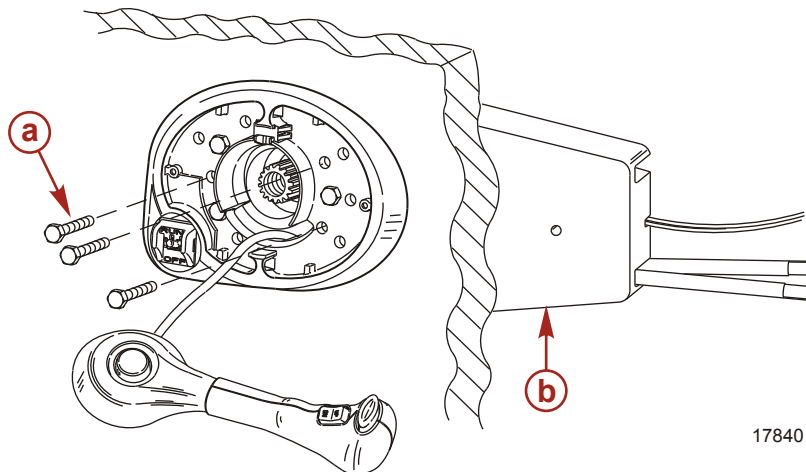
- a** - Control handle bushing

7. Disconnect the control handle trim switch wire connector from the trim lead connector.



- a** - Trim lead connector
b - Control handle trim switch wire connector
c - Control handle trim switch wire harness

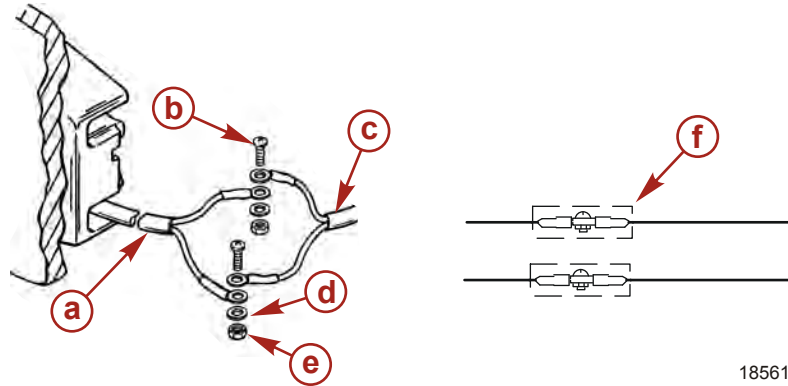
8. Remove the three screws securing the control module to the bezel.



- a** - Screws securing the control module to the bezel
b - Control module

9. Disconnect the neutral start safety switch wire harness from the boat wire harness.

NOTE: Some remote control models have bullet connectors instead of ring terminals.



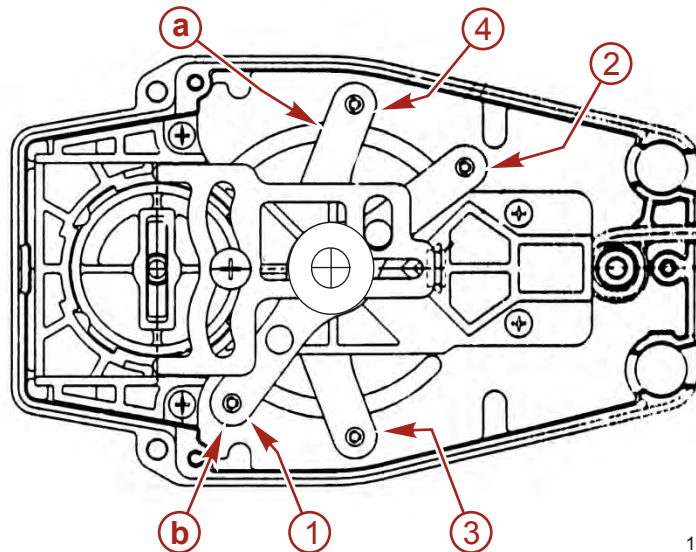
18561

- a** - Control module neutral start safety switch wire harness
- b** - Screw (2)
- c** - Boat wire harness neutral start safety switch wire harness
- d** - Washer
- e** - Nut
- f** - Rubber sleeve

Commander 4000 Shift and Throttle Cable Installation

OUTBOARD MODELS

Outboard Models (U.S. and Belgium Models Only)	Starboard Mount Control		Port Mount Control	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Force Outboards and L-Drive (except 9.9 and 15)	4	2	3	2
Mariner and Mercury Outboards (Standard Rotation Models) - All Models through 225 HP (With Pull Throttle) includes 1994-1/2 20/25	4	2	3	2
Mariner and Mercury Outboards - 18 HP, 20 HP, 25 HP (U.S. Origin) (With Push Throttle Cable)	4	1	3	1
Mariner and Mercury Outboards (Counter Rotation Gearcase) - All Models through 225 HP	3	2	4	2
Mariner and Mercury Outboards (Standard Rotation Gearcase) - 250 HP/275 HP	3	2	4	2
Mariner and Mercury Outboards (Counter Rotation Gearcase) - 250 HP/275 HP	4	2	3	2
Mercury Outboards (Standard Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2
Mercury Outboards (Counter Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2



17705

- a** - Shift arm
b - Throttle arm

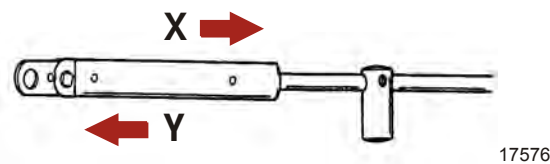
MERCURY MERCUISER MODELS

IMPORTANT: The shift cable must be correctly installed at the remote control assembly for the appropriate drive unit rotation, standard or counter rotation. Ensure to determine the type of drive unit rotation you are installing the cable to.

NOTE: Bravo Three and Blackhawk Drive Units refer to instructions for Standard Rotation (following).

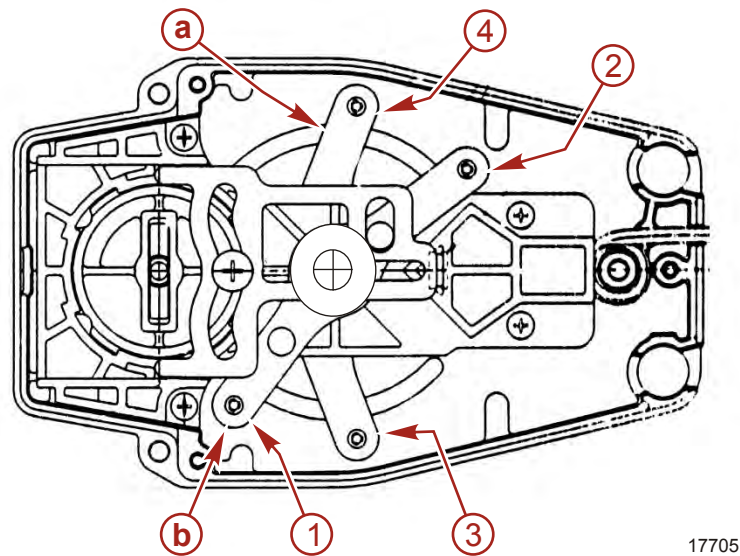
Mercury MerCruiser Models Standard Rotation - The control cable will have to be installed in remote control so that cable end will move in direction X when shift handle is placed in the forward position.

Mercury MerCruiser Models Counter Rotation - The control cable must be installed in the remote control so the cable end will move in the direction of Y when the shift handle is placed in the forward position.



Direction of arrow (Viewed at shift plate)

Mercury MerCruiser Models	Standard Rotation		Counter Rotation	
Starboard Mount Mechanical Control	Anchor Attachment Points		Anchor Attachment Points	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Direction of arrow	X	X	Y	X
Lever number	4	2	3	2



- a - Shift arm
- b - Throttle arm

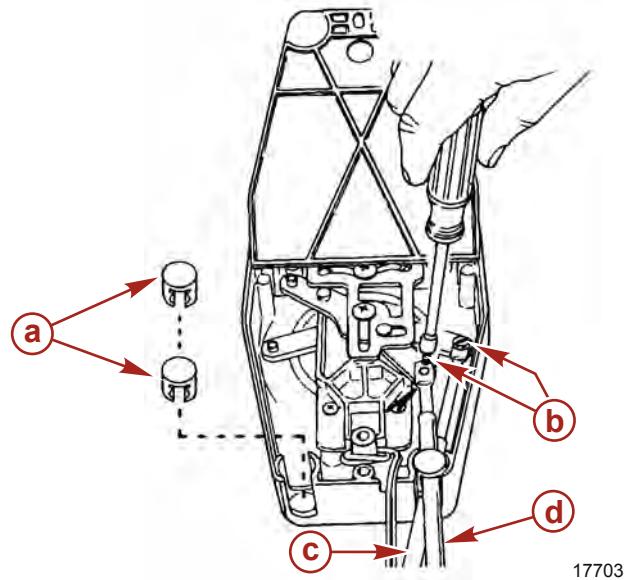
TYPICAL SHIFT AND THROTTLE CABLE INSTALLATION, OUTBOARD AND MERCURY MERCUISER

WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. Control cable fastener screws must be properly torqued and retained with Loctite Threadlocker to prevent control cable fastener screws from loosening, thus allowing the cable ends to disconnect.

1. Apply Loctite 271 Threadlocker to the threads of the cable fastener screws.
2. Install the control cables in the appropriate arm in the remote control module.

3. Tighten the cable fastener screws to specified torque.



- a** - Filler grommet
b - Screw 10-32 (2)
c - Shift cable
d - Throttle cable

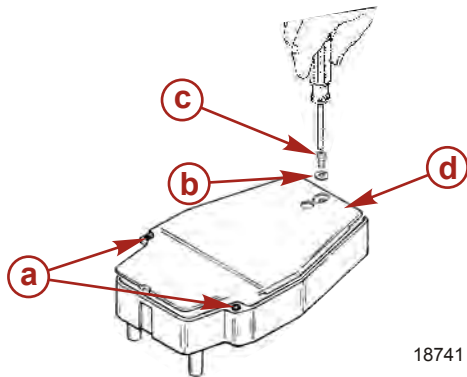
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control cable fastener screws	92-809819

Description	Nm	lb. in.	lb. ft.
Control cable fastener screws	2.8	25	

WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The back plate must be fastened to the control with washer and screw to prevent the back cover from loosening, thus resulting in the control cables slipping out of the mounting slots at the rear of the control.

4. After installing the control cables, secure the back cover with a washer and three screws. Tighten the screws to the specified torque.

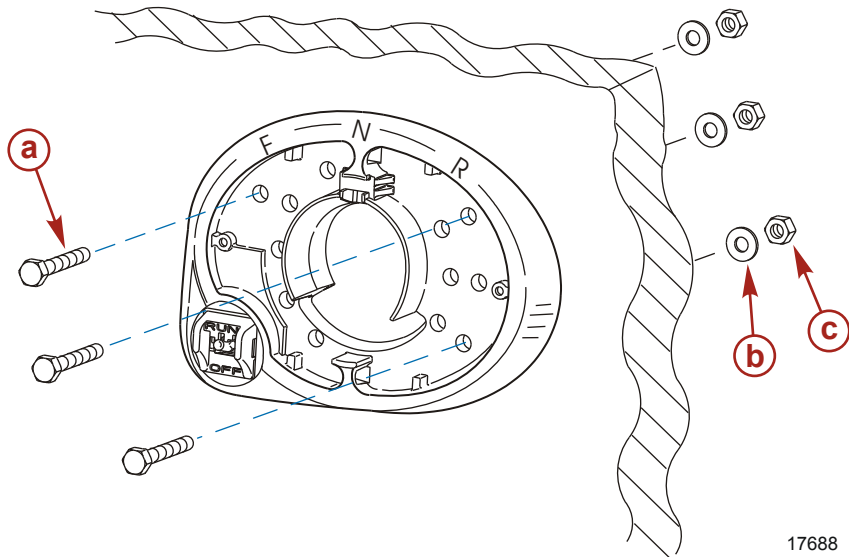


- a - Screw (2)
- b - Washer
- c - Screw
- d - Back cover

Description	Nm	lb. in.	lb. ft.
Back plate screw	4	35	

Commander 4000 Pistol Grip Panel Mount Remote Control Installation

1. Install the bezel to the panel. Secure the bezel with three screws, nuts, and washers. Tighten the screws and nuts to the specified torque.

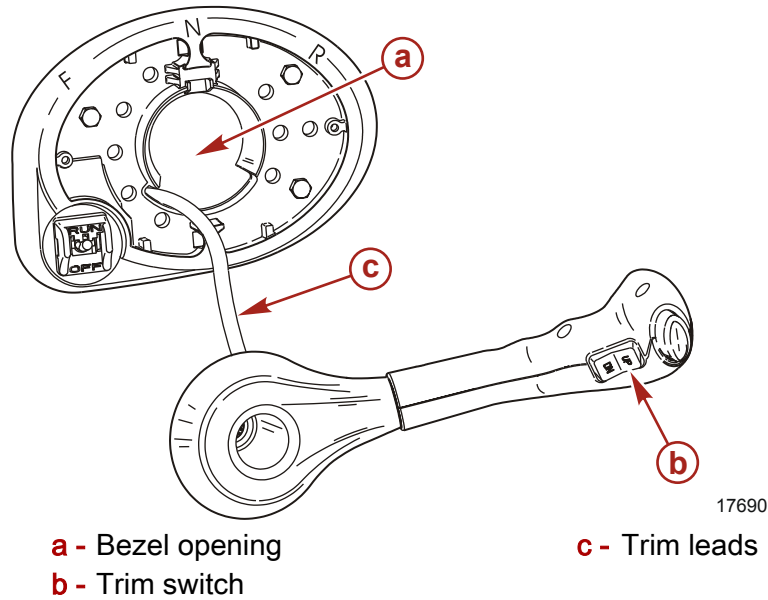


- a - Screw (0.250-20 x 1.75 in.) (3)
- b - Washer (3)
- c - Nut (3)

Description	Nm	lb. in.	lb. ft.
Screw (3)	5.6	50	

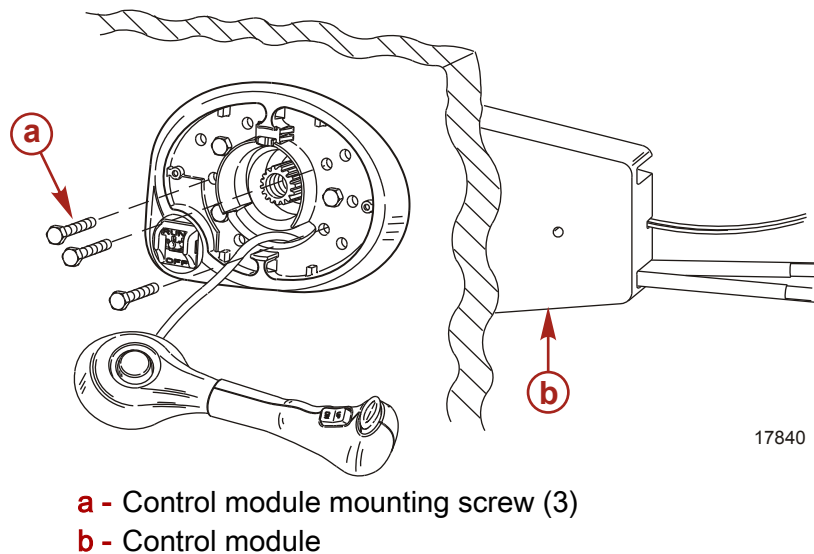
2. Route the trim switch leads from the handle assembly through the bezel opening.

3. Allow sufficient slack in leads to permit free movement of trim leads through the full range of shift handle motion.



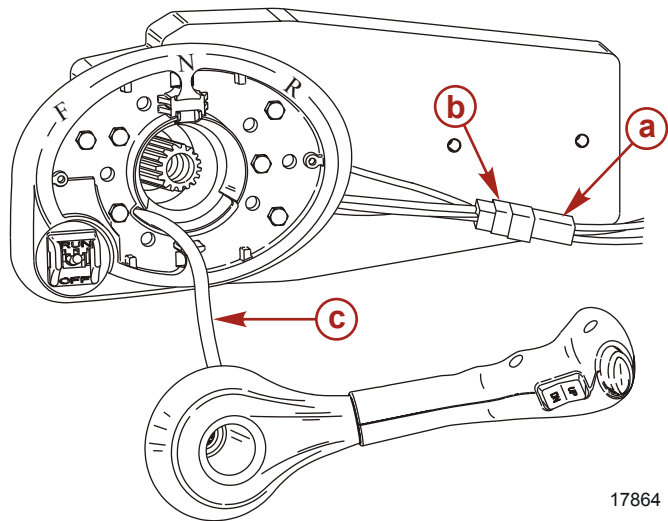
4. Install the remote control cables to the control module assembly. Refer to the **Shift and Throttle Cable Installation** instructions before preceeding with the installation of the remote control module.
5. Install the control module to the bezel. Secure the control module to the bezel with three screws. Tighten the screws to specified torque.

IMPORTANT: Ensure the trim/trailer wires are not pinched when mounting the remote control module to the bezel. The trim wires must be free to move with the remote control handle.



Description	Nm	lb. in.	lb. ft.
Control module mounting screw (3)	5.6	50	

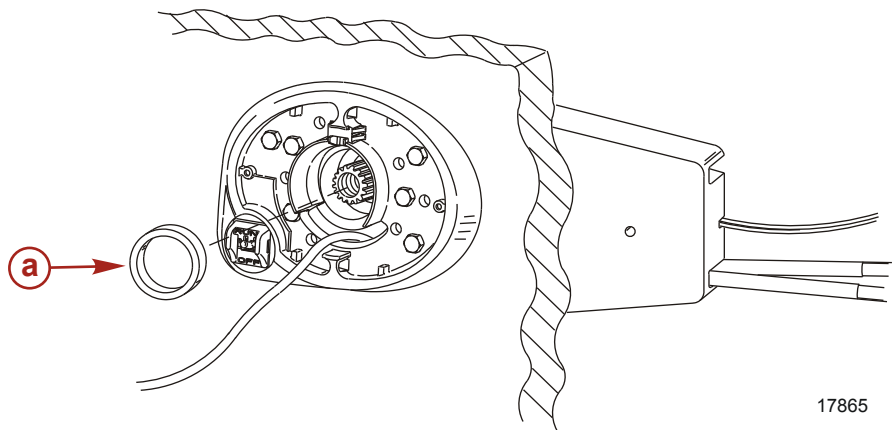
6. Connect the trim switch wires to the trim lead connector.



17864

- a - Trim lead connector
- b - Trim pump lead
- c - Trim switch wires

7. Install the control handle bushing into the control module. Lubricate the inside of the control handle bushing with 2-4-C with Teflon.



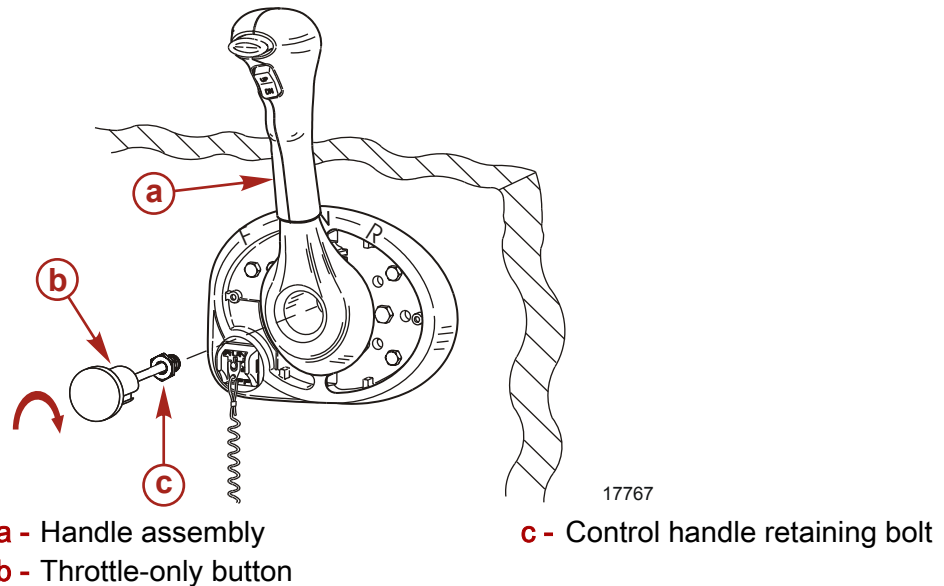
17865

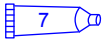
- a - Bushing

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle bushing	92-802859A1

8. Install the control handle onto the control module splined shaft. Ensure the control is in neutral and the control handle is in the desired handle position.
9. Apply Loctite 271 Threadlocker to the threads of the control handle retaining bolt.
10. Secure the control handle to the control module with the control handle retaining bolt. Tighten the control handle retaining bolt to the specified torque.

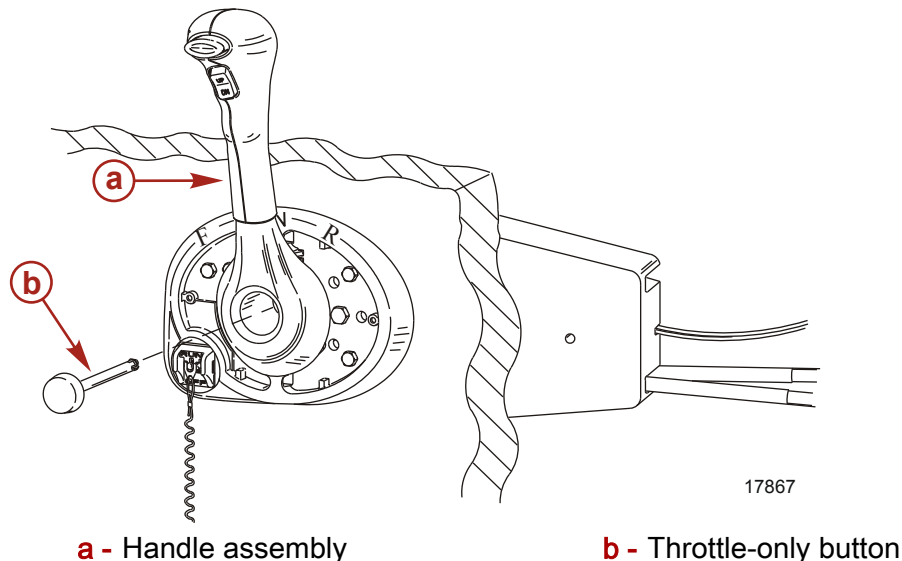
NOTE: As an aid for installing the control handle retaining bolt, use the throttle-only button as a tool to align the threads of the control handle retaining bolt to the control module splined shaft. Once the control handle retaining bolt threads are started, remove the throttle-only button and tighten the control handle retaining bolt to the specified torque.



Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle retaining bolt	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle retaining bolt	17	150	

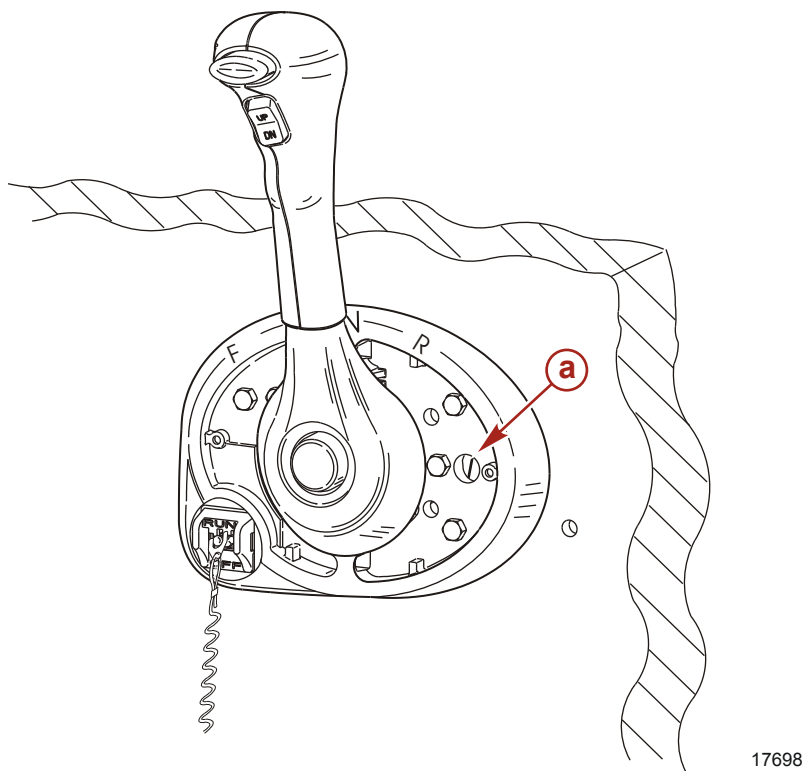
11. Install the throttle-only button.



IMPORTANT: Ensure the trim harness is loose behind the panel. Do not use cable ties near the control module. The harness must have free movement when rotating the control handle.

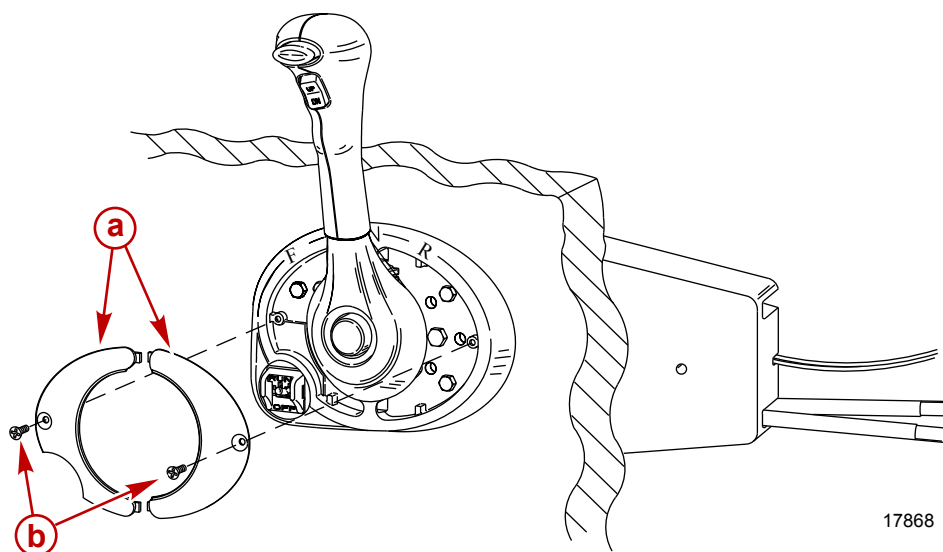
12. Use a flat blade screwdriver to adjust the control handle friction to the desired resistance.

- Turn the friction screw clockwise to increase the amount of desired resistance.
- Turn the friction screw counterclockwise to decrease the amount of desired resistance.



a - Control handle friction adjustment screw

13. Install the bezel covers onto the bezel. Secure the bezels with two screws. Tighten the screws securely. Do not overtighten the bezel screw. Overtightening the bezel screws will damage the bezel.



a - Bezel covers

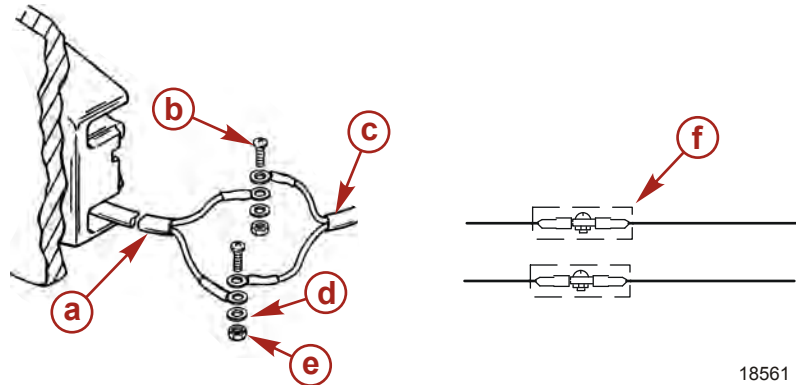
b - Bezel cover screws

14. Connect the remote control module assembly neutral start safety switch leads to the wire harness. Apply Liquid Neoprene to the connection to prevent corrosion. Allow the Liquid Neoprene to dry. Protect the connections with a rubber sleeve or shrink tubing.

NOTE: Some remote control Models have bullet connectors instead of ring terminals.

⚠ WARNING

Avoid serious injury or death from a sudden unexpected acceleration when starting the engine. The neutral start safety switch must be correctly connected to prevent engine startup when in gear. Refer to wiring diagrams for correct wiring connections.

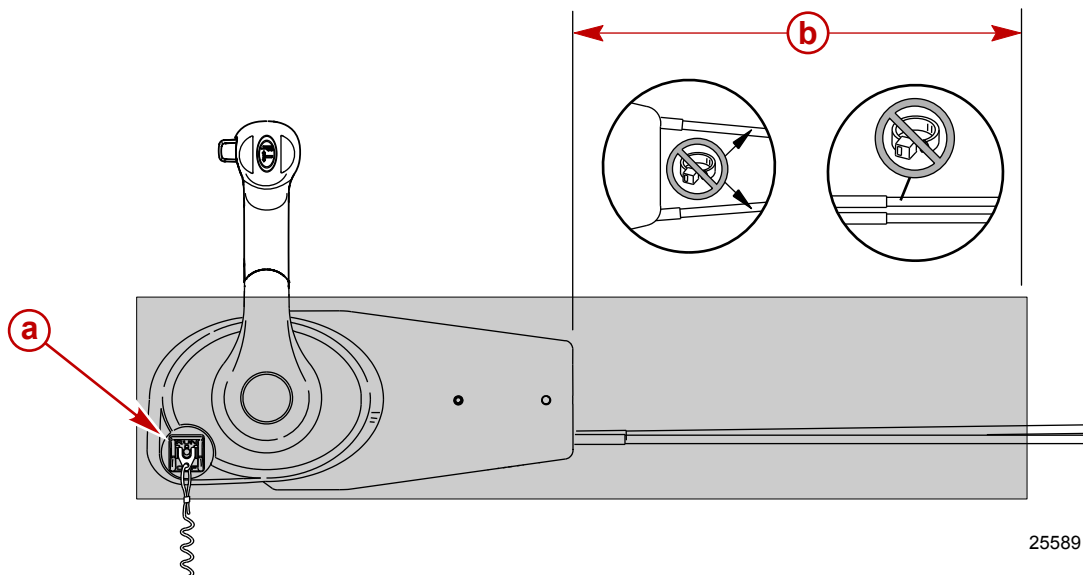


18561

- a** - Control module neutral start safety switch wire harness
- b** - Screw (2)
- c** - Boat wire harness neutral start safety switch wire harness
- d** - Washer
- e** - Nut
- f** - Rubber sleeve

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch wire connection	92-25711-3

IMPORTANT: The control cables must be able to move independently of each other. Do not use anchors, clamps, cable ties, or secure any harnesses or other items within 45.7 cm (18 in.) of the control cables exiting the remote control module assembly.



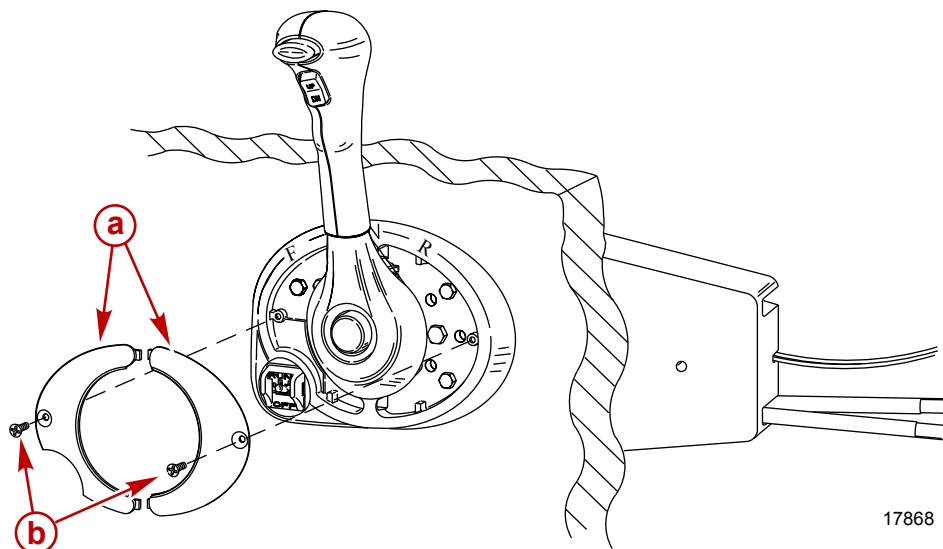
25589

- a** - Lanyard stop switch
- b** - Remote control cable clearance space - 45.7 cm (18 in.)

Commander 4000 Gen II Pistol Grip Panel Mount Remote Control Removal and Installation

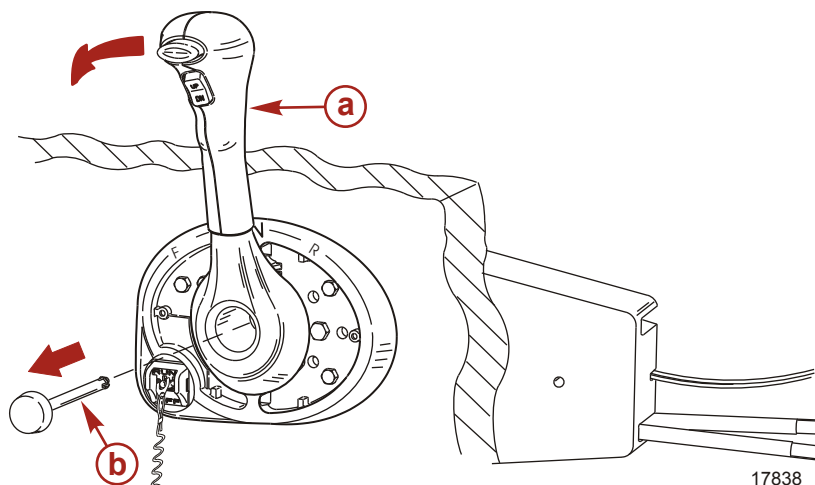
Commander 4000 Gen II Pistol Grip Panel Mount Remote Control Removal

1. Remove the two screws securing the bezel covers to the bezel.



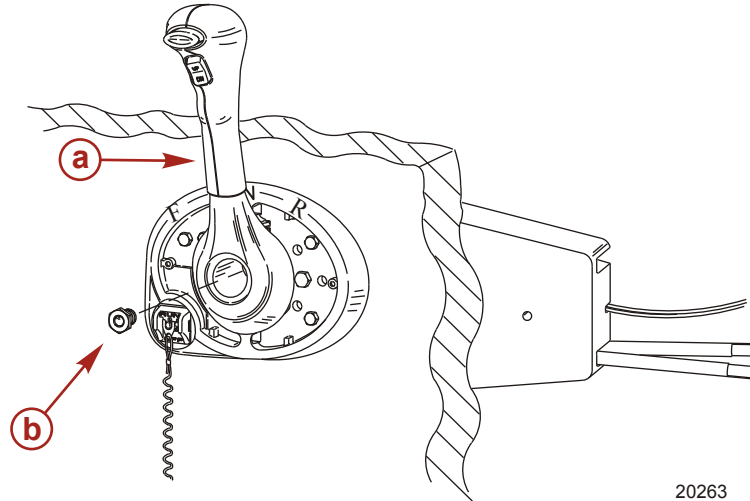
- a** - Bezel covers
b - Bezel screws (2)

2. Ensure the control handle is in the neutral position.
3. Push the throttle-only button in and advance the control handle forward.
4. Use a flat blade screwdriver to pry the throttle-only button out of the control handle.



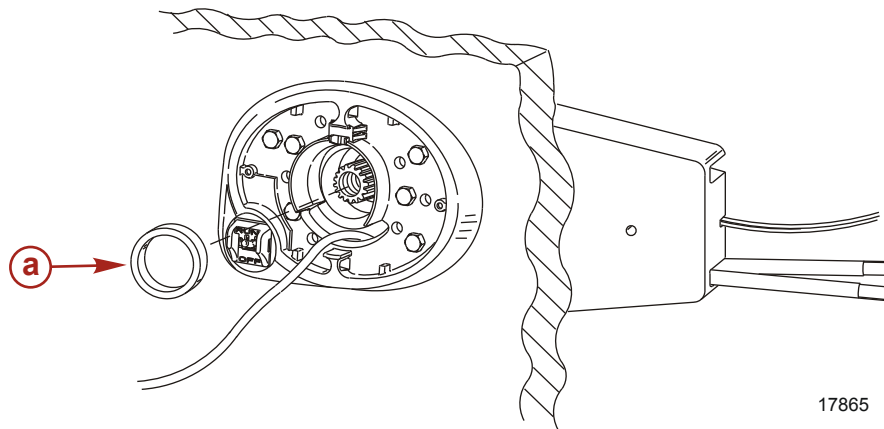
- a** - Control handle
b - Throttle-only button

5. Remove the control handle retaining nut. Remove the control handle from the control module splined shaft.



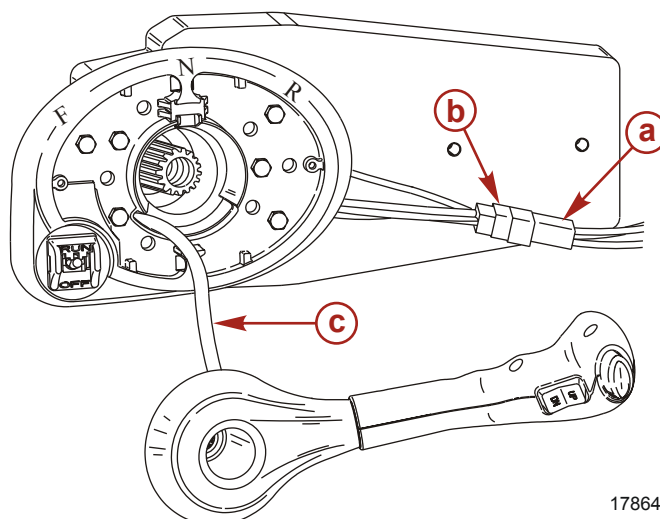
- a** - Control handle
- b** - Control handle retaining nut

6. Remove the control handle bushing.



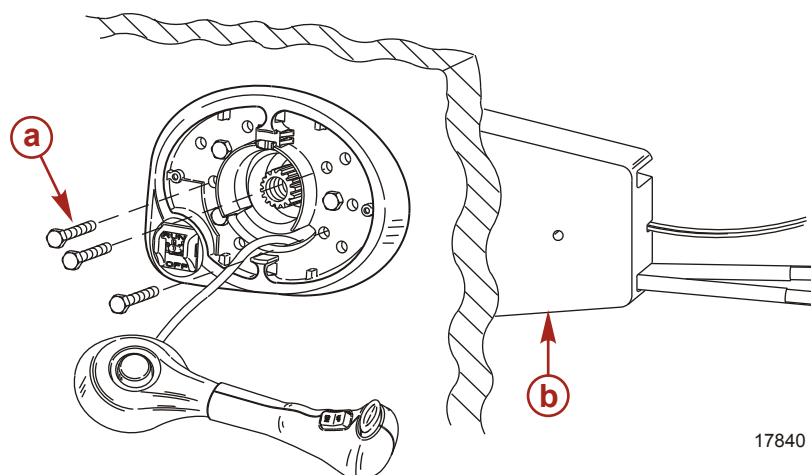
- a** - Control handle bushing

7. Disconnect the control handle trim switch wire connector from the trim lead connector.



- a** - Trim lead connector
b - Control handle trim switch wire connector
c - Control handle trim switch wire harness

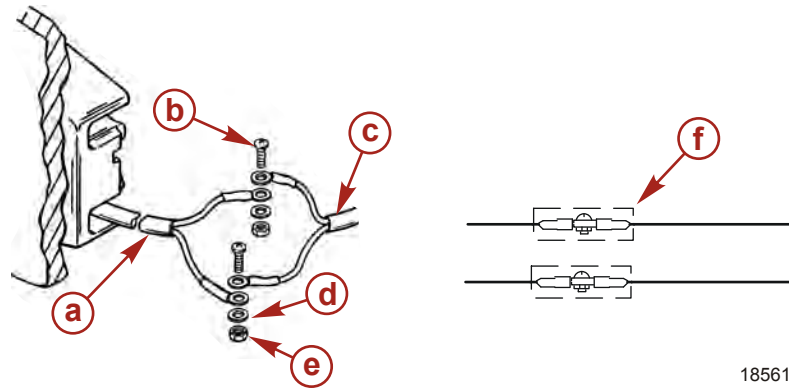
8. Remove the three screws securing the control module to the bezel.



- a** - Screws securing the control module to the bezel
b - Control module

9. Disconnect the neutral start safety switch wire harness from the boat wire harness.

NOTE: Some remote control models have bullet connectors instead of ring terminals.



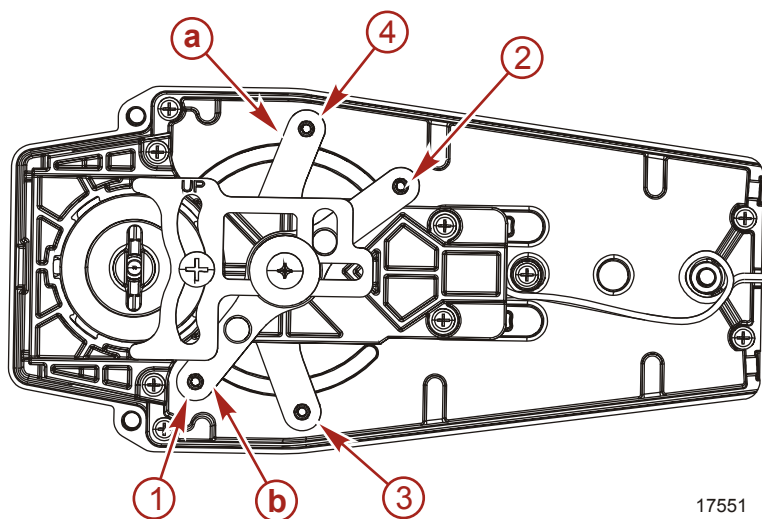
18561

- a** - Control module neutral start safety switch wire harness
- b** - Screw (2)
- c** - Boat wire harness neutral start safety switch wire harness
- d** - Washer
- e** - Nut
- f** - Rubber sleeve

Shift and Throttle Cable Installation

CONTROL CABLE ANCHOR ATTACHING LOCATION

Outboard Models (U.S. and Belgium Models Only)	Starboard Mount Control		Port Mount Control	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Force Outboards and L-Drive (except 9.9 and 15)	4	2	3	2
Mariner and Mercury Outboards (Standard Rotation Models) - All Models through 225 HP (With Pull Throttle) includes 1994-1/2 20/25	4	2	3	2
Mariner and Mercury Outboards - 18 HP, 20 HP, 25 HP (U.S. Origin) (With Push Throttle Cable)	4	1	3	1
Mariner and Mercury Outboards (Counter Rotation Gearcase) - All Models through 225 HP	3	2	4	2
Mariner and Mercury Outboards (Standard Rotation Gearcase) - 250 HP/275 HP	3	2	4	2
Mariner and Mercury Outboards (Counter Rotation Gearcase) - 250 HP/275 HP	4	2	3	2
Mercury Outboards (Standard Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2
Mercury Outboards (Counter Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2

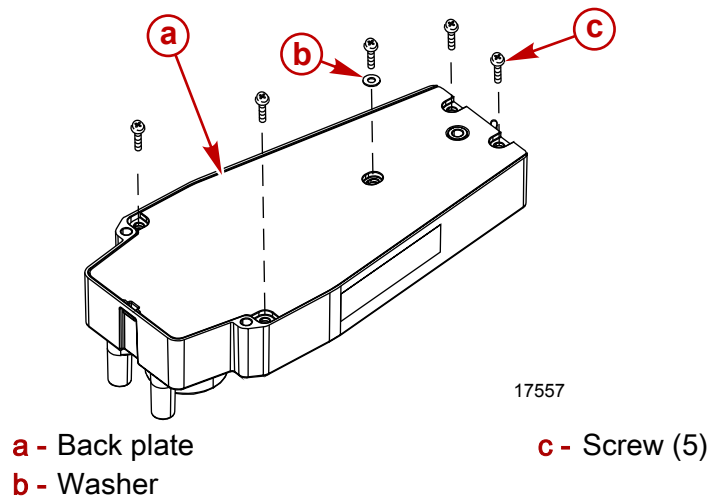


a - Shift arm

b - Throttle arm

NOTE: The base assembly gasket and the base assembly, must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.

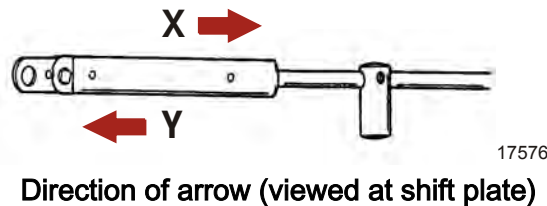
1. Remove the screws securing the back plate to the control module.



IMPORTANT: Determine the type of drive unit rotation the cable is installed onto. The shift cable must be correctly installed at the remote control assembly for the appropriate drive unit rotation; standard or counter rotation.

NOTE: For Bravo Three, Blackhawk Drive, and for Outboard models 3.0 Liter EFI GEN II, OptiMax GEN II units, refer to the instructions for standard rotation control cable installation.

2. **Mercury MerCruiser Models Standard Rotation** - The control cable must be installed in the remote control so the cable end will move in the direction of X when the shift handle is placed in the forward position.
3. **Mercury MerCruiser Models Counter Rotation** - The control cable must be installed in the remote control so the cable end will move in the direction of Y when the shift handle is placed in the forward position.



Mercury MerCruiser Models	Standard Rotation		Counter Rotation	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Starboard Mount Mechanical Control				
Direction of arrow	X	X	Y	X
Lever number	4	2	3	2

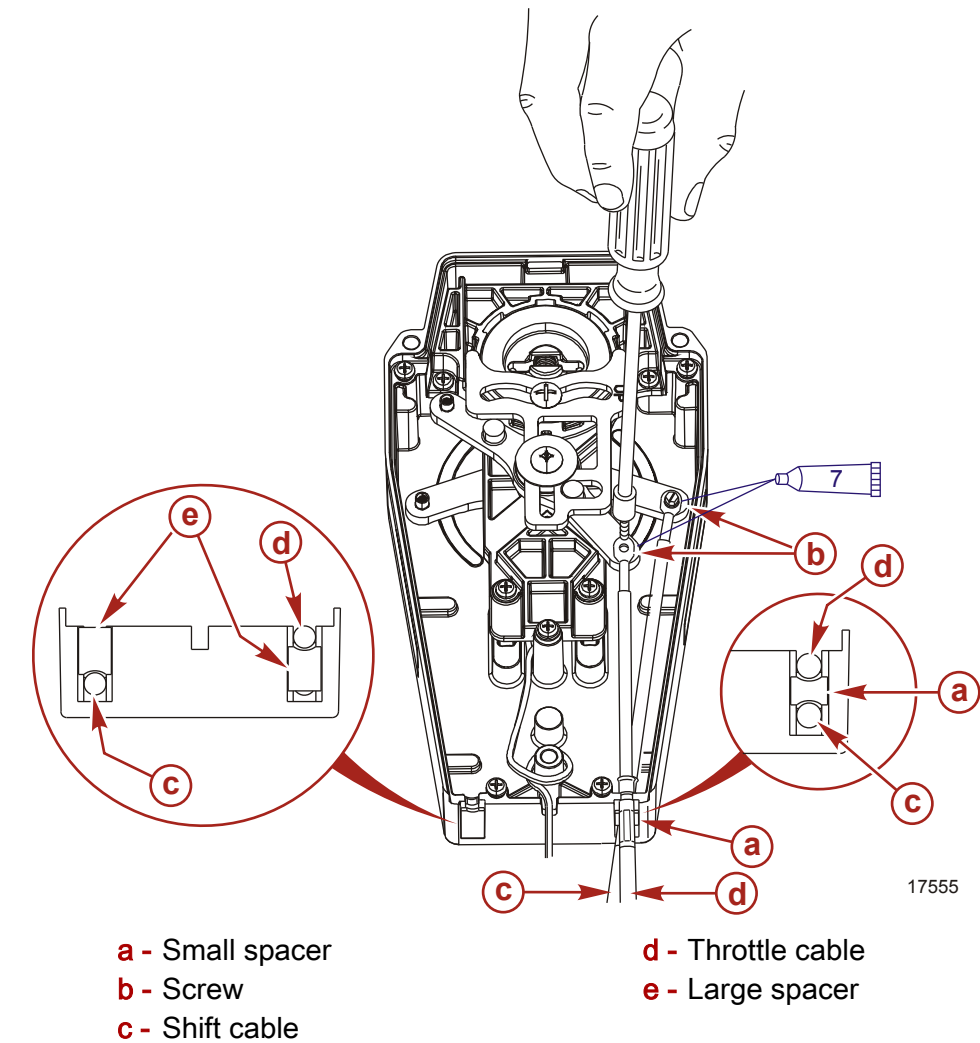
TYPICAL SHIFT AND THROTTLE CABLE INSTALLATION, OUTBOARD AND MERCURY MERCRISEUR

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. Control cable fastener screws must be properly torqued and retained with Loctite Threadlocker to prevent control cable fastener screws from loosening, thus allowing the cable ends to disconnect.

1. Apply Loctite 271 Threadlocker to the threads of the cable fastener screws.
2. Install the control cables in the appropriate arm in the remote control module.

3. Tighten the cable fastener screws to the specified torque.



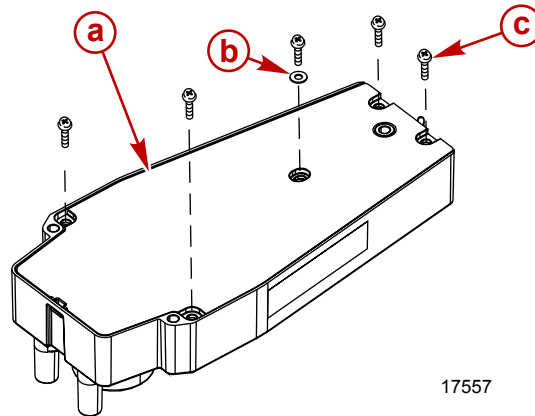
Tube Ref No.	Description	Where Used	Part No.
	Loctite 271 Threadlocker	Control cable fastener screws	92-809819

Description	Nm	lb. in.	lb. ft.
Control cable fastener screws	2.8	25	

4. After installing the control cables, secure the back plate with five washers and screws. Tighten the screws to the specified torque.

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The back plate must be fastened to the control with five (5) screws to prevent the back cover from loosening, thus resulting in the control cables slipping out of the mounting slots at the rear of the control.



17557

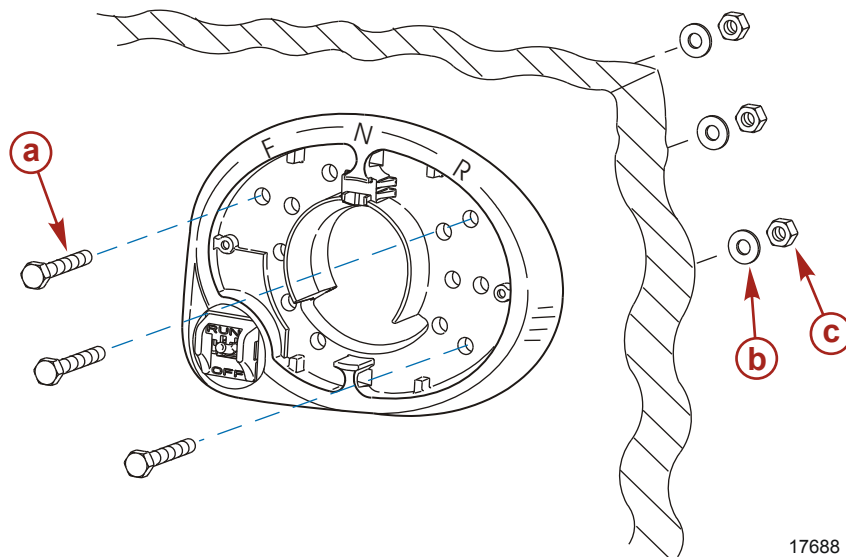
a - Back plate
b - Washer

c - Screw (5)

Description	Nm	lb. in.	lb. ft.
Back plate screws (5)	1.1	10	

Commander 4000 Gen II Pistol Grip Panel Mount Remote Control Installation

1. Install the bezel to the panel. Secure the bezel with three screws, nuts, and washers. Tighten the screws and nuts to the specified torque.



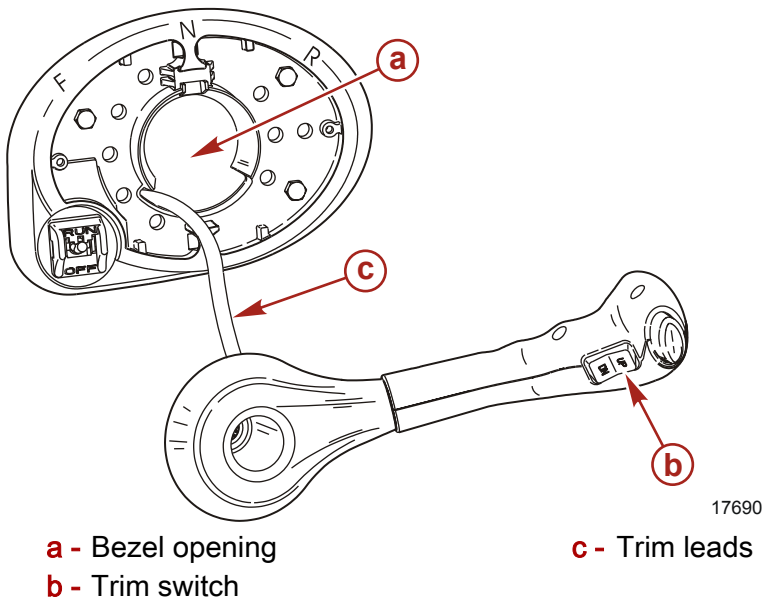
17688

a - Screw (3)
b - Washer (3)
c - Nut (3)

Description	Nm	lb. in.	lb. ft.
Bezel mounting screw (3)	5.6	50	

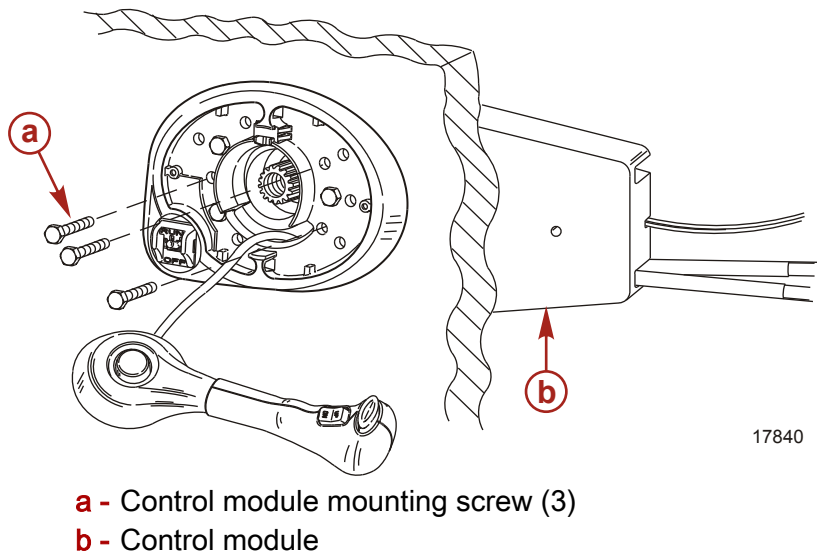
2. Route the trim switch leads from the handle assembly through the bezel opening.

3. Allow sufficient slack in leads to permit free movement of trim leads through the full range of shift handle motion.



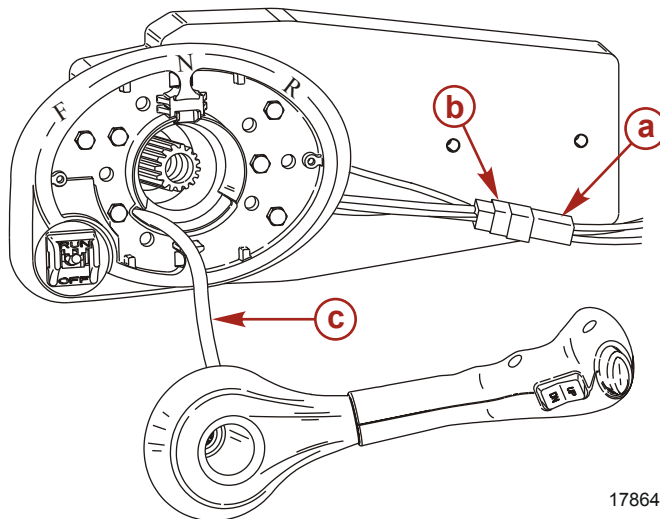
4. Install the shift and throttle cables. Refer to the **Shift and Throttle Cable Installation** instructions before preceeding with the installation of the remote control module.
5. Adjust the control handle friction to the desired resistance.
- NOTE:** The control handle friction adjustment must be made prior to the installation and securing of the control module to the bezel.
6. Install the control module to the bezel. Secure the control module to the bezel with three screws. Tighten the screws to specified torque.

IMPORTANT: Ensure the trim/trailer wires are not pinched when mounting the remote control module to the panel of the boat. The trim wires must be free to move with the remote control handle.



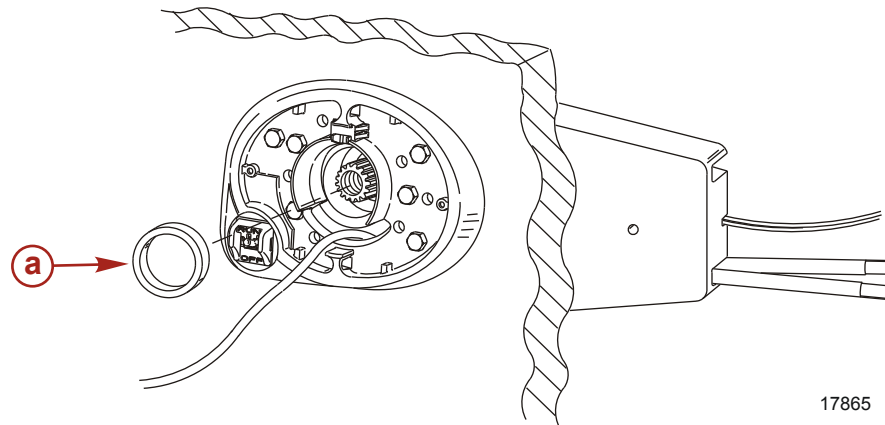
Description	Nm	lb. in.	lb. ft.
Control module mounting screw (3)	5.6	50	

7. Connect the trim switch harness connector to the trim lead connector.



- a** - Trim lead connector
b - Trim switch harness connector
c - Trim switch wires

8. Install the control handle bushing into the control module. Lubricate the inside of the control handle bushing with 2-4-C with Teflon.

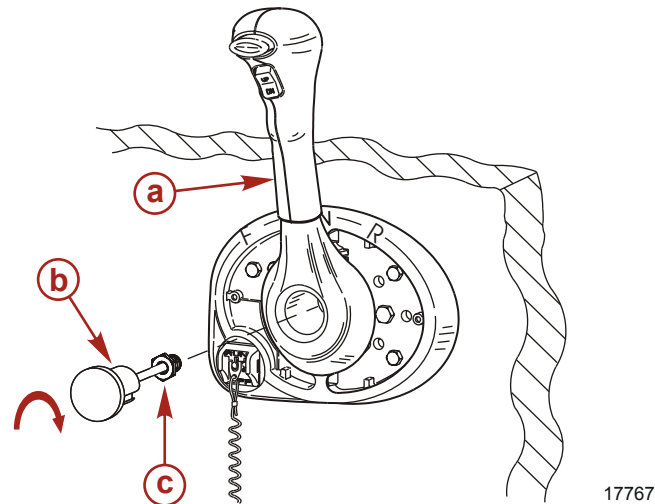


- a** - Bushing

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle bushing	92-802859A1

9. Install the control handle onto the control module splined shaft. Ensure the control is in the neutral and the control handle is in the desired handle position.
10. Apply Loctite 271 Threadlocker to the threads of the control handle retaining bolt.
11. Secure the control handle to the control module with the control handle retaining bolt. Tighten the control handle retaining bolt to the specified torque.

NOTE: As an aid for installing the control handle retaining bolt, use the throttle-only button as a tool to align the threads of the control handle retaining bolt to the control module splined shaft. Once the control handle retaining bolt threads are started, remove the throttle-only button and tighten the control handle retaining bolt to the specified torque.

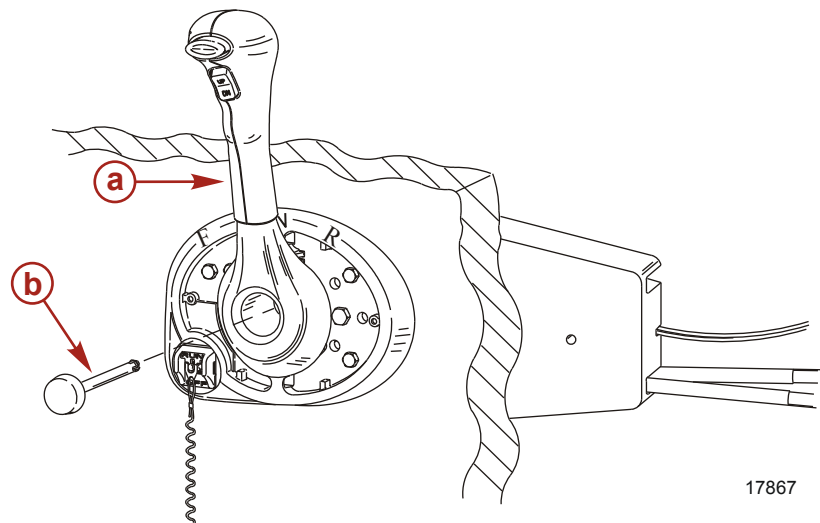


- a - Handle assembly
- b - Throttle-only button
- c - Control handle retaining bolt

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle retaining bolt	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle retaining bolt	17	150	

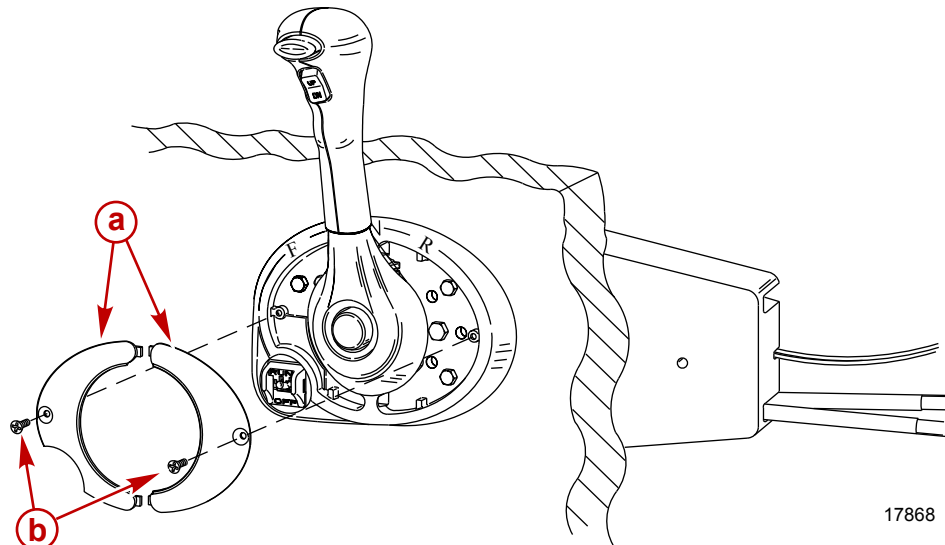
12. Install the throttle-only button.



- a - Handle assembly
- b - Throttle-only button

IMPORTANT: Ensure the trim harness is loose behind the panel. Do not use cable ties near the control module. The harness must have free movement when rotating the control handle.

13. Install the bezel covers onto the bezel. Secure the bezels with two screws. Tighten the screws securely. Do not overtighten the bezel screw. Overtightening the bezel screws will damage the bezel.



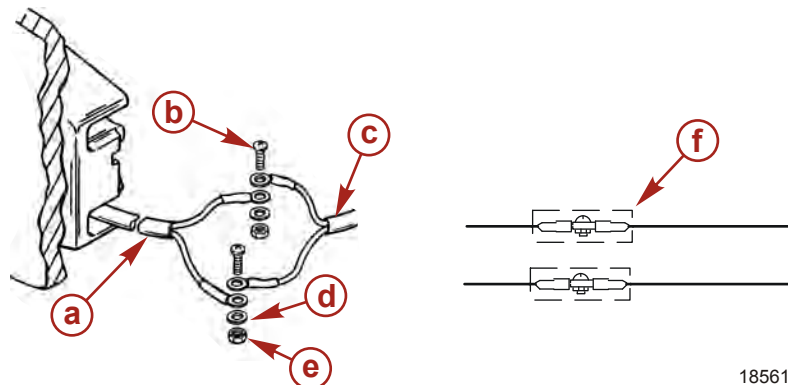
- a - Bezel covers
- b - Bezel cover screws

14. Connect the remote control module assembly neutral start safety switch leads to the wire harness.
15. Apply Liquid Neoprene to the ring terminal connections to prevent corrosion. Allow the Liquid Neoprene to dry. Protect the connection with a rubber sleeve or shrink tubing.

NOTE: Some remote control models have bullet connectors instead of ring terminals.

⚠ WARNING

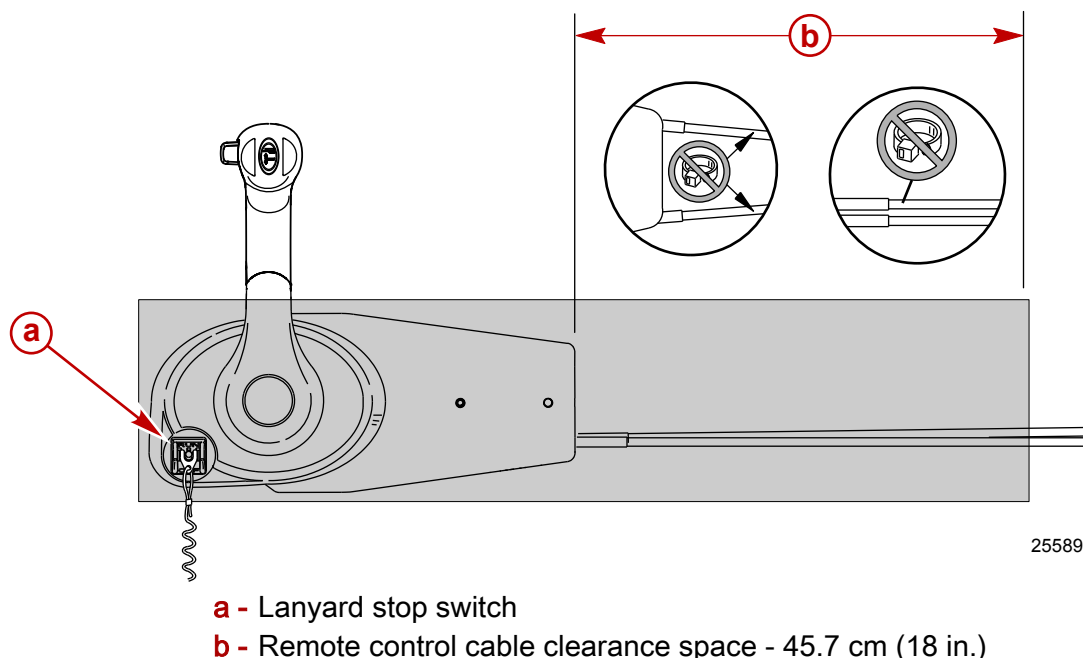
Avoid serious injury or death from a sudden unexpected acceleration when starting the engine. The neutral start safety switch must be correctly connected to prevent engine startup when in gear. Refer to wiring diagrams for correct wiring connections.



- a - Control module neutral start safety switch wire harness
- b - Screw (2)
- c - Boat wire harness neutral start safety switch wire harness
- d - Washer
- e - Nut
- f - Rubber sleeve

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch wire connection	92-25711-3

IMPORTANT: The control cables must be able to move independently of each other. Do not use anchors, clamps, cable ties, or secure any harnesses or other items within 45.7 cm (18 in.) of the control cables exiting the remote control module assembly.

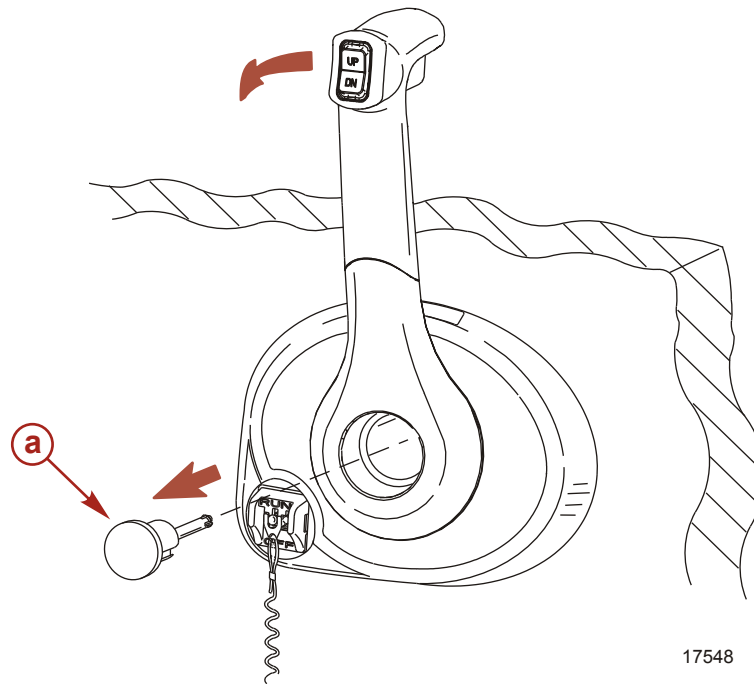


Commander 4000 Gen II Lock Bar Panel Mount Remote Control Removal and Installation

Commander 4000 Gen II Lock Bar Panel Mount Remote Control Removal

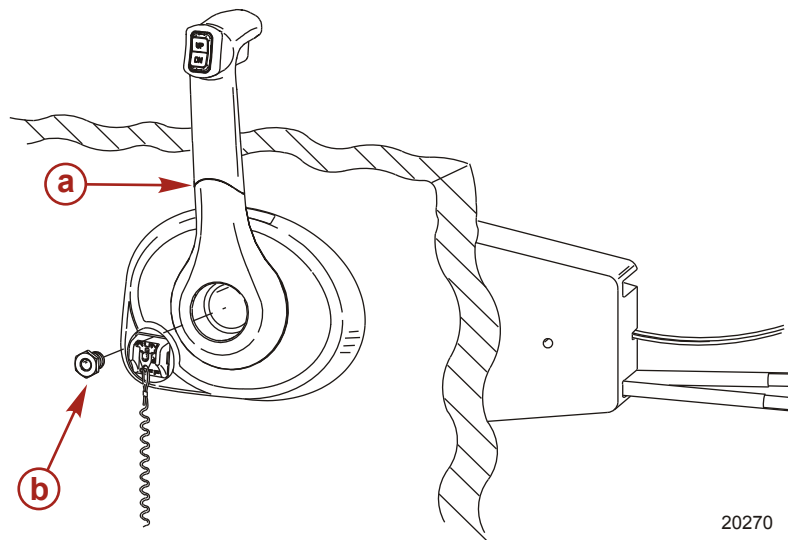
1. Ensure the control handle is in the neutral position.
2. Push the throttle-only button in and advance the control handle forward.

3. Use a flat blade screwdriver to pry the throttle-only button out of the control handle.



a - Throttle-only button

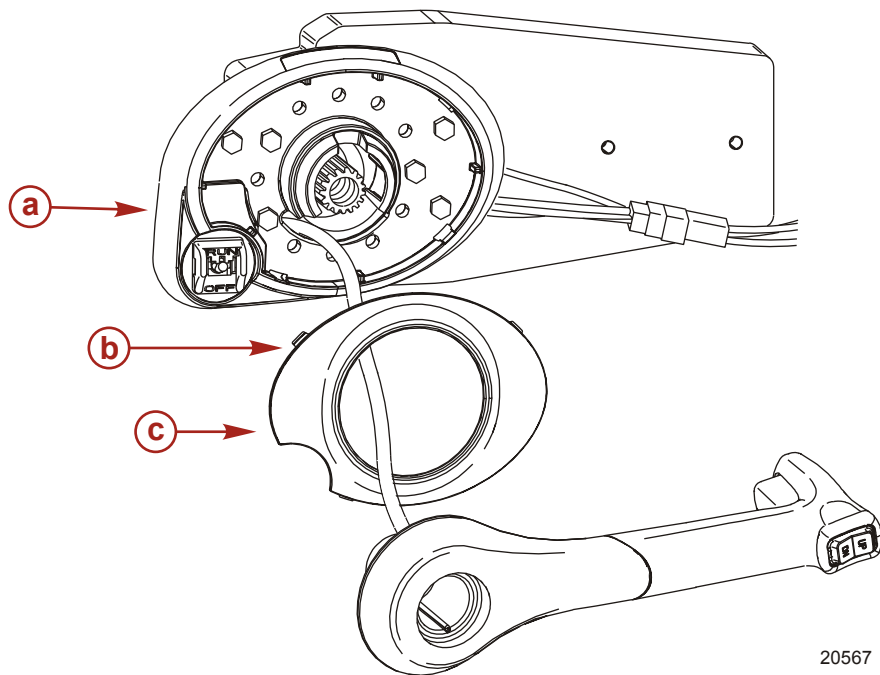
4. Remove the control handle retaining nut. Remove the control handle from the control module splined shaft.



a - Control handle

b - Control handle retaining nut

5. With a flat blade screwdriver, pry the bezel cover off the bezel.

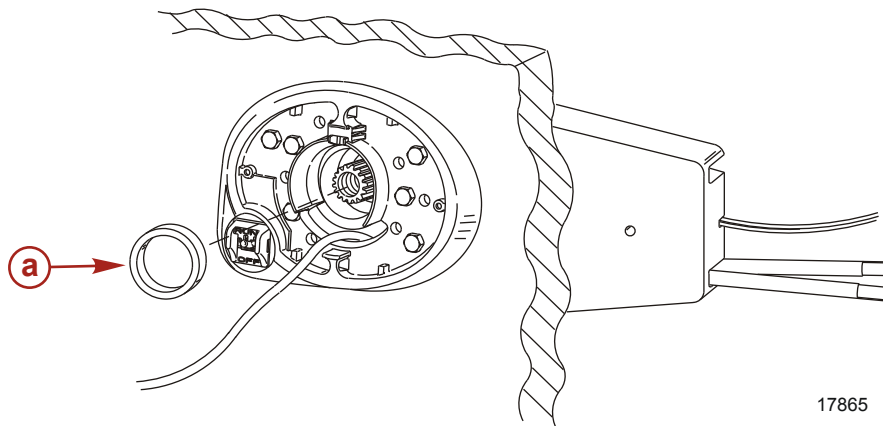


a - Bezel

b - Bezel cover tab (4)

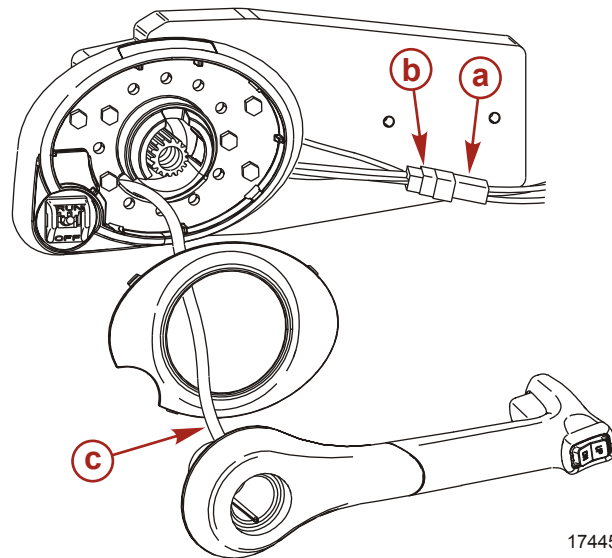
c - Bezel cover

6. Remove the control handle bushing.



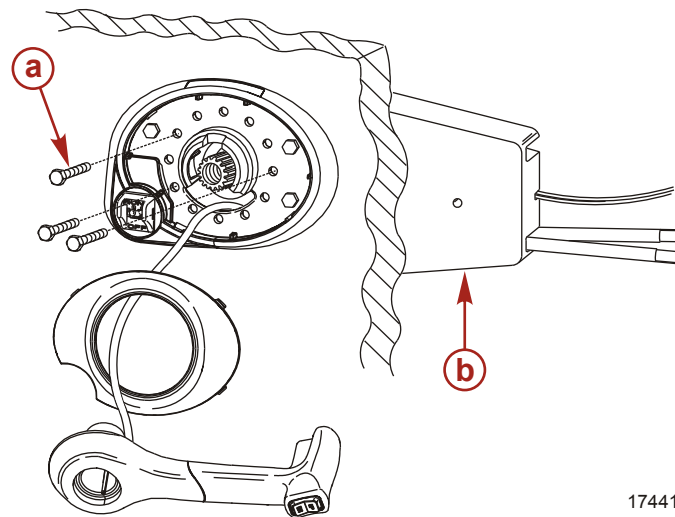
a - Control handle bushing

7. Disconnect the control handle trim switch wire connector from the trim lead connector.



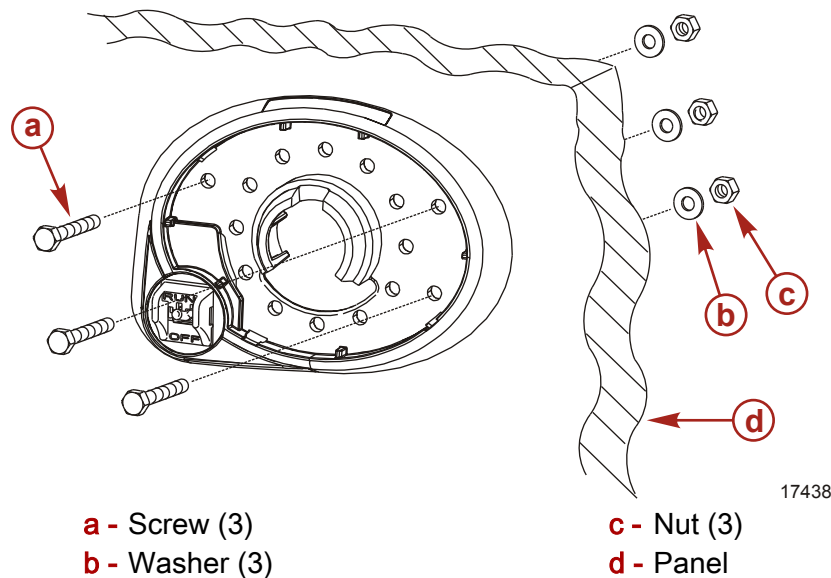
- a** - Trim lead connector
- b** - Control handle trim switch wire connector
- c** - Control handle trim switch wire harness

8. Remove the three screws securing the control module to the bezel.



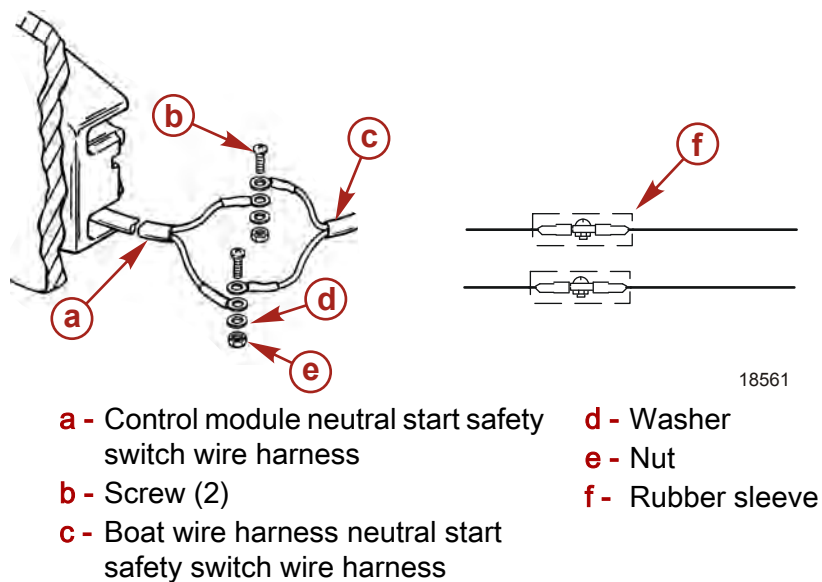
- a** - Screws securing the control module to the bezel
- b** - Control module

9. Remove the three bolts, nuts and washers securing the bezel to the panel.



10. Disconnect the neutral start safety switch wire harness from the boat wire harness.

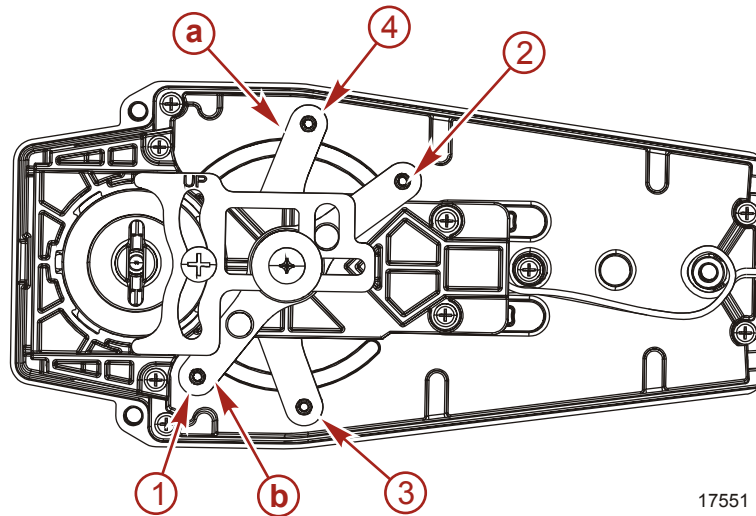
NOTE: Some remote control models have bullet connectors instead of ring terminals.



Shift and Throttle Cable Installation

CONTROL CABLE ANCHOR ATTACHING LOCATION

Outboard Models (U.S. and Belgium Models Only)	Starboard Mount Control		Port Mount Control	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Force Outboards and L-Drive (except 9.9 and 15)	4	2	3	2
Mariner and Mercury Outboards (Standard Rotation Models) - All Models through 225 HP (With Pull Throttle) includes 1994-1/2 20/25	4	2	3	2
Mariner and Mercury Outboards - 18 HP, 20 HP, 25 HP (U.S. Origin) (With Push Throttle Cable)	4	1	3	1
Mariner and Mercury Outboards (Counter Rotation Gearcase) - All Models through 225 HP	3	2	4	2
Mariner and Mercury Outboards (Standard Rotation Gearcase) - 250 HP/275 HP	3	2	4	2
Mariner and Mercury Outboards (Counter Rotation Gearcase) - 250 HP/275 HP	4	2	3	2
Mercury Outboards (Standard Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2
Mercury Outboards (Counter Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2

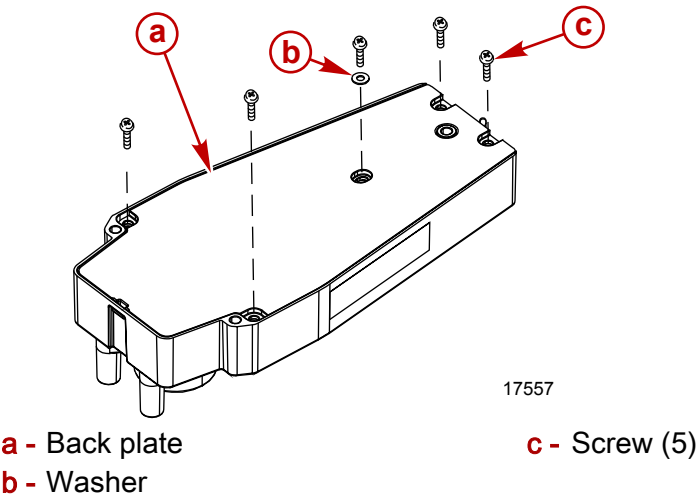


a - Shift arm

b - Throttle arm

NOTE: The base assembly gasket and the base assembly, must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.

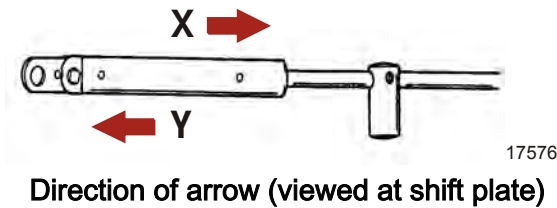
- 1. Remove the screws securing the back plate to the control module.



IMPORTANT: Determine the type of drive unit rotation the cable is installed onto. The shift cable must be correctly installed at the remote control assembly for the appropriate drive unit rotation; standard or counter rotation.

NOTE: For Bravo Three, Blackhawk Drive, and for Outboard models 3.0 Liter EFI GEN II, OptiMax GEN II units, refer to the instructions for standard rotation control cable installation.

- 2. **Mercury MerCruiser Models Standard Rotation** - The control cable must be installed in the remote control so the cable end will move in the direction of X when the shift handle is placed in the forward position.
- 3. **Mercury MerCruiser Models Counter Rotation** - The control cable must be installed in the remote control so the cable end will move in the direction of Y when the shift handle is placed in the forward position.



Mercury MerCruiser Models	Standard Rotation		Counter Rotation	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Starboard Mount Mechanical Control				
Direction of arrow	X	X	Y	X
Lever number	4	2	3	2

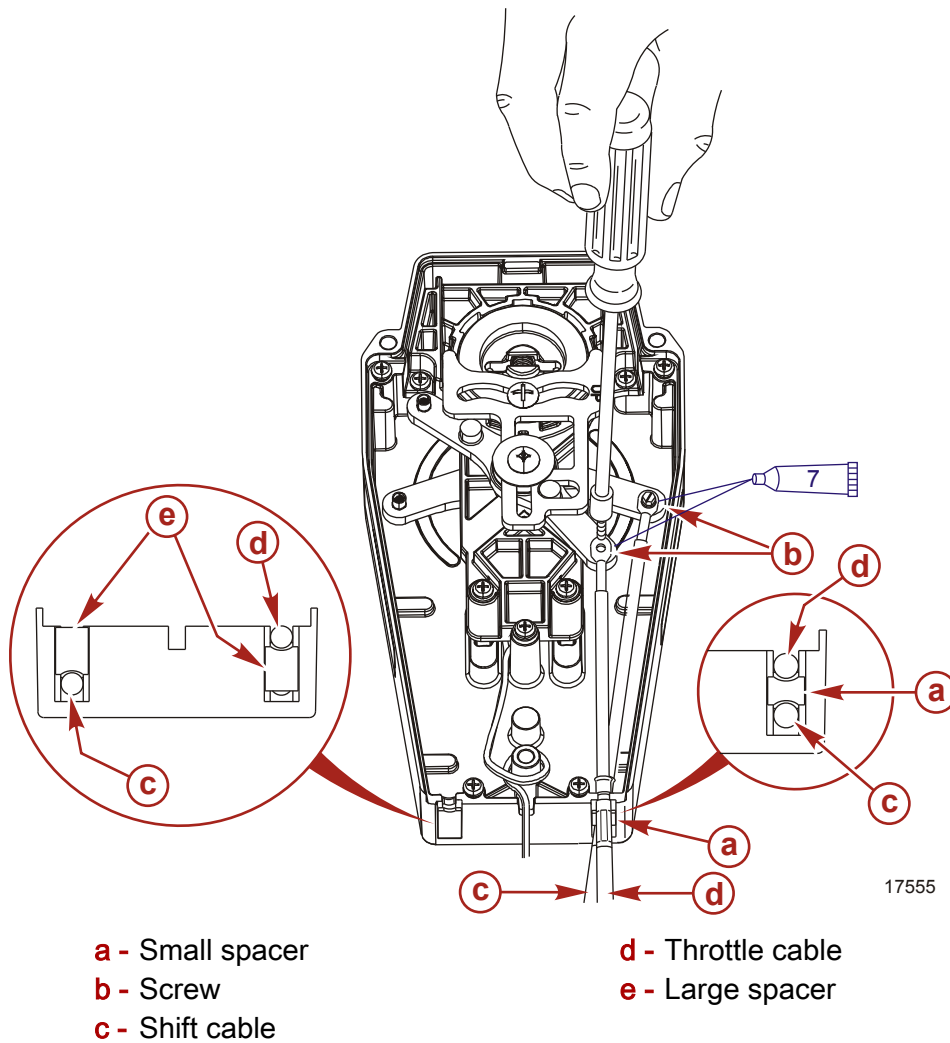
TYPICAL SHIFT AND THROTTLE CABLE INSTALLATION, OUTBOARD AND MERCURY MERCUISER

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. Control cable fastener screws must be properly torqued and retained with Loctite Threadlocker to prevent control cable fastener screws from loosening, thus allowing the cable ends to disconnect.

- 1. Apply Loctite 271 Threadlocker to the threads of the cable fastener screws.
- 2. Install the control cables in the appropriate arm in the remote control module.

3. Tighten the cable fastener screws to the specified torque.



Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control cable fastener screws	92-809819

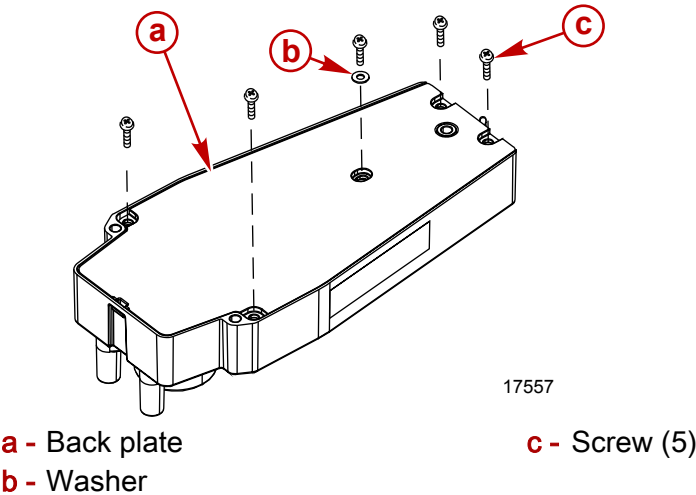
Description	Nm	lb. in.	lb. ft.
Control cable fastener screws	2.8	25	

4. After installing the control cables, secure the back plate with five washers and screws. Tighten the screws to the specified torque.



WARNING

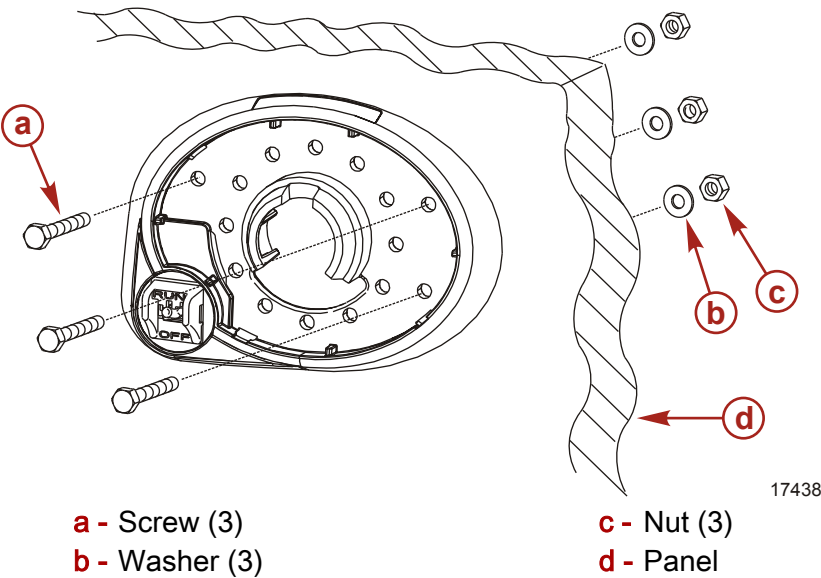
Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The back plate must be fastened to the control with five (5) screws to prevent the back cover from loosening, thus resulting in the control cables slipping out of the mounting slots at the rear of the control.



Description	Nm	lb. in.	lb. ft.
Back plate screws (5)	1.1	10	

Commander 4000 Gen II Lock Bar Panel Mount Remote Control Installation

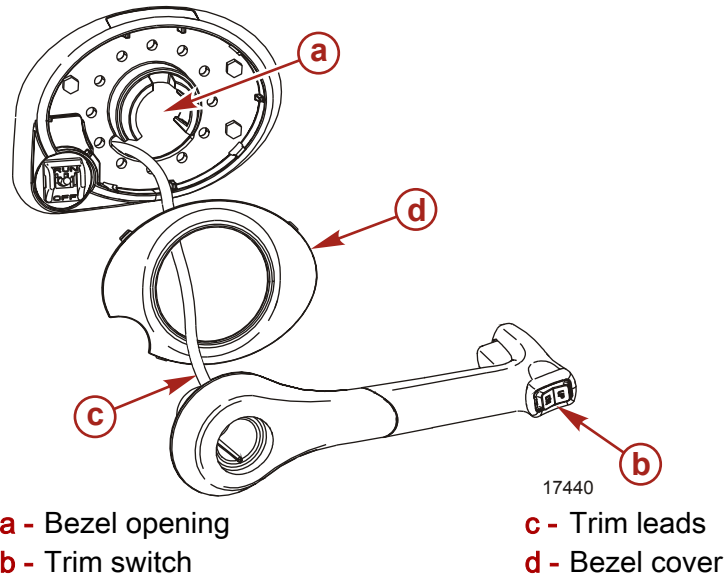
1. Install the bezel to the panel. Secure the bezel with three screws, nuts, and washers. Tighten the screws and nuts to the specified torque.



Description	Nm	lb. in.	lb. ft.
Bezel mounting screw (3)	5.6	50	

2. Route the trim switch leads from the handle assembly through the bezel and the bezel opening.

3. Allow sufficient slack in leads to permit free movement of trim leads through the full range of shift handle motion.



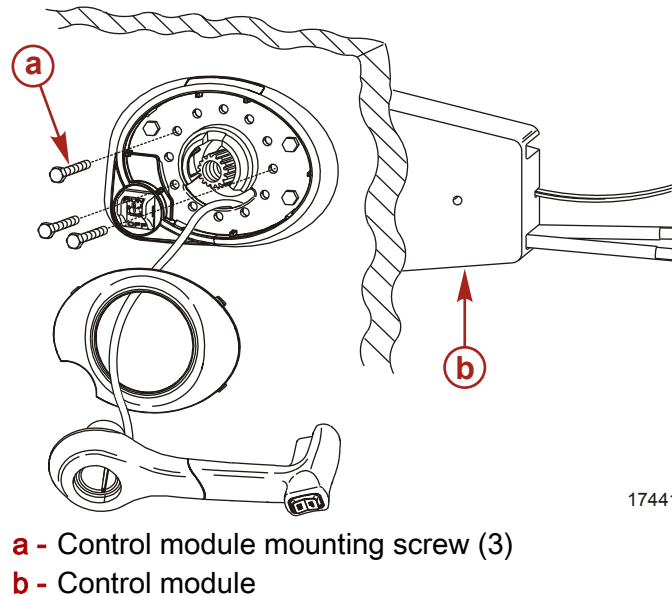
4. Install the shift and throttle cables to the control module. Refer to the **Shift and Throttle Cable Installation** instructions before preceeding with the installation of the remote control module.

5. Adjust the control handle friction to the desired resistance.

NOTE: The control handle friction adjustment must be made prior to the installation and securing of the control module to the bezel.

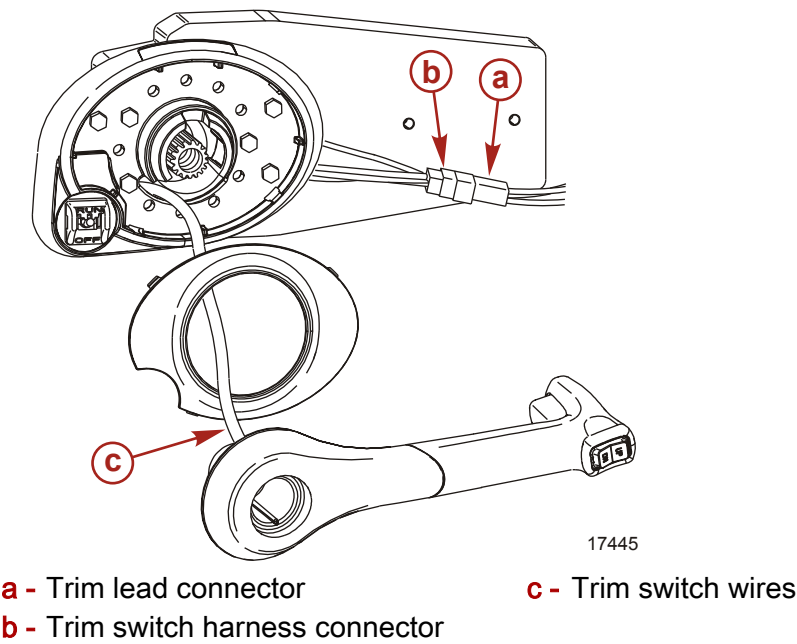
6. Install the control module to the bezel. Secure the control module to the bezel with three screws. Tighten the screws to specified torque.

IMPORTANT: Ensure the trim/trailer wires are not pinched when mounting the remote control module to the panel of the boat. The trim wires must be free to move with the remote control handle.

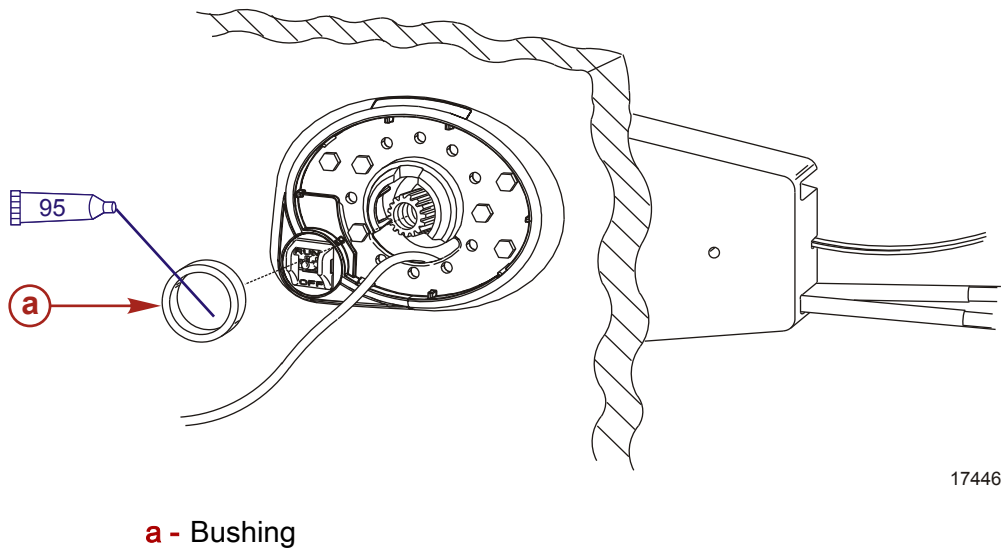


Description	Nm	lb. in.	lb. ft.
Control module mounting screw (3)	5.6	50	

7. Connect the trim switch harness connector to the trim lead connector.

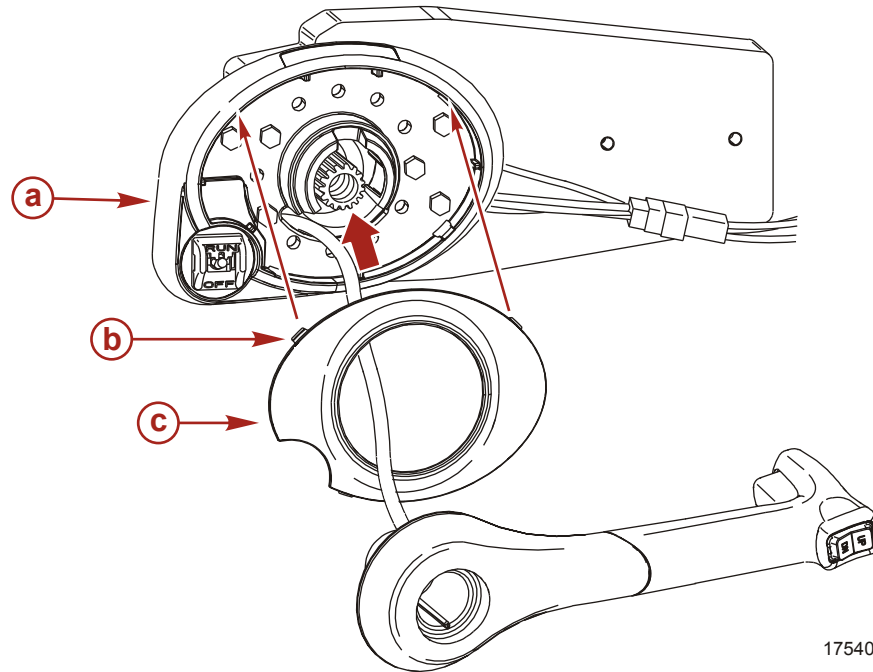


8. Install the control handle bushing into the control module. Lubricate the inside of the control handle bushing with 2-4-C with Teflon.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle bushing	92-802859A1

9. Align the tab on the bezel cover with the slots on the bezel. Snap the bezel cover into the bezel.



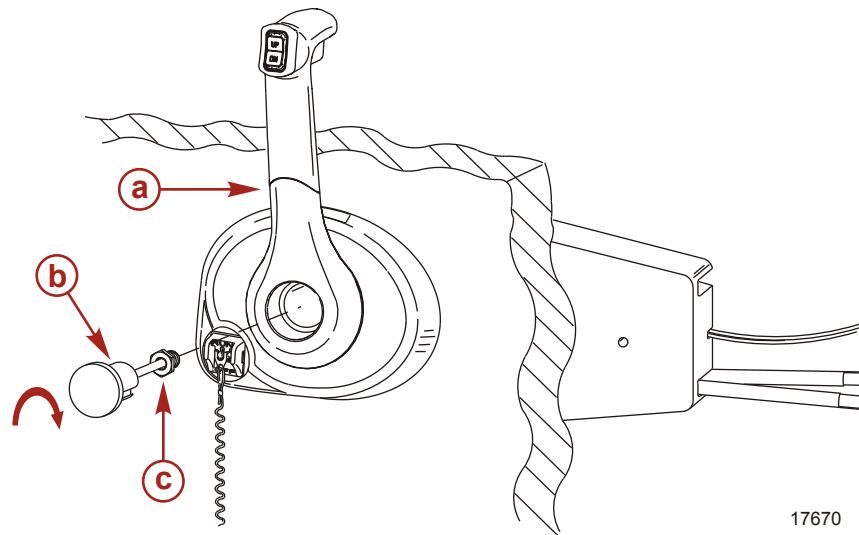
a - Bezel

b - Bezel cover tabs (4)

c - Bezel cover

10. Install the control handle onto the control module splined shaft. Ensure the control is in neutral and the control handle is in the desired handle position.
11. Apply Loctite 271 Threadlocker to the threads of the control handle retaining bolt.
12. Secure the control handle to the control module with the control handle retaining bolt. Tighten the control handle retaining bolt to the specified torque.

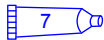
NOTE: As an aid for installing the control handle retaining bolt, use the throttle-only button as a tool to align the threads of the control handle retaining bolt to the control module splined shaft. Once the control handle retaining bolt threads are started, remove the throttle-only button and tighten the control handle retaining bolt to the specified torque.



a - Handle assembly

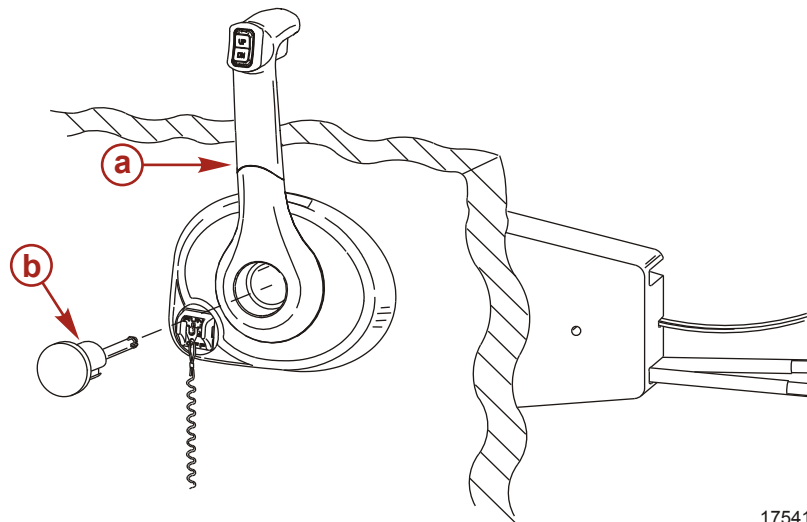
b - Throttle-only button

c - Control handle retaining bolt

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle retaining bolt	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle retaining bolt	17	150	

13. Install the throttle-only button.



a - Handle assembly

b - Throttle-only button

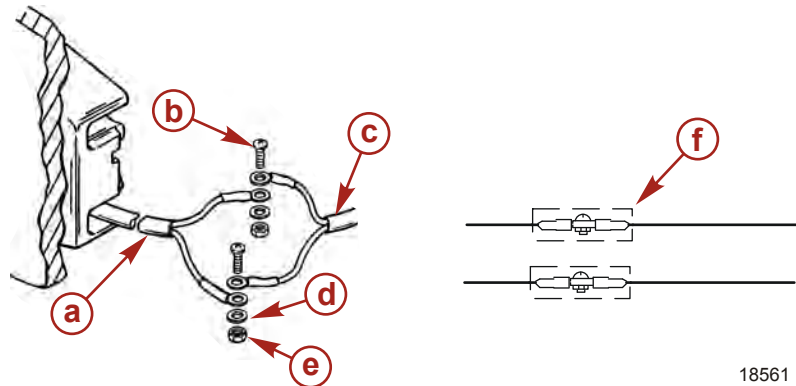
IMPORTANT: Ensure the trim harness is loose behind the panel. Do not use cable ties near the control module. The harness must have free movement when rotating the control handle.

14. Connect the remote control module assembly neutral start safety switch leads to the wire harness. Apply Liquid Neoprene to the ring terminal style connections to prevent corrosion. Allow the Liquid Neoprene to dry. Protect the connection with a rubber sleeve or shrink tubing.

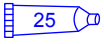
NOTE: Some remote control models have bullet connectors instead of ring terminals.

⚠ WARNING

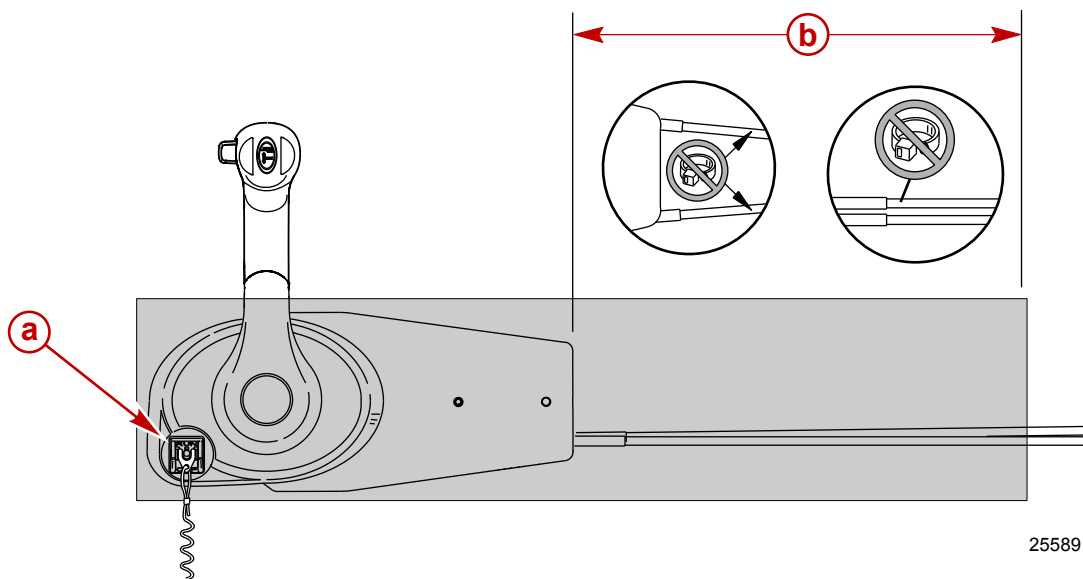
Avoid serious injury or death from a sudden unexpected acceleration when starting the engine. The neutral start safety switch must be correctly connected to prevent engine startup when in gear. Refer to wiring diagrams for correct wiring connections.



- a** - Control module neutral start safety switch wire harness
b - Screw (2)
c - Boat wire harness neutral start safety switch wire harness
d - Washer
e - Nut
f - Rubber sleeve

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch wire connection	92-25711-3

IMPORTANT: The control cables must be able to move independently of each other. Do not use anchors, clamps, cable ties, or secure any harnesses or other items within 45.7 cm (18 in.) of the control cables exiting the remote control module assembly.

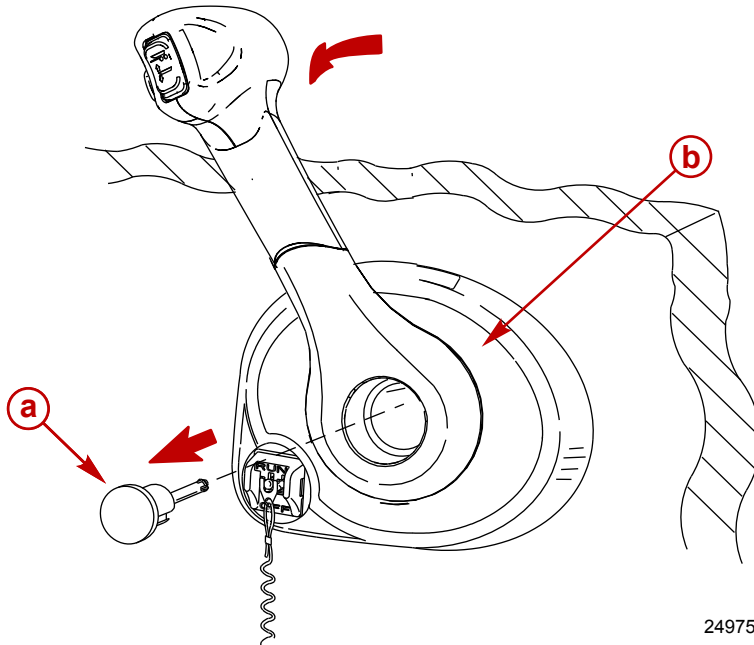


- a** - Lanyard stop switch
b - Remote control cable clearance space - 45.7 cm (18 in.)

Pistol Grip with Finger Tip Neutral Lock Release Remote Control Removal and Installation

Pistol Grip Remote Control with Finger Tip Lock Release Removal

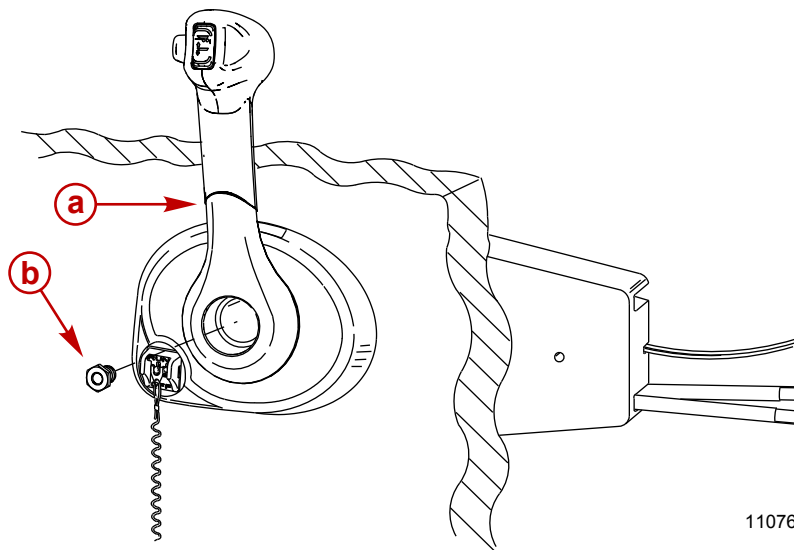
1. Place the control handle in the neutral position.
2. Push the throttle-only button in until it stops.
3. Hold the throttle-only button in and rotate the remote control handle to the forward position.
4. Use a flat blade screwdriver to gently pry the throttle-only button out of the control handle.



a - Throttle-only button

b - Bezel

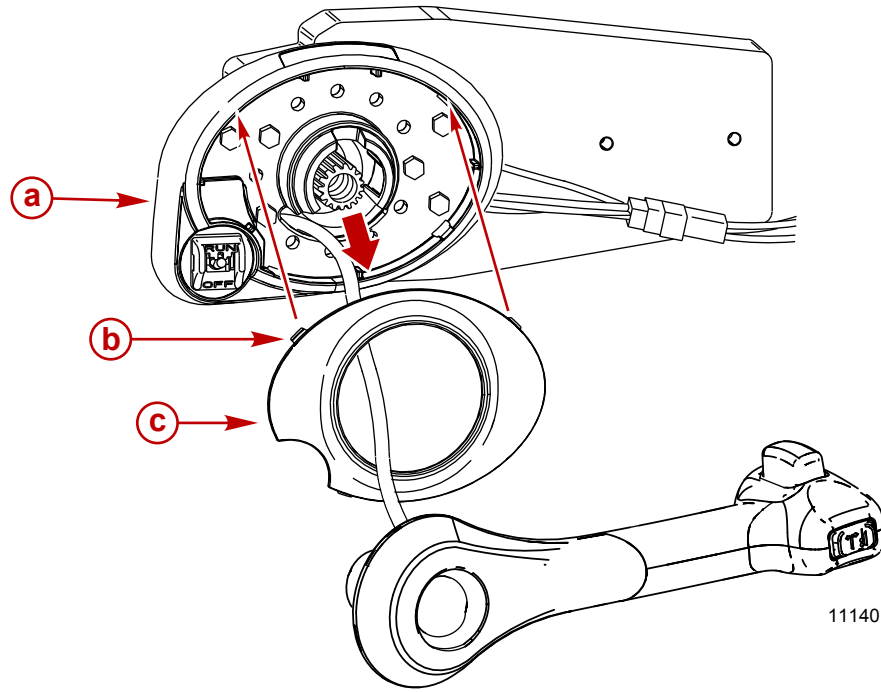
5. Remove the control handle retaining bolt. Remove the control handle from the control module splined shaft.



a - Handle assembly

b - Control handle retaining bolt

6. Use a small flat blade screwdriver to dislodge the tabs on the bezel cover with the slots on the bezel. Remove the bezel.

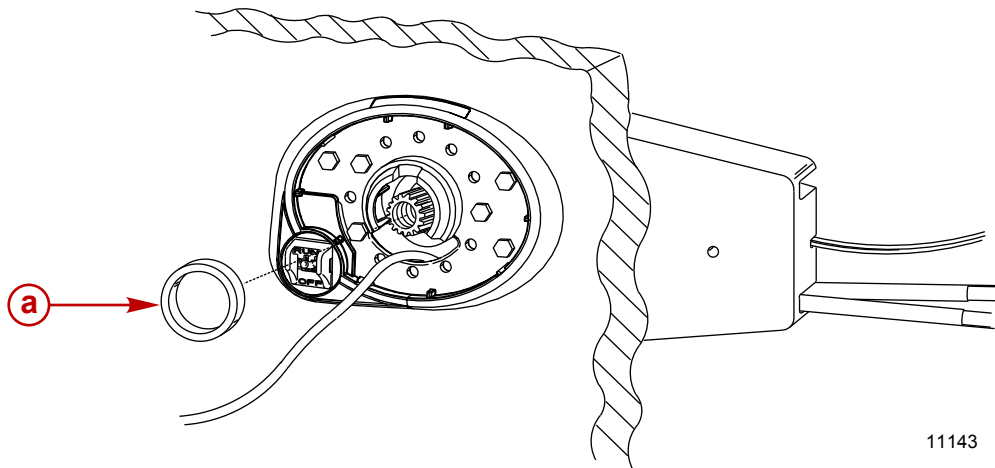


a - Bezel

b - Tabs (4)

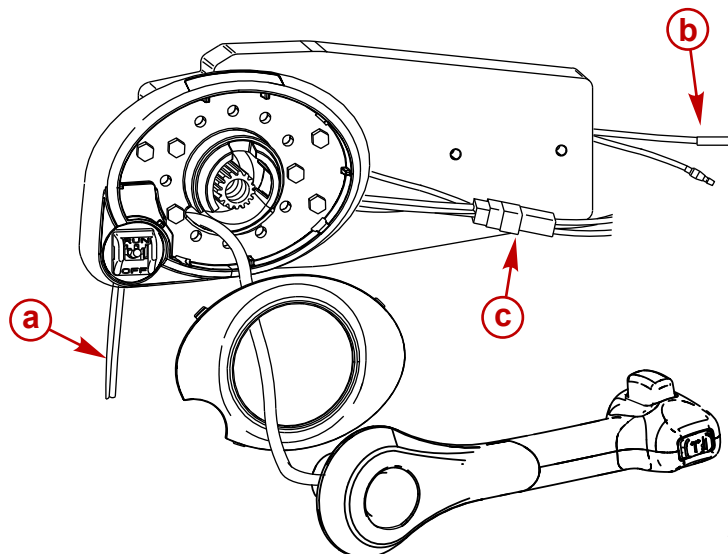
c - Bezel cover

7. Remove the bushing from the inside diameter of the module assembly.



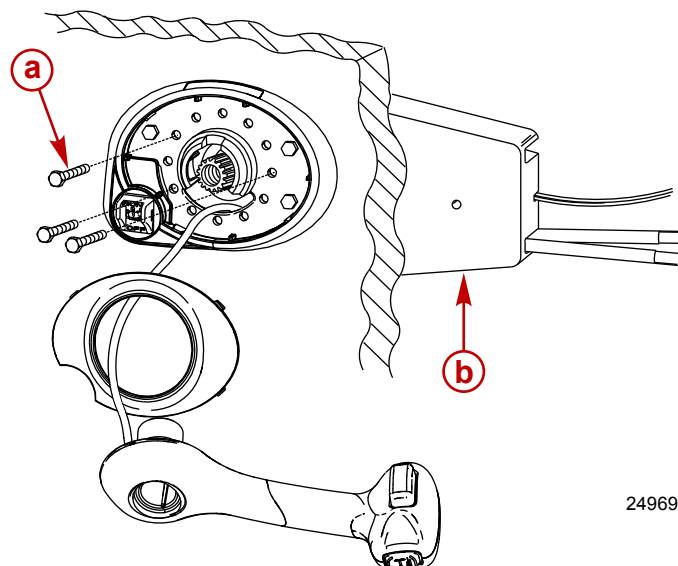
a - Bushing

8. Disconnect the neutral start safety switch leads, the lanyard stop switch (if equipped), and the trim switch leads.



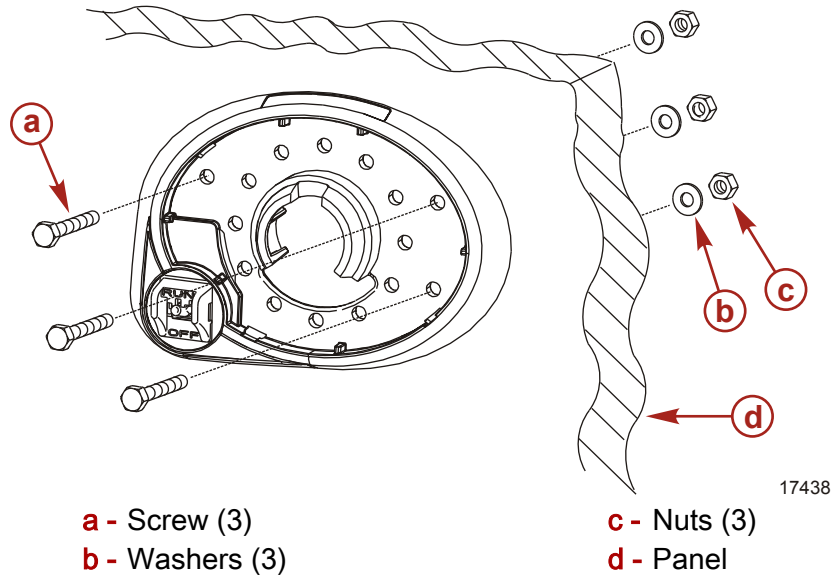
- a** - Lanyard stop switch leads **c** - Trim switch connection
b - Neutral start safety switch leads

9. Remove the three screws securing the remote control module to the bezel. Remove the remote control module from the bezel.
10. Remove the control handle and bezel.

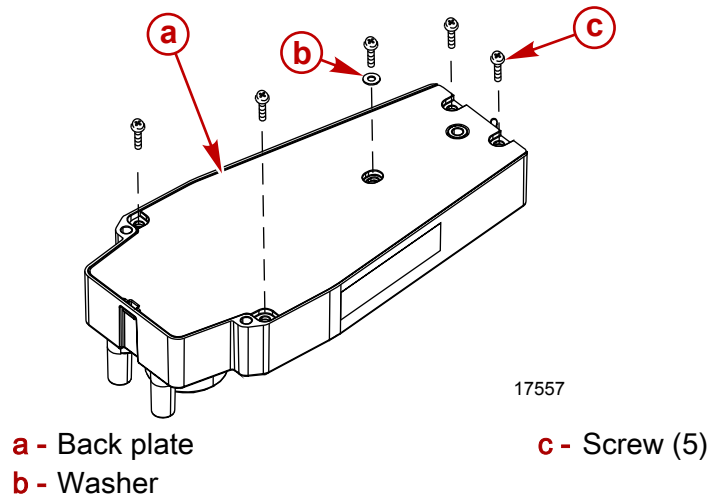


- a** - Control module mounting screw (3)
b - Control module

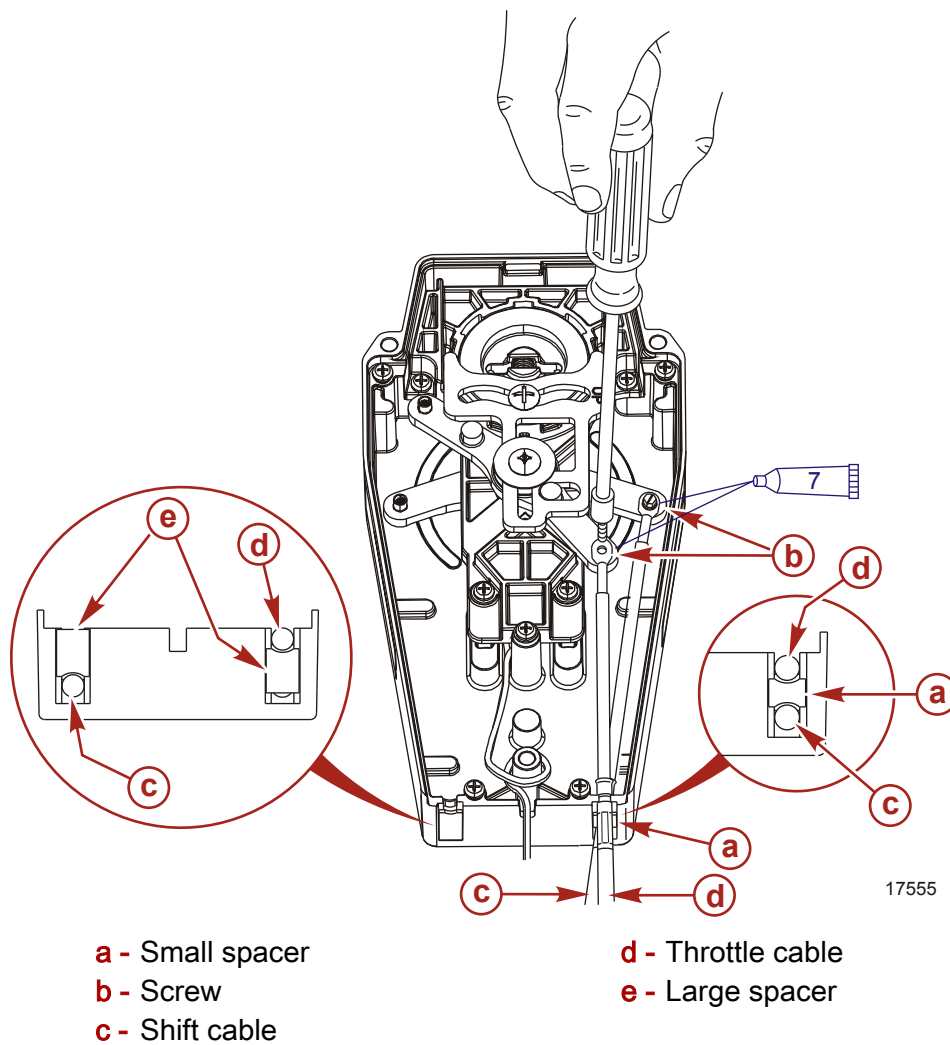
11. Remove the three screws, nuts and, washer securing the bezel to panel.



12. Remove the five screws and washers securing the back plate to the module.



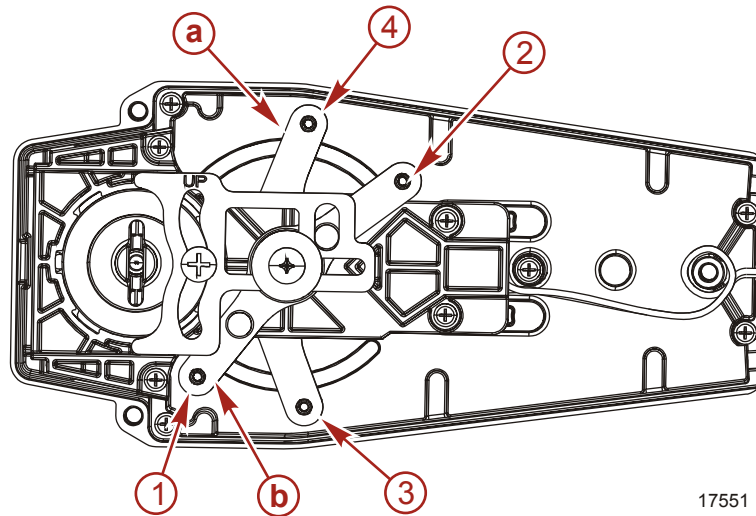
13. Remove the screws securing the cable to the control module.



Shift and Throttle Cable Installation

CONTROL CABLE ANCHOR ATTACHING LOCATION

Outboard Models (U.S. and Belgium Models Only)	Starboard Mount Control		Port Mount Control	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Force Outboards and L-Drive (except 9.9 and 15)	4	2	3	2
Mariner and Mercury Outboards (Standard Rotation Models) - All Models through 225 HP (With Pull Throttle) includes 1994-1/2 20/25	4	2	3	2
Mariner and Mercury Outboards - 18 HP, 20 HP, 25 HP (U.S. Origin) (With Push Throttle Cable)	4	1	3	1
Mariner and Mercury Outboards (Counter Rotation Gearcase) - All Models through 225 HP	3	2	4	2
Mariner and Mercury Outboards (Standard Rotation Gearcase) - 250 HP/275 HP	3	2	4	2
Mariner and Mercury Outboards (Counter Rotation Gearcase) - 250 HP/275 HP	4	2	3	2
Mercury Outboards (Standard Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2
Mercury Outboards (Counter Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2

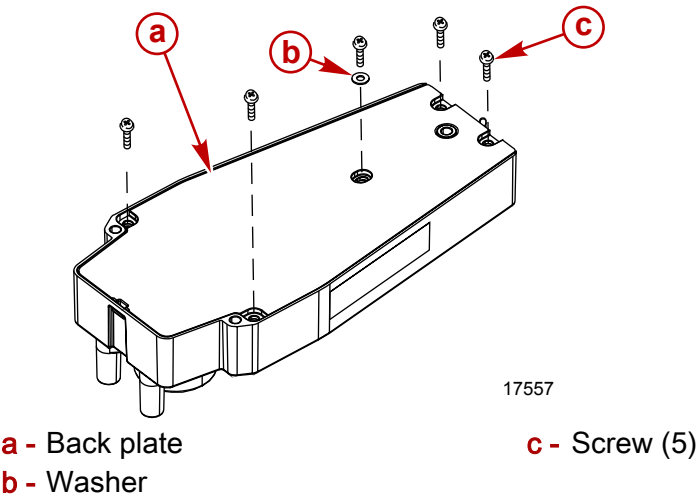


a - Shift arm

b - Throttle arm

NOTE: The base assembly gasket and the base assembly, must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.

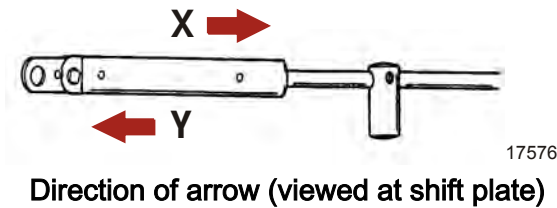
- 1. Remove the screws securing the back plate to the control module.



IMPORTANT: Determine the type of drive unit rotation the cable is installed onto. The shift cable must be correctly installed at the remote control assembly for the appropriate drive unit rotation; standard or counter rotation.

NOTE: For Bravo Three, Blackhawk Drive, and for Outboard models 3.0 Liter EFI GEN II, OptiMax GEN II units, refer to the instructions for standard rotation control cable installation.

- 2. **Mercury MerCruiser Models Standard Rotation** - The control cable must be installed in the remote control so the cable end will move in the direction of X when the shift handle is placed in the forward position.
- 3. **Mercury MerCruiser Models Counter Rotation** - The control cable must be installed in the remote control so the cable end will move in the direction of Y when the shift handle is placed in the forward position.



Mercury MerCruiser Models	Standard Rotation		Counter Rotation	
Starboard Mount Mechanical Control	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Direction of arrow	X	X	Y	X
Lever number	4	2	3	2

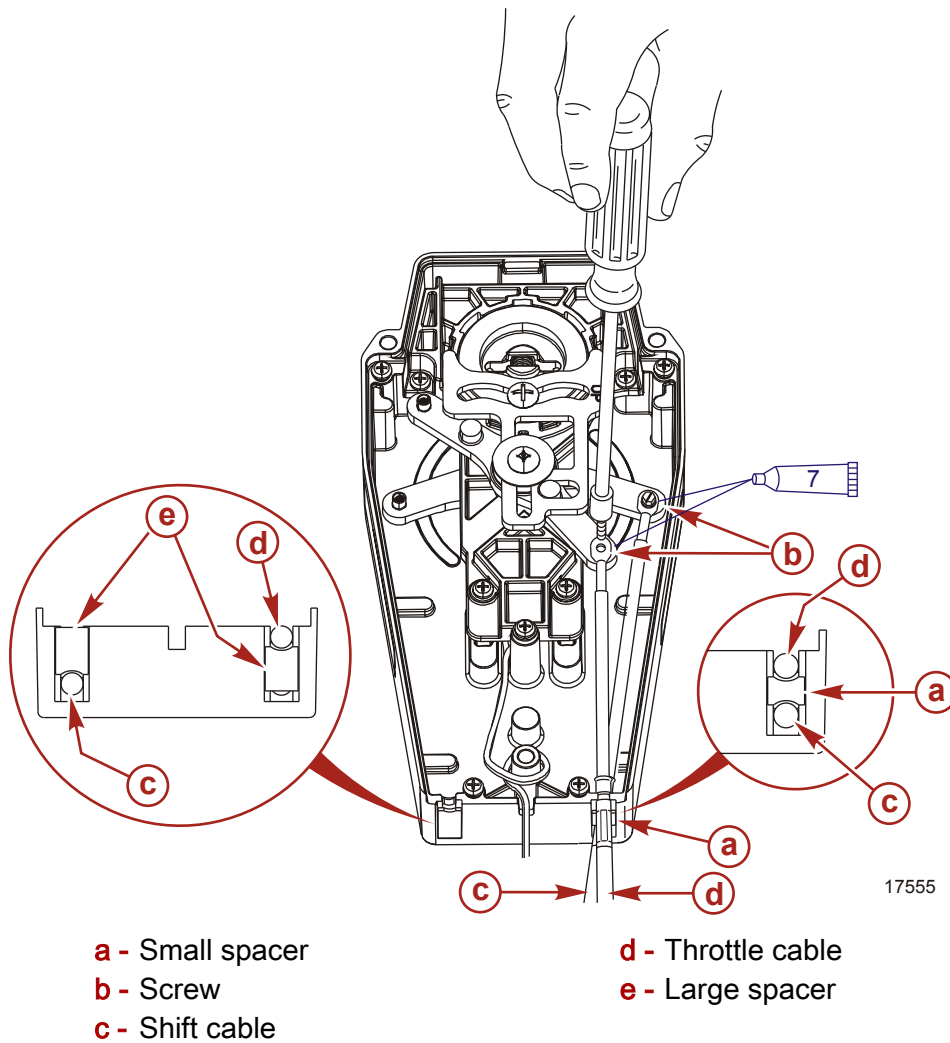
TYPICAL SHIFT AND THROTTLE CABLE INSTALLATION, OUTBOARD AND MERCURY MERCUISER

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. Control cable fastener screws must be properly torqued and retained with Loctite Threadlocker to prevent control cable fastener screws from loosening, thus allowing the cable ends to disconnect.

- 1. Apply Loctite 271 Threadlocker to the threads of the cable fastener screws.
- 2. Install the control cables in the appropriate arm in the remote control module.

3. Tighten the cable fastener screws to the specified torque.



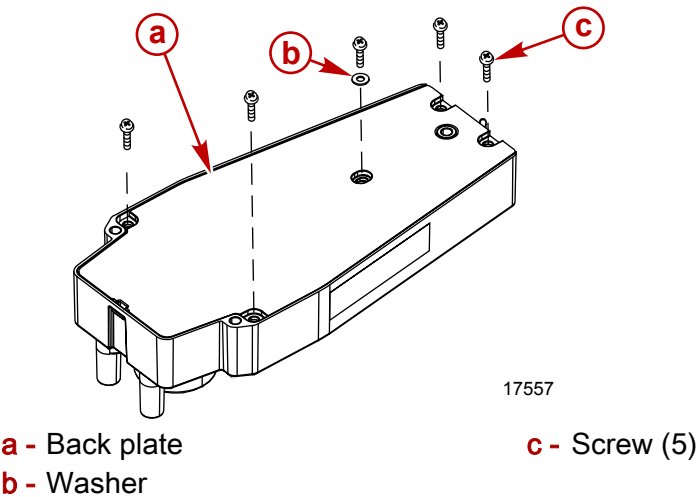
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control cable fastener screws	92-809819

Description	Nm	lb. in.	lb. ft.
Control cable fastener screws	2.8	25	

4. After installing the control cables, secure the back plate with five washers and screws. Tighten the screws to the specified torque.

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The back plate must be fastened to the control with five (5) screws to prevent the back cover from loosening, thus resulting in the control cables slipping out of the mounting slots at the rear of the control.

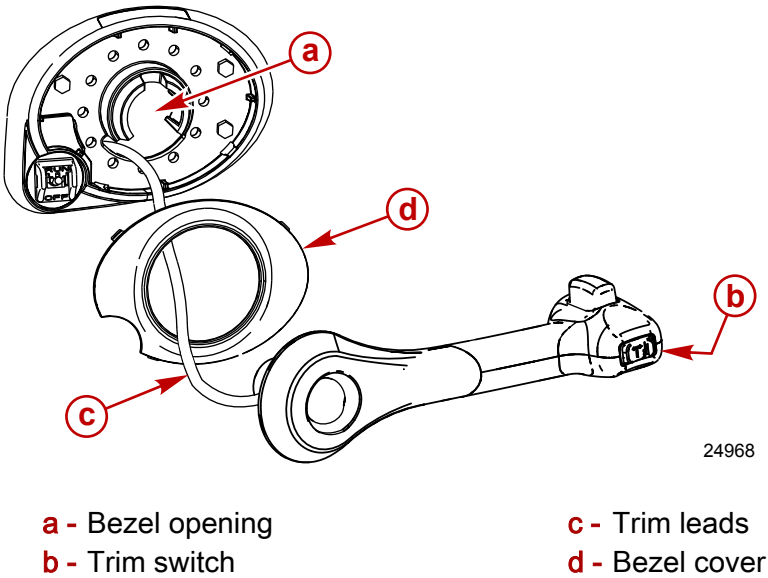


Description	Nm	lb. in.	lb. ft.
Back plate screws (5)	1.1	10	

Pistol Grip Remote Control with Finger Tip Lock Release Installation

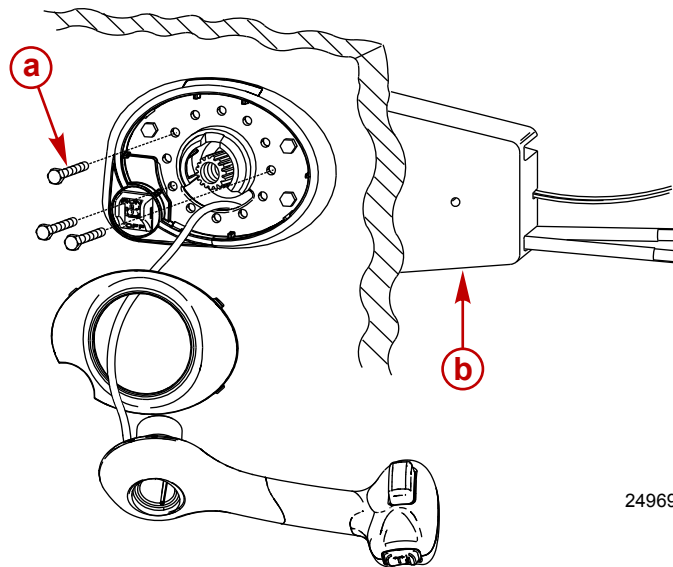
NOTE: The control handle friction is pre-set at the factory. To increase or decrease the control handle friction, the adjustment must be made prior to the installation of the remote control module onto the bezel. When adjusting the control handle friction, the control cables must be installed, and the control handle temporarily installed onto the control module to get a true feel for the amount of control handle friction.

- 1. Route the trim switch leads from the control handle assembly through the bezel cover and bezel opening.
- 2. Allow sufficient slack in the trim switch leads to permit free movement through the full range of the control handle motion. Do not restrain the trim switch leads with cable ties.



IMPORTANT: Ensure the trim switch leads are not pinched when mounting remote control module to the bezel. The trim switch leads must be free to move with the full range of the control handle motion.

3. Install the remote control module to the bezel. Secure the remote control module with three screws. Tighten the screws to the specified torque.

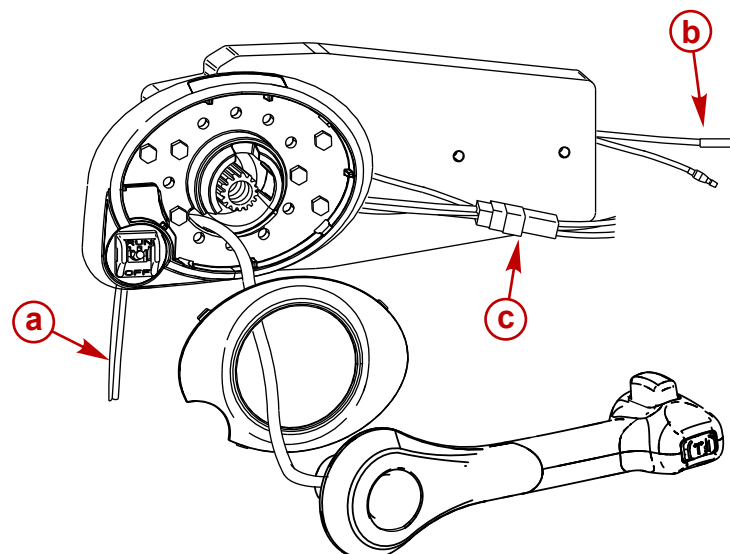


24969

- a** - Control module mounting screw (3)
b - Control module

Description	Nm	lb. in.	lb. ft.
Control module mounting screw (3)	5.6	50	

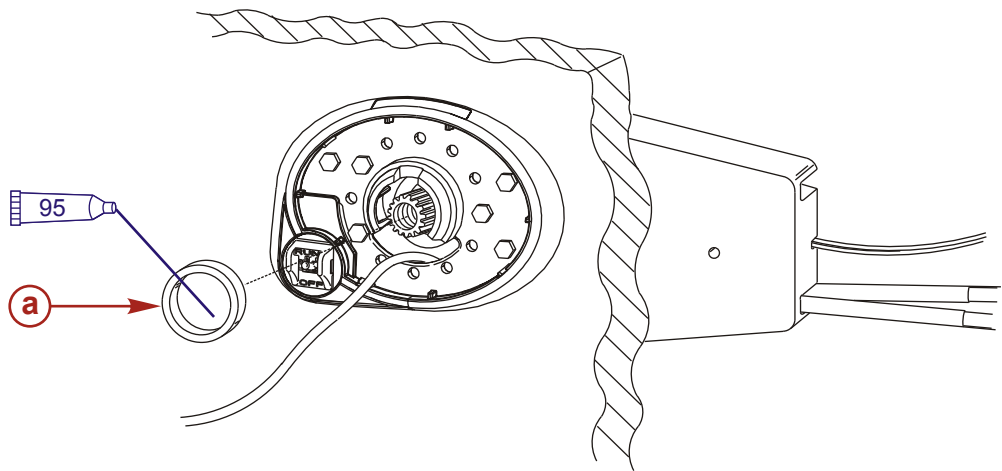
4. Connect the trim switch connector to the trim motor harness connectors.
5. Connect the neutral start safety switch leads to the wire harness.



24970

- a** - Lanyard stop switch leads
b - Neutral start safety switch leads
c - Trim switch connection

6. Install the bushing into the module assembly. Apply a small amount of 2-4-C with Teflon to the inside diameter of the bushing.

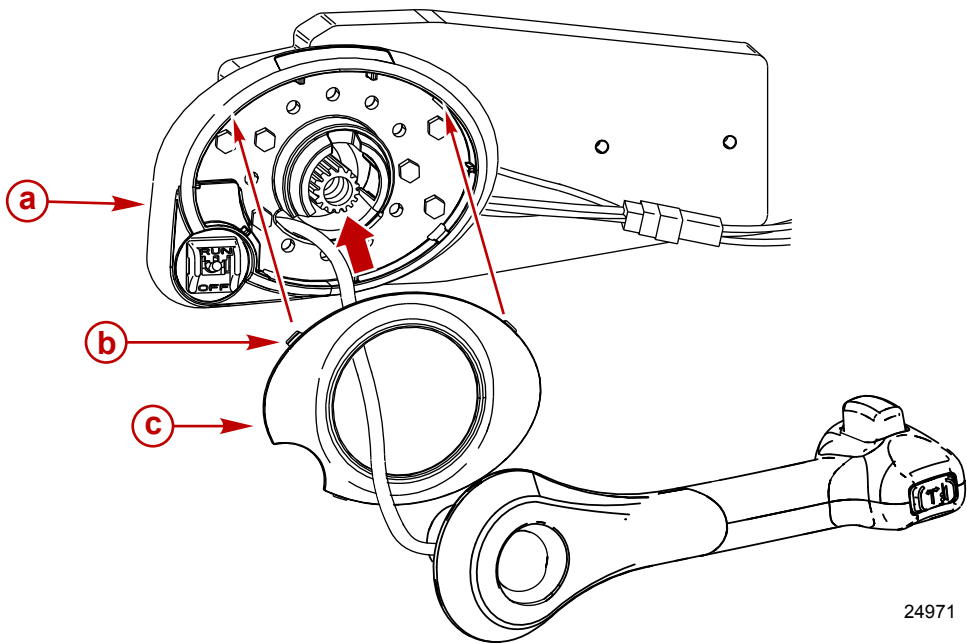


17446

a - Bushing

Tube Ref No.	Description	Where Used	Part No.
	2-4-C with Teflon	Inside diameter of the module assembly bushing	92-802859A1

7. Align the tabs on the bezel cover with the slots on the bezel. Snap the bezel cover in place.



24971

a - Bezel

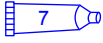
b - Tabs (4)

c - Bezel cover

8. Apply Loctite 271 Threadlocker on the threads of the control handle retaining bolt.
- NOTE:** A new control handle retaining bolt has thread locking compound on the threads. A control handle retaining bolt that was installed and removed must have Loctite 271 Threadlocker applied to the threads.

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The control handle retaining bolt must be properly torqued and retained with Loctite Threadlocker to prevent the control handle retaining bolt from loosening, thus resulting in disengagement of the control handle.

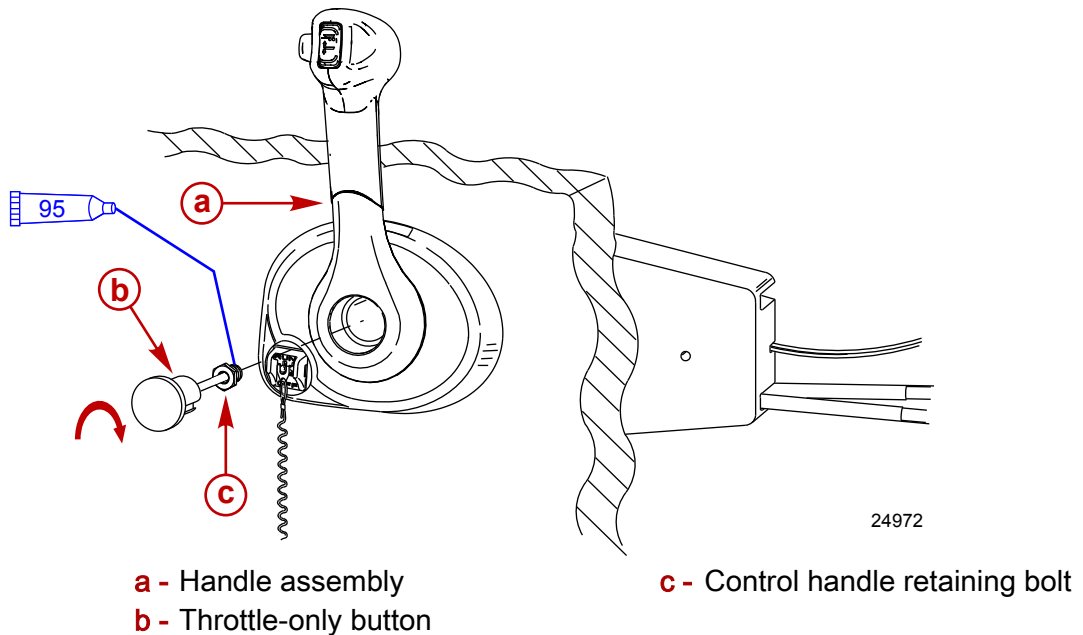
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle retaining bolt threads	92-809819

9. Install the control handle assembly onto the remote control module. Ensure the control handle is in neutral and in the desired position.

10. Secure the control handle with the retaining bolt. Tighten the control handle retaining bolt to the specified torque.

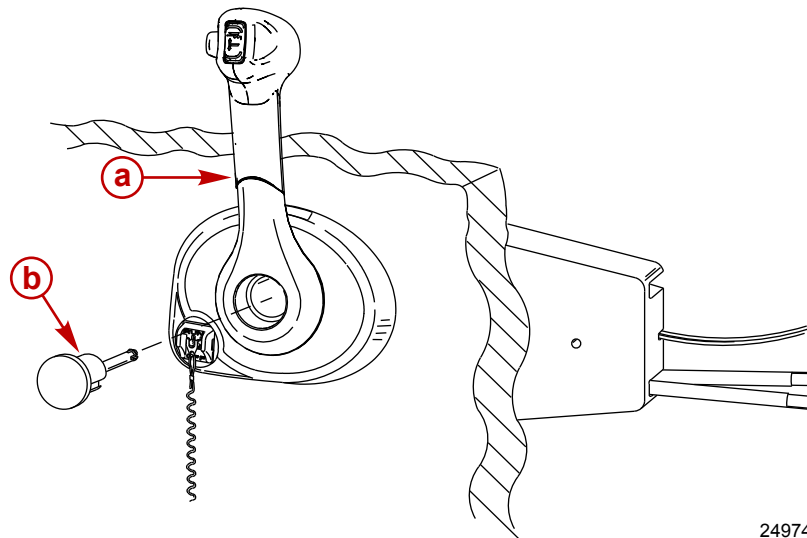
IMPORTANT: Do not use air driven tools to install the control handle retaining bolt.

NOTE: As an aid for installing the control handle retaining bolt, use the throttle only button as a tool to align the threads to the control. Once the bolt threads are started, remove the throttle-only button and complete the installation. Tighten the retaining bolt to the specified torque.



Description	Nm	lb. in.	lb. ft.
Control handle retaining bolt	17	150	

11. Install the throttle-only button. Push the throttle-only button in completely.



a - Handle assembly

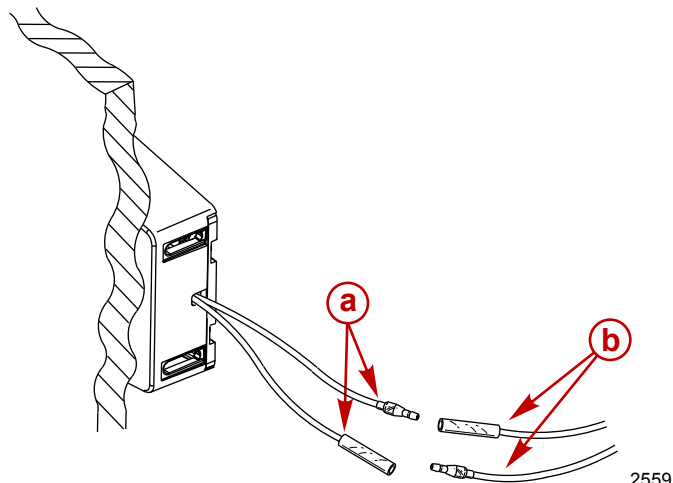
b - Throttle-only button

IMPORTANT: The trim harness must be loose behind the panel. Do not use cable ties near the control module. The trim switch leads must be free to move with the full range of the control handle motion.

12. Connect the remote control module assembly neutral start safety switch leads to the wire harness.

⚠ WARNING

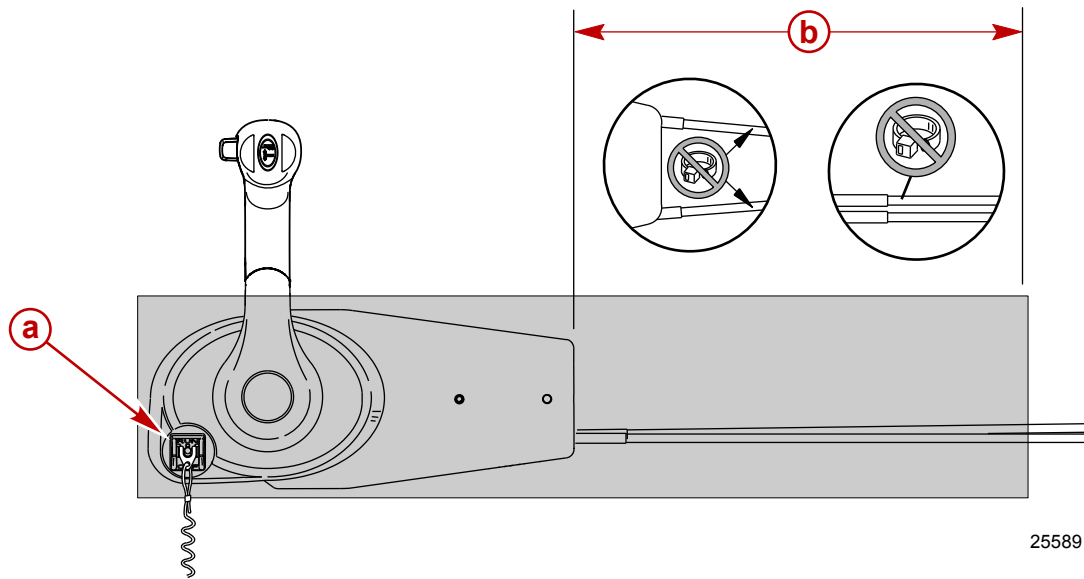
Avoid serious injury or death from a sudden unexpected acceleration when starting the engine. The neutral start safety switch must be correctly connected to prevent engine startup when in gear. Refer to wiring diagrams for correct wiring connections.



a - Remote control module assembly neutral start safety switch leads

b - Wire harness safety switch leads

IMPORTANT: The control cables must be able to move independently of each other. Do not use anchors, clamps, cable ties, or secure any harnesses or other items within 45.7 cm (18 in.) of the control cables exiting the remote control module assembly.



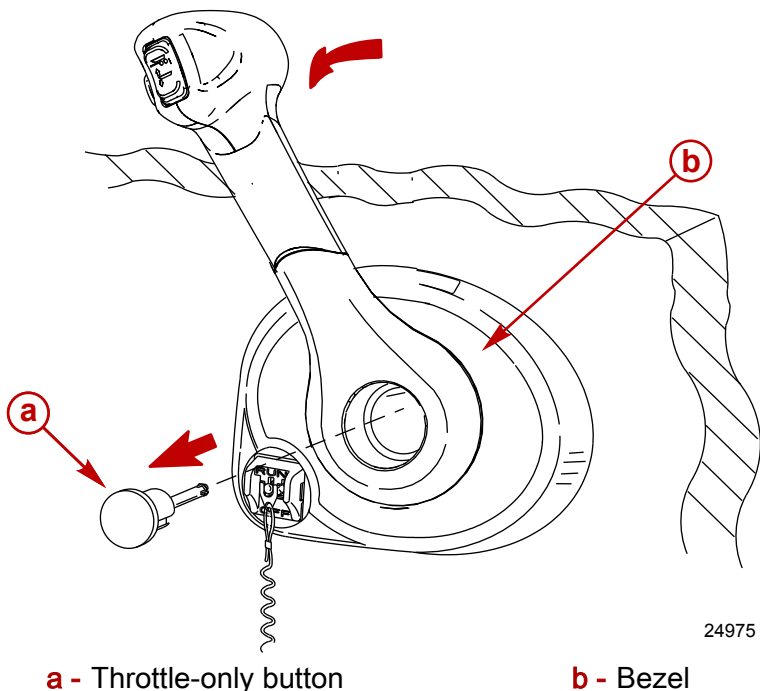
a - Lanyard stop switch

b - Remote control cable clearance space - 45.7 cm (18 in.)

THROTTLE-ONLY BUTTON REMOVAL

1. Place the control handle in the neutral position.
2. Push the throttle-only button in until it stops.
3. Hold the throttle-only button in and rotate the remote control handle to the forward position.
4. Use a flat blade screwdriver to gently pry the throttle-only button out of the control handle.

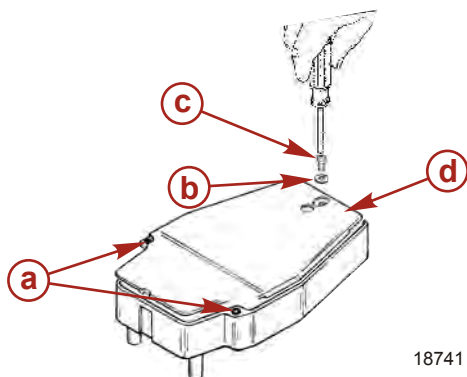
NOTE: The control handle is a painted component. Protect the control handle paint from damage when removing the throttle-only button.



Commander 4000 Series Remote Control Module Disassembly and Assembly

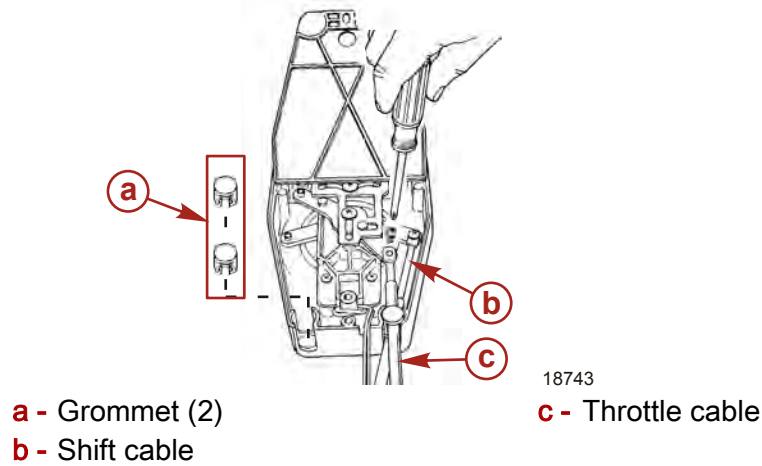
Commander 4000 Remote Control Module Disassembly

1. Remove the two screws without washers and one screw with a washer securing the back plate to the control module housing. Remove the back cover.

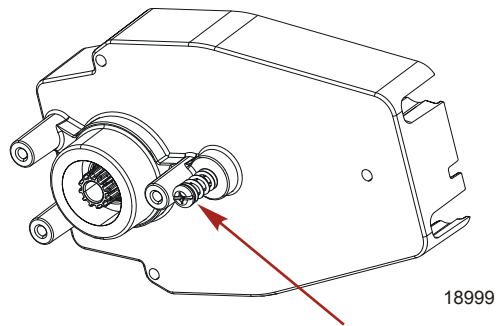


2. Remove the screws securing the shift cable and throttle cable to the shift and throttle arm assemblies. Remove the cables.

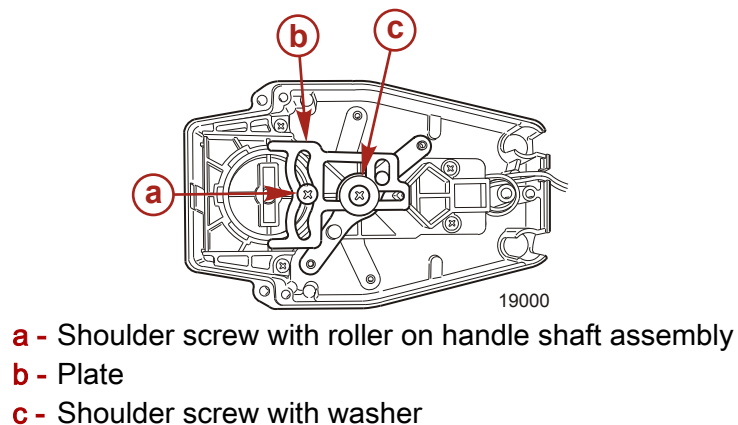
3. Remove the two grommets.



4. Remove the friction adjustment screw, and the spring from the remote control module assembly.

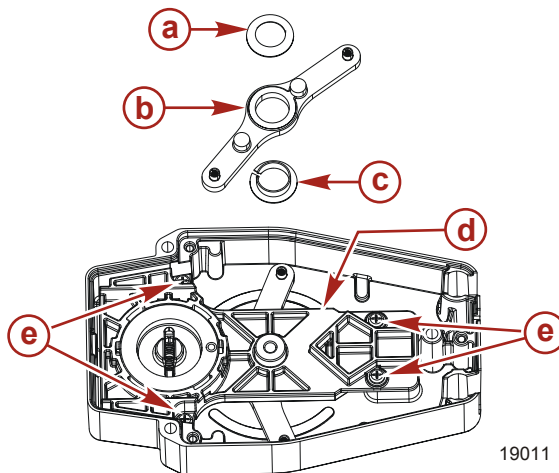


5. Remove the shoulder screw with a roller from the handle shaft assembly.
6. Remove the shoulder screw, and the washer securing the plate to the remote control module assembly.
7. Remove the plate from the remote control module.



8. Remove the washer, throttle arm, and the bushing from the control module.

9. Remove the four screws securing the shaft support assembly to the control module housing. Remove the shaft support assembly.



a - Washer

b - Throttle arm

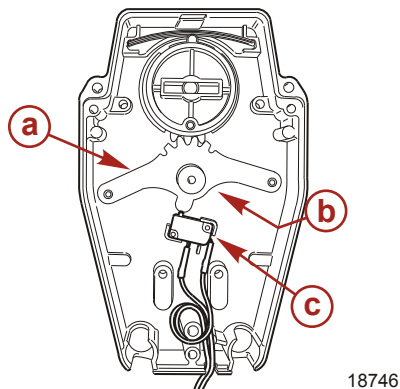
c - Bushing

d - Shaft support assembly

e - Screws (4)

10. Remove the shift arm assembly and the bushing from the control module housing.

11. Remove the neutral start safety switch from the control module housing.



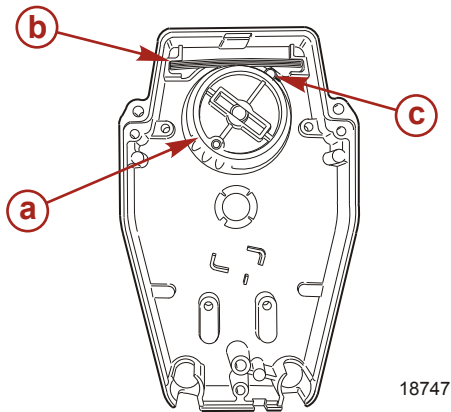
a - Shift arm assembly

b - Bushing (located under shift arm assembly)

c - Neutral start safety switch

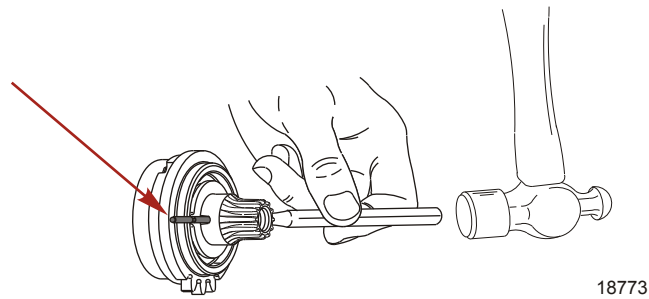
12. Remove the detent springs and detent roller from the control module housing.

13. Remove the shift gear and the handle shaft assembly.

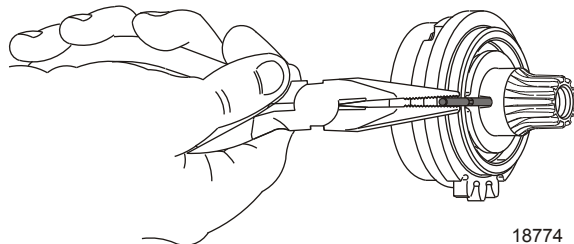


- a** - Shift gear and handle shaft assembly
- b** - Detent spring
- c** - Detent roller

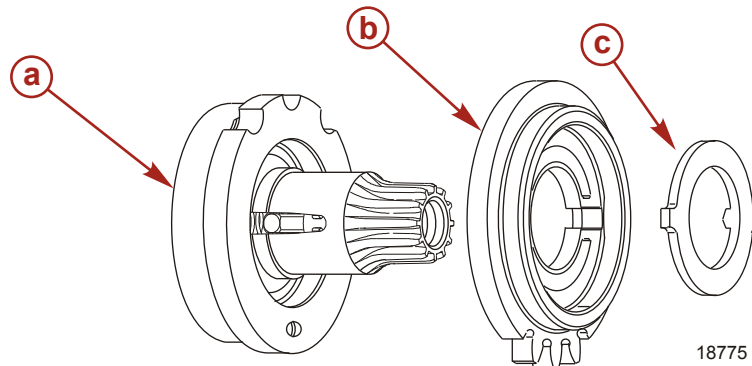
14. Use a hammer and a punch to push the round lock pin out of the handle shaft.



15. Use a pair of pliers to remove the round lock pin from the handle shaft.

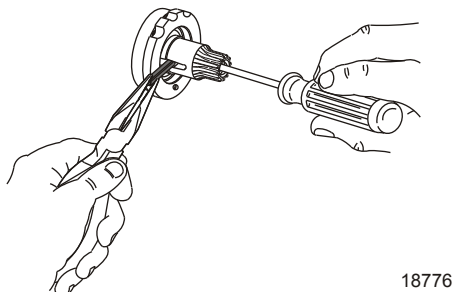


16. Remove the shift gear and lock ring from the handle shaft assembly.

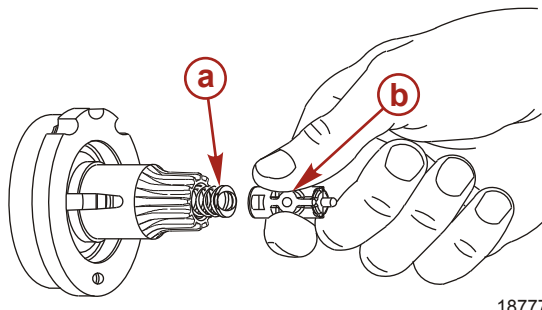


- a** - Handle shaft assembly
- b** - Shift gear
- c** - Lock ring

17. Push the throttle-only shaft in and remove the square drive pin from the handle shaft assembly.



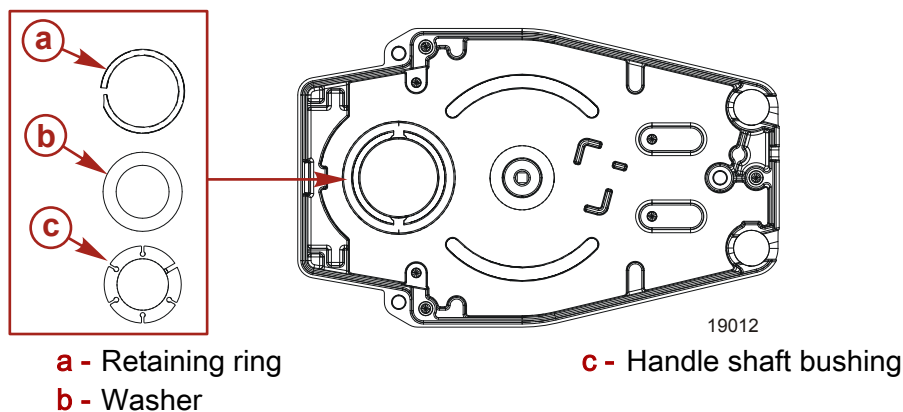
18. Remove the throttle-only shaft and spring.



a - Spring

b - Throttle-only shaft

19. Use a screwdriver to remove the retaining ring in the control housing.
20. Remove the washer and handle shaft bushing from the control housing.



a - Retaining ring

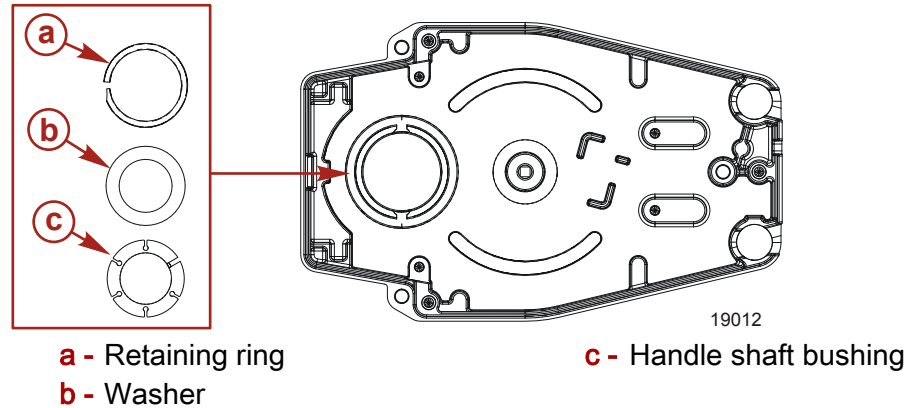
b - Washer

c - Handle shaft bushing

Commander 4000 Remote Control Module Assembly

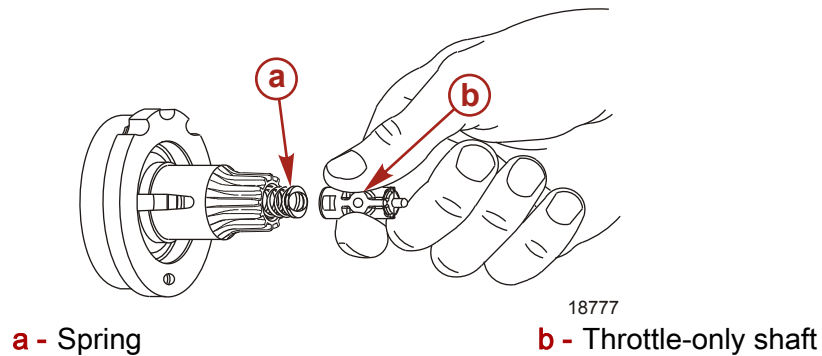
1. Lubricate the handle shaft bushing with 2-4-C with Teflon and insert handle shaft bushing into the control module housing.

2. Install the washer on top of the handle shaft bushing. Secure the washer onto the control module housing with a retaining ring.



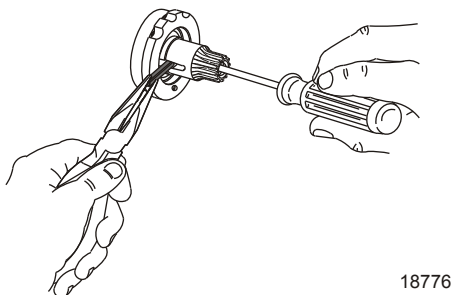
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft bushing	92-802859A1

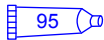
3. Apply 2-4-C with Teflon to the spring and throttle-only shaft.
4. Ensure the hole in the throttle-only shaft is aligned with the hole in the handle shaft. Install the spring and throttle-only shaft into the handle shaft.



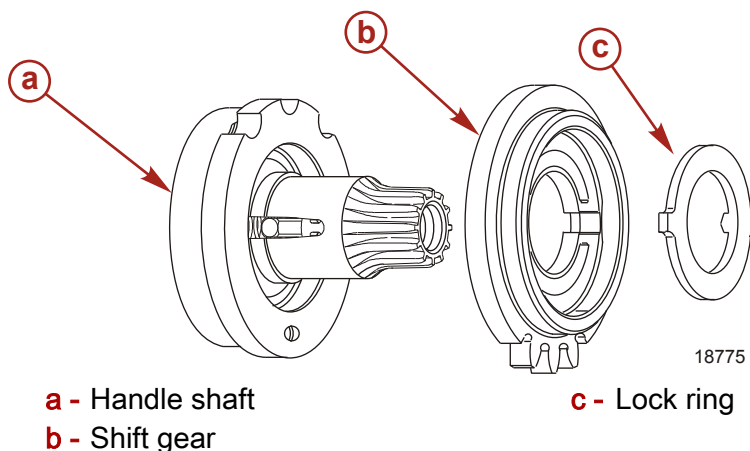
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle-only shaft and spring	92-802859A1

5. Lubricate the square drive pin with 2-4-C with Teflon.
6. Push the throttle-only shaft in to align the hole in the handle shaft and the hole in the throttle-only shaft. Insert the square drive pin into the handle shaft hole and through the throttle-only shaft.



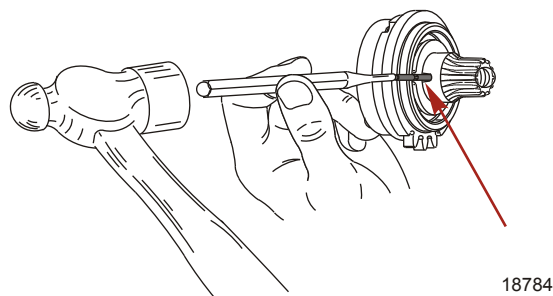
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Square drive pin	92-802859A1

7. Lubricate the handle shaft with 2-4-C with Teflon.
8. Lubricate the entire shift gear, and the lock ring with 2-4-C with Teflon.
9. Slide the shift gear, and the lock ring onto the handle shaft.



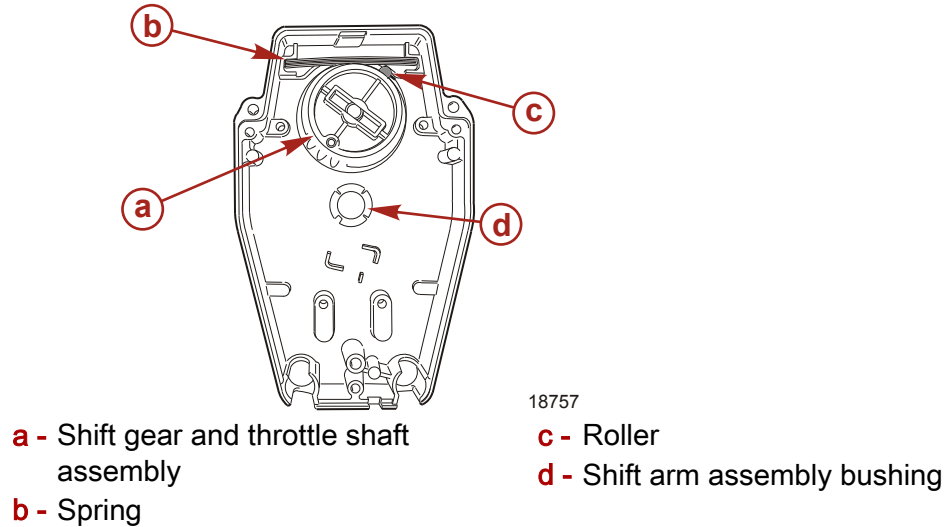
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft, shift gear and lock ring	92-802859A1

10. Install the round lock pin into the handle shaft with a hammer and punch. Ensure the round pin is centered in the handle shaft.



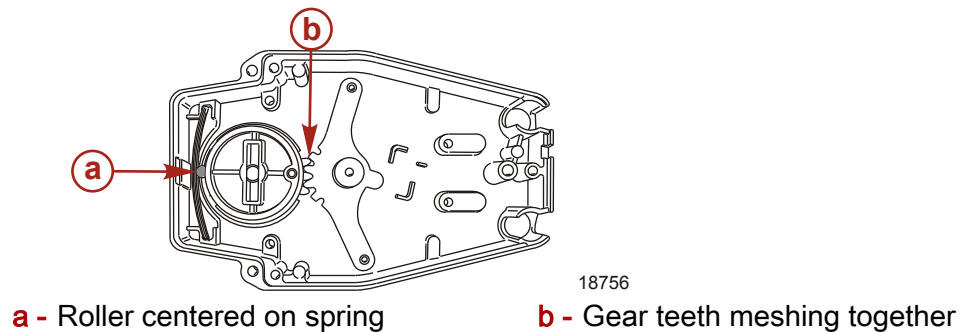
11. Lubricate the handle shaft assembly bore of the control module housing with 2-4-C with Teflon.
12. Install the handle shaft assembly into the control module housing.
13. Lubricate the shift arm assembly bushing with 2-4-C with Teflon. Install the shift arm assembly bushing onto the control module housing.
14. Install the springs onto the control module housing.

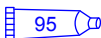
15. Lubricate the roller with 2-4-C with Teflon. Install the roller between the spring and handle shaft



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft bore of control module housing, roller, and bushing	92-802859A1

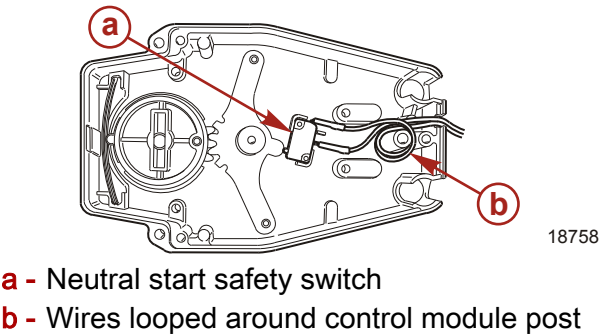
16. Turn the handle shaft so the roller is centered on the spring.
17. Lubricate the gear teeth on the shift arm assembly with 2-4-C with Teflon.
18. Install the shift arm assembly to the control module housing. Ensure the gear teeth of the shift arm assembly mesh with the teeth on the handle shift assembly.



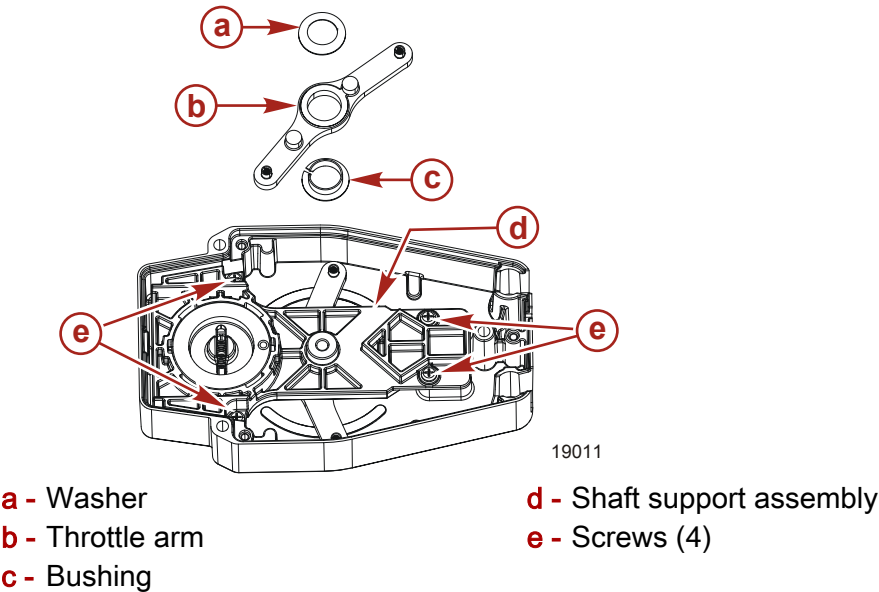
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Gear teeth on shift arm assembly	92-802859A1

19. Install the neutral start safety switch onto the squared area of the control module housing.

20. Loop the neutral start safety switch wires around the control module post.



21. Lubricate the handle shaft assembly and shift arm assembly with 2-4-C with Teflon.
22. Install the shaft support assembly.
23. Secure the shaft support assembly to the control module housing assembly with four screws. Tighten the screws to the specified torque.
24. Lubricate the throttle arm bushing with 2-4-C with Teflon and install onto the control module.
25. Install the throttle arm onto the throttle arm bushing.
26. Lubricate the throttle arm washer with 2-4-C with Teflon. Install the throttle arm washer on top of the throttle arm.

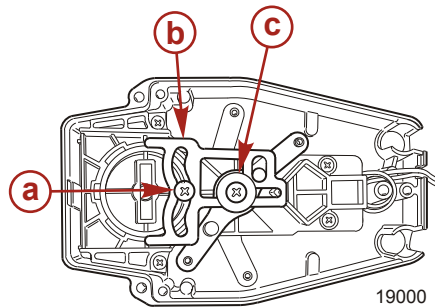


Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft assembly, shift arm assembly, throttle arm bushing, and throttle arm washer	92-802859A1

Description	Nm	lb. in.	lb. ft.
Screw securing shaft support assembly (4)	4.4	39	

27. Align the plate with the throttle arm assembly, and handle shaft.
28. Install the roller onto one of the shoulder screws.

29. Apply Loctite 271 Threadlocker to the threads of the shoulder screw with the roller installed.
30. Secure the plate with the shoulder screw and roller into the handle shaft. Tighten the shoulder screw with the roller to the specified torque.
31. Install the shoulder screw with a washer into the shift arm assembly.



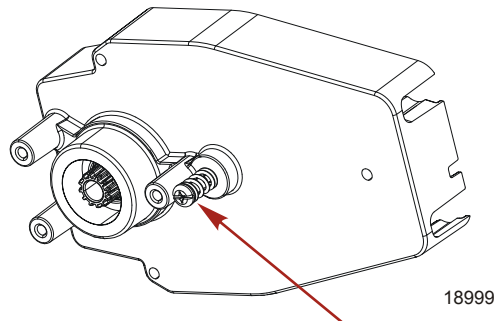
a - Shoulder screw with roller
b - Plate

c - Shoulder screw with washer

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Threads of shoulder screw with roller	92-809819

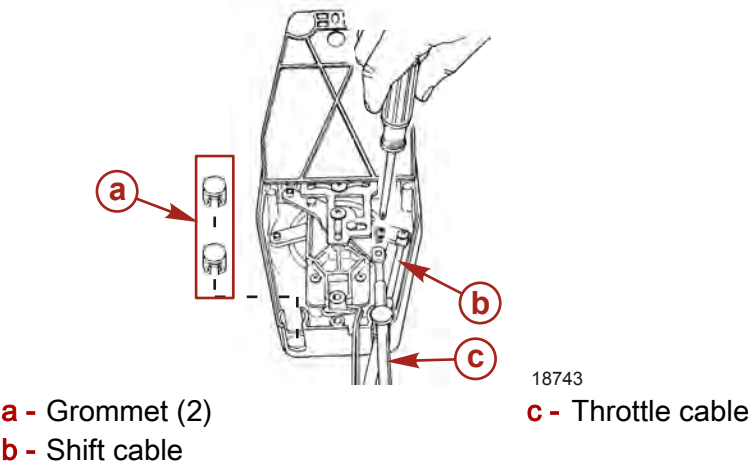
Description	Nm	lb. in.	lb. ft.
Shoulder screw with roller	4.4	39	

32. Install the spring onto the friction screw. Install the friction screw with spring onto the shoulder screw in the control module.



33. Install the shift cable to the shift arm assembly.
34. Apply Loctite 271 Threadlocker to the screws which secure the shift cable and throttle cable to the shift arm assembly, and the throttle arm assembly.
35. Secure the shift cable to the shift arm assembly with a screw. Tighten the screw to the specified torque.
36. Secure the throttle cable to the throttle arm assembly with a screw. Tighten the screw to the specified torque.

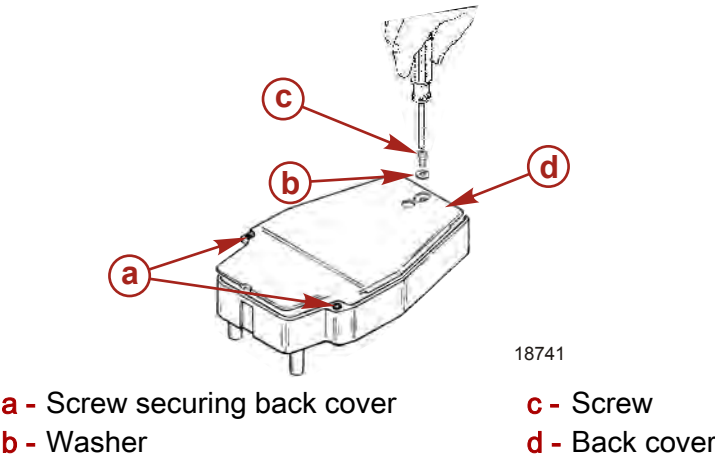
37. Install the two grommets.



Tube Ref No.	Description	Where Used	Part No.
	Loctite 271 Threadlocker	Screws securing the shift, and throttle cables	92-809819

Description	Nm	lb. in.	lb. ft.
Screws securing shift and throttle cables	2.8	25	

38. Install the back cover with three screws and one washer. Tighten the three screws to the specified torque.

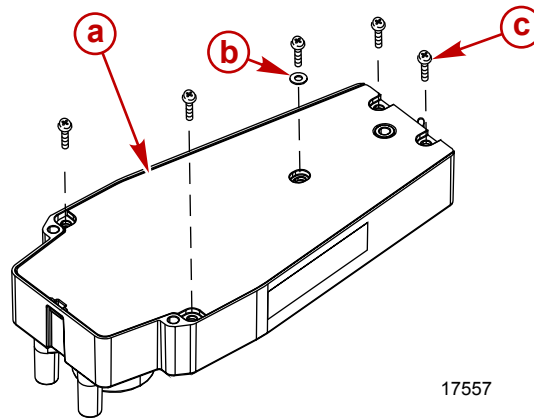


Description	Nm	lb. in.	lb. ft.
Back cover screw (3)	4.4	39	

Commander 4000 Remote Control Module Gen II Disassembly

- 1. Remove the five screws and washer securing the back plate to the control module housing.

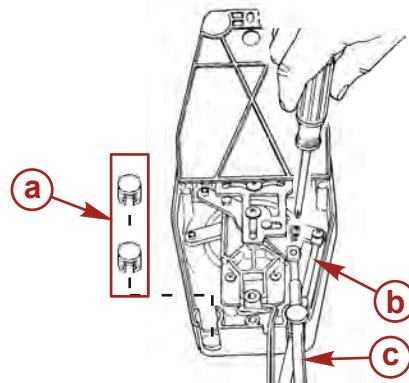
2. Remove the back plate.



a - Back plate
b - Washer

c - Screw (5)

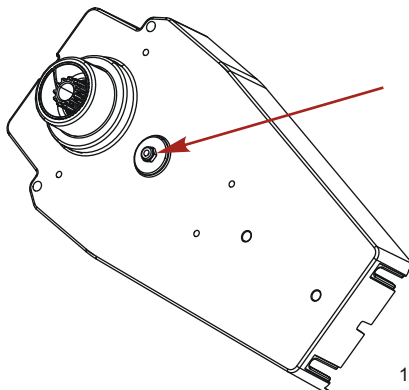
3. Remove the screws securing the shift cable and throttle cable to the shift and throttle arm assemblies.
4. Remove the two grommets.



a - Grommet (2)
b - Shift cable

c - Throttle cable

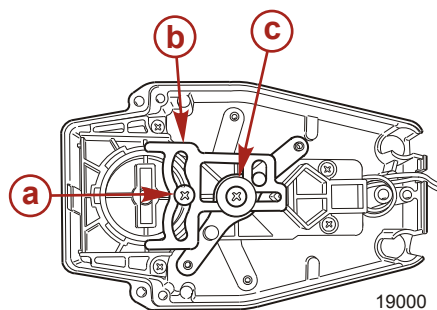
5. Remove the friction adjustment nut.



19042

6. Remove the shoulder screw and roller securing the plate to the handle shaft assembly.
7. Remove the shoulder screw and washer securing the plate to the remote control module assembly.

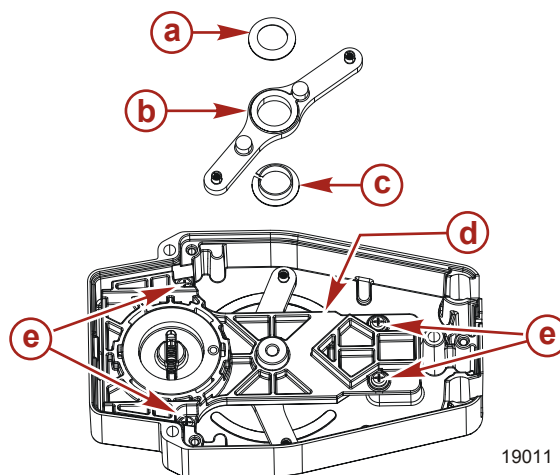
8. Remove the plate from the remote control module.



- a** - Shoulder screw with roller secured to the handle shaft assembly
b - Plate
c - Shoulder screw with washer

9. Remove the washer, throttle arm, and bushing from the control module.

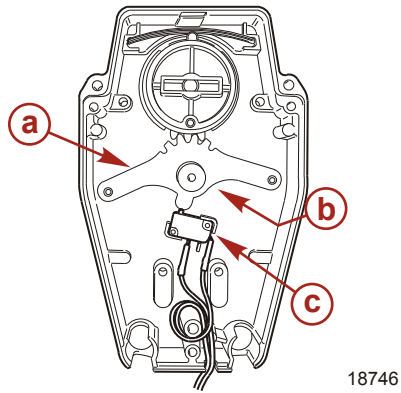
10. Remove the four screws securing the shaft support assembly to the control module housing. Remove the shaft support assembly.



- a** - Washer
b - Throttle arm
c - Bushing
d - Shaft support assembly
e - Screws (4)

11. Remove the shift arm assembly, and the bushing from the control module housing.

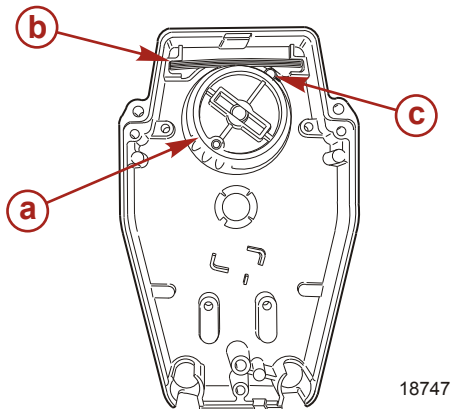
12. Remove the neutral start safety switch from the control module housing.



- a** - Shift arm assembly
- b** - Bushing (located under shift arm assembly)
- c** - Neutral start safety switch

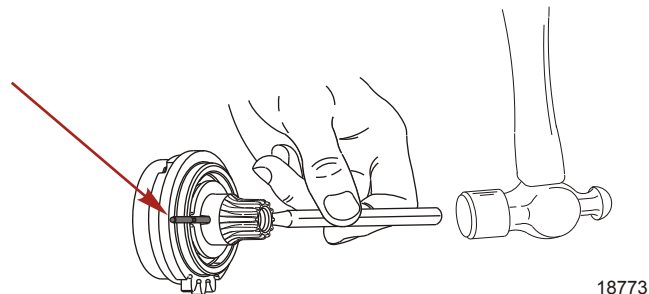
13. Remove the detent springs and detent roller from the control module housing.

14. Remove the shift gear and the handle shaft assembly.

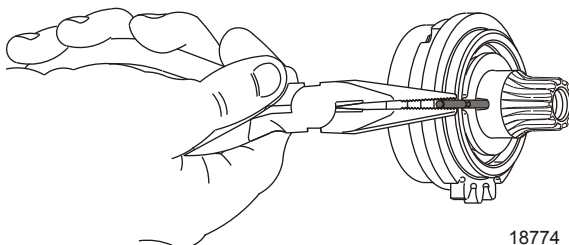


- a** - Shift gear and handle shaft assembly
- b** - Detent spring
- c** - Detent roller

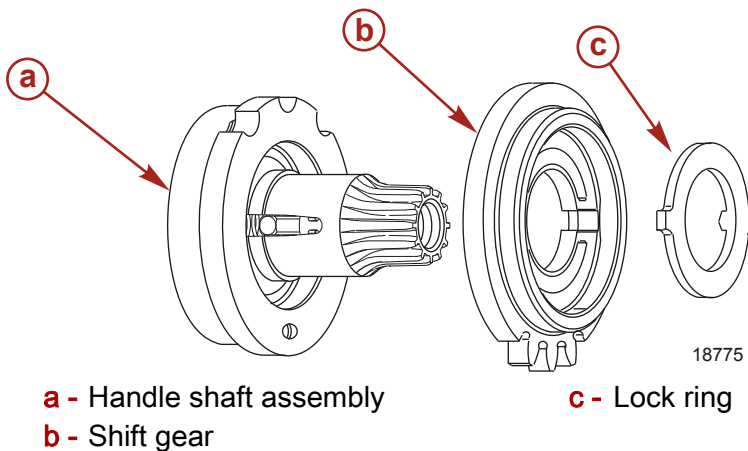
15. Use a hammer and a punch to push the round lock pin out of the handle shaft assembly.



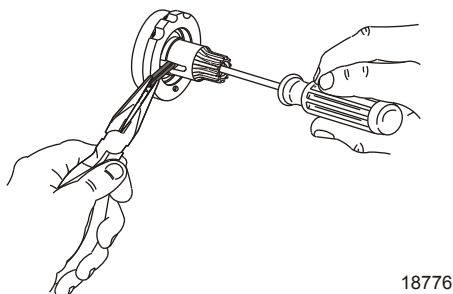
16. Use a pair of pliers to remove the round lock pin from the handle shaft assembly.



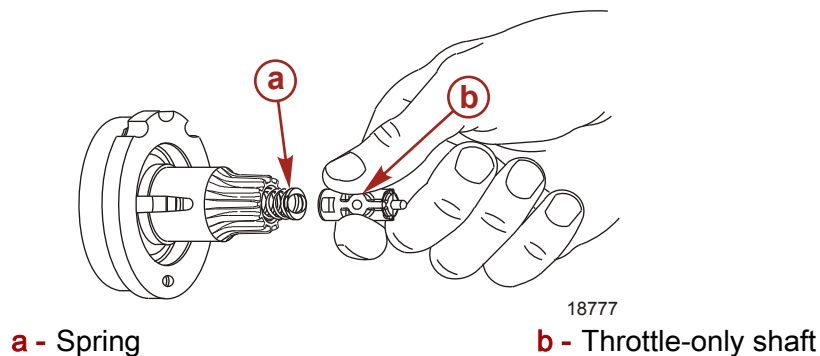
17. Remove the shift gear, and lock ring from the handle shaft assembly.



18. Push the throttle-only shaft in to remove the square drive pin from the handle shaft assembly.

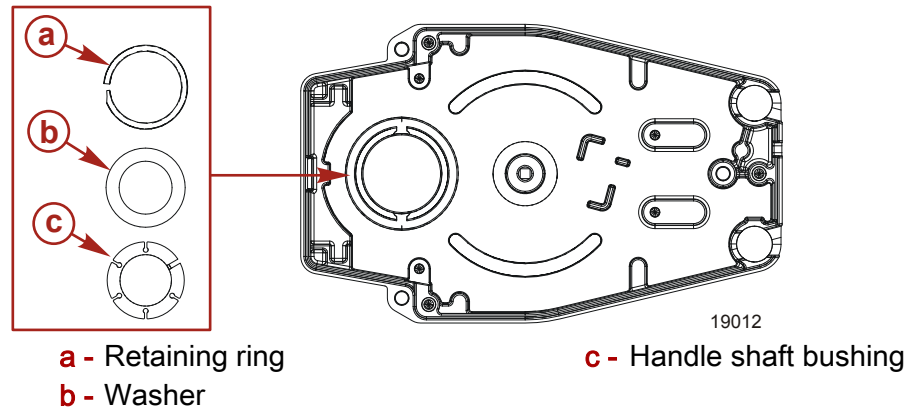


19. Remove the throttle-only shaft and spring.



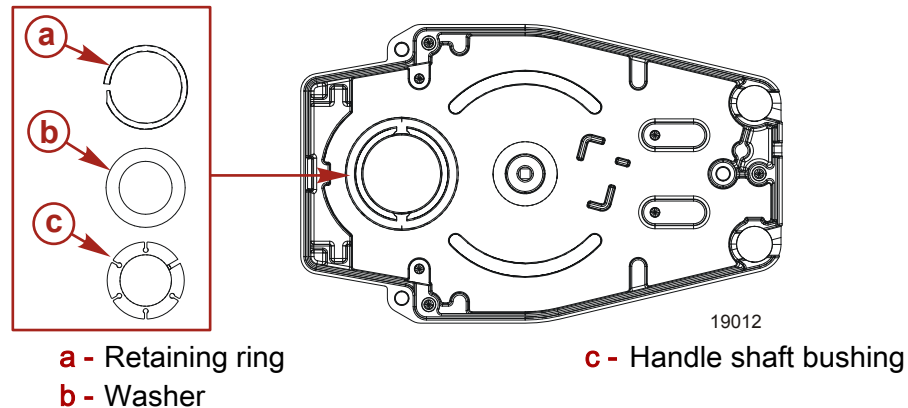
20. Use a screwdriver to remove the retaining ring in the control housing.

21. Remove the washer and handle shaft bushing from the control housing.



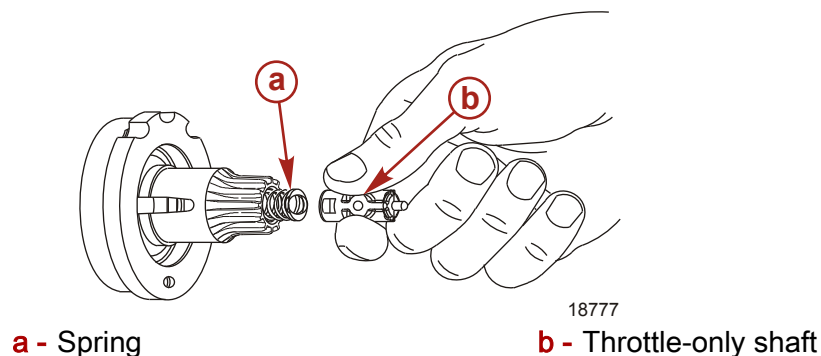
Commander 4000 Remote Control Module Gen II Assembly

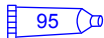
1. Lubricate the handle shaft bushing with 2-4-C with Teflon and insert handle shaft bushing into the control module housing.
2. Install the washer on top of the handle shaft bushing. Secure the washer to the control module housing with a retaining ring.



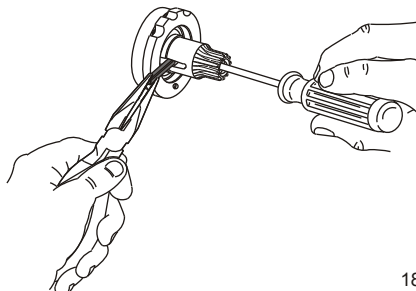
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft bushing	92-802859A1

3. Apply 2-4-C with Teflon to the spring and throttle-only shaft.
4. Ensure the hole in the throttle-only shaft is aligned with the hole in the handle shaft assembly. Install the spring and throttle-only shaft into the handle shaft assembly.

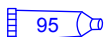


Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle-only shaft and spring	92-802859A1

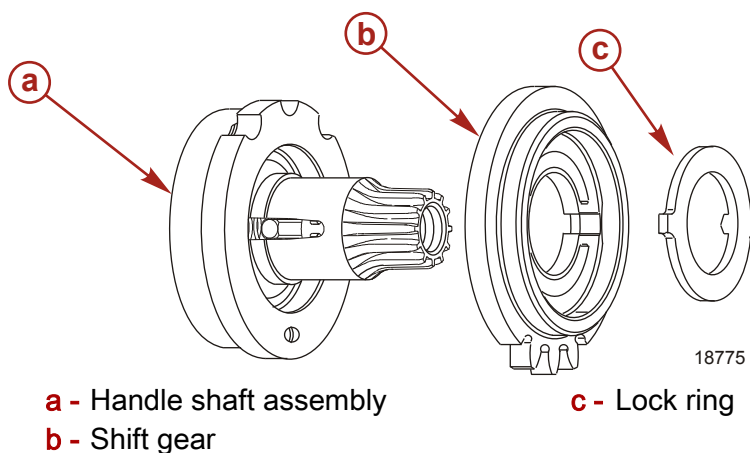
5. Lubricate the square drive pin with 2-4-C with Teflon.
6. Push the throttle-only shaft in to align the hole in the handle shaft assembly and the hole in the throttle-only shaft. Insert the square drive pin into the handle shaft assembly hole, and through the throttle-only shaft.



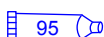
18776

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Square drive pin	92-802859A1

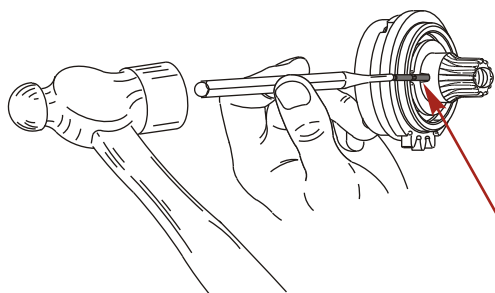
7. Lubricate the handle shaft with 2-4-C with Teflon.
8. Lubricate the entire shift gear, and lock ring with 2-4-C with Teflon.
9. Slide the shift gear, and lock ring onto the handle shaft assembly.



18775

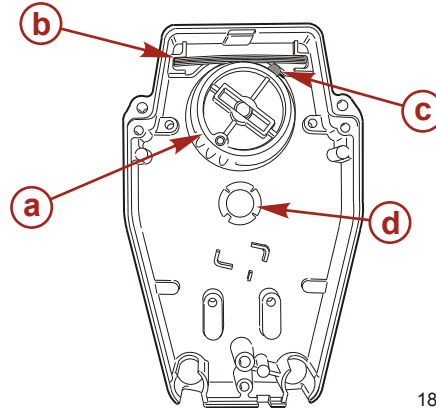
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft assembly, shift gear and lock ring	92-802859A1

10. Install the round lock pin into the handle shaft assembly with a hammer and punch. Ensure the round pin is centered in the handle shaft assembly.



18784

11. Lubricate the handle shaft assembly bore of the control module housing with 2-4-C with Teflon.
12. Install the handle shaft assembly into the control module housing.
13. Lubricate the shift arm assembly bushing with 2-4-C with Teflon. Install the shift arm assembly bushing onto the control module housing.
14. Install the detent springs onto the control module housing.
15. Lubricate the detent roller with 2-4-C with Teflon. Install the detent roller between the detent springs, and handle shaft assembly.



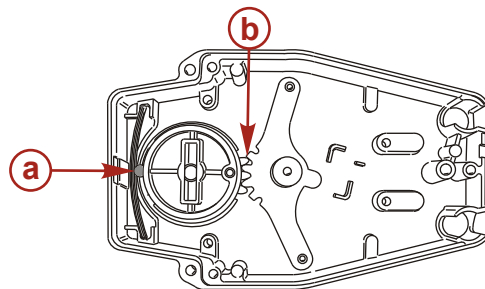
18757

a - Shift gear and handle shaft assembly
b - Detent spring

c - Detent roller
d - Shift arm assembly bushing

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft bore of control module housing, detent roller and bushing	92-802859A1

16. Rotate the handle shaft assembly so the detent roller is centered on the detent spring.
17. Lubricate the gear teeth on the shift arm assembly with 2-4-C with Teflon.
18. Install the shift arm assembly to the control module housing. Ensure the gear teeth of the shift arm assembly mesh with the teeth on the handle shift assembly.



18756

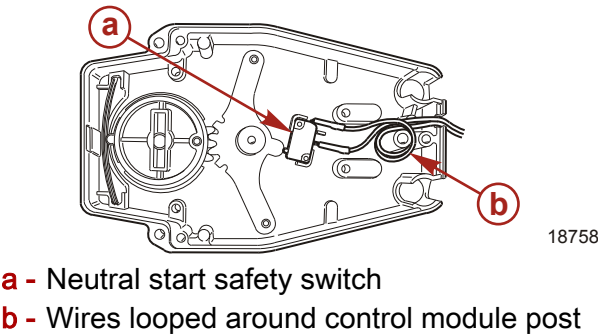
a - Detent roller centered on detent springs

b - Gear teeth meshing together

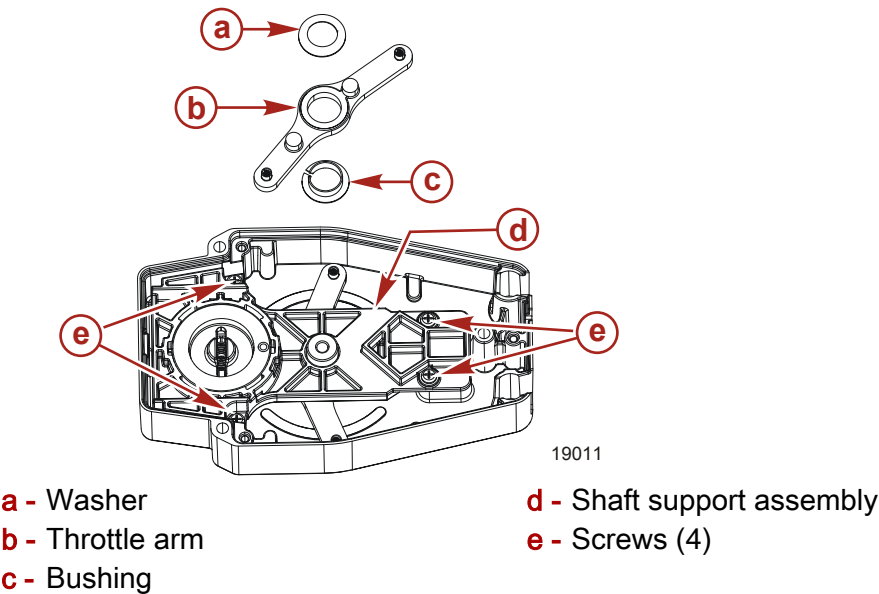
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Gear teeth on shift arm assembly	92-802859A1

19. Install the neutral start safety switch onto the squared area of the control module housing.

20. Loop the neutral start safety switch wires around the control module post.



21. Lubricate the handle shaft assembly, and shift arm assembly with 2-4-C with Teflon.
22. Install the shaft support assembly.
23. Secure the shaft support assembly to the control module housing assembly with four screws. Tighten the screws to the specified torque.
24. Lubricate the throttle arm bushing with 2-4-C with Teflon, and install onto the control module.
25. Install the throttle arm onto the throttle arm bushing.
26. Lubricate the throttle arm washer with 2-4-C with Teflon. Install the throttle arm washer on top of the throttle arm.

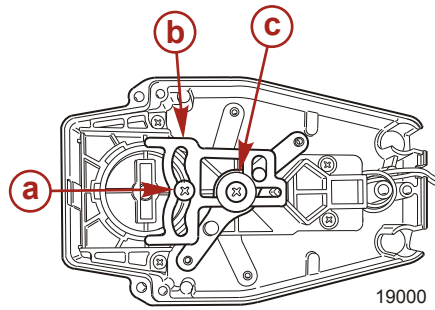


Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft assembly, shift arm assembly, throttle arm bushing, and throttle arm washer	92-802859A1

Description	Nm	lb. in.	lb. ft.
Screw securing shaft support assembly (4)	4.4	39	

27. Align the plate with the throttle arm assembly, and handle shaft assembly.
28. Install the roller onto the shoulder screw.
29. Apply Loctite 271 Threadlocker to the threads of the shoulder screw with the roller.

30. Secure the plate to the handle shaft assembly with the shoulder screw and roller. Tighten the shoulder screw with the roller to the specified torque.
31. Install the shoulder screw with a washer onto the shift arm assembly.



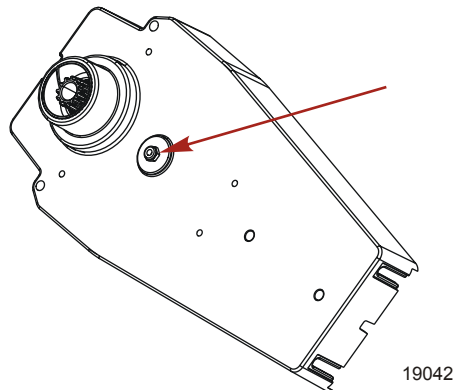
a - Shoulder screw with roller
b - Plate

c - Shoulder screw with washer

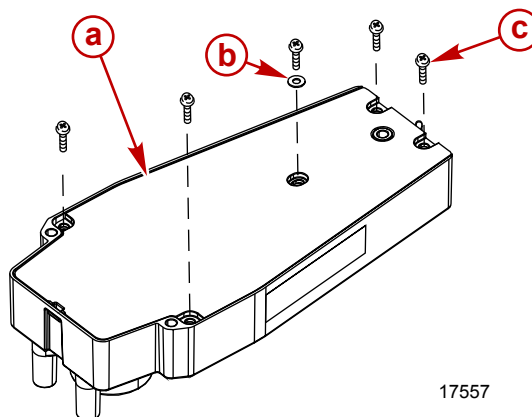
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Threads of shoulder screw with roller	92-809819

Description	Nm	lb. in.	lb. ft.
Shoulder screw with roller	4.4	39	

32. Install the friction nut onto the control module.



33. Install the back plate. Secure the back plate to the control module with a washer and five screws. Tighten the screws to the specified torque.



a - Back plate
b - Washer

c - Screw (5)

Commander 4000 Series Remote Control

Description	Nm	lb. in.	lb. ft.
Screws (5)	4.4	39	

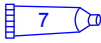
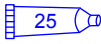
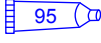
Commander 4000/4500 Controls

Section 5B - Commander 4500 Series Remote Control

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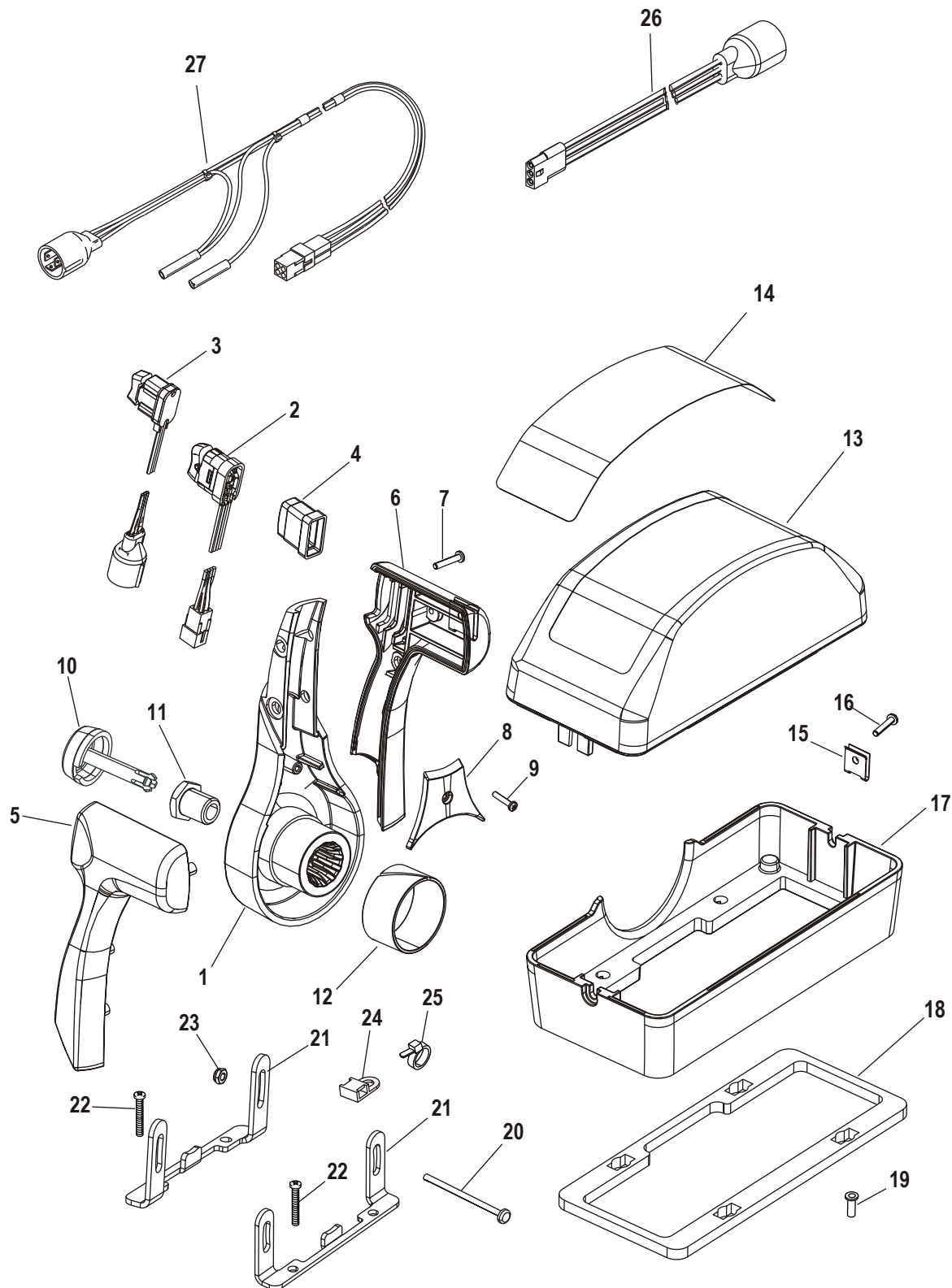
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Commander 4500 Series Removal and Installation.....	5B-16	Commander 4500 Gen II Remote Control Module Assembly.....	5B-41
Commander 4500 Series Console Control Removal.....	5B-16		

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control cable fastener screws	92-809819
		Threads of shoulder bolt with roller	
		Threads of shoulder screw	
 25	Liquid Neoprene	Neutral start safety switch wire connection	92-25711-3
 95	2-4-C with Teflon	Handle shaft bushing	92-802859A1
		Throttle-only shaft and spring	
		Square drive pin	
		Handle shaft, shift gear and lock ring	
		Handle shaft bore of control module housing, roller, and shift arm bushing	
		Gear teeth on shift arm assembly	
		Handle shaft assembly, shift arm assembly, throttle arm bushing, and throttle arm washer	
		Control handle bushing	
		Handle shaft, shift gear, and lock ring	
		Handle shaft assembly and shift arm assembly, throttle arm bushing, throttle arm washer	

Notes:

Commander 4500 Single Handle Remote Control Components

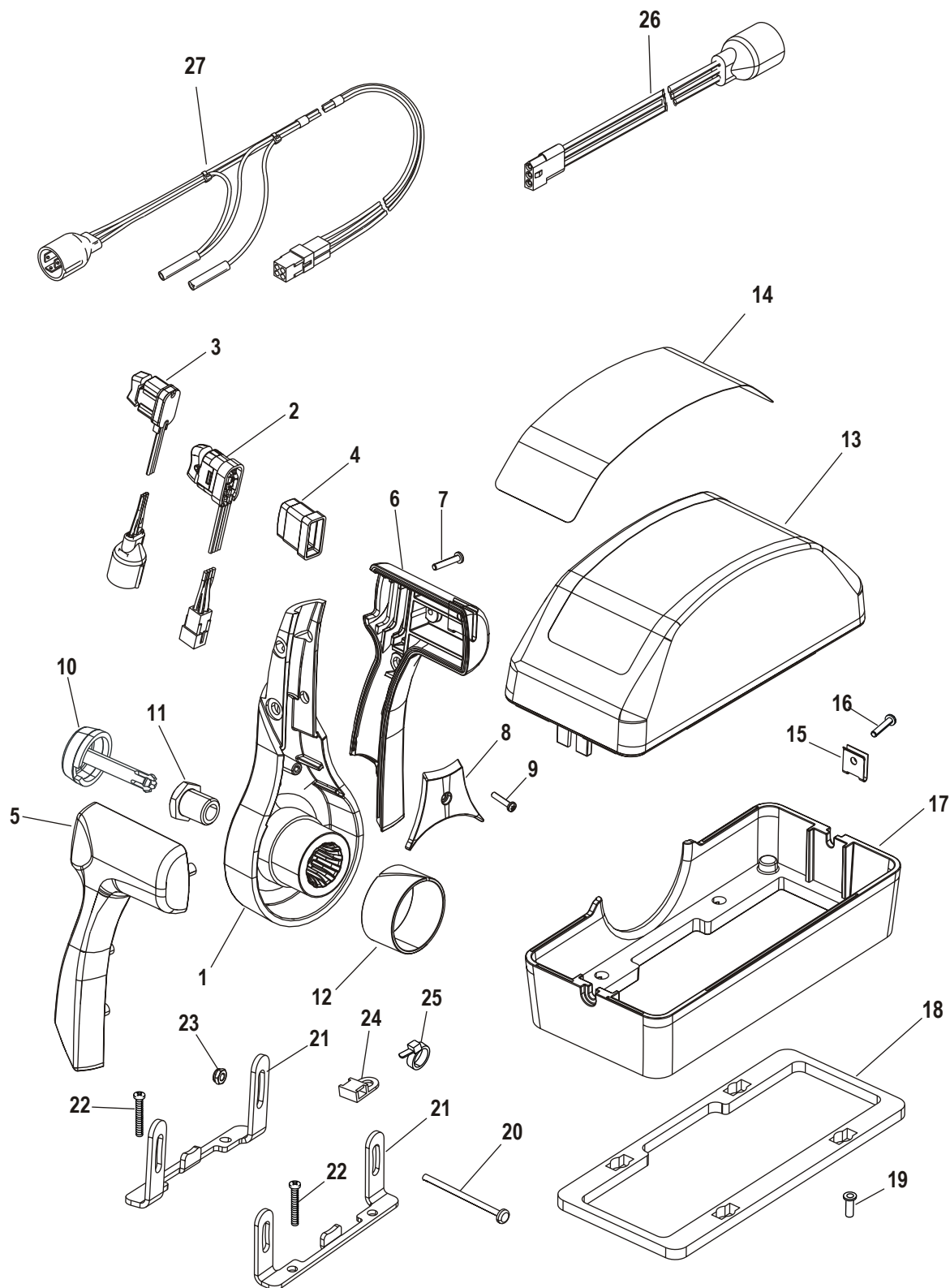


2494

Commander 4500 Single Handle Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Handle assembly			
2	1	Trim switch assembly (MerCruiser)			
3	1	Trim switch assembly (Outboard)			
4	1	Plug			
5	1	Back grip			
6	1	Front grip			
7	5	Screw	1.1	10	
8	1	Handle hub cover			
9	1	Screw	1.4	12	
10	1	Throttle only button			
11	1	Bolt	17	150	
12	1	Bushing			
13	1	Cover assembly			
14	1	Decal			
15	2	Nut (8 - 32)			
16	2	Screw (8 - 32 x 0.5 in.)	Tighten securely		
17	1	Base assembly			
18	1	Gasket			
19	4	Well nut (10 - 32)			
20	2	Screw (10 - 32 x 2.25 in.)	4	35	
21	2	Bracket			
22	4	Screw (10 - 32 x 1.5 in.)	Tighten securely		
23	2	Nut (10 - 32)	4	35	
24	1	Cable tie anchor			
25	1	Cable tie			
26	1	Trim harness assembly (Outboard)			
27	1	Trim harness assembly (MerCruiser)			

Commander 4500 Gen II Single Handle Remote Control Components

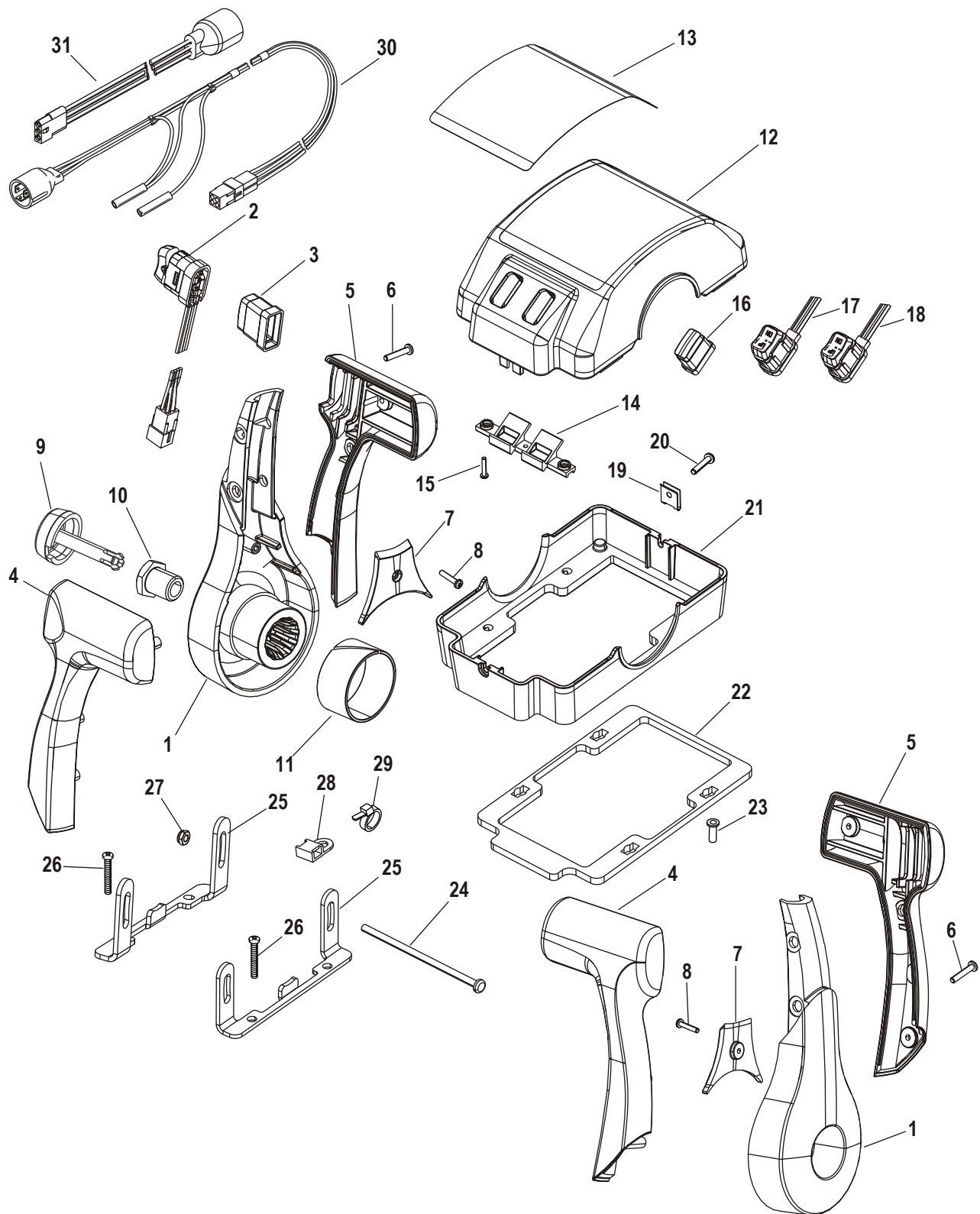


2494

Commander 4500 Gen II Single Handle Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Handle assembly			
2	1	Trim switch assembly (MerCruiser)			
3	1	Trim switch assembly (Outboard)			
4	1	Plug			
5	1	Back grip			
6	1	Front grip			
7	5	Screw	1.1	10	
8	1	Handle hub cover			
9	1	Screw	1.4	12	
10	1	Throttle only button			
11	1	Bolt	17	150	
12	1	Bushing			
13	1	Cover assembly			
14	1	Decal			
15	2	Nut (8 - 32 in.)			
16	2	Screw (8 - 32 x 0.5 in.)	Tighten securely		
17	1	Base assembly			
18	1	Gasket			
19	4	Well nut (10 - 32 in.)			
20	2	Screw (10 - 32 x 2.25 in.)	4	35	
21	2	Bracket			
22	4	Screw (10 - 32 x 1.5 in.)	Tighten securely		
23	2	Nut (10 - 32 in.)	4	35	
24	1	Cable tie anchor			
25	1	Cable tie			
26	1	Trim harness assembly (Outboard)			
27	1	Trim harness assembly (MerCruiser)			

Commander 4500 Console Dual Handle Remote Control Components

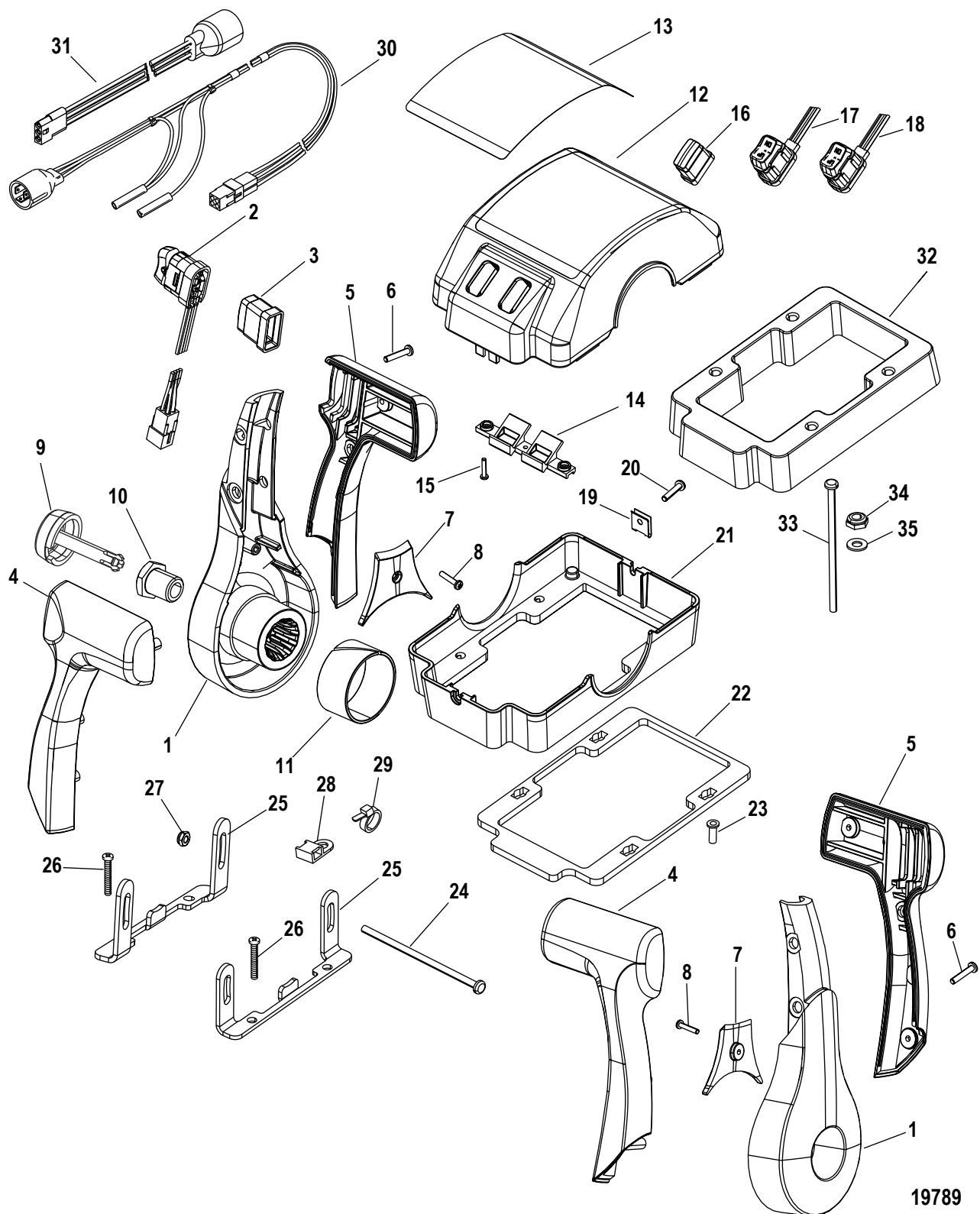


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Commander 4500 Console Dual Handle Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Handle assembly			
2	1	Trim switch harness assembly			
3	1	Plug			
4	2	Front grip			
5	2	Back grip			
6	10	Screw	1.1	10	
7	2	Handle hub cover			
8	2	Screw	1.4	12	
9	2	Throttle only button			
10	2	Bolt	17	150	
11	2	Bushing			
12	1	Cover assembly			
13	1	Decal			
14	1	Switch retainer			
15	3	Screw	0.8	7	
16	2	Plug			
17	1	Trim switch assembly (dual Outboard)			
18	1	Trim switch assembly (dual MerCruiser)			
19	2	Nut (8 - 32)			
20	2	Screw (8 - 32 x 0.5 in.)	Tighten securely		
21	1	Base assembly			
22	1	Gasket			
23	4	Wellnut (10 - 32)			
24	2	Screw (10 - 32 x 2.25 in.)	4	35	
25	2	Bracket			
26	4	Screw (10 - 32 x 1.5 in.)	Tighten securely		
27	2	Nut (10 - 32)	4	35	
28	1	Cable tie anchor			
29	3	Cable tie			
30	2	Trim harness assembly (Outboard)			
31	2	Trim harness assembly (MerCruiser)			

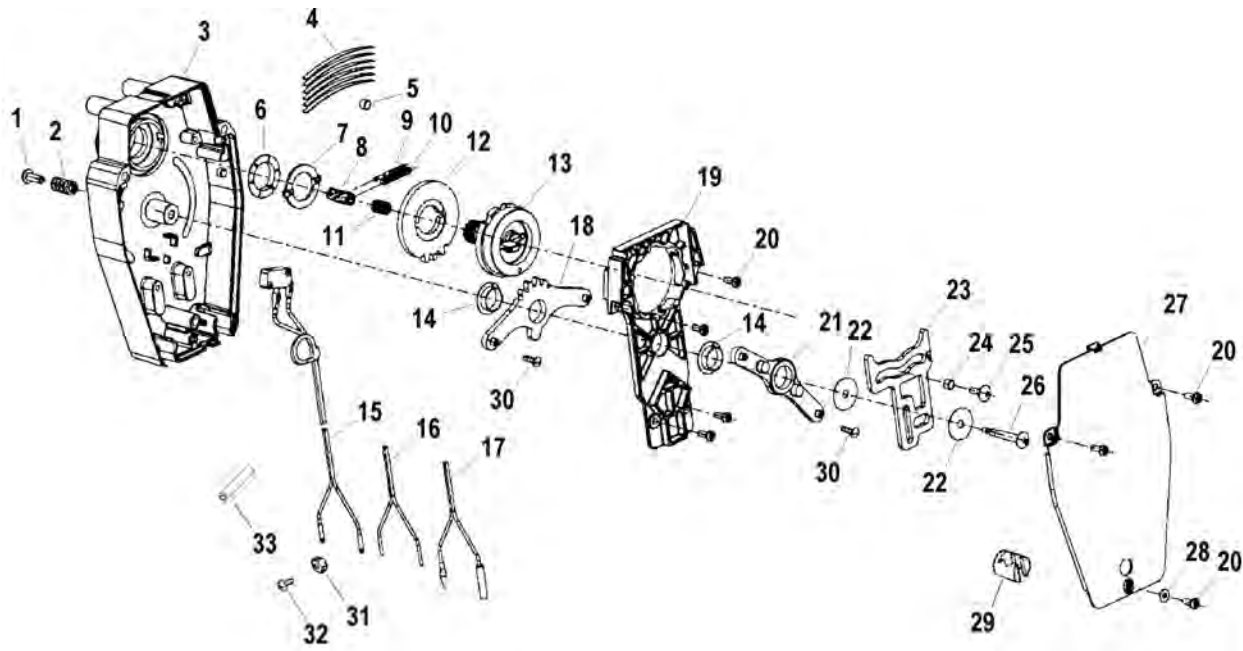
Commander 4500 Gen II Console Dual Handle Remote Control Components



Commander 4500 Gen II Console Dual Handle Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Handle assembly			
2	1	Trim switch harness assembly			
3	1	Plug			
4	2	Front grip			
5	2	Back grip			
6	10	Screw	1.1	10	
7	2	Handle hub cover			
8	2	Screw	1.4	12	
9	2	Throttle only button			
10	2	Bolt	17	150	
11	2	Bushing			
12	1	Cover assembly			
13	1	Decal			
14	1	Switch retainer			
15	3	Screw	0.8	7	
16	2	Plug			
17	1	Trim switch assembly (dual Outboard)			
18	1	Trim switch assembly (dual MerCruiser)			
19	2	Nut (8 - 32)			
20	2	Screw (8 - 32 x 0.5 in.)	Tighten securely		
21	1	Base assembly			
22	1	Gasket			
23	4	Wellnut (10 - 32)			
24	2	Screw (10 - 32 x 2.25 in.)	4	35	
25	2	Bracket			
26	4	Screw (10 - 32 x 1.5 in.)	Tighten securely		
27	2	Nut (10 - 32)	4	35	
28	1	Cable tie anchor			
29	3	Cable tie			
30	2	Trim harness assembly (Outboard)			
31	2	Trim harness assembly (MerCruiser)			
32	1	Spacer kit			
33	4	Screw (10 - 32 x 4.0 in.)	4	35	
34	4	Nut (10 - 32)	4	35	
35	4	Washer			

Commander 4500 Control Module Components

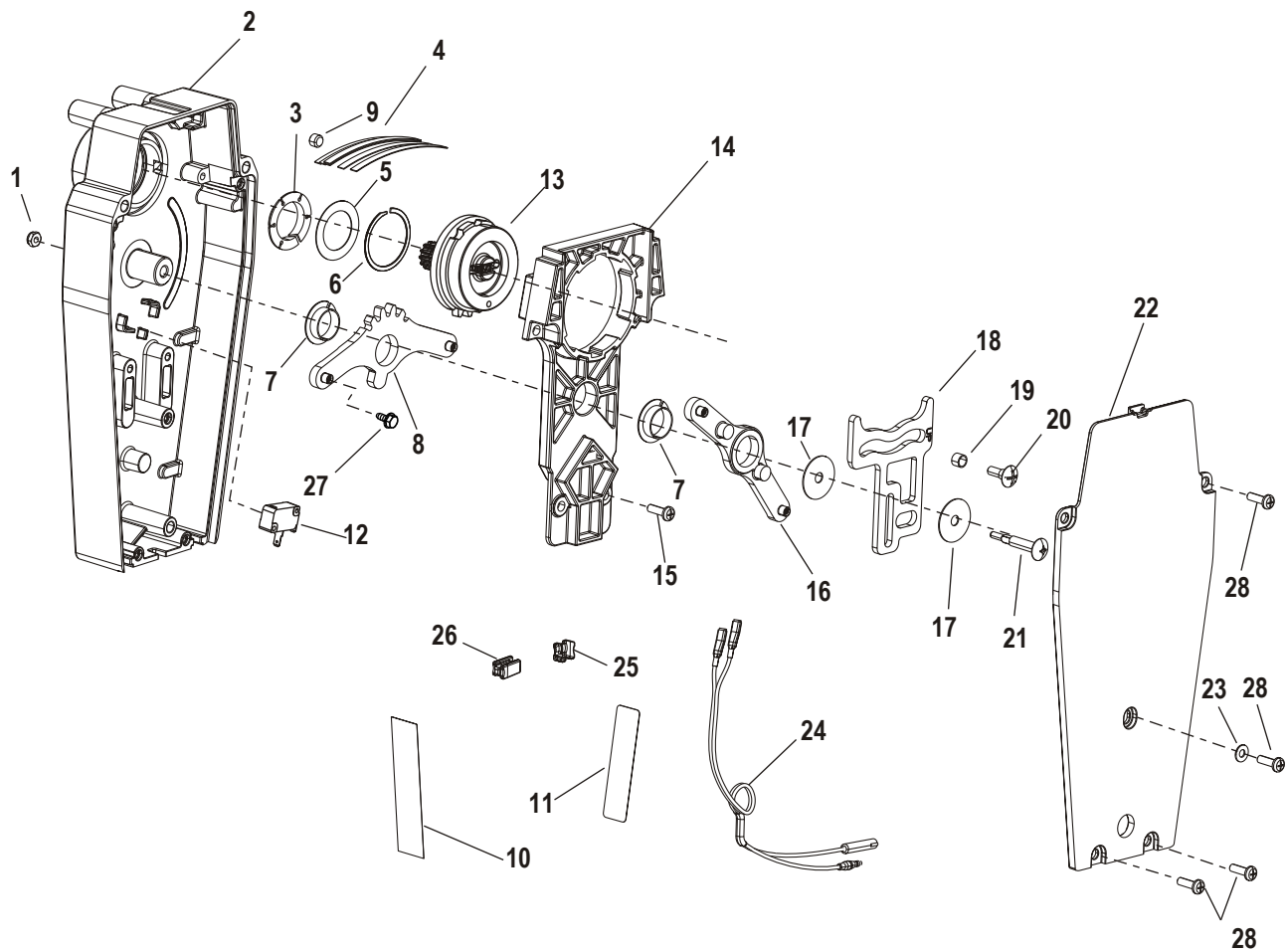


15574

Commander 4500 Control Module Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Friction adjustment nut			
2	1	Throttle friction spring			
3	1	Control housing			
4	6	Detent spring			
5	1	Detent roller			
6	1	Bushing			
7	1	Throttle only lock			
8	1	Throttle only shaft			
9	1	Round lock pin			
10	1	Square lock pin			
11	1	Spring			
12	1	Shift gear			
13	1	Handle shaft assembly			
14	2	Bushing			
15	1	Neutral start safety switch (two ring terminals)			
16	1	Neutral start safety switch (no terminals)			
17	1	Neutral start safety switch (bullet terminals)			
18	1	Shift arm assembly			
19	1	Shaft support assembly			
20	7	Screw	4.4	39	
21	1	Throttle arm assembly			
22	2	Plastic washer			
23	1	Plate			
24	1	Roller			
25	1	Shoulder bolt	4.4	39	
26	1	Shoulder bolt			
27	1	Back plate			
28	1	Washer			
29	2	Grommet			
30	2	Screw	2.8	25	
31	2	Nut with lock washer	Tighten securely		
32	2	Screw	Tighten securely		
33	2	Insulator			

Commander 4500 Gen II Control Module Components



20456

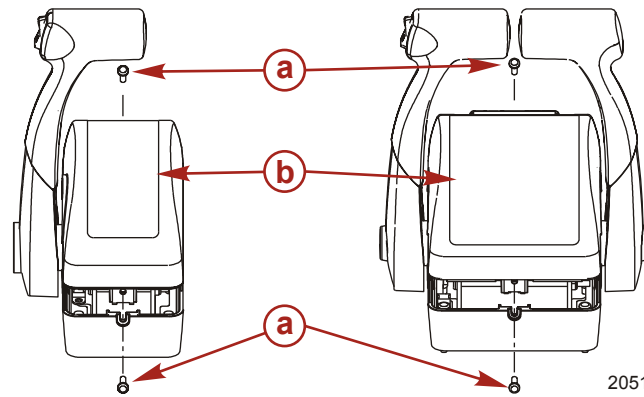
Commander 4500 Gen II Control Module Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Friction adjustment nut (8 - 36)			
2	1	Panel mount housing			
3	1	Bushing			
4	6	Detent spring			
5	1	Washer			
6	1	Retaining ring			
7	1	Nyliner			
8	1	Shift arm assembly			
9	1	Detent roller			
10	1	Decal			
11	1	Decal			
12	1	Neutral start safety switch			
13	1	Handle shaft assembly			
14	1	Support shaft			
15	5	Screw (10 - 32)	3	26	
16	1	Throttle arm assembly			
17	2	Washer			
18	1	Plate			
19	1	Roller			
20	1	Shoulder bolt (10 - 32)	4.4	39	
21	1	Shoulder bolt			
22	1	Back plate			
23	1	Washer			
24	1	Stop switch cable assembly			
25	AR	Spacer (single)			
26	AR	Spacer (double)			
27	2	Screw (8 - 32)	2.8	25	
28	3	Screw (10 - 32)	1.1	10	

Commander 4500 Series Removal and Installation

Commander 4500 Series Console Control Removal

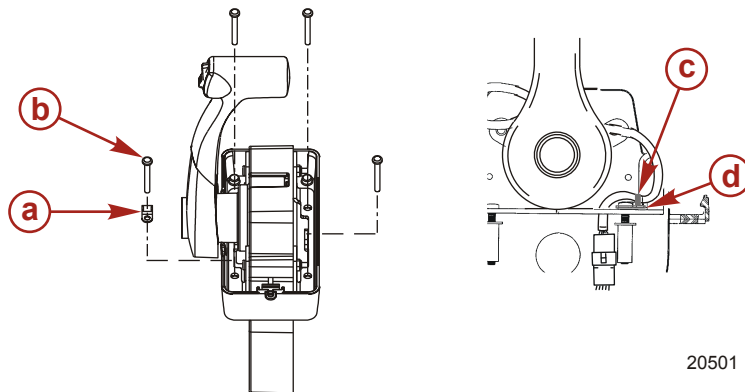
1. Remove the two screws securing the remote control cover to the base assembly. Lift the remote control cover off of the base assembly.



a - Screws (2)

b - Remote control cover

2. Cut the cable tie securing the trim switch wire harness to the cable tie anchor.
3. Remove the four screws securing the remote control module assembly to the console.



a - Cable tie anchor

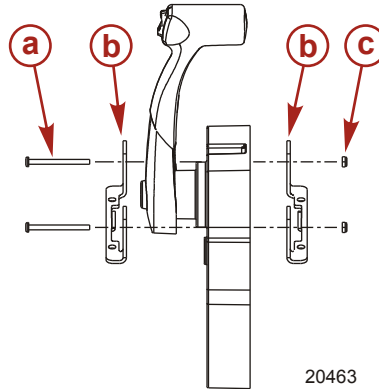
b - Screw (4)

c - Cable tie

d - Cable tie anchor

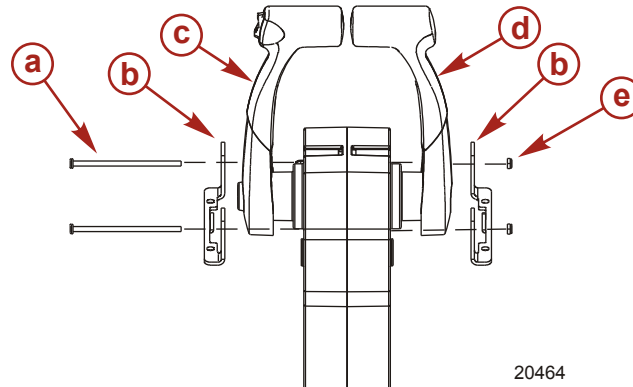
4. Disconnect the control handle trim switch wire harness connector.
5. Disconnect the remote control cover trim switch wire harness connector if equipped.

6. Remove the two screws and nuts securing the mounting brackets to the remote control module.



Single handle console control mounting bracket

- a** - Screw (2) 57 mm (2.0 in.)
- b** - Mounting bracket (2)
- c** - Locknuts (2)

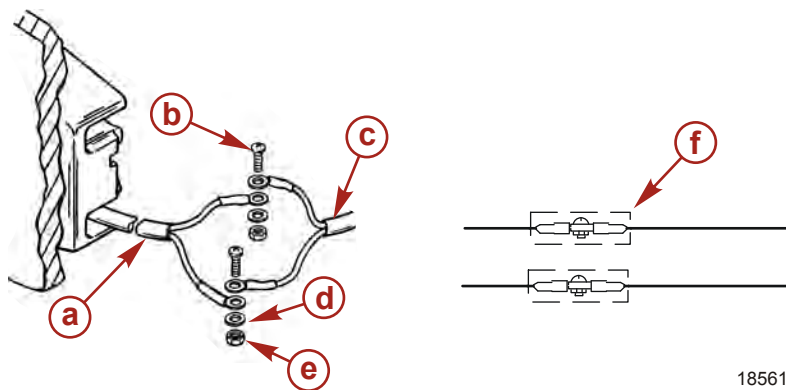


Dual handle console control mounting bracket

- a** - Screws (2) 102 mm (4.0 in.)
- b** - Mounting bracket (2)
- c** - Port side control module
- d** - Starboard side control module
- e** - Locknuts (2)

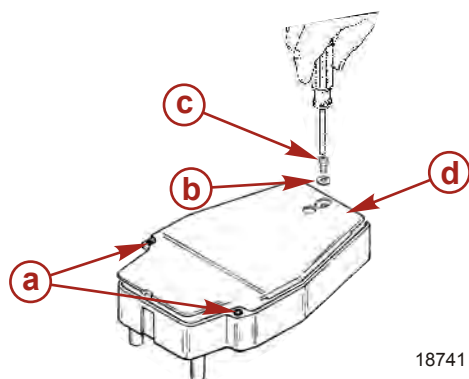
7. Disconnect the neutral start safety switch wire harness from the boat wire harness.

NOTE: Some remote control models have bullet connectors instead of ring terminals.



- a** - Control module neutral start safety switch wire harness
- b** - Screw (2)
- c** - Boat wire harness neutral start safety switch wire harness
- d** - Washer
- e** - Nut
- f** - Rubber sleeve

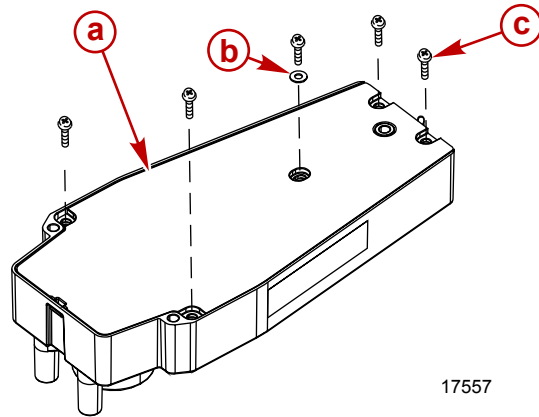
8. Remove three screws and one washer securing the back plate to the Gen I remote control module assembly.



Generation I

- a** - Screw securing back plate
- b** - Washer
- c** - Screw
- d** - Back plate

9. Remove the five screws and washers securing the back plate to the Gen II remote control module assembly.

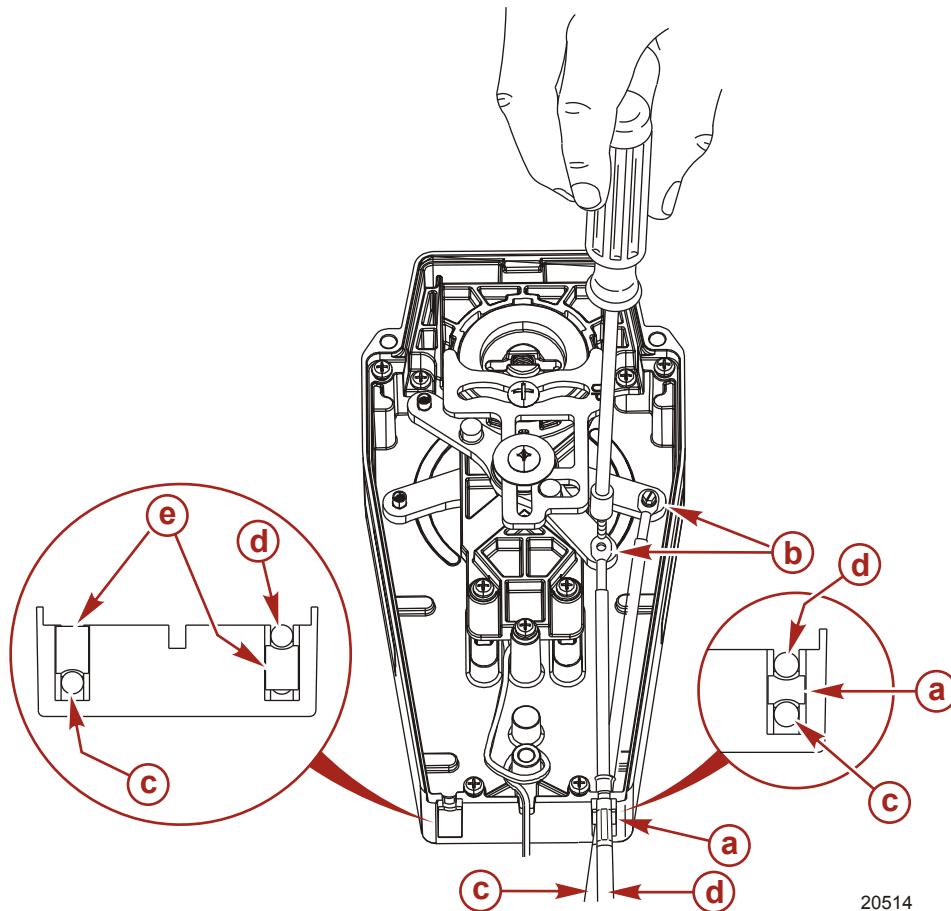


Generation II

a - Back plate
b - Washer

c - Screw (5)

10. Remove the screws securing the shift cable to the shift arm and the throttle cable to the throttle arm.
11. Remove the shift cable and the throttle cable.



a - Small spacer
b - Screw
c - Shift cable

d - Throttle cable
e - Large spacer

Shift and Throttle Cable Installation

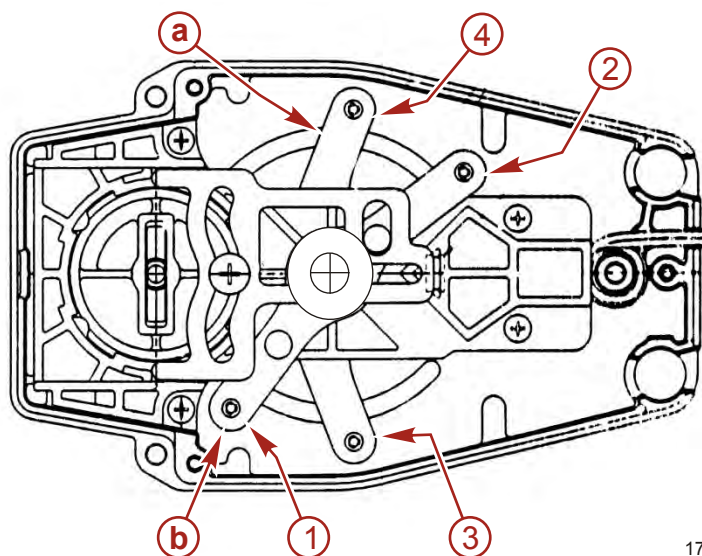
OUTBOARD MODELS

Outboard Models (U.S. and Belgium Models Only)	Starboard Mount Control		Port Mount Control	
	Anchor Attaching Location		Anchor Attaching Location	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Force Outboards and L-Drive (except 9.9 and 15)	4	2	3	2
Mariner and Mercury Outboards (Standard Rotation Models) - All Models through 225 HP (With Pull Throttle) includes 1994-1/2 20/25	4	2	3	2
Mariner and Mercury Outboards - 18 HP, 20 HP, 25 HP (U.S. Origin) (With Push Throttle Cable)	4	1	3	1
Mariner and Mercury Outboards (Counter Rotation Gearcase) - All Models through 225 HP	3	2	4	2
Mariner and Mercury Outboards (Standard Rotation Gearcase) - 250 HP/275 HP	3	2	4	2
Mariner and Mercury Outboards (Counter Rotation Gearcase) - 250 HP/275 HP	4	2	3	2
Mercury Outboards (Standard Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2
Mercury Outboards (Counter Rotation Gearcase) - 3.0 Liter EFI GEN II, OptiMax GEN II	4	2	3	2

IMPORTANT: The shift cable must be correctly installed at the remote control assembly for the appropriate gear housing rotation (standard or counter). Determine the type of rotation prior to cable installation.

NOTE: For 3.0 Liter EFI GEN II and OptiMax GEN II outboard units, refer to the instructions for standard rotation control cable installation.

NOTE: The base assembly gasket and the base assembly must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.



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- a** - Shift arm
b - Throttle arm

MERCURY MERCUISER MODELS

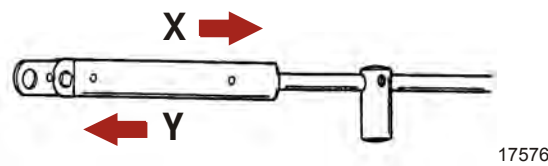
IMPORTANT: The shift cable must be correctly installed at the remote control assembly for the appropriate drive unit rotation (standard or counter). Determine the type of drive unit rotation prior to cable installation.

NOTE: For Bravo Three and Blackhawk drive units, refer to the instructions for standard rotation control cable installation.

NOTE: The base assembly gasket and the base assembly must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.

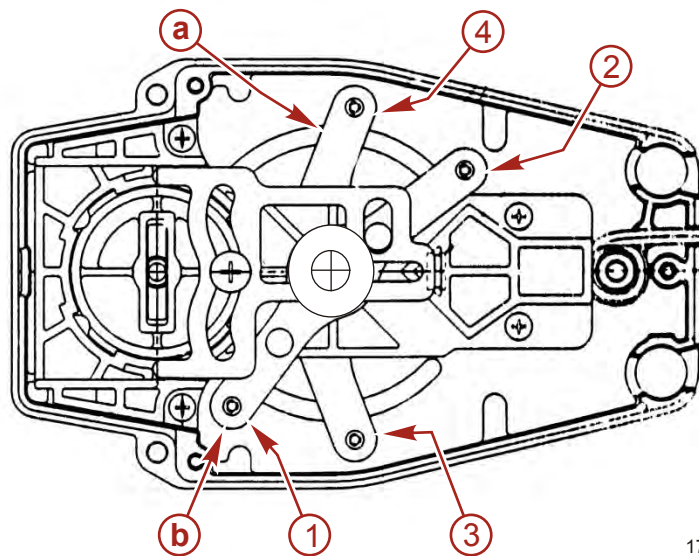
Mercury MerCruiser Models Standard Rotation - The control cable will have to be installed in the remote control so the cable end will move in direction X when shift handle is placed in the forward position.

Mercury MerCruiser Models Counter Rotation - The control cable must be installed in the remote control so the cable end will move in the direction Y when the shift handle is placed in the forward position.



Direction of arrow (Viewed at shift plate)

Mercury MerCruiser Models	Standard Rotation		Counter Rotation	
Starboard Mount Mechanical Control	Anchor Attachment Points		Anchor Attachment Points	
	Shift Cable	Throttle Cable	Shift Cable	Throttle Cable
Direction of arrow	X	X	Y	X
Lever number	4	2	3	2



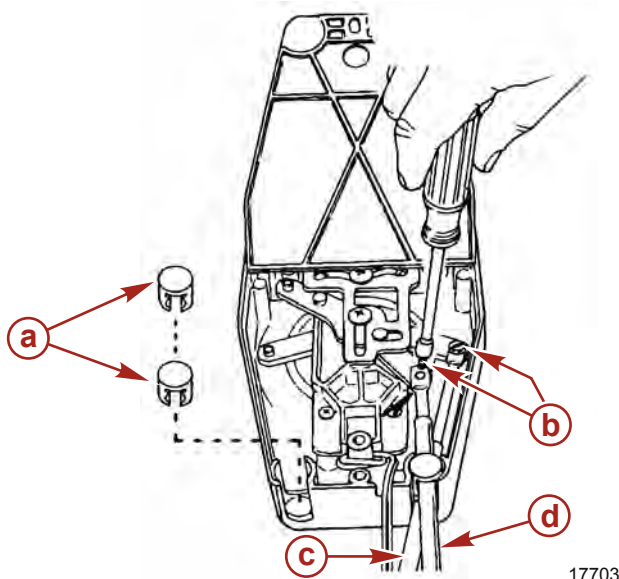
- a - Shift arm
- b - Throttle arm

TYPICAL SHIFT AND THROTTLE CABLE INSTALLATION, OUTBOARD AND MERCURY MERCURUISER

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. Control cable fastener screws must be properly torqued and retained with Loctite Threadlocker to prevent control cable fastener screws from loosening, thus allowing the cable ends to disconnect.

1. Apply Loctite 271 Threadlocker to the threads of the cable fastener screws.
2. Install the control cables in the appropriate arm in the remote control module.
3. Tighten the cable fastener screws to specified torque.



- a** - Filler grommet
- b** - Screw (2) (10-32)
- c** - Shift cable
- d** - Throttle cable

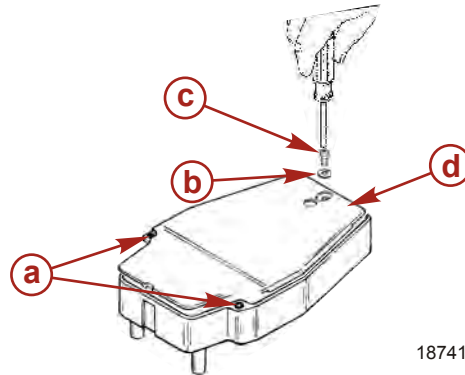
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control cable fastener screws	92-809819

Description	Nm	lb. in.	lb. ft.
Control cable fastener screws	2.8	25	

⚠ WARNING

Avoid serious injury or death from sudden unexpected loss of throttle/shift control. The back plate must be fastened to the control with washer and screw to prevent the back cover from loosening, thus resulting in the control cables slipping out of the mounting slots at the rear of the control.

4. After installing the control cables, secure the back cover with a washer and three screws. Tighten the screws to the specified torque.



- a** - Screw (2)
- b** - Washer
- c** - Screw
- d** - Back cover

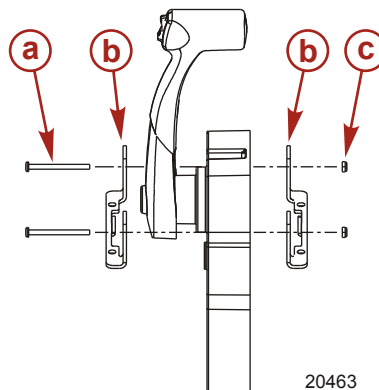
Description	Nm	lb. in.	lb. ft.
Back cover screws (3)	4.4	39	

Commander 4500 Series Console Control Installation

SINGLE HANDLE CONSOLE CONTROL MOUNTING BRACKET INSTALLATION

NOTE: The base assembly gasket and the base assembly, must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.

1. Install the mounting brackets onto the control module.
2. Secure the mounting brackets to the control module with two 57 mm (2.0 in.) screws and locknuts. Do not tighten the screws and nuts at this time.

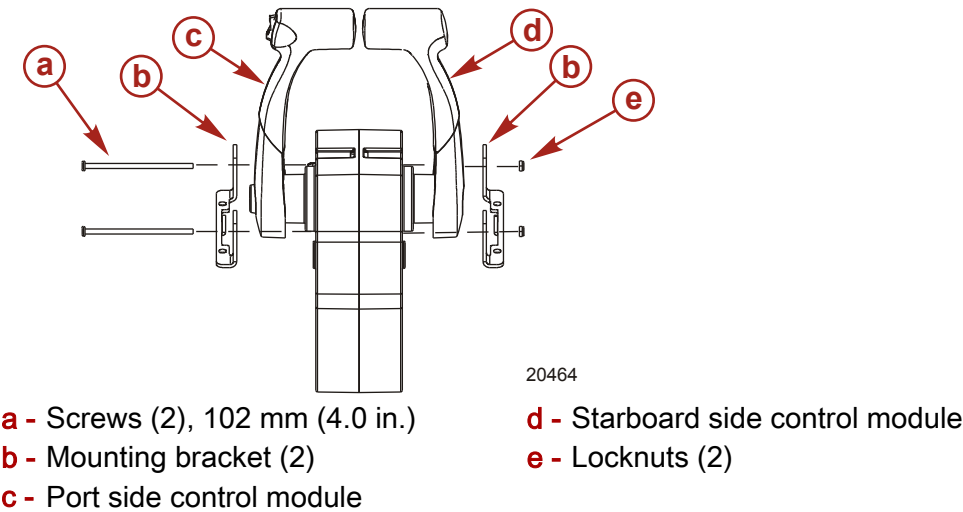


- a** - Screw (2), 57 mm (2.0 in.)
- b** - Mounting bracket (2)
- c** - Locknut (2)

DUAL HANDLE CONSOLE CONTROL MOUNTING BRACKET INSTALLATION

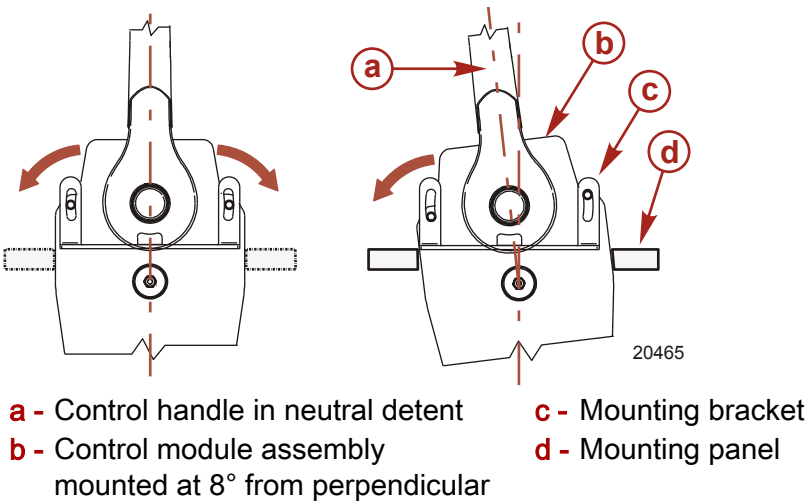
1. Place the control modules back to back.
2. Install the mounting brackets to the control modules.

3. Secure the mounting brackets to the control modules with two 102 mm (4.0 in.) screws and locknuts. Do not tighten the screws and nuts at this time.



REMOTE CONTROL MODULE ANGLE ADJUSTMENT

1. Ensure the control handle is in the neutral detent position.
2. Move the control module assembly to the desired angle relative to the mounting surface. The maximum angle is 8° from perpendicular.
3. Tighten the control module mounting bracket screws and nuts to the specified torque.



Description	Nm	lb. in.	lb. ft.
Control module mounting bracket screws and nuts	4	35	

CONSOLE CONTROL INSTALLATION

NOTE: The base assembly gasket and the base assembly, must be placed over the console control mount opening prior to installing the shift and throttle cables to the control module.

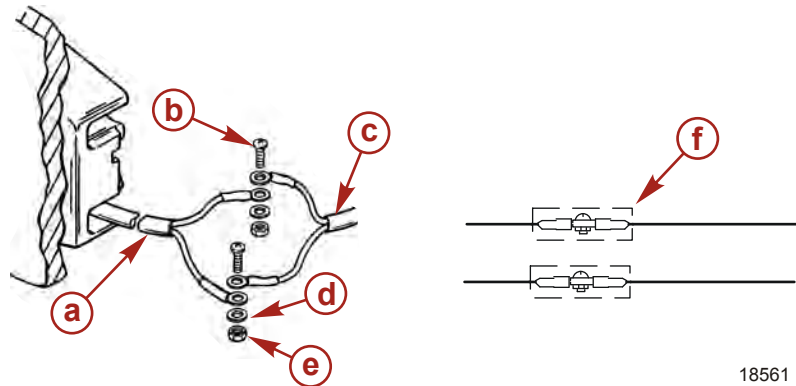
1. Install the base gasket over the console opening.
2. Install the base assembly over the console opening.
3. Ensure the shift and throttle control cables are securely installed onto the remote control module assembly.

4. Connect the remote control module assembly neutral start safety switch leads to the wire harness. Apply Liquid Neoprene to the connection to prevent corrosion. Allow the Liquid Neoprene to dry. Protect each connection with a rubber sleeve or shrink tubing.

⚠ WARNING

Avoid serious injury or death from a sudden unexpected acceleration when starting the engine. The neutral start safety switch must be correctly connected to prevent engine startup when in gear. Refer to wiring diagrams for correct wiring connections.

NOTE: Some remote control models have bullet connectors instead of ring terminals.

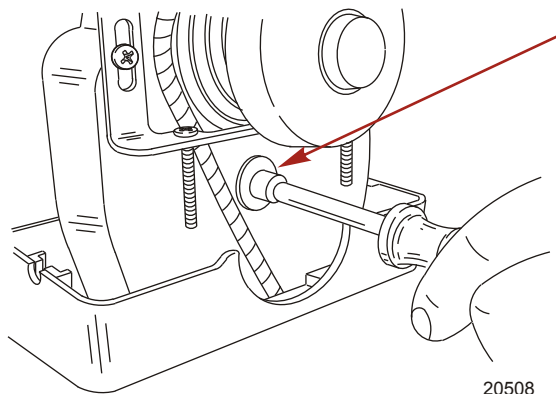


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- a** - Control module neutral start safety switch wire harness
- b** - Screw (2)
- c** - Boat wire harness
- d** - Washer
- e** - Nut
- f** - Rubber sleeve

Tube Ref No.	Description	Where Used	Part No.
25	Liquid Neoprene	Neutral start safety switch wire connection	92-25711-3

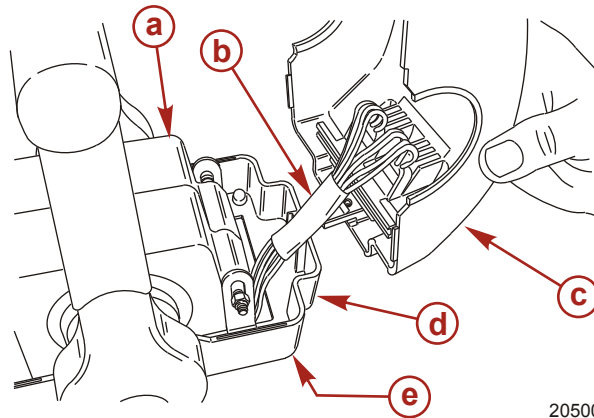
5. Adjust the control friction to the desired resistance.
 - Turn the control friction adjustment nut clockwise to increase the resistance.
 - Turn the control friction adjustment nut counterclockwise to decrease the resistance.



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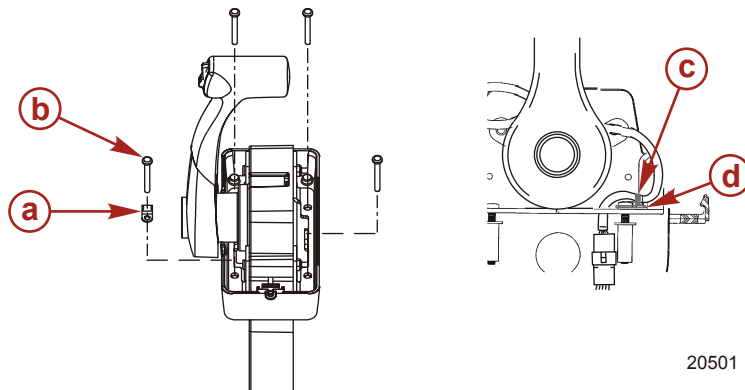
6. Connect the trim switch harness connector to the wire harness connector. Ensure the trim switch harness wires are at the rear of the remote control module assembly.

7. Install the remote control module assembly into the base assembly. Ensure that the wires will not be pinched during the installation and securing of the remote control module assembly to the console.



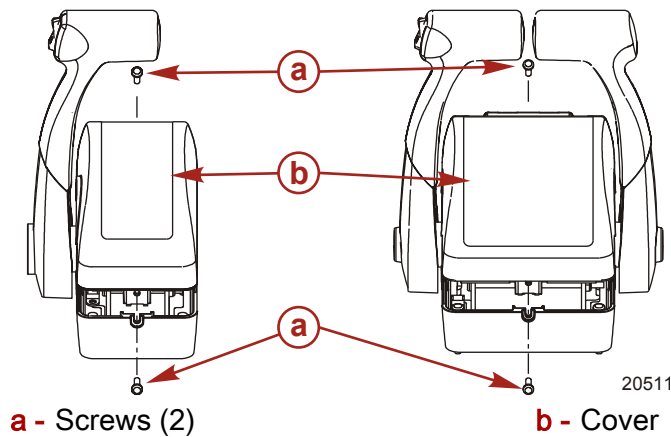
- a** - Remote control modules
- b** - Trim switch harness leads
- c** - Remote control cover
- d** - Base assembly
- e** - Base assembly gasket (hidden)

8. Install a cable tie anchor onto the screw.
9. Secure the remote control module assembly to the console with four 38 mm (1.5 in.) screws. Tighten the screws securely.
10. Ensure the control handle trim switch wire harness has enough slack to move freely while operating the control handle to full forward and full reverse. Secure the control handle trim switch wire harness to the cable tie anchor with a cable tie.



- a** - Cable tie anchor
- b** - Screw (4)
- c** - Cable tie
- d** - Cable tie anchor

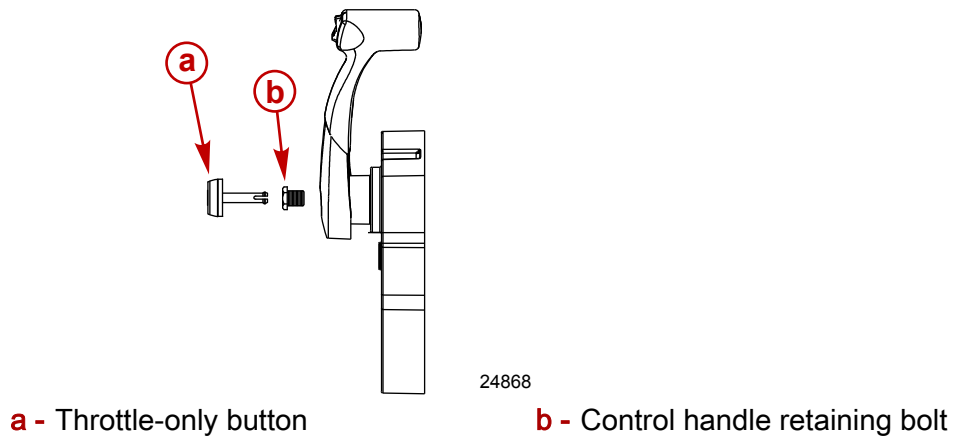
11. Secure the remote control cover with two screws. Tighten the screws securely.



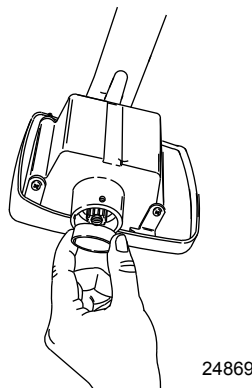
Commander 4500 Series Remote Control Module Disassembly and Assembly

Commander 4500 Gen I Remote Control Module Disassembly

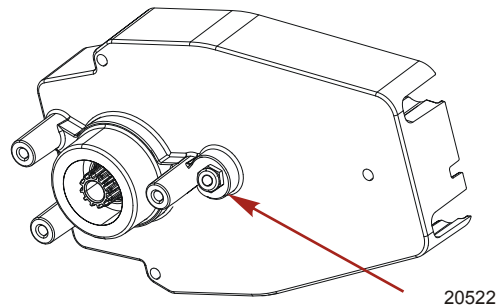
1. Push the throttle-only button in and advance the throttle.
2. Pry the throttle-only button out the the control handle with a flat blade screwdriver.
3. Remove the control handle retaining bolt securing the handle to the control module.
4. Remove the control handle.



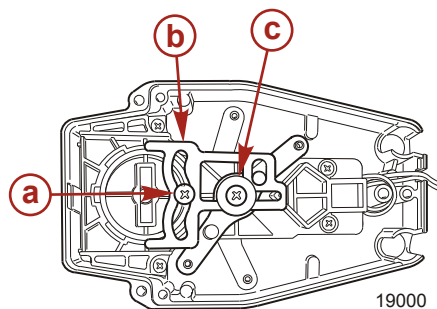
5. Remove the control handle bushing.



6. Remove the friction adjustment nut from the remote control module assembly.

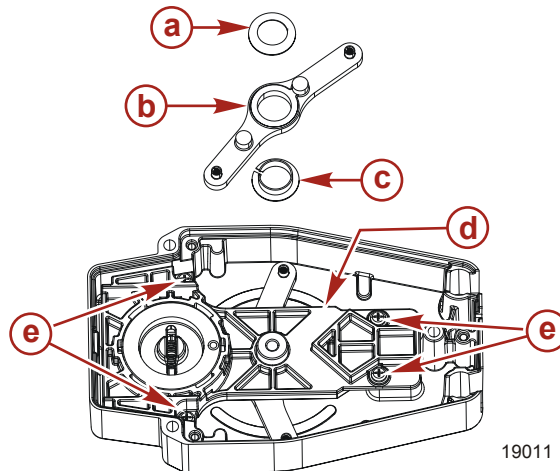


7. Remove the shoulder screw with the roller from the handle shaft assembly.
8. Remove the shoulder screw, and the washer securing the plate to the remote control module assembly.
9. Remove the throttle plate from the remote control module.



- a** - Shoulder screw with roller on handle shaft assembly
b - Throttle plate
c - Shoulder screw with washer

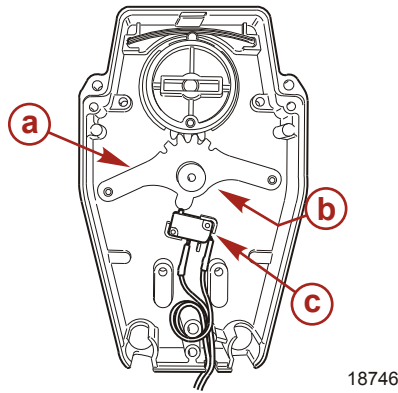
10. Remove the washer, throttle arm, and the bushing from the control module.
11. Remove the four screws securing the shaft support to the control module housing.
Remove the shaft support.



- a** - Washer
b - Throttle arm
c - Bushing
d - Shaft support
e - Screws (4)

12. Remove the shift arm assembly and the bushing from the control module housing.

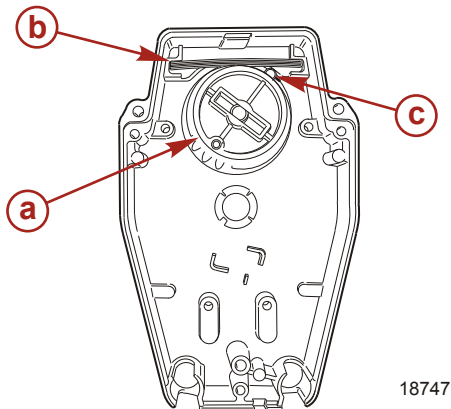
13. Remove the neutral start safety switch from the control module housing.



- a** - Shift arm assembly
- b** - Bushing (located under shift arm assembly)
- c** - Neutral start safety switch

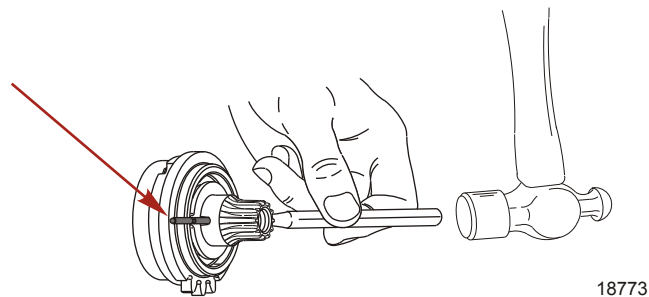
14. Remove the detent springs and detent roller from the control module housing.

15. Remove the handle shaft assembly.

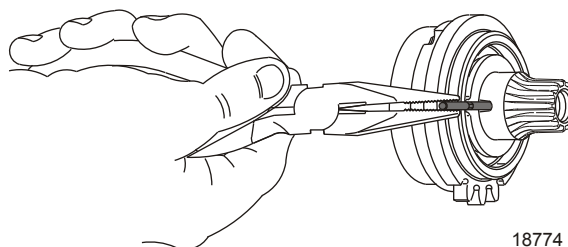


- a** - Handle shaft assembly
- b** - Detent springs (6)
- c** - Detent roller

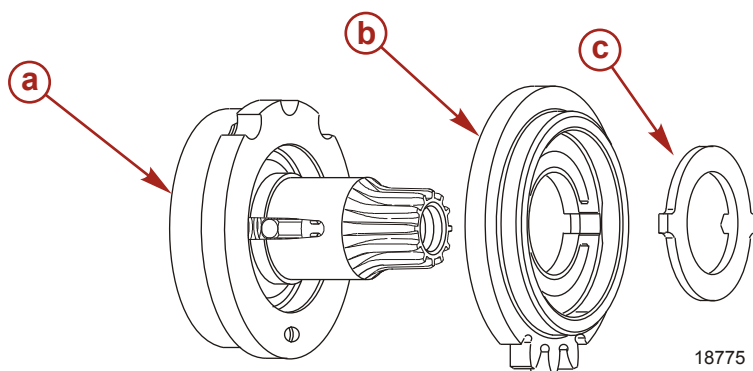
16. Use a hammer and a punch to push the round lock pin out of the handle shaft.



17. Use a pair of pliers to remove the round lock pin from the handle shaft.

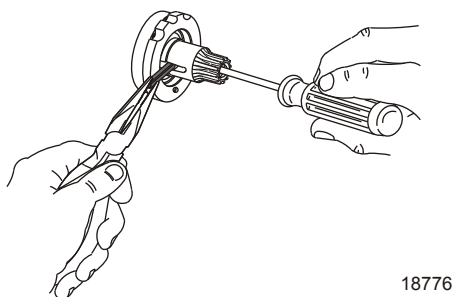


18. Remove the shift gear and lock ring from the handle shaft assembly.

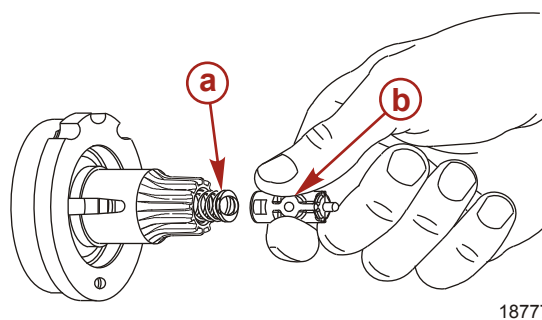


- a** - Handle shaft assembly
- b** - Shift gear
- c** - Lock ring

19. Push the throttle-only shaft to remove the square drive pin from the handle shaft assembly.



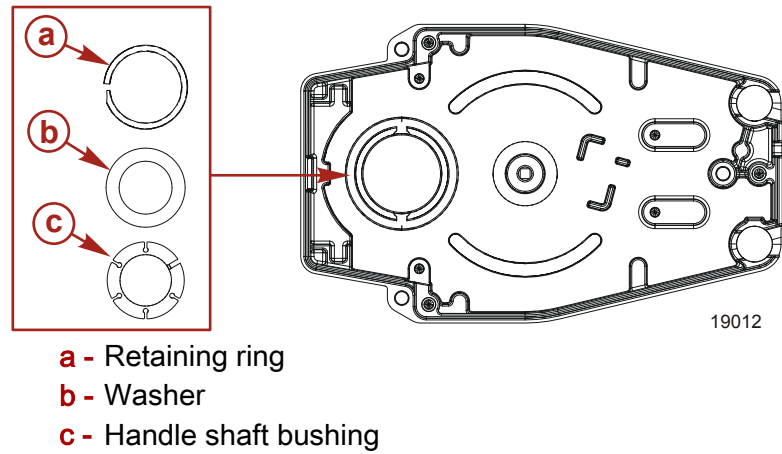
20. Remove the throttle-only shaft and spring.



- a** - Spring
- b** - Throttle-only shaft

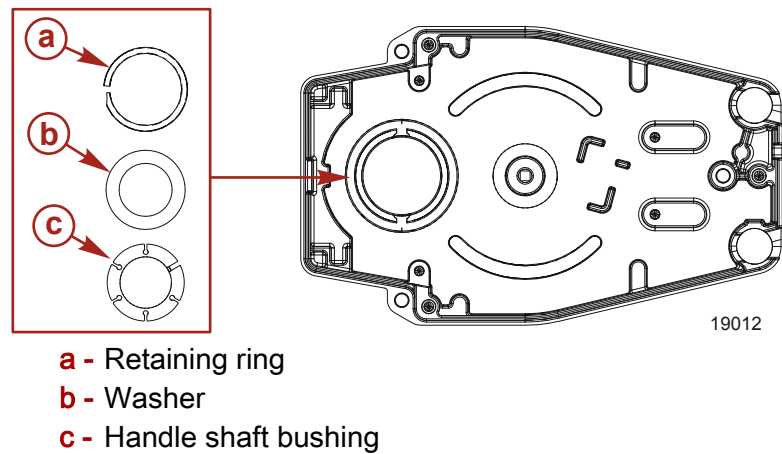
21. Use a screwdriver to remove the retaining ring in the control housing.

22. Remove the washer and handle shaft bushing from the control housing.



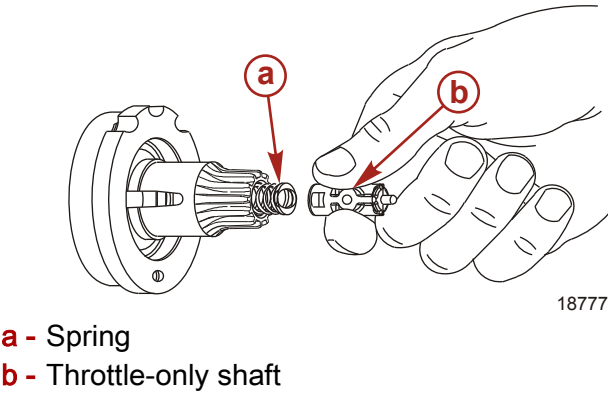
Commander 4500 Gen I Remote Control Module Assembly

1. Lubricate the handle shaft bushing with 2-4-C with Teflon and insert handle shaft bushing into the control module housing.
2. Install the washer on top of the handle shaft bushing. Secure the washer onto the control module housing with a retaining ring.



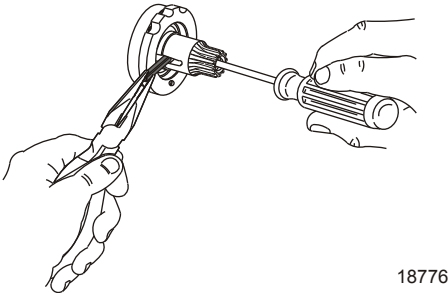
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft bushing	92-802859A1

3. Apply 2-4-C with Teflon onto the spring and throttle-only shaft. Ensure the hole in the throttle-only shaft is aligned with the hole in the handle shaft. Install the spring and throttle-only shaft into the handle shaft.



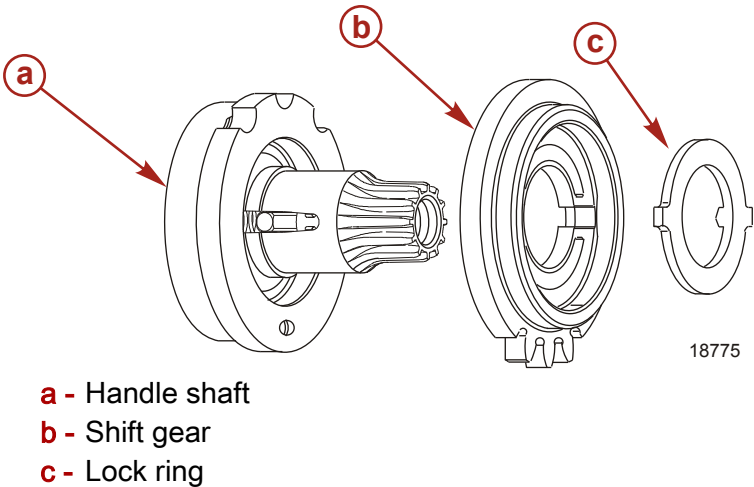
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle-only shaft and spring	92-802859A1

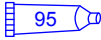
4. Lubricate the square drive pin with 2-4-C with Teflon.
5. Push the throttle-only shaft into the handle shaft with a small screwdriver to align the hole in the handle shaft and the hole in the throttle-only shaft.
6. Insert the square drive pin into the handle shaft hole and through the throttle-only shaft.



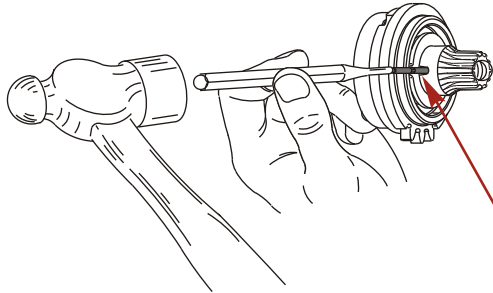
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Square drive pin	92-802859A1

7. Lubricate the handle shaft, lock ring, and the entire shift gear with 2-4-C with Teflon. Slide the shift gear and the lock ring onto the handle shaft.



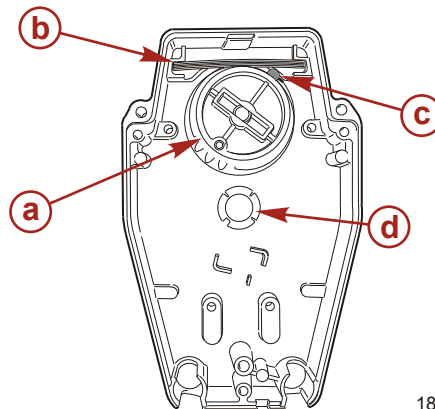
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft, shift gear and lock ring	92-802859A1

8. Install the round lock pin into the handle shaft with a hammer and punch. Ensure the round pin is centered in the handle shaft.



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9. Lubricate the handle shaft assembly bore of the control module housing with 2-4-C with Teflon. Install the handle shaft assembly into the control module housing.
10. Lubricate the shift arm bushing with 2-4-C with Teflon. Install the shift arm bushing onto the control module housing.
11. Install the detent springs onto the control module housing. Lubricate the detent roller with 2-4-C with Teflon and install the detent roller between the springs and handle shaft



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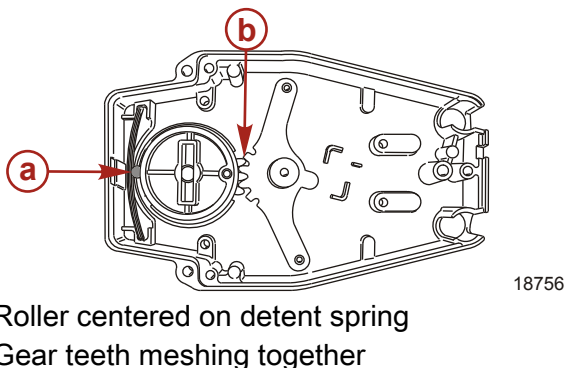
- a** - Shift gear and throttle shaft assembly
- b** - Detent spring (6)

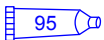
- c** - Detent roller
- d** - Bushing

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft bore of control module housing, roller, and shift arm bushing	92-802859A1

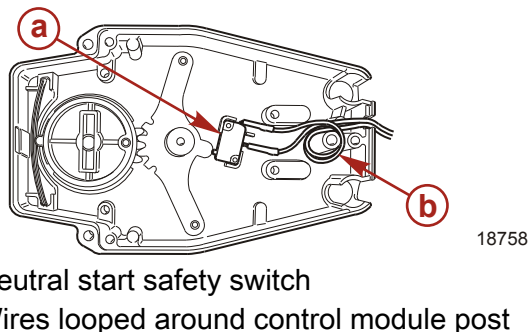
12. Turn the handle shaft so the roller is centered on the spring.
13. Lubricate the gear teeth on the shift arm assembly with 2-4-C with Teflon.

14. Install the shift arm assembly to the control module housing. Ensure the gear teeth of the shift arm assembly mesh with the teeth on the handle shaft assembly.



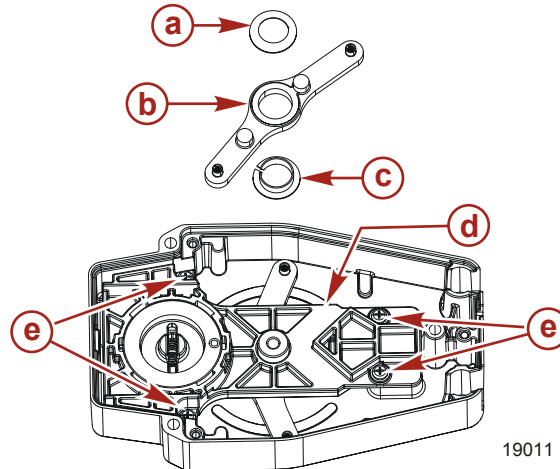
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Gear teeth on shift arm assembly	92-802859A1

15. Install the neutral start safety switch onto the squared area of the control module housing and loop the wires around the control module post.



16. Lubricate the handle shaft assembly and shift arm assembly with 2-4-C with Teflon.
17. Install the shaft support assembly. Secure the shaft support assembly to the control module housing assembly with four screws. Tighten the screws to the specified torque.
18. Lubricate the throttle arm bushing with 2-4-C with Teflon and install onto the control module. Install the throttle arm onto the throttle arm bushing.

19. Lubricate the throttle arm washer with 2-4-C with Teflon. Install the throttle arm washer on top of the throttle arm.



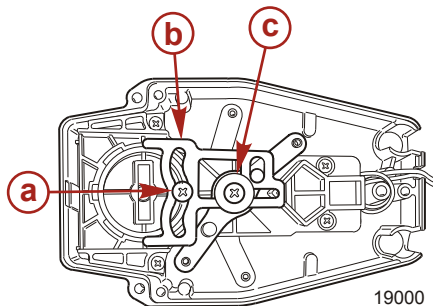
a - Washer
b - Throttle arm
c - Bushing

d - Shaft support assembly
e - Screws (4)

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft assembly, shift arm assembly, throttle arm bushing, and throttle arm washer	92-802859A1

Description	Nm	lb. in.	lb. ft.
Screw securing shaft support assembly (4)	2.5	22	

20. Align the throttle plate with the throttle arm assembly and handle shaft.
21. Install the roller onto one of the shoulder screws. Apply Loctite 271 Threadlocker to the threads of the shoulder screw with the roller installed.
22. Secure the plate to the handle shaft with the shoulder screw and roller. Tighten the shoulder screw with the roller to the specified torque.
23. Secure the plate to the control module with a shoulder screw and washer.

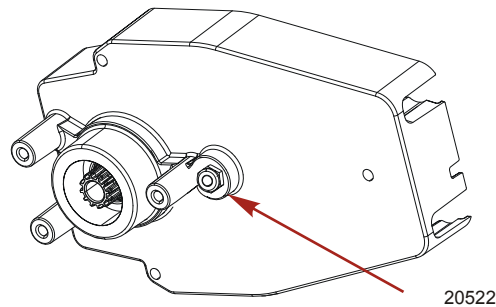


a - Shoulder bolt with roller
b - Throttle plate
c - Shoulder bolt with washer

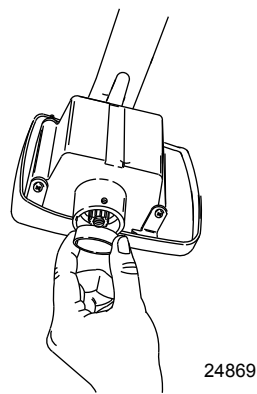
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Threads of shoulder bolt with roller	92-809819

Description	Nm	lb. in.	lb. ft.
Shoulder bolt with roller	4	35	

24. Install the friction nut onto the friction screw.



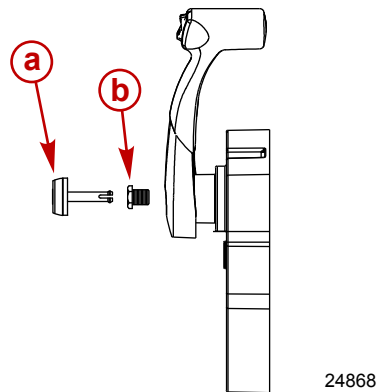
25. Lubricate the control handle bushing with 2-4-C with Teflon. Insert the control handle bushing into the control module assembly.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle bushing	92-802859A1

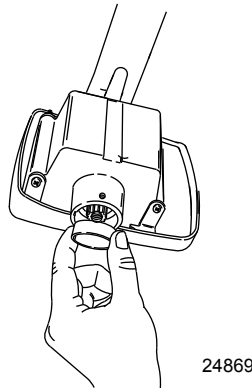
Commander 4500 Gen II Remote Control Module Disassembly

- 1. Pry the throttle-only button out the the control handle with a flat blade screwdriver.
- 2. Remove the screw securing the handle to the control module.
- 3. Remove the control handle.

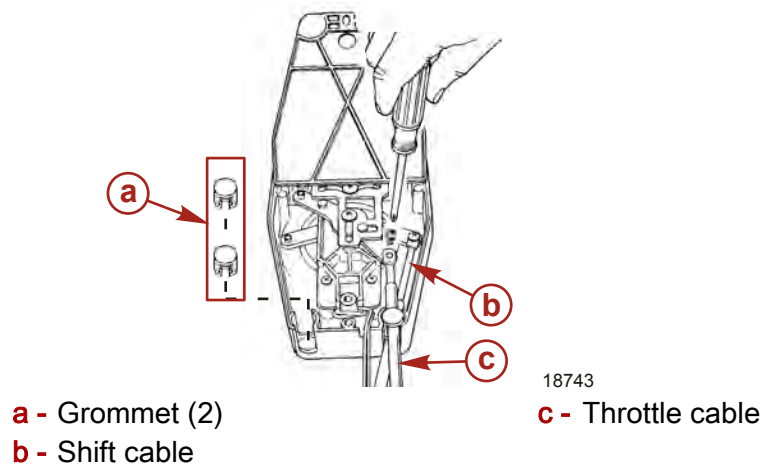


a - Throttle-only button **b** - Screw

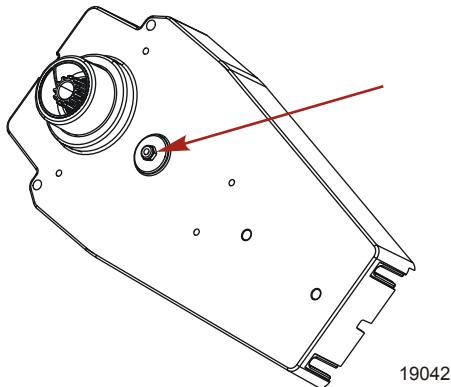
4. Remove the bushing.



5. Remove the screws securing the shift cable and throttle cable to the shift and throttle arm assemblies.
6. Remove the two grommets.

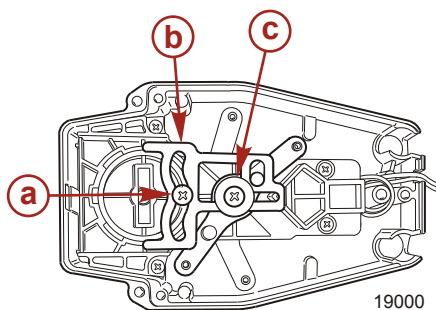


7. Remove the friction adjustment nut.



8. Remove the shoulder screws and roller securing the plate to the remote control module assembly.
9. Remove the shoulder screw and washer securing the plate to the remote control module assembly.

10. Remove the plate from the remote control module.



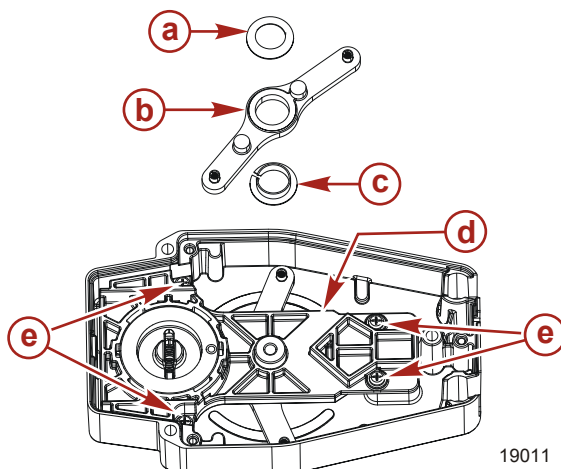
a - Shoulder screw with roller

c - Shoulder screw with washer

b - Plate

11. Remove the washer, throttle arm, and bushing from the control module.

12. Remove the four screws securing the shaft support to the control module housing. Remove the shaft support.



a - Washer

b - Throttle arm

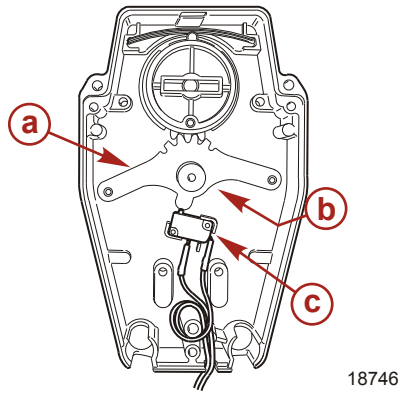
c - Bushing

d - Shaft support

e - Screws (4)

13. Remove the shift arm assembly and the shift arm bushing from the control module housing.

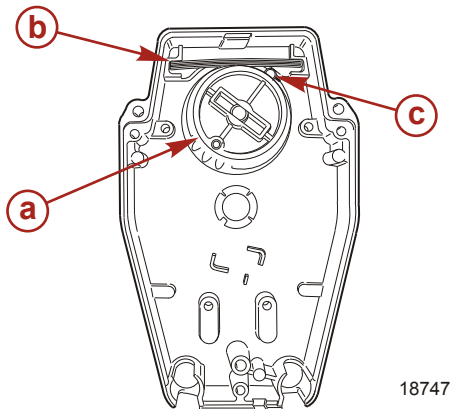
14. Remove the neutral start safety switch from the control module housing.



- a** - Shift arm assembly
- b** - Shift arm bushing (located under shift arm assembly)
- c** - Neutral start safety switch

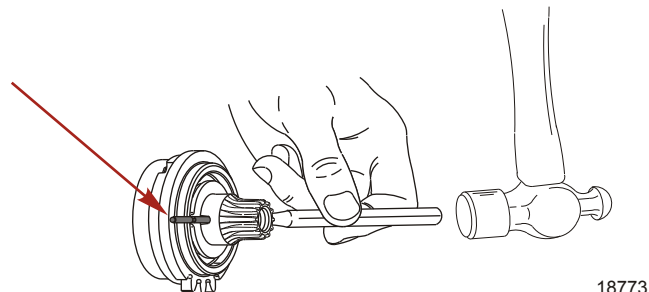
15. Remove the springs and roller from the control module housing.

16. Remove the shift gear and the throttle shaft assembly by pushing on the handle shaft.

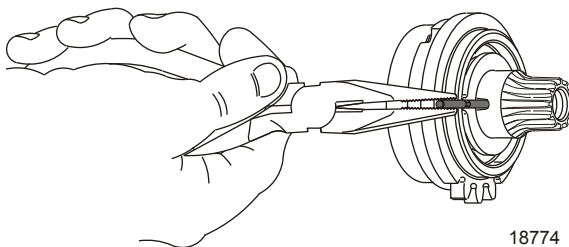


- a** - Shift gear and throttle shaft assembly
- b** - Spring
- c** - Roller

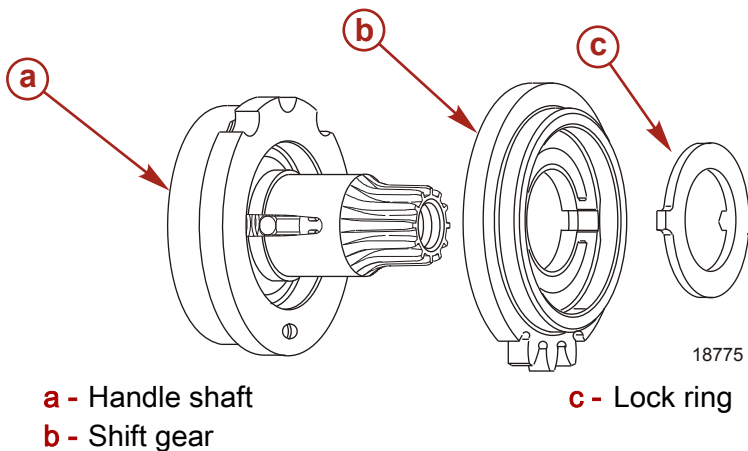
17. Use a hammer and a punch to push the round lock pin out of the handle shaft.



18. Use a pair of pliers to remove the round lock pin from the handle shaft.

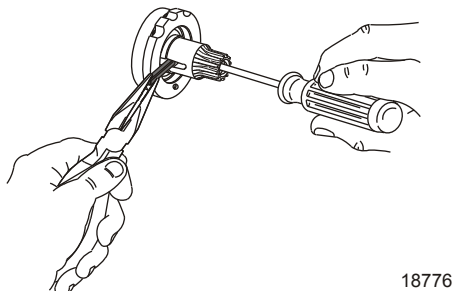


19. Remove the shift gear, and lock ring from the handle shaft.

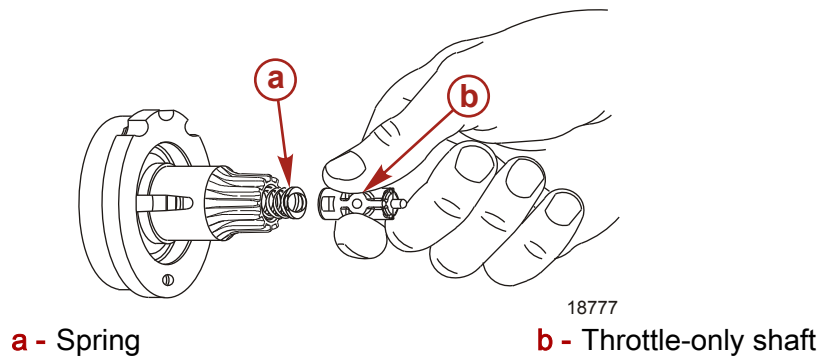


20. Push the throttle-only shaft in with a screwdriver or other tool.

21. Use a pair of pliers to remove the square drive pin from the handle shaft.

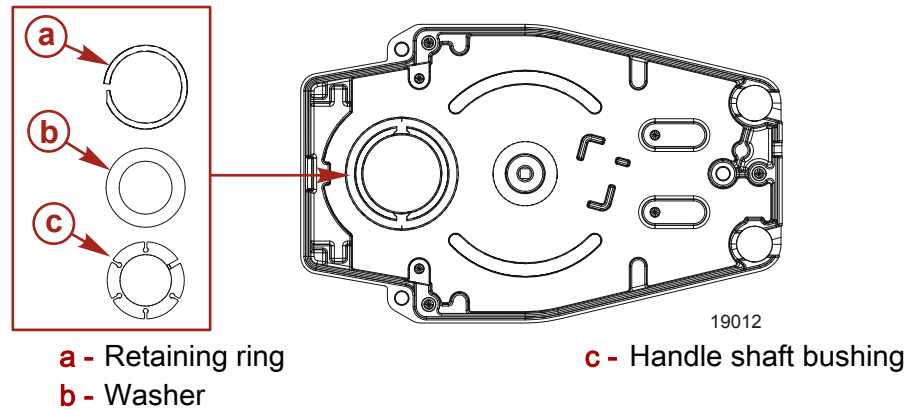


22. Remove the throttle-only shaft and spring.



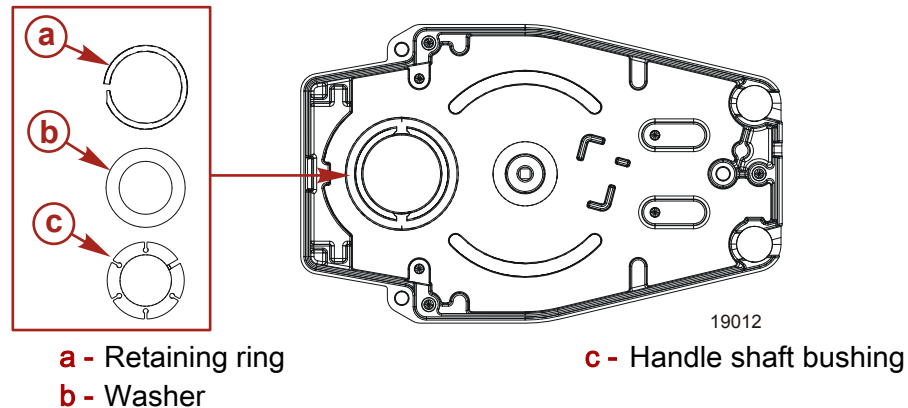
23. Use a screwdriver to remove the retaining ring in the control housing.

24. Remove the washer and handle shaft bushing from the control housing.



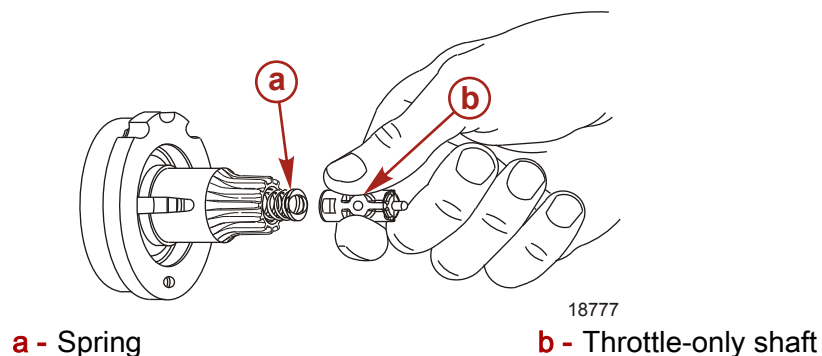
Commander 4500 Gen II Remote Control Module Assembly

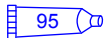
1. Lubricate the handle shaft bushing with 2-4-C with Teflon and insert the handle shaft bushing into the control module housing.
2. Install the washer on top of the handle shaft bushing. Secure the washer onto the control module housing with a retaining ring.



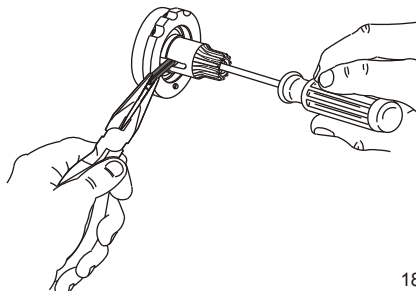
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft bushing	92-802859A1

3. Apply 2-4-C with Teflon to the spring and throttle-only shaft.
4. Ensure the hole in the throttle-only shaft is aligned with the hole in the handle shaft. Install the spring and throttle-only shaft into the handle shaft.

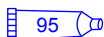


Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Throttle-only shaft and spring	92-802859A1

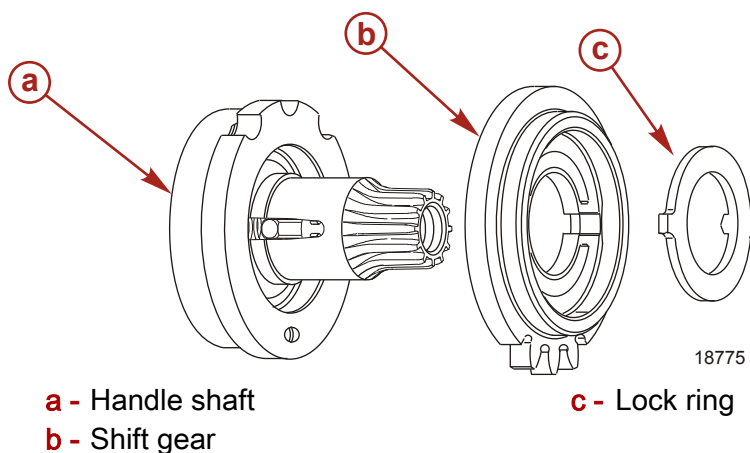
5. Lubricate the square drive pin with 2-4-C with Teflon.
6. Push the throttle-only shaft into the handle shaft to align the hole in the handle shaft with the hole in the throttle-only shaft. Insert the square drive pin into the handle shaft hole and through the throttle-only shaft.



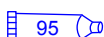
18776

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Square drive pin	92-802859A1

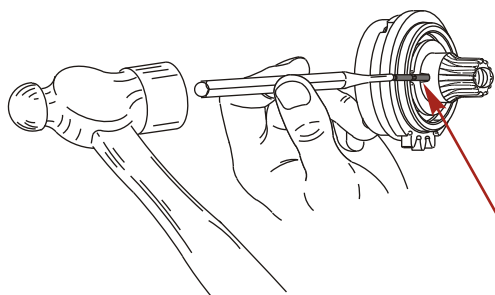
7. Lubricate the handle shaft with 2-4-C with Teflon.
8. Lubricate the entire shift gear and lock ring with 2-4-C with Teflon.
9. Slide the shift gear and lock ring onto the handle shaft.



18775

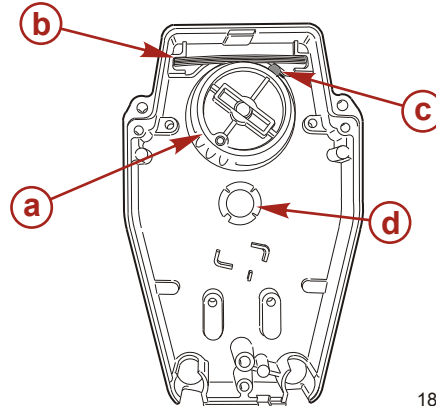
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft, shift gear, and lock ring	92-802859A1

10. Install the round lock pin into the handle shaft with a hammer and punch. Ensure the round pin is centered in the handle shaft.



18784

11. Lubricate the handle shaft assembly bore of the control module housing with 2-4-C with Teflon.
12. Install the handle shaft assembly into the control module housing.
13. Lubricate the shift arm bushing with 2-4-C with Teflon. Install the shift arm bushing onto the control module housing.
14. Install the springs onto the control module housing.
15. Lubricate the detent roller with 2-4-C with Teflon. Install the detent roller between the spring and handle shaft



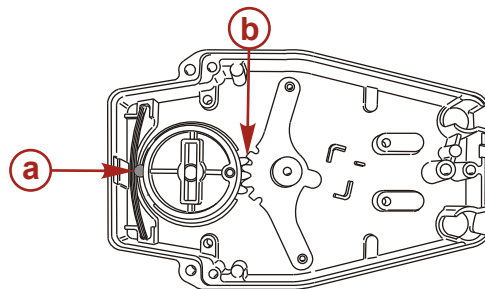
18757

a - Shift gear and throttle shaft assembly
b - Spring

c - Detent roller
d - Shift arm bushing

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft bore of control module housing, roller, and shift arm bushing	92-802859A1

16. Turn the handle shaft so the roller is centered on the spring.
17. Lubricate the gear teeth on the shift arm assembly with 2-4-C with Teflon.
18. Install the shift arm assembly to the control module housing. Ensure the gear teeth of the shift arm assembly mesh with the teeth on the handle shift assembly.



18756

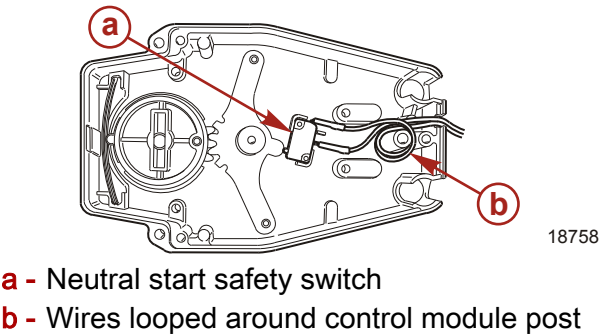
a - Roller centered on spring

b - Gear teeth meshing together

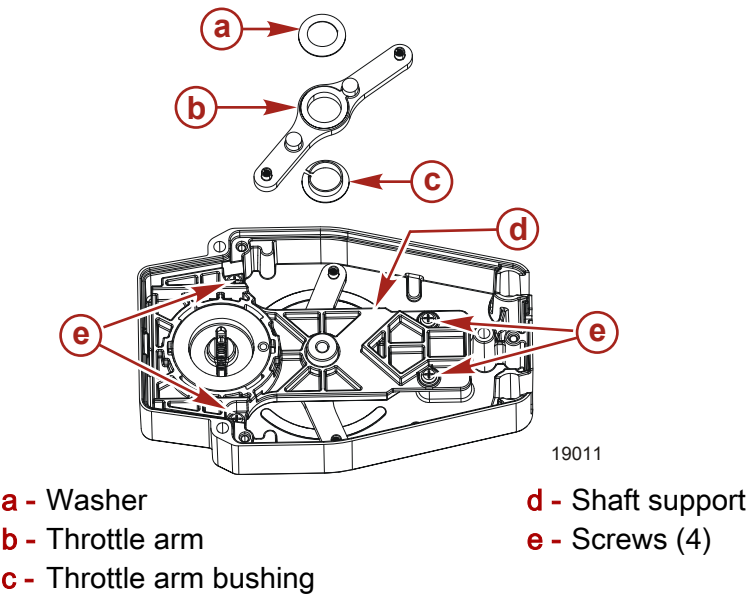
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Gear teeth on shift arm assembly	92-802859A1

19. Install the neutral start safety switch onto the squared area of the control module housing.

20. Loop the neutral start safety switch wires around the control module post.



21. Lubricate the handle shaft assembly and shift arm assembly with 2-4-C with Teflon.
22. Install the shaft support and secure to the control module housing assembly with four screws. Tighten the screws to the specified torque.
23. Lubricate the throttle arm bushing with 2-4-C with Teflon and install onto the control module.
24. Install the throttle arm onto the throttle arm bushing.
25. Lubricate the throttle arm washer with 2-4-C with Teflon. Install the throttle arm washer on top of the throttle arm.



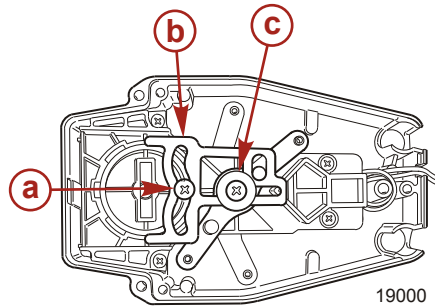
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Handle shaft assembly and shift arm assembly, throttle arm bushing, throttle arm washer	92-802859A1

Description	Nm	lb. in.	lb. ft.
Screw securing shaft support assembly (4)	3.0	26	

26. Align the plate with the throttle arm assembly and handle shaft.
27. Install the roller onto the shoulder screw. Apply Loctite 271 Threadlocker to the threads of the shoulder screw with the roller installed.
28. Secure the plate with the shoulder screw and roller into the handle shaft. Tighten the shoulder screw with the roller to the specified torque.

29. Install a washer onto the shoulder screw

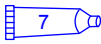
30. Install the shoulder screw with the washer into the shift arm assembly.



a - Shoulder screw with roller

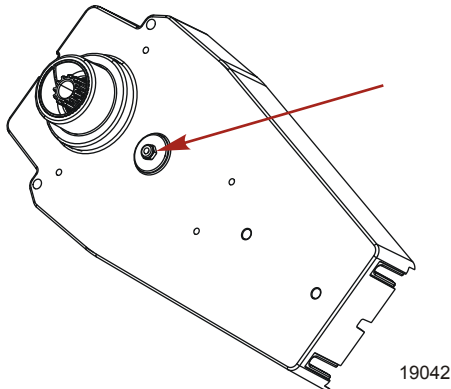
b - Plate

c - Shoulder screw with washer

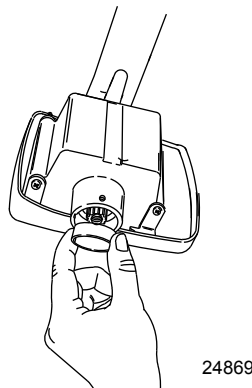
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Threads of shoulder screw	92-809819

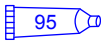
Description	Nm	lb. in.	lb. ft.
Shoulder screw with roller	4.4	39	

31. Install the friction nut.



32. Lubricate the control handle bushing with 2-4-C with Teflon and insert into the control module assembly.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Control handle bushing	92-802859A1

Notes:

Foot Throttle Control

Section 6A - "Hot Foot" Throttle Controls

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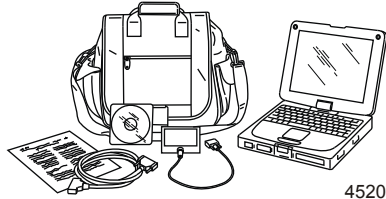
Components Contained in DTS Foot Throttle	DTS Foot Throttle Installation.....6A-12
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Hot Foot Throttle.....6A-6	DTS Foot Throttle Configuration with Hand
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Pre-Installation.....6A-7	Wiring Diagram - Typical Installation.....6A-15
DTS Foot Throttle Component Installation	Inspection and Maintenance.....6A-15
.....6A-7	



Lubricant, Sealant, Adhesives

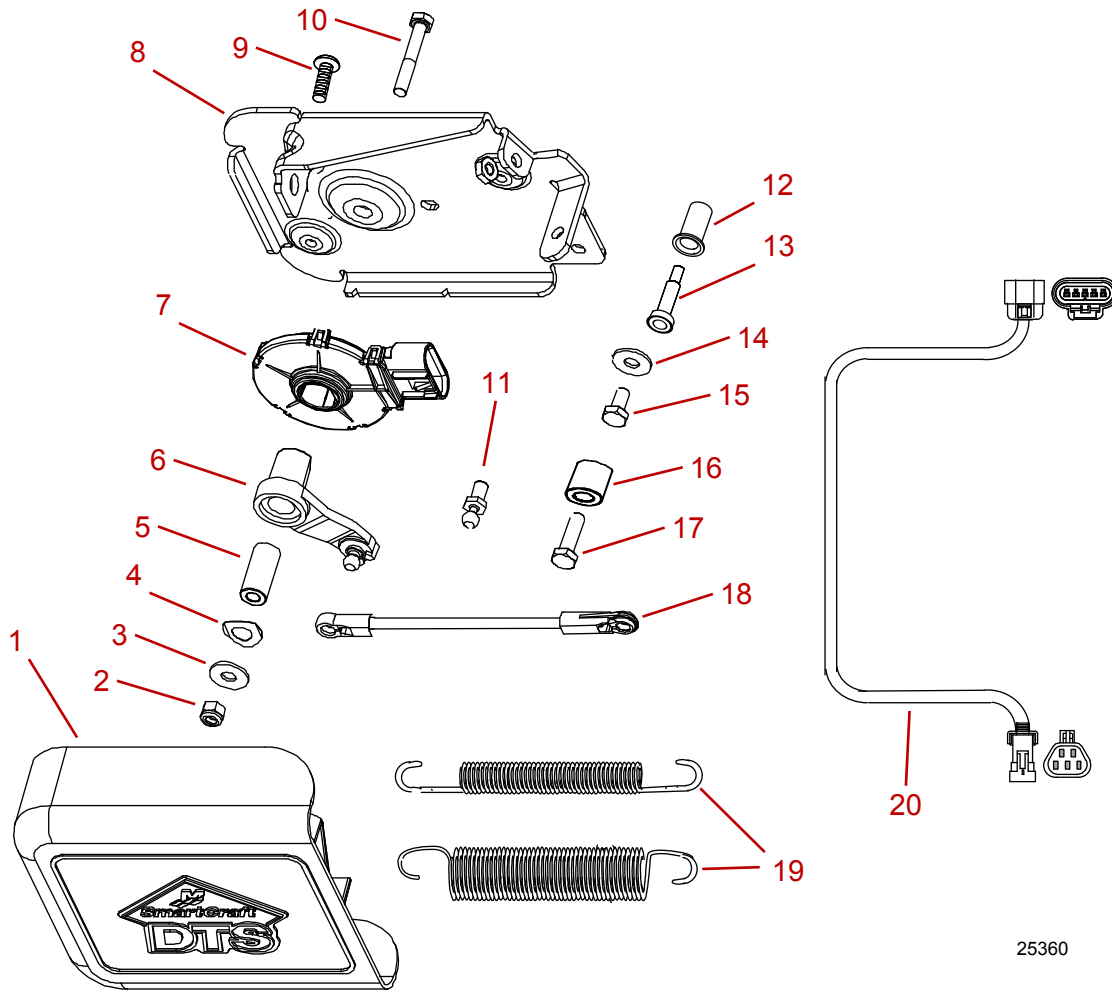
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Threads of ball swivel screw	92-809819
		Threads of the WOT stop screw	
 95	2-4-C with Teflon	Bushing	92-802859A1
		Pivot points and rollers	

Special Tools

Computer Diagnostic System (CDS)	Order through SPX
 4520	Monitors all electrical systems for proper function, diagnostics, and calibration purposes. For additional information, pricing, or to order the Computer Diagnostic System contact: SPX Corporation 28635 Mound Rd. Warren, MI 48092 or call: USA - 1-800-345-2233 Canada - 800-345-2233 Europe - 49 6182 959 149 Australia - (03) 9544-6222

Notes:

Components Contained in DTS Foot Throttle



25360

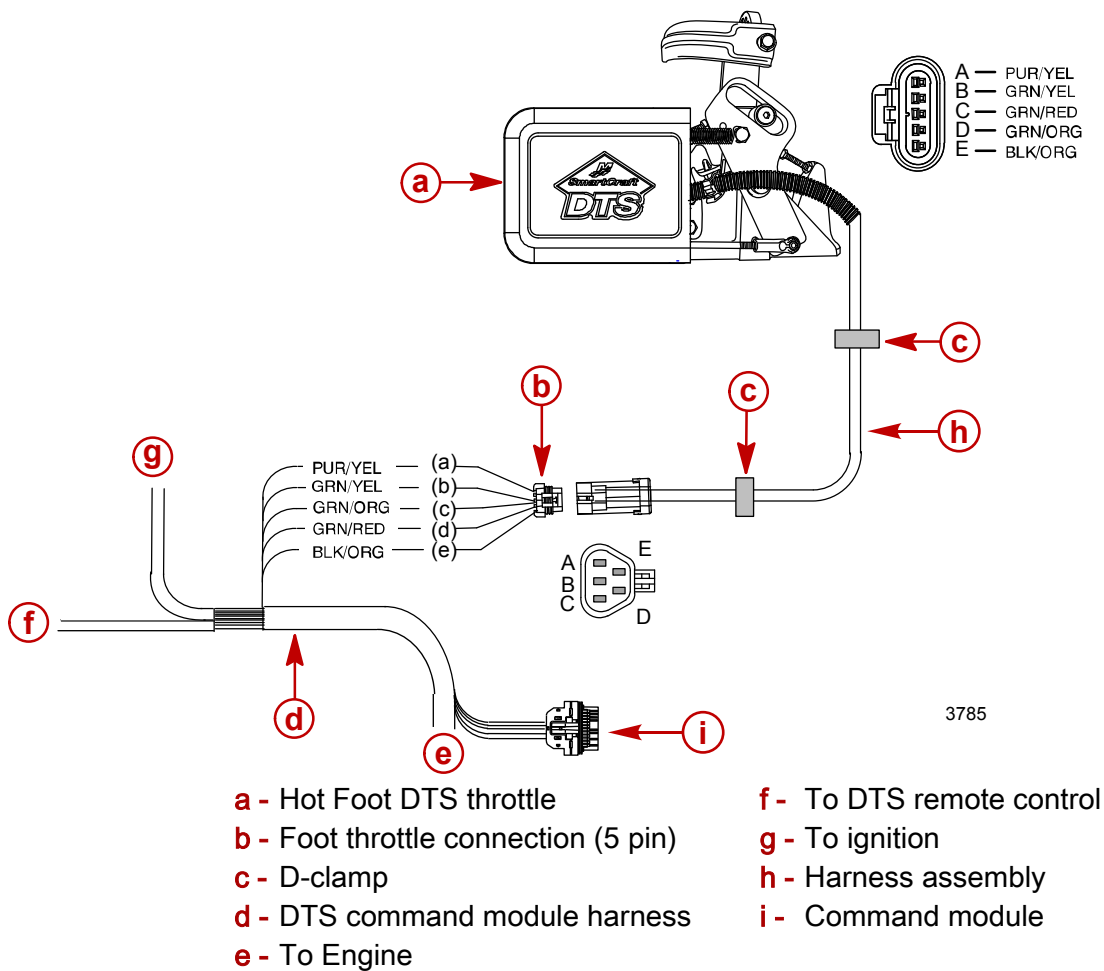
Components Contained in DTS Foot Throttle

Ref. No.	Qty.	Description	Torque		
			Nm	lb. In.	lb. ft.
		DTS Hot Foot (N.S.S.)			
1	1	Cover			
2	1	Nut (M6)	4	35	
3	1	Washer			
4	1	Wave washer			
5	1	Bushing			
6	1	Throttle lever			
7	1	Sensor			
8	1	Mounting plate			
9	2	Screw (10 - 16 x 0.750 in.)			
10	1	Screw (M6 x 40)	4	35	
11	1	Ball swivel screw	6.8	60	
12	1	Grooved bushing			
13	1	Screw (0.250 - 20 x 0.620 in.)			
14	1	Washer			
15	1	Screw (0.250 - 20 x 0.500 in.)	9	79.6	
16	1	Throttle lever stop			
17	1	Screw (0.250 - 20 x 1.12 in.)	9	79.6	
18	1	Link rod assembly			
19	1	Spring kit			
20	1	Harness assembly			

Hot Foot Throttle

Wiring Diagram - Typical Installation

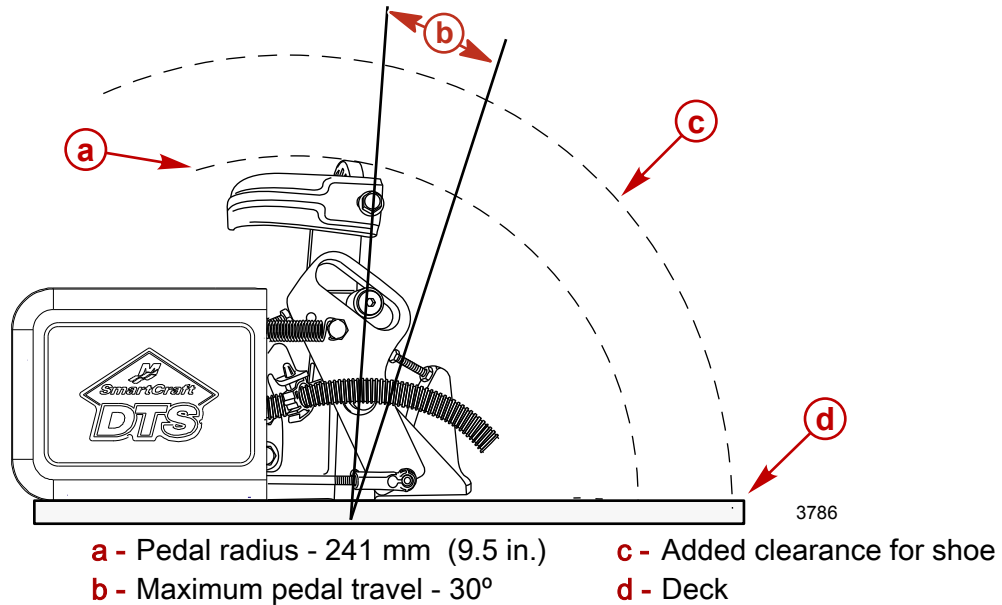
NOTE: The C and D wires are reversed at the cable end connectors.



Pre-Installation

FOOT CLEARANCE

1. Find a location that has adequate clearance for the DTS foot throttle pedal plus clearance for the shoe of the operator.



DTS Foot Throttle Component Installation

NOTE: Installation of the DTS Hot Foot throttle assembly requires a system configuration reset of the SmartCraft system.

NOTE: The DTS Hot Foot throttle assembly is completely set up at the factory. The following information is for reference only.

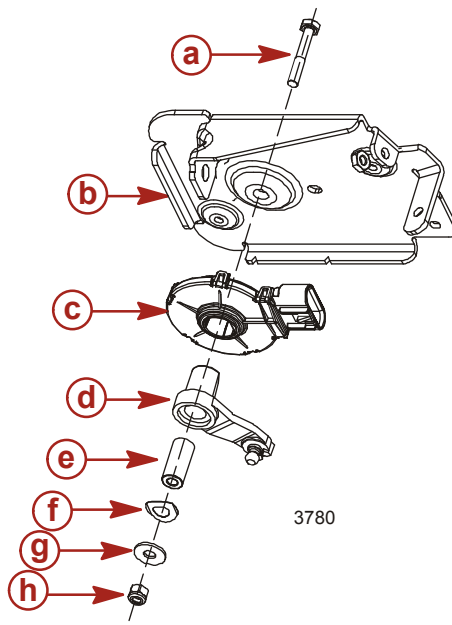
1. Lubricate the bushing with 2-4-C with Teflon.

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Bushing	92-802859A1

2. Install the lubricated bushing into the throttle lever.
3. Install the throttle lever onto the center hole of the sensor.
4. Place the sensor onto the mounting plate. Insert the peg on the sensor into the hole on the mounting plate.

NOTE: Ensure the peg on the sensor is placed into the hole on the mounting plate.

- Secure the sensor to the mounting plate with a screw, wave washer, washer and locknut. Tighten the locknut to the specified torque.



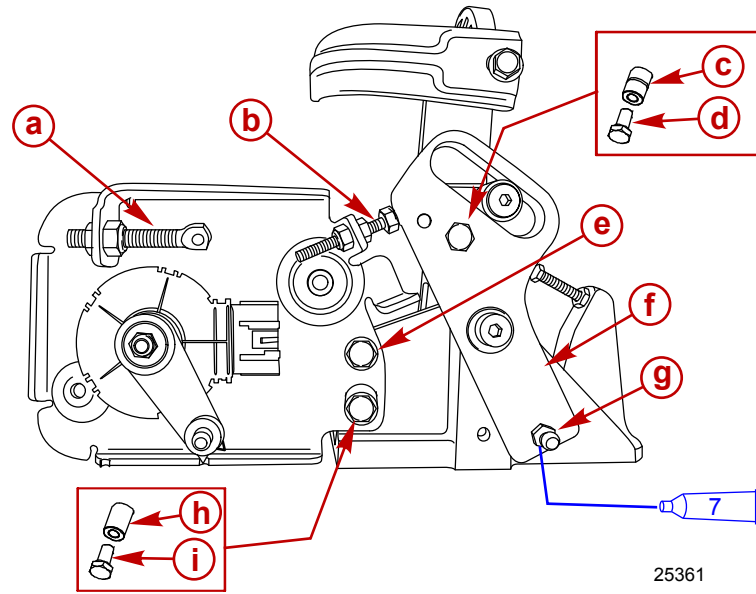
a - Screw (M6 x 40)
b - Mounting plate
c - Sensor
d - Throttle lever

e - Bushing
f - Wave washer
g - Washer
h - Locknut (M6)

Description	Nm	lb. in.	lb. ft.
Locknut	4	35	

- Install the spring tension adjustment screw and jam nuts to the mounting plate. Do not tighten the jam nuts.
 - Install the idle stop adjustment screw and jam nuts to the mounting plate. Do not tighten the jam nuts.
 - Install the grooved bushing onto the shoulder screw. Secure the grooved bushing onto the Hot Foot throttle lever. Tighten the shoulder screw to the specified torque.
 - Secure the mounting plate to the Hot Foot throttle pedal assembly with two screws, a washer and a throttle lever stop spacer.
 - The upper mounting hole must have a (0.250 - 20 x 0.500 in.) screw with a washer.
 - The lower mounting hole must have a (0.250 - 20 x 1.12 in.) screw with the throttle lever stop spacer.
- Tighten the screws to the specified torque.

10. Apply Loctite 271 Threadlocker to the threads of the ball swivel screw. Install the ball swivel screw to the throttle lever. Tighten the ball swivel screw to the specified torque.

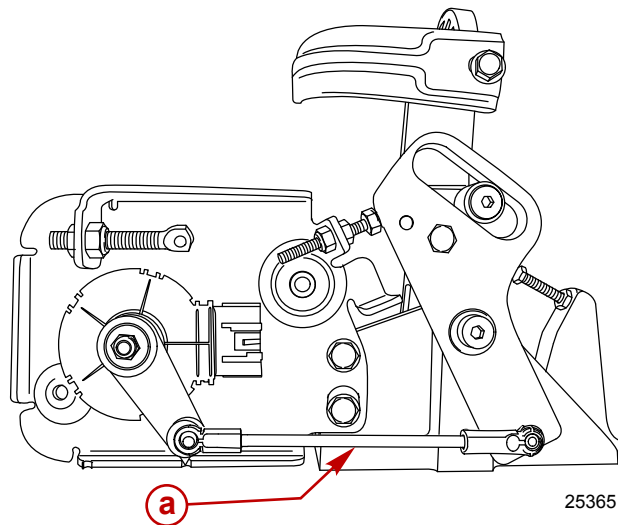


- a** - Spring tension adjustment screw and nuts
b - Idle stop adjustment screw and nuts
c - Grooved bushing
d - Shoulder screw
e - Screw (0.250 - 20 x 0.500 in.) and washer
f - Throttle lever
g - Ball swivel screw
h - Spacer
i - Screw (0.250 - 20 x 1.12 in.)

Tube Ref No.	Description	Where Used	Part No.
	Loctite 271 Threadlocker	Threads of ball swivel screw	92-809819

Description	Nm	lb. in.	lb. ft.
Shoulder screw	9	79.6	
Screw (0.250 - 20 x 0.500 in.)	9	79.6	
Screw (0.250 - 20 x 1.12 in.)	9	79.6	
Ball swivel screw	6.8	60	

11. Install the throttle link.



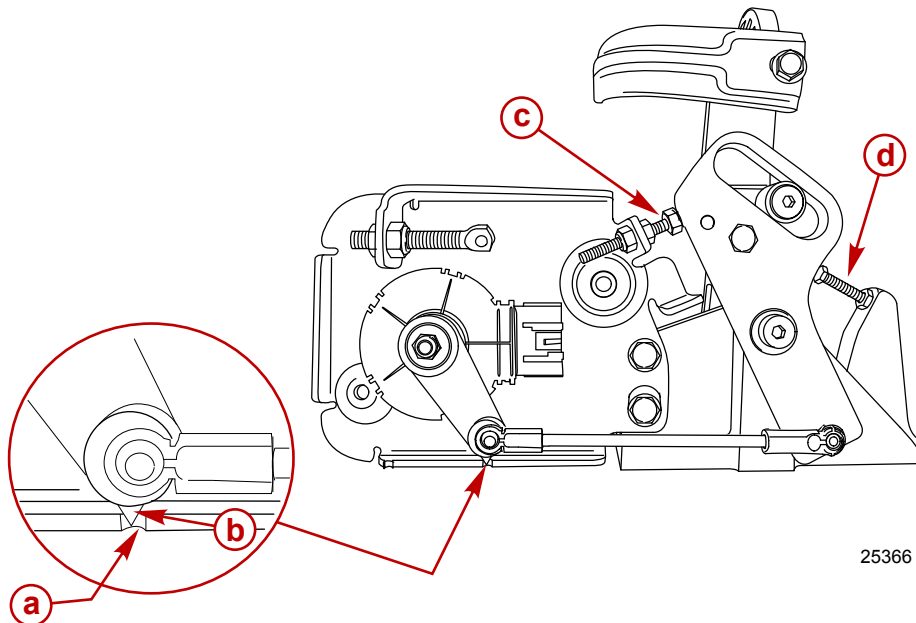
a - Throttle link

ADJUSTMENTS

NOTE: Installation of the DTS Hot Foot throttle assembly requires a System Configuration Reset of the SmartCraft system.

NOTE: The DTS Hot Foot throttle assembly is completely set up at the factory. The following information is for reference only.

1. Pull the Hot Foot pedal against the idle stop adjustment screw. Adjust the idle stop adjustment screw so the throttle lever pointer for idle aligns with the idle notch on the mounting plate. Tighten the jam nuts securely.

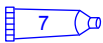


a - Idle notch on the mounting plate
b - Throttle lever pointer for idle

c - Idle stop adjustment screw
d - WOT stop screw

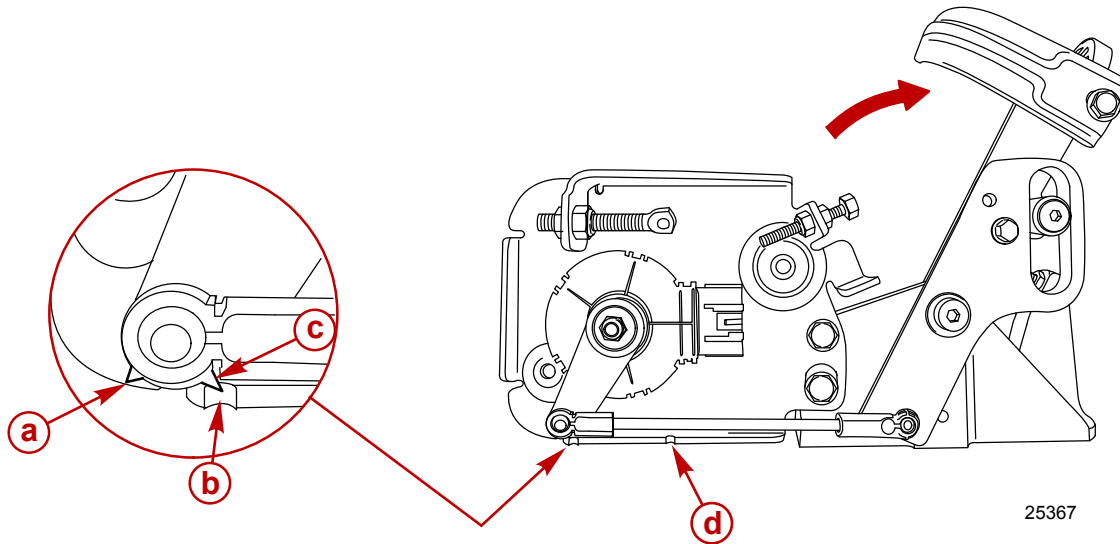
2. Loosen the WOT stop screw jam nut several turns out.
3. Depress the Hot Foot pedal until the throttle lever pointer for WOT aligns with the WOT notch on the mounting plate.

4. Adjust the WOT stop screw to limit the Hot Foot pedal travel to this distance. Apply Loctite 271 Threadlocker to the threads of the WOT stop screw. Do not move the WOT stop screw while tightening the jam nut securely.

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Threads of the WOT stop screw	92-809819

NOTE: This adjustment is for the maximum sensor travel. Adjusting the pedal travel beyond the maximum sensor travel will not increase the amount of the engine RPM at WOT.

NOTE: When replacing the sensor, the WOT stop screw will not need to be adjusted unless the throttle lever pointer for WOT does not align with the WOT notch on the mounting plate.



a - Throttle lever pointer for idle

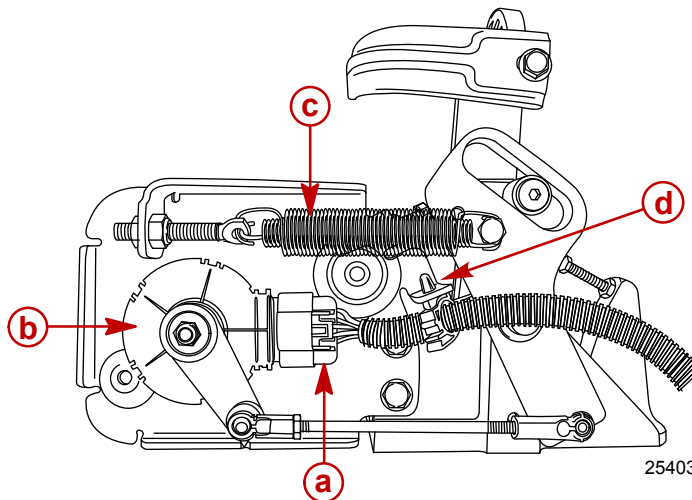
b - WOT notch on the mounting plate

c - Throttle lever pointer for WOT

d - Idle notch on the mounting plate

5. Return the pedal to the idle position.
6. Install the throttle springs.
7. Adjust the springs to the desired tension. Tighten the jam nuts securely.
8. Connect the harness assembly between sensor and the DTS command module harness.
9. Secure the harness to the mounting plate. Insert the bayonet end of the harness clamp into the mounting bracket hole.

10. Install the cover with two (10 - 16 x 0.750 in.) screws. Tighten the screws securely.



a - Harness assembly
b - Sensor

c - Throttle springs (2)
d - Harness clamp bayonet

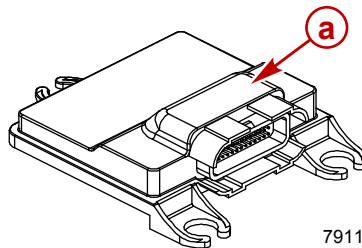
DTS Foot Throttle Installation

1. Route the wire harness.
2. After establishing a suitable location for mounting, mark the location for drilling.
3. Drill five 4 mm (5/32 in.) holes.
4. Use #12 screws and washers not supplied in kit to attach the foot throttle base to the deck.
5. Connect the harness assembly to the DTS Command Module harness.
6. Coil the excess harness wire and secure with cable tie.
7. Secure the harness to the boat structure with cable ties or D-clamps.
8. Install the cover to the Hot Foot mounting plate. Secure with the two screws provided in the kit.

Optional DTS Foot Throttle Kits

COMMAND MODULE (2006 MODEL YEAR ONLY)

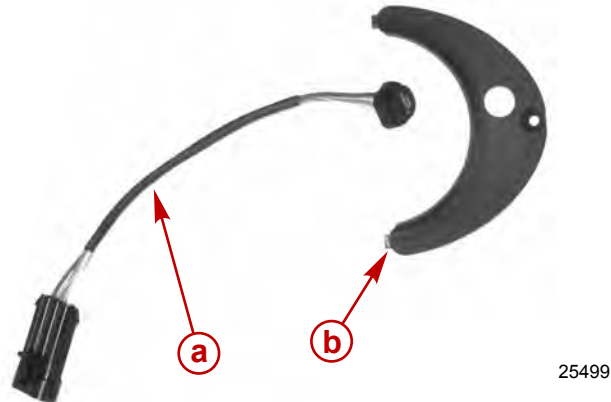
1. If adding a foot throttle to an existing DTS panel control, the command module must be replaced. Command module part number 891661005 must replace the original command module.



a - Part number location

PANEL MOUNT REMOTE CONTROL ON/OFF SWITCH KIT

If adding a hand throttle on/off switch kit to an existing panel mount remote control, follow the instructions included with the panel mount remote control on/off switch kit.



a - Hand throttle on/off switch

b - Rear bezel cover

DTS Foot Throttle Configuration with Hand Throttle On/Off Switch

SYSTEM CONFIGURATION RESET

After installation, a system configuration reset must be performed by a Mercury trained technician. The Computer Diagnostic System is required for configuration.

Computer Diagnostic System (CDS)	Order through SPX
----------------------------------	-------------------

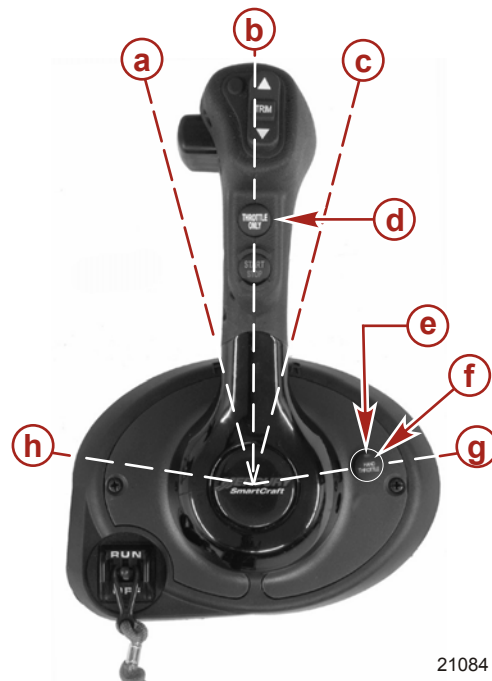
HAND AND FOOT CONTROL OPERATION WITH HAND THROTTLE ON/OFF SWITCH

1. Engine speed is controlled from idle to WOT by either the foot throttle or the panel mount control handle.
2. **The default setting when the engine is started:**
 - a. Throttle control at the foot throttle.
 - b. The hand throttle indicator light is off.
3. **To transfer throttle control to the panel mount remote control handle:**
 - a. Place the throttle control handle in neutral or in the forward/reverse detent position.
 - b. Push the hand throttle on/off switch button.
 - c. A single chirp will sound.
 - d. The hand throttle indicator light is on.
 - e. Throttle control at the panel mount remote control handle.

NOTE: If the transfer fails, a double chirp will sound.

4. **To return throttle control to the foot throttle:**
 - a. Place the throttle control handle in neutral or in the forward/reverse detent position.
 - b. Push the hand throttle on/off switch button.
 - c. A single chirp will sound.
 - d. The hand throttle indicator light is off.
 - e. Throttle control at the foot throttle.

NOTE: If the transfer fails, a double chirp will sound.

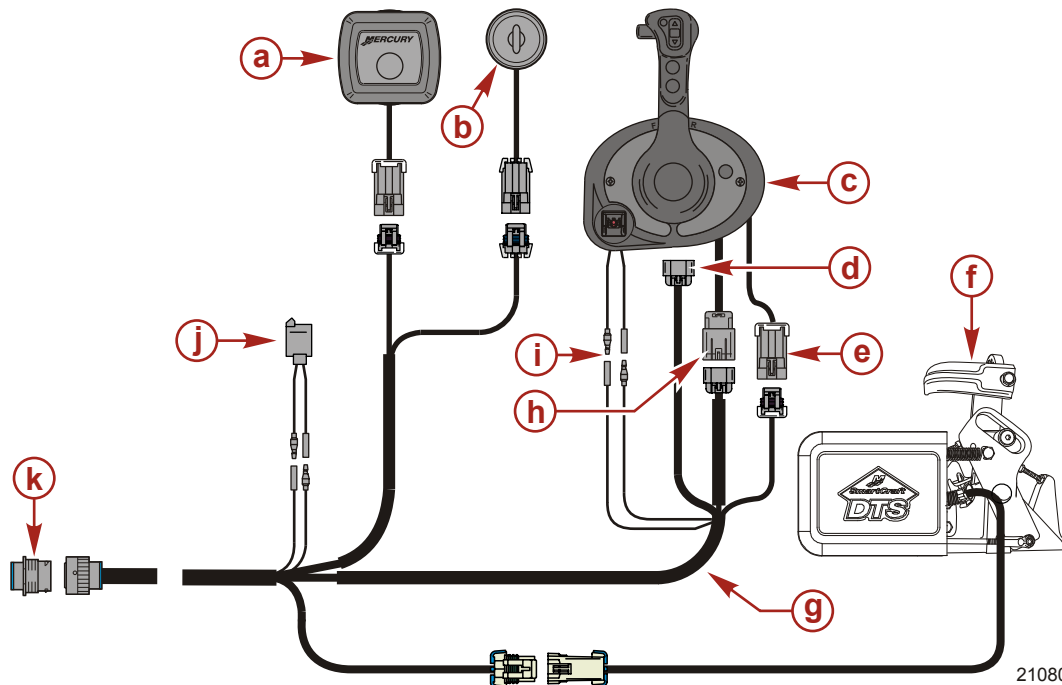


21084

- a** - Forward detent position
- b** - Neutral detent position
- c** - Reverse detent position
- d** - Throttle only button

- e** - Hand throttle indicator light
- f** - Hand throttle on/off switch button
- g** - Full reverse position
- h** - Full forward position

Wiring Diagram - Typical Installation



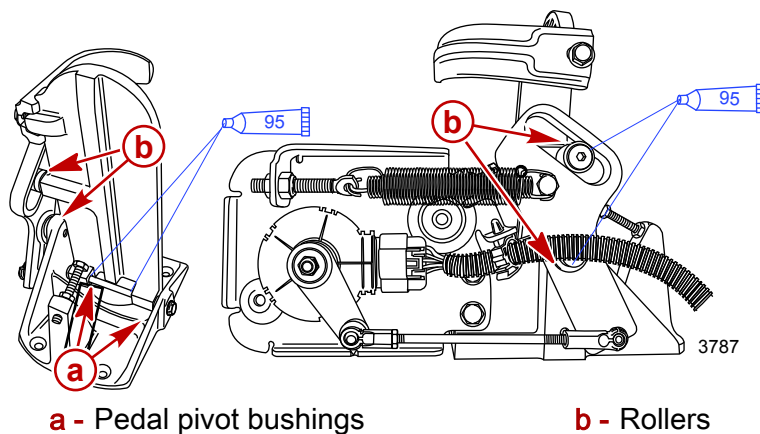
- | | |
|--|---|
| a - Start switch | g - Command module harness |
| b - Key switch | h - Remote control handle connector |
| c - Panel mount electronic remote control | i - Lanyard switch bullet connectors |
| d - Lever 1 connector | j - Warning horn |
| e - Hand throttle on/off switch | k - 14 pin data harness connector |
| f - Foot throttle | |

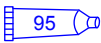
Inspection and Maintenance

Every 100 hours of use or once yearly, whichever occurs first, have the foot throttle assembly serviced by an authorized dealer for the following:

1. Inspect throttle springs and throttle spring adjustment screw for broken spring or loose fasteners. Replace or adjust as required.
2. Inspect foot pedal pivot points for looseness or wear. Replace bushings if required.
3. Lubricate foot pedal pivot bushings and rollers with 2-4-C with Teflon or a general purpose spray lubricant.

4. If the foot pedal effort decreases anytime during operation, it is likely that one of the throttle springs has broken or the adjustment screw jam nuts are loose. Remove cover and inspect the foot throttle springs and jam nuts. Replace or adjust as required.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C Marine Lubricant with Teflon	Pivot points and rollers	92-802859A1

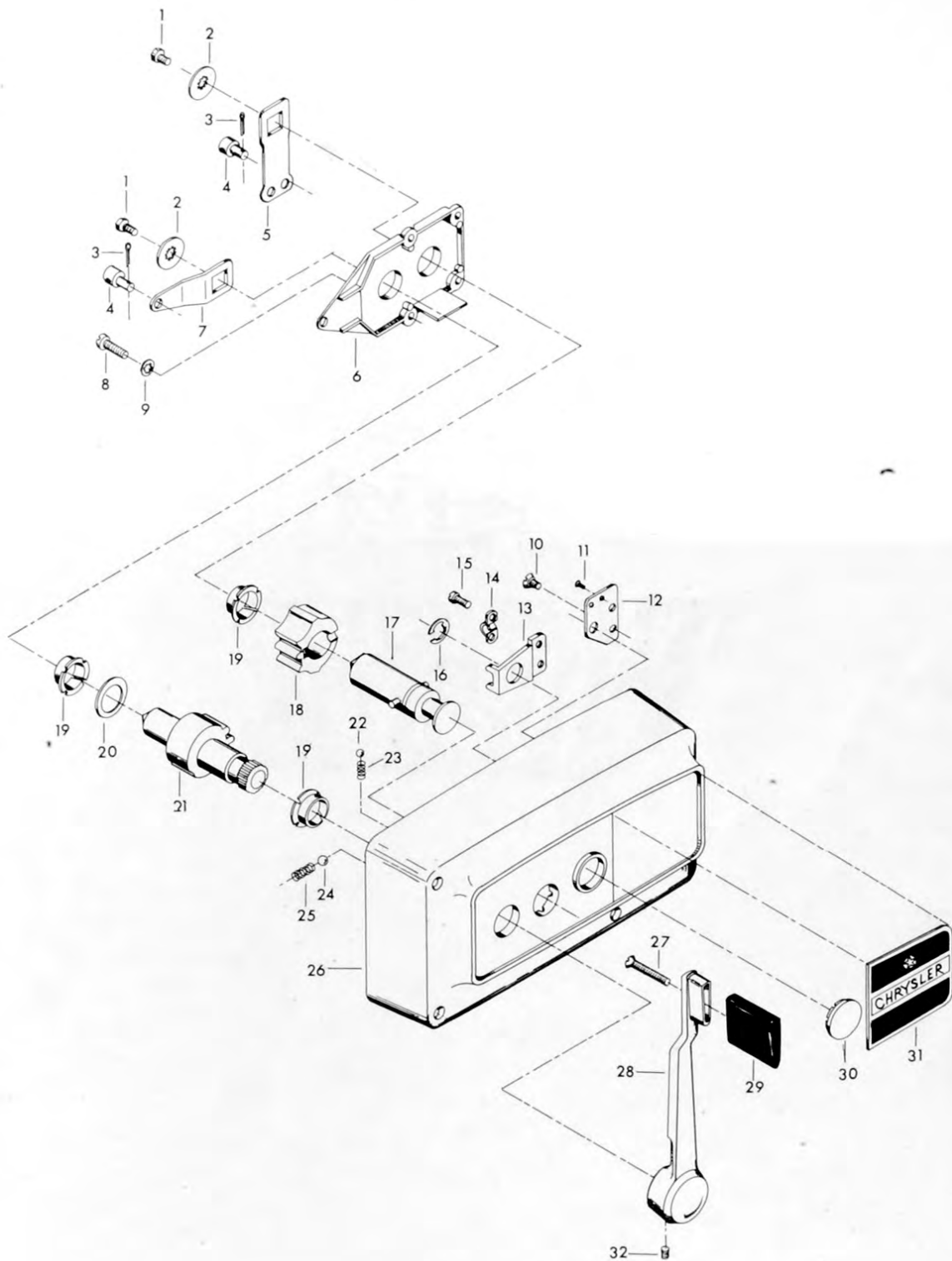
Chrysler and Force Remote Controls

Section 7A - Chrysler Remote Controls

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Chrysler Controls 161 and 163 Components



23806

Chrysler Controls 161 and 163 Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Screw (1/4 - 28 x 1/2)			
2	2	Lockwasher			
3	2	Cotter pin			
4	2	Cable terminal			
5	1	Clutch arm			
6	1	Retaining plate			
7	1	Throttle cam			
8	2	Screw (1/4 - 28 x 1/2)			
9	2	Lockwasher			
10	2	Screw (10 - 24 x 3/8)			
11	2	Screw (8 - 32 x 1/4)			
12	1	Junction board			
13	1	Swivel			
14	1	Cable clamp			
15	2	Screw (10 - 24 x 5/16)			
16	1	Retaining ring			
17	1	Clutch shaft			
18	1	Clutch gear			
19	3	Bearing			
20	1	Wave washer			
21	1	Throttle gear			
22	1	Ball			
23	1	Spring			
24	1	Ball			
25	1	Spring			
26	1	Housing			
27	1	Screw (10 x 2)			
28	1	Hand lever			
29	1	Grip			
30	1	Cap			
31	1	Decal			
32	1	Screw (5/16 - 18 x 5/16)			

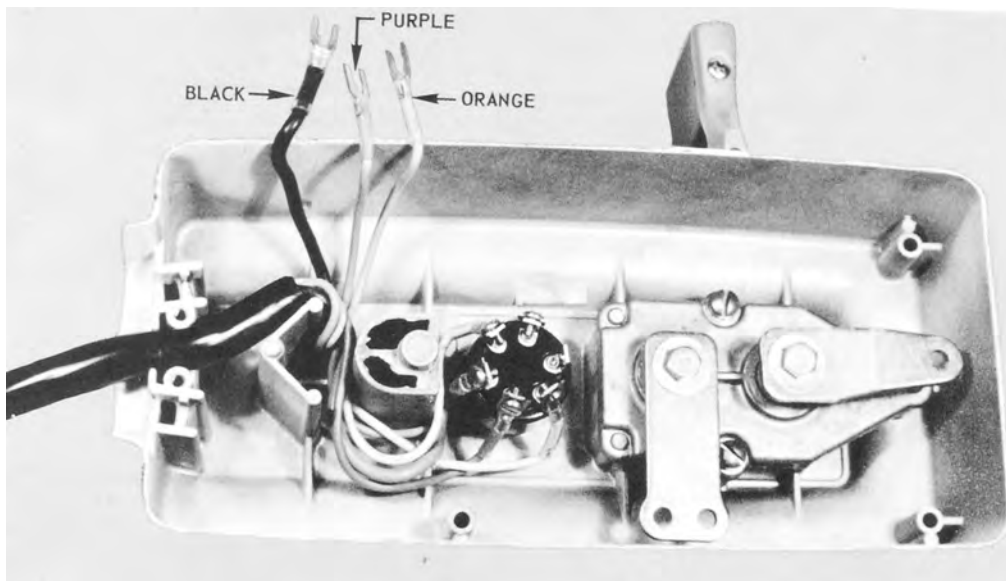
161 and 163 Control Box Installation

The 161 and 163 control boxes are a single lever remote control for the throttle and gear shift for Chrysler outboard motors. The 161 model is for starboard side installation. The 163 model is for port side installation.

1. Place the control box in the desire location on the side of boat. Mark the location with a pencil or marker.
2. Remove the cap from the front of the control box.
3. Attach the lead wire of the electrical harness to the terminals of the ignition switch. Refer to the wire diagram instructions included with the key switch.

IMPORTANT: The wires are attached to the key switch with the leads facing away from the key side of the switch.

4. Thread the large chrome plated nut approximately 3/4 of the way onto the key switch barrel. The flat side of the nut must face towards the key side of the switch.
5. Insert the key switch through the hole in the control box. Secure the key switch to the control box with a washer and nut. Tighten the nut securely.
6. Insert the electrical harness into the center notch at the rear of the control box.
7. Fold the black, purple and orange leads under the electrical harness, extending the wire towards the top of the control box.

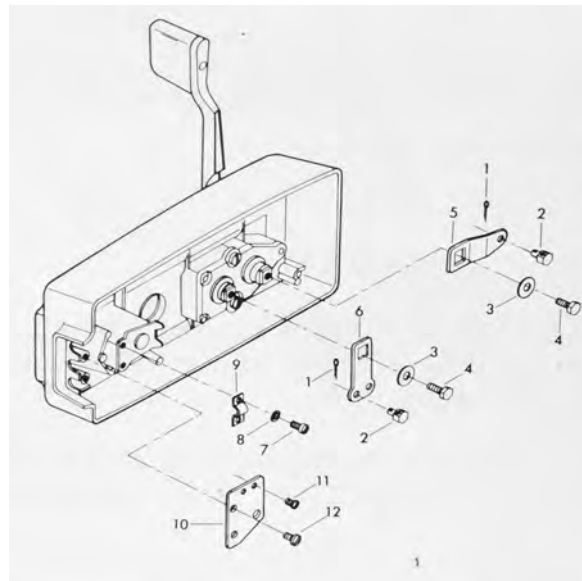


23808

Connecting the Control Cables to the Control Box

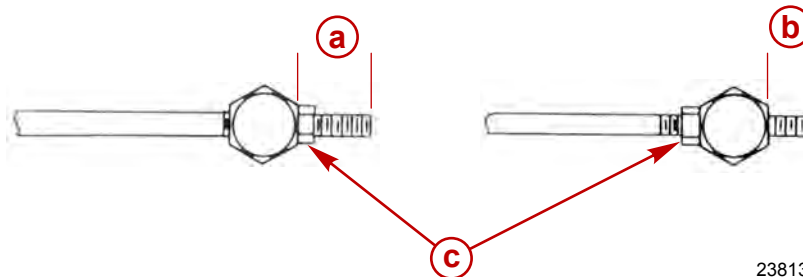
1. Remove the shift arm and the throttle arm from the control box.
2. Remove the cable clamp from the swivel.

3. Remove the junction board (if installed) from the control box.



23811

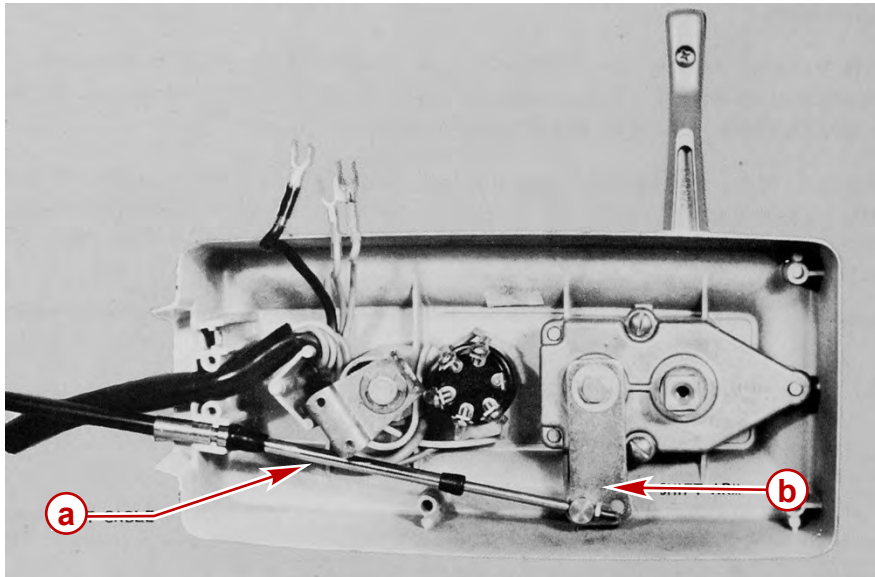
- | | |
|---------------------------------------|--------------------------------------|
| 1 - Cotter pin (2) | 7 - Screw (10 - 24 x 5/16) |
| 2 - Cable terminal (2) | 8 - Lockwasher (2) |
| 3 - Lockwasher (2) | 9 - Cable clamp |
| 4 - Screw (1/4 - 28 x 1/2) (2) | 10 - Junction board |
| 5 - Throttle arm | 11 - Screw (8 - 32 x 1/4) (2) |
| 6 - Shift arm | 12 - Screw (10 - 24 x 3/8) |
4. For engines 55 HP and below, thread the cable terminal onto the shift cable until 12.7 mm (0.5 in.) of threads extend beyond the cable terminal. Install the lock nut and tighten securely against the cable terminal.
5. For engines over 55 HP, thread the lock nut all the way onto the shift cable. Thread the cable terminal onto the shift cable until 4.7 mm (0.187 in.) of threads extend beyond the cable terminal. Tighten the lock nut securely against the cable terminal.



23813

- | |
|---|
| a - 12.7 mm (0.5 in.) of threads extended beyond the cable terminal |
| b - 4.7 mm (0.187 in.) of threads extended beyond the cable terminal |
| c - Lock nut |
6. Install the cable terminal into the read hole in the shift arm and secure the cable terminal to the shift arm with a cotter pin.
7. Install the shift arm onto the control box and secure with a screw and lockwasher.

8. Install the shift cable onto the control box slot at the lower rear corner of the control box.

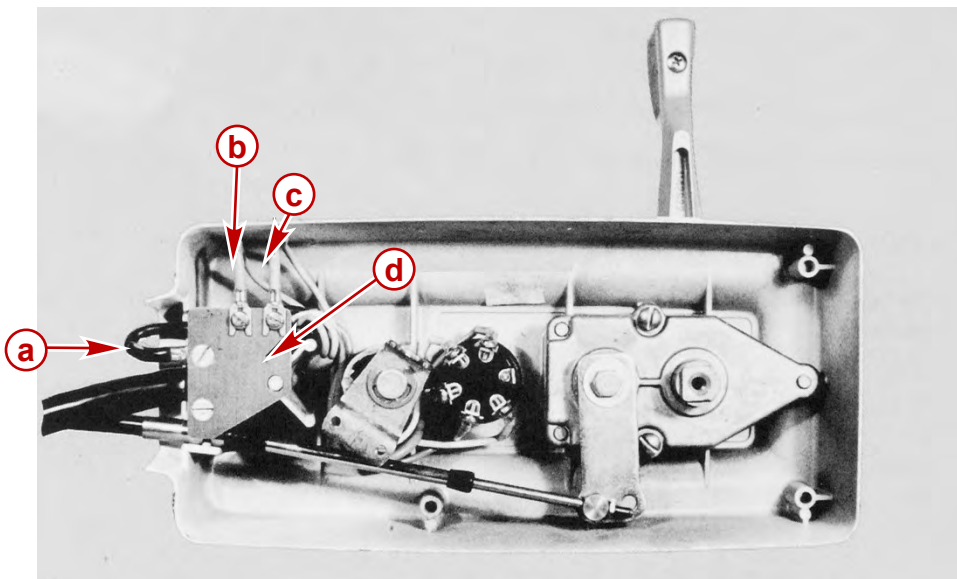


23814

a - Shift cable

b - Shift arm

9. Install the junction board to the control box. Secure the junction board to the control box with two (10 - 24 x 38) screws. Do not tighten the two screws at this time.
10. Install the black lead wire under the junction board at the top (10 - 24 x 38) screw.
11. Tighten the two (10 - 24 x 38) screws securely.
12. Secure the purple and orange lead wires to the terminal board with two (8 - 32 x 1/4) screws. Tighten the screws securely.



23820

a - Black lead wire

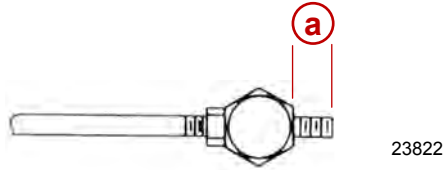
b - Purple lead wire

c - Orange lead wire

d - Junction board

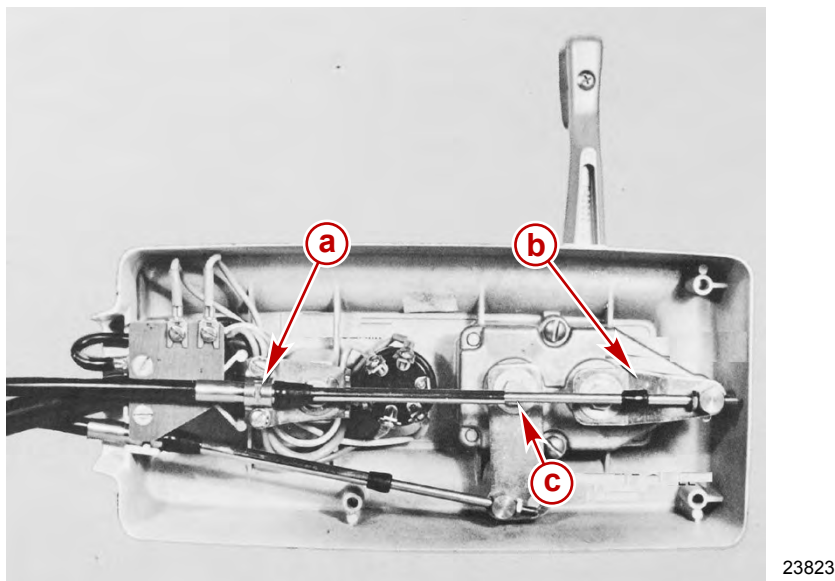
13. Thread the lock nut onto the throttle cable.

14. Thread the cable terminal onto the throttle cable until 4.7 mm (0.187 in.) of threads extend beyond the cable terminal. Tighten the lock nut securely.



a - 4.7 mm (0.187 in.) of threads extended beyond the cable terminal.

15. Install the throttle cable terminal into the hole in the throttle arm. Secure the cable terminal to the throttle arm with a cotter pin.
16. Install the throttle arm onto the control box. Secure the throttle arm with a washer and screw. Tighten the screw securely.
17. Install the throttle cable onto the box and secure with a cable clamp and two (10 - 24 x 5/16) screws.

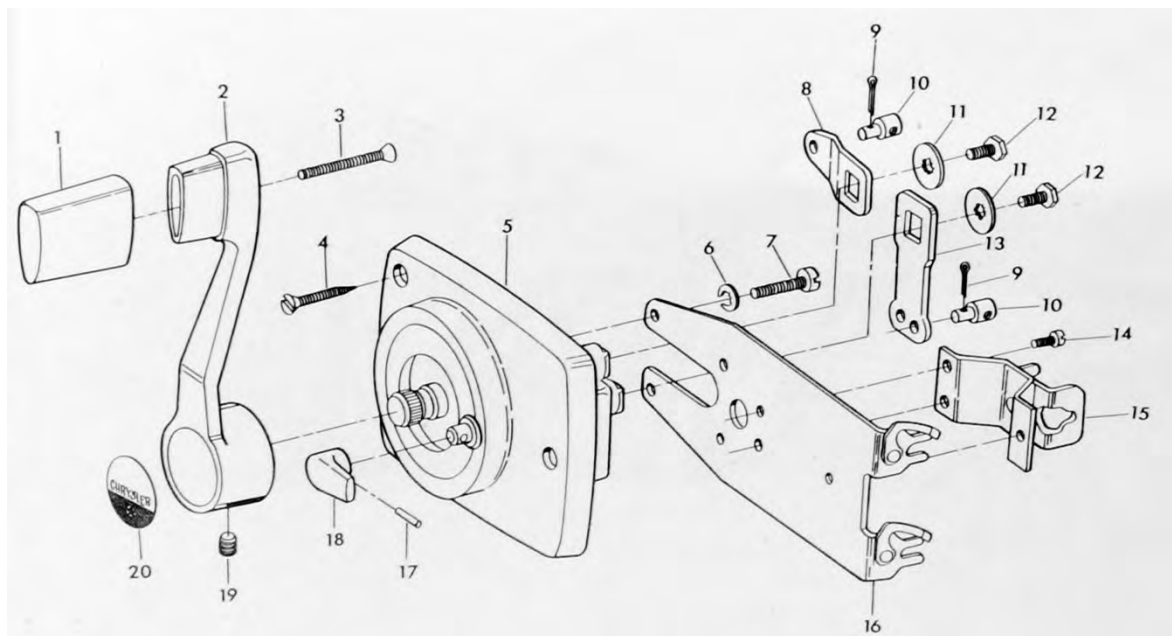


a - Cable clamp
b - Throttle arm

c - Throttle cable

18. Secure the control box to the boat.

5901 Panel Mount Control Components



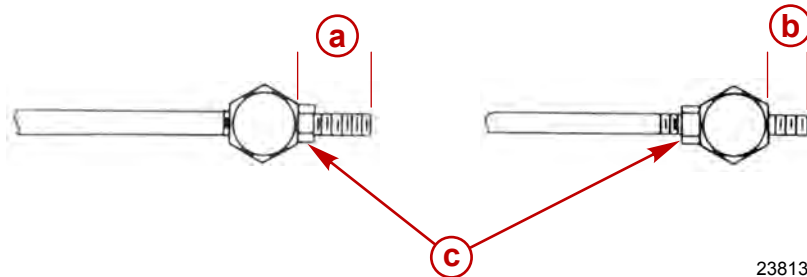
23826

5901 Panel Mount Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Grip			
2	1	Lever			
3	1	Screw (self tapping 10 x 2 in.)			
4	3	Screw (self tapping 10 x 1.5 in.)			
5	1	Gear assembly			
6	4	Lockwasher			
7	4	Screw (1/4 - 20 x 1.25 in.)			
8	1	Throttle arm			
9	2	Cotter pin			
10	2	Cable terminal			
11	2	Lockwasher			
12	2	Screw (1/4 - 28 x 0.5 in.)			
13	1	Clutch arm			
14	3	Screw (10 - 32 x 5/16)			
15	1	Anchor bracket assembly			
16	1	Hanger			
17	1	Grove pin			
18	1	Clutch knob			
19	1	Set screw (5/16 - 18 x 0.5)			
20	1	Decal			

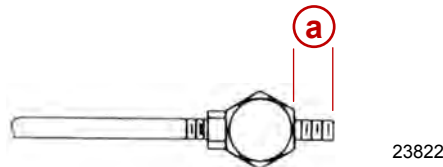
5901 Panel Mount Control Installation

1. For engines 55 HP and below, thread the cable terminal onto the shift cable until 12.7 mm (0.5 in.) of threads extend beyond the cable terminal. Install the lock nut and tighten securely against the cable terminal.
2. For engines over 55 HP, thread the lock nut all the way onto the shift cable. Thread the cable terminal onto the shift cable until 4.7 mm (0.187 in.) of threads extend beyond the cable terminal. Tighten the lock nut securely against the cable terminal.



- a** - 12.7 mm (0.5 in.) of threads extended beyond the cable terminal
b - 4.7 mm (0.187 in.) of threads extended beyond the cable terminal
c - Lock nut

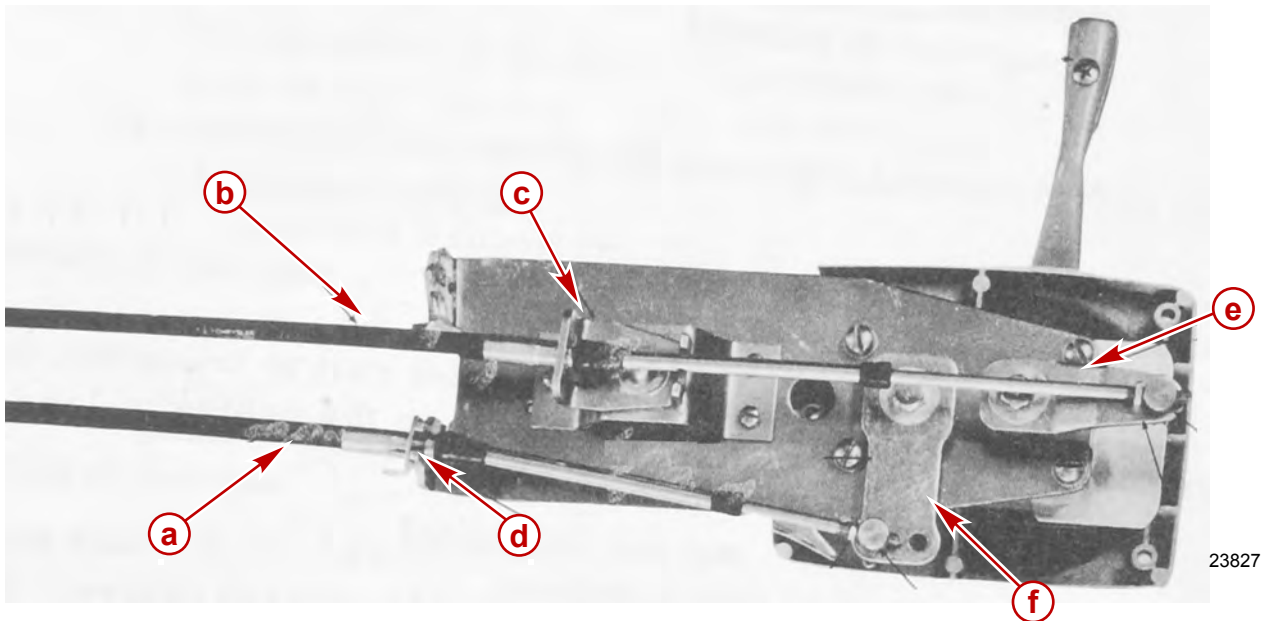
3. Install the cable terminal into the read hole in the shift arm and secure the cable terminal to the shift arm with a cotter pin.
4. Install the shift cable onto the control box slot at the lower rear corner of the control box. Secure the shift cable to the control box with the cable clip.
5. Thread the lock nut onto the throttle cable.
6. Thread the cable terminal onto the throttle cable until 4.7 mm (0.187 in.) of threads extend beyond the cable terminal. Tighten the lock nut securely.



- a** - 4.7 mm (0.187 in.) of threads extended beyond the cable terminal.

7. Install the throttle cable terminal into the hole in the throttle arm. Secure the cable terminal to the throttle arm with a cotter pin.

8. Secure the throttle cable to the anchor bracket with the cable clip.

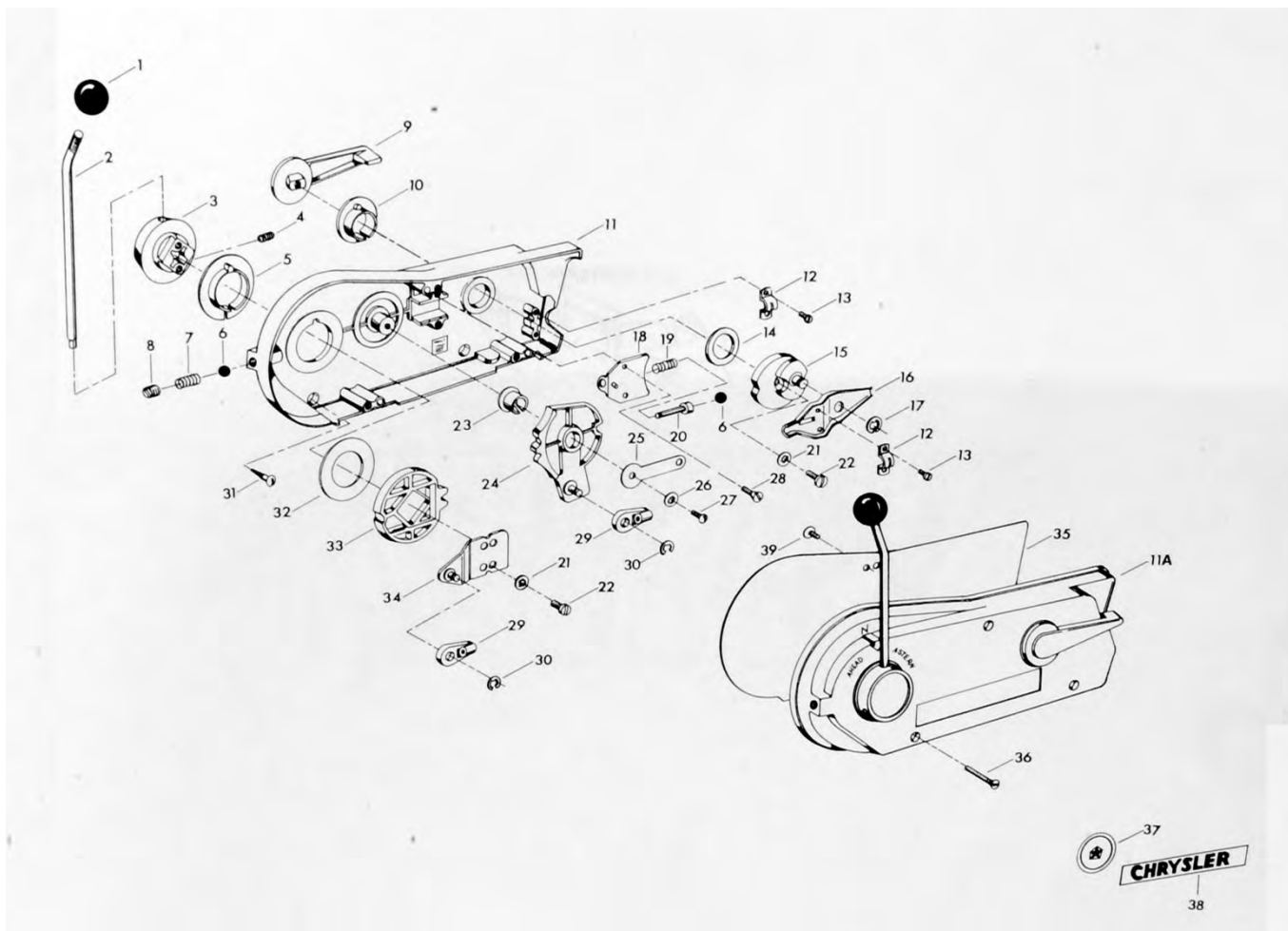


a - Shift cable
b - Throttle cable
c - Anchor bracket

d - Cable clip
e - Throttle arm
f - Shift arm

9. Secure the control box to the boat.

865 Remote Control Components



23828

865 Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Knob			
2	2	Lever			
3	2	Hub			
4	2	Set screw			
5	2	Bearing			
6	4	Detent ball			
7	2	Detent spring			
8	2	Detent plug			
9	2	Lever			
10	2	Bearing			
11 (A)	1	Right housing (A Left housing)			
12	1	Left housing			
13	4	Clamp			
14	8	Screw			
15	2	Crank			
16	2	Swivel bracket			
17	2	Snap ring			
18	2	Retainer			
19	2	Spring			
20	2	Detent pin			
21	6	Washer			
22	6	Screw (1/4 - 20 x 5/8)			
23	2	Bearing			
24	1	Right side gear assembly			
25	1	Left side gear assembly			
26	2	Retainer			
27	2	Screw			
28	4	Screw			
29	4	Cable fitting			
30	4	Snap ring			
31	3	Screw			
32	2	Wave washer			
33	2	Gear			
34	2	Arm			
35	1	Plate			
36	3	Screw			
37	1	Decal			
38	1	Decal			
39	3	Screw			

Notes:

Chrysler and Force Remote Controls

Section 7B - Force Remote Control

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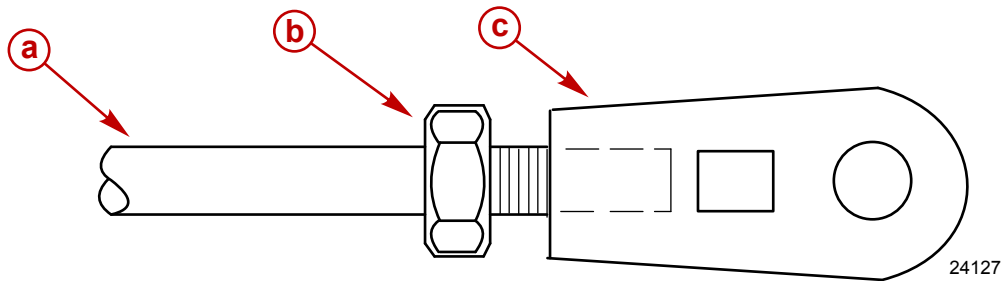
Force Remote Control Installation	7B-2	Force Remote Control Cable Installation	7B-4
Attaching the Cable Ends to the Control Cables.....	7B-2		



Force Remote Control Installation

Attaching the Cable Ends to the Control Cables

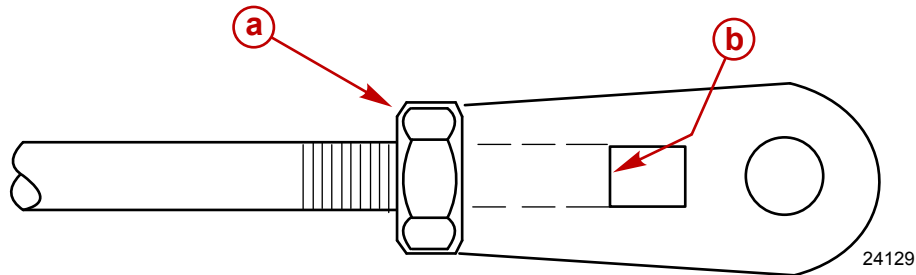
1. Thread the locknut completely onto the shift cable and the throttle cable.
2. Thread the cable connector ends onto the shift cable and the throttle cable.



- a** - Control cable
b - Locknut
c - Cable connector end

ADJUSTING THE CABLE CONNECTOR ENDS 35 HP

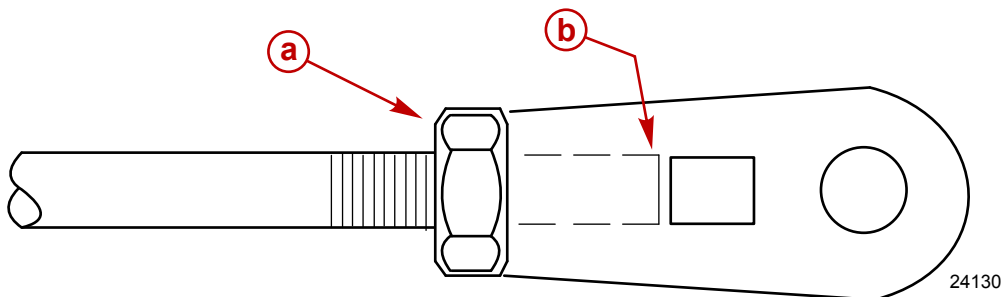
1. Adjust the shift cable and throttle cable connector ends so the control cable is flush with the cable connector end pocket wall. Tighten the locknut securely.



- a** - Locknut
b - Control cable flush with the cable connector end pocket wall

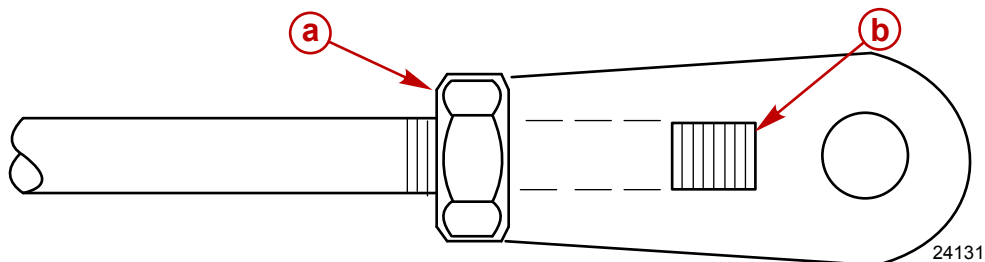
ADJUSTING THE CABLE CONNECTOR ENDS 50 HP

1. Adjust the throttle cable connector end so the control cable is flush with the cable connector end pocket wall.
2. Turn the throttle cable connector end counterclockwise two turns. Tighten the locknut securely.



- a** - Locknut
b - Throttle cable connector end two turns from flush with the cable connector end pocket wall

3. Thread the shift cable connector end completely onto the shift cable. Tighten the locknut securely.

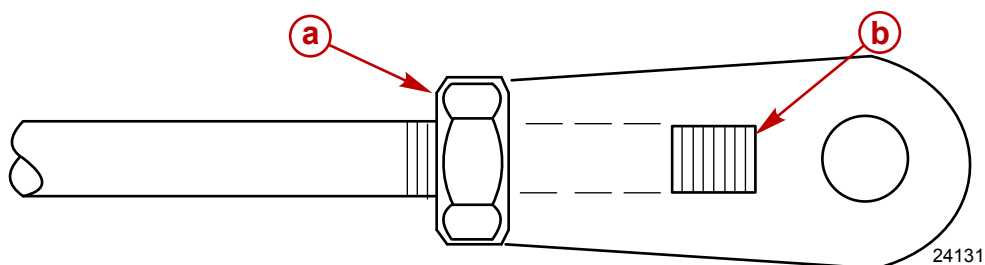


a - Locknut

b - Shift cable connector end completely threaded on

ADJUSTING THE CABLE CONNECTOR ENDS 1987 B MODELS 85/125 HP

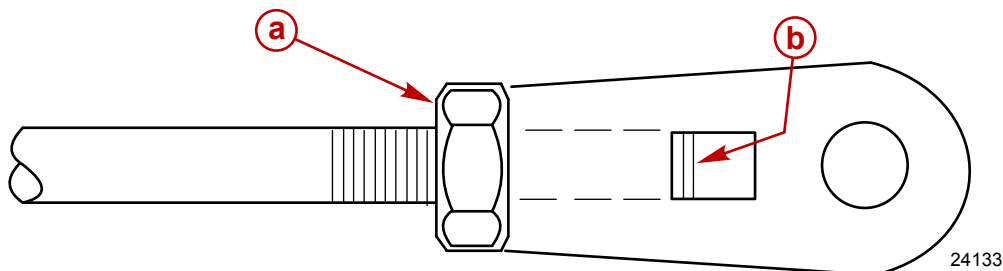
1. Thread the shift cable connector end completely onto the shift cable. Tighten the locknut securely.



a - Locknut

b - Shift cable connector end completely threaded on

2. Adjust the throttle cable connector end so the control cable is flush with the cable connector end pocket wall.
3. Turn the throttle cable connector end additional two turns past flush with the cable connector end pocket wall. Tighten the locknut securely.

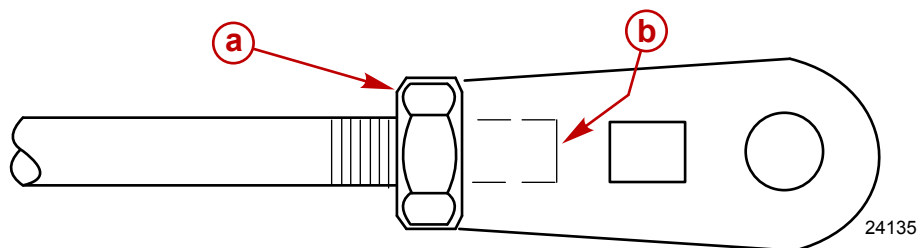


a - Locknut

b - Two turns past flush with the cable connector end pocket wall

ADJUSTING THE CABLE CONNECTOR ENDS 1990 A MODELS 90/120/150 HP

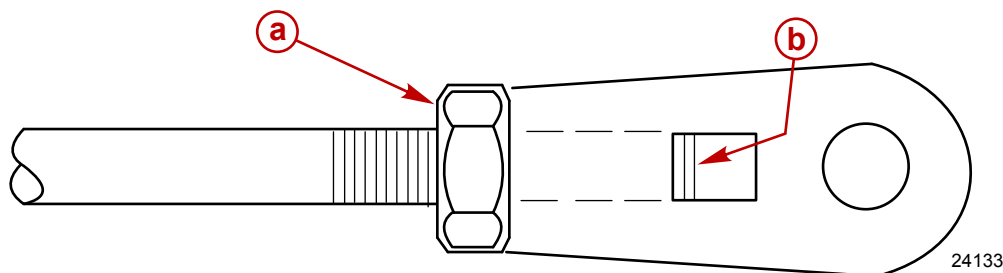
1. Thread the shift cable connector end on eight turns. Tighten the locknut securely.



a - Locknut

b - Shift cable connector end threaded on eight turns

2. Adjust the throttle cable connector end so the control cable is flush with the cable connector end pocket wall.
3. Turn the throttle cable connector end additional two turns past flush with the cable connector end pocket wall. Tighten the locknut securely.

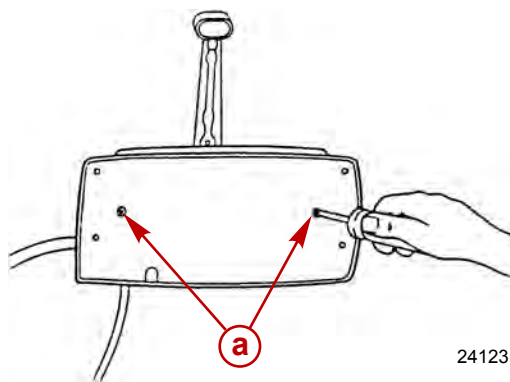


a - Locknut

b - Two turns past flush with the cable connector end pocket wall

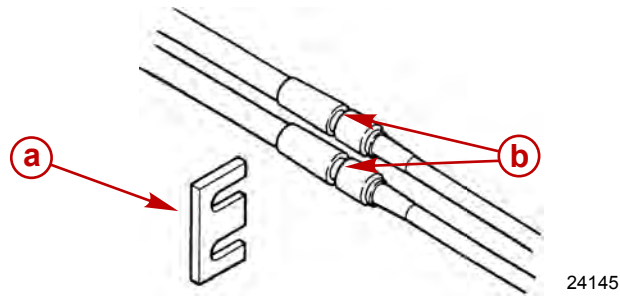
Force Remote Control Cable Installation

1. Remove the two screws securing the back cover to the remote control.



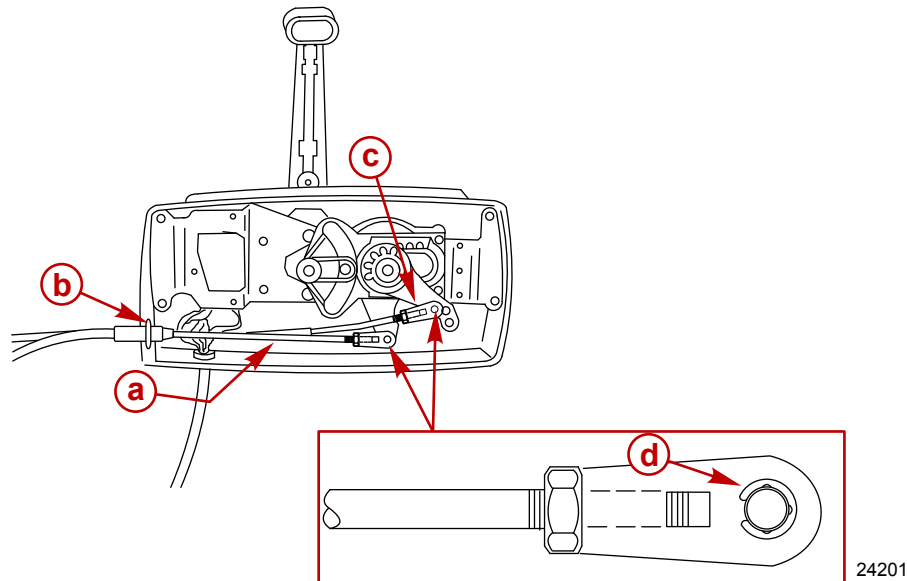
a - Screws (2)

2. Insert the cable retainer into the shift cable and throttle cable retainer grooves.



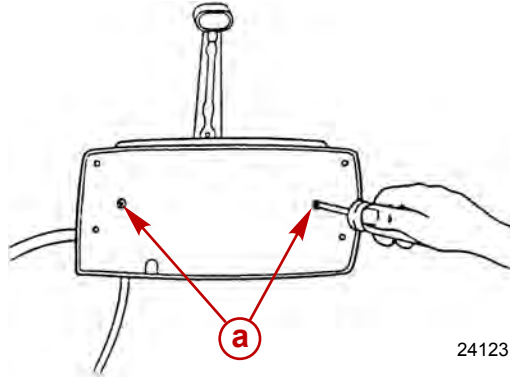
- a** - Cable retainer
b - Shift and throttle cable retainer grooves

3. Slide the shift and throttle cable, along with the cable retainer, into the remote control.
IMPORTANT: The shift cable must be inserted first into the remote control.
4. Install the shift cable and the throttle cable to the shift arm and throttle arm.
5. Secure the shift cable and the throttle cable to the shift arm and throttle arm with an E-clip retainer.



- a** - Throttle cable
b - Cable retainer
c - Shift cable
d - E-clip retainer

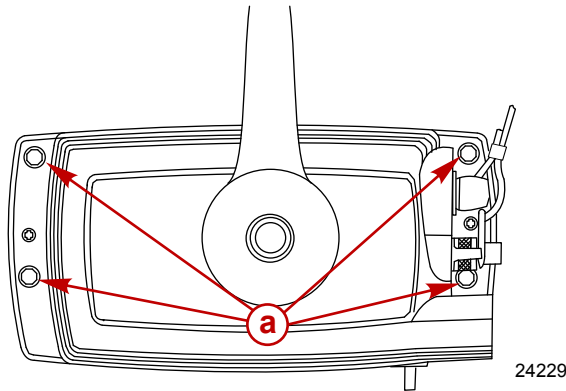
6. Install the back cover to the remote control. Secure the back cover with two screws. Tighten the screws securely



24123

a - Screws (2)

7. Install the remote control to the mounting platform. Secure the remote control with four screws. Tighten the screws securely.



24229

a - Screws (4)

Jet Drive Control

Section 8A - Sport Jet Remote Controls

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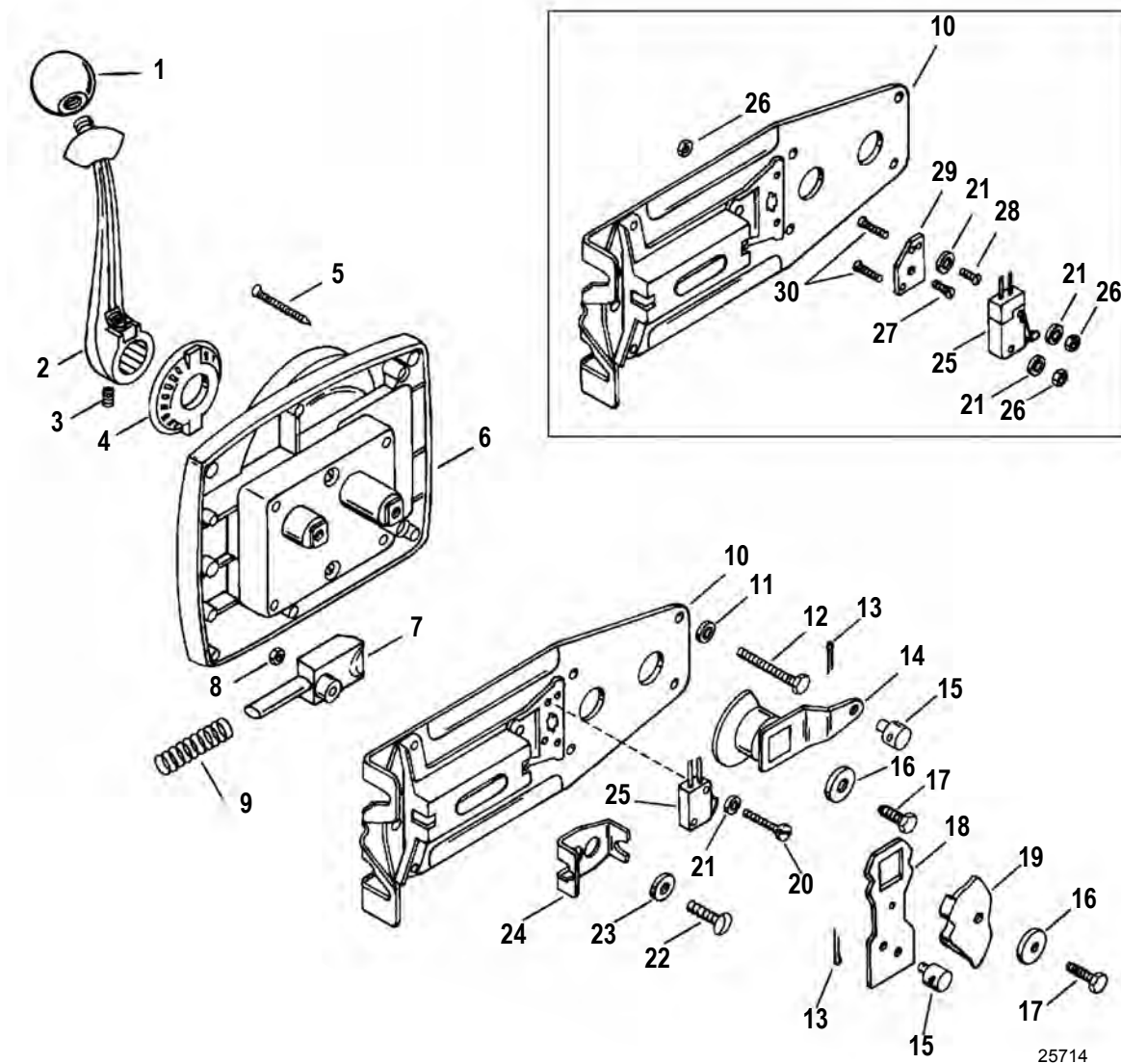
Sport Jet 30 Series Remote Control Components	8A-4	Shift Cable Conversion Kit 850698A1.....	8A-12
Sport Jet 40 Series Remote Control 850696 Components.....	8A-6	Shift Cable and Shift Cable Bracket Removal	8A-12
Sport Jet 40 Series Remote Control 802755 Components.....	8A-8	Shift Cable and Shift Cable Bracket Installation.....	8A-13

Lubricants, Sealants, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 19	Perfect Seal	Shift cable conduit	92-34227-1

Notes:

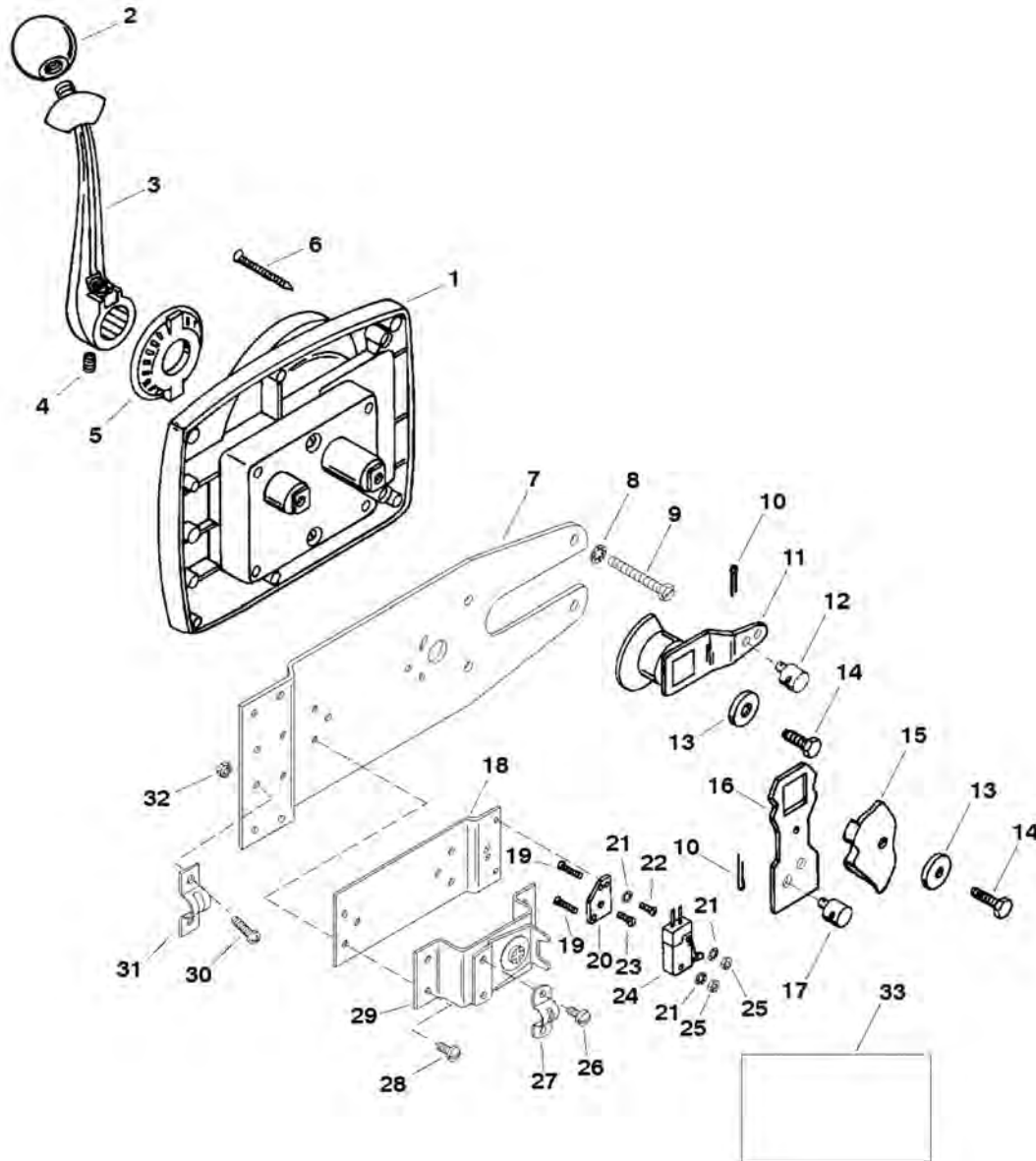
Sport Jet 30 Series Remote Control Components



Sport Jet 30 Series Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Ball			
2	1	Lever			
3	1	Screw			
4	1	Interlock insert			
5	3	Screw			
6	1	Remote control assembly			
7	1	Dwell block			
8	1	Nut			
9	1	Dwell block spring			
10	1	Hanger assembly			
11	4	Lockwasher			
12	4	Screw			
13	2	Cotter pin			
14	1	Throttle arm			
15	2	Cable terminal pivot			
16	2	Washer			
17	2	Screw			
18	1	Shift arm			
19	1	Switch activation cam			
20	1	Screw			
21	4	Washer			
22	1	Screw			
23	1	Washer			
24	1	Swivel bracket			
25	1	Switch assembly			
26	3	Nut			
27	1	Screw			
28	1	Screw			
29	1	Switch mounting bracket			
30	3	Screw			

Sport Jet 40 Series Remote Control 850696 Components

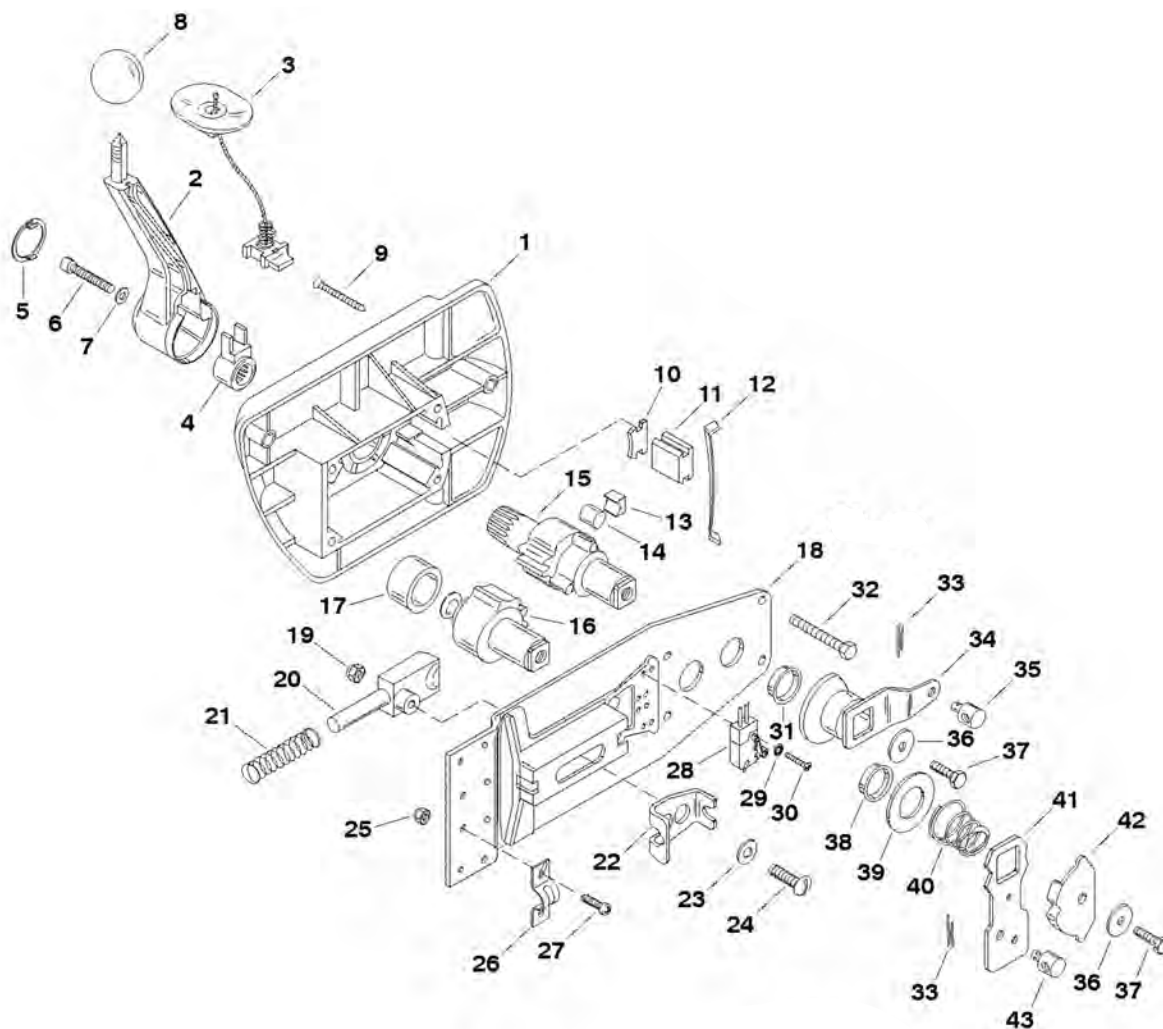


15601

Sport Jet 40 Series Remote Control 850696 Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Remote control assembly			
2	1	Ball			
3	1	Hand lever			
4	1	Screw			
5	1	Interlock			
6	3	Screw			
7	1	Hanger			
8	4	Lockwasher			
9	4	Screw			
10	2	Cotter pin			
11	1	Throttle arm			
12	1	Cable end			
13	2	Washer			
14	2	Screw			
15	1	Cam			
16	1	Shift arm			
17	1	Cable end			
18	1	Bracket			
19	2	Screw			
20	1	Bracket			
21	3	Lockwasher			
22	1	Screw			
23	1	Screw			
24	1	Neutral start safety switch			
25	2	Nut			
26	2	Screw			
27	1	Clamp			
28	4	Screw			
29	1	Bracket			
30	2	Screw			
31	1	Clamp			
32	2	Nut			
33	1	Hardware package			

Sport Jet 40 Series Remote Control 802755 Components



25716

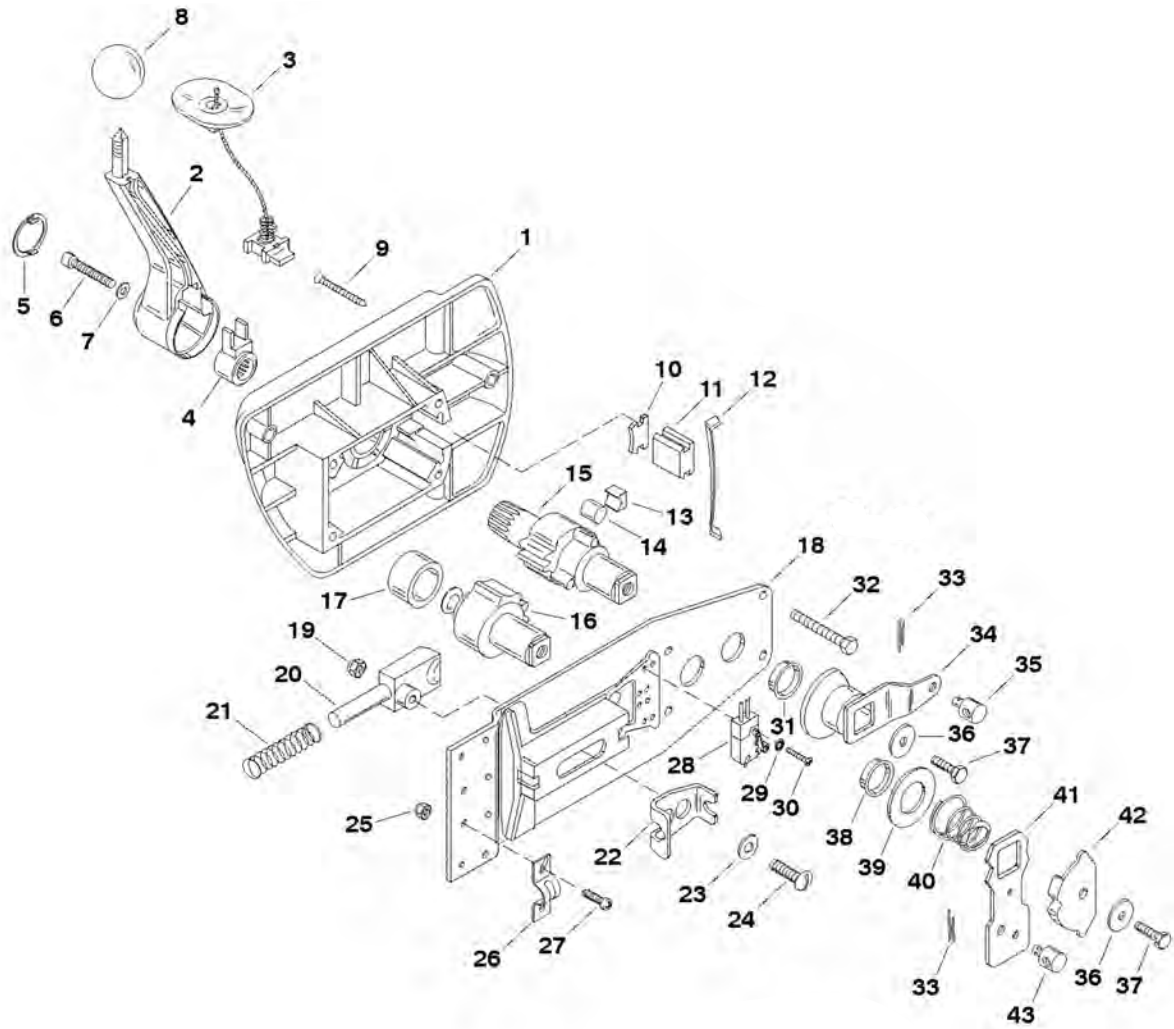
Sport Jet 40 Series Remote Control 802755 Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Remote control assembly			
2	1	Hand lever			
3	1	Shift lever assembly			
4	1	Shift interlock			
5	1	Hub			
6	1	Screw			
7	1	Washer			
8	1	Ball			
9	2	Screw (10 x 1.25)			
10	1	Screw (10 x 1.5)			
11	1	Detent retainer			
12	1	Detent spring			
13	1	Detent roller shoe			
14	1	Detent roller			
15	1	Throttle shaft			
16	1	Clutch gear			
17	1	Gear bushing			
18	1	Hanger assembly			
19	1	Nut (0.250 x 28)			
20	1	Dwell block			
21	1	Dwell block spring			
22	1	Swivel bracket			
23	1	Washer			
24	1	Screw (0.250 - 28 x 0.875)			
25	4	Nut (10 - 24)			
26	2	Cable clamp			
27	4	Screw (10 - 24 x 0.5)			
28	1	Neutral start safety switch			
29	2	Lockwasher			
30	2	Screw (4 x 0.625)			
31	1	Bushing			
32	4	Screw			
33	2	Cotter pin			
34	1	Throttle arm			
35	2	Cable end (brass)			
36	2	Washer			
37	2	Screw (0.250 - 28 x 0.500)			
38	1	Bushing			
39	1	Thrust washer			
40	1	Spring			

Sport Jet Remote Controls

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
41	1	Shift arm			
42	1	Cam			
43	2	Cable end (stainless steel)			

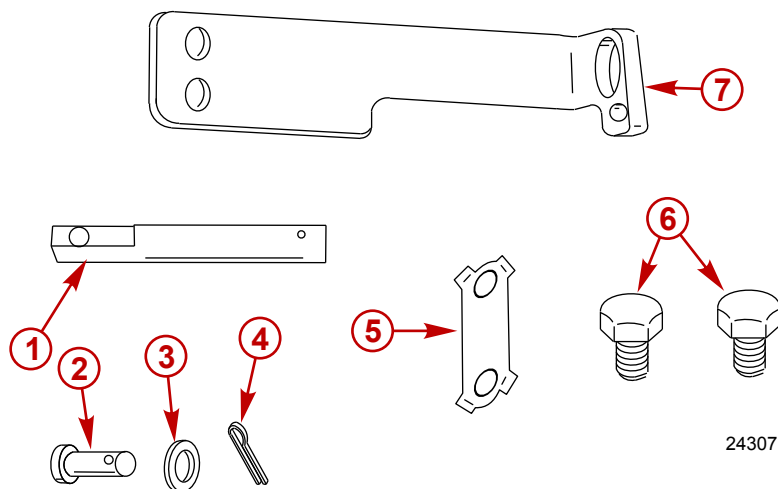
Sport Jet 40 Series Remote Control 802755 Components



25716

Shift Cable Conversion Kit 850698A1

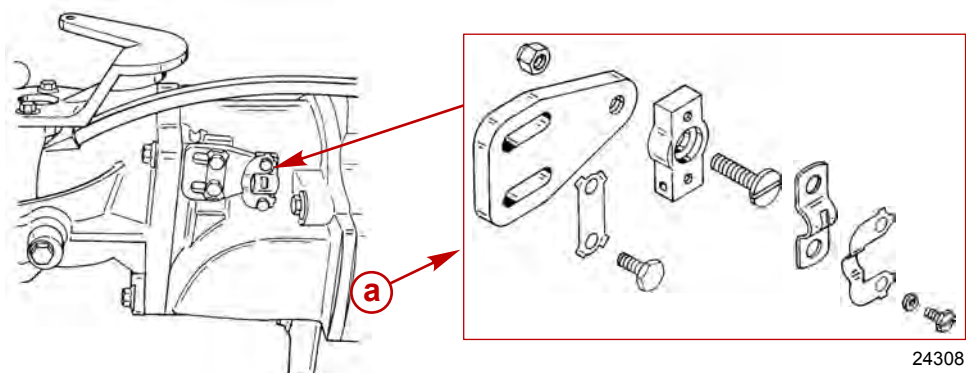
NOTE: This shift cable conversion kit is used to replace the standard #30 series shift cable with a heavy duty, water proof, #40 series shift cable (64-853951A10 through A18). When replacing the cable, a new control box (802755) and through hull fitting (850697A2) must be used.



Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Cable end adapter			
2	1	Clevis pin			
3	1	Washer			
4	1	Cotter pin			
5	1	Locking tab			
6	2	Screw			
7	1	Cable adapter bracket			

Shift Cable and Shift Cable Bracket Removal

1. Disconnect the shift cable from the reverse gate.
2. Remove and discard the shift cable bracket assembly.
3. Remove the pump assembly from the boat. Refer to the Service Manual for the pump assembly removal procedure.



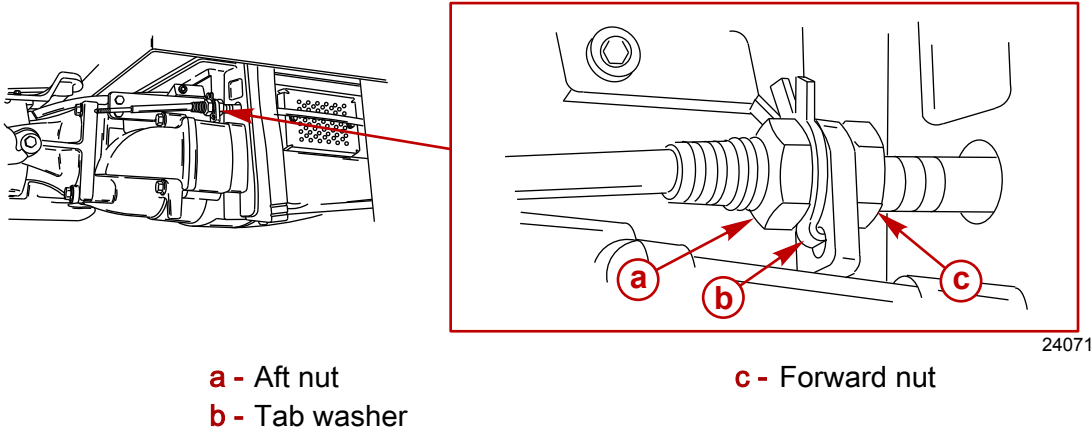
a - Shift cable bracket assembly (remove and discard)

5. Remove the shift cable from the boat.

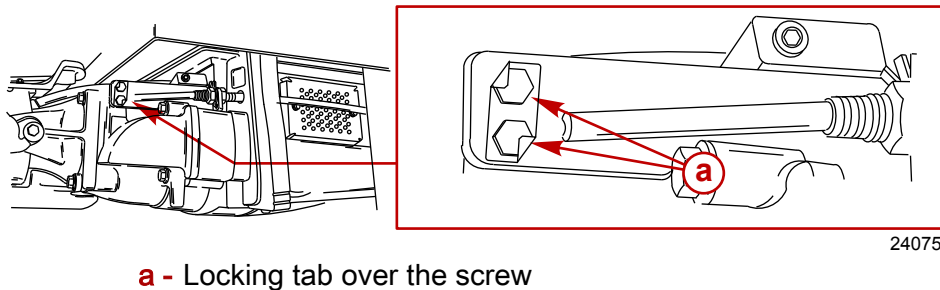
Shift Cable and Shift Cable Bracket Installation

1. Install the through hull fitting (850697A1).
2. Install a #40 series shift cable.
3. Install the pump assembly to the boat. Refer to the Service Manual for the pump assembly installation procedure.
4. Install the forward nut onto the cable.
5. Route the cable through the cable bracket included with the kit.
6. Install the tab washer and aft nut. Ensure the tab washer is installed correctly.

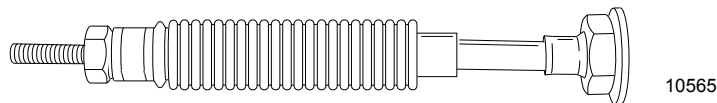
IMPORTANT: Coarse shift cable adjustment are made with the forward and aft nuts. Do not tighten the nuts until after the final shift cable adjustments are made.



7. Secure the cable bracket to the pump housing with two screws and the locking tab.
8. Tighten the two screws to the specified torque. Secure the two screws by bending a locking tab over the flat of the screw head.

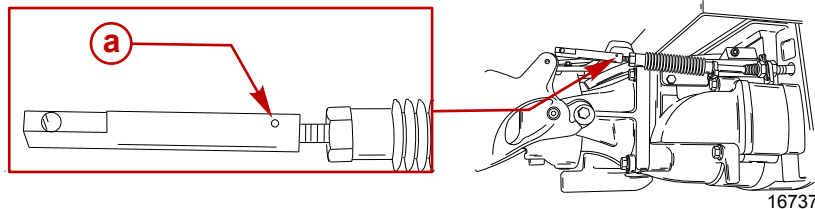


- Slide the bellows assembly over the cable and thread onto the cable completely. Do not tighten the bellows assembly onto the cable.



10. Thread the adaptor onto the cable end until the threads of the cable are visible through the sight hole in the adaptor. Thread the adaptor on an additional five turns to allow for adjustment.

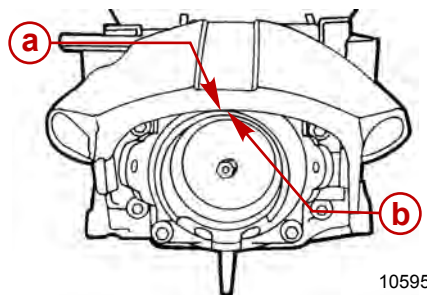
IMPORTANT: The shift cable must be properly adjusted so the reverse gate is not pre-loaded against the forward stop, or the reverse stop. A pre-loaded shift cable in either position may cause failure of the stop, and/or premature wear of the shift cable or control box components. It may also cause additional resistance in the throttle control.



a - Sight hole on adapter

11. Shift remote control to forward.
12. Lift the reverse gate up and temporarily install the clevis pin through reverse gate boss and cable end adaptor. Do not install the washer or the cotter pin onto the clevis pin.
13. Pull reverse gate with your hand toward the neutral position to pull out any cable slack. With cable slack pulled out, adjust the cable so the lower edge of the reverse gate is positioned above the top edge of the nozzle by 6.35 mm (0.250 in.). Use the cable nuts or the cable end adaptor to make this adjustment. It may be necessary to adjust the forward stop to allow the reverse gate to reach the correct position for forward.

NOTE: Ensure the threads of the cable end are visible in the adapter sight hole after the final adjustments are made.



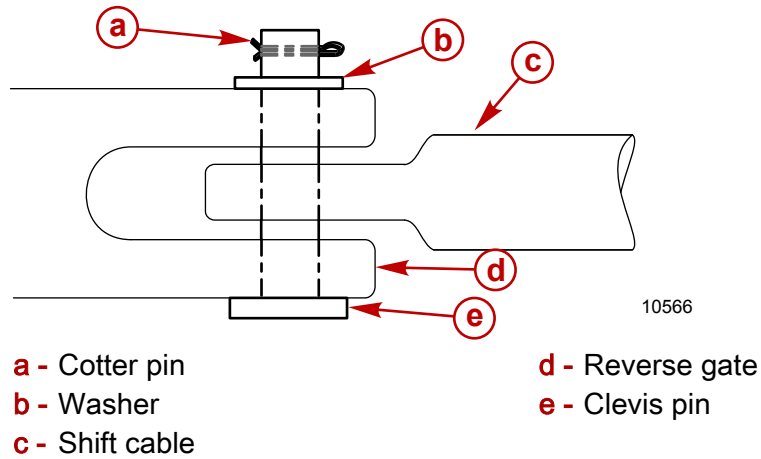
a - Reverse gate edge 6.35 mm (0.250 in.) above the nozzle edge
b - Nozzle edge

⚠ WARNING

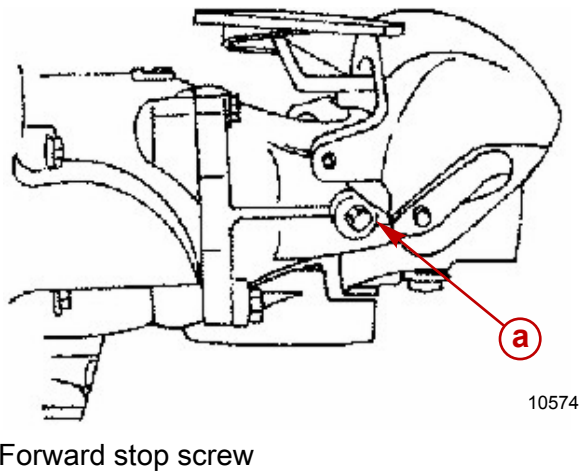
Avoid property damage, personal injury or death. Adjust the shift cable correctly, so that the reverse gate does not interfere with water flow coming out of the rudder. If the reverse gate hangs down into the water flow, a vibration may be felt in the control box. If this occurs, reduce throttle immediately and readjust the cable. Improper adjustment may result in pump damage, including loss of the reverse gate.

14. After adjusting the shift cable, tighten the cable nuts. Secure the cable nuts by bending the tab washer over the nut.

15. Check the cable adaptor sight hole to ensure that adequate thread engagement of the cable end has been maintained. Install clevis pin, washer, and cotter pin.



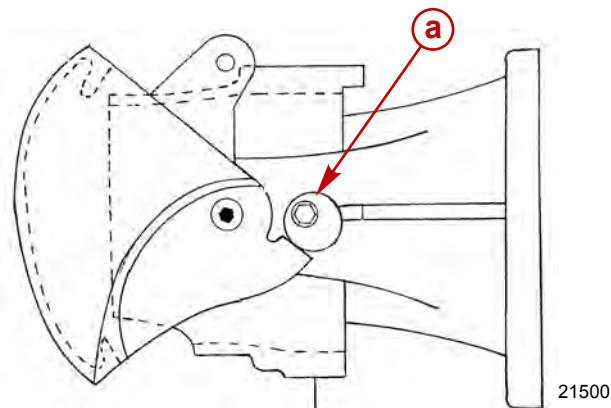
16. Adjust the forward stop located on the port side of nozzle so that it just touches the reverse gate in the forward position with the slack pulled out of the cable. Tighten the forward stop screw to the specified torque.



Description	Nm	lb. in.	lb. ft.
Forward stop screw	14	124	

17. Shift the remote control box into full reverse.

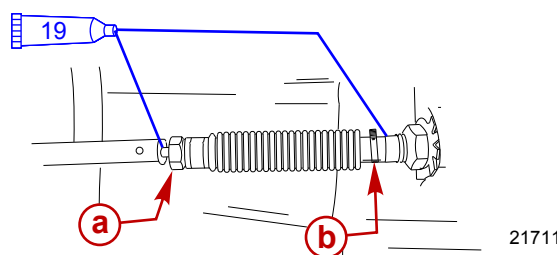
18. Adjust the reverse stop located on the starboard side of the nozzle so the stop just touches the reverse gate. Tighten the reverse stop screw to the specified torque.



a - Reverse stop screw

Description	Nm	lb. in.	lb. ft.
Reverse stop screw	14	124	

19. Apply Perfect Seal to the exposed cable end threads between the cable adaptor and the bellows nut. Tighten the bellows nut against the cable adaptor.
20. Shift the remote control box into full forward. Apply Perfect Seal to the cable conduit just behind the cable nut threads. Slide the end of the bellows over the cable conduit up to the threads. Secure bellows to the cable conduit with the bellows clamp provided with the shift cable bellows kit.



a - Bellows nut

b - Bellows clamp

Tube Ref No.	Description	Where Used	Part No.
 19	Perfect Seal	Shift cable conduit	92-34227-1

21. Shift the remote control box through the entire range several times. Check for any cable binding or if the bellows rubbing. Check the stops for proper adjustment. Recheck the forward cable adjustment so the reverse gate is positioned above the top edge of the nozzle by 6.35 mm (0.250 in.). Re-adjust the shift cable as necessary.

Digital Throttle and Shift (DTS) Electronic Remote Controls

Section 9A - DTS Panel Mount Remote Control

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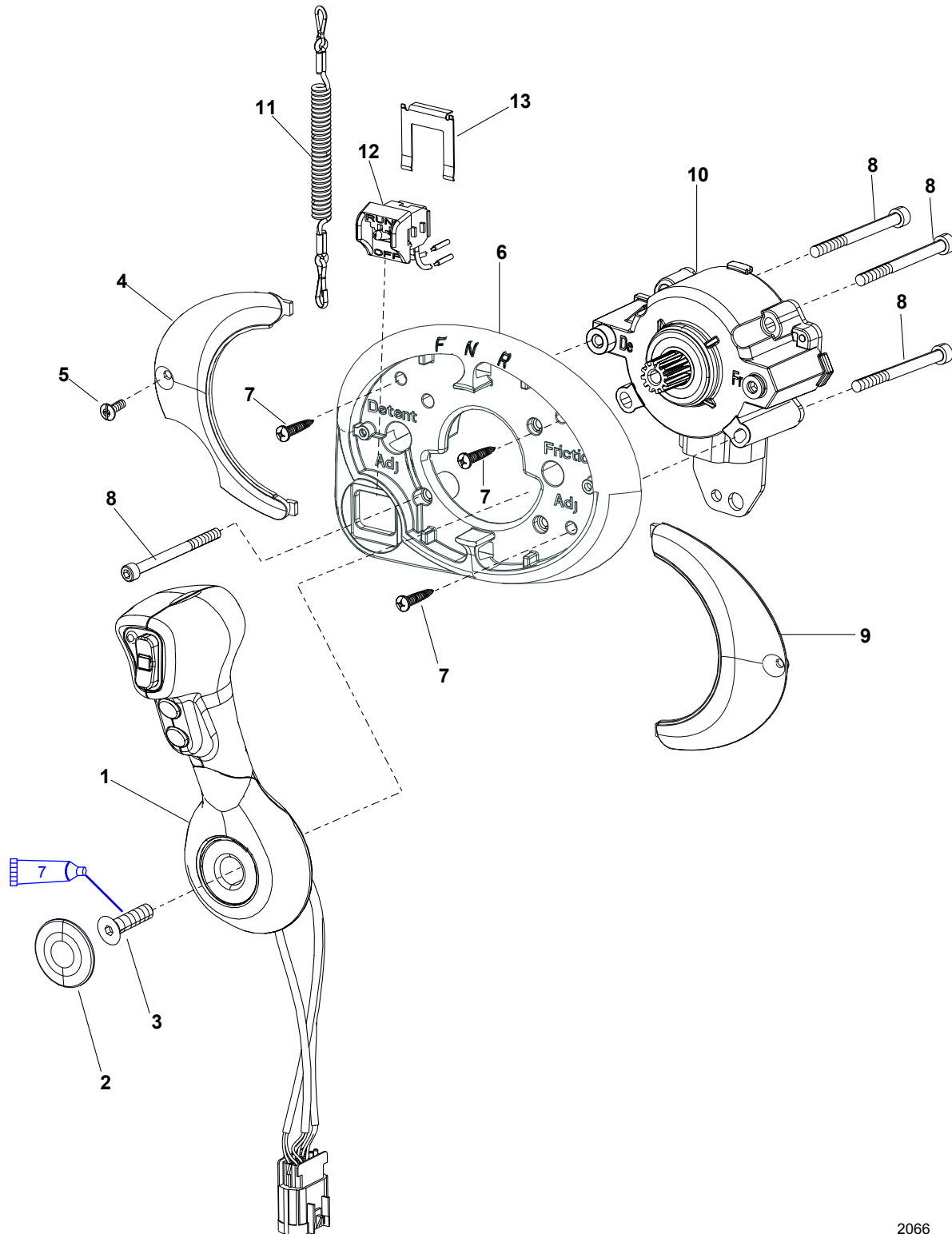
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Panel Mount Disassembly.....	9A-6		

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
	Loctite 271 Threadlocker	Control handle screw threads	92-809819
		Control handle attaching screw threads	

Notes:

Panel Mount Components



2066

Panel Mount Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Handle assembly (Panel Mount)(Chrome)			
2	1	Emblem (Mercury)			
3	1	Screw (M8 x 30)	27.1		20
4	1	Cover - Front			
5	2	Screw			
6	1	Bezel (Panel Mount)			
7	3	Screw (12 x 1.25)			
8	4	Screw (M6 x 70)	5.6	50	
9	1	Cover - Front			
10	1	Module assembly - Housing			
11	1	Lanyard assembly - Stop switch			
12	1	Stop switch - Lanyard			
13	1	Retainer - Switch			

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle screw threads	92-809819

DTS Panel Mount Remote Control Removal, Disassembly, Assembly and Installation

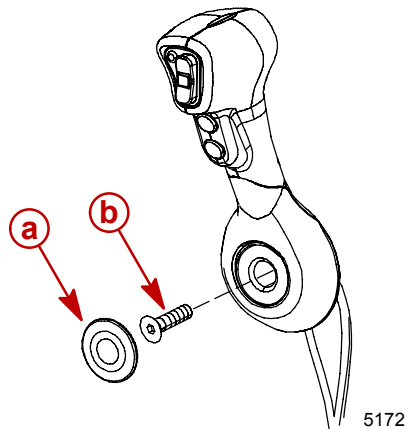
Panel Mount Removal

NOTE: Place the remote control handle in neutral detent position. Note position of handle for reassembly.

1. Remove two screws securing covers to bezel and remove covers.
2. Remove three screws securing the bezel to panel of boat.
3. Remove remote control assembly from side panel. Disconnect wire harness connectors.

Panel Mount Disassembly

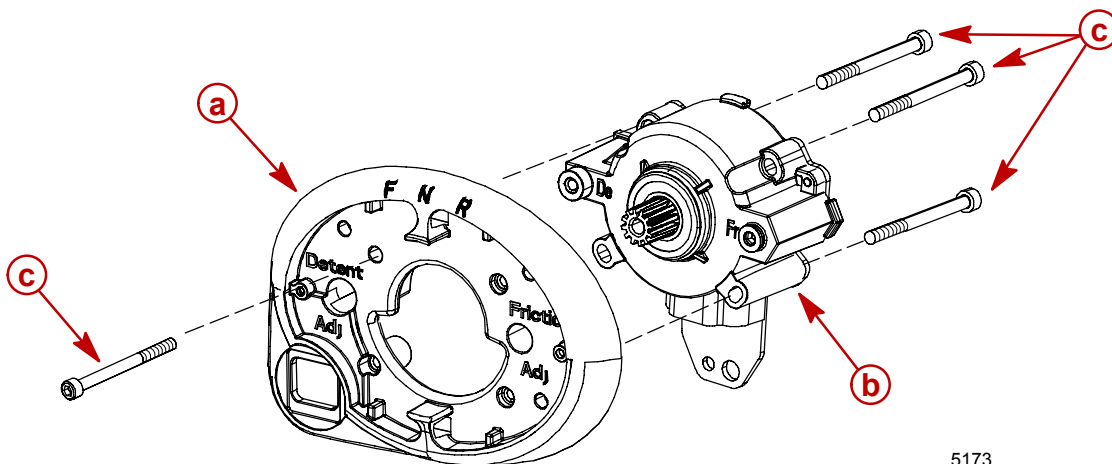
1. Remove the emblem from the center of the handle using a flat blade screwdriver.
2. Place the control handle in neutral detent position. Note the position of the handle for reassembly.
3. Remove the screw securing the handle to the control module.
4. Remove the handle from the control module shaft.



a - Emblem

b - Control handle screw (M8 x 30)

5. Remove the four screws securing the bezel to the module.



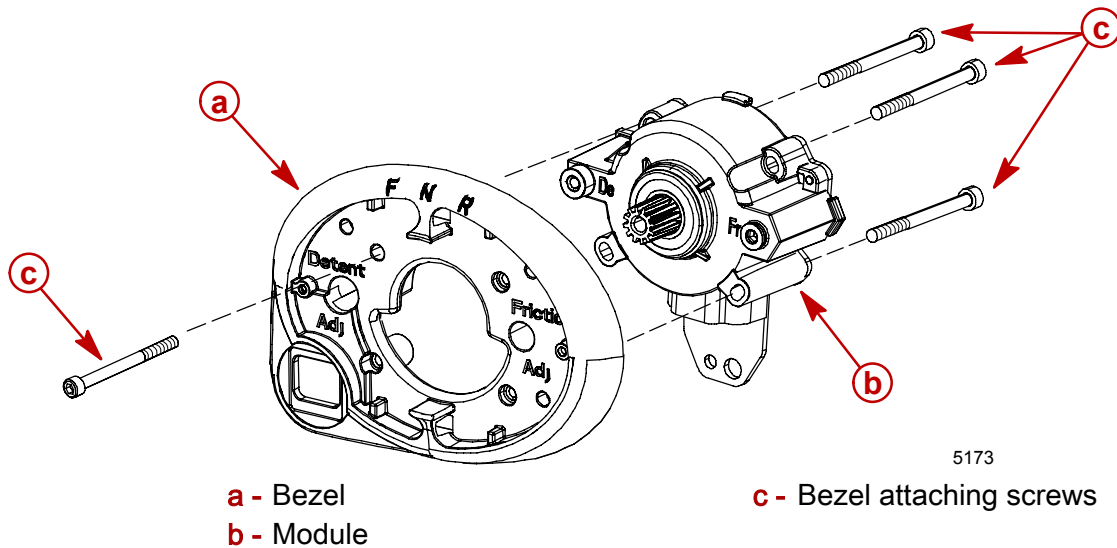
a - Bezel

b - Module

c - Bezel attaching screws

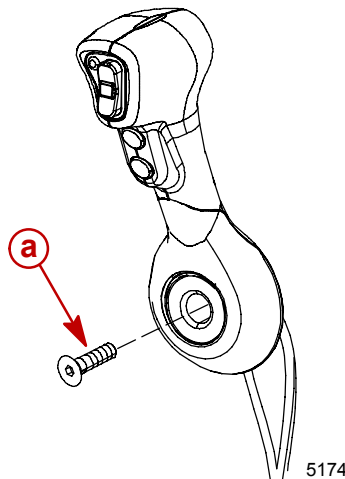
Panel Mount Reassembly

1. Attach the bezel to the module with four screws. Tighten the screws to the specified torque.



Description	Nm	lb. in.	lb. ft.
Bezel attaching screws	5.6	50	

2. With the control in neutral detent, attach the handle to the control module shaft in the same vertical position it was removed.
3. Apply Loctite 271 Threadlocker on the control handle attaching screw, and secure the handle to the module. Do not torque the screw at this time.

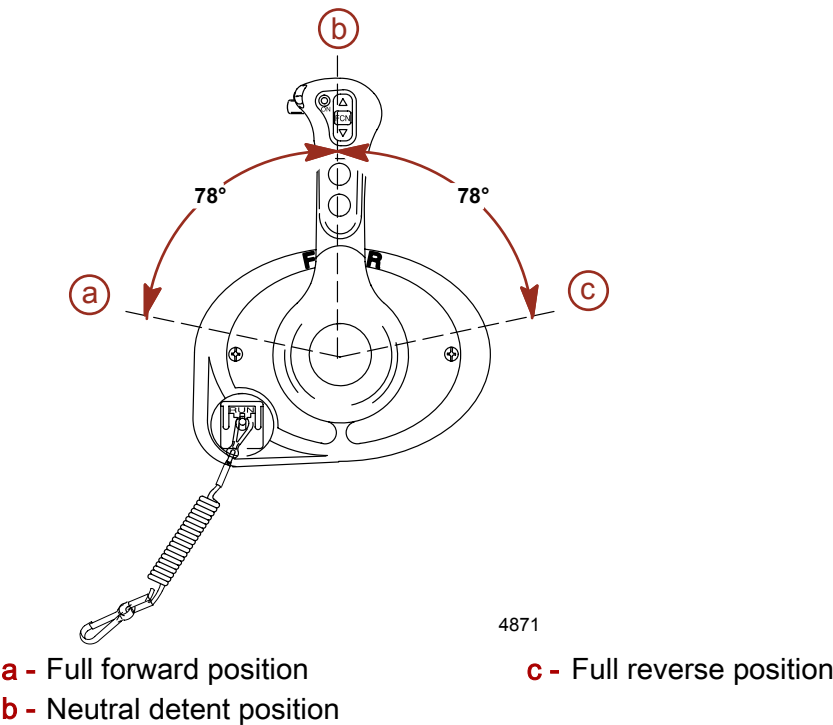


Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle attaching screw threads	92-809819

Panel Mount Installation

1. Route the wiring harnesses through the mounting opening. Connect the remote control harnesses to the main wire harness.
2. Install the bezel/module assembly to the side panel. Attach with three screws.

3. Shift the handle from neutral to full forward and full reverse to ensure that the handle has full range of movement. Allow slack in the harness for flexing due to control handle movement.

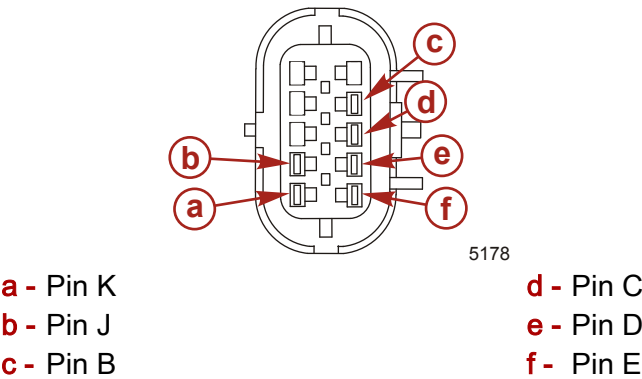


4. Tighten the control handle attaching screw to the specified torque.

Description	Nm	lb. in.	lb. ft.
Control handle attaching screw	27.1		20

5. Adjust the handle tension and detent tension to desired efforts. Refer to **Features and Operation**, preceding.
6. Attach the side covers to the control module with two screws.
7. Attach the emblem to the center of the control handle.

Panel Mount Control Trim Switch Harness Test



Ref. No.	Pin	Wire Color	Description
a	K	White/green	Trim up
b	J	White/blue	Trim down
c	B	Yellow/black	Throttle only/station select

Ref. No.	Pin	Wire Color	Description
d	C	Yellow/red	Start/stop
e	D	Purple	Trim - 12 volts
f	E	Purple	Start/stop, neutral lockout - 12 volts

Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Pin C	Pin J	Up	Continuity
Pin C	Pin K	Down	Continuity
Pin B	Pin B	Throttle only/station select	Continuity
Pin B	Pin C	Start/stop	Continuity

Notes:

Digital Throttle and Shift (DTS) Electronic Remote Controls

Section 9B - DTS Single Handle Console Remote Control

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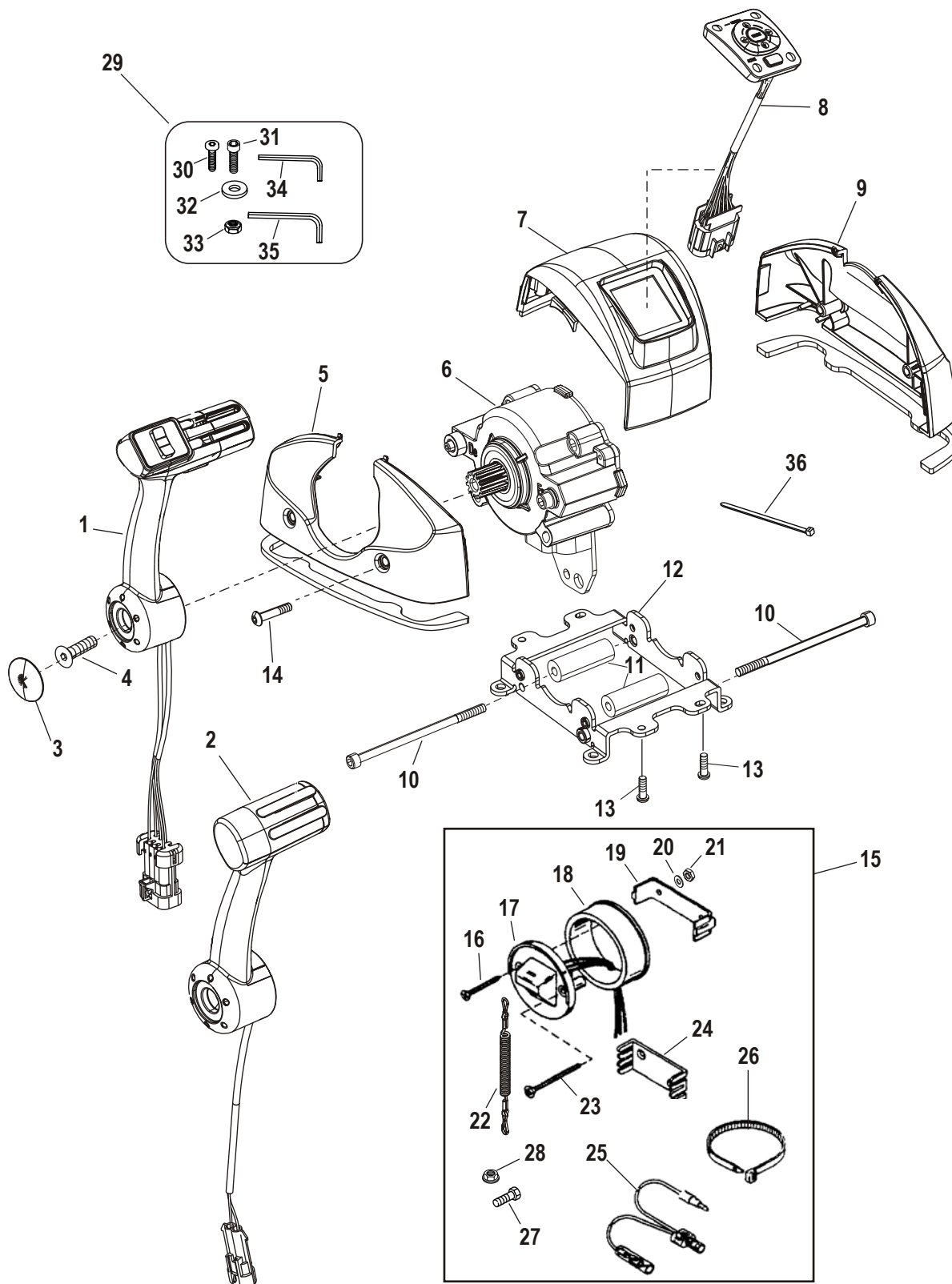
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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle screw threads	92-809819

Notes:

Single Handle Console Mount Components



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Single Handle Console Mount Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Handle assembly (Trim)			
2	1	Handle assembly (No trim)			
3	1	Emblem - Mercury			
4	1	Screw (M8 x 30)	27.1		20
5	1	Cover - Side			
6	1	Module assembly - Housing			
7	1	Cover - Top			
8	1	Keypad assembly			
9	1	Cover - Side			
10	2	Screw (M6 x 110)	5.6	50	
11	2	Spacer			
12	1	Bracket			
13	4	Screw (M5 x 16)			
14	4	Screw (M4 x 20)			
15	1	Switch kit - Lanyard			
16	2	Screw (0.190-16 x 1.750)			
17	1	Switch assembly - Lanyard			
18	1	Adaptor - Switch assembly			
19	1	Clamp - Mounting			
20	2	Washer			
21	4	Nut (#10-32)			
22	1	Lanyard assembly			
23	2	Screw (#10-32 x 2.00)			
24	1	Retainer - Cable assembly			
25	1	Cable assembly			
26	7	Cable tie (8 in.)			
27	1	Screw (#10-32 x 0.25)			
28	1	Nut and lockwasher (#10-32)			
29	1	Hardware bag assembly - Mounting			
30	4	Screw (M4 x 20)			
31	4	Screw (M6 x 40)			
32	4	Washer			
33	4	Nut (M6)			
34	1	Wrench - Allen (2.5 mm)			
35	1	Wrench - Allen (5.0 mm)			
36	1	Cable tie (4 in.)			

DTS Single Handle Console Remote Control Removal, Disassembly, Assembly and Installation

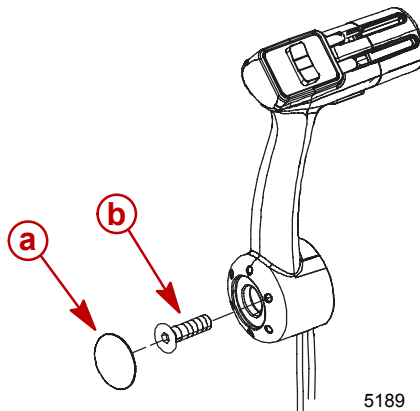
Single Handle Console Removal

NOTE: Place the remote control handle in neutral detent position. Note position of handle for reassembly.

1. Remove the four screws securing the side covers to the control housing and remove the covers.
2. Remove the four screws securing the bracket to the console to access the harness connectors.
3. Remove the remote control assembly from the console. Disconnect the wire harness connectors.

Single Handle Console Disassembly

1. Remove the emblem from the center of the handle using a flat blade screwdriver.
2. Place the control handle in neutral detent position. Note the position of the handle for reassembly.
3. Remove the screw securing the handle to the control module and remove the handle from the control module shaft.

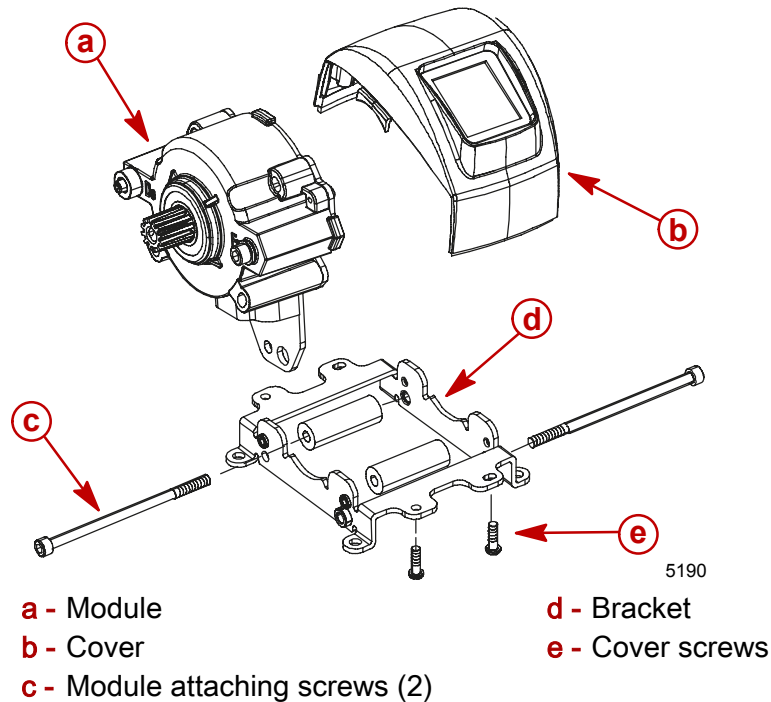


a - Emblem

b - Control handle screw (M8 x 30)

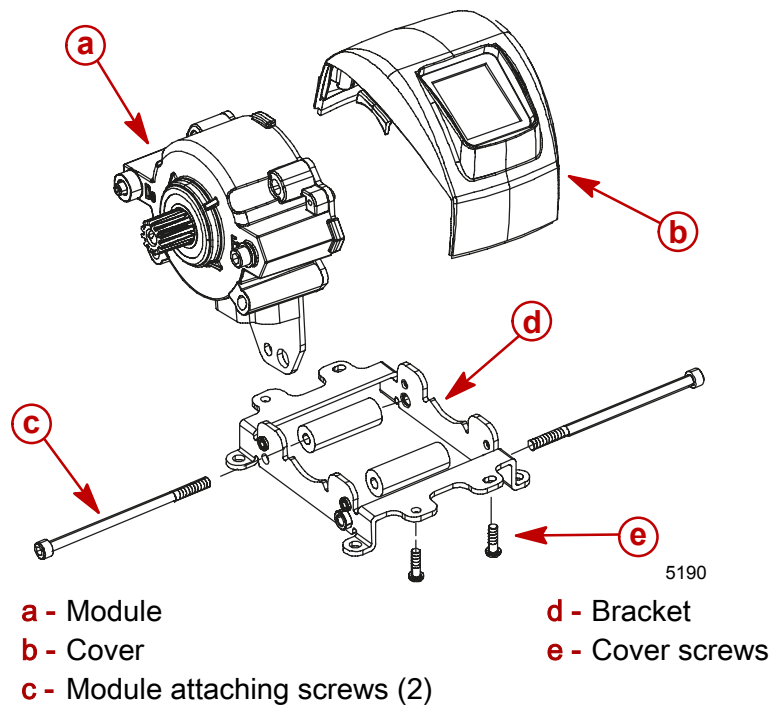
4. Remove the cable tie securing the keypad harness to the module.
5. Remove the four screws securing the top cover to the bracket and remove the cover.

6. Remove the two screws securing the module to the bracket and remove the module.



Single Handle Console Reassembly

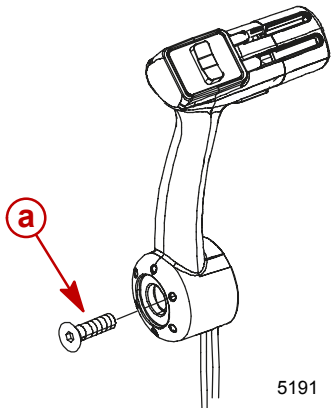
1. Align the spacers, module and bracket. Install the two screws attaching the module to the bracket and tighten to the specified torque.



Description	Nm	lb. in.	lb. ft.
Module attaching screws	5.6	50	

2. With the control handle in neutral detent, attach the handle to the control module shaft in the same vertical position it was removed.

- 3. Apply Loctite 271 Threadlocker to the control handle screw and secure the handle to the module. Torque the screw to specification.

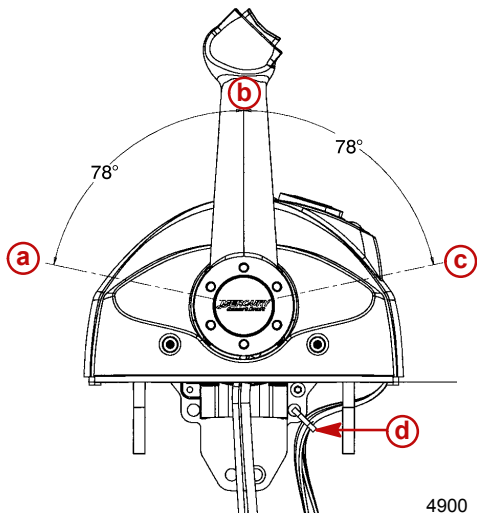


a - Control handle screw (M8 x 30)

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle screw threads	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle attaching screw	27.1		20

- 4. Shift the handle from neutral to full forward and full reverse to ensure the handle has full range of movement. Allow slack in the harness for flexing due to control handle movement.
- 5. Install the top cover. Ensure the wire harness is routed in between the bracket and mounting tabs. Secure the cover with four screws.
- 6. Attach the keypad wire harness to the module with cable tie.

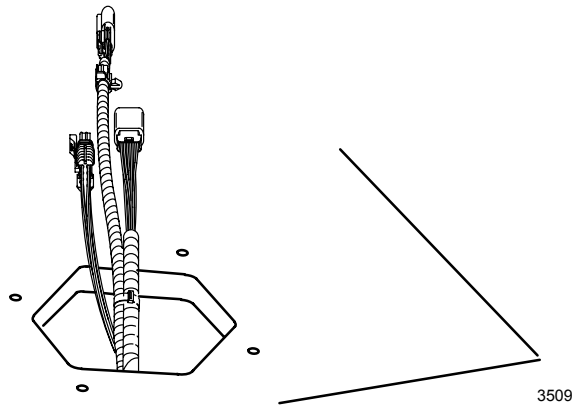


a - Full forward position
b - Neutral detent position
c - Full reverse position
d - Cable tie

Installing DTS Single Handle Console Control

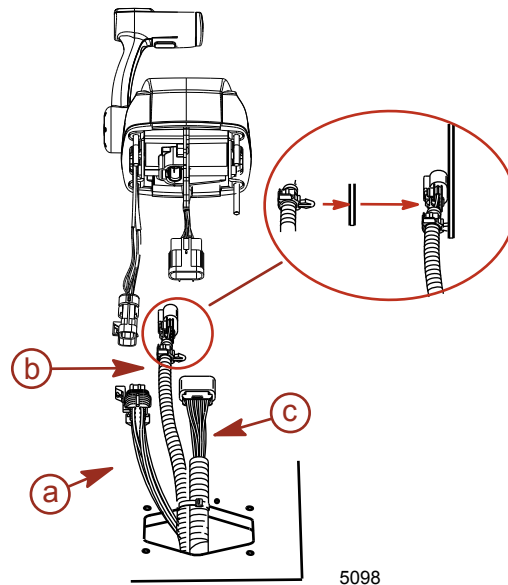
- 1. Ensure opening is free of sharp edges.

2. Route wiring for the remote control into opening.



3. Connect trim, lever and trackpad harnesses.
4. Insert the bayonet end of the lever harness into bracket hole. This will prevent connector from pulling out.

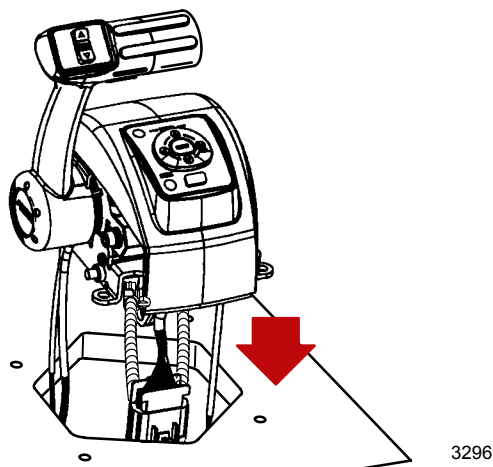
IMPORTANT: Allow slack in the trim harness. Harness will flex and move during control handle movement.



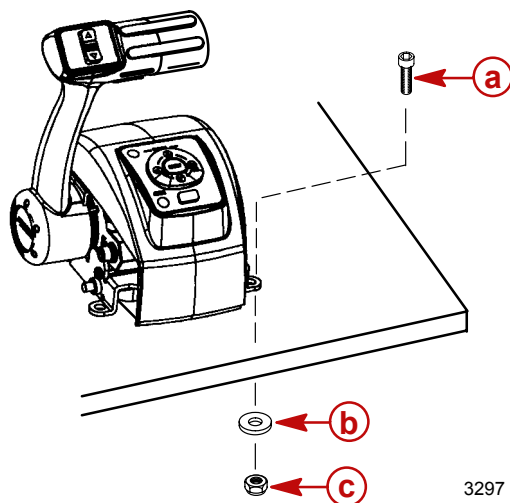
a - Trim harness
b - Lever harness

c - Trackpad harness

5. Place the remote control into the opening.



6. Fasten the remote control with four M6 x 40 long screws.



a - Mounting screw (4) M6 x 40

b - Washer

c - Nut - nylon insert

⚠ CAUTION

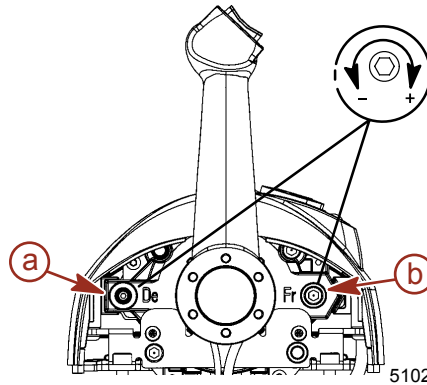
Do not turn control handle tension adjustment screw clockwise more than 11 turns from the initial point of hex head contact with bracket. Damage to the module may occur.

⚠ CAUTION

Do not turn detent tension adjustment screw clockwise more than 11 turns from full out position. Damage to the module may occur.

7. Control Handle Tension Adjustment Screw – This screw can be adjusted to increase or decrease the overall effort to move the control handle. This will help prevent the handle from unwanted motion in rough water. Turn screw towards "+" to increase tension or towards "-" to decrease tension.

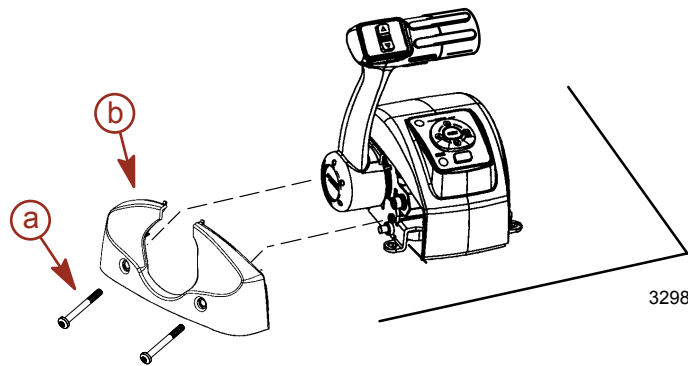
8. Detent Tension Adjustment Screw – This screw can be adjusted to increase or decrease the effort to move control handle into or out of detent position. Turn screw towards "+" to increase tension or towards "-" to decrease tension.



a - Detent tension adjustment

b - Control handle tension adjustment

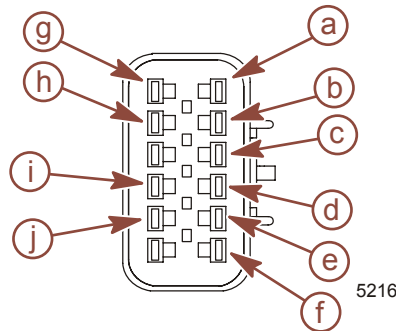
9. Install the side cover with attaching screws.



a - Attaching screws (4) M4 x 20

b - Side cover (2)

Single Console Control Key Pad Harness Test



a - Pin A

b - Pin B

c - Pin C

d - Pin D

e - Pin E

f - Pin F

g - Pin G

h - Pin H

i - Pin K

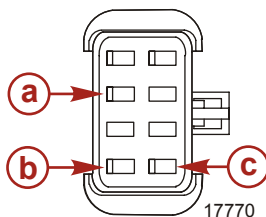
j - Pin L

Ref. No.	Pin	Wire Color	Description
a	A	Purple	12 volts
b	B	White/red	Up

Ref. No.	Pin	Wire Color	Description
c	C	White/black	Down
d	D	White/brown	Right
e	E	White/orange	Left
f	F	White/gray	Select
g	G	White/purple	Throttle only
h	H	Black	Ground
i	K	White/yellow	Neutral LED
j	L	Gray	Active station LED

Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Purple	White/red	Up arrow	Continuity
Purple	White/black	Down arrow	Continuity
Purple	White/brown	Right arrow	Continuity
Purple	White/orange	Left arrow	Continuity
Purple	White/gray	Select	Continuity
Purple	White/purple	Throttle only	Continuity

Single Console/Slim Binnacle Control Trim Switch Harness Test



a - Pin B

b - Pin D

c - Pin E

Ref. No.	Pin	Wire Color	Description
a	B	Purple	12 volts
b	D	White/blue	Trim down
c	E	White/green	Trim up

Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Purple	White/green	Trim down	Continuity
Purple	White/blue	Trim up	Continuity

Digital Throttle and Shift (DTS) Electronic Remote Controls

Section 9C - DTS Slim Binnacle Single Handle Console Control

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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle screw threads	92-809819

Notes:



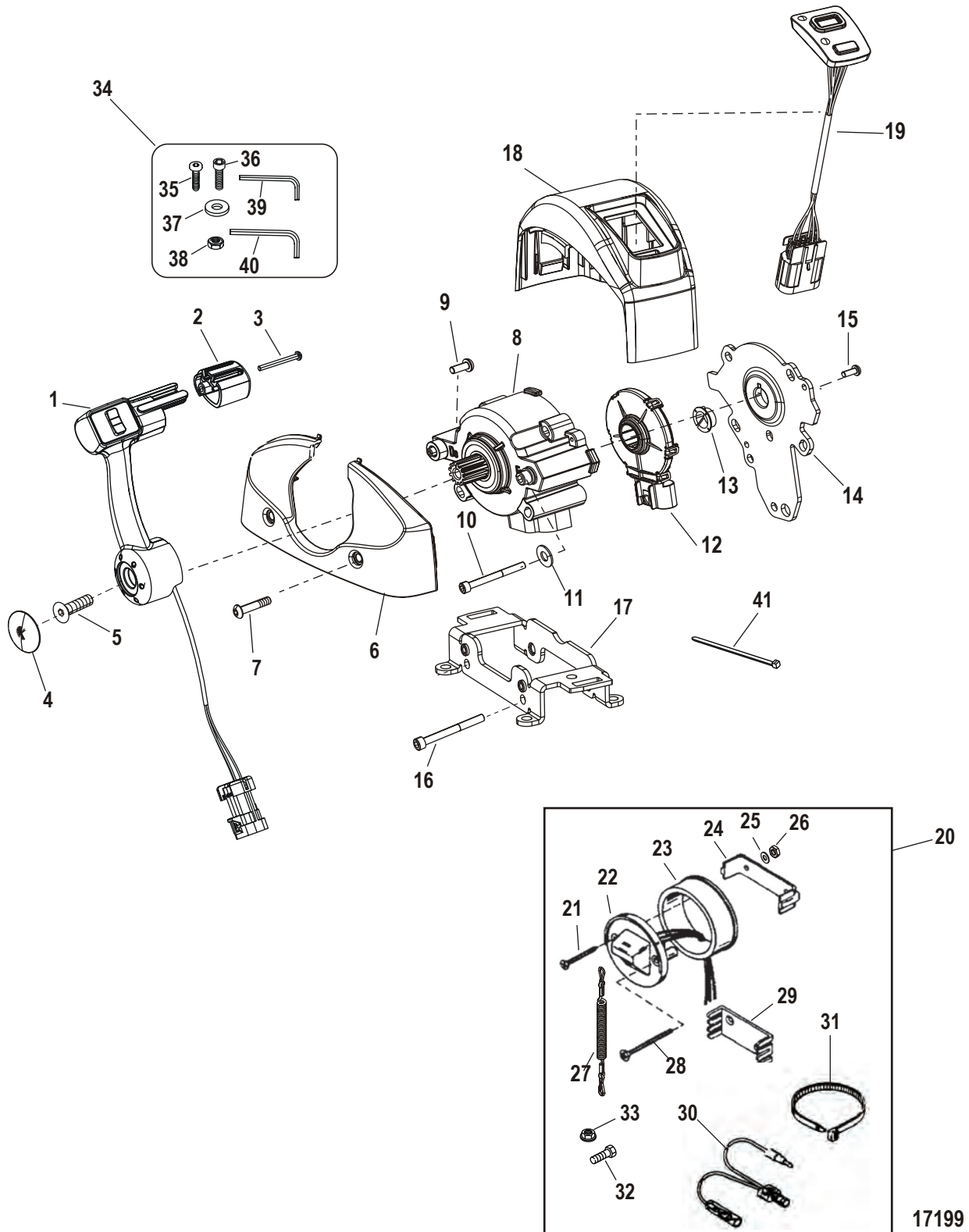
DTS Slim Binnacle Single Handle Console Mount Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. In.	lb. ft.
1	1	Handle assembly with trim			
2	1	Cap kit			
3	1	Screw (M4 x 40)			
4	1	Emblem - Mercury			
5	1	Screw (M8 x 30)			
6	1	Cover side (Chrome)			
7	2	Screw (M4 x 20)			
8	2	Module assembly housing			
9	1	Not sold separate - Screw			
10	1	Screw (M6 x 45)			
11	1	Washer (.281 x .500 x .060)			
12	1	Sensor Throttle/Shift			
13	1	Nylner flange			
14	1	Not sold separate - Plate			
15	2	Screw (M4 x 10)			
16	2	Screw (M6 x 60)	5.6	50	
17	1	Not sold separate - Bracket			
18	1	Cover assembly top (With gasket)			
19	1	Keypad assembly			
20	1	Switch/Lanyard kit - stop			
21	2	Screw (.190-16 x 1.750)			
22	1	Switch assembly - Lanyard			
23	1	Adapter			
24	1	Clamp - mounting			
25	2	Washer (.200 x .440 x .032)			
26	4	Nut (#10-32)			
27	1	Lanyard assembly			
28	2	Nut (#10-32 x 2.00)			
29	1	Retainer			
30	1	Cable assembly (6.0 in.)			
31	AR	Cable tie (8.0 in.)			
32	1	Screw (#10-32 x .250)			
33	1	Nut and lockwasher (#10-32)			
34	1	Hardware bag assembly - Mounting			
35	4	Screw (M4 x 20)			
36	4	Screw (M6 x 40)			
37	4	Washer			
38	4	Nut (M6)			
39	1	Wrench - Allen (2.5 mm)			
40	1	Wrench - Allen (5.0 mm)			

DTS Slim Binnacle Single Handle Console Control

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
41	AR	Cable tie (8.0 in.)			

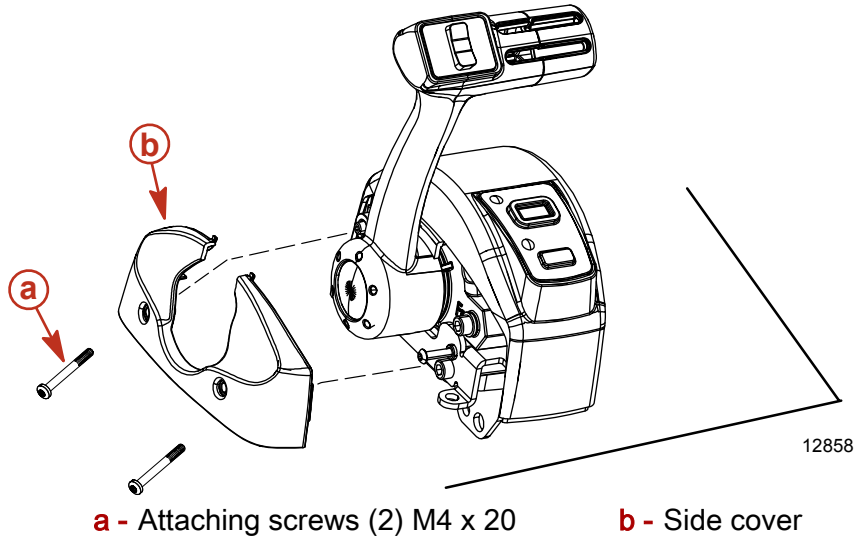
DTS Slim Binnacle Single Handle Console Mount Components



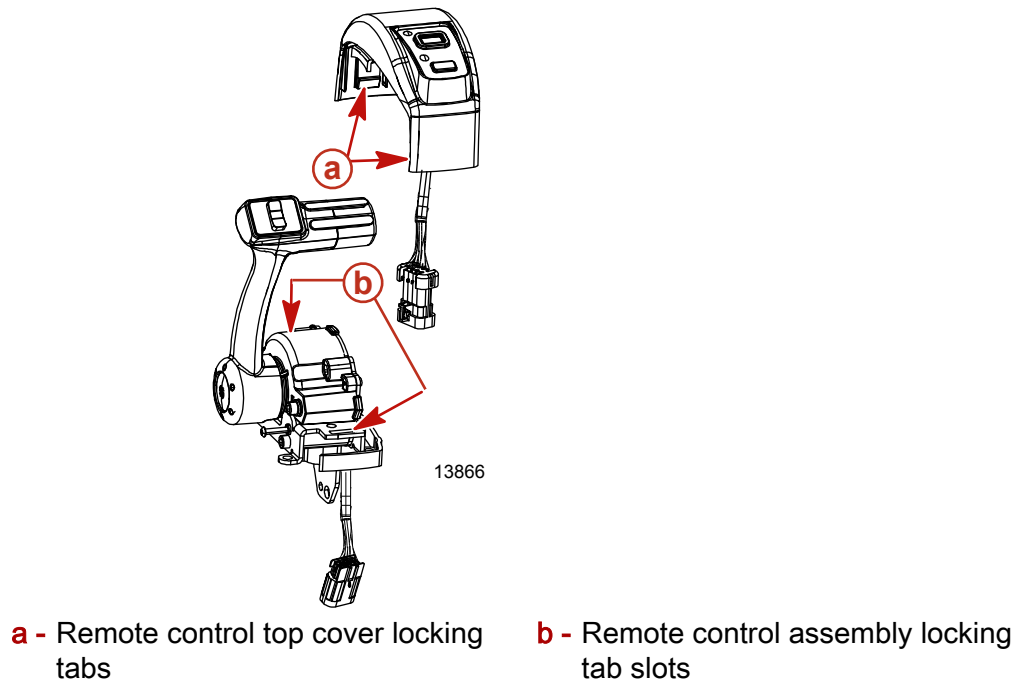
DTS Slim Binnacle Single Handle Console Control Removal, Disassembly, Assembly, Installation and Tests

DTS Slim Binnacle Single Handle Console Control Removal

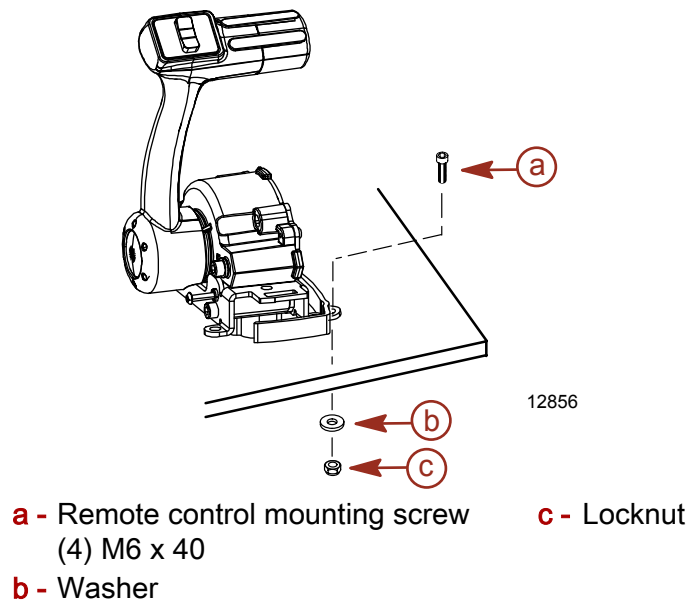
1. Remove the side cover attaching screws and remove the side cover.



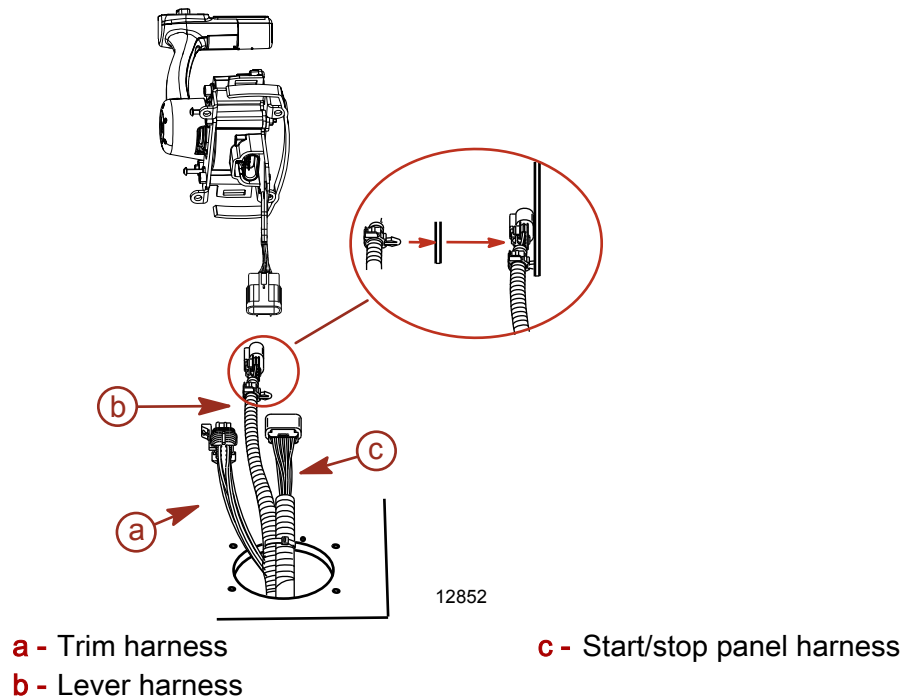
2. Remove the slim binnacle remote control top cover from the remote control assembly.
 - a. Push the locking tabs outward to release the remote control top cover.
 - b. Lift the top cover straight up.



3. Remove the remote control locknuts and mounting screws.



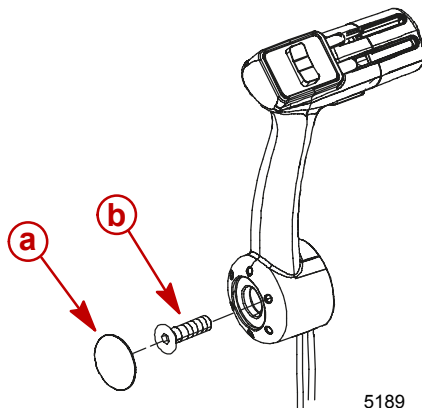
4. Carefully lift the control straight up.
5. Remove the cable tie securing the start/stop panel connector to the remote control mounting bracket.
6. Disconnect the trim harness, lever harness, and start/stop panel harness from the remote control.



DTS Slim Binnacle Single Handle Console Control Disassembly

1. Remove the emblem from the center of the handle using a flat blade screwdriver.
2. Place the control handle in neutral detent position. Note the position of the handle for reassembly.

3. Remove the screw securing the handle to the control module and remove the handle from the control module shaft.

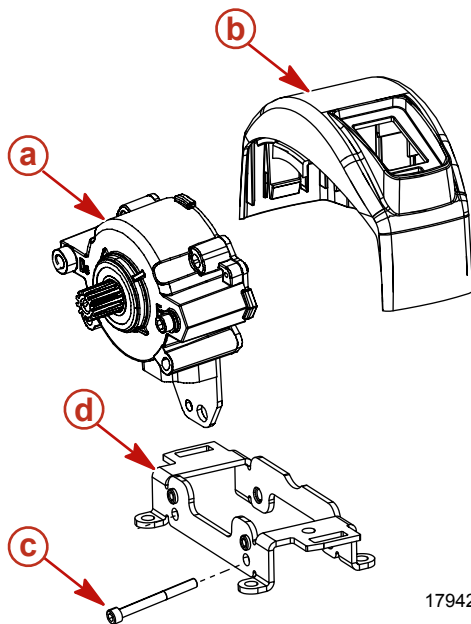


5189

a - Emblem

b - Control handle screw (M8 x 30)

4. Remove the two screws securing the module to the bracket and remove the module.



17942

a - Module

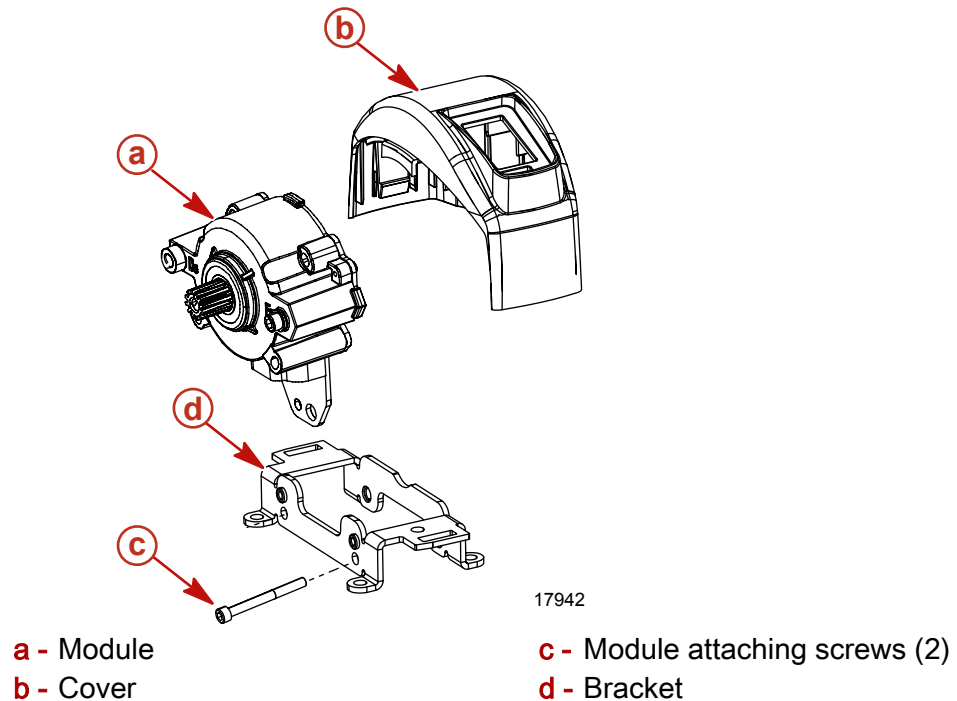
b - Cover

c - Module attaching screws (2)

d - Bracket

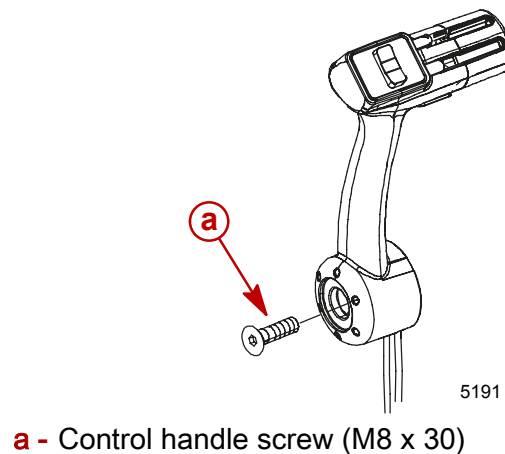
DTS Slim Binnacle Single Handle Console Control Reassembly

1. Align the module and the bracket. Install the two screws attaching the module to the bracket and tighten to the specified torque.



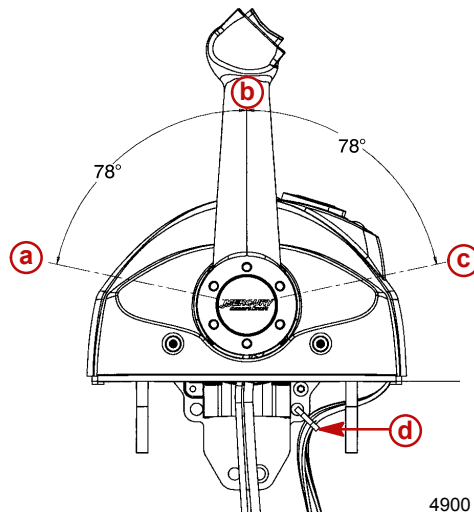
Description	Nm	lb. in.	lb. ft.
Module attaching screws	5.6	50	

2. With the control handle in neutral detent, attach the handle to the control module shaft in the same vertical position it was removed.
3. Apply Loctite 271 Threadlocker to the control handle screw and secure the handle to the module. Do not torque the screw at this time.



Tube Ref No.	Description	Where Used	Part No.
7	Loctite 271 Threadlocker	Control handle screw threads	92-809819

- Shift the handle from neutral to full forward and full reverse to ensure the handle has full range of movement. Allow slack in the harness for flexing due to control handle movement.

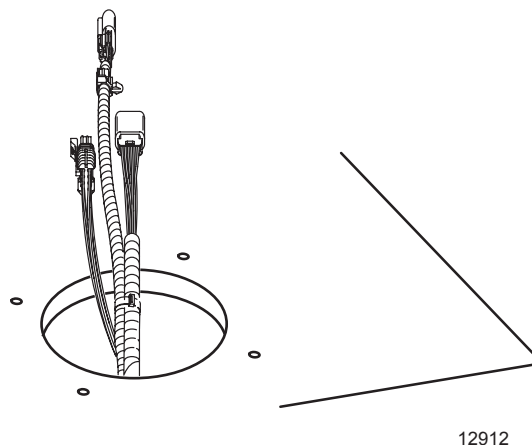


a - Full forward position
b - Neutral detent position

c - Full reverse position
d - Cable tie

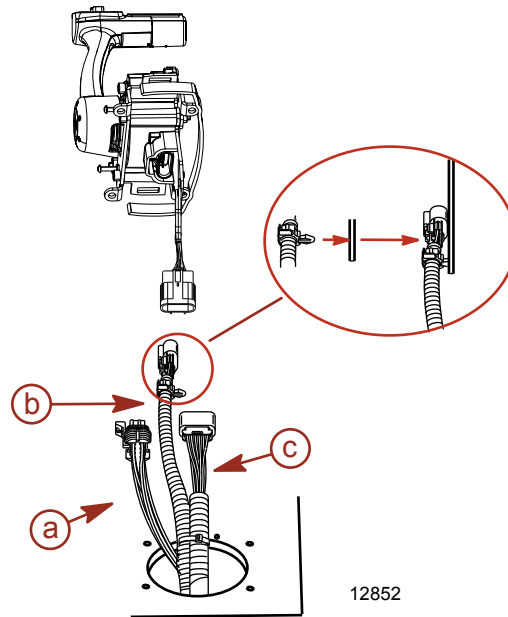
DTS Slim Binnacle Single Handle Console Control Installation

- Ensure opening is free of sharp edges.
- Route wiring for the remote control into opening.



- Connect trim, lever and start/stop panel harnesses.
- Insert the bayonet end of the lever harness into bracket hole. This will prevent connector from pulling out.

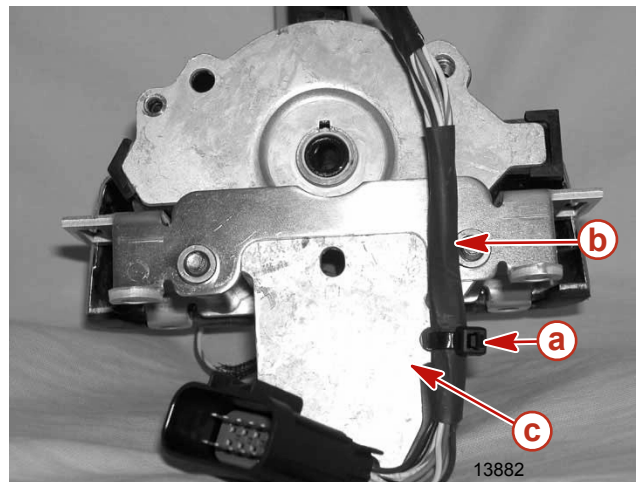
IMPORTANT: Allow slack in the trim harness. Harness will flex and move during control handle movement.



a - Trim harness
b - Lever harness

c - Start/Stop panel harness

5. Using a cable tie secure the start/stop panel connector harness to the remote control mounting bracket.

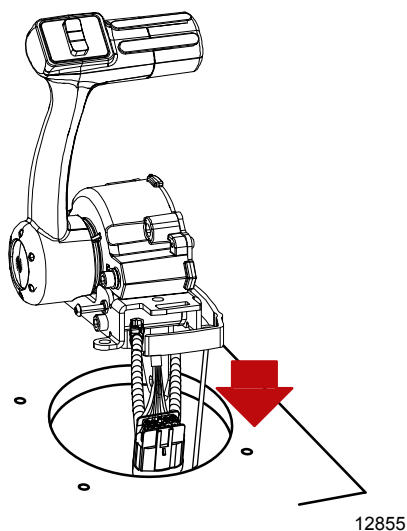


a - Cable tie
b - Start/Stop panel connector harness

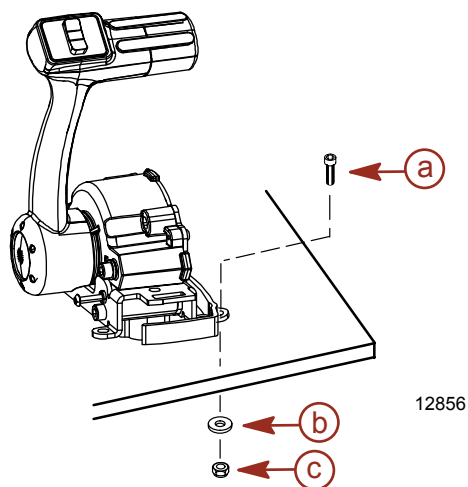
c - Remote control mounting bracket

6. Position the remote control top cover to the side of the opening until the remote control assembly has been securely fastened and all necessary adjustments have been made. Refer to **Slim Binnacle Remote Control Adjustment**.

7. Place the remote control into the opening.



8. Fasten the remote control with four M6 x 40 long screws.



a - Mounting screw (4) M6 x 40

b - Washer

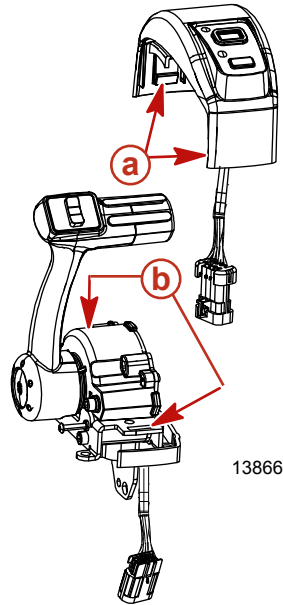
c - Nut - nylon insert

9. Tighten the handle attaching screw to the specified torque.

Description	Nm	lb. in.	lb. ft.
Control handle attaching screw	27.1		20

10. Install the slim binnacle remote control top cover onto the remote control assembly.
- Align and insert the remote control top cover locking tabs into the locking tab slots located to the front and rear of the remote control assembly.

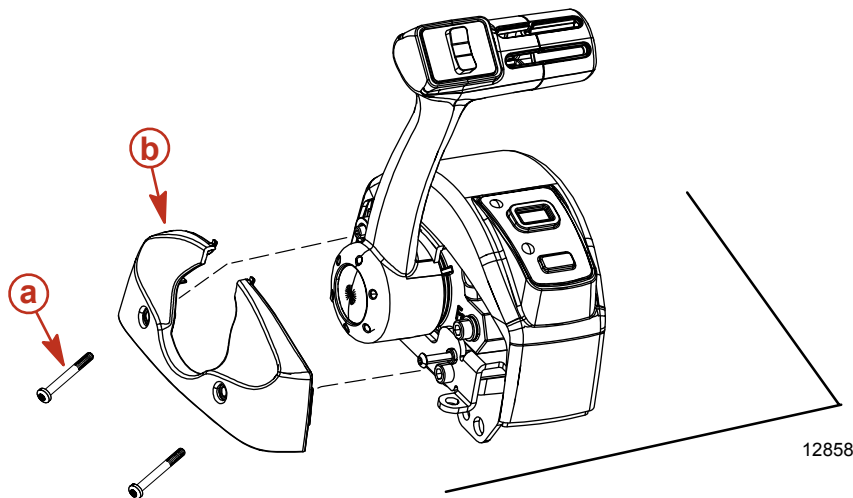
- b. Press down firmly until the remote control top cover locking tabs lock into place and the remote control top cover is securely fastened.



a - Remote control top cover locking tabs

b - Remote control assembly locking tab slots

11. Install the side cover with attaching screws.



a - Attaching screws (2) M4 x 20

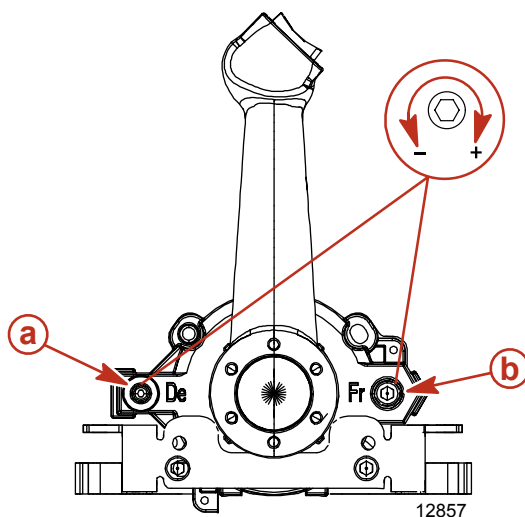
b - Side cover

12. Attach the emblem to the center of the control handle.

Slim Binnacle Remote Control Adjustment

1. Control Handle Tension Adjustment Screw – This screw can be adjusted to increase or decrease the overall effort to move the control handle. This will help prevent the handle from unwanted motion in rough water. Turn screw towards "+" to increase tension or towards "-" to decrease tension.

2. Detent Tension Adjustment Screw – This screw can be adjusted to increase or decrease the effort to move control handle into or out of detent position. Turn screw towards "+" to increase tension or towards "-" to decrease tension.



a - Detent tension adjustment

b - Control handle tension adjustment

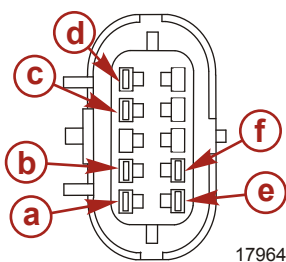
⚠ CAUTION

Do not turn control handle tension adjustment screw clockwise more than 11 turns from the initial point of hex head contact with bracket. Damage to the module may occur.

⚠ CAUTION

Do not turn detent tension adjustment screw clockwise more than 11 turns from full out position. Damage to the module may occur.

Slim Binnacle Control Start/Stop Panel Harness Test



a - Pin A

b - Pin B

c - Pin D

d - Pin E

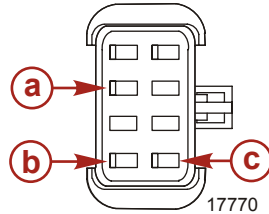
e - Pin F

f - Pin G

Ref. No.	Pin	Wire Color	Description
a	A	Purple	12 volts
b	B	Black	Ground
c	D	Yellow/red	Start/stop
d	E	White/purple	Throttle only
e	F	Gray	Active station LED
f	G	White/yellow	Neutral LED

Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Purple	Yellow/Red	Start/stop	Continuity
Purple	White/purple	Throttle only	Continuity

Single Console/Slim Binnacle Control Trim Switch Harness Test



a - Pin B

b - Pin D

c - Pin E

Ref. No.	Pin	Wire Color	Description
a	B	Purple	12 volts
b	D	White/blue	Trim down
c	E	White/green	Trim up

Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Purple	White/green	Trim down	Continuity
Purple	White/blue	Trim up	Continuity

Notes:

Digital Throttle and Shift (DTS) Electronic Remote Controls

Section 9D - DTS Dual Handle Console Remote Control

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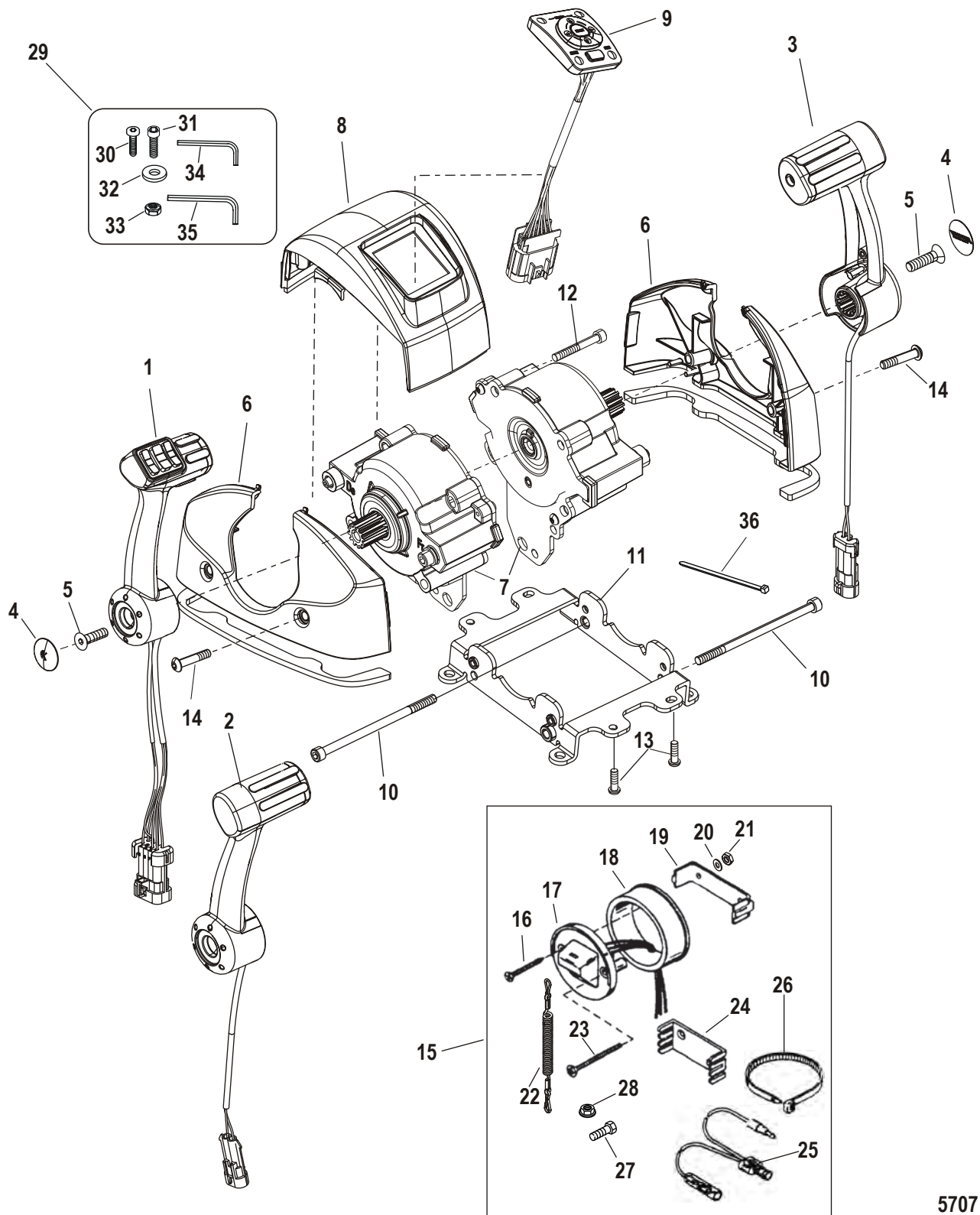
Dual Handle Console Mount Components.....	9D-4	Installing DTS Dual Handle Console Control		9D-8
DTS Dual Handle Console Remote Control		Dual Console Control Key Pad Harness Test		9D-12
Removal, Disassembly, Assembly and Installation		Dual Console Control Trim Switch Harness		
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Dual Handle Console Disassembly.....	9D-6			
Dual Handle Console Reassembly.....	9D-7			

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle attaching screw	92-809819

Notes:

Dual Handle Console Mount Components



5707

Dual Handle Console Mount Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Handle assembly - Left (with trim)			
2	1	Handle assembly - Left (no trim)			
3	1	Handle assembly - Right (no trim)			
4	1	Emblem - Mercury			
5	2	Screw (M8 x 30)	27.1		20
6	2	Cover - Side			
7	2	Module assembly - Housing			
8	1	Cover - Top			
9	1	Keypad assembly			
10	2	Screw (M6 x 110)	5.6	50	
11	1	Bracket			
12	2	Screw (M6 x 45)			
13	4	Screw (M5 x 16)			
14	4	Screw (M4 x 20)			
15	1	Switch kit - Lanyard			
16	2	Screw (10-16 x 2.25)			
17	1	Switch assembly - Lanyard			
18	1	Adaptor - Switch assembly			
19	1	Clamp - Mounting			
20	2	Washer			
21	4	Nut (#10-32)			
22	1	Lanyard assembly			
23	2	Screw (#10-32 x 2.50)			
24	1	Retainer - Cable assembly			
25	1	Cable assembly			
26	7	Cable tie (8 in.)			
27	1	Screw (#10-32 x 0.25)			
28	1	Nut and lockwasher (#10-32)			
29	1	Hardware bag assembly - Mounting			
30	4	Screw (M4 x 20)			
31	4	Screw (M6 x 40)			
32	4	Washer			
33	4	Nut (M6)			
34	1	Wrench - Allen (2.5 mm)			
35	1	Wrench - Allen (5.0 mm)			
36	1	Cable tie (4 in.)			

DTS Dual Handle Console Remote Control Removal, Disassembly, Assembly and Installation

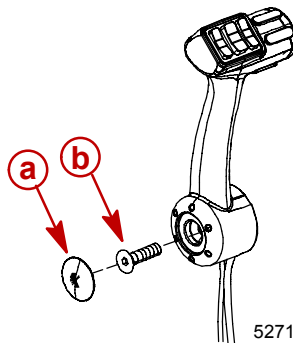
Dual Handle Console Removal

NOTE: Place the remote control handle in neutral detent position. Note position of handle for reassembly.

1. Remove the four screws securing the side covers to the control housing and remove the covers.
2. Remove the four screws securing the bracket to the console to access the harness connectors.
3. Remove the remote control assembly from the console. Disconnect the wire harness connectors.

Dual Handle Console Disassembly

1. Remove the emblem from the center of the handle using a flat blade screwdriver.
2. Place the control handle in the neutral detent position. Note the position of the handle for reassembly.
3. Remove the screw securing the handle to the control module and remove the handle from the control module shaft.

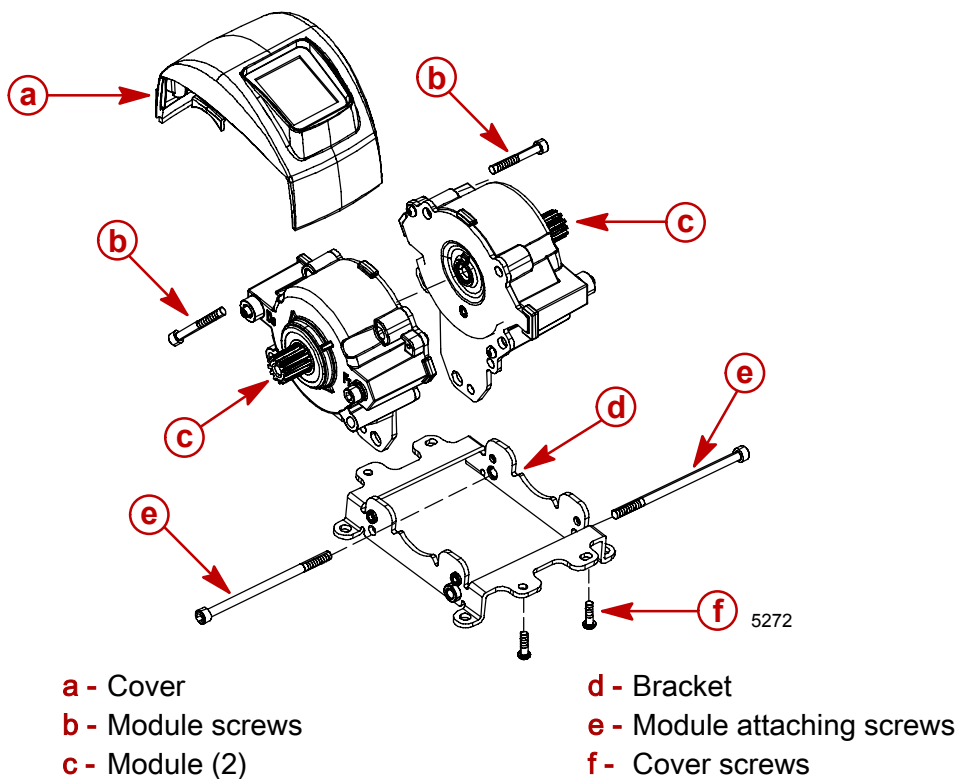


a - Emblem

b - Control handle screw (M8 x 30)

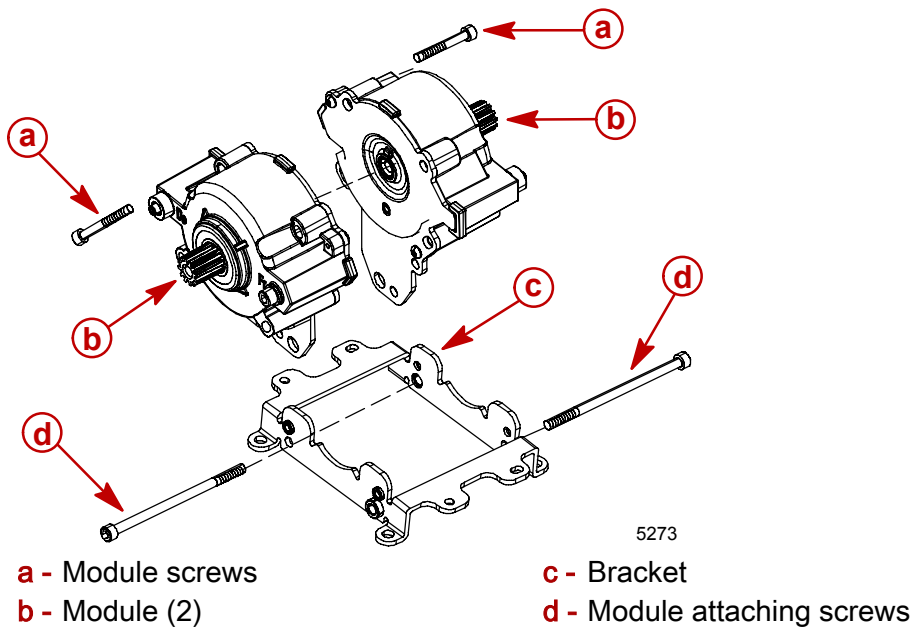
4. Remove the cable tie securing the keypad harness to the modules.
5. Remove the four screws securing the top cover to the bracket and remove the cover.
6. Remove the two screws securing the modules to the bracket and remove the modules.

7. Remove the two screws securing the left and right modules.



Dual Handle Console Reassembly

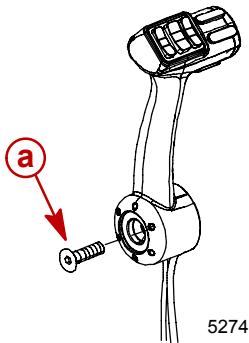
1. Attach the left and right module with two screws.
2. Align the modules to the bracket. Install the two screws attaching the modules to the bracket and tighten to the specified torque.



Description	Nm	lb. in.	lb. ft.
Module attaching screws	5.6	50	

3. With the control handles in neutral detent, attach the handles to the control module shaft in the same vertical position they were removed.

- 4. Apply Loctite 271 Threadlocker to the control handle screw and secure the handles to the modules. Torque the screw to specification.

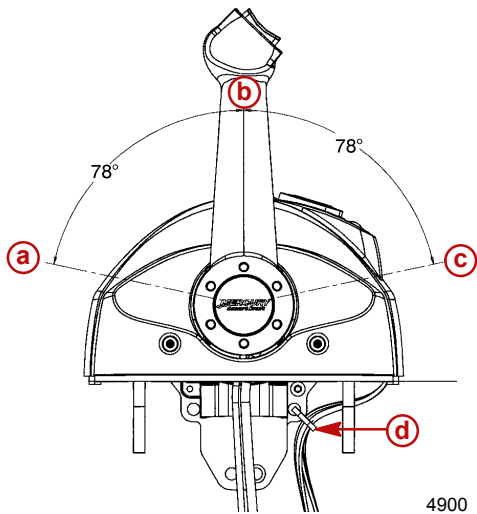


a - Control handle attaching screw

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle attaching screw	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle attaching screws	27.1		20

- 5. Shift the handles from neutral to full forward and full reverse to ensure that the handles have full range of movement. Allow slack in the harnesses for flexing due to control handle movement.
- 6. Install the top cover. Ensure that the wire harnesses are routed in between the bracket mounting tabs. Secure the cover with four screws.
- 7. Attach the keypad wire harness to the module with a cable tie.

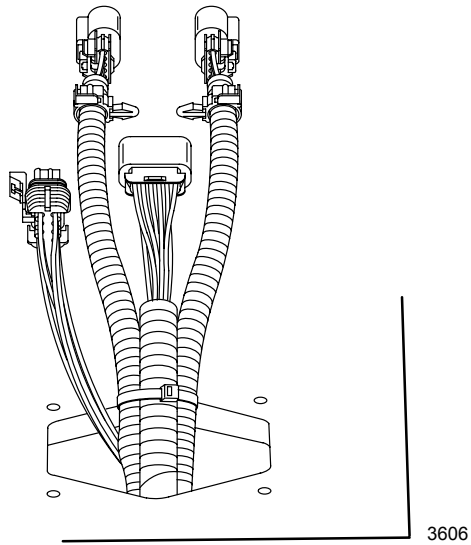


a - Full forward position
b - Neutral detent position
c - Full reverse position
d - Cable tie

Installing DTS Dual Handle Console Control

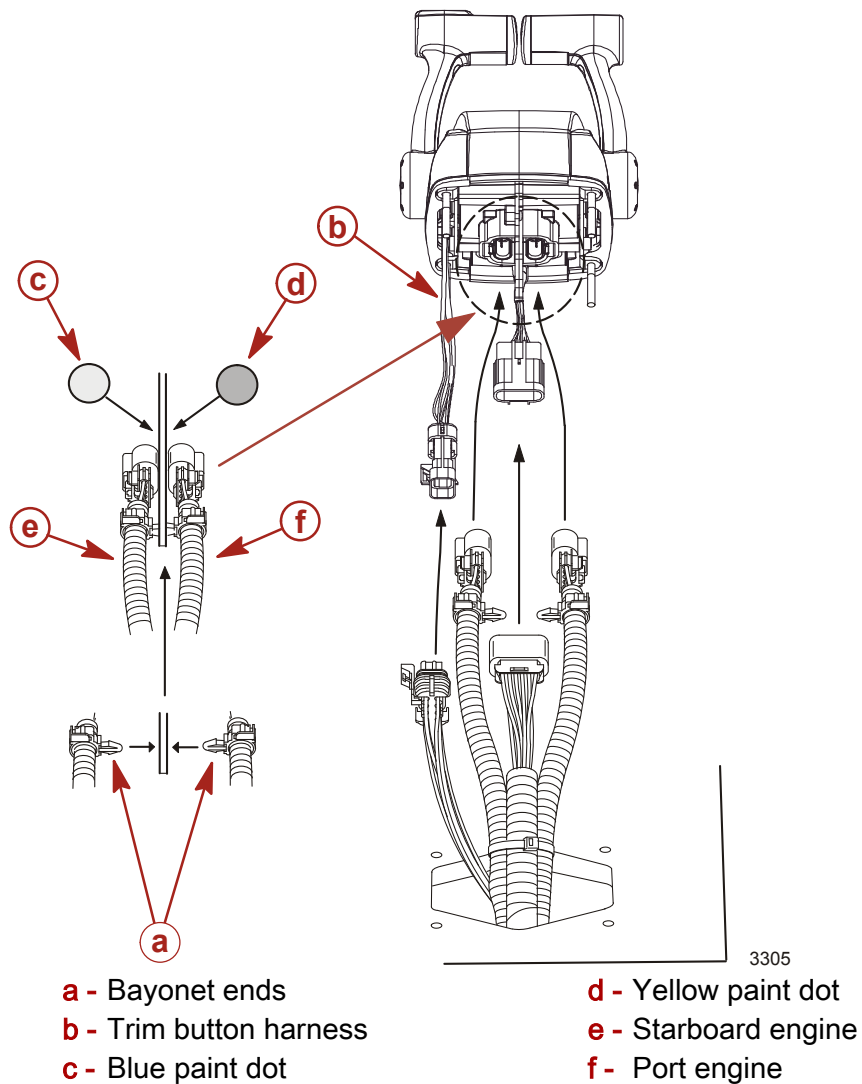
- 1. Make sure opening is free of sharp edges.

2. Route wiring for the remote control into opening.

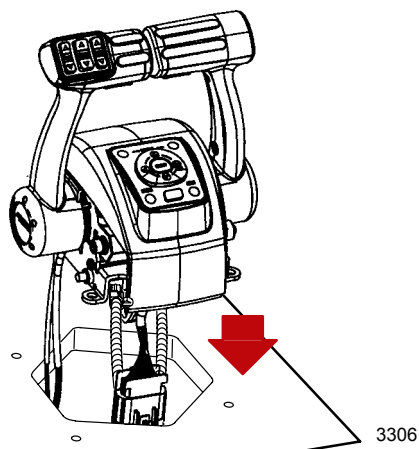


3. Insert the bayonet ends into bracket holes. This will prevent connectors from pulling out.

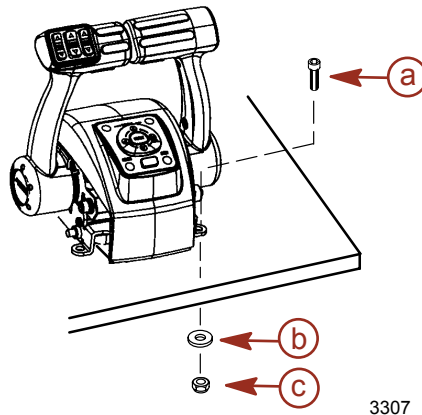
IMPORTANT: Allow slack in the trim button harness going to the control handle. This harness will flex and move during control handle movement.



4. Place the remote control into the opening.



5. Fasten the remote control with four M6 x 40 screws.



a - Mounting Screw (4) M6 x 40
b - Washer

c - Nut - nylon insert

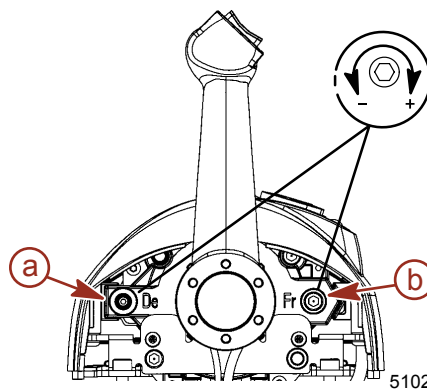
⚠ CAUTION

Do not turn control handle tension adjustment screw clockwise more than 11 turns from the initial point of hex head contact with bracket. Damage to the module may occur.

⚠ CAUTION

Do not turn detent tension adjustment screw clockwise more than 11 turns from full out position. Damage to the module may occur.

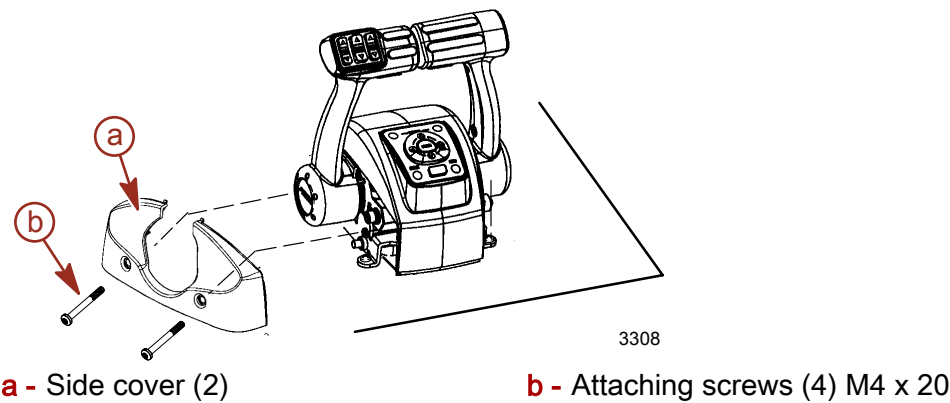
6. Control Handle Tension Adjustment Screw – This screw can be adjusted to increase or decrease the overall effort to move the control handle. This will help prevent the handle from unwanted motion in rough water. Turn screw towards "+" to increase tension or towards "-" to decrease tension.
7. Detent Tension Adjustment Screw – This screw can be adjusted to increase or decrease the effort to move control handle into or out of detent position. Turn screw towards "+" to increase tension or towards "-" to decrease tension.



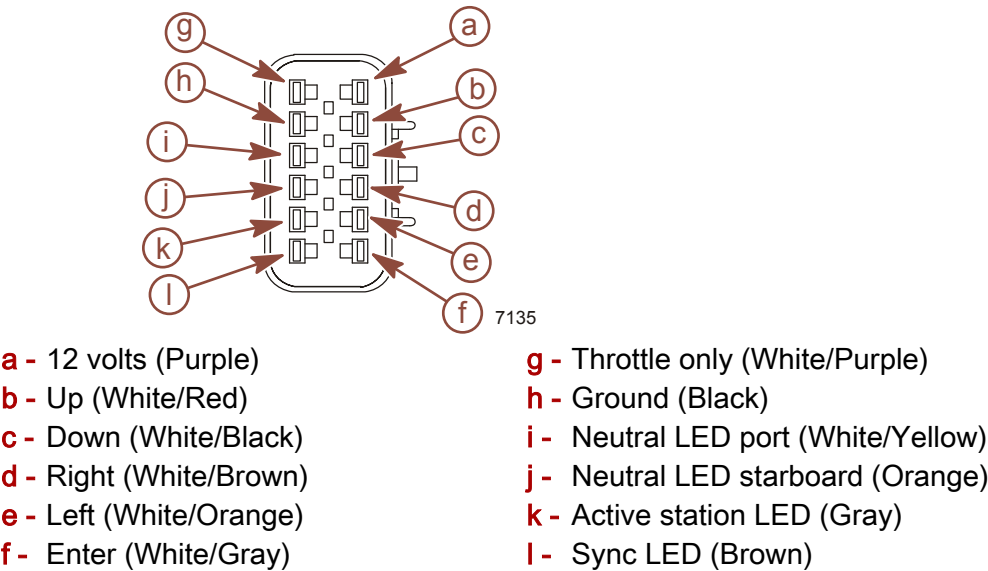
a - Detent tension adjustment

b - Control handle tension adjustment

8. Install the side cover with attaching screws.

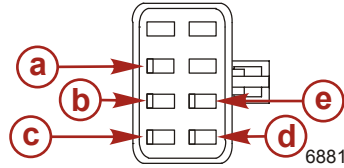


Dual Console Control Key Pad Harness Test



Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Purple	White/Red	Up arrow	Continuity
Purple	White/Black	Down arrow	Continuity
Purple	White/Brown	Right arrow	Continuity
Purple	White/Orange	Left arrow	Continuity
Purple	White/Gray	Select	Continuity
Purple	White/Purple	Throttle Only	Continuity

Dual Console Control Trim Switch Harness Test

**a** - Pin B**b** - Pin C**c** - Pin D**d** - Pin E**e** - Pin F

Ref. No.	Pin	Wire Color	Description
a	B	Purple	12 volts
b	C	Blue	Up (port)
c	D	White/blue	Up (starboard)
d	E	White/green	Down (starboard)
e	F	Green	Down (port)

Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Purple	Blue	Up (port)	Continuity
Purple	White/blue	Up (starboard)	Continuity
Purple	Blue, White/blue	Dual Up	Continuity
Blue	White/blue		No continuity
White/blue	Blue		No continuity
Purple	Green	Down (port)	Continuity
Purple	White/green	Down (starboard)	Continuity
Purple	Green, White/green	Dual Down	Continuity
Green	White/green		No continuity
White/green	Green		No continuity

Notes:

Digital Throttle and Shift (DTS) Electronic Remote Controls

Section 9E - DTS Shadow Mode Console Remote Control

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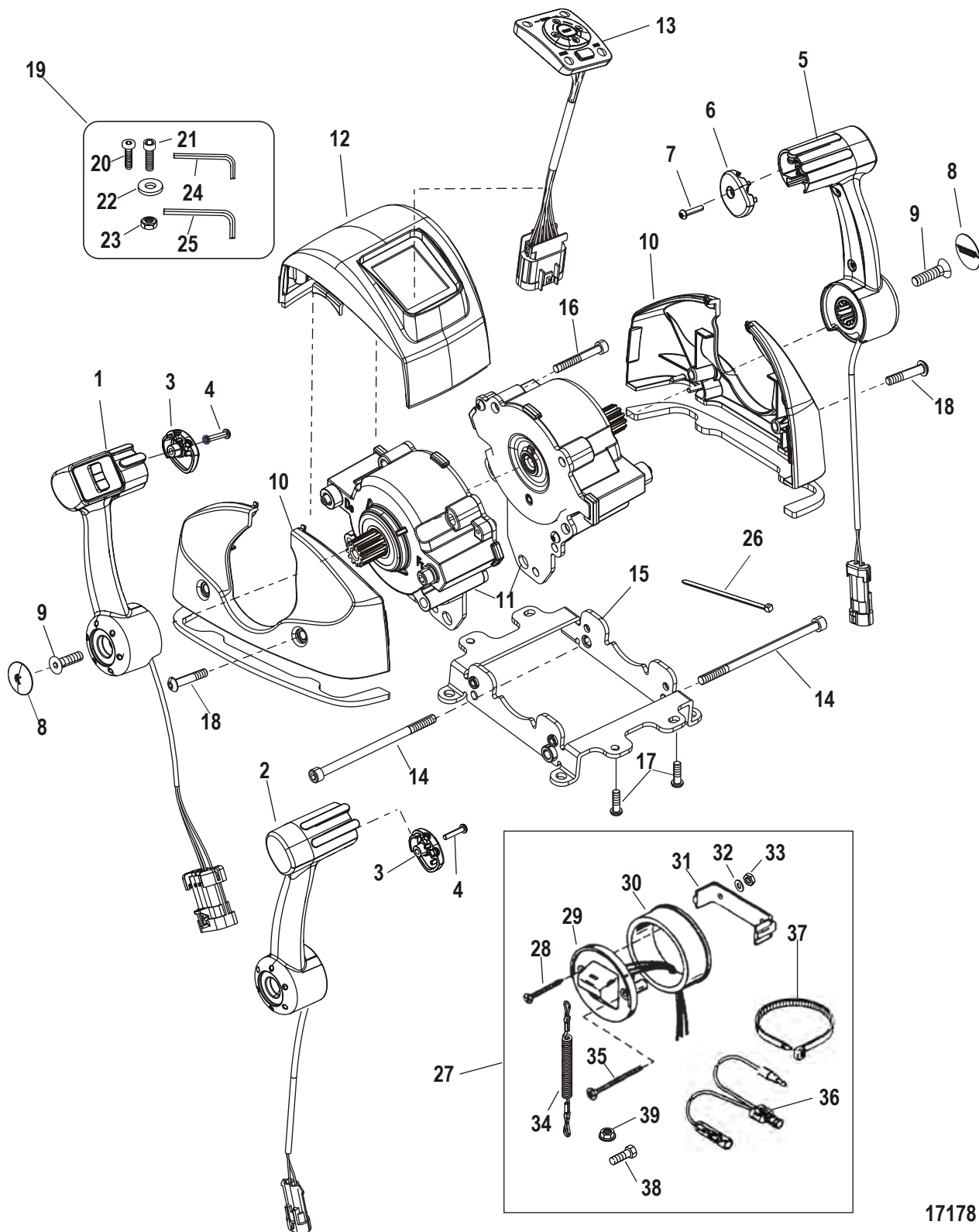
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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle attaching screw	92-809819

Notes:

Shadow Mode Console Mount Components



17178

Shadow Mode Console Mount Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Handle assembly - Left (with trim)			
2	1	Handle assembly - Left (no trim)			
3	1	Cap kit - Handle			
4	1	Screw (M4 x 20)			
5	1	Handle assembly - Right (no trim)			
6	1	Cap kit - Handle			
7	1	Screw (M4 x 20)			
8	2	Emblem - Mercury			
9	2	Screw (M8 x 30)	27		20
10	2	Side cover			
11	2	Module assembly			
12	1	Top cover			
13	1	Keypad assembly			
14	2	Screw (M6 x 110)	5.5	50	
15	1	Bracket			
16	2	Screw (M6 x 45)			
17	4	Screw (M5 x 16)			
18	4	Screw (M4 x 20)			
19	1	Mounting hardware bag assembly			
20	4	Screw (M4 x 20)			
21	4	Screw (M6 x 40)			
22	4	Washer			
23	4	Nut (M6)			
24	1	Wrench - Allen (2.5 mm)			
25	1	Wrench - Allen (5.0 mm)			
26	1	Cable tie (4 in.)			
27	1	Lanyard stop switch kit			
28	2	Screw (#10-16 x 2.25)			
29	1	Lanyard switch assembly			
30	1	Adapter - Switch assembly			
31	1	Mounting clamp			
32	2	Washer			
33	4	Nut (#10-32)			
34	1	Lanyard assembly			
35	2	Screw (#10-32 x 2.00)			
36	1	Cable assembly (6 in.)			
37	7	Cable tie (8 in.)			
38	1	Screw (#10-32 x 0.25)			
39	1	Nut and lockwasher (#10-32)			

Shadow Mode Console Mount Remote Control Removal, Disassembly, Assembly and Installation

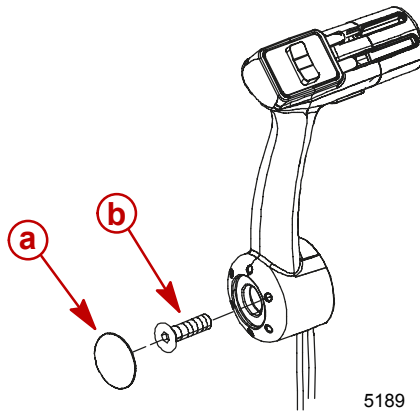
Shadow Mode Control Removal

NOTE: Place the remote control handle in neutral detent position. Note position of handle for reassembly.

1. Remove four screws securing side covers to control housing and remove covers.
2. Remove four screws securing bracket to console to access harness connectors.
3. Remove remote control assembly from console. Disconnect wire harness connectors.

Shadow Mode Control Disassembly

1. Remove the emblem from the center of the handle using a flat blade screwdriver.
2. Place the control handle in neutral detent position. Note the position of the handle for reassembly.
3. Remove the screw securing the handle to the control module, and remove the handle from the control module shaft.

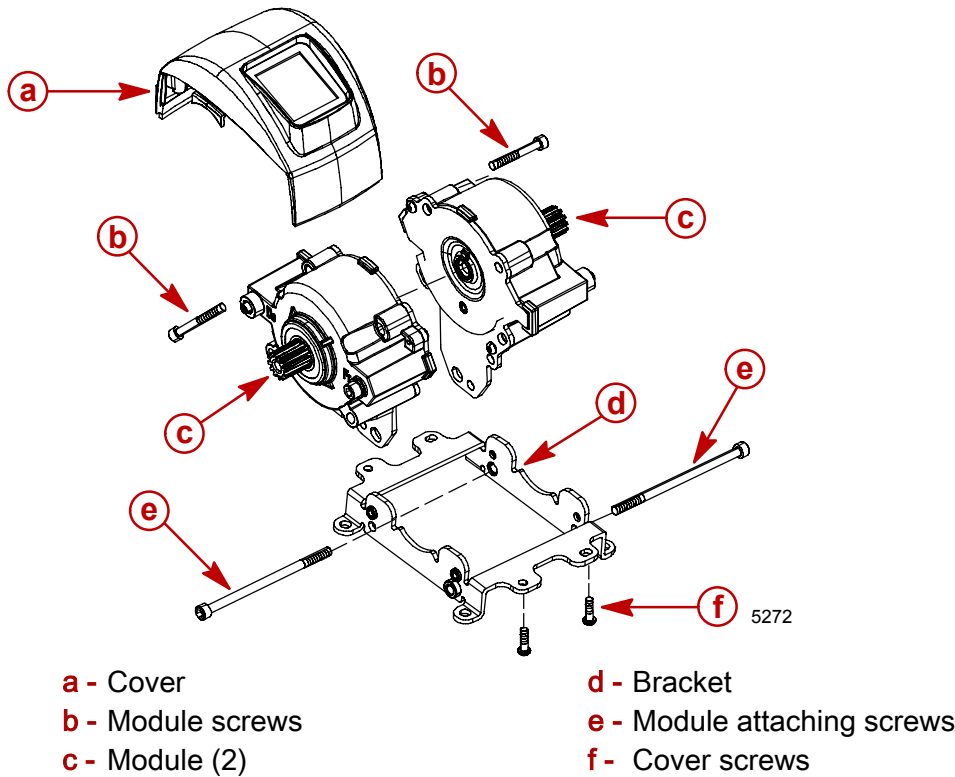


a - Emblem

b - Control handle screw (M8 x 30)

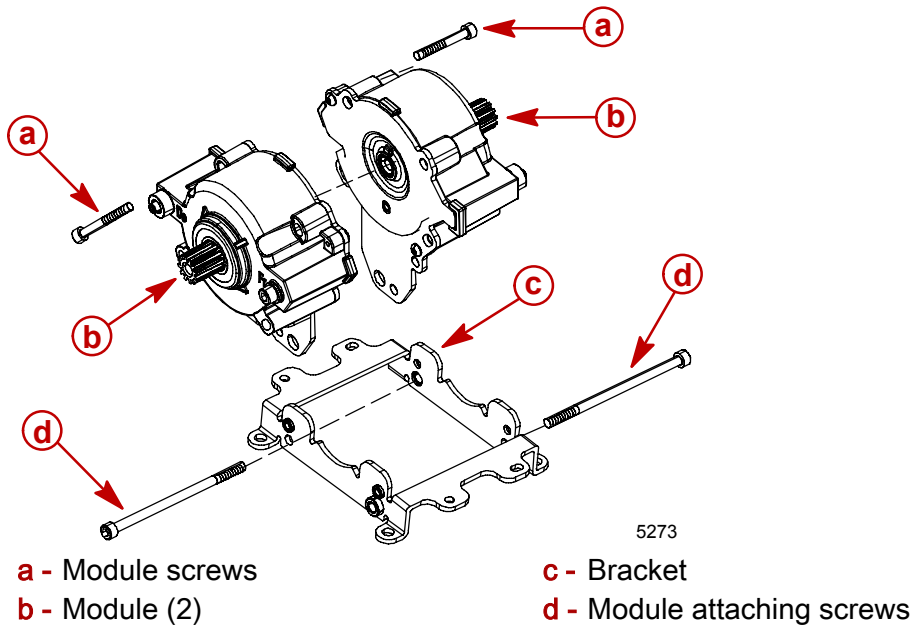
4. Remove the cable tie securing the keypad harness to the modules.
5. Remove the four screws securing the top cover to the bracket and remove the cover.
6. Remove the two screws securing the modules to the bracket, and remove the modules.

7. Remove the two screws securing the left and right modules.



Shadow Mode Control Reassembly

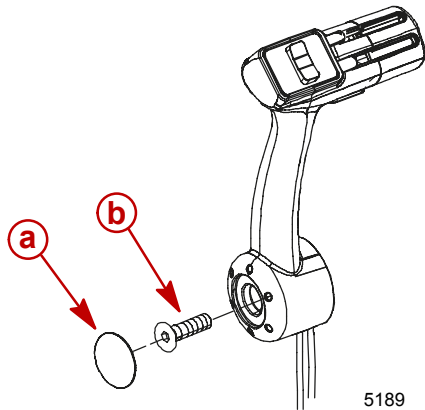
1. Attach the left and right module with two screws.
2. Align the modules to the bracket. Install the two screws attaching the modules to the bracket and tighten to the specified torque.



Description	Nm	lb. in.	lb. ft.
Module attaching screws	5.6	50	

3. With the control handles in neutral detent, attach the handles to the control module shaft in the same vertical position they were removed.

4. Apply Loctite 271 Threadlocker to the control handle screw, and secure the handles to the modules. Tighten the screw to the specified torque.

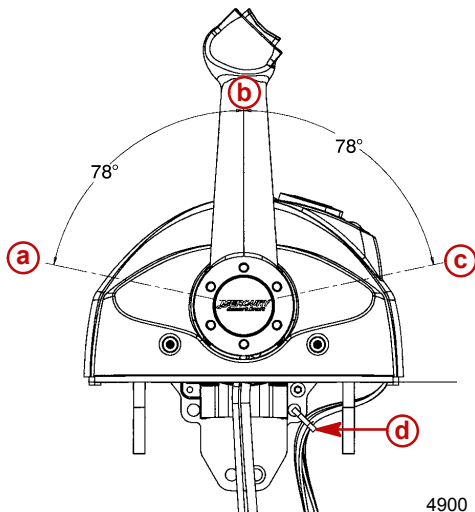


a - Emblem **b** - Control handle attaching screw

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle attaching screw	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle attaching screws	27.1		20

5. Shift the handles from neutral to full forward and full reverse to ensure that the handles have full range of movement. Allow slack in the harnesses for flexing due to control handle movement.
6. Install the top cover. Ensure that wire harnesses are routed in between the bracket mounting tabs. Secure the cover with four screws. Tighten the screws to the specified torque.
7. Attach the keypad wire harness to the module with a cable tie.

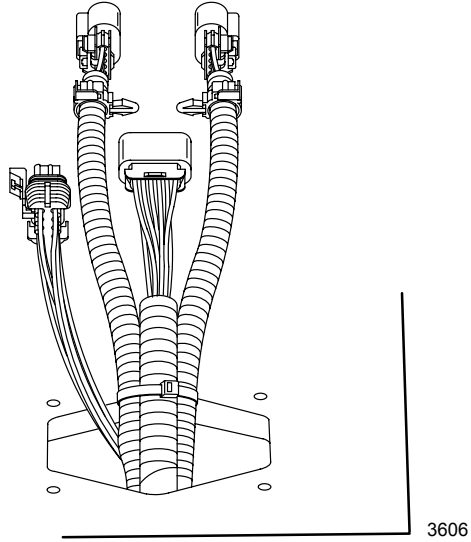


a - Full forward position **b** - Neutral detent position **c** - Full reverse position **d** - Cable tie

Description	Nm	lb. in.	lb. ft.
Top cover screws	2.3	20	

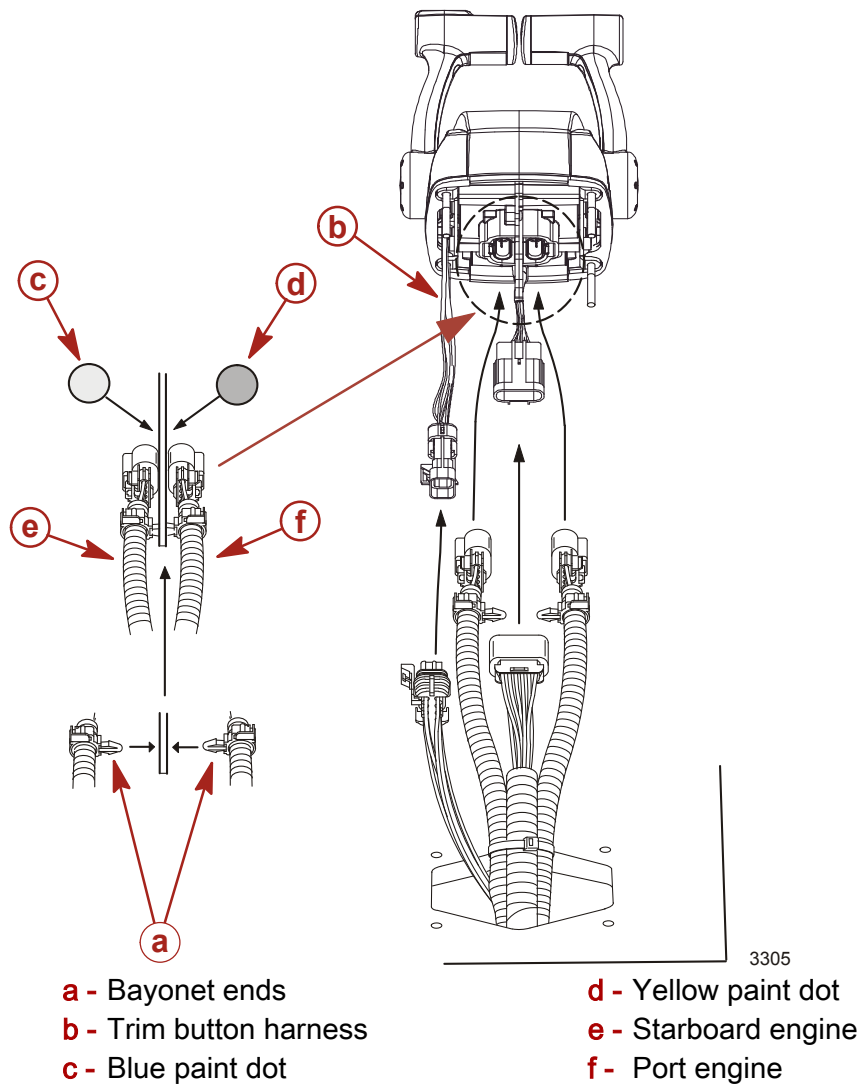
Installing DTS Shadow Mode Remote Control

1. Make sure opening is free of sharp edges.
2. Route wiring for the remote control into opening.

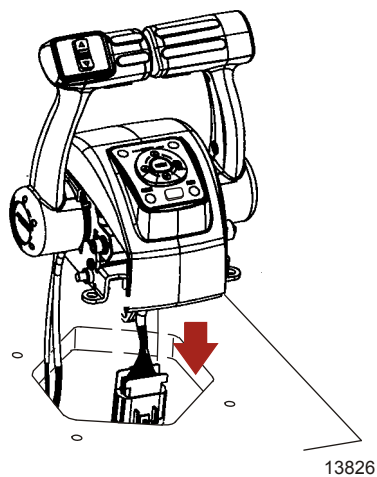


3. Insert the bayonet ends into bracket holes. This will prevent connectors from pulling out.

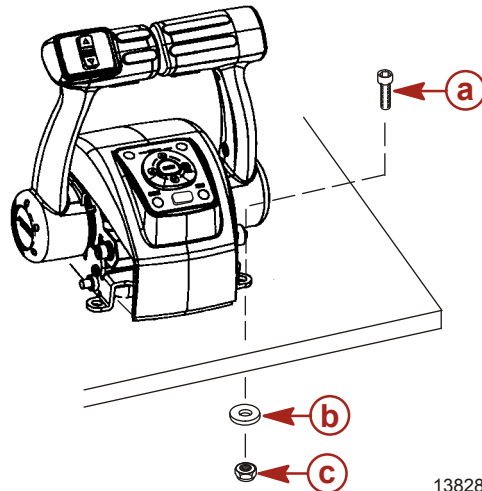
IMPORTANT: Allow slack in the trim button harness going to the control handle. This harness will flex and move during control handle movement.



4. Place the remote control into the opening.



5. Fasten the remote control with four M6 x 40 screws.



a - Mounting Screw (4) M6 x 40

b - Washer

13828

c - Nut - nylon insert

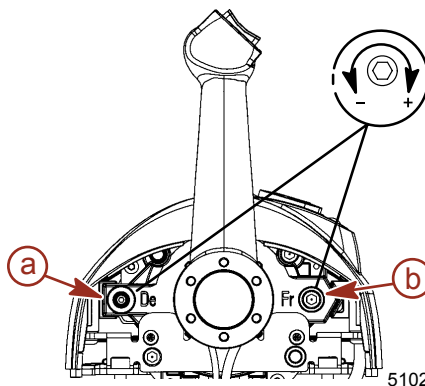
⚠ CAUTION

Do not turn control handle tension adjustment screw clockwise more than 11 turns from the initial point of hex head contact with bracket. Damage to the module may occur.

⚠ CAUTION

Do not turn detent tension adjustment screw clockwise more than 11 turns from full out position. Damage to the module may occur.

6. Control Handle Tension Adjustment Screw – This screw can be adjusted to increase or decrease the overall effort to move the control handle. This will help prevent the handle from unwanted motion in rough water. Turn screw towards "+" to increase tension or towards "-" to decrease tension.
7. Detent Tension Adjustment Screw – This screw can be adjusted to increase or decrease the effort to move control handle into or out of detent position. Turn screw towards "+" to increase tension or towards "-" to decrease tension.

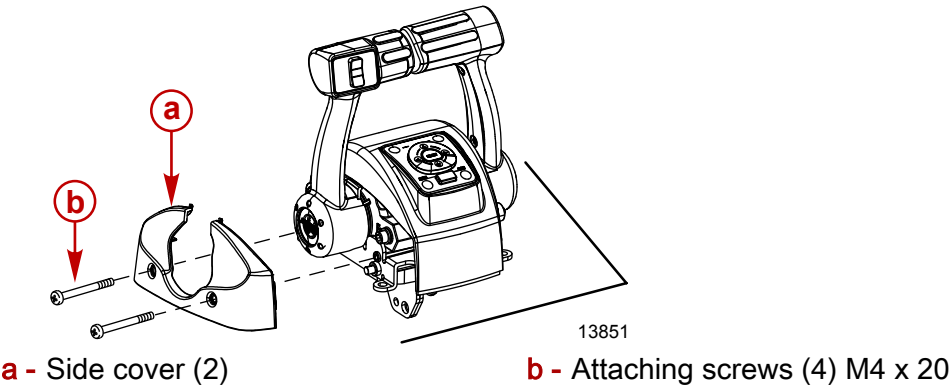


5102

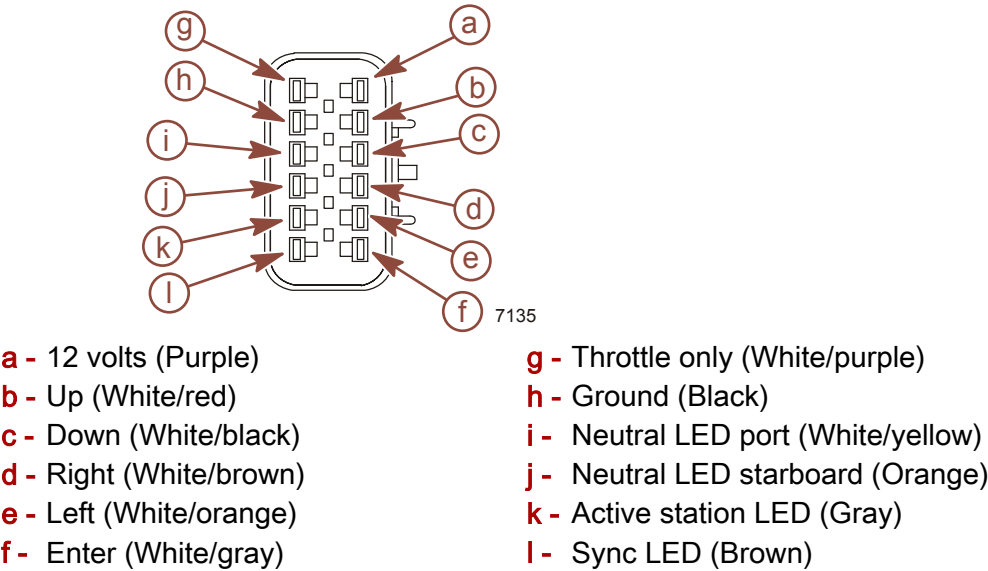
a - Detent tension adjustment screw

b - Control handle tension adjustment screw

8. Install the side cover with attaching screws.

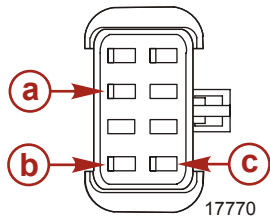


Shadow Mode Control Key Pad Harness Test



Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Purple	White/red	Up arrow	Continuity
Purple	White/black	Down arrow	Continuity
Purple	White/brown	Right arrow	Continuity
Purple	White/orange	Left arrow	Continuity
Purple	White/gray	Select	Continuity
Purple	White/purple	Throttle Only	Continuity

Shadow Mode Control Handle Trim Switch Harness Test

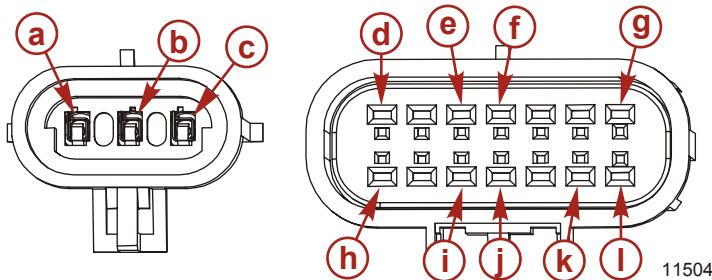


- a** - Pin B
- b** - Pin D
- c** - Pin E

Ref. No.	Pin	Wire Color	Description
a	B	Purple	12 volts
b	D	White/blue	Trim down
c	E	White/green	Trim up

Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Purple	White/blue	Trim up	Continuity
Purple	White/green	Trim down	Continuity

Dash Mounted Triple Trim Switch Pin-Out



- a** - Pin C
- b** - Pin B
- c** - Pin A
- d** - Pin P
- e** - Pin M
- f** - Pin L
- g** - Pin H
- h** - Pin G
- i** - Pin E
- j** - Pin D
- k** - Pin B
- l** - Pin A

Ref. No.	Pin	Wire Color	Description
a	C	Green/white	All down
b	B	Gray/white	All up
c	A	Red/blue	12 volts
d	P	Green	Down port
e	M	Green/yellow	Down middle
f	L	Green/white	Down starboard
g	H	Purple/black	12 volt switched
h	G	Light blue	Up port
i	E	Blue/yellow	Up middle
j	D	Light blue/white	Up starboard

DTS Shadow Mode Console Remote Control

Ref. No.	Pin	Wire Color	Description
k	B	Black	Ground
l	A	Red/purple	12 volts

Digital Throttle and Shift (DTS) Electronic Remote Controls

Section 9F - DTS Dual Engine Console Control with CAN Pad

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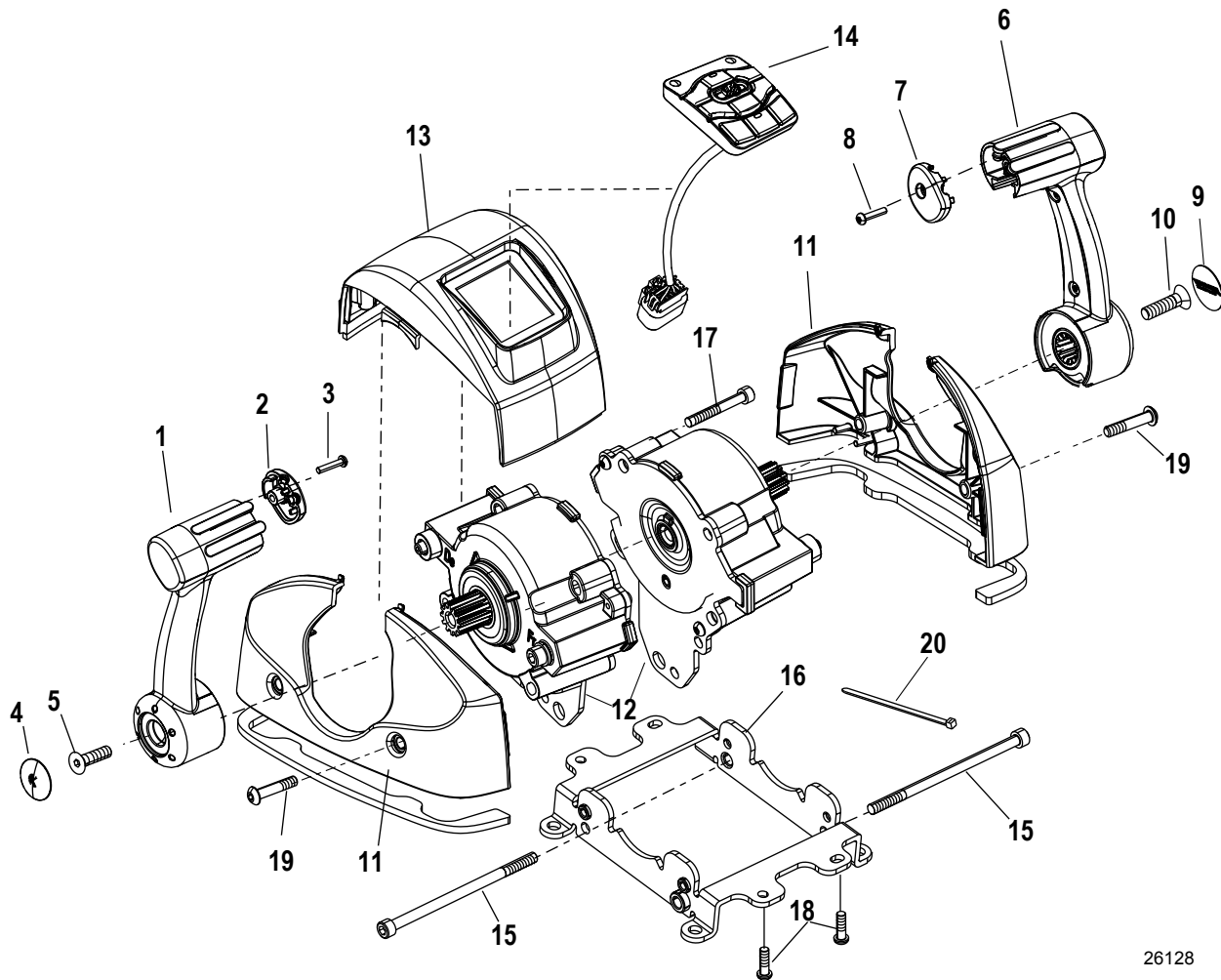
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Dual Console Control with CAN Pad Removal	9F-8		

Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle screw	92-809819

Notes:

Dual Console Control Non-trim with CAN Pad Components



26128

Dual Console Control Non-trim with CAN Pad Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Left handle assembly			
2	1	Cap kit			
3	1	Screw (M4 x 20)	3.4	30	
4	1	Emblem			
5	1	Screw (M8 x 30)	22.6	200	
6	1	Right handle assembly			
7	1	Cap kit			
8	1	Screw (M4 x 20)	3.4	30	
9	1	Emblem			
10	1	Screw (M8 x 30)	22.6	200	
11	2	Cover			
12	2	Module assembly			
13	1	Top cover			
14	1	CAN pad			
15	2	Screw (M6 x 110)	5.6	50	
16	1	Bracket			
17	1	Screw (M6 x 45)	5.6	50	
18	4	Screw (M5 x 16)	2.3	20	
19	4	Screw (M4 x 20)			
20	1	Cable tie			



Dual Console Control with CAN Pad Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Left handle assembly			
2	1	Cap kit			
3	1	Screw (M4 x 20)	3.4	30	
4	1	Emblem			
5	1	Screw (M8 x 30)	22.6	200	
6	1	Washer			
7	1	Right handle assembly			
8	1	Cap kit			
9	1	Screw (M4 x 20)	3.4	30	
10	1	Emblem			
11	1	Screw (M8 x 30)	22.6	200	
12	1	Washer			
13	2	Cover			
14	2	Module assembly			
15	1	Top cover			
16	1	CAN pad			
17	2	Screw (M6 x 110)	5.6	50	
18	1	Bracket			
19	1	Screw (M6 x 45)	5.6	50	
20	4	Screw (M5 x 16)	2.3	20	
21	4	Screw (M4 x 20)			
22	1	Cable tie			

Dual Console Control with CAN Pad Removal, Disassembly, Assembly, and Installation

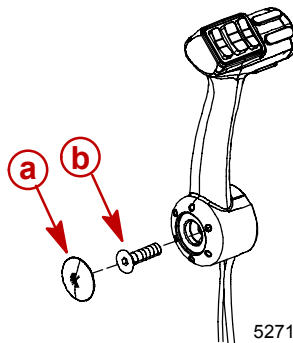
Dual Console Control with CAN Pad Removal

NOTE: Place the remote control handle into the neutral detent position. Note the position of the handle for reassembly.

1. Remove the four screws securing the side covers to the control housing and remove the covers.
2. Remove the four screws securing the bracket to the console to access the harness connectors.
3. Remove the remote control assembly from the console. Disconnect the wire harness connectors.

Dual Console Control with CAN Pad Disassembly

1. Remove the emblem from the center of the handle using a flat blade screwdriver.
2. Place the control handle in the neutral detent position. Note the position of the handle for reassembly.
3. Remove the screw securing the handle to the control module and remove the handle from the control module shaft.

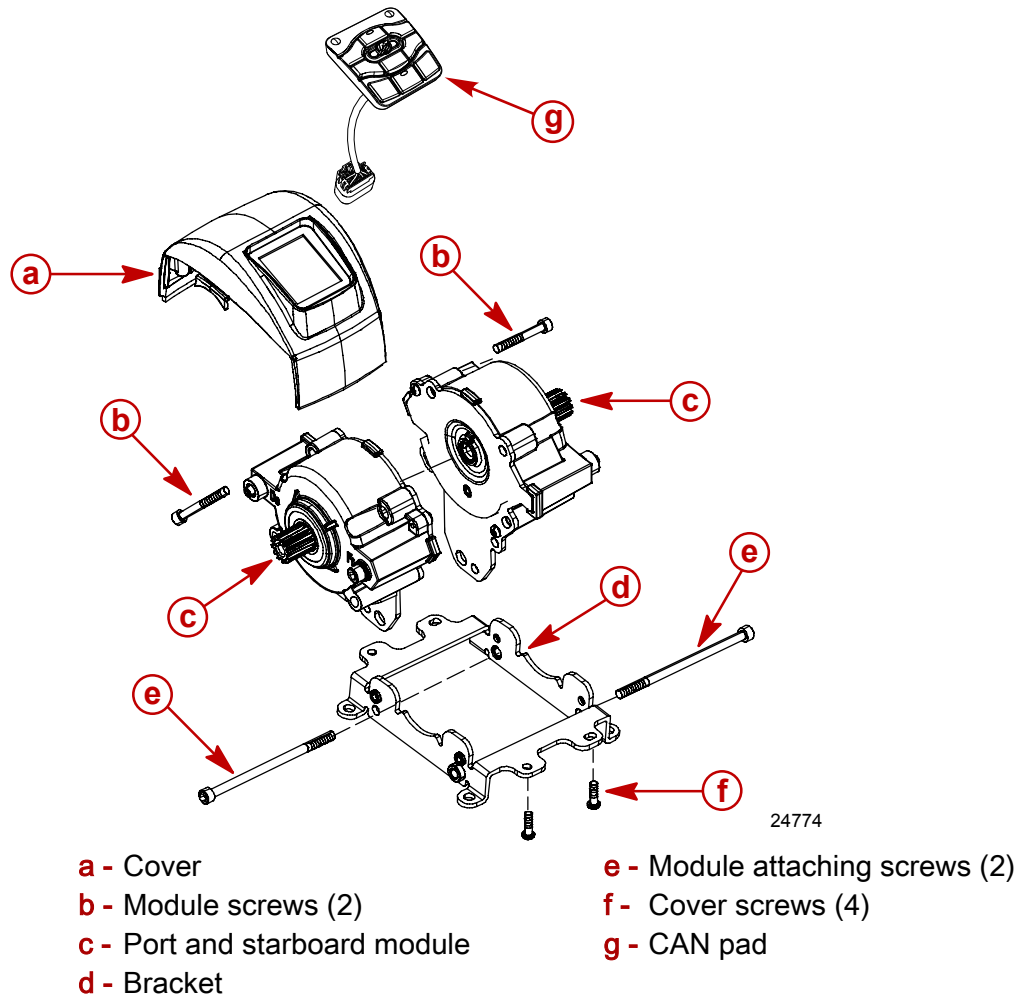


a - Emblem

b - Control handle screw (M8 x 30)

4. Remove the cable tie securing the CAN pad harness to the modules.
5. Remove the four screws securing the cover to the bracket and remove the cover.
6. Remove the two screws securing the modules to the bracket and remove the modules.

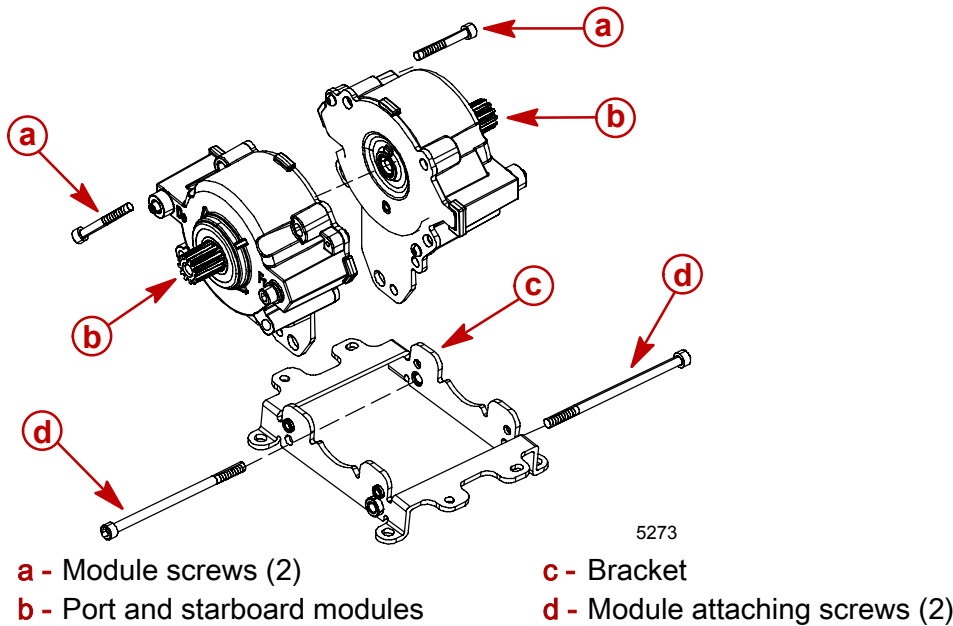
7. Remove the two screws securing the port and starboard modules.



Dual Console Control with CAN Pad Reassembly

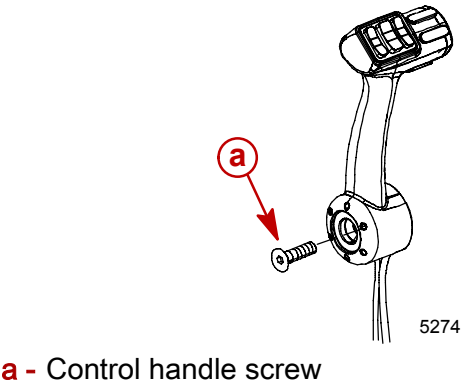
1. Attach the left and right module with two screws. Do not tighten the screws at this time.
2. Align the modules to the bracket. Install the two screws attaching the modules to the bracket

3. Tighten to the two module screws and the two screws attaching the module to the bracket to the specified torque.



Description	Nm	lb. in.	lb. ft.
Module screws (2) (M6 x 45)	5.6	50	
Module attaching screws (2) (M6 x 110)	5.6	50	

4. With the control handles in the neutral detent position, attach the handles to the control module shaft in the same vertical position they were removed.
5. Apply Loctite 271 Threadlocker to the control handle screw and secure the handles to the modules. Tighten the screw to the specified torque.

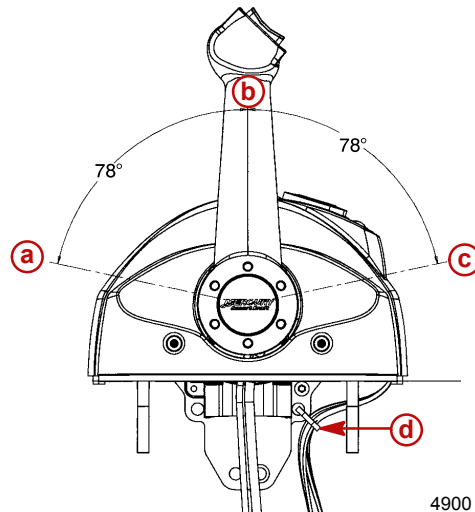


Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle screw	92-809819

Description	Nm	lb. in.	lb. ft.
Screw (M8 x 30)	22.6	200	

6. Shift the handles from neutral to full forward, and to full reverse to ensure the handles have full range of movement.

7. Install the cover. Ensure the wire harnesses are routed in between the bracket mounting tabs. Secure the cover with four screws. Tighten the screws to the specified torque.
8. Attach the CAN pad wire harness to the module with a cable tie.

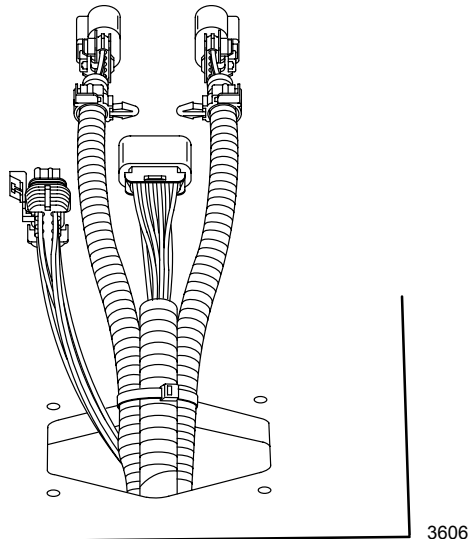


- a** - Full forward position **c** - Full reverse position
b - Neutral detent position **d** - Cable tie

Description	Nm	lb. in.	lb. ft.
Top cover screws (4)	2.3	20	

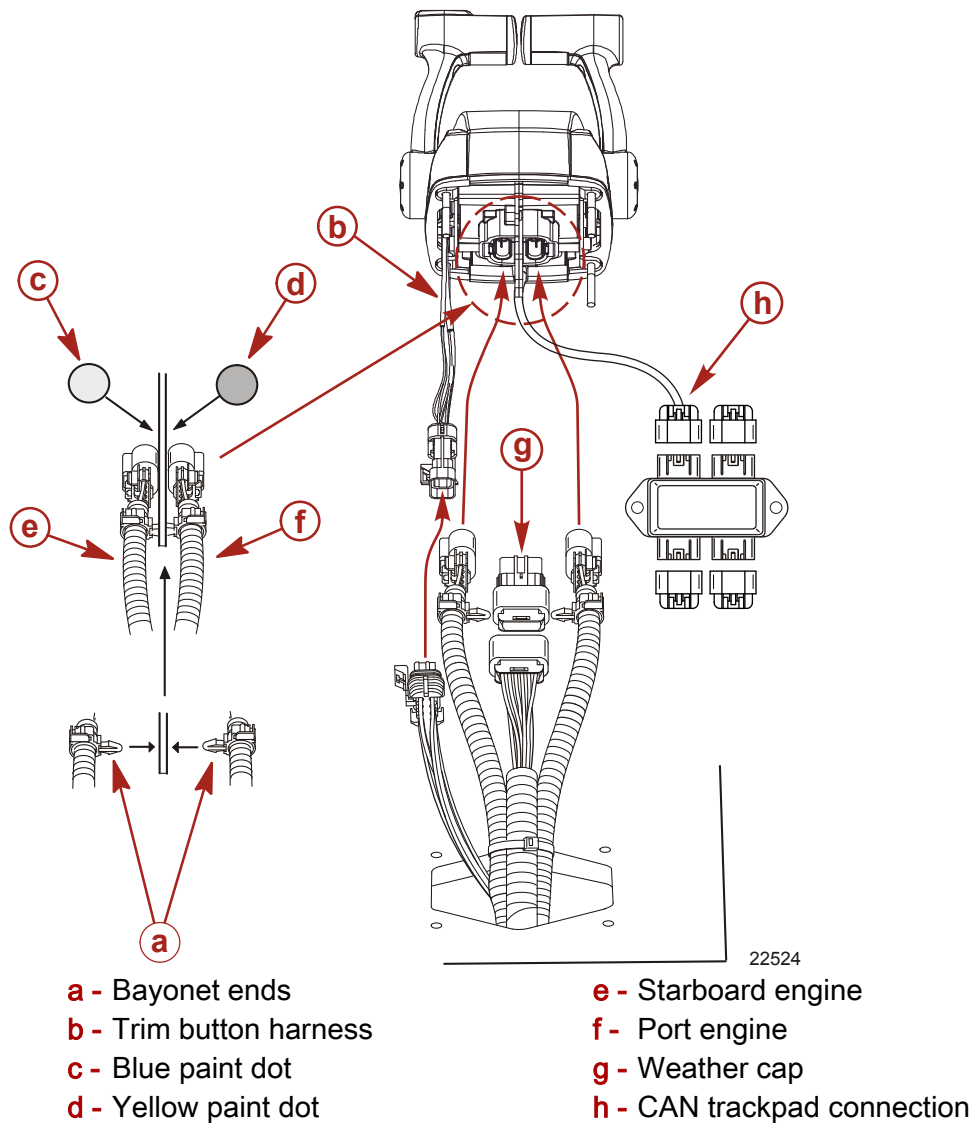
Installing the Dual Console Control with CAN Trackpad

1. Ensure the opening is free of sharp edges.
2. Route the wiring for the remote control into opening.

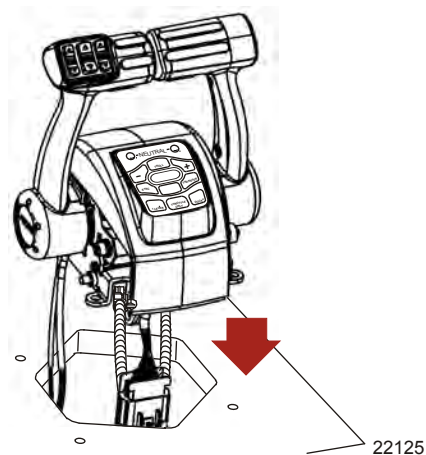


3. Insert the bayonet ends of the two lever harnesses into bracket holes. This will prevent connectors from pulling out.
4. Ensure the trackpad connector is sealed with a weather cap.
5. Connect the CAN trackpad connector to a junction box.

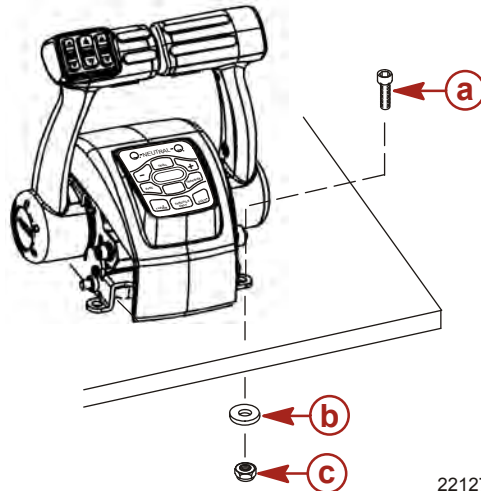
IMPORTANT: Allow slack in the trim button harness going to the control handle. This harness will flex and move during control handle movement.



6. Place the remote control into the opening.



7. Fasten the remote control with four M6 x 40 screws.



22127

a - Mounting Screw (4) M6 x 40

c - Nut - nylon insert

b - Washer

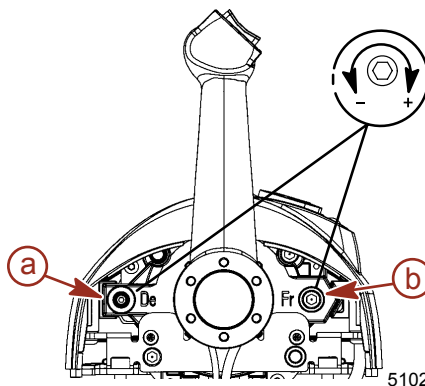
⚠ CAUTION

Do not turn control handle tension adjustment screw clockwise more than 11 turns from the initial point of hex head contact with bracket. Damage to the module may occur.

⚠ CAUTION

Do not turn detent tension adjustment screw clockwise more than 11 turns from full out position. Damage to the module may occur.

8. Control handle tension adjustment screw – This screw can be adjusted to increase or decrease the overall effort to move the control handle. This will help prevent the handle from unwanted motion in rough water. Turn screw towards "+" to increase tension or towards "-" to decrease tension.
9. Detent tension adjustment screw – This screw can be adjusted to increase or decrease the effort to move control handle into or out of detent position. Turn screw towards "+" to increase tension or towards "-" to decrease tension.

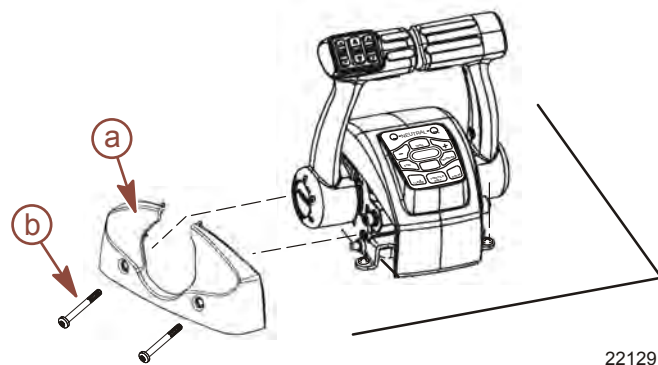


5102

a - Detent tension adjustment

b - Control handle tension adjustment

10. Install the side cover with attaching screws.



22129

a - Side cover (2)

b - Attaching screws (4) M4 x 20

Digital Throttle and Shift (DTS) Electronic Remote Controls

Section 9G - DTS Shadow Mode Console Control with CAN Pad

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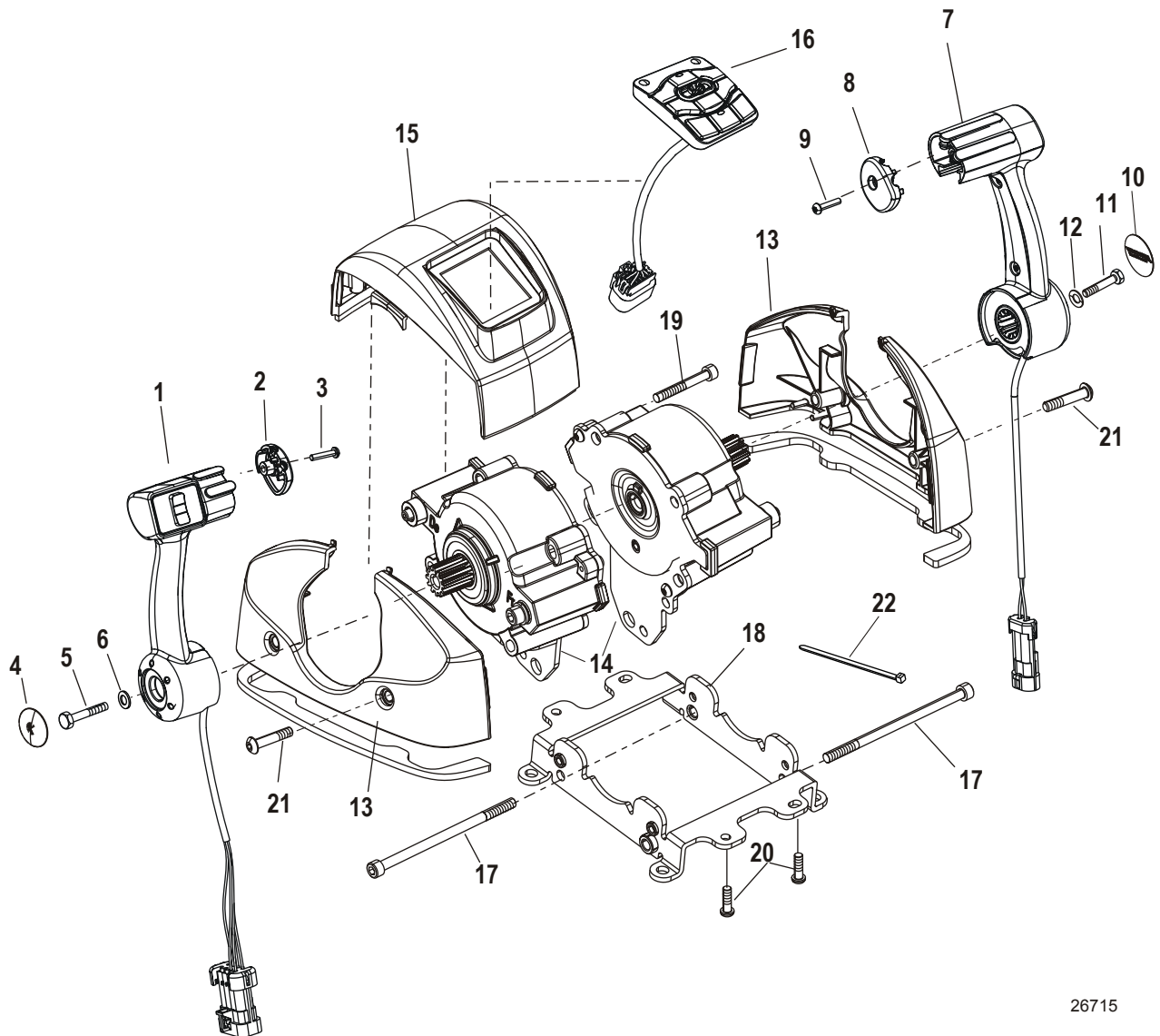
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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle attaching screw	92-809819

Notes:

Shadow Mode Console Control with CAN Pad Components



26715

Shadow Mode Console Control with CAN Pad Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Left handle assembly			
2	1	Cap kit			
3	1	Screw (M4 x 20)	3.4	30	
4	1	Emblem			
5	1	Screw (M8 x 30)	27.1		20
6	1	Right handle assembly			
7	1	Cap kit			
8	1	Screw (M4 x 20)	3.4	30	
9	1	Emblem			
10	1	Screw (M8 x 30)	22.6	200	
11	2	Cover			
12	2	Module assembly			
13	1	Top cover			
14	1	CAN pad			
15	2	Screw (M6 x 110)	5.6	50	
16	1	Bracket			
17	1	Screw (M6 x 45)	5.6	50	
18	4	Screw (M5 x 16)	2.3	20	
19	4	Screw (M4 x 20)			
20	1	Cable tie			

Shadow Mode Console Mount Remote Control Removal, Disassembly, Assembly and Installation

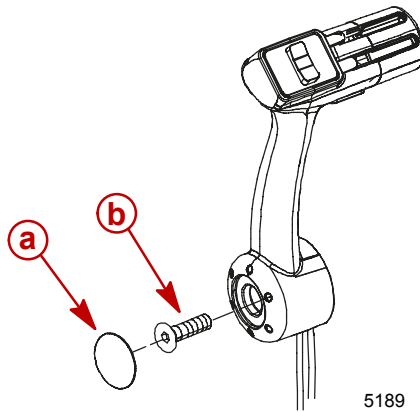
Shadow Mode Control Removal

NOTE: Place the remote control handle in neutral detent position. Note position of handle for reassembly.

1. Remove four screws securing side covers to control housing and remove covers.
2. Remove four screws securing bracket to console to access harness connectors.
3. Remove remote control assembly from console. Disconnect wire harness connectors.

Shadow Mode Control Disassembly

1. Remove the emblem from the center of the handle using a flat blade screwdriver.
2. Place the control handle in neutral detent position. Note the position of the handle for reassembly.
3. Remove the screw securing the handle to the control module, and remove the handle from the control module shaft.

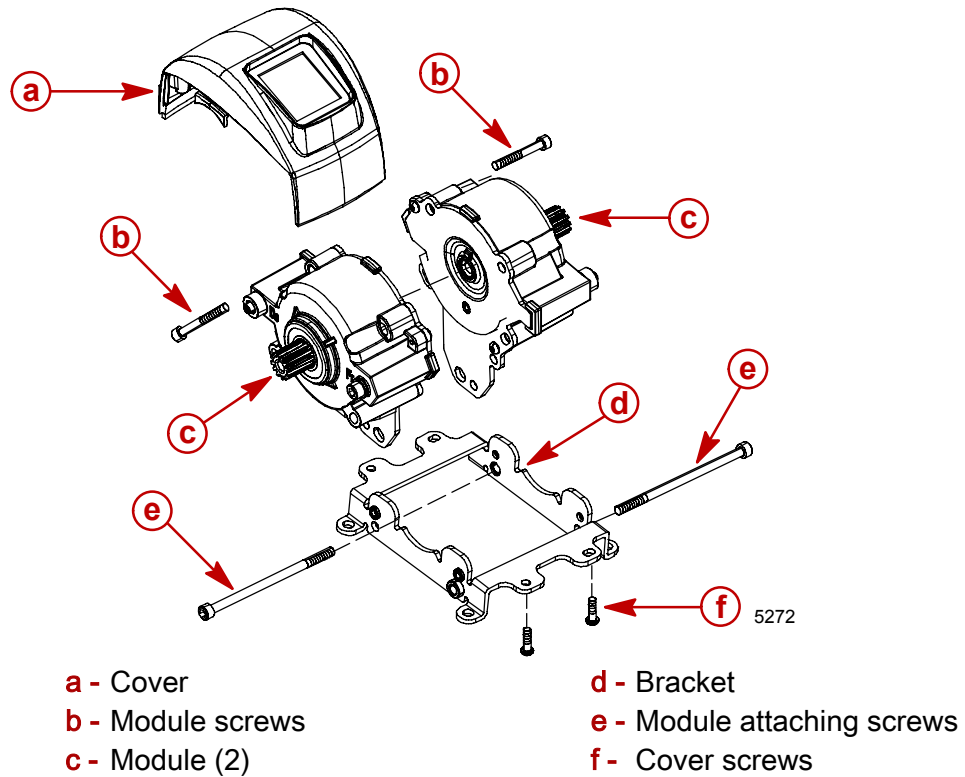


a - Emblem

b - Control handle screw (M8 x 30)

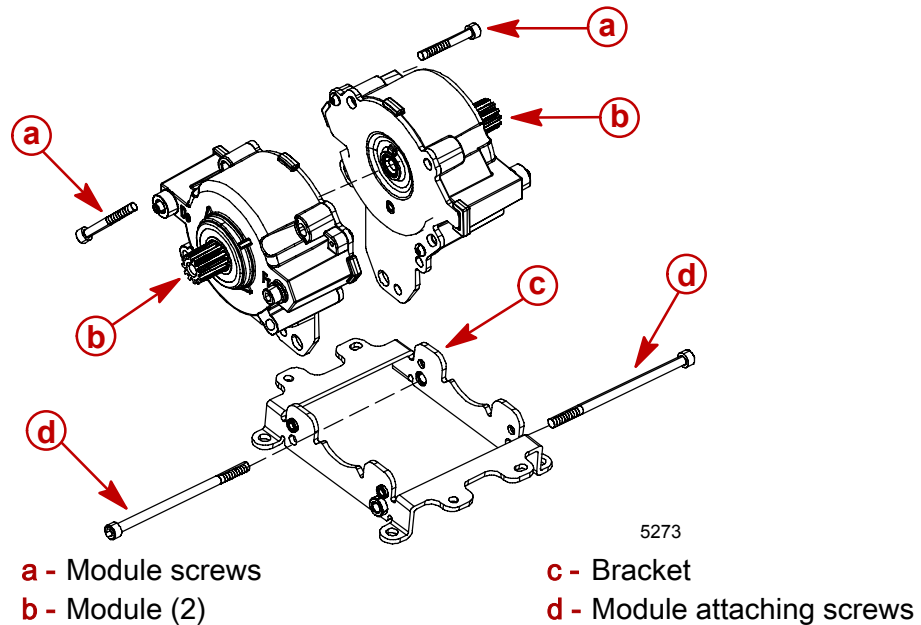
4. Remove the cable tie securing the keypad harness to the modules.
5. Remove the four screws securing the top cover to the bracket and remove the cover.
6. Remove the two screws securing the modules to the bracket, and remove the modules.

7. Remove the two screws securing the left and right modules.



Shadow Mode Control Reassembly

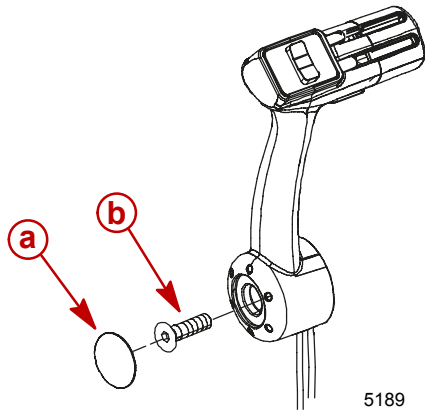
1. Attach the left and right module with two screws.
2. Align the modules to the bracket. Install the two screws attaching the modules to the bracket and tighten to the specified torque.



Description	Nm	lb. in.	lb. ft.
Module attaching screws	5.6	50	

3. With the control handles in neutral detent, attach the handles to the control module shaft in the same vertical position they were removed.

4. Apply Loctite 271 Threadlocker to the control handle screw, and secure the handles to the modules. Tighten the screw to the specified torque.

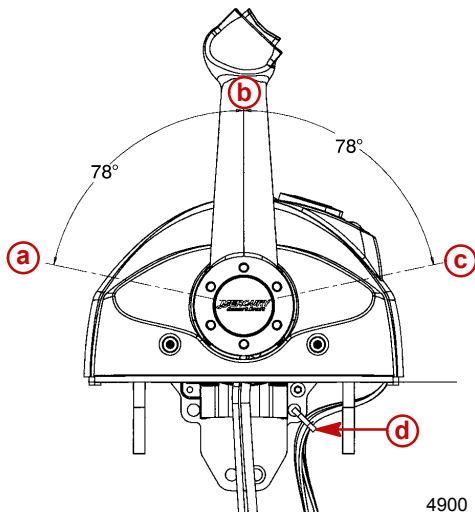


a - Emblem **b** - Control handle attaching screw

Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle attaching screw	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle attaching screws	27.1		20

5. Shift the handles from neutral to full forward and full reverse to ensure that the handles have full range of movement. Allow slack in the harnesses for flexing due to control handle movement.
6. Install the top cover. Ensure that wire harnesses are routed in between the bracket mounting tabs. Secure the cover with four screws. Tighten the screws to the specified torque.
7. Attach the keypad wire harness to the module with a cable tie.

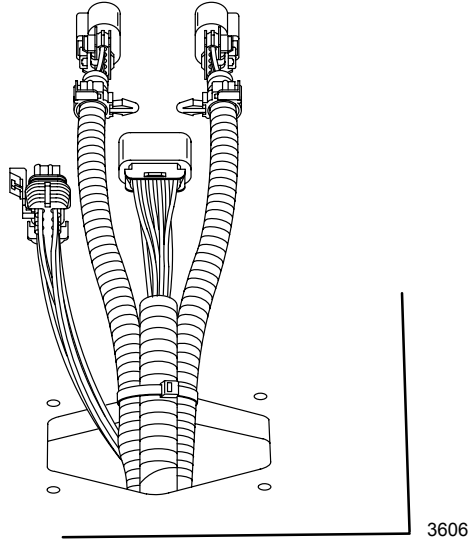


a - Full forward position **b** - Neutral detent position **c** - Full reverse position **d** - Cable tie

Description	Nm	lb. in.	lb. ft.
Top cover screws	2.3	20	

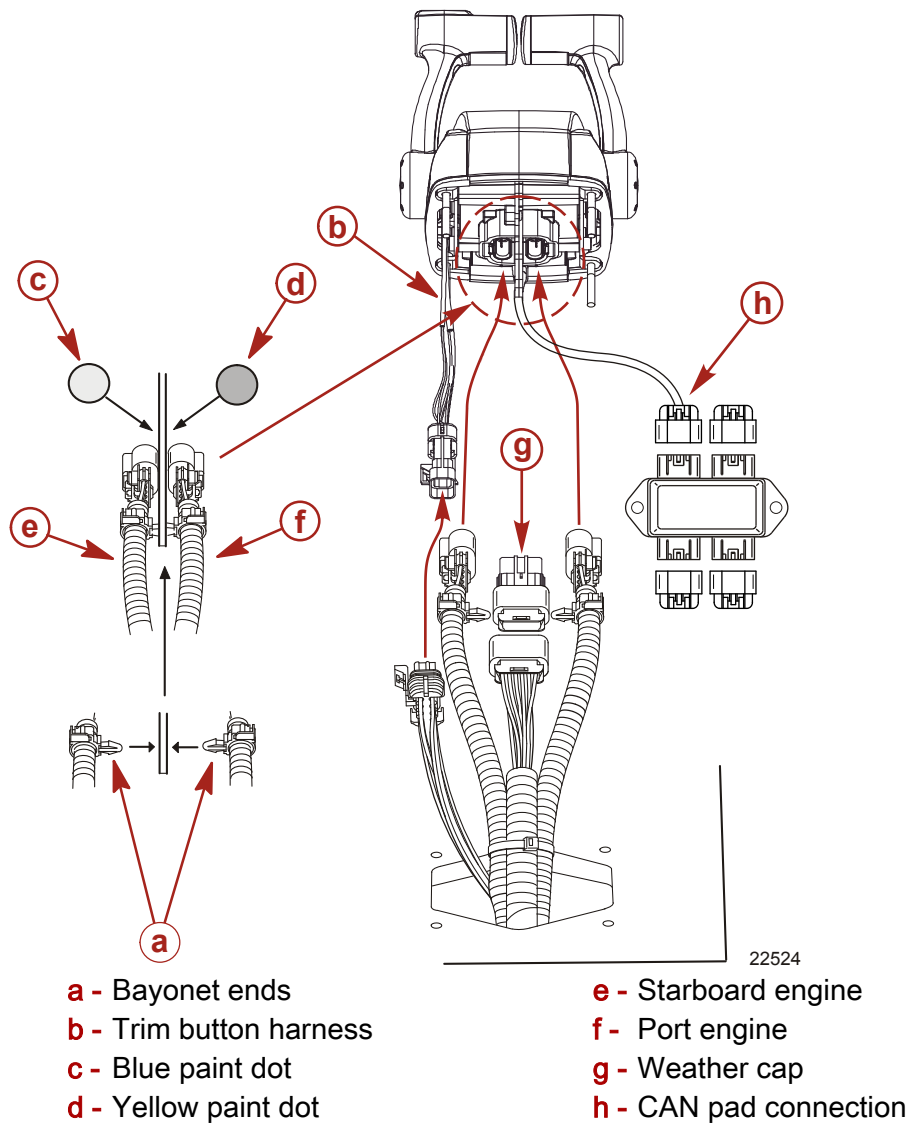
Installing the Shadow Mode Control with CAN Pad

1. Ensure the opening is free of sharp edges.
2. Route the wiring for the remote control into opening.

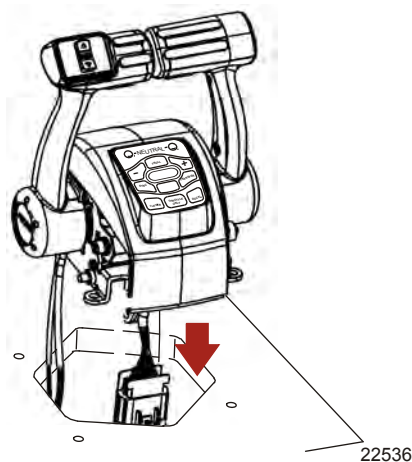


3. Insert the bayonet ends of the two lever harnesses into bracket holes. This will prevent connectors from pulling out.
4. Ensure the trackpad connector is sealed with a weather cap.
5. Connect the CAN pad connector to a junction box.

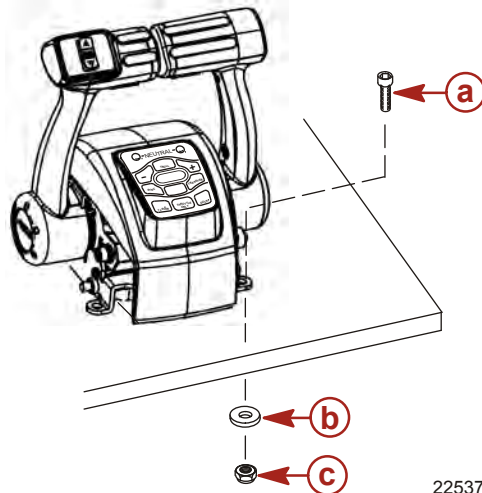
IMPORTANT: Allow slack in the trim button harness going to the control handle. This harness will flex and move during control handle movement.



6. Place the remote control into the opening.



7. Fasten the remote control with four M6 x 40 screws.



22537

a - Mounting Screw (4) M6 x 40

c - Nut - nylon insert

b - Washer

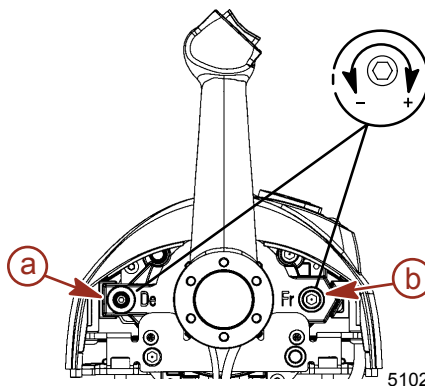
⚠ CAUTION

Do not turn control handle tension adjustment screw clockwise more than 11 turns from the initial point of hex head contact with bracket. Damage to the module may occur.

⚠ CAUTION

Do not turn detent tension adjustment screw clockwise more than 11 turns from full out position. Damage to the module may occur.

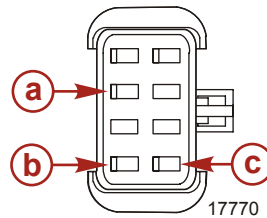
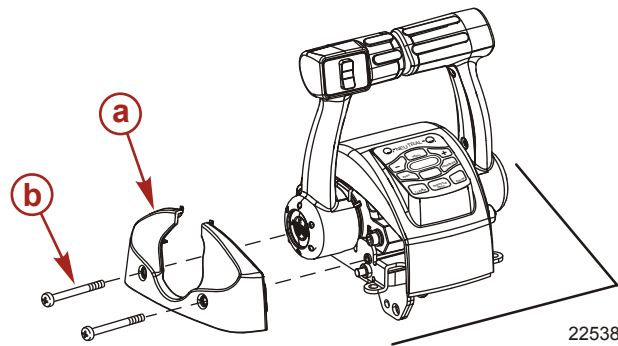
8. Control handle tension adjustment screw – This screw can be adjusted to increase or decrease the overall effort to move the control handle. This will help prevent the handle from unwanted motion in rough water. Turn screw towards "+" to increase tension or towards "-" to decrease tension.
9. Detent tension adjustment screw – This screw can be adjusted to increase or decrease the effort to move control handle into or out of detent position. Turn screw towards "+" to increase tension or towards "-" to decrease tension.



5102

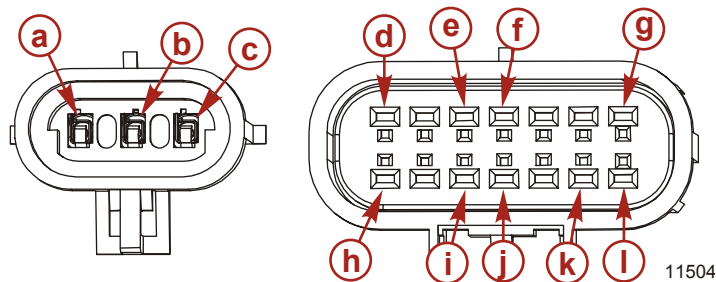
a - Detent tension adjustment

b - Control handle tension adjustment



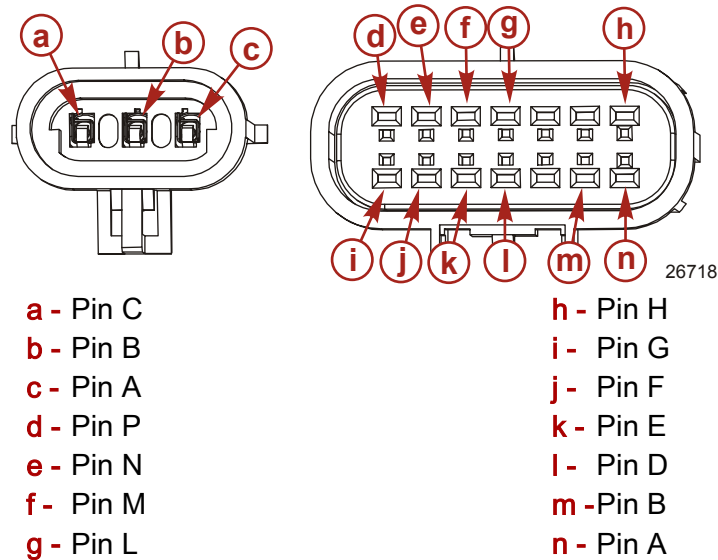
Ref. No.	Pin	Wire Color	Description
a	B	Purple	12 volts
b	D	White/blue	Trim down
c	E	White/green	Trim up

Meter Test Leads		Switch	Reading (Ω)
Red	Black		
Purple	White/blue	Trim up	Continuity
Purple	White/green	Trim down	Continuity



Ref. No.	Pin	Wire Color	Description
a	C	Green/white	All down
b	B	Gray/white	All up
c	A	Red/blue	12 volts
d	P	Green	Down port
e	M	Green/yellow	Down middle
f	L	Green/white	Down starboard
g	H	Purple/black	12 volt switched
h	G	Light blue	Up port
i	E	Blue/yellow	Up middle
j	D	Light blue/white	Up starboard
k	B	Black	Ground
l	A	Red/purple	12 volts

Dash Mounted Quad Trim Switch Pin-Out



Ref. No.	Pin	Wire Color	Description
a	C	Green/white	All down
b	B	Gray/white	All up
c	A	Red/blue	12 volts
d	P	Green	Down port outside
e	N	Green/red	Down port inside
f	M	Green/yellow	Down starboard inside
g	L	Green/white	Down starboard outside
h	H	Purple/black	12 volt switched
i	G	Light blue	Up port outside
j	F	Blue/red	Up port inside
k	E	Blue/yellow	Up starboard inside
l	D	Light blue/white	Up starboard outside
m	B	Black	Ground
n	A	Red/purple	12 volts

Notes:

Digital Throttle and Shift (DTS) Electronic Remote Controls

Section 9H - DTS Dual Handle Yacht Console Remote Controls

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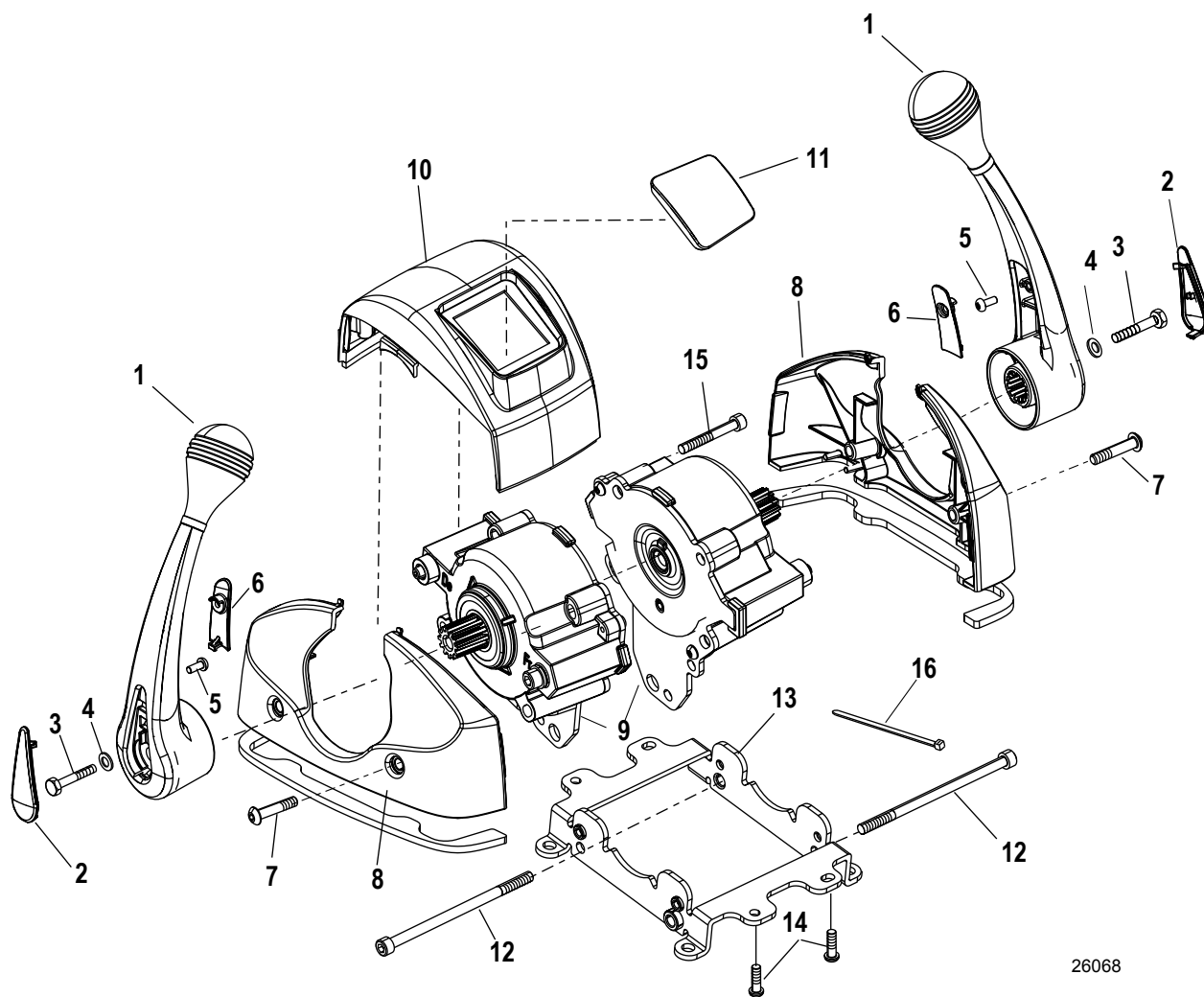
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Dual Handle Yacht Console Remote Control with CAN Pad Reassembly.....9H-16	

Lubricants, Sealants, Adhesives

Tube Ref No.	Description	Where Used	Part No.
	Loctite 271 Threadlocker	First three threads of control handle	92-809819
		Control handle screw	

Notes:

Throttle/Throttle Dual Handle Yacht Console Remote Control Components

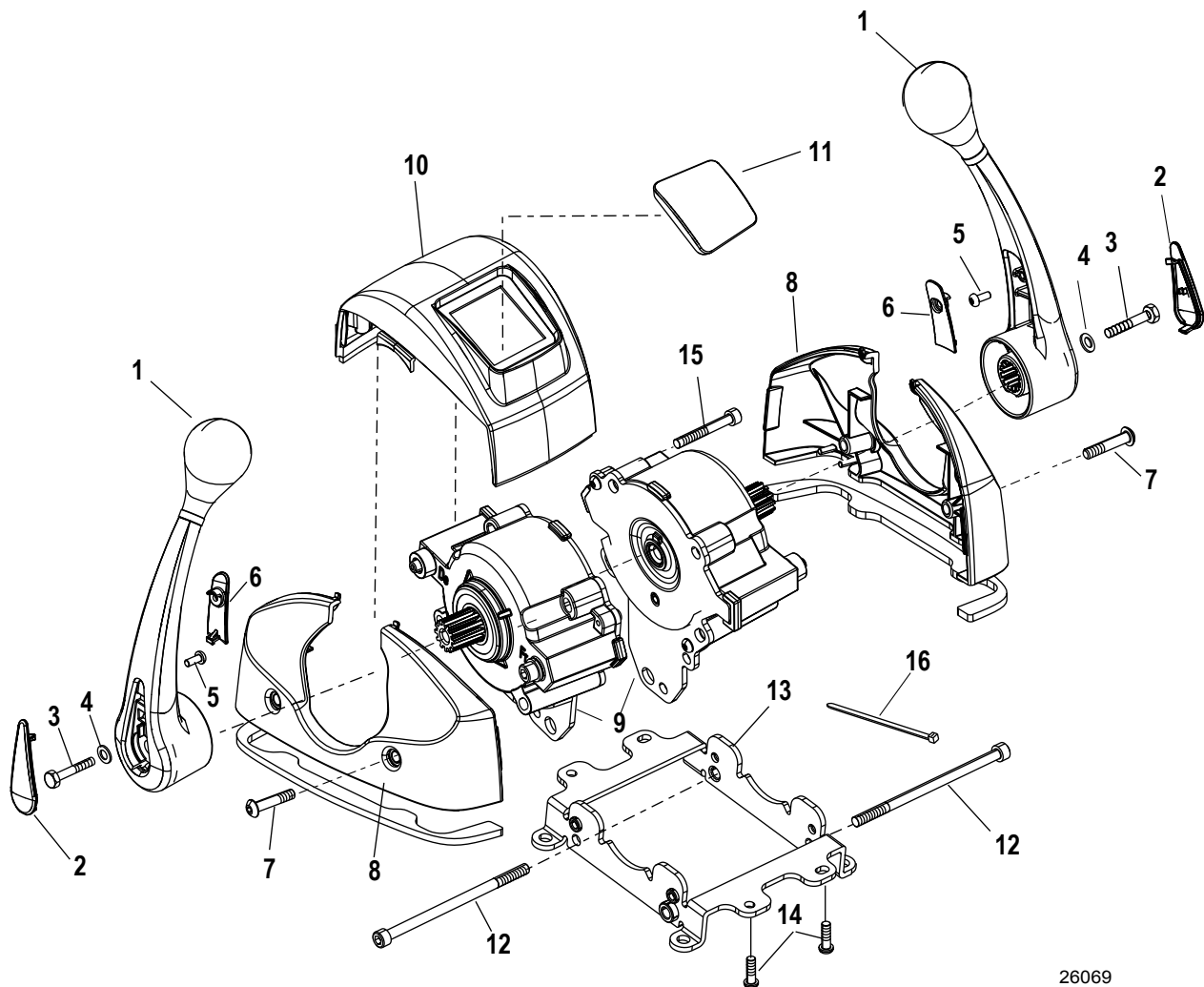


26068

Throttle/Throttle Dual Handle Yacht Console Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Handle			
2	2	Handle cover			
3	2	Control handle screw (M8 x 25)	22.6	200	
4	4	Washer			
5	2	Screw	3.4	30	
6	2	Handle cover			
7	4	Screw (M4 x 20)			
8	2	Cover with gasket			
9	2	Throttle module			
10	1	Top cover			
11	1	Console cover			
12	2	Screw (M6 x 110)	5.6	50	
13	1	Bracket			
14	4	Screw	2.3	20	
15	2	Screw (M6 x 45)	5.6	50	
16	1	Cable tie			

Shift/Shift Dual Handle Yacht Console Remote Control Components

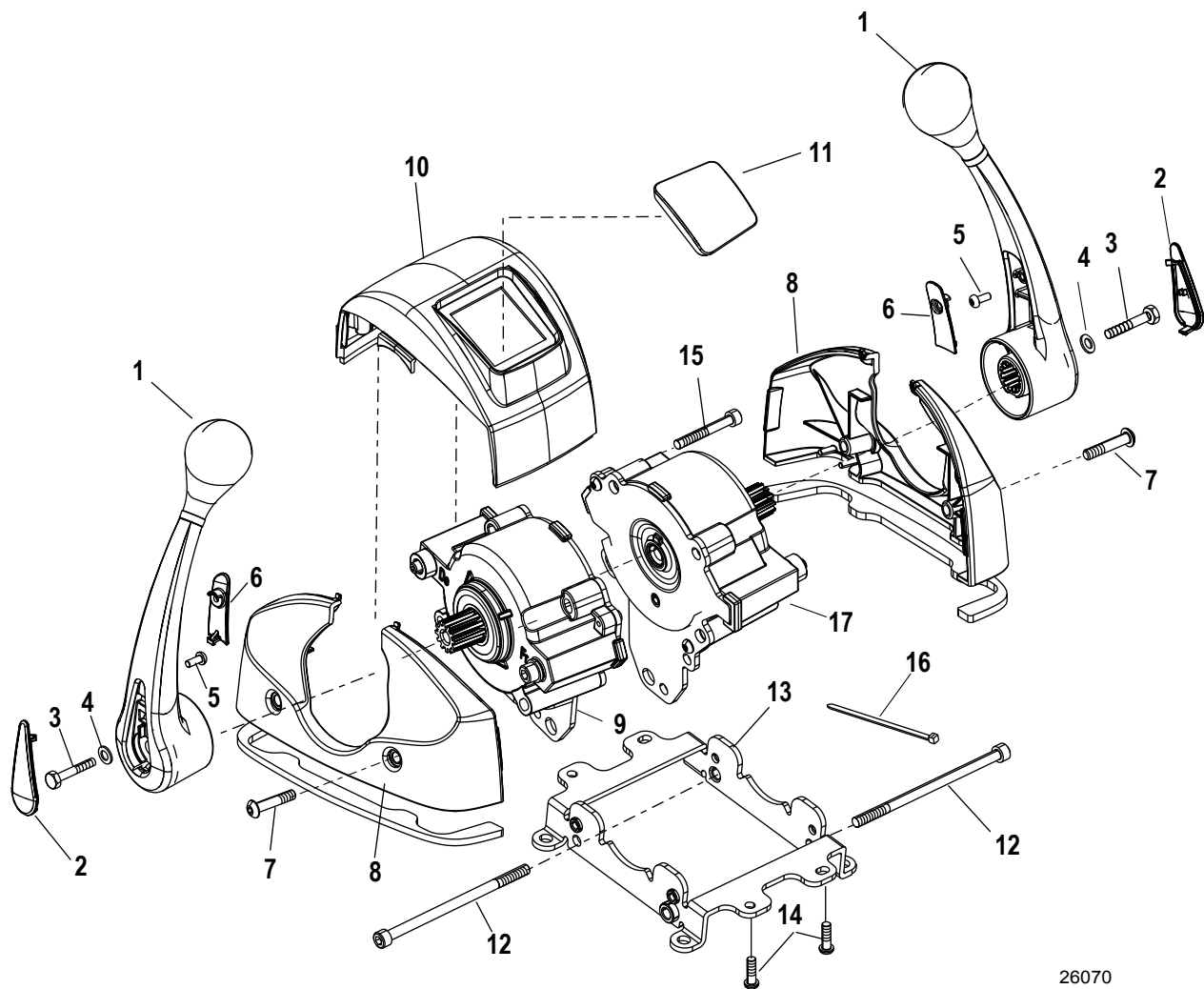


26069

Shift/Shift Dual Handle Yacht Console Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Handle			
2	2	Handle cover			
3	2	Control handle screw (M8 x 25)	22.6	200	
4	4	Washer			
5	2	Screw	3.4	30	
6	2	Handle cover			
7	4	Screw (M4 x 20)			
8	2	Cover with gasket			
9	2	Shift module			
10	1	Top cover			
11	1	Console cover			
12	2	Screw (M6 x 110)	5.6	50	
13	1	Bracket			
14	4	Screw	2.3	20	
15	2	Screw (M6 x 45)	5.6	50	
16	1	Cable tie			

Throttle/Shift Dual Handle Yacht Console Remote Control Components

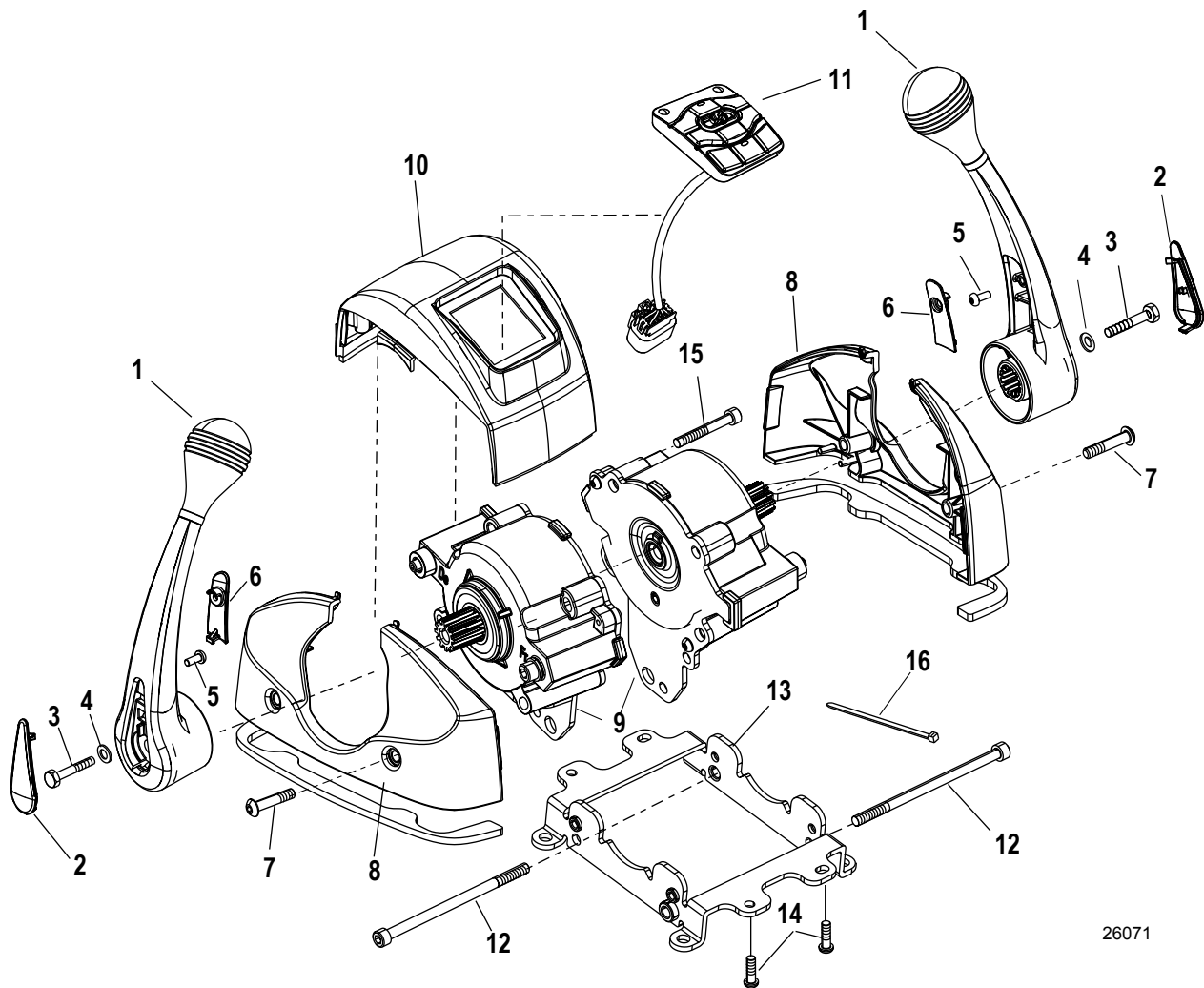


26070

Throttle/Shift Dual Handle Yacht Console Remote Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Handle			
2	2	Handle cover			
3	2	Control handle screw (M8 x 25)	22.6	200	
4	4	Washer			
5	2	Screw	3.4	30	
6	2	Handle cover			
7	4	Screw (M4 x 20)			
8	2	Cover with gasket			
9	1	Shift module			
10	1	Top cover			
11	1	Console cover			
12	2	Screw (M6 x 110)	5.6	50	
13	1	Bracket			
14	4	Screw	2.3	20	
15	2	Screw (M6 x 45)	5.6	50	
16	1	Cable tie			
17	1	Throttle module			

Throttle/Throttle Dual Handle Yacht Console Remote Console Control with CAN Pad

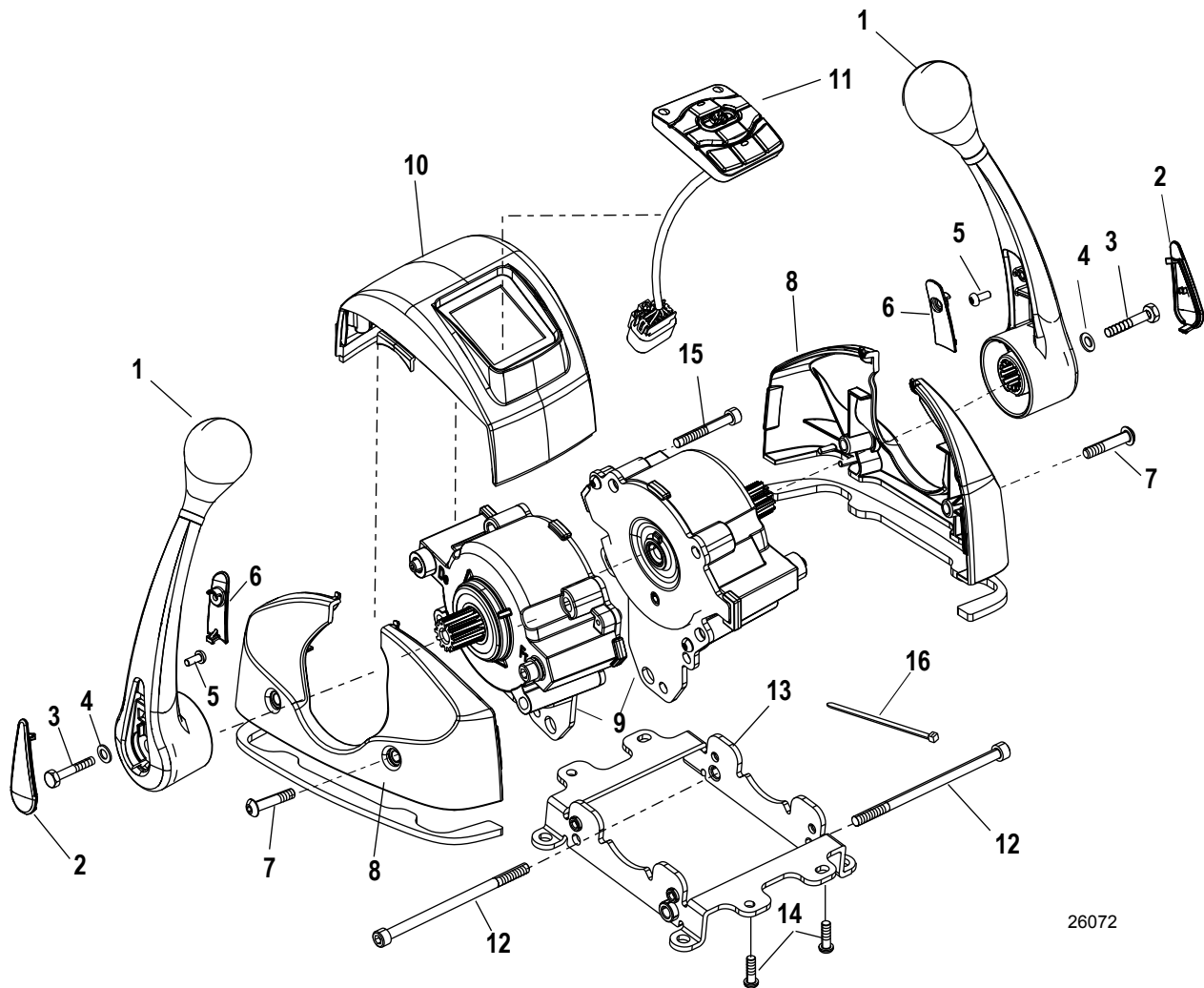


26071

Throttle/Throttle Dual Handle Yacht Console Remote Console Control with CAN Pad

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Handle			
2	2	Handle cover			
3	2	Control handle screw (M8 x 25)	22.6	200	
4	4	Washer			
5	2	Screw	3.4	30	
6	2	Handle cover			
7	4	Screw (M4 x 20)			
8	2	Cover with gasket			
9	2	Throttle module			
10	1	Top cover			
11	1	CAN pad			
12	2	Screw (M6 x 110)	5.6	50	
13	1	Bracket			
14	4	Screw	2.3	20	
15	2	Screw (M6 x 45)	5.6	50	
16	1	Cable tie			

Throttle/Shift Dual Handle Yacht Console Remote Console Control with CAN Pad



26072

Throttle/Shift Dual Handle Yacht Console Remote Console Control with CAN Pad

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	2	Handle			
2	2	Handle cover			
3	2	Control handle screw (M8 x 25)	22.6	200	
4	4	Washer			
5	2	Screw	3.4	30	
6	2	Handle cover			
7	4	Screw (M4 x 20)			
8	2	Cover with gasket			
9	2	Throttle/shift module			
10	1	Top cover			
11	1	CAN pad			
12	2	Screw (M6 x 110)	5.6	50	
13	1	Bracket			
14	4	Screw	2.3	20	
15	2	Screw (M6 x 45)	5.6	50	
16	1	Cable tie			

Dual Handle Yacht Console Remote Control with CAN Pad Removal, Disassembly, Assembly and Installation

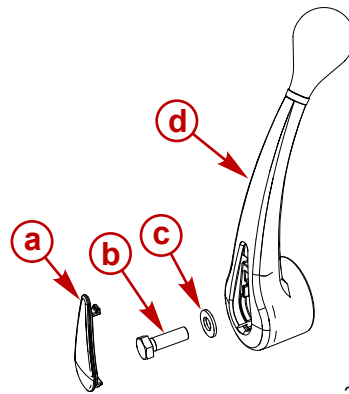
Dual Handle Yacht Console Remote Control with CAN Pad Removal

NOTE: Place the remote control handle in neutral detent position. Note position of handle for reassembly.

1. Remove the four screws securing the side covers to the control housing and remove the covers.
2. Remove the four screws securing the bracket to the console to access the harness connector.
3. Remove the remote control assembly from the console. Disconnect the wire harness connector.

Dual Handle Yacht Console Remote Control with CAN Pad Disassembly

1. Remove the cover from the center of the handle using a flat blade screwdriver.
2. Place the control handle in the neutral detent position. Note the position of the handle for reassembly.
3. Remove the screw securing the handle to the control module and remove the handle from the control module shaft.



24775

a - Cover

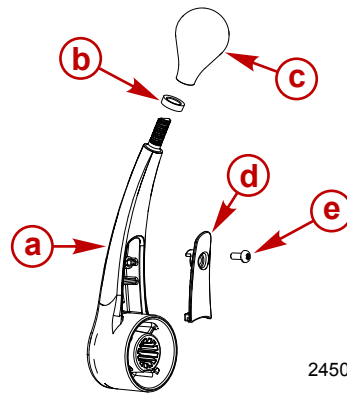
b - Screw (M8 x 25)

c - Washer

d - Control handle

4. Remove the screw securing the handle cover to the control handle. Remove the handle cover.

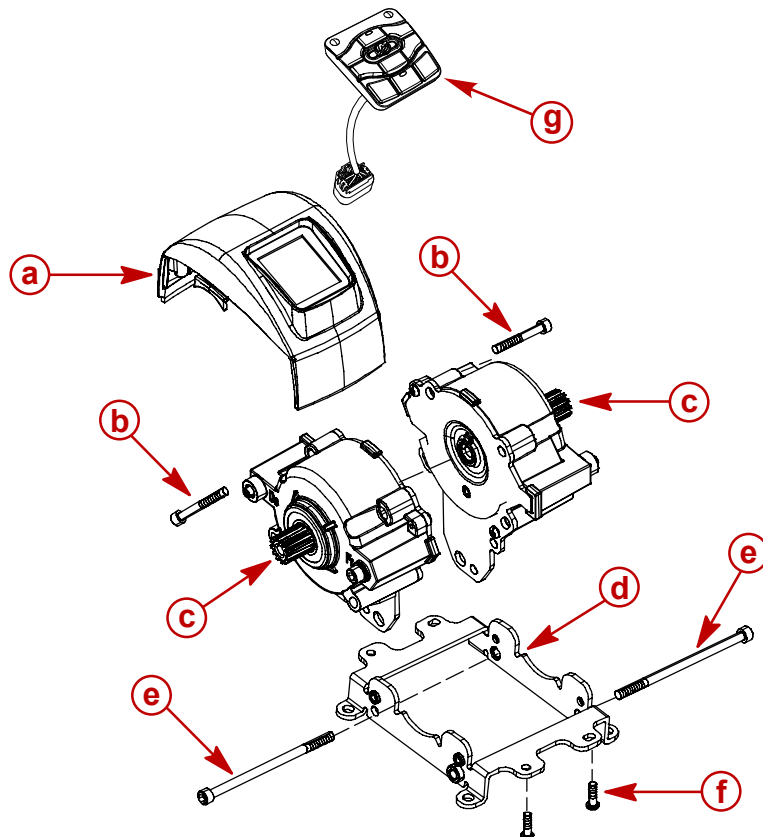
5. Unthread the knob from the control handle. Remove the trim ring.



24502

- | | |
|---------------------------|-------------------------|
| a - Control handle | d - Handle cover |
| b - Trim ring | e - Screw |
| c - Knob | |

6. Remove the cable tie securing the CAN pad harness to the modules.
 7. Remove the four screws securing the top cover to the bracket and remove the cover.
 8. Remove the two screws securing the modules to the bracket and remove the modules.
 9. Remove the two screws securing the port and starboard modules.

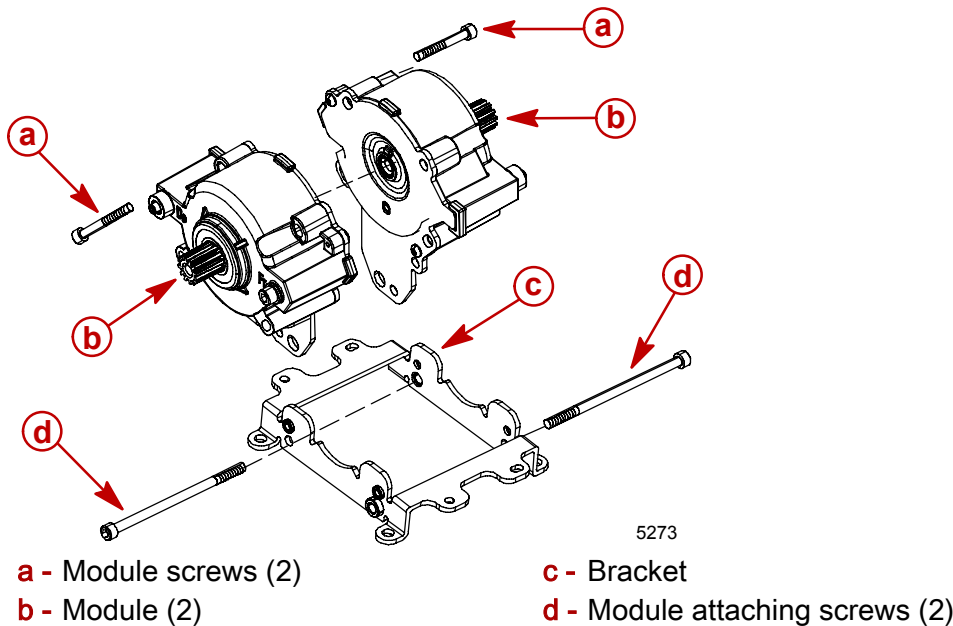


24774

- | | |
|--------------------------------------|--|
| a - Cover | e - Module attaching screws (2) |
| b - Module screws (2) | f - Cover screws (4) |
| c - Port and starboard module | g - CAN pad |
| d - Bracket | |

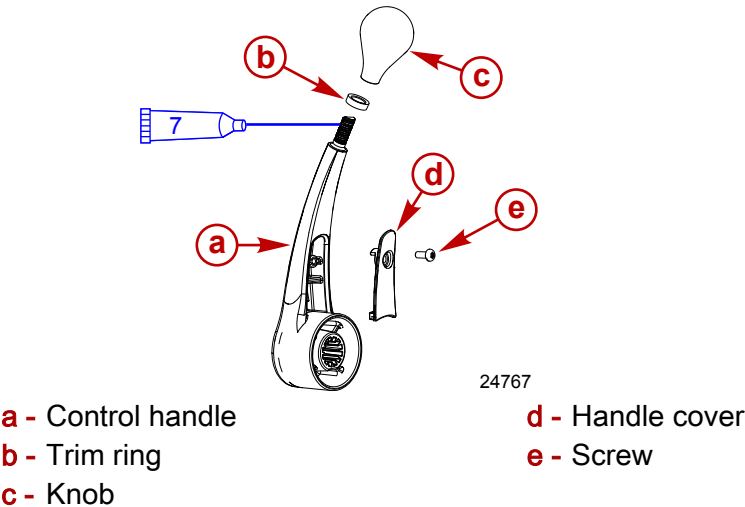
Dual Handle Yacht Console Remote Control with CAN Pad Reassembly

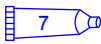
- 1. Attach the port and starboard module with two screws. Do not tighten the two screws at this time.
- 2. Align the modules to the bracket. Install the two screws attaching the modules to the bracket.
- 3. Tighten the two module screws and the two screws attaching the modules to the bracket to the specified torque.



Description	Nm	lb. in.	lb. ft.
Module screws (2) (M6 x 45)	5.6	50	
Module attaching screws (2) (M6 x 110)	5.6	50	

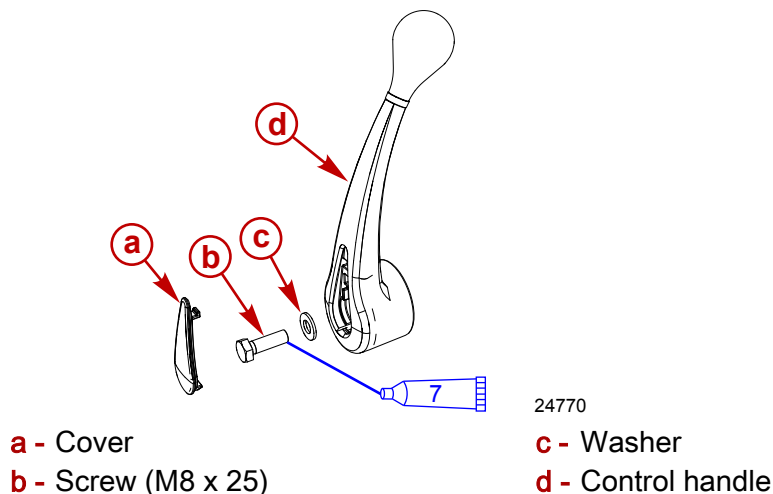
- 4. Install the trim ring onto the control handle.
- 5. Apply Loctite 271 Threadlocker to the first three threads on the control handle.
- 6. Thread the knob onto the handle until it is snug and the trim ring can no longer spin.
- 7. Install the handle cover and secure with a screw. Tighten the screw to the specified torque.



Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	First three threads of control handle	92-809819

Description	Nm	lb. in.	lb. ft.
Screw	3.4	30	

8. With the control handles in neutral detent, attach the handles to the control module shaft in the same vertical position they were removed.
9. Apply Loctite 271 Threadlocker to the control handle screw, and secure the handles to the modules. Tighten the screw to the specified torque.
10. Install the cover.

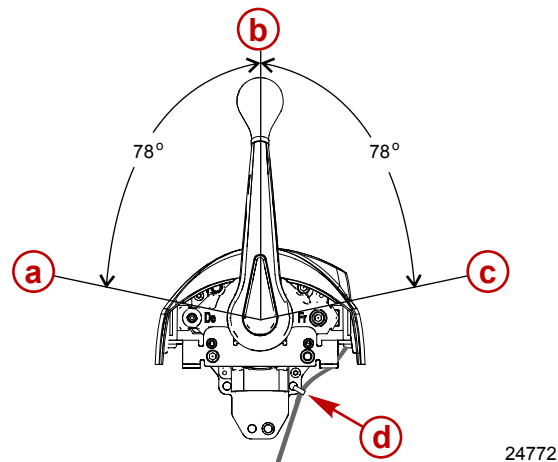


Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle screw	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle screw (M8 x 25)	22.6	200	

11. Shift the handles from neutral to full forward and full reverse to ensure that the handles have full range of movement.
12. Install the top cover. Ensure the wire harness for the CAN pad is routed in between the bracket mounting tabs. Secure the cover with four screws. Tighten the screws to the specified torque.

13. Attach the CAN pad wire harness to the module with a cable tie.



Throttle/shift handle range

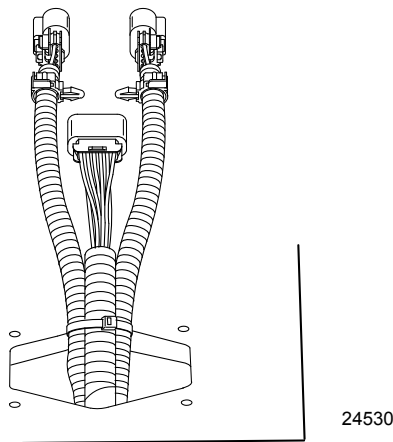
- a - Full forward position
- b - Neutral detent position
- c - Full reverse position
- d - Cable tie

Description	Nm	lb. in.	lb. ft.
Top cover screws (4)	2.3	20	

Dual Handle Yacht Console Control with CAN Pad Assembly Installation

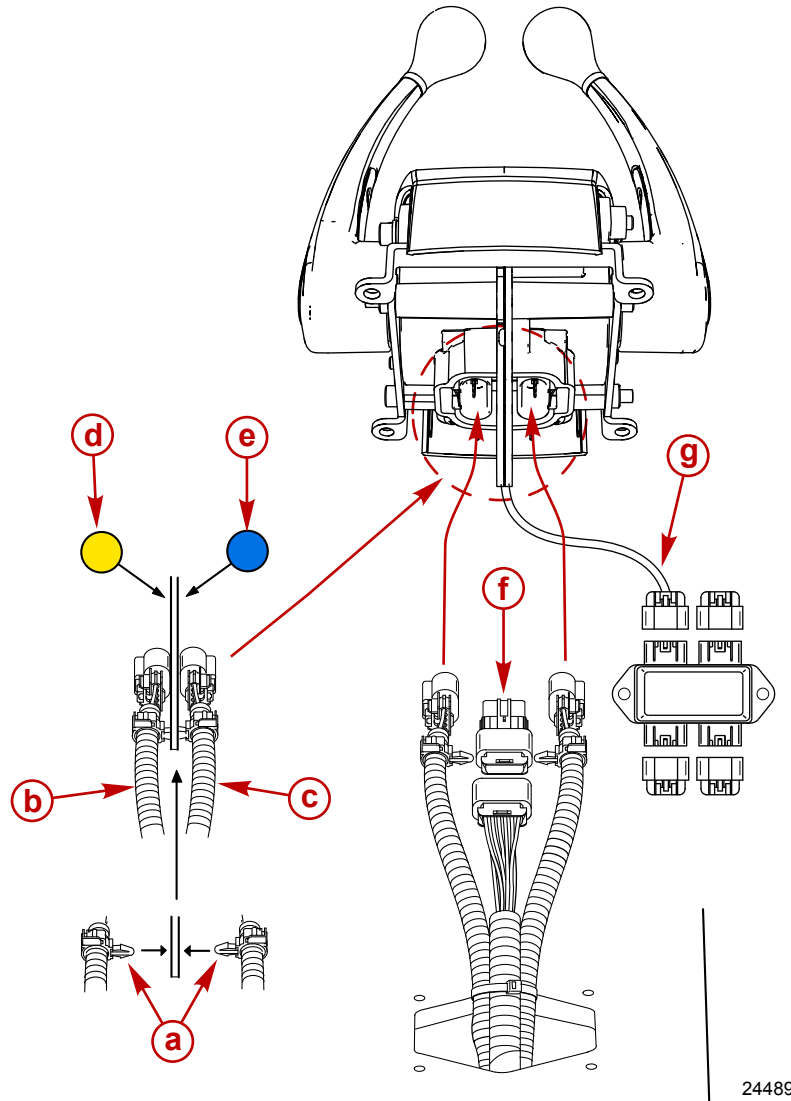
After completing the installation of the DTS Yacht Console Control, use the Computer Diagnostic System (CDS) to calibrate the DTS Yacht Console Control.

1. Make sure the opening is free of sharp edges.
2. Route the wiring for the remote control through the opening.



3. Connect the wiring to the correct control module.

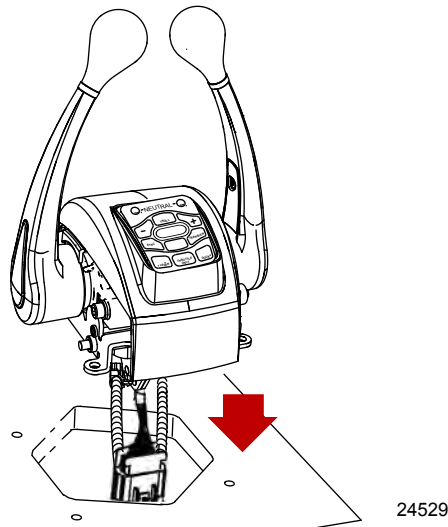
4. Insert the bayonet ends into the bracket holes. This will prevent the connectors from pulling out.



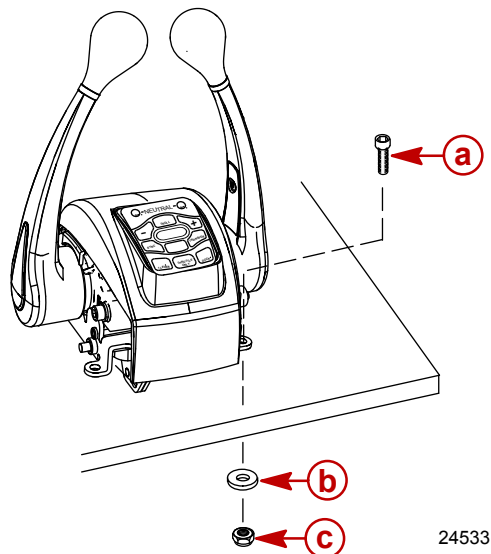
Throttle/shift, throttle/shift yacht control

- | | |
|---|-------------------------------|
| a - Bayonet ends | e - Blue paint dot |
| b - Port engine control harness | f - Weather cap |
| c - Starboard engine control harness | g - CAN pad connection |
| d - Yellow paint dot | |

5. Place the remote control into the opening.



6. Fasten the remote control with four M6 x 40 screws, washers, and locknuts.



- a** - Mounting screw (4) M6 x 40
b - Washer
c - Nut - nylon insert

7. Control Handle Tension Adjustment Screw – This screw can be adjusted to increase or decrease the overall effort to move the control handle. This will help prevent the handle from unwanted motion in rough water. Turn the screw towards "+" to increase the tension or towards the "-" to decrease the tension.

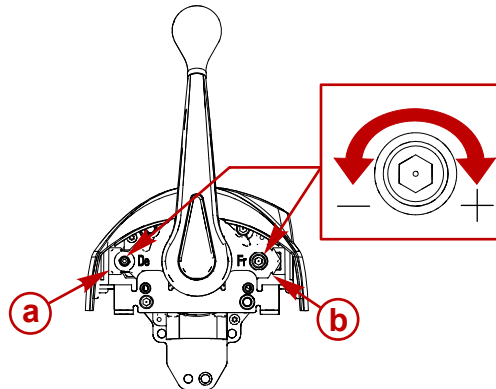
⚠ CAUTION

Do not turn control handle tension adjustment screw clockwise more than 11 turns from the initial point of hex head contact with bracket. Damage to the module may occur.

8. Detent Tension Adjustment Screw – This screw can be adjusted to increase or decrease the effort to move control handle into or out of detent position. Turn the screw towards "+" to increase the tension or towards the "-" to decrease the tension.

⚠ CAUTION

Do not turn detent tension adjustment screw clockwise more than 11 turns from full out position. Damage to the module may occur.

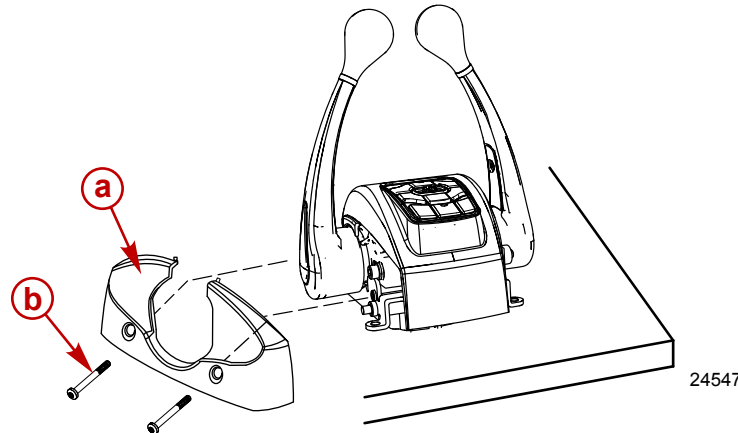


24543

a - Detent tension adjustment

b - Control handle tension adjustment

9. Install the two side covers with attaching screws.



24547

a - Side cover (2)

b - Attaching screws (4) (M4 x 20)

Dual Handle Yacht Console Remote Control (Throttle/Throttle, Shift/Shift) Removal, Disassembly, Assembly and Installation

Dual Handle Yacht Console Remote Control (Throttle/Throttle, Shift/Shift) Removal

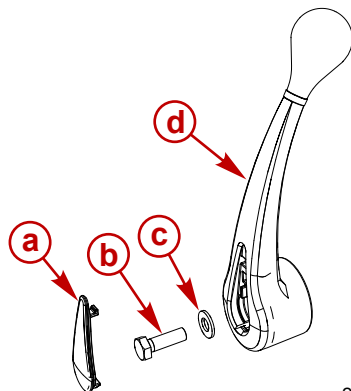
NOTE: Place the remote control handle in neutral detent position. Note position of handle for reassembly.

1. Remove the four screws securing the side covers to the control housing and remove the cover.
2. Remove the four screws securing the bracket to the console.
3. Remove the remote control assembly from the console.

Dual Handle Yacht Console Remote Control (Thottle/Throttle, Shift/Shift) Disassembly

1. Remove the cover from the center of the handle using a flat blade screwdriver.
2. Place the control handle in the neutral detent position. Note the position of the handle for reassembly.

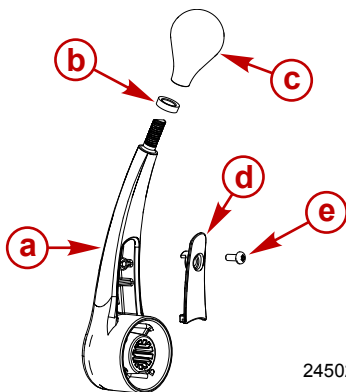
3. Remove the screw securing the handle to the control module and remove the handle from the control module shaft.



24775

- | | |
|----------------------------|---------------------------|
| a - Cover | c - Washer |
| b - Screw (M8 x 25) | d - Control handle |

4. Remove the screw securing the handle cover to the control handle. Remove the handle cover.
5. Unthread the knob from the control handle. Remove the trim ring.

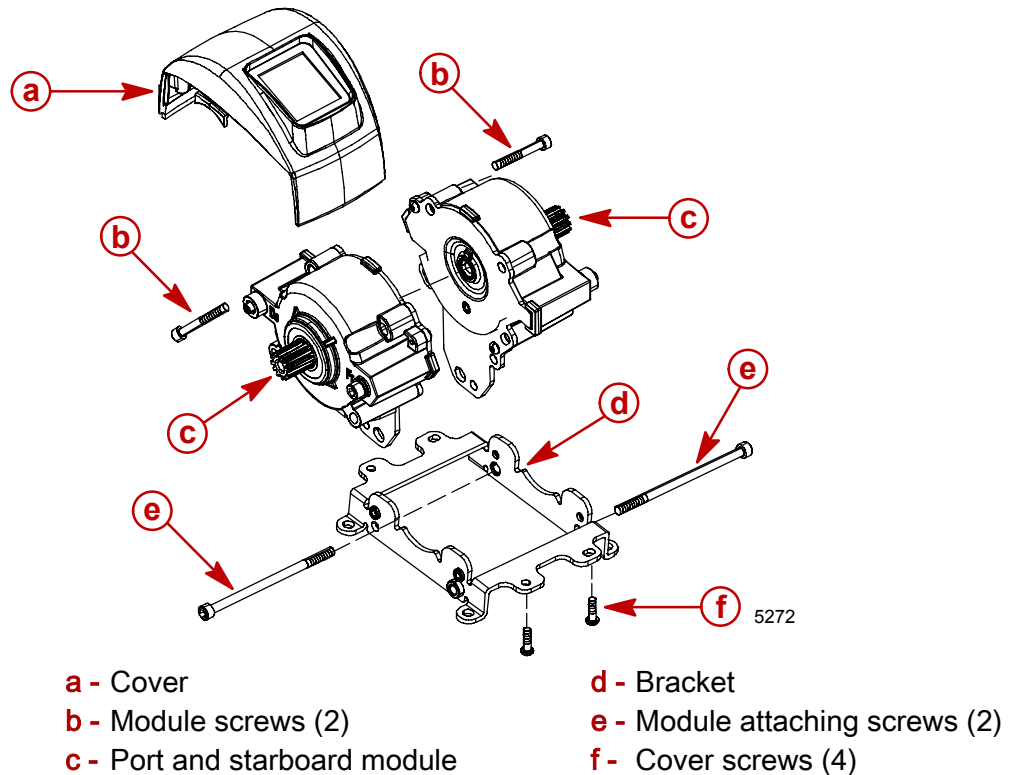


24502

- | | |
|---------------------------|-------------------------|
| a - Control handle | d - Handle cover |
| b - Trim ring | e - Screw |
| c - Knob | |

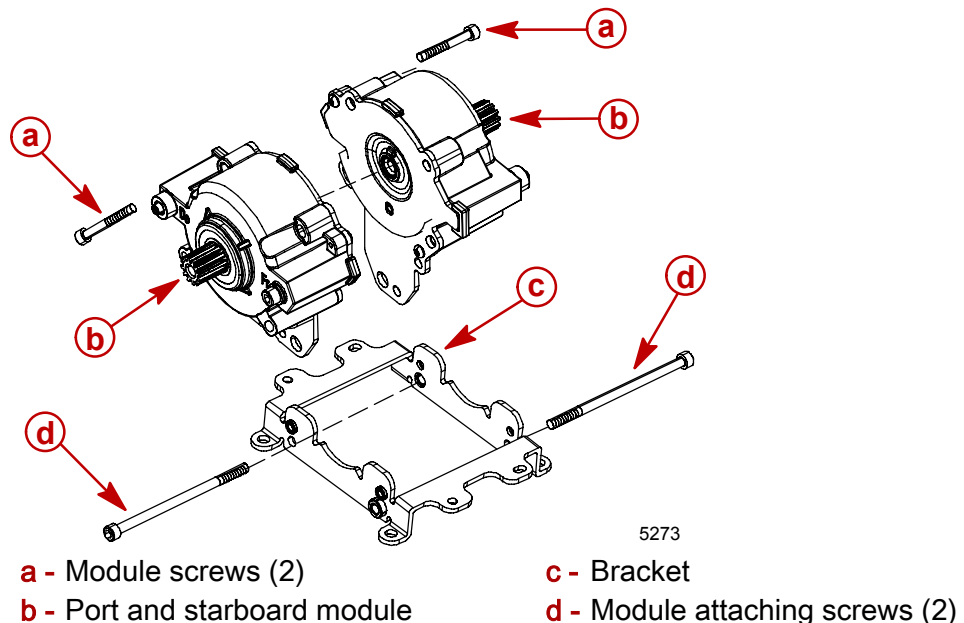
6. Remove the four screws securing the top cover to the bracket and remove the cover.
7. Remove the two screws securing the modules to the bracket and remove the modules.

8. Remove the two screws securing the port and starboard modules.



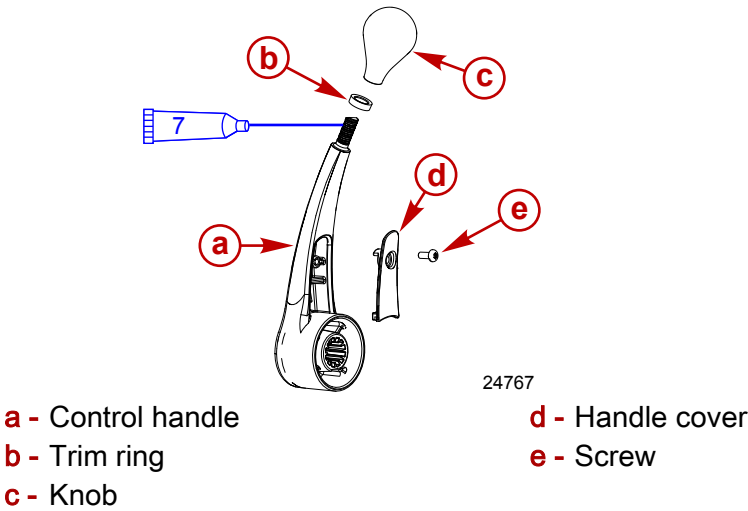
Dual Handle Yacht Console Remote Control (Throttle/Throttle, Shift/Shift) Reassembly

1. Attach the port and starboard modules with two screws. Do not tighten the two screws at this time.
2. Align the modules to the bracket. Install the two screws attaching the modules to the bracket.
3. Tighten the two module screws and the two screws attaching the modules to the bracket to the specified torque.



Description	Nm	lb. in.	lb. ft.
Module screws (2) (M6 x 45)	5.6	50	
Module attaching screws (2) (M6 x 110)	5.6	50	

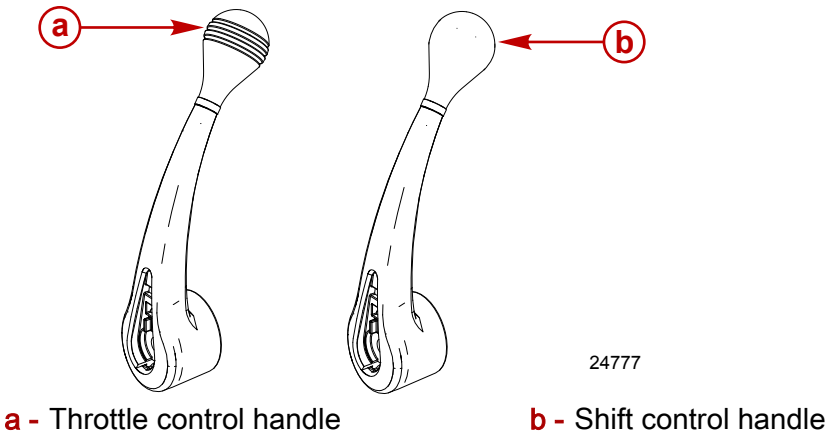
- 4. Install the trim ring onto the control handle.
- 5. Apply Loctite 271 Threadlocker to the first three threads of the control handle.
- 6. Thread the knob onto the handle until it is snug and the trim ring can no longer spin.
- 7. Install the handle cover and secure with a screw. Tighten the screw to the specified torque.



Description	Nm	lb. in.	lb. ft.
Screw (4 x 10)	3.4	30	

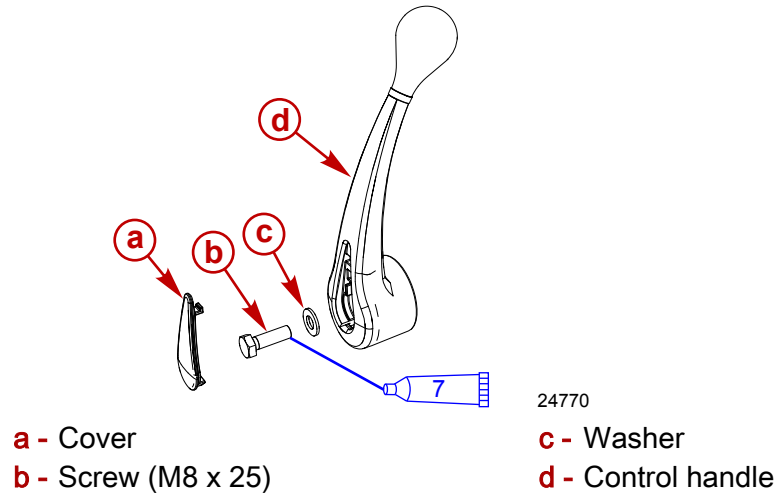
Tube Ref No.	Description	Where Used	Part No.
	Loctite 271 Threadlocker	First three threads of control handle	92-809819

- 8. Ensure the control handle assemblies installed onto the remote control module assembly are identical.



- 9. With the control handles in neutral detent, attach the handles to the control module shaft in the same vertical position they were removed.
- 10. Apply Loctite 271 Threadlocker to the control handle screw, and secure the handles to the modules. Tighten the screw to the specified torque.

11. Install the cover.

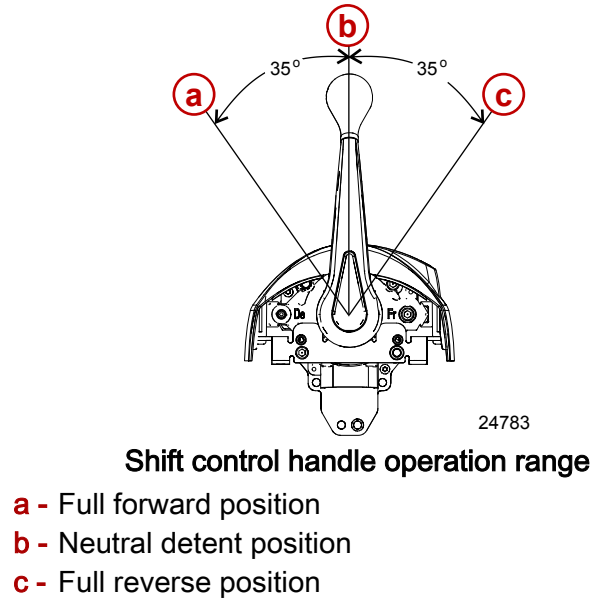


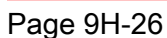
Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle screw	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle screws (M8 x 25)	22.6	200	

12. Move the handles to ensure the handles have the full range of movement.

13. Install the top cover. Secure the cover with four screws. Tighten the screws to the specified torque.





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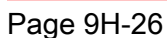
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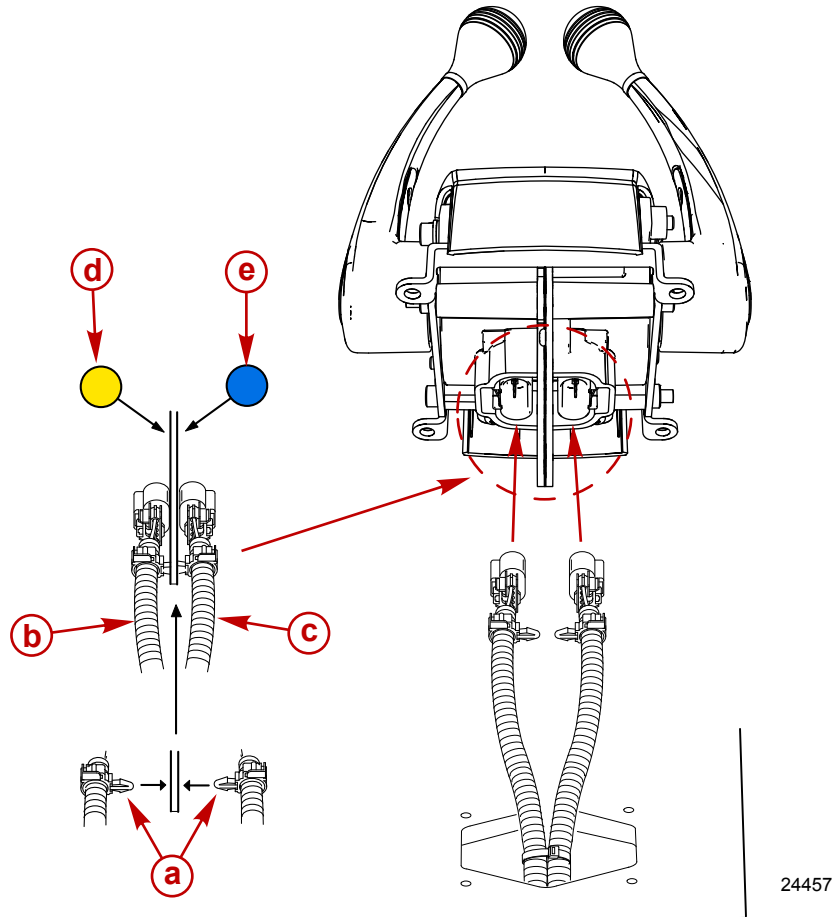
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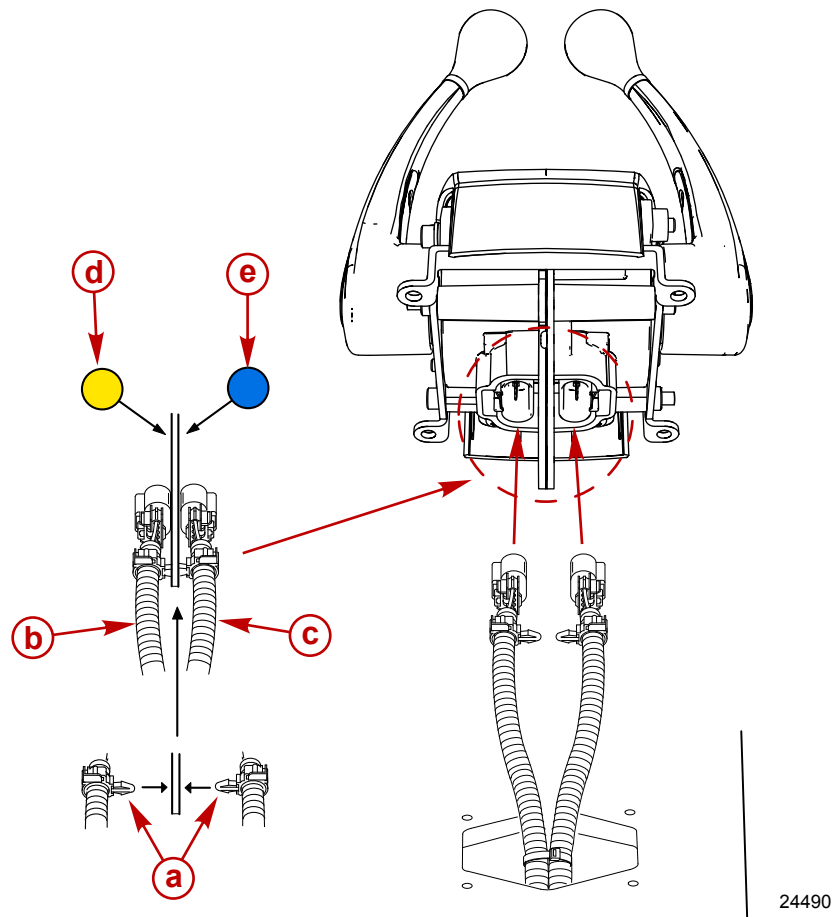
- Page 9H-26

4. Insert the bayonet ends into the bracket holes. This will prevent the connectors from pulling out.



Throttle/throttle yacht control

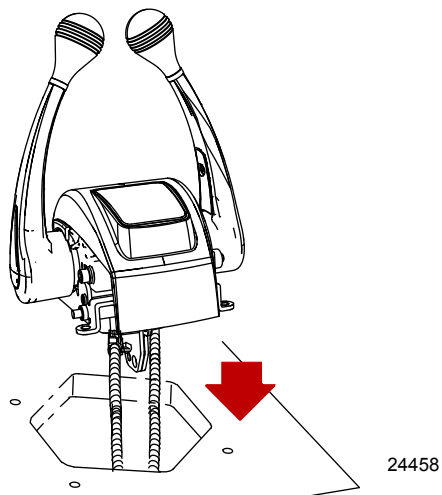
- a** - Bayonet ends
- b** - Adapter harness port engine (LEVER 4)
- c** - Adapter harness starboard engine (LEVER 3)
- d** - Yellow paint dot
- e** - Blue paint dot



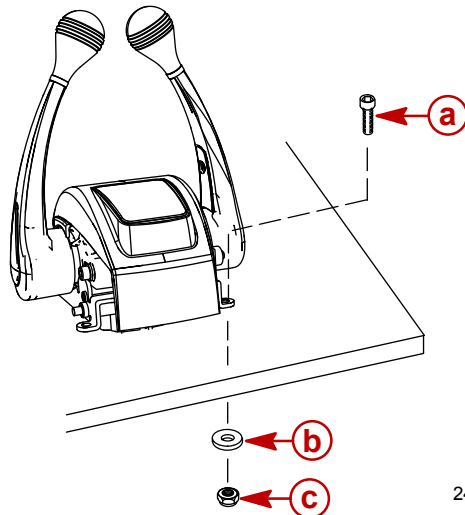
Shift/shift yacht control

- a** - Bayonet ends
- b** - Shift control harness port engine (LEVER 2)
- c** - Shift control harness starboard engine (LEVER 1)
- d** - Yellow paint dot
- e** - Blue paint dot

5. Place the remote control into the opening.



6. Fasten the remote control with four M6 x 40 screws, washers, and locknuts.



24459

- a** - Mounting Screw (4) M6 x 40
b - Washer
c - Nut - nylon insert

7. Control Handle Tension Adjustment Screw – This screw can be adjusted to increase or decrease the overall effort to move the control handle. This will help prevent the handle from unwanted motion in rough water. Turn the screw towards "+" to increase the tension or towards the "-" to decrease the tension.

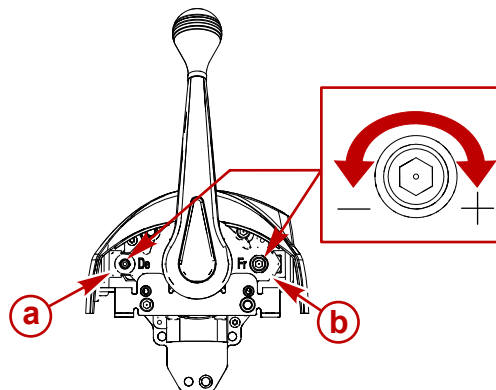
⚠ CAUTION

Do not turn control handle tension adjustment screw clockwise more than 11 turns from the initial point of hex head contact with bracket. Damage to the module may occur.

8. Detent Tension Adjustment Screw – This screw can be adjusted to increase or decrease the effort to move control handle into or out of detent position. Turn the screw towards "+" to increase the tension or towards the "-" to decrease the tension.

⚠ CAUTION

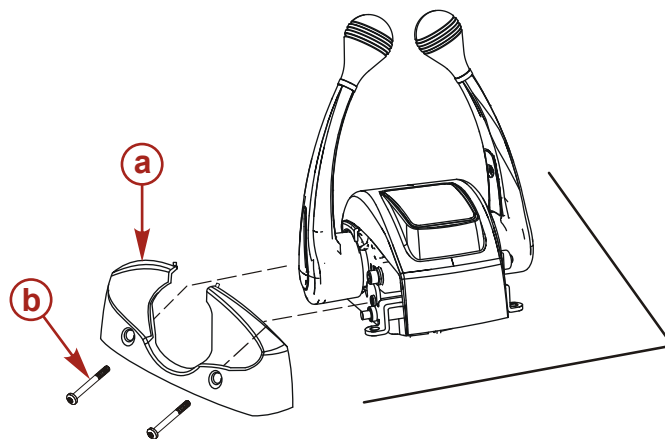
Do not turn detent tension adjustment screw clockwise more than 11 turns from full out position. Damage to the module may occur.



24460

- a** - Detent tension adjustment **b** - Control handle tension adjustment

9. Install the two side covers with attaching screws.

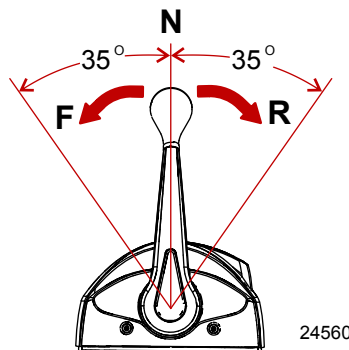


a - Side cover (2)

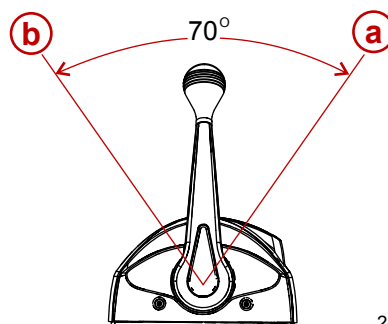
b - Attaching screws (4) (M4 x 20)

DUAL HANDLE YACHT CONTROL OPERATION

Shift operation is controlled by the movement of the control handle. Push the shift control handles forward from the neutral position for forward gear. Pull the control handle back from the neutral position for reverse gear.



Throttle operation is controlled by the movement of the control handle. Move the control handle forward to increase the engine speed. Pull the control handle back to decrease the engine speed.



a - Idle position

b - WOT position

NOTE: The control handle idle position is adjustable. The total angular rotation of 70 degrees remains unchanged.

Handle Position Adjustment

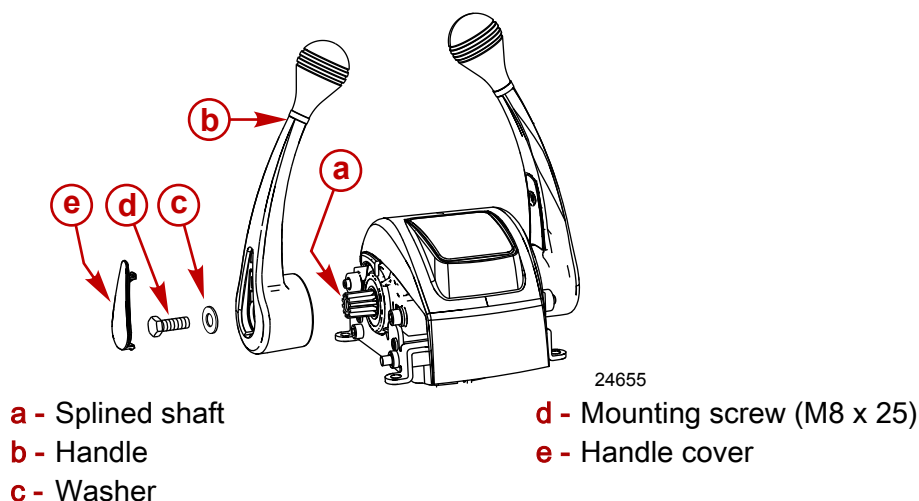
The idle position of the handles may be adjusted to any position in 30° increments. The total 70° range of rotation remains the same.

REMOVAL

1. Move the handle to the idle/neutral position.
2. Carefully remove the handle cover.
3. Remove the handle mounting screw and washer.
4. Remove the handle from the splined shaft.

INSTALLATION

1. Position the handle to the desired idle position and install it onto the splined shaft.
2. Install the washer onto the screw.
3. Apply Loctite 271 Threadlocker to the screw threads.
4. Install the screw into the splined shaft. Tighten the screw to the specified torque.
5. Install the throttle handle cover.



Tube Ref No.	Description	Where Used	Part No.
 7	Loctite 271 Threadlocker	Control handle screw	92-809819

Description	Nm	lb. in.	lb. ft.
Control handle screw (M8 x 25)	27.1		20

Notes:

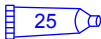
Zero Effort Controls

Section 10A - Non-DTS Quadrant Controls

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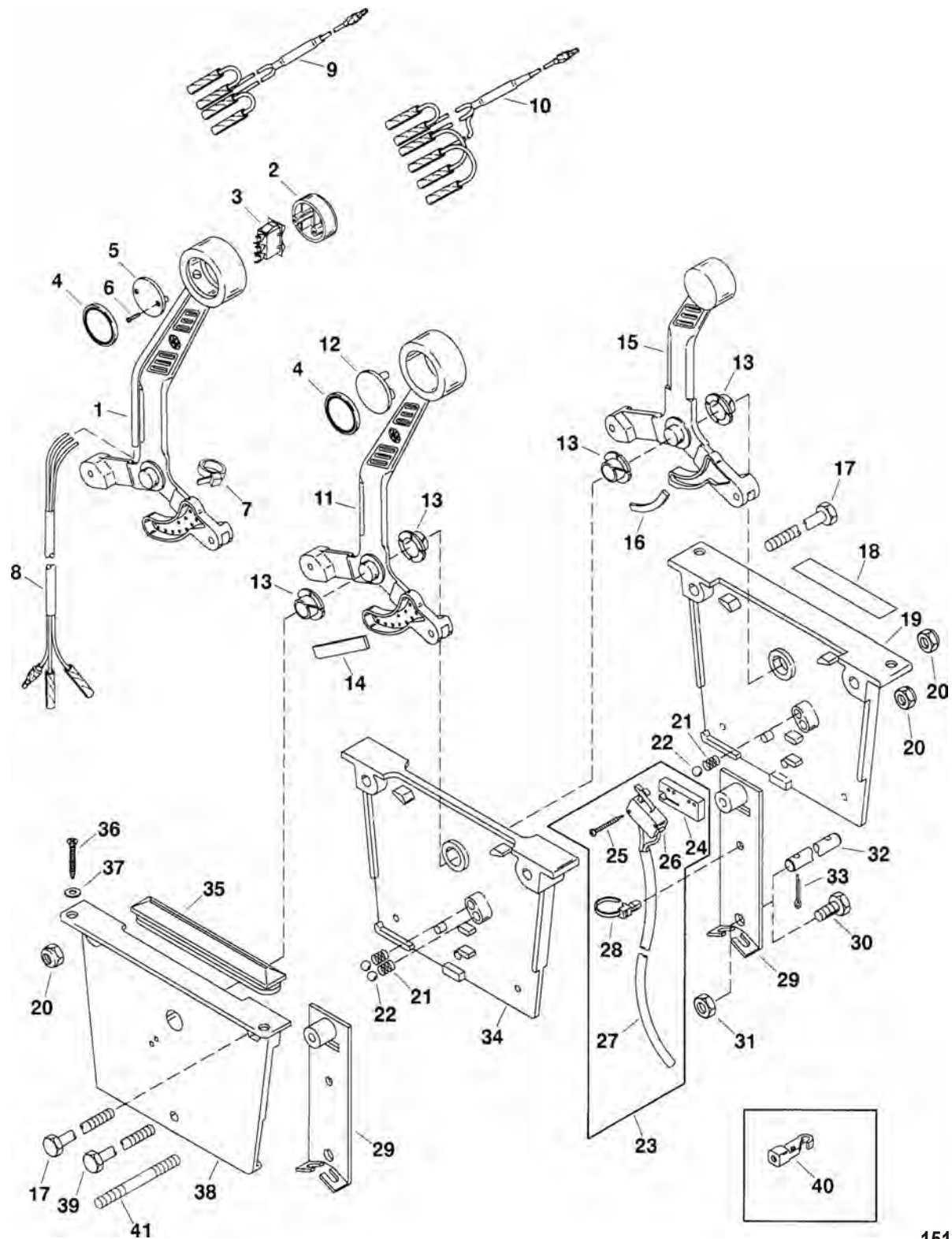
Quadrant Control Components.....	10A-4	Quadrant Control Removal and Installation	
Non-DTS Quadrant Control Installation			10A-10
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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch wires	92-25711-3
 34	Special Lubricant 101	Quadrant control housing near the shift and throttle lever pivot, and detent balls	92-802865A1
		Throttle and shift lever pivot bushings	

Notes:

Quadrant Control Components



15106

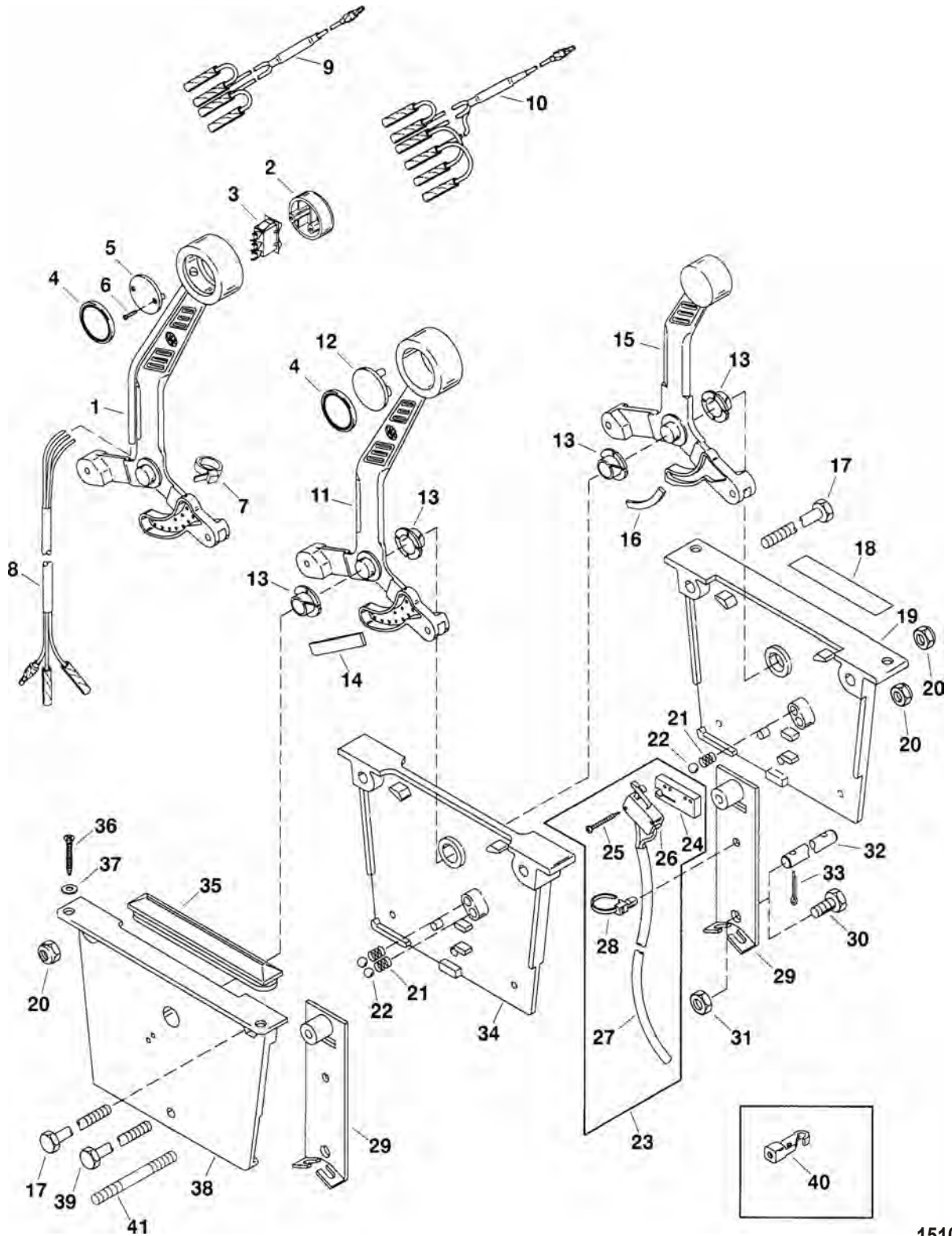
Quadrant Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Lever			
2	1	Trim switch cover			
3	1	Trim switch			
4	1/8	Emblem			
5	1	Backplate			
6	2	Screw			
7	1	Cable tie			
8	1	Trim switch harness			
9	1	Dual engine diode kit			
10	1	Triple engine diode kit			
11	1/4	Lever (non-trim)			
12	2/8	Throttle lever insert			
13	2/12	Bushing			
14	1/4	Slide			
15	1/4	Lever			
16	1/4	Slide			
17	2	Screw			
18	1	Shift warning decal			
19	1	Housing			
20	2/4	Nut			
21	2/9	Spring			
22	1/9	Ball			
23	1/4	Switch assembly			
24	1	Switch mounting block			
25	2	Screw			
26	1	Switch			
27	1	Switch wire assembly			
28	1	Cable tie			
29	1/6	Bracket			
30	1	Screw			
31	1	Nut			
32	1	Cable anchor pin			
33	2	Cotter pin			
34	1	Housing			
35	1/5	Boot			
36	4	Screw			
37	4	Washer			
38	1	Housing			
39	1	Screw			
40	1/6	Control cable clevis			

Non-DTS Quadrant Controls

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
41	1	Stud			

Quadrant Control Components

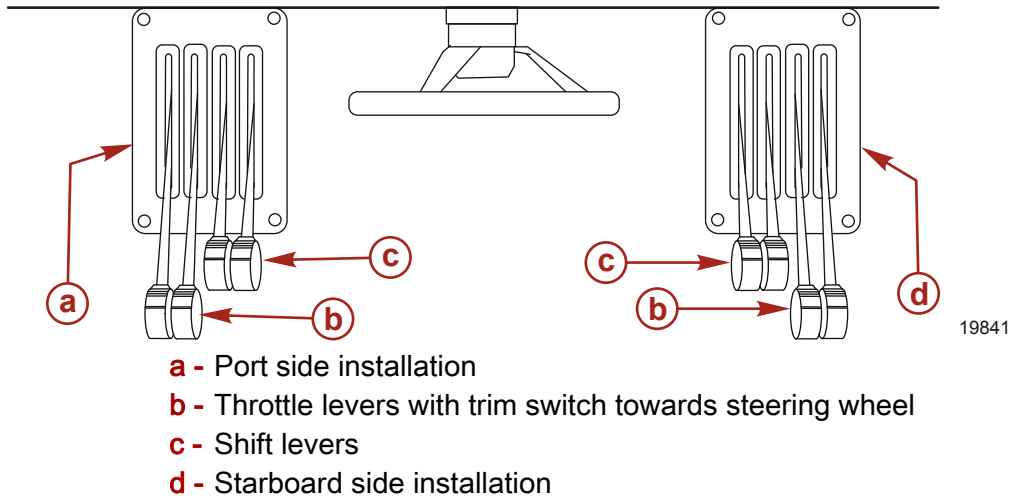


15106

Non-DTS Quadrant Control Installation Instructions

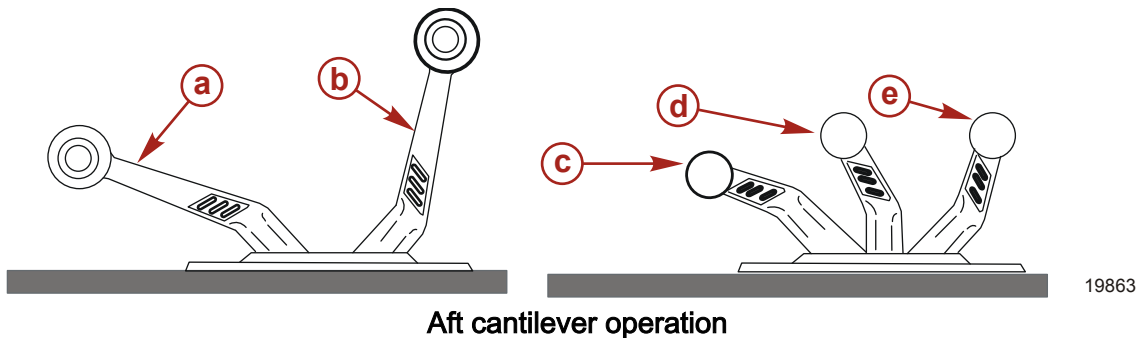
Choosing a Quadrant Control Location

- The location for the quadrant control must provide the operator a comfortable and controlling position during operation while allowing sufficient hand and shift/throttle lever clearances without interference.
- The location must allow the control cables to be routed without binding or interference.
- The trim switch in the handle must be located on the steering wheel side of the control.
- The quadrant control is typically positioned so the shift lever (short lever) is located close to the steering wheel.

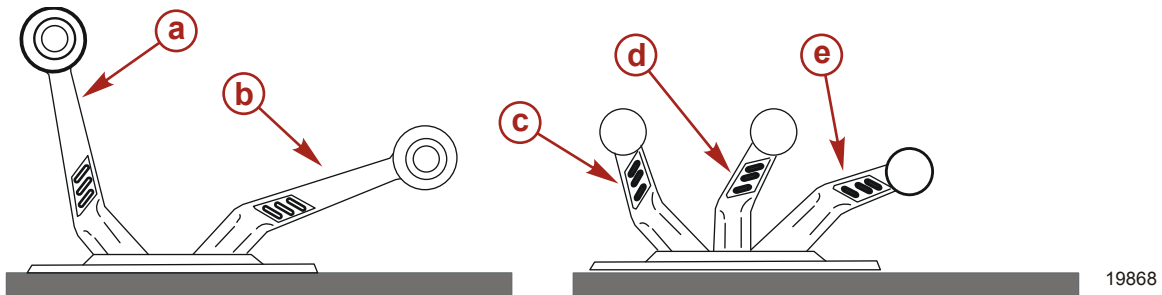


Choosing a Quadrant Control Operation

The quadrant control can be installed as a forward cantilever (forward cant) or an aft cantilever (aft cant) operation. Choose the type of cantilever operation best suited for the available clearance and application.



Aft cantilever operation

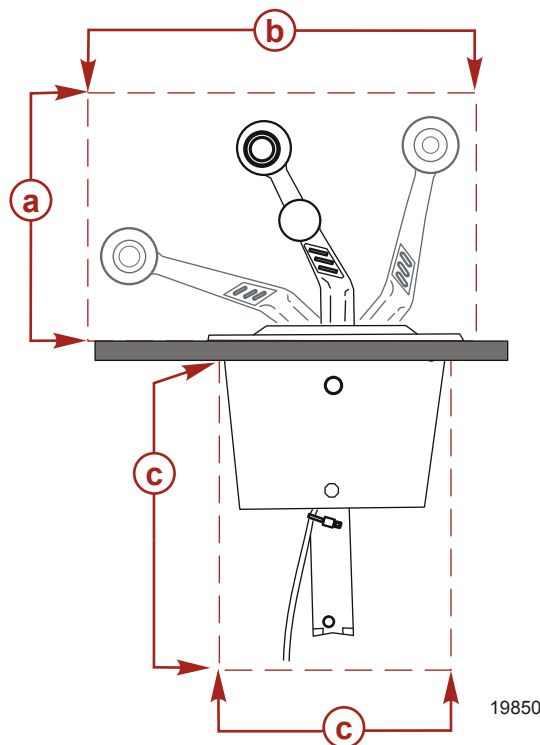


Forward cantilever operation

- a** - Throttle lever at idle
- b** - Throttle lever at WOT
- c** - Shift lever in reverse
- d** - Shift lever in neutral
- e** - Shift lever in forward

Quadrant Control Clearances

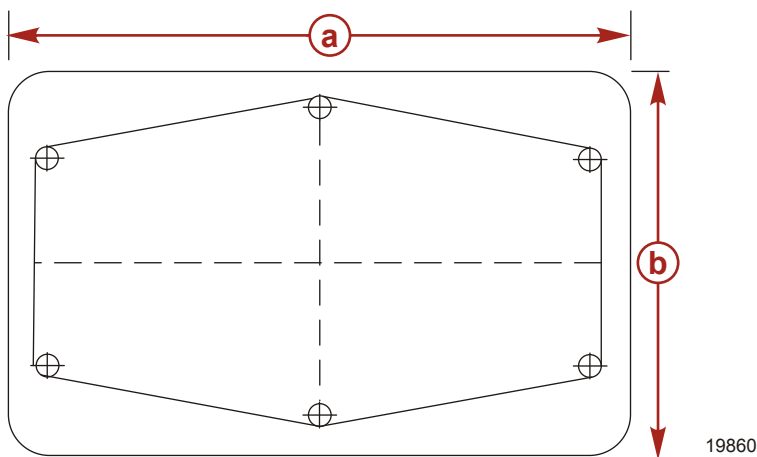
- Ensure there is enough hand clearance for the throttle lever at its maximum height from the control mounting surface. An approximate clearance from the control mounting surface to the maximum height of the throttle lever is 210 mm (8.25 in.).
- Ensure there is enough hand clearance for the throttle and shift levers when moved to idle, full throttle, reverse gear, and forward gear. An approximate clearance when the throttle and shift levers are move to the maximum aft position and to the maximum forward position is 355 mm (14 in.).
- Route the control cables with a smooth radius bend. Do not allow interference of the cable movement during the maximum aft position through the maximum forward position.



- a** - Minimum height approximate clearance 210 mm (8.25 in.)
- b** - Maximum aft position and forward position approximate clearance 355 mm (14 in.)
- c** - Unrestricted area for cable movement

Quadrant Controls Minimum Required Flat Surface Mounting Area

The following graphic and dimension table indicate the minimum requirements for mounting the various quadrant controls to a ridged flat surface.



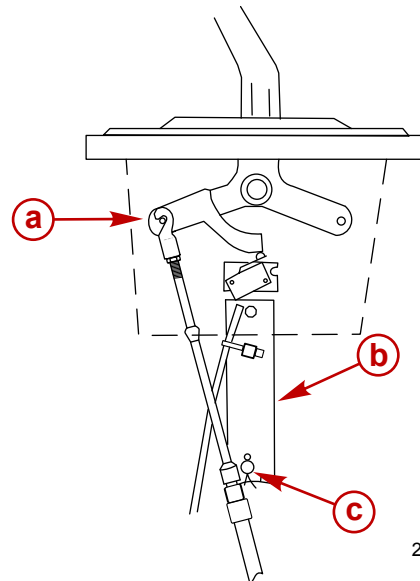
Quadrant Controls Minimum Required Flat Surface Mounting Area Dimensions		
a	Flat area length required for all controls	210 mm (8.25 in.)
b	Flat area length required for a single lever installation	64 mm (2.5 in.)
	Flat area length required for a dual lever installation	89 mm (3.5 in.)
	Flat area length required for a three lever installation	114 mm (4.5 in.)
	Flat area length required for a four lever installation	137 mm (5.38 in.)
	Flat area length required for a five lever installation	159 mm (6.25 in.)
	Flat area length required for a six lever installation	184 mm (7.25 in.)

Quadrant Control Removal and Installation

REMOVAL

1. Place the remote control handle in the neutral detent position. Note the position of the handle for reassembly.
2. Remove and retain the screws and nylon washers securing the remote control to the mounting surface.
3. Remove the remote control assembly from the console.
4. Disconnect the harness connections from the remote control.
5. Remove the cotter pins securing the retaining pins to the standoff bracket.

- Rotate the cable clevis end and disconnect the throttle and shift cables from the control levers.

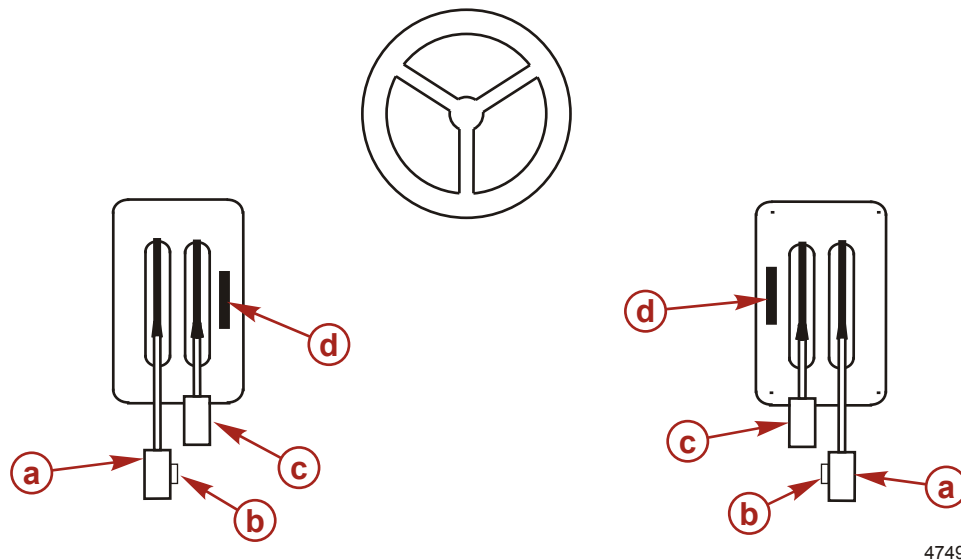


a - Cable clevis
b - Standoff bracket

c - Cotter pin securing the retaining pins to the standoff bracket

INSTALLATION

- Ensure that the control is positioned so the forward-neutral-reverse ("F-N-R") label is in the correct orientation.

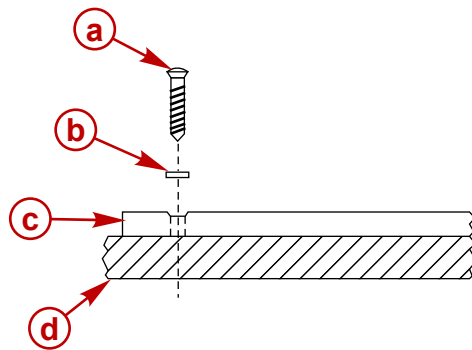


a - Throttle lever
b - Trim switch
c - Shift lever
d - Forward-neutral-reverse "F-N-R" label

⚠ CAUTION

Avoid possible corrosion damage. Always install the nylon washer between each screw and the control plate. Improper installation may result in chipped paint, triggering corrosion.

- Secure the control to the console using the screws and nylon washers.



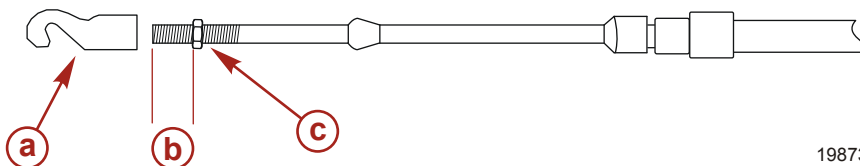
4764

- a** - 8 x 1-1/4 in. self tapping screw
- b** - Nylon washer
- c** - Control quadrant assembly
- d** - Console

Quadrant Control Cable Installation

NOTE: All Non-DTS Zero Effort quadrant controls require the use of Morse 33C control cables.

- Determine if the throttle and shift cable is a push or pull operation. The shift cable operation is determined by the direction going into forward gear. The throttle cable direction is determined by the direction of the cable moving towards WOT.
- Guide the control cables up and through the console far enough so the cables can be connected to the quadrant control.
- Ensure the jam nut is on the cable threaded end.
- Install the clevis end onto the throttle and shift cable. Ensure the clevis engages the threads of the cable a minimum of 9.5 mm (0.375 in.). Tighten the jam nut securely to the clevis.

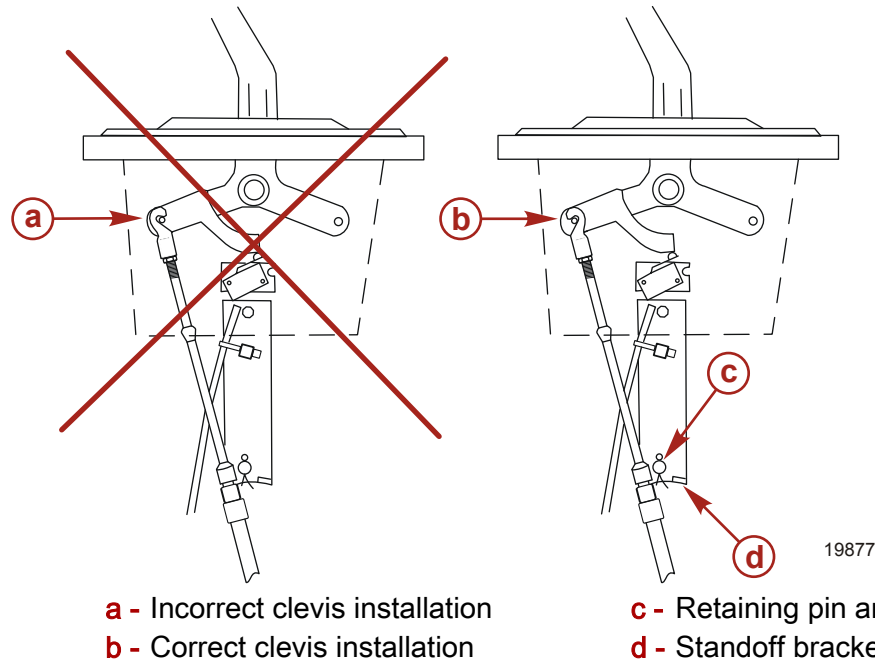


19873

- a** - Clevis
- b** - Minimum thread engagement 9.5 mm (0.375 in.)
- c** - Jam nut

- Install the clevis onto the control lever pin. The clevis opening must face towards the outside of the control housing.
- Install the cable onto the standoff bracket.
- Secure the cable to the standoff bracket.

8. Install the retaining pin through the standoff bracket. Secure the retaining pin with a cotter pin.



9. Install plastic washers onto the quadrant control mounting screws. Secure the quadrant control to the console with the screws and washers.
10. Connect an ohmmeter to the two wires coming from the neutral start safety switch.
11. Check the neutral start safety switch operation.
- Ensure the shift lever is in neutral. The ohmmeter must show a closed circuit indicating continuity.
 - Place the shift lever into forward. The ohmmeter must show an open circuit indicating no continuity.
 - Place the shift lever into reverse. The ohmmeter must show an open circuit indicating no continuity.
12. Connect the neutral start safety switch between the key switch start circuit and the engine starter solenoid exciter wire.

⚠ WARNING

Avoid serious injury or death from a sudden unexpected acceleration when starting the engine. The neutral start safety switch must be correctly connected to prevent engine startup when in gear. Refer to wiring diagrams for correct wiring connections.

13. Secure the neutral start safety switch connection to the key switch and the engine starter solenoid exciter wire with solder or with a screw and nut. Cover the neutral start safety switch connection with Liquid Neoprene to protect the connection from corrosion.

Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch wires	92-25711-3

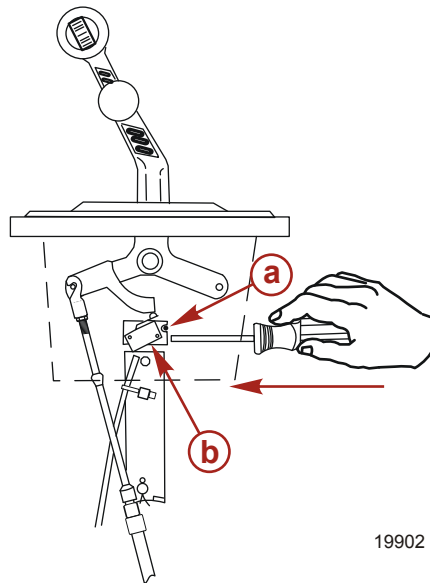
14. Insulate the neutral start safety switch connections with heat shrink tubing or rubber tubing.

15. Ensure the neutral start safety switch wire harness will not contact any sharp object or moving components. Secure the neutral start safety switch wire harness slack with a cable tie.

Quadrant Control Neutral Start Safety Switch Replacement

NOTE: The neutral start safety switch can be removed without the disassembly of the quadrant control.

1. Remove the quadrant control from the console.
2. Use a screwdriver to push on the end of the neutral start safety switch mounting block. The neutral start safety switch mounting block snaps onto a mounting pin on the quadrant control.



19902

a - Mounting pin

b - Neutral start safety switch

3. Remove the wires from the neutral start safety switch. Remove the two screws securing the neutral start safety switch to the mounting block.

NEUTRAL START SAFETY SWITCH INSTALLATION

1. Solder the neutral start safety switch wires to the neutral start safety switch.
2. Cover the neutral start safety switch soldered wires with Liquid Neoprene. Allow the Liquid Neoprene to dry.

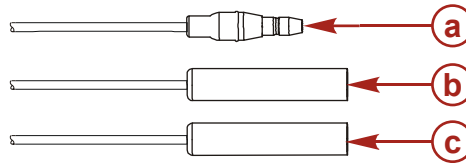
Tube Ref No.	Description	Where Used	Part No.
 25	Liquid Neoprene	Neutral start safety switch wires	92-25711-3

3. Secure the neutral start safety switch to the mounting block with two screws. Do not overtighten the screws securing the neutral start safety switch to the mounting block. Overtightening the screws securing the neutral start safety switch to the mounting block will damage the neutral start safety switch.
4. Snap the neutral start safety switch mounting block onto the mounting pin.
5. Check the neutral start safety switch operation prior to securing the quadrant control to the console.
 - a. Ensure the shift lever is in neutral. Turn the key switch to the "START" position. The starter should turn the engine over.
 - b. Place the shift lever into forward. Turn the key switch to the "START" position. The starter should not turn the engine over.

- Secure the quadrant control to the console with four screws and washers.

Trim Harness Test

To test the trim switch and harness, connect an ohmmeter to the bullet connectors on the trim harness (if equipped) as described below.



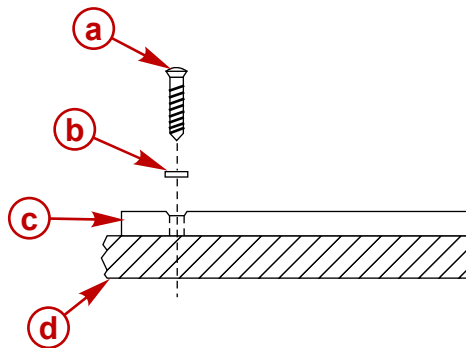
5337

- a** - Power (RED)
- b** - Trim up (BLU/WHT)
- c** - Trim down (GRN/WHT)

Meter Leads		Switch	Reading (Ω)
RED	Black		
RED	GRN/WHT	Trim down	Continuity
RED	BLU/WHT	Trim up	Continuity

Quadrant Control Lever Switch Kit 848924_ _

- Remove and retain the screws and washers securing the quadrant control to the console.

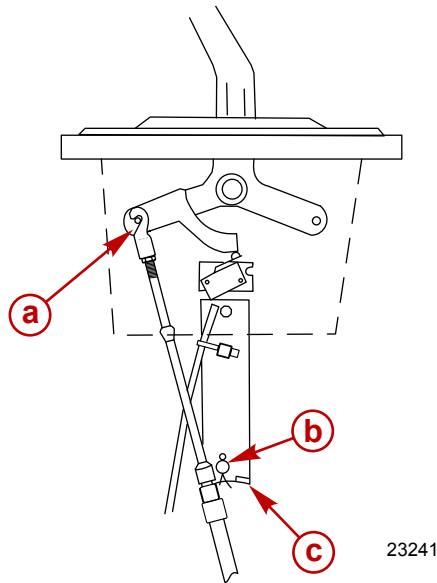


4764

- a** - 8 x 1-1/4 in. self tapping screw
- b** - Nylon washer
- c** - Control quadrant assembly
- d** - Console

- Lift the quadrant control from the console mounting area to gain access to the cable attachments and wiring connections.
- Disconnect the neutral start safety switch connections and the trim switch connections.
- Remove a cotter pin from the retaining pin and remove the cable retaining pin from the standoff brackets.

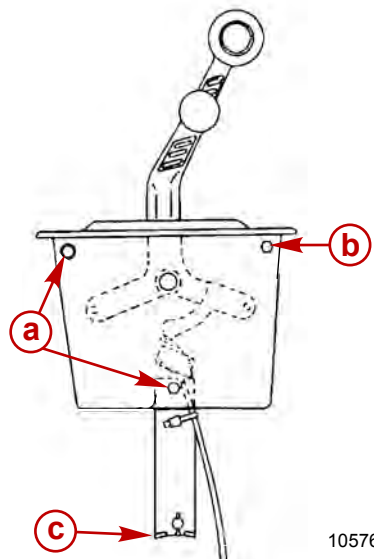
5. Rotate the cable clevis ends and disconnect all cables from the control levers.



- a** - Cable clevis
- b** - Standoff bracket
- c** - Cotter pin securing the retaining pins to the standoff bracket

Quadrant Control Disassembly

1. Position the quadrant control on the side so the standoff tabs are facing up. This position will keep the internal components in place.
2. To ensure the housing sections do not dislodging from one another, remove the nut and bolt from the side of the control which only shows one nut.
3. Remove the nuts from the two remaining bolts. Do not remove the bolts. The bolts will ensure the quadrant control remains in alignment with all internal components.



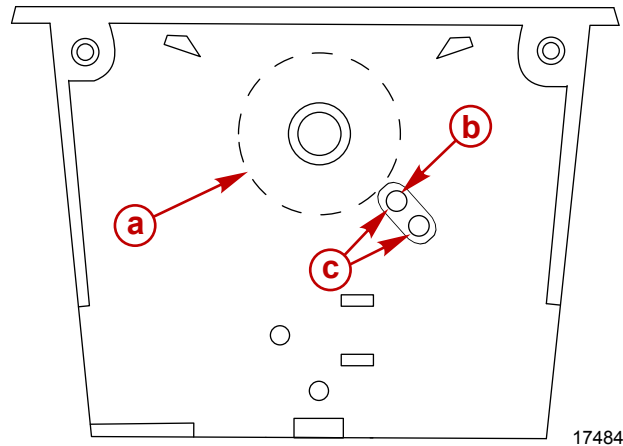
- a** - Remove nuts only
- b** - Remove nut and bolt
- c** - Standoff tabs are facing up

4. Separate the housing sections where the lever is to be replaced.

5. Lift the throttle lever from the housing. Remove and retain the pivot bushings for reinstallation.
6. Remove and retain the rubber boot.

Quadrant Control Reassembly

1. Lubricate the housing around the lever pivot with Special Lubricant 101. This will prevent the trim wires from binding and chafing.
2. Install the correct combination of detent ball and spring relating to the lever that is being installed.
 - The shift lever will have one detent ball and spring located in the top hole of the boss area.
 - The throttle lever will have two detent balls and springs.

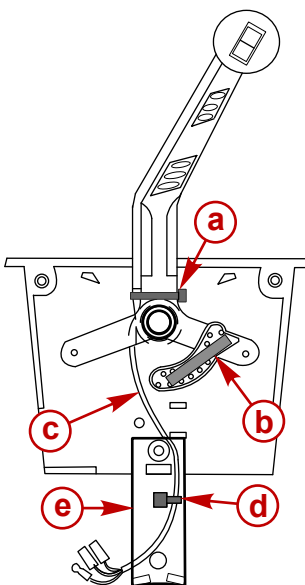


- a** - Lubricate with Special Lubricant 101
- b** - One detent ball and spring for shift lever
- c** - Two detent balls and springs for throttle lever

Tube Ref No.	Description	Where Used	Part No.
 34	Special Lubricant 101	Quadrant control housing near the shift and throttle lever pivot, and detent balls	92-802865A1

3. Lubricate the lever pivot bushings with Special Lubricant 101. Install the lever pivot bushings into the quadrant control housing.
4. Remove the rub bar from the old throttle lever and install the rub bar into the pocket of the new throttle lever.
5. Coil the trim switch wire around the pivot boss of the throttle lever. Ensure there is adequate slack in the trim switch wire to prevent binding when the lever is moved through its full range. Install the throttle lever onto the quadrant control housing.

6. Secure the trim switch wires to the standoff bracket.

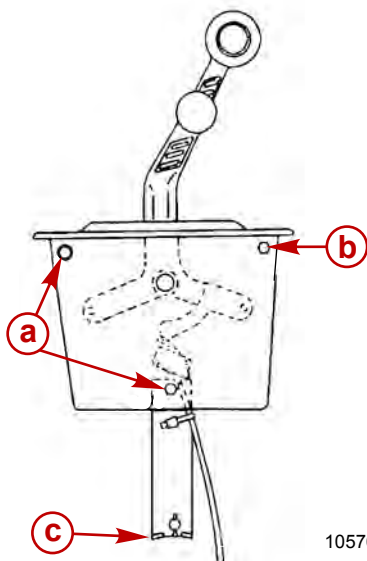


17503

- a** - Cable tie securing the trim switch wires
- b** - Rub bar
- c** - Trim switch wires
- d** - Cable tie securing the trim switch wires to the standoff bracket
- e** - Standoff bracket

Tube Ref No.	Description	Where Used	Part No.
 34	Special Lubricant 101	Throttle and shift lever pivot bushings	92-802865A1

7. Carefully assemble the quadrant control housings together.
8. Secure the quadrant control housings together with the nuts and bolts.



10576

- a** - Nuts removed during the disassembly process
- b** - Nut and bolt removed during the disassembly process
- c** - Standoff tabs are facing up

Zero Effort Controls

Section 10B - DTS Zero Effort Controls

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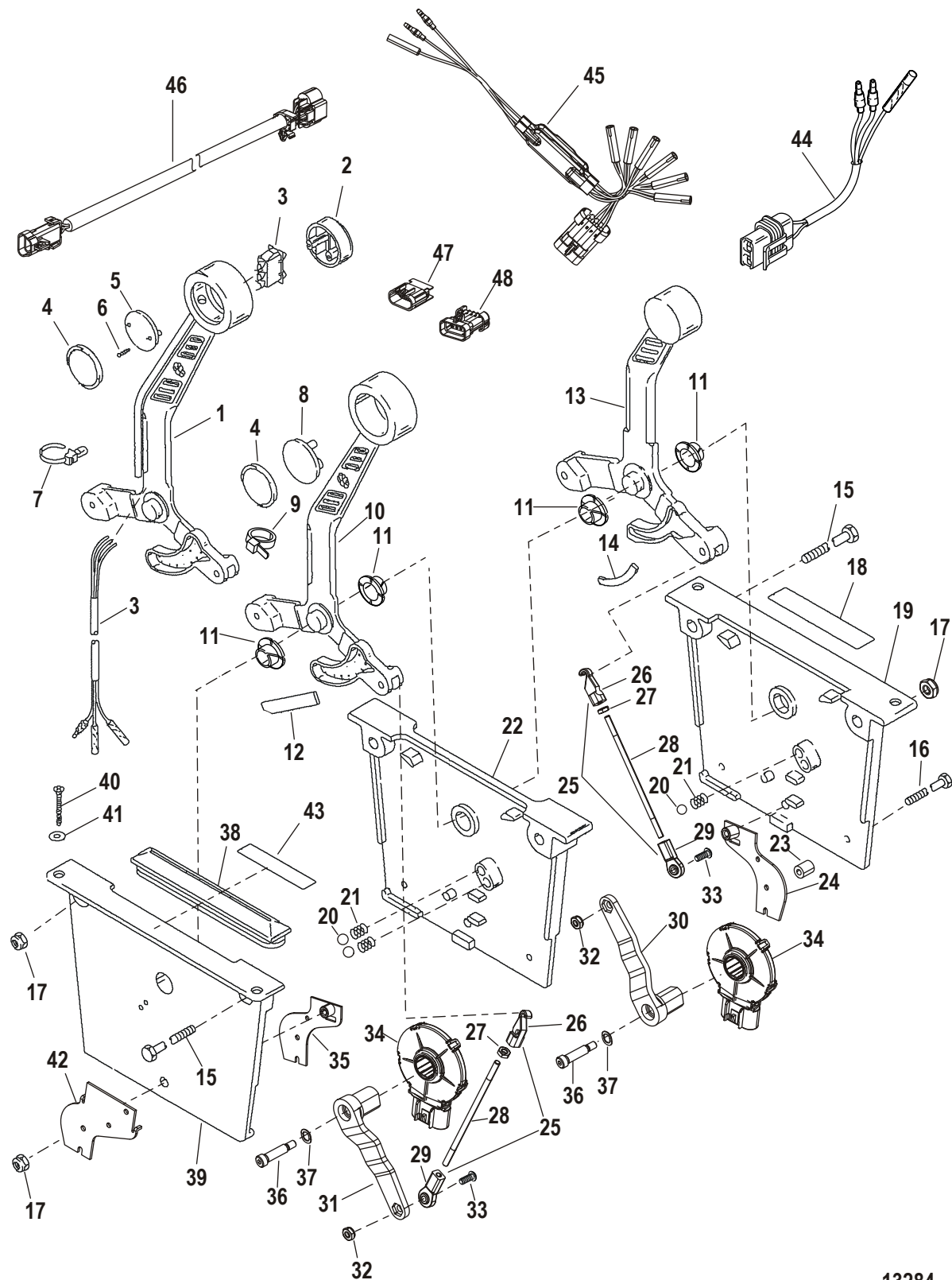
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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 34	Special Lubricant 101	Raised center hole and nylon liner	92-802865A1
		Raised boss, liner, detent ball tracks, and nylon slide	
		Raised center boss and nylon liner	
		Detent ball track	
		Raised boss and slide	
 131	Anti-seize Compound	All bolt threads	Obtain Locally

Notes:

Zero Effort Control Components



13284

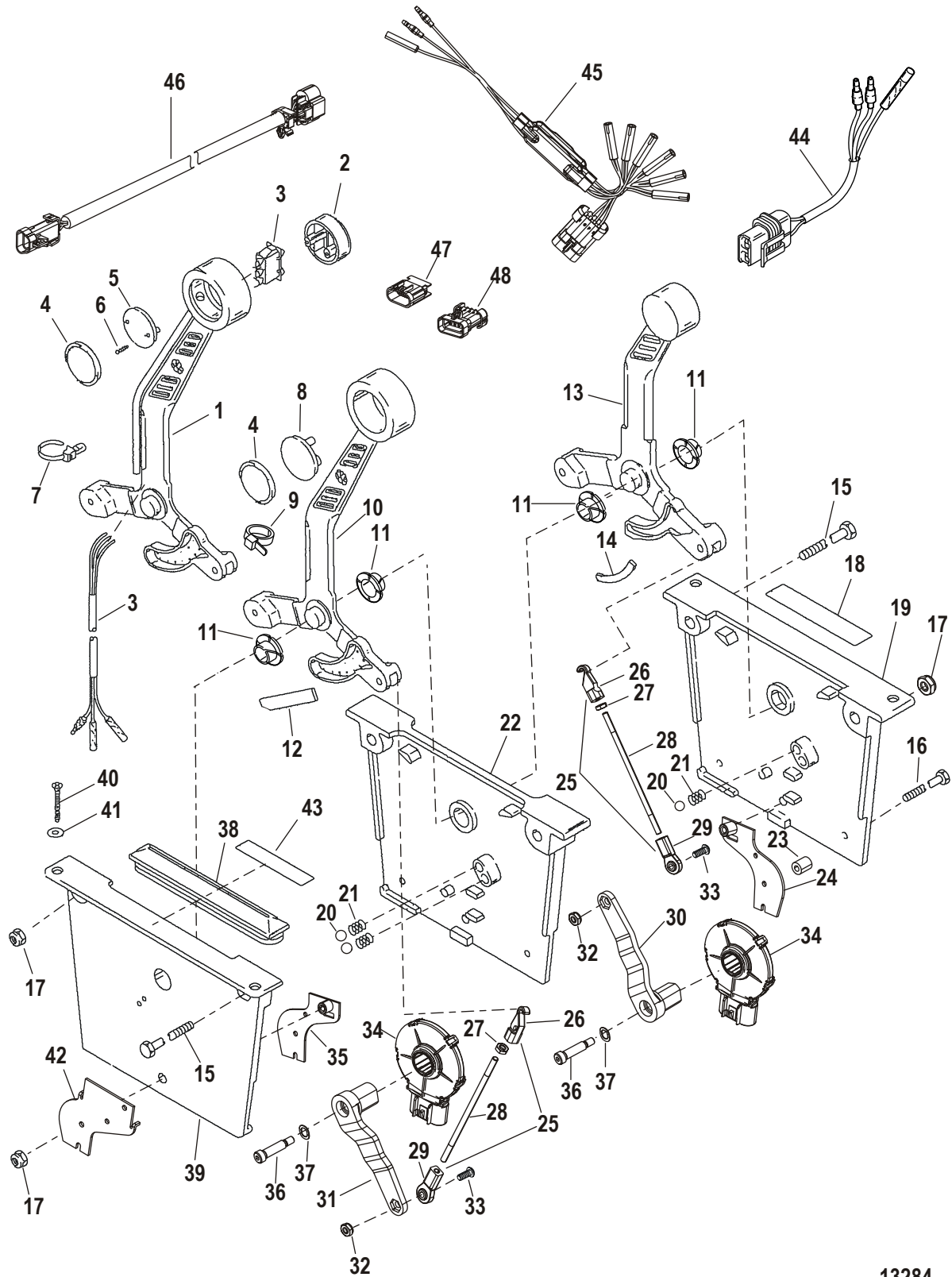
Zero Effort Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Lever assembly - Throttle			
2	1	Trim switch assembly			
3	1	Trim switch			
4	1	Emblem - Throttle lever			
5	1	Backplate			
6	2	Screw (4 x 0.620)			
7	1	Cable tie			
8	2	Locking insert - Throttle lever			
9	1	Cable tie (5.50 in.)			
10	1	Throttle lever			
11	3	Bushing			
12	1	Slide - Throttle lever			
13	1	Shift lever			
14	1	Slide - Shift lever			
15	2	Screw (0.250-20 x 1.75)			
16	1	Screw (0.250-20 x 2.50)			
17	5	Nut			
18	1	Decal - F/N/R			
19	1	Housing			
20	3/4	Ball			
21	3/4	Spring			
22	1	Housing			
23	AR	Spacer			
24	1	Bracket - Starboard			
25	2	Link rod assembly			
26	1	Control cable clevis			
27	1	Nut			
28	1	Link rod			
29	1	Rod end			
30	1	Throttle lever			
31	1	Shift lever			
32	2	Nut			
33	2	Screw (10-32 x 0.580)			
34	2	Throttle/shift sensor			
35	1	Bracket - Port			
36	2	Shoulder screw (0.250-20 x 1.00)			
37	2	Wave washer			
38	2	Boot			
39	1	Housing			
40	4	Screw (8 x 1.250)			

DTS Zero Effort Controls

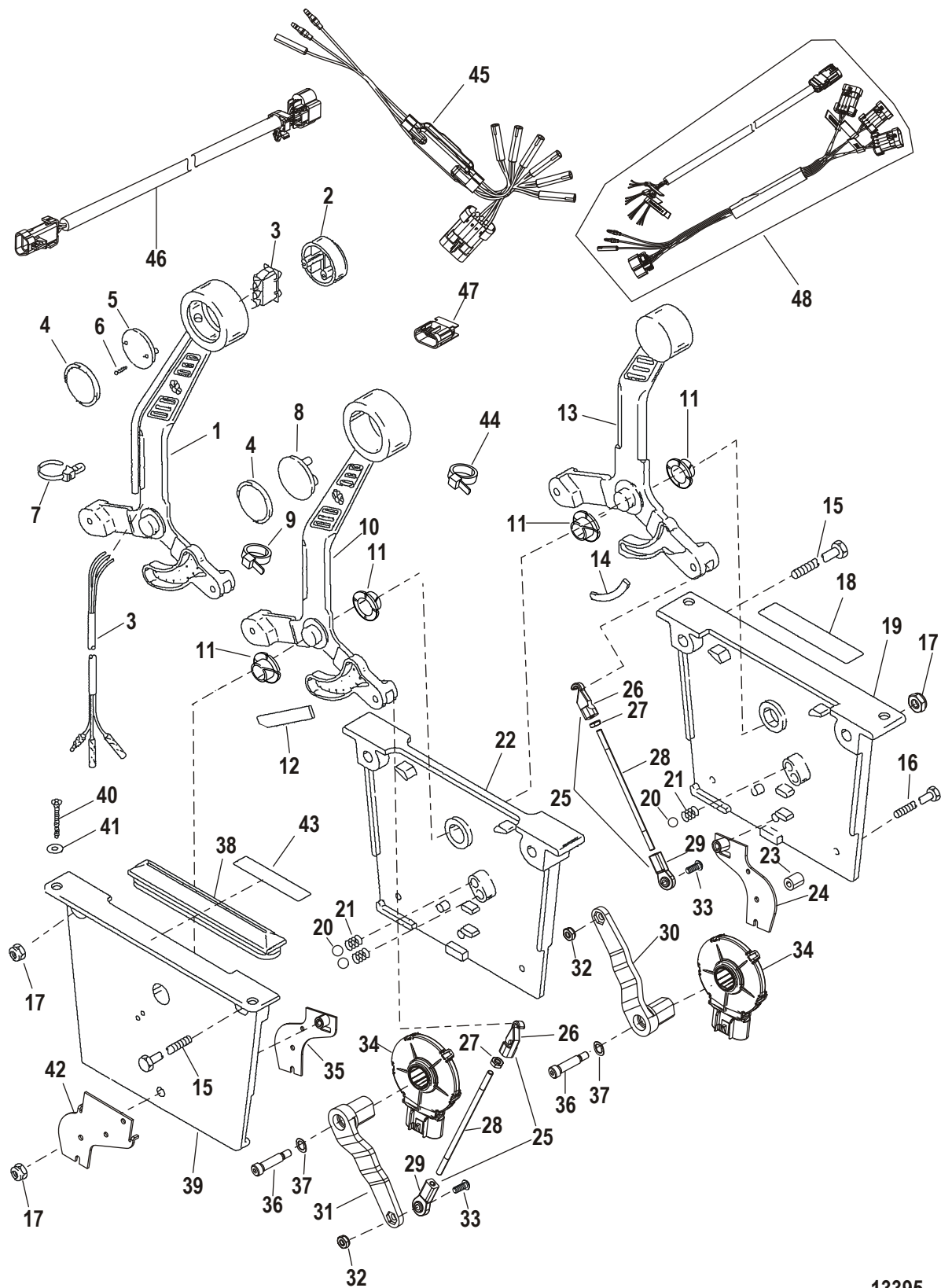
Ref. No.	Qty.	Description	Torque		
			Nm	lb. In.	lb. ft.
41	4	Nylon washer			
42	AR	Bracket - Outer-forward cant			
43	AR	Decal - Shift warning			
44	1	Harness assembly - Trim switch adapter			
45	1	Diode kit - Trim			
46	1	Harness assembly - Lever			
47	1	Connector assembly - 12-way (male)			
48	1	Connector assembly - Weather cap (2 pin male)			

Zero Effort Control Components



13284

Zero Effort DTS Four Lever Control Components



13395

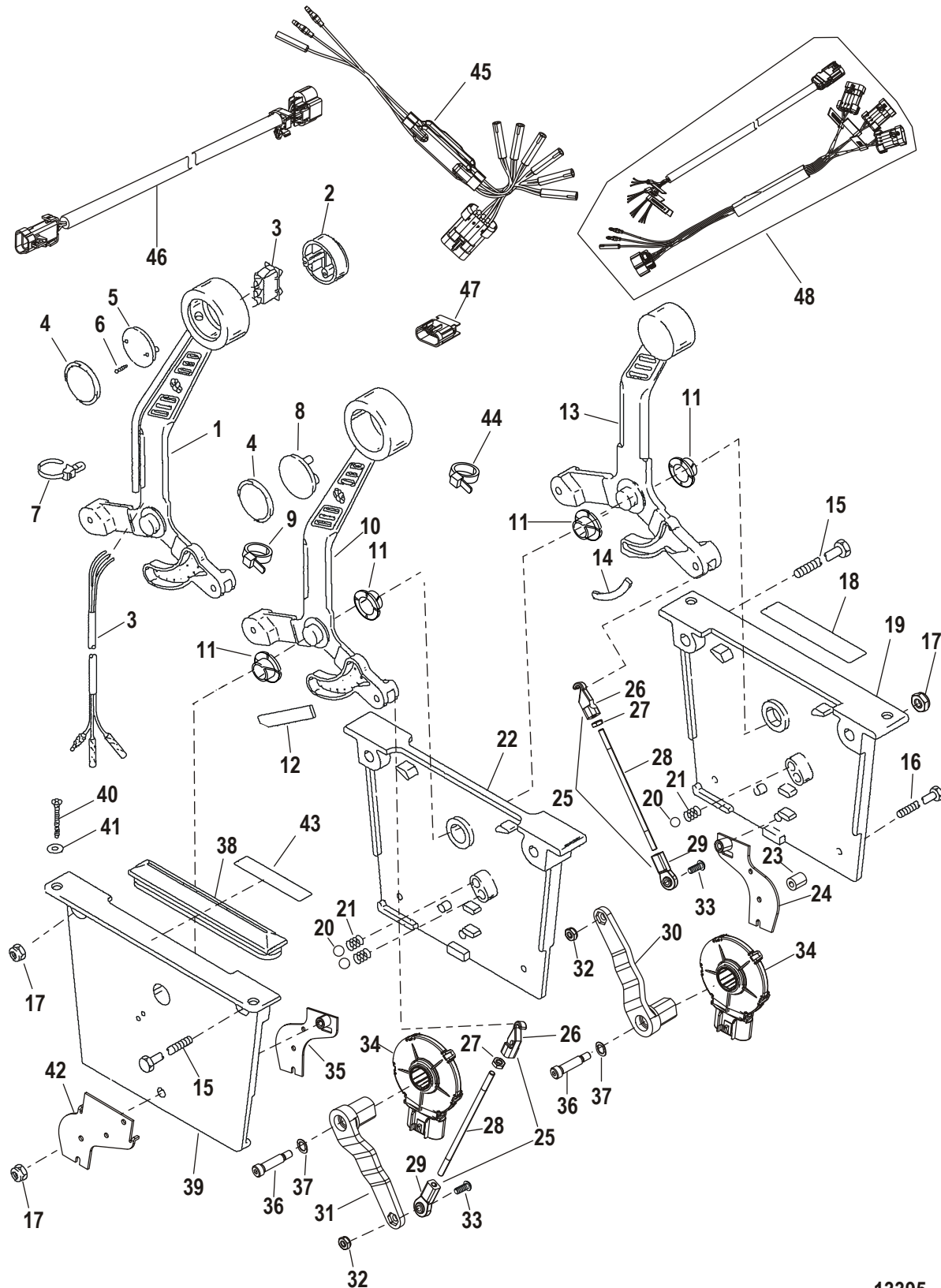
Zero Effort DTS Four Lever Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Throttle lever assembly			
2	1	Trim switch cover			
3	1	Trim switch			
4	1	Emblem			
5	1	Backplate			
6	2	Screw			
7	1	Cable tie			
8	2	Insert			
9	1	Cable tie			
10	1	Lever			
11	8	Bushing			
12	2/5	Slide			
13	1/2	Lever			
14	2/4	Slide			
15	2	Screw			
16	2	Screw			
17	7	Nut			
18	1	Shift decal			
19	1	Housing			
20	4/8	Ball			
21	4/8	Spring			
22	3	Housing			
23	1	Spacer			
24	2	Starboard bracket			
25	4	Link rod assembly			
26	1	Cable control clevis			
27	1	Nut			
28	1	Link rod			
29	1	Rod end			
30	2	Throttle lever			
31	2	Shift lever			
32	4	Nut			
33	4	Screw			
34	4	Sensor			
35	2	Port bracket			
36	4	Shoulder screw			
37	4	Wave washer			
38	4	Boot			
39	1	Housing			
40	4	Screw			

DTS Zero Effort Controls

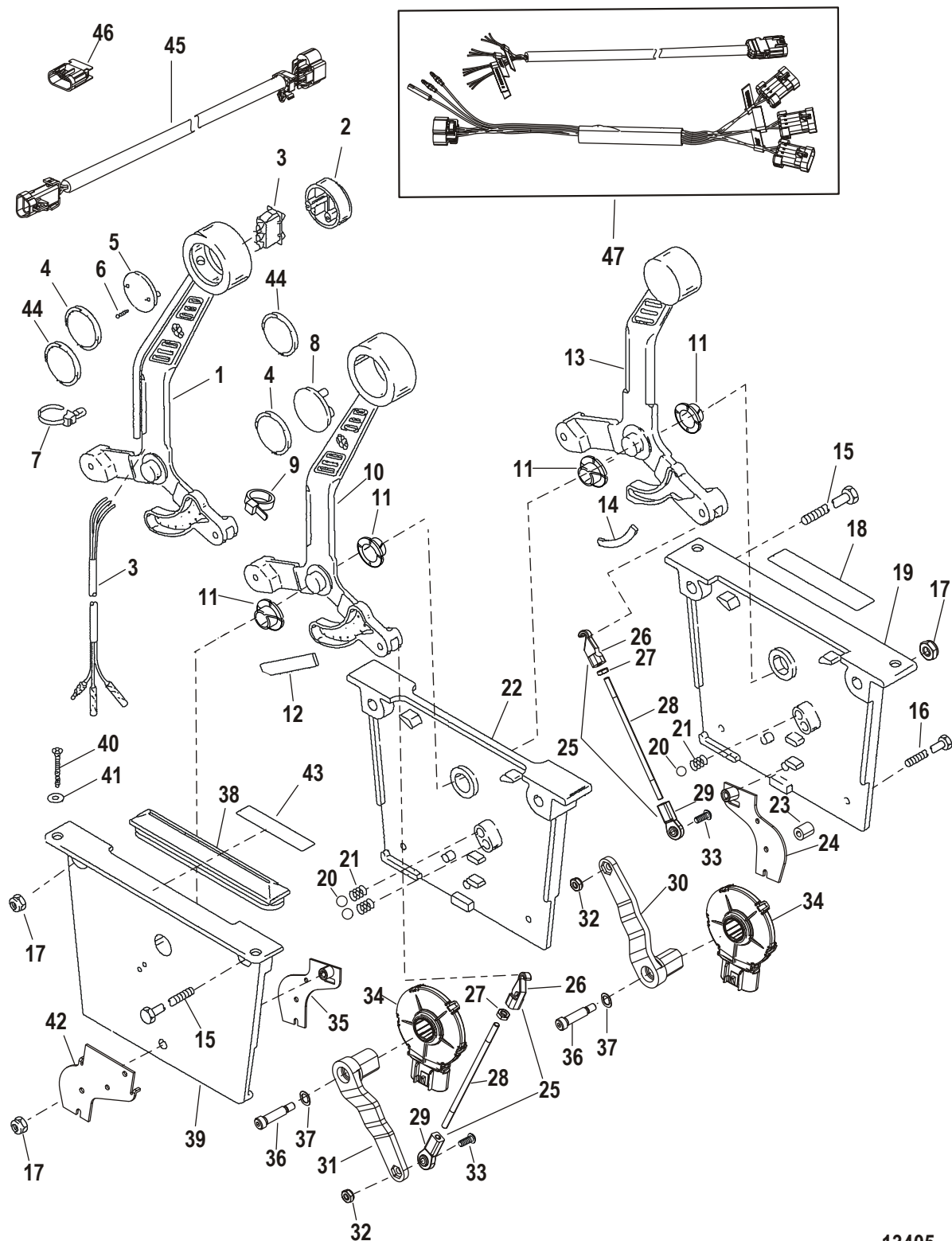
Ref. No.	Qty.	Description	Torque		
			Nm	lb. In.	lb. ft.
41	4	Nylon washer			
42	1	Bracket			
43	AR	Shift warning decal			
44	2	Cable tie			
45	1	Trim diode kit			
46	1	Lever harness assembly			
47	1	12-way (male) connector assembly			
48	1	Quad engine trim harness kit			

Zero Effort DTS Four Lever Control Components



13395

Zero Effort DTS Six Lever Control Components



13405

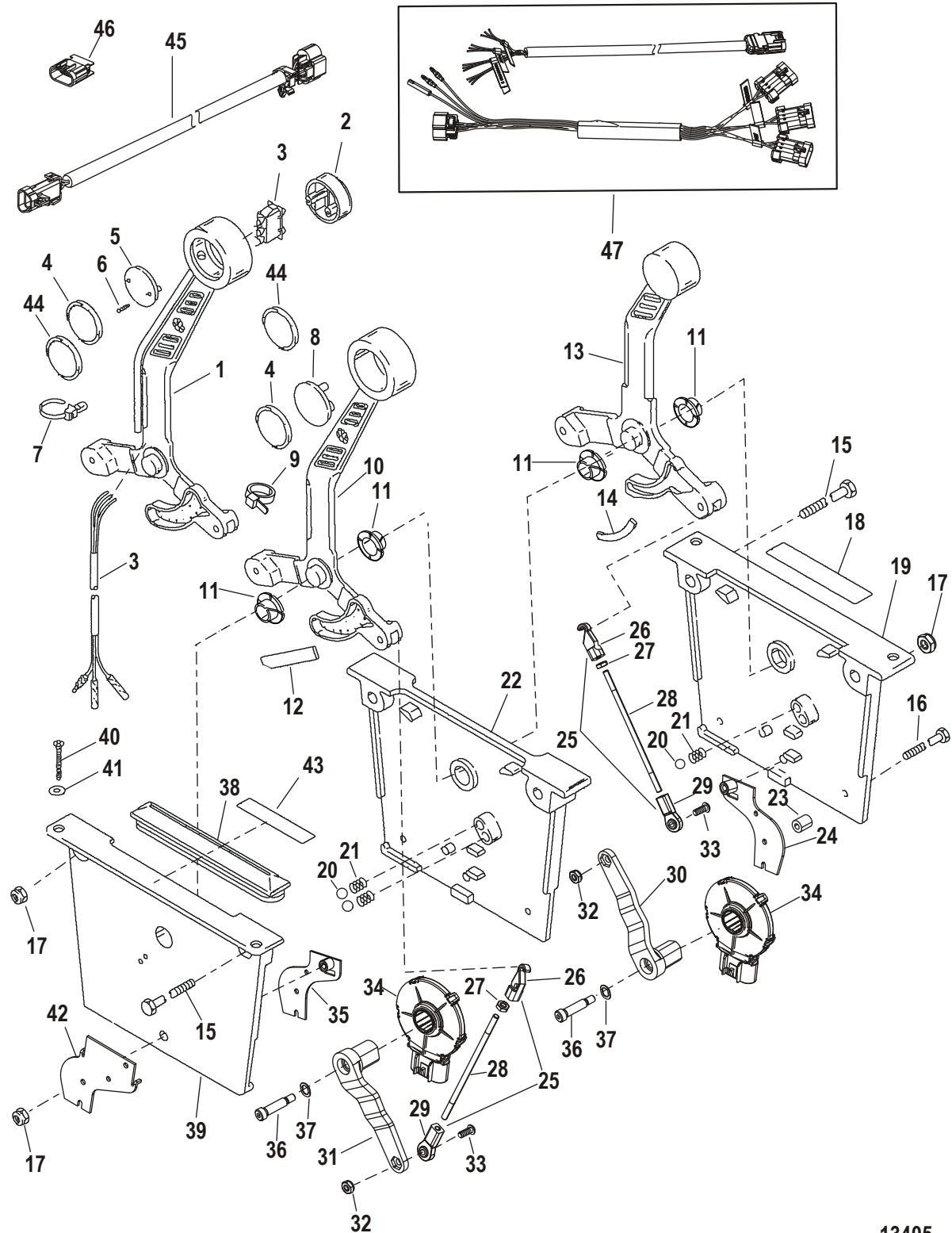
Zero Effort DTS Six Lever Control Components

Ref. No.	Qty.	Description	Torque		
			Nm	lb. in.	lb. ft.
1	1	Throttle lever assembly			
2	1	Trim switch cover			
3	1	Trim switch			
4	1	Emblem			
5	1	Backplate			
6	2	Screw			
7	1	Cable tie			
8	4	Insert			
9	2	Cable tie			
10	2	Throttle lever			
11	12	Bushing			
12	3	Slide			
13	2/3	Shift lever			
14	3	Slide			
15	2	Screw			
16	1	Screw			
17	6	Nut			
18	1	Shift decal			
19	1	Housing			
20	9	Ball			
21	9	Spring			
22	5	Housing			
23	1	Spacer			
24	3	Starboard bracket			
25	6	Link rod assembly			
26	1	Control cable clevis			
27	1	Nut			
28	1	Link rod			
29	1	Rod end			
30	3	Throttle lever			
31	3	Shift lever			
32	6	Nut			
33	6	Screw			
34	6	Sensor			
35	2/3	Port bracket			
36	6	Shoulder screw			
37	6	Wave washer			
38	6	Boot			
39	1	Housing			
40	4	Screw			

DTS Zero Effort Controls

Ref. No.	Qty.	Description	Torque		
			Nm	lb. In.	lb. ft.
41	4	Nylon washer			
42	1	Bracket			
43	AR	Shift warning decal			
44	AR	Emblem			
45	1	Lever harness assembly			
46	1	12-way (male) connector assembly			
47	1	Triple engine trim harness assembly			

Zero Effort DTS Six Lever Control Components



13405

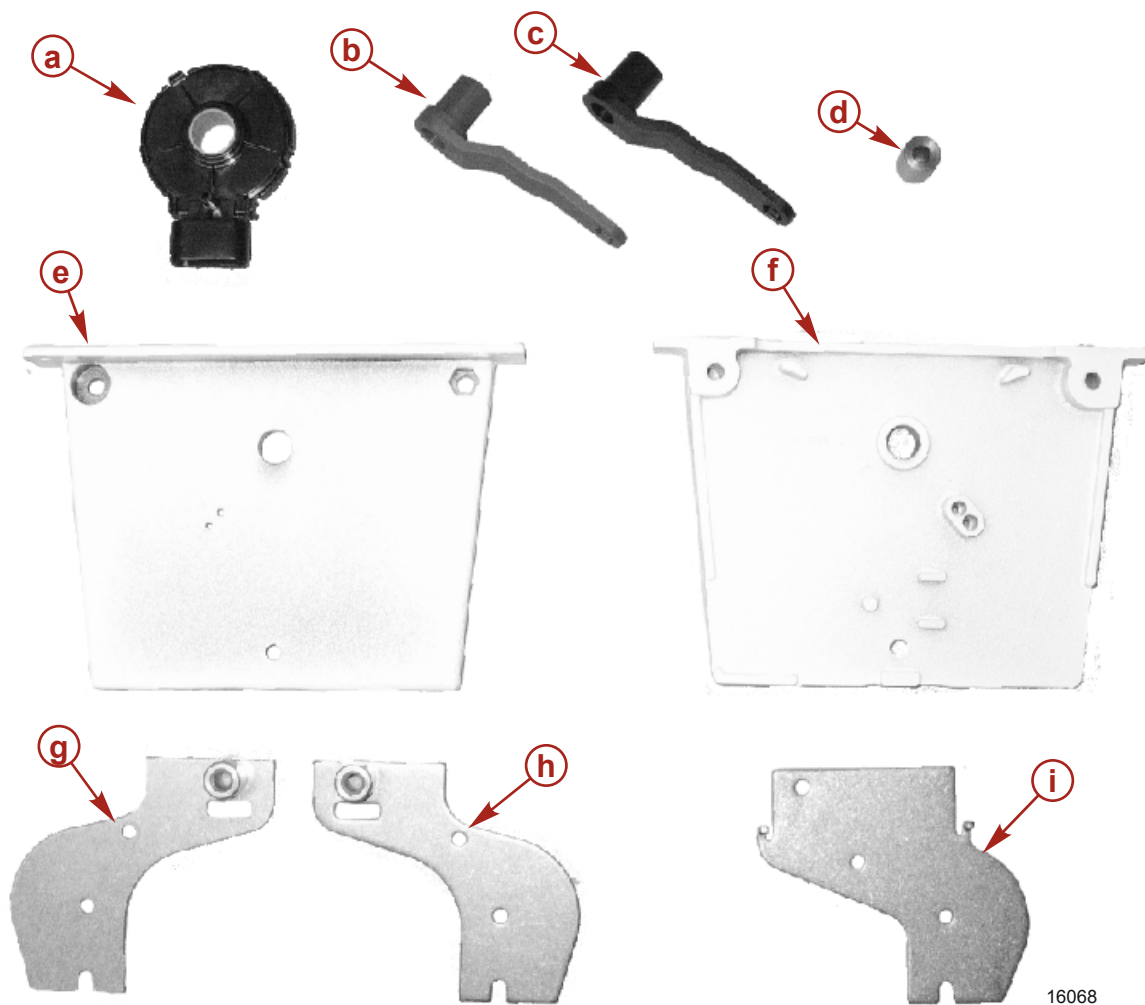
Zero Effort Console Removal and Installation

Removal

1. Place the remote control handle in neutral detent position. Note position of handle for reassembly.
2. Remove four screws and nylon washers securing the remote control.
3. Remove the remote control assembly from the console.
4. Disconnect the harness connections from the control.

Assembly Guidelines

NOTE: Zero Effort controls are modular in design and can be assembled to suit many possible configurations (aft cant, forward cant, two-lever, three-lever, etc.), which affect how the controls are assembled. The following instructions depict a forward cant, two-lever, throttle and shift configuration. Use these instructions as a guide to assemble custom configurations.



- a - Potentiometer
- b - Throttle lever (red)
- c - Shift lever (black)
- d - Spacer
- e - Outer plate

- f - Inner plate
- g - Port bracket
- h - Starboard bracket
- i - Outer bracket

Assembly instructions vary depending on the number and placement of controls. That is, assembly for an aft cant throttle and shift configuration differs from a forward cant throttle and shift configuration. The following guidelines should help during assembly of any control configuration:

- If assembling a forward cant configuration, start with a spacer on the outer plate.
- The first bracket to install is always a starboard bracket.
- Alternate starboard and port brackets during installation.
- When installing potentiometers in a forward cant model, place the potentiometer on the back of the bracket.
- When installing potentiometers in an aft cant model, place the potentiometer on the top of the bracket.
- During installation, place the spacer/knob of the bracket down for forward cant models and up for aft cant models.

BRACKETS

There are three brackets used when assembling these controls. These brackets hold the potentiometers in place:

- Starboard bracket - the convex curve (hump) is on the right side (when the spacer/knob is on top).
- Port bracket - the convex curve (hump) is on the left side (when the spacer/knob is on top).
- Outer bracket - the wide bracket with the bent tabs. The outer bracket is only used when assembling a forward cant control.

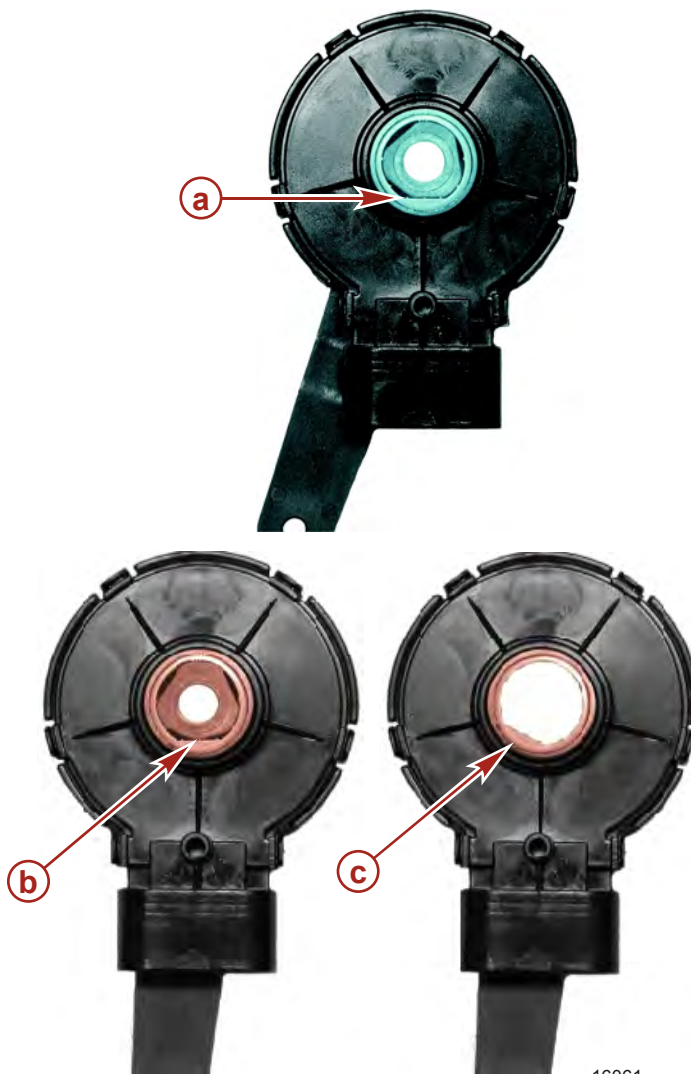
LEVER INSTALLATION

IMPORTANT: The lever orientation is critical for correct operation of the controls.

If replacing a potentiometer and throttle or shift lever:

- When installing throttle or shift levers, ensure the flat on the inner (gray) portion of the potentiometer is parallel with the connector-end of the potentiometer.

- Install the throttle or shift levers so the flat portion of the lever insert is flush with the notched area in the potentiometer.

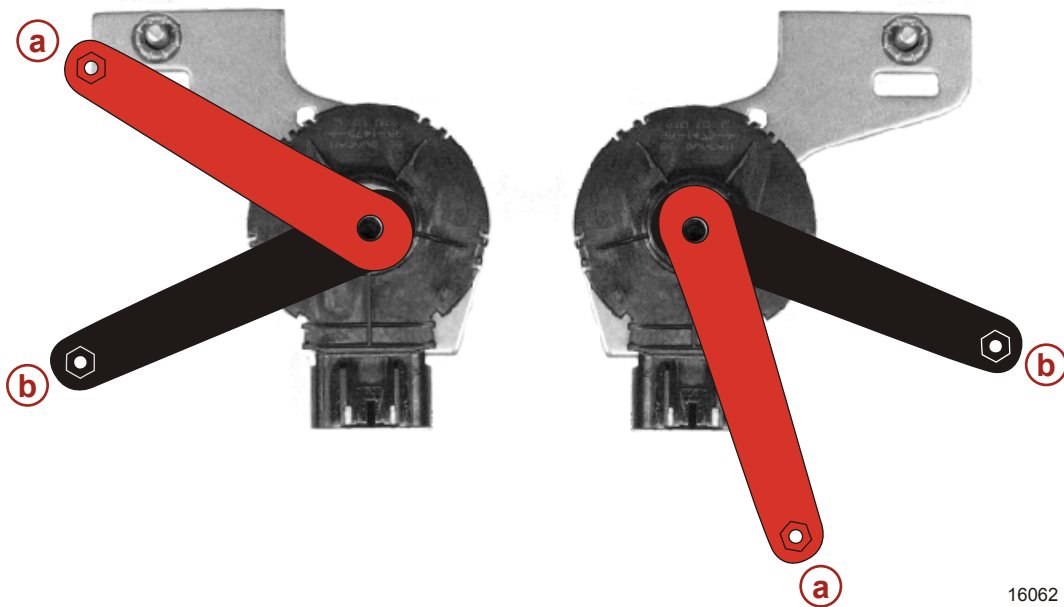


- a** - Correct installation (flat area of insert flush with notch in potentiometer)
- b** - Incorrect installation (insert incorrect)
- c** - Incorrect installation (flat on inner (gray) portion of the potentiometer not parallel with the connector-end of the potentiometer)

Refer to the following guidelines if installing throttle or shift levers into potentiometers:

- If the spacer/knob on the bracket is on the left, use the left side of the installation template as shown.

- If the spacer/knob on the bracket is on the right (with the potentiometer installed), use the right side of the installation template as shown.



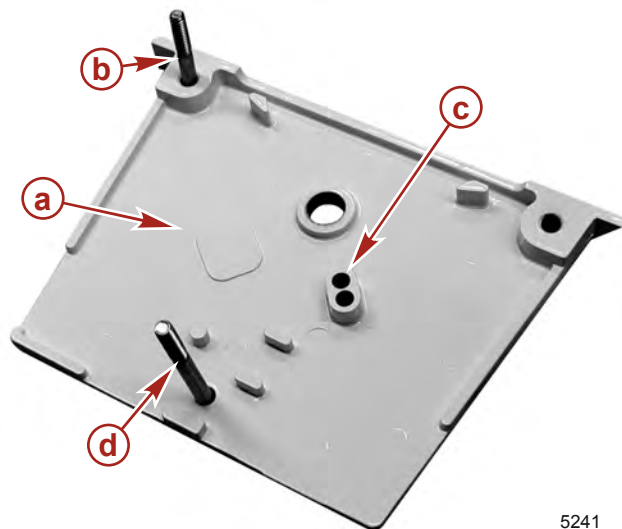
Left side installation

- a** - Throttle lever (red)
b - Shift lever (black)

Right side installation

Assembly

1. Place the outer plate with raised boss facing up on a smooth, clean work surface.
2. Insert one long bolt in the bottom hole, and one short bolt in the upper hexagonal hole as shown.



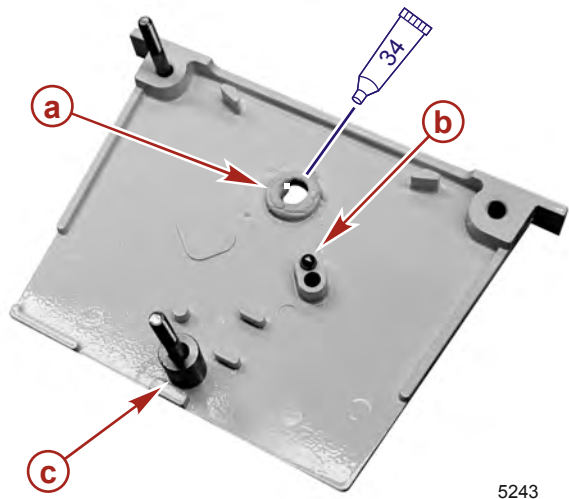
- a** - Outer plate with raised boss
b - Short bolt

- c** - Raised boss
d - Long bolt

NOTE: Bolt sizes vary depending on control configuration.

3. Insert one spring and detent ball in the top hole of the raised boss for the shift lever installation.

- 4. Apply Special Lubricant 101 to the raised center hole in the plate and insert a nylon liner into the hole.
- 5. Apply Special Lubricant 101 to the nylon liner.
- 6. Forward cant models: Place a spacer on the bottom bolt as shown.

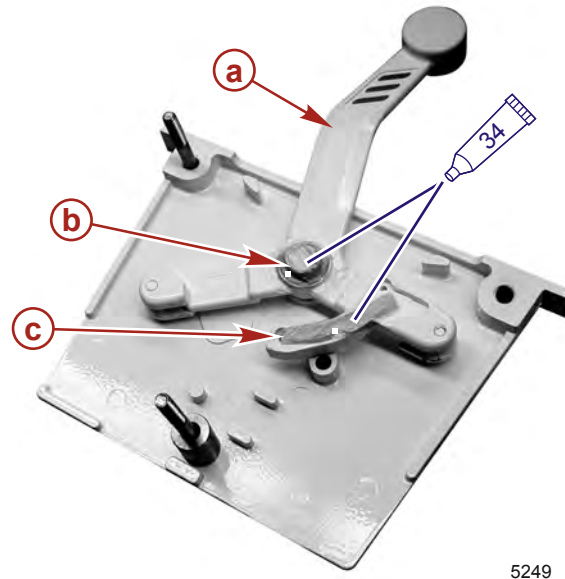


- a - Raised center hole and nylon liner
- b - Detent ball and spring
- c - Spacer (forward cant models only)

Tube Ref No.	Description	Where Used	Part No.
	Special Lubricant 101	Raised center hole and nylon liner	92-802865A1

- 7. Lubricate both sides of the detent ball track on the shift lever.
- 8. Place the shift lever (short lever) onto the lubricated center hole and nylon liner. Ensure that the detent ball does not fall out.
- 9. Apply Special Lubricant 101 to the lever boss and slide as shown.

10. Install a nylon liner to the shift lever boss and lubricate with Special Lubricant 101.



- a** - Shift shaft
- b** - Lever boss and nylon liner
- c** - Nylon slider

Tube Ref No.	Description	Where Used	Part No.
	Special Lubricant 101	Raised boss, liner, detent ball tracks, and nylon slide	92-802865A1

11. Install the inner plate with raised center boss up. Snap into place.

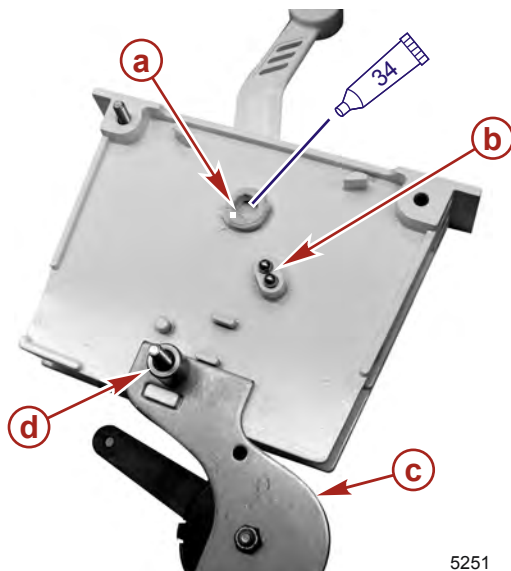


- a** - Inner plate with boss

12. Insert a starboard bracket (shift potentiometer) to the bottom center slot/tab as shown.

13. Insert one spring and detent ball in each hole of the raised center boss for the shift lever installation.

14. Lubricate the hole with Special Lubricant 101, install a nylon liner to the lever boss, and lubricate the liner.

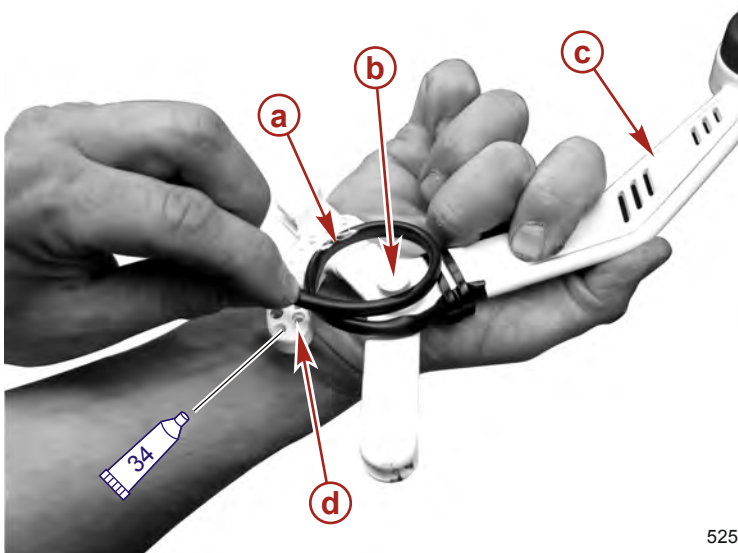


5251

- a** - Raised center boss and nylon liner **c** - Starboard bracket and shift potentiometer
b - Detent balls and springs (2 each) **d** - Bottom slot/tab

Tube Ref No.	Description	Where Used	Part No.
	Special Lubricant 101	Raised center boss and nylon liner	92-802865A1

15. On the throttle lever, lubricate the detent ball track with Special Lubricant 101.
 16. Loop the trim harness for stress relief as shown (if equipped).



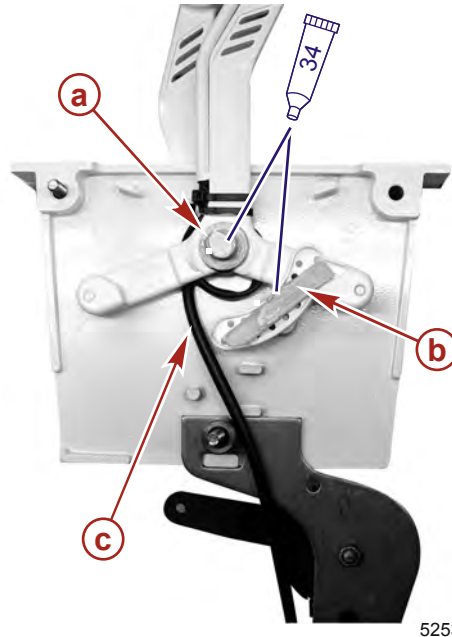
5252

- a** - Trim harness
b - Lever boss
c - Throttle lever
d - Detent ball track

Tube Ref No.	Description	Where Used	Part No.
 34	Special Lubricant 101	Detent ball track	92-802865A1

17. Without pinching the harness, insert the throttle lever on the center hole on the plate, centering the loop around the center boss on the inner plate.

18. Apply Special Lubricant 101 to the lever boss and nylon slide.



- a** - Raised boss
- b** - Nylon slide
- c** - Trim harness

19. Install the outer plate without a raised boss to the assembly, and snap into place. Be careful not to pinch the trim harness (if equipped).

Tube Ref No.	Description	Where Used	Part No.
 34	Special Lubricant 101	Raised boss and slide	92-802865A1

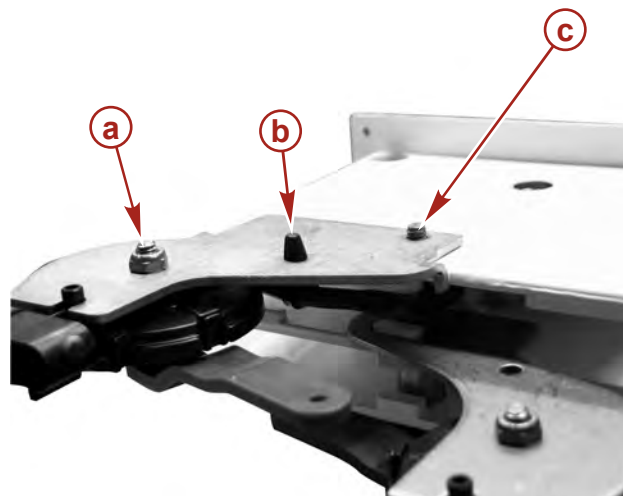
20. Aft cant models only: Install the outer port plate and throttle potentiometer to the bottom bolt.

21. Apply Anti-Seize Compound to the bolt threads.

Tube Ref No.	Description	Where Used	Part No.
 131	Anti-seize Compound	All bolt threads	Obtain Locally

22. Forward cant models: Install the outer port plate and throttle potentiometer to the bottom bolt.

23. Insert the cable tie into the hole provided in the throttle potentiometer bracket as shown.



5254

- a** - Outer port bracket and throttle potentiometer
- b** - Cable tie
- c** - Bottom bolt

NOTE: The preceding illustration depicts a forward cantilever installation. Aft cantilever models, the potentiometer bracket is installed inside the outer plate.

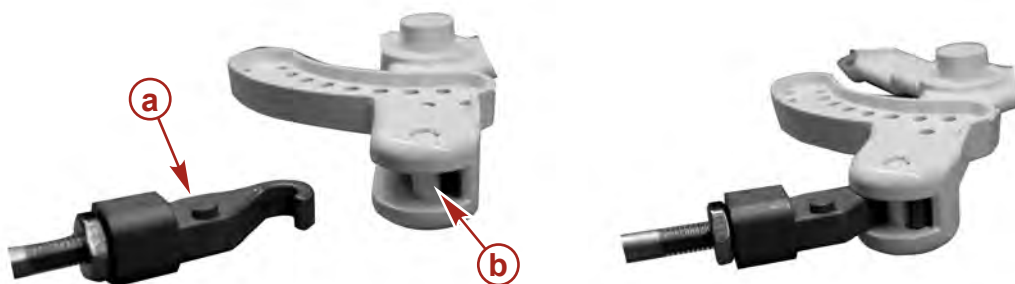
24. Tighten all bolts with nylon locknuts until hand tight only.

25. Insert the remaining bolts and washers. Tighten hand tight only.

26. Tap the top of the plates with a rubber mallet to even out the plates, then tighten the locknuts until secure.

27. Install the black rubber boots around each lever and secure in the console plates.

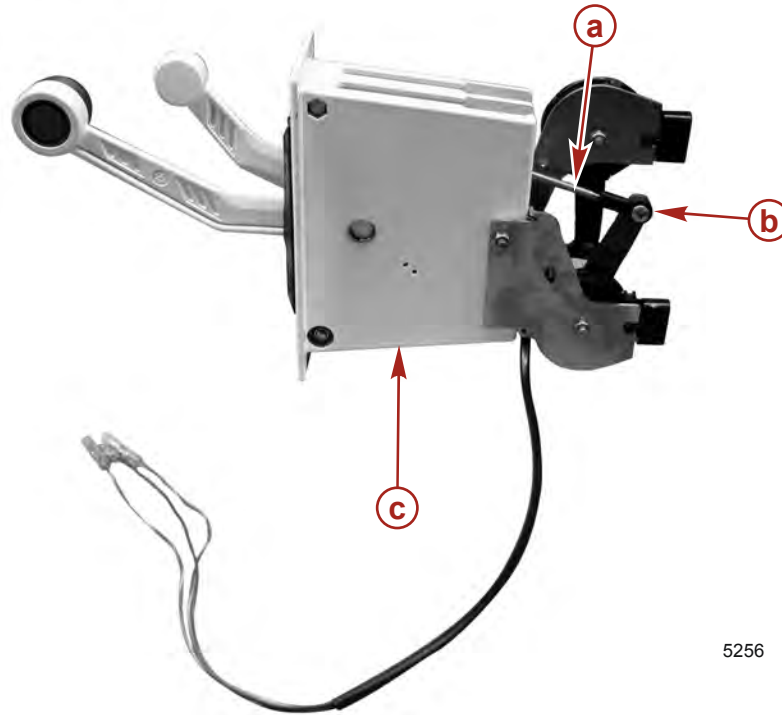
28. Hook connecting rods to each clevis as shown.



5266

- a** - Connecting rod hook
- b** - Pin on lever

29. Attach the connecting rod to the potentiometer arm using a bolt and nylon locknut. Tighten securely.

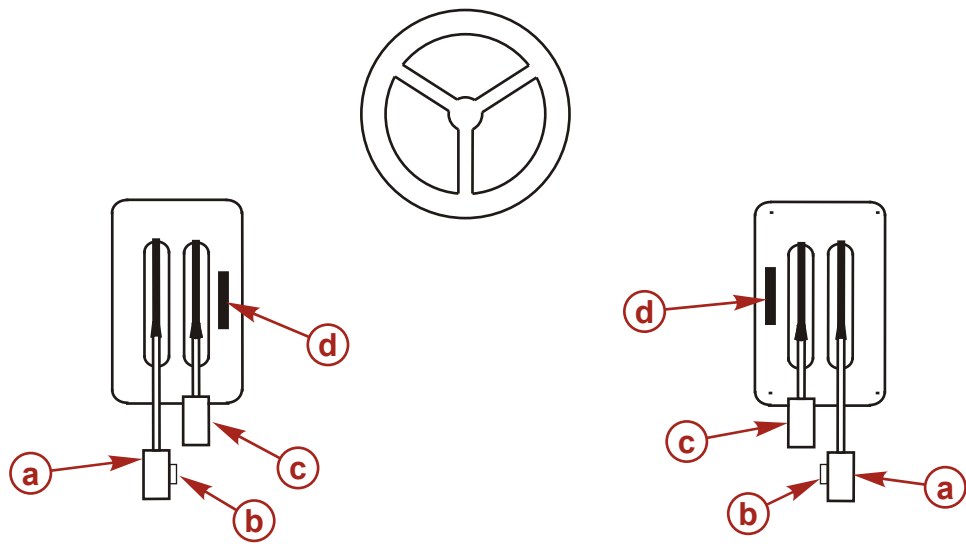


- a** - Connecting rod
- b** - Nylon locknut and bolt
- c** - Control assembly

30. Disassemble the control in reverse order.

Installation

1. Ensure the control is positioned so the forward-neutral-reverse ("F-N-R") label is in the correct orientation.



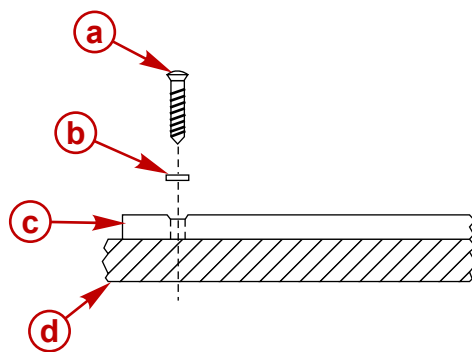
- a** - Throttle lever
- b** - Trim switch
- c** - Shift lever
- d** - Forward-neutral-reverse "F-N-R" label

4749

⚠ CAUTION

Avoid possible corrosion damage. Always install the nylon washer between each screw and the control plate. Improper installation may result in chipped paint, triggering corrosion.

2. Secure the control to the console using the 8 x 1-1/4 in. self tapping screws and nylon washers.

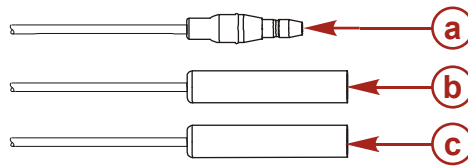


4764

- a** - 8 x 1-1/4 in. self tapping screw (4)
- b** - Nylon washer (4)
- c** - Control quadrant assembly
- d** - Console

Trim Harness Test

To test the trim switch and harness, connect an ohmmeter to the bullet connectors on the trim harness (if equipped) as described below.



5337

- a** - Power (RED)
- b** - Trim up (BLU/WHT)
- c** - Trim down (GRN/WHT)

Meter Leads		Switch	Reading (Ω)
RED	Black		
RED	GRN/WHT	Trim down	Continuity
RED	BLU/WHT	Trim up	Continuity

Notes: