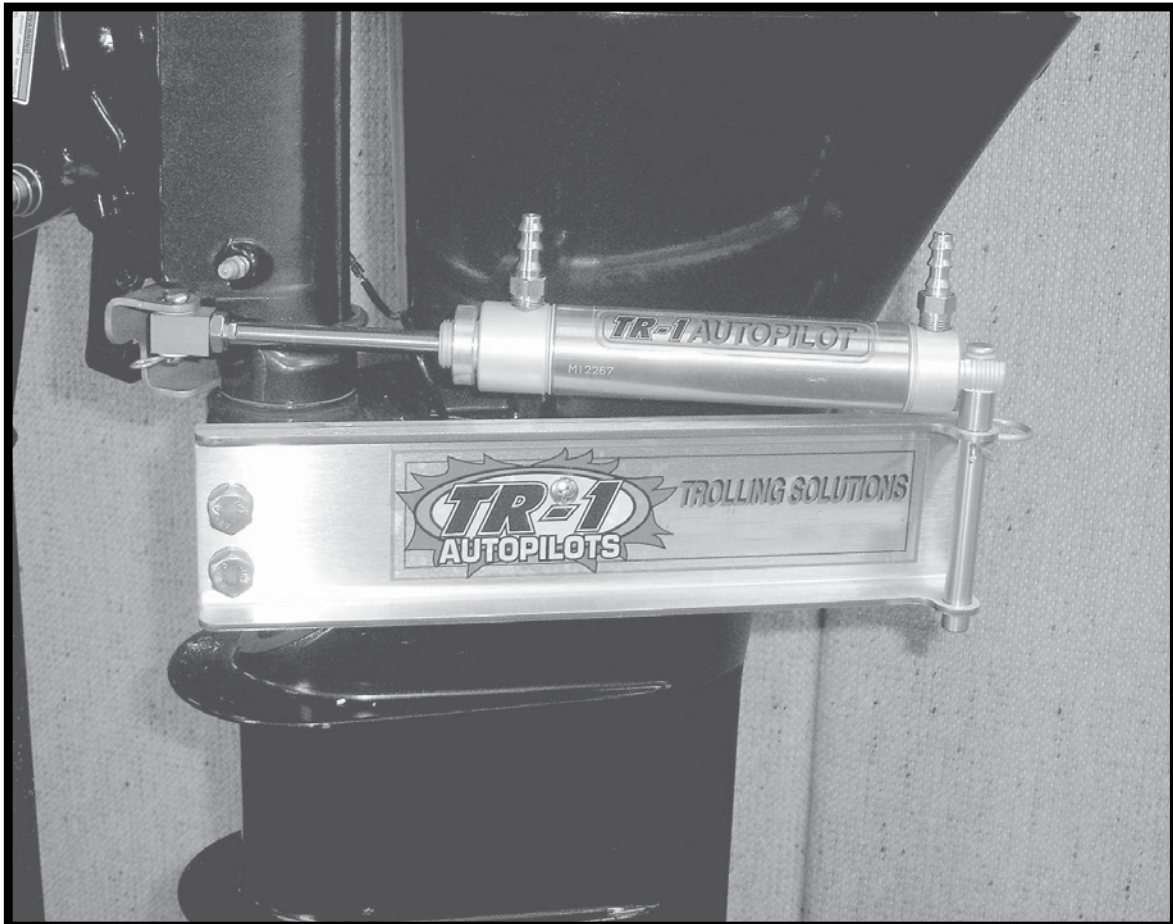


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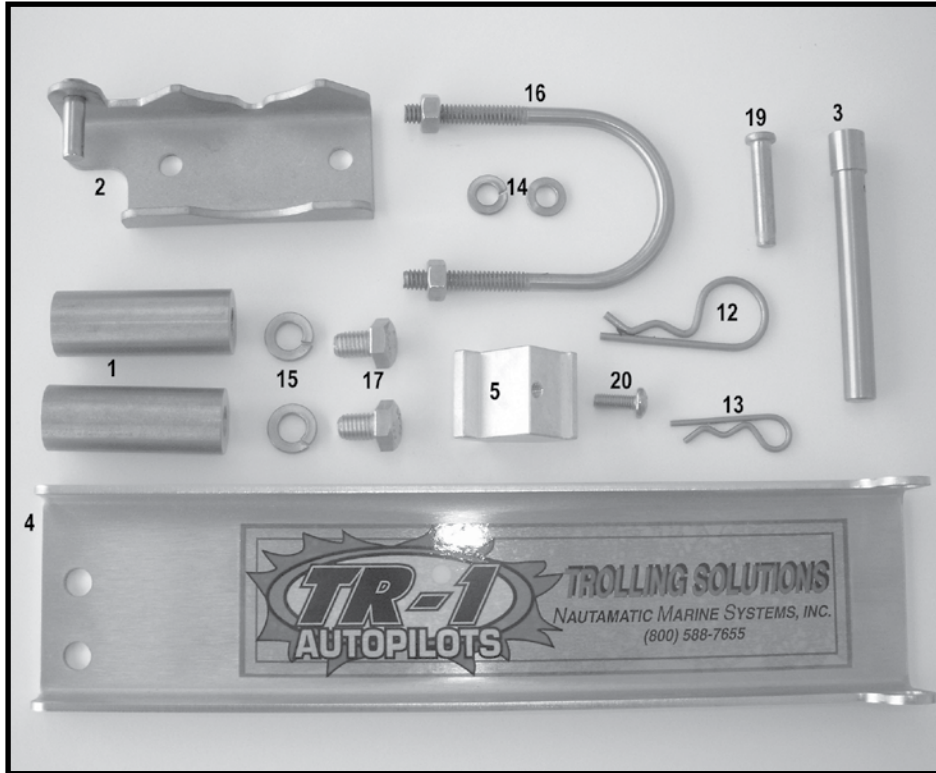
TR-1 Gold

Cylinder and Bracket Mounting Instructions

Suzuki 9.9 & 15 HP: 1997 & Newer
Johnson/OMC 9.9 & 15 HP: 2002-2007



Parts List:



Cylinder Mounting Kit PN 120-1090-00



Cylinder Kit PN 120-0900-00

Item Number	Part Number	Name	Qty.
Cylinder Mounting Kit 120-1090-00			
1	330-1091-00	Standoff, Spacer	2
2	130-1092-00	Bracket, Rod Eye Mounting	1
3	330-1023-00	Pin, Stern Pivot	1
4	380-1094-00	Channel, Cylinder Mounting	1
5	340-1095-00	Clamp, Channel Snubber	1
12	310-0067-01	Hair Pin Cotter Lg.	1
13	310-0067-02	Hair Pin Cotter Med.	1
14	310-0076-25	LW, Split 1/4, SS	2
15	310-0076-31	LW, Split 8mm	2
16	130-0084-02	"U" Bolt 1 3/4" ID 1/4-20 with nuts	1
17	310-0208-12	Hex Cap screw M8 X 12mm (bolt)	2
19	310-2501-25	Clevis Pin 1/4 D X 1.25	1
20	310-0014-08	#10-32 UNF X 1/2 Phillips Pan HD screw	1
Cylinder Kit 120-0900-00			
31	330-1002-00	Rod Eye, 5/16-24	1
33	310-0042-09	Hex Jam Nut 5/16-24	1
34	340-0900-00	Cylinder	1
35	321-0001-00	Fitting, Straight 1/8 NPT X 1/4	2
36	330-1101-00	Zinc Anode (Replace)	1
37	310-0040-26	Washer, Flat, Nylon 1/4 ID X 3/8 OD x .03 Thick	1
38	328-0901-00	Bushing 1/4 ID X 5/16 OD X 1/4"L	2
40	328-0902-00	Cylinder Tail Bushing	1

Tools:



Minimum Tools Needed:

- 1- 13 mm Wrench
- 1- 12mm Wrench
- 1-1/2 Wrench
- 1- 7/16 Wrench
- 1- #1 Phillips Screwdriver
- 1- Thread Locker (Loctite or similar)

Introduction:

Caution: You are mounting this steering cylinder to a vibration isolation mount on your motor. Note; that the factory bolts and screws have had thread locker used on them. You must use thread locker on all threaded nuts and bolts in this installation.

Before starting installation: Loosen the friction lock on the motor. The motor must turn freely both ways without friction, failure to do so, will cause damage to the autopilot. (It is located on the Port side of the steering pivot tube.)

Installation of Mounting Bracket:



Fig. 1

Step One:

Remove the upper factory nut and washer from the lower vibration isolation shroud. See Fig 1 (Save these or use if you change motors)

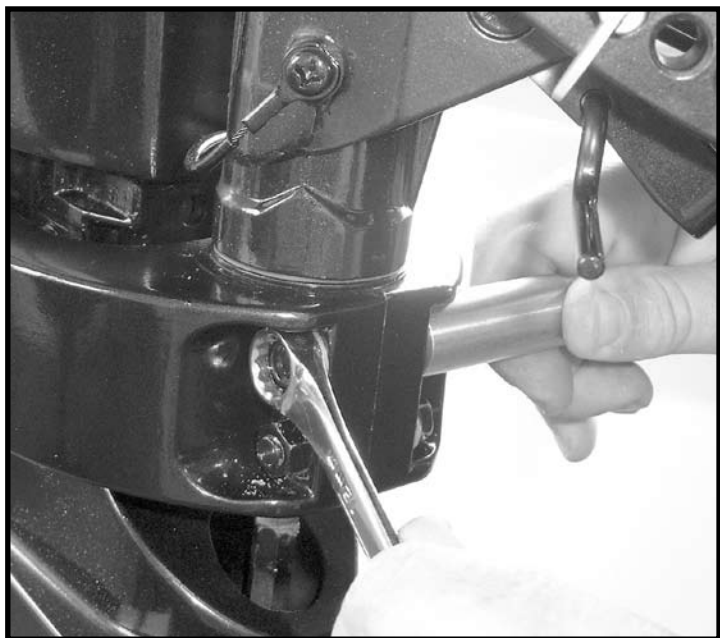


Fig. 2

Step Two:

Reverse the factory bolt with it's washer in the hole it was removed from. Use thread lock on the bolt thread and screw it into the stand off spacer (item #1) and tighten. See Fig 2.



Fig. 3

Step Three:

Remove the lower nut and washer from the lower vibration isolation shroud. See Fig 3 (keep this nut and washer also)



Fig. 4

Step Four:

Reverse the factory bolt and washer in the hole it was removed from. Use thread lock on bolt threads and screw it into the stand off spacer (item #1) and tighten finger tight. You will tighten these later.

Step Five:

Place the “U” Bolt (item #16) around steering pivot tube as pictured in fig. 5.



Fig 5



Fig 6

Step Six:

Place the Rod eye Bracket (item # 2) over the “U” bolt ends. Slide it up as far as it will go against the slopped gussets. With the lower arch against the pivot tube and the face (with the “U” bolt through it) parallel to the steering pivot center line. Install the lock washers (item #14) and nuts on the legs of the “U” bolt and tighten.



Fig 7

Step Seven:

Use thread lock on the two 8mm x 12mm bolts (item#17) and put the bolts with lock washers (item # 15) through the Channel (item #4) and into the two standoffs (item #1) that were previously mounted. Tighten finger tight. You will tighten firmly later. See fig 6.

Step Eight:

Use thread lock on the phillips screw (item #20). Put the channel snubber clamp (item#5) behind the channel with the ear behind the isolation shroud. Put the screw through the hole in the channel and into the snubber clamp. Line the upper surface of the snubber with the upper surface of the shroud and tighten the screw. See fig 7.



Fig 8



Fig. 9

Step Nine:

Tighten the lower bolt in the isolation shroud installed in step 2. Retighten upper bolt if necessary.



Fig. 10

Step Ten:

Tighten both 8mm bolts through the channel.



Step Eleven:

Place the stern pivot pin (item #3) into the rear of the channel as pictured in fig. 11.

Fig. 11



Fig. 12

Step Twelve:

Slide the cylinder rod eye (item # 31) up over the pin the Front rod eye mounting bracket (item # 2) and install the medium bridge pin (item #13) through the hole in the pin to capture the rod eye. See fig. 12



Fig. 13

Step Thirteen:

The Flange that holds the rod eye pin may need to be aligned (depending on how tight you tighten up the “U” bolt). Check the

position of the lower bushing at the back end of cylinder at the stern pivot pin. See Fig. 13. They should align freely without creating a bind at the front cylinder rod eye. The extended cylinder should be as parallel as possible to the mounting channel. If the rear of the cylinder does not, you may need to bend the flange at the rod eye bracket (item #2) slightly up or down to adjust alignment of cylinder. See Fig.14. Do not bend the pin. If these are not aligned correctly it will create a bind and damage cylinder, the rod eye bracket, or the seals inside cylinder and cause it to leak fluid.

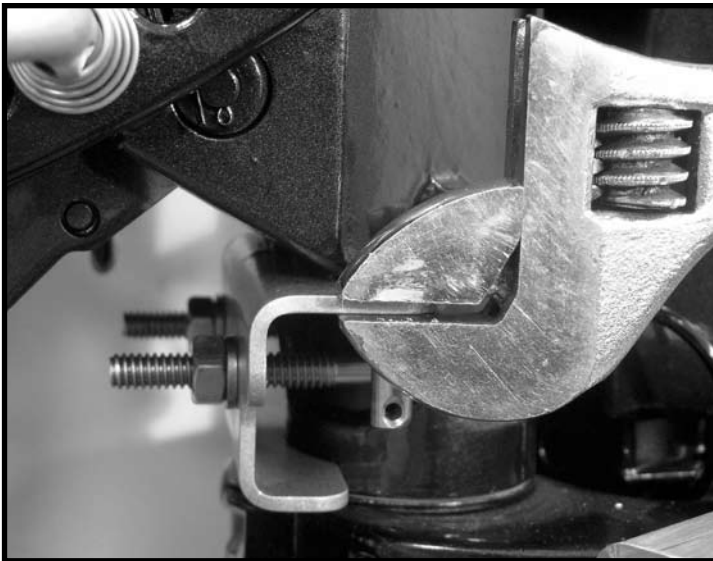


Fig 14

Step Fourteen:

Put the clevis pin (item # 19) through the nylon washer (very important) (item #39) then through the bushing in the lug at the rear of the cylinder, and into the stern pivot pin. Align the holes and slide the large hair pin (item #12) through both pins.

See Fig. 15.

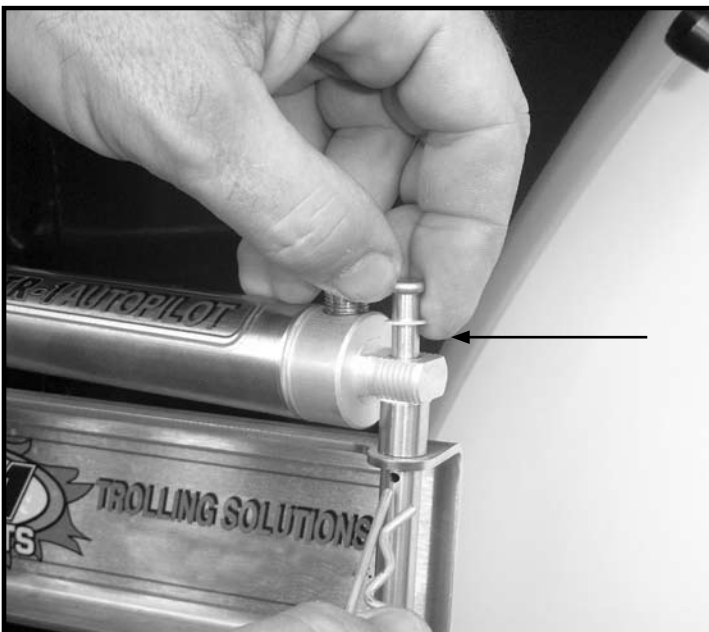


Fig. 15

Note: The two bushings in the cylinder rod eye and the bushing and washer at the cylinders end, insulating the cylinder from the motor and lets the zinc located at the front of the cylinder (item #36) do its job. Replacement zincs are available from TR-1. Check the Zinc often if the boat is moored continually, less often or twice each year if it is not.



Fig.15



Fig 16

Step Fifteen:

Turn the motor to retract the cylinder rod into the cylinder. Check that the cylinder rod is still free to retract at least a little more. See fig 15 Next turn the motor to extend the cylinder rod completely. Check that the cylinder rod is still free to extend at least a little more. See fig 16. This will prevent the cylinder from being damaged by over extended cylinder each time the motor turns. The motor should use the motor stops instead of the cylinder to stop motor travel. If it does not, adjust the position of the Rod Eye (item #31) end of cylinder rod shaft by turning it to lengthen or shorten cylinder rod shaft as necessary.

Caution: Do not use any tool on the cylindrical part of the cylinder shaft. If the shaft gets scratched, bent or dinged the seal will fail.

It is also recommended that you trailer your boat with the kicker turned & tied so that the cylinder is in the retracted position to prevent damage to the cylinder shaft.

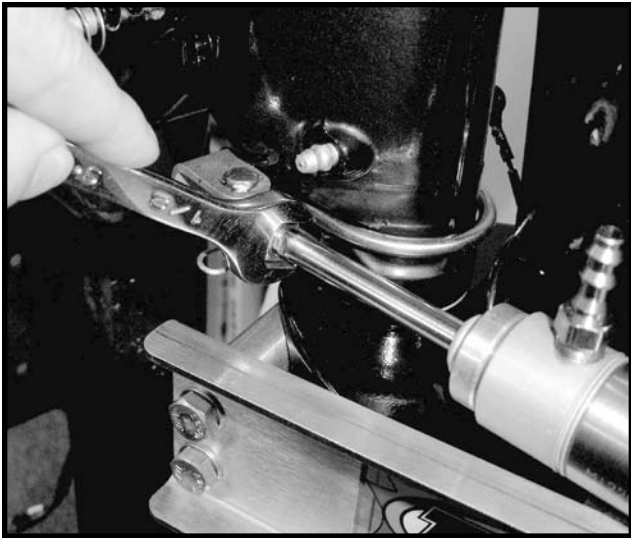


Fig. 17

Step Sixteen:

With the cylinder properly adjusted, secure it by tightening the hex jam nut (item #32) against the Rod eye end of cylinder, (1/2" wrench) **be sure to put thread locker on this nut, failure to do so may cause the cylinder rod to unscrew from the rod eye block.**

Note: We suggest you put the original parts in a container and carefully store them. You may eventually want to sell or trade in your motor, but we know you will want to keep your TR-1 Autopilot.