

MODEL BT SERIES ASSEMBLY INSTRUCTIONS
FOR TOHATSU MSF40 AND MSF50 4 STROKE MOTORS
40-50 HP 52.9 CU. IN. 3 CYLINDER STARTING 2014

1. Place the engine on the transom of your boat so that it is mounted vertically, in the normal fashion. Loosen the locknut and loosen the coupling to disconnect the shift rod from the gearbox. Remove the 5 bolts holding the gearbox to the exhaust housing and remove the gearbox assembly. Do not remove the dowel pins from the motor exhaust housing. These dowel pins will be used to align the 3/4 inch adapter plate. (See instruction 6 below).
2. Remove the water pump assembly from the propeller drive, including the lower stainless steel plate, gasket and dowel pins.
3. Install the jet driveshaft assembly into the spiral pump housing locking it in place with the four 1/4-20 x 3/4 bolts and lockwashers. Use grease on the threads.
4. Install the water pump assembly on top of the gasket and stainless steel plate, using 4 – M8 x 40 MM bolts. Be sure also, to install the water pump impeller drive key and dowel pins. Install the brass water tube extension onto the copper water tube. If there is a burr on the end of the water tube, file it smooth so the “O” ring inside the water tube extension will slide on. Grease the threads.
5. Insert the plastic shift rod guide into the top side of the 3/4 inch adapter plate. **Do not apply grease to the shift guide pilot.** Make sure shift rod inserts into the shift rod guide.
6. The large 3/4 inch adapter plate is attached to the exhaust housing to hold the jet drive. Use the two dowels from the motor exhaust housing to align the plate. Secure the plate with five M10 x 35MM bolts with lock washers. Grease the bolt threads.
7. Next, attach the jet drive to the motor. Install the two 3/16 x 1/2 dowel pins to the top mounting surface of the volute. **Grease the bolt threads, driveshaft spline generously, and rubber water tube pilot and guide the jet into place. Tighten the 5 bolts.** Use two 5/16-18 x 2-1/2 bolts (front), two 5/16-18 x 2-3/4 bolts (rear) from below with lock washers. Use one 3/8-16 x 1-1/2 bolt and lock washer, from above rear.
8. Next, install the impeller. Grease the shaft threads, key and impeller bore. Place the plastic sleeve inside the impeller, hold the key in the nose of the impeller with your forefinger and slide onto the driveshaft. Install the 7 shim washers and nut retainer on the shaft, up against the impeller, and bring the nut up snug by hand.

Hold the flanged liner, part 1521, up to the volute and check the clearance between the liner wall and the impeller blades. If the blade clearance becomes more than about 1/32 inch between the impeller edge and the water intake liner, one or more of the stainless shim washers can be transferred from the bottom stack to the top of the impeller, which moves the impeller down into the tapered casing to reduce the clearance. Be careful not to shim your impeller too close. Insufficient blade clearance will damage your liner and impeller. **(It is not uncommon to use shim washers above the impeller on new installs).**

When the impeller clearance is satisfactory, bump the nut up snug with a wrench. If the ears of the retainer do not line up with the flats on the nut, spin the nut off, turn the retainer over and tighten the nut again. In one of these two positions you will have alignment and can fold the ears down against the nut to retain it. The flat in the retainer is angled to the ears to allow this.

9. Place the flanged liner, part 1521, into the intake casing and attach to the volute by sliding both liner and intake over the six studs in the volute housing. Grease the threads and secure with the six 1/4-20 nylon locking nuts.
10. If your jet drive uses tiller handle steering, see attached page “TILLER SHIFT CABLE ASSY TOHATSU STARTING 2014,” for instructions on how to attach the shift cable assembly part 2185, to shift your reverse gate to forward, neutral and reverse. A neutral shift cable, part 1318 is also required.

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11. With the shift handle in forward and the reverse gate in forward, **with the cam roller at the end of the slot, adjust the cable and/or cable anchor position to this condition. Shift to reverse and back to forward. The roller should be at the end of the cam slot such that the gate cannot be forcibly rotated toward reverse. Pull on the gate by hand to verify this.**
12. When converting to jet drive, your motor will have to be raised to height shown in diagram on page 3, using a straight edge under the boat. Test run the boat and then raise or lower the motor 5/16 inch at a time to obtain the best results.

The motor has four sets of upper mounting holes. You will use one set to begin with. Mark pencil lines on the boat transom through the other sets. Then if you wish to go up or down 5/16 inch, you can drill one alternate set of holes 5/16 inch up or down from the pencil marks. By alternating between these two sets of transom holes and the four sets of motor holes, the motor can be moved in 5/16 inch increments over almost one inch. The transom height should be about 21 inches measured vertically from the boat bottom for short shaft motors and 26 inches for long shaft.

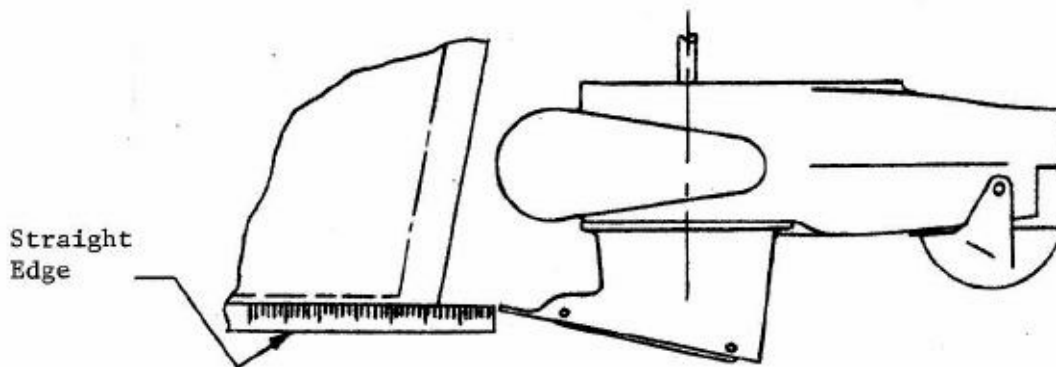
If you raise it too much it will suck air and cavitate, either on start up or when banking on turns. When cavitating, the motor overspeeds in spurts and shakes considerably in the motor mount. This is not a normal condition and should be avoided by proper adjustment of motor height on each individual boat. If you lower it too much you will have excessive drag, therefore mount the motor as high as possible without allowing cavitation.

CAUTION

When starting the engine for the first time, watch to see that cooling water comes out of the small hole at the rear side of engine just below the powerhead. This is to check your assembly of the cooling water pump and its connections.

The cooling system can be flushed by removing the slotted screw next to the grease fitting. A hose coupling No. 24789A1 is available from a Yamaha dealer. Turn on the water gently, start the motor, set to idle and watch for cooling water at the tell tale. Adjust water pressure if needed. Replace the screw after flushing.

SETTING MOTOR HEIGHT



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MAINTENANCE AND LUBRICATION

See last page.

MAINTENANCE AND LUBRICATION OUTBOARD JET DRIVE

BEARING LUBRICATION

A grease gun and tube of grease is supplied with your jet drive. We recommend greasing the bearing every 10 hours. Make greasing a part of your cleanup after the days use. Pump in just enough grease to fill the lube hose. Then reconnect the lube hose coupling to the zerk grease fitting.

Every 30-40 hours, pump in extra grease so as to purge any moisture. The texture of the grease coming out gives an indication of conditions inside the bearing housing. A gradual increase in moisture content indicates seal wear. If the grease begins to turn dark, dirty gray, the bearing and seals should be inspected and replaced if necessary. Some discoloration of the grease is normal during the break in period on new sets of seals.

We have selected a water resistant grease of the proper consistency for this application. If you use a substitute grease, be sure it is water resistant and of the same consistency.

IMPELLER

Your jet drive is equipped with a key to protect the unit in the event of a rock jam. This can be reached by removing the water intake, and then the driveshaft nut, similar to a propeller drive. After replacing the key, pull the shaft nut up tight to remove any play between the impeller and shaft. Note the position of the impeller shim washers, and replace them in the same order.

REVERSE GATE MECHANISM

Occasionally check adjustment of the gate shifting linkage. In "forward" the gate should be firmly locked in position. Pull on the gate by hand to verify this. This will prevent wave action from accidentally shifting the gate into reverse as the boat is violently maneuvered

GENERAL

Check all mounting bolts, intake screws, linkage connections, etc., occasionally to be sure they are tight.

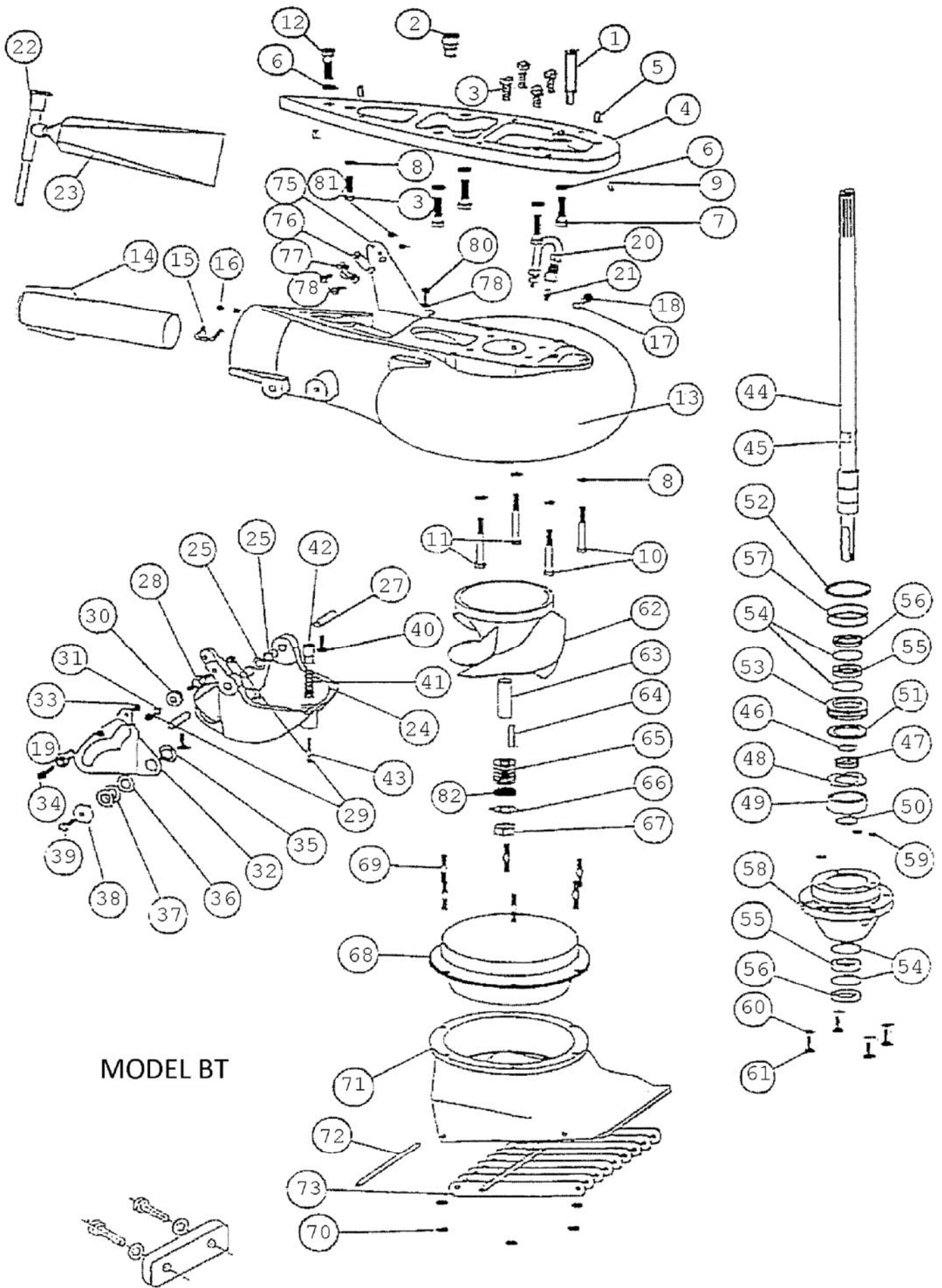
SALT WATER USE

Aluminum and stainless steel have been used in the construction of your jet drive. These materials have either been treated or are inherently resistant to corrosion. It is recommended, however, that when not in use the motor be tipped up so that the jet unit is out of the water. When used in salt water more than in fresh water, remove mounting hardware, grease, and reassemble once a year. Failure to do this may result in hardware that is difficult if not impossible to remove at a later date.

GUARANTEE

Due to inflexible government regulation, we do not have a written warranty. We have, however, a good reputation for fairness with our customers which we intend to maintain. If you think you have a warranty situation, regarding material, workmanship, call us before making repairs.

Specialty Manufacturing Company
Outboard Jets
2035 Edison Avenue
San Leandro, CA 94577



MODEL BT

ANODE KIT 1693

MODEL BT TOHATSU
4 STROKE, 3 CYL. 40-50 HP 2014

REF	QTY	PART NO.	DESCRIPTION	REF	QTY	PART NO.	DESCRIPTION
1	1	2210	SHIFT ROD GUIDE BT	51	1	1535	SPACER
2	1	2211	WATER TUBE EXT. BT	52	1	512	TRUARC N5002-212ZD
3	4	591.4	BOLT HEX HD M8-1.25 X 40MM	53	1	433	UPPER SEAL CARRIER W/SEALS & O RINGS
4	1	2202	ADAPTER PLATE BT	54	4	517	SPIROLOX RR-150S
6	5	636	WASHER SPRING LOCK M10	55	2	506	SEAL INNER
7	5	592	BOLT HEX HD M10-1.25 X 35MM	56	2	507	SEAL OUTER 6324-S
8	5	640	WASHER SPRING LOCK 5/16	57	2	526	O RING 568-135 3/32X1 15/16X2 1/8
9	2	631	DOWEL PIN 3/16 X 1/2	58	1	1380	BEARING CARRIER W/SEALS & O RINGS AJ
10	2	603	BOLT HEX HD 5/16-18 X 2 1/2	59	3	521	O RING 568-011 1/16X5/16X7/16
11	2	599	BOLT HEX HD 5/16-18 X 2 3/4	60	4	638	WASHER SPRING LOCK 1/4
12	1	607	BOLT HEX HD 3/8-16 X 1 1/2	61	4	573	BOLT HEX HD 1/4-20 X 3/4
		2208	VOLUTE WITH GATE BT	62	1	8.23	IMPELLER 6 1/8 W/36 SLEEVE
13	1	2207	VOLUTE WITH EXHAUST TUBE BT	62	1	1737	IMPELLER 6 1/8 W/36 SLEEVE, STAINLESS
14	1	80	EXHAUST TUBE ASSY MED 2	63	1	36	SHAFT SLEEVE PLASTIC MEDIUM
15	1	846	CLIP EXHAUST TUBE 1	64	1	782	IMPELLER TEE KEY - SQUARE
16	2	621	NYLOC 10-32	64	1	1705	IMPELLER TEE KEY - 1/2 ROUND
17	1	1023	WASHER FIBER 3/8	65	8	21	SHIM WASHER MEDIUM
18	1	1022	BOLT HEX HD 3/8-16 X 1/2	66	1	805	NUTKEEPER MED/PKG 2 PER BAG
19	1	553.2	BALL END 1/4X10-32 CABLE	67	1	22.1	SHAFT NUT 5/8-18 BRASS
20	1	975	LUBE HOSE ASSY			1447.04	INTAKE ASSY 6 1/8 FLANGED W/ GRILL & LINER
21	1	539	ZIRC FITTING 1/4-28	68	1	1521	LINER 6 1/8 FLANGED
22	1	550	GREASE GUN	69	6	1300	STUD - INTAKE MEDIUM
23	1	552	GREASE 10 OZ TUBE 630-AA	70	6	623	NYLOC 1/4-20
24	1	1175	REVERSE GATE MEDIUM	71	1	1326.04	INTAKE PAINTED ONLY MED FLANGED
25	2	535	NYLINER 3/8 1D X 1D X 11/16	72	2	14	GRILL ROD
26	1	1177	SPRING GATE PIVOT 3/8	73	9	16	GRILL BAR MEDIUM
27	2	822	PIN GATE PIVOT 3/8 MEDIUM			171	BRACKET ASSY MORSE W/CLAMP & HARDWARE
28	1	1043	SHAFT ROLLER	75	1	156	BRACKET CABLE SUPPORT
29	2	624	NYLOC 1/4-28	76	1	542	SHIM MORSE A035777
30	1	1042	ROLLER ASSY	77	4	543	CLAMP CHRYS 154317
31	1	635	1/4 WASHER AN960C416	78	2	561	FL JD SLOTTED 10-24 X 5/8
32	1	1035	SHIFT CAM MEDIUM	79	2	635	1/4 WASHER AN960C416
33	1	623	NYLOC 1/4-20	80	2	572	BOLT HEX HD 1/4-20 X 5/8
34	1	573	BOLT HEX HD 1/4-20 X 3/4	81	2	619	NYLOC 10-24
35	1	1037	BUSHING CAM	82	1	1718	TORSIONAL DAMPER 5/8
36	1	1038	WASHER CAM				
37	2	1039	SHIM-CAM				
38	1	1036	CAM ECCENTRIC DRILLED				
39	1	574.1	BOLT HEX HD 1/4-20 X 1 PATCH				
40	2	574	BOLT HEX HD 1/4-20 X 3/4 PATCH				
41	1	1170	SPRING GATE BUMPER				
42	1	1169	GATE BUMPER				
43	1	559.2	FIL HD SLOTTED 10-32 X 1/4 PATCH				
44	1	2200	SHAFT ONLY, BTS, 14T, 24-3/8 LG.				
		2201	SHAFT ASSY COMPLETE, BTS, 14T				
44	1	2214	SHAFT ONLY, BTL, 14T 29-3/8 LG.				
		2215	SHAFT ASSY COMPLETE, BTL, 14T				
45	1	1275	KEY, TEE WATER PUMP				
46	1	41	SHAFT BEARING THRUST RING				
47	1	477	COLLAR BACKFIT 7205				
48	1	1536	THRUST WASHER				
49	1	504	BEARING 7205B-UA				
50	1	511	TRUARC 5100-98				

SIZE	TORQUE
1/4-20 (M6)	8-9 FT-LBS
5/16-18 (M8)	12 FT-LBS
3/8-16 (M10)	22 FT-LBS

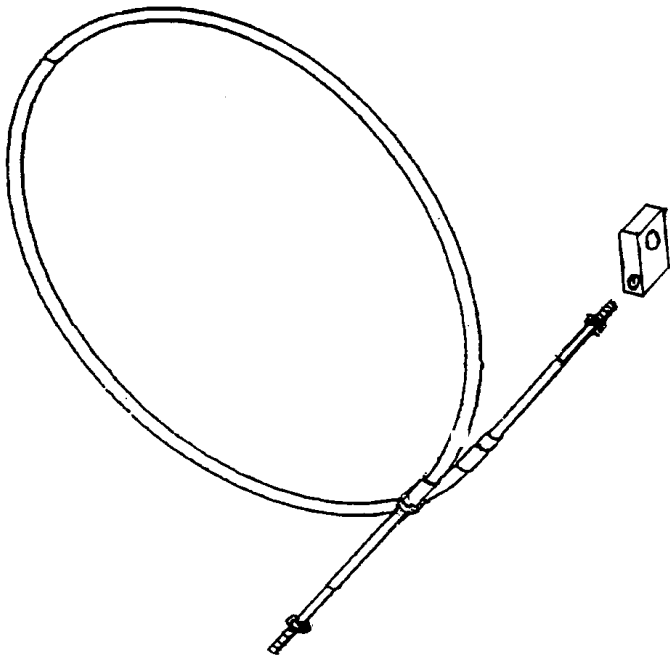
TILLER STEERING

SHIFT CABLE ASSY, 2185

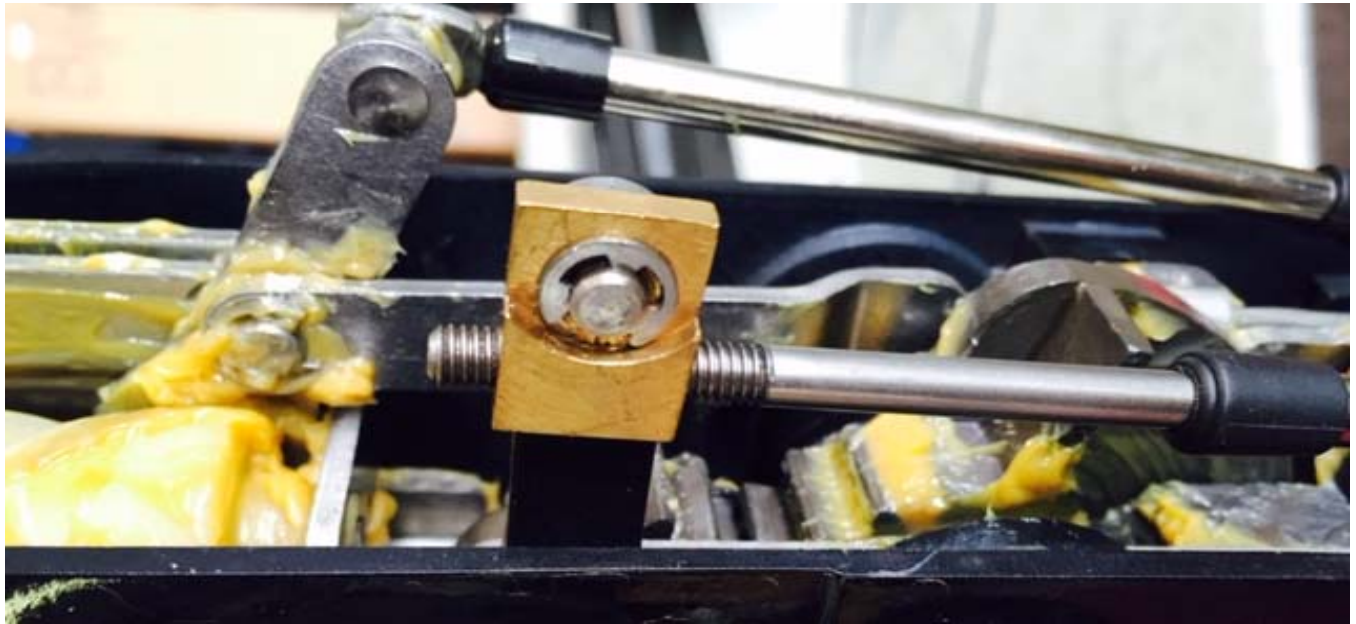
NEUTRAL CABLE ASSY, 1318

BEARING, SEAL, SNAP & "O" RING KIT
803.1

TILLER SHIFT CABLE ASSY
 TOHATSU STARTING 2014
 2185 SHORT
 2209 LONG

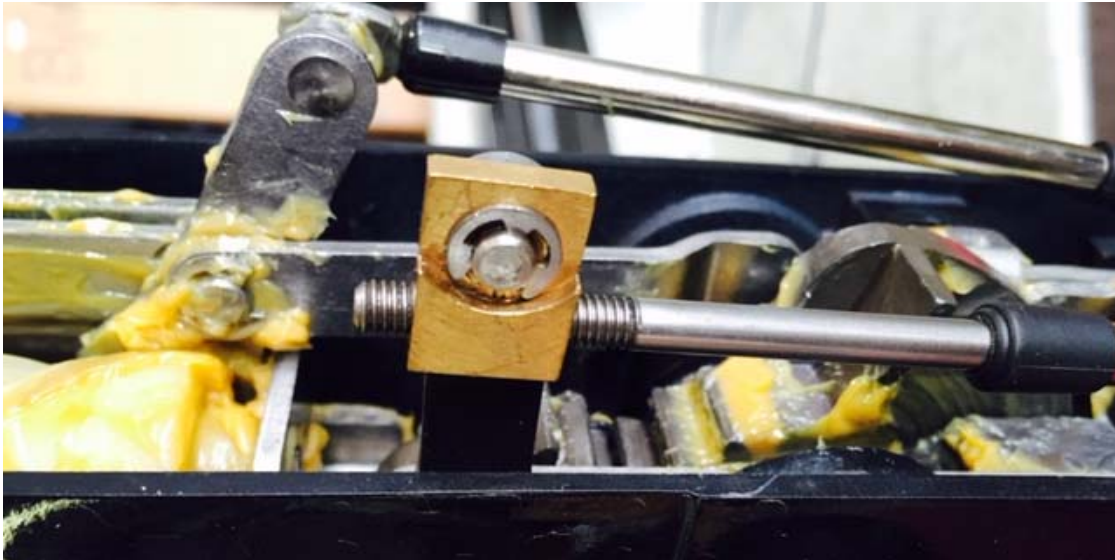


← REMOVE NUT



REF	QTY	PART NO.	DESCRIPTION
1	1	547.1	CABLE 4 1/2 FT MOR 33C SUPREME LONG
1	1	547.2	CABLE 5 FT MOR 33C SUPREME LONG
2	1	2180	CABLE END TOHATSU 2014 TILLER

TILLER SHIFT CABLE ASSY
TOHATSU STARTING 2014
2185 SHORT
2209 LONG



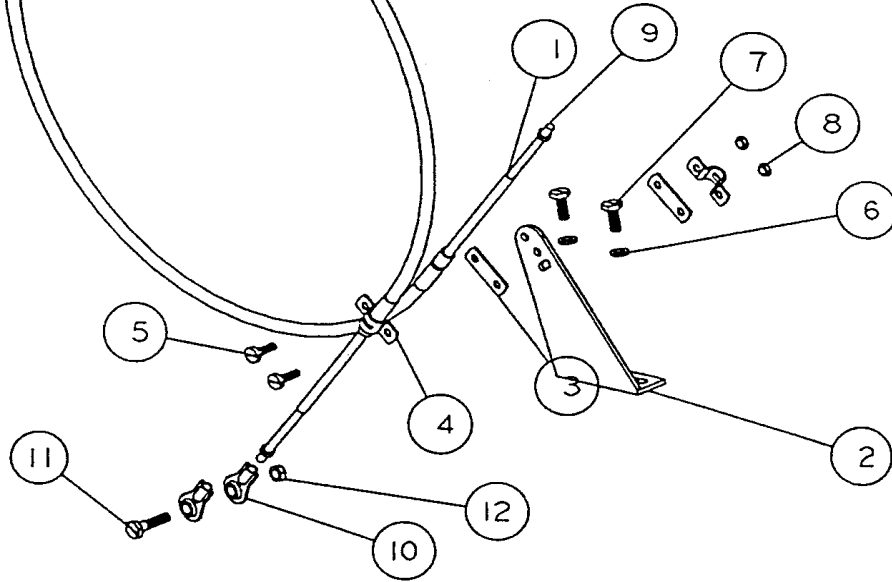
1. Cut out the template and tape to the motor pan as shown in the template sheet
2. Remove the lower plastic cover from the tiller steering handle.
3. Remove the shift cable clip and cable
4. Install the 4 1/2 ft. or 5 ft. standard 33C cable provided, using the cable end 2180 and replace the clip. Pass the cable through the routing ring eye (Part 2012) that is threaded through the template hole and held with a 10-24 nyloc nut.
5. Attach the lower end of the cable to the jet drive with the ball rod end threaded on the cable as far as it will go and the cable anchor bracket centered and locked. Pass the cable through the routing ring eye (Part 2012).
6. Place the shift handle in forward, solidly in the detent. The reverse gate cam roller must be at the end of the slot in the cam. If these conditions are not met, slide the cable anchor bracket on the jet drive and/or adjust the threaded rod end on the cable.
7. Shift to reverse and back to forward. Do not be concerned if the gate does not reach reverse. There is clearance at this position and water pressure will close the gate.
8. In forward, with the roller at the end of the cam slot, the gate cannot be forcibly rotated toward reverse. Pull on the gate by hand to verify this.
9. Lock the nuts on the cable against the rod ends to complete the adjustment and reassemble the lower cover of the steering arm.

CAUTION

**YOU MUST RETURN THE THROTTLE
TO IDLE BEFORE SHIFTING.**

LARGE SERIES

NEUTRAL CABLE ASSEMBLY
 MODEL AIR, AN, AP, U4-4, U4S-60,
 U4L-60 SUZUKI
 1318



REF	QTY	PART NO.	DESCRIPTION
1	1	547.2	CABLE 5 FT MOR 33C SUPREME
2	1	156	BRACKET CABLE SUPT OMC, MORSE
3	2	542	SHIM MORSE A035777
4	2	543	CLAMP CHRYS 154317
5	2	561.1	FIL HD SLOTTED 10-24 X 3/4
6	2	635	1/4 WASHER AN960C416
7	2	572	BOLT HEX HD 1/4-20 X 5/8
8	2	619	NYLOC 10-24
9	2	621.1	NUT HEX 10-32
10	2	553.2	BALL END 1/4X10-32 CABLE
11	1	585	BOLT HEX HD 1/4-20 X 1 1/4
12	1	623	NYLOC 1/4-20



Cut out the template below and attach to the lower motor pan as shown. Drill through the marked hole with a 3/16 drill . Make sure to drill through where a nyloc nut can be attached inside the pan. **Be careful not to drill through any motor part.**

