

IMCO SCX SERIES INFORMATION, OPERATION & MAINTENANCE

Warning!

1. SCX & SCX4 Drives will not fit on a standard gimbal helmet, IMCO HELMET: #05-8025 Black or #05-8027 Silver or #05-8028 ITS Black is required.

Warning!

2. Maximum engine idle speed is 800 RPM. Shift drive with a positive move, do not let clutch sit between neutral and in gear position.

Warning!

3. Do Not! Install propeller until the drive shift linkage has been properly installed and tested with the engine running!

Danger!

4. When using SCX or SCX4 drives it is necessary to have full hydraulic steering for your safety.

Warning!

5. When tuning engine remove propeller and shift drive into forward gear!

6. Do not run your boat with a worn or loose gimbal ring or helmet, worn clevis pins, or clevis bushings.

7. Every hull is different and requires a different setup: Many different things contribute to performance: water pickup location, cavitation plates, gear ratio, drive height, prop, weight distribution, water conditions, weather conditions.

8. If you are installing the drive on a new application, consult the manufacturer or a dealer with experience with the hull to determine the proper drive height.

9. SCX Drive is 19 7/8" from crankshaft center line to prop shaft center line (2" shorter than standard Bravo).

10. The bolt pattern is different from the SCX to the SCX4, lowers cannot be interchanged.

Warning!

11. Max propeller diameter on the SCX is 16 3/4", SCX4 is 17" (always check that there is at least 1/2" clearance between the propeller blades and the drive case).

12. Large diameter propellers installed on a #6 prop shaft will require a torque tab on single engine boats.

13. SCX and SCX 4 drives require a drive oil reservoir with a minimum capacity of 1 1/2 quarts.

14. When installing drive to gimbal or lower to upper always use anti-seize on all threads.

15. When installing lower to upper, inspect all "O" rings, replace as necessary, pressure check to insure proper seal.

16. If you do your own maintenance and repairs on your IMCO drive, you will need a service manual and the proper tools.. Service manuals and tools are available at www.imcomarine.com/cal_store.

Before Running!

17. Always wear proper safety equipment when operating your boat, testing or running at high speeds.

18. Inspect for: oil level in drive and reservoir, leaks, loose fasteners, worn parts.

Recommended oil: Torco RTF GL-6 Torco Part #A220015CE (unit) Part # S220015C (case) IMCO Part # 09-2600 (unit) Part # 09-2605 (5 Gal.) Part # 09-2610 (case) (100% Synthetic Racing Transmission Fluid) Replaces SAE 75W90.

To drain oil: remove drain screws form bearing carrier (right below the prop shaft) and on port side of upper.

To replace oil: pump oil in from lower drain screw until it comes out of upper drain screw hole. Replace drain screws and add oil to drive oil reservoir.

When changing oil, run the used oil through a strainer to check for metal particles, if there are metal particles in the oil, it is time for inspection of the gears and bearings. If oil appears milky or off colored check for leaks.

SCX, SCX4 capacity: 5 qts + reservoir - SCX Upper with SC Lower 4 1/2 qts + reservoir.

SCX Upper & SCX Lower	New Break in 5-8 hours	After Break in 20-30 hours
SCX4 Upper & SCX4 Lower	New Break in 5-8 hours	After Break in 20-30 hours
SCX Upper & SC Lower	New Break in 5-8 hours	Check Drain Plug Magnet Every 20 Hours

Warning! 19. Drive must be turning before shifting.

Warning! 20. Do not run engine when drive is trimmed extremely high, or in trailer tow mode.

Caution! 21. Do not use solvents or chemical cleaner to clean painted surfaces on the drive.

Caution! 22. When installing or changing propeller use extreme caution, propeller blades can be very sharp.

23. SCX Upper vertical shaft is 17 tooth spline, SC, Merc lowers are 15 tooth spline. A 17-15 tooth coupler is available 01-2150 (cannot be used with a spacer).

Caution! 24. Use extreme caution if modifying lower, case can be weakened or handling can be adversely affected.

25. Break in: Do not use full throttle until drive is fully warmed up, do not hold drive at wide open throttle for more than 2 minutes for the first 3 hours of use.

26. Inspect anode (located on front of cavitation plate) for corrosion or debris; if necessary clean or replace.

Caution! 27. Do not shift drive while running on hose with propeller installed.

28. Rotation: shift linkage pushed in - right hand rotation, shift linkage pulled out - left hand rotation.

29. Serial # location: Port side below SCX,SCX4 sticker.



XXTREME ADVANTAGE **scX-dd** Parts and Service Manual



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Check Oil Before Running

First break in oil change 5-8 hours

Oil is filled to upper drain screw [Fig 1-33]

Pump oil from bottom drain screw [fig 6-36]

Recommended oil change intervals 20-30 hours

Heavy use or high HP change more often.

Serial Number _____

Date of Purchase _____

Purchased From _____

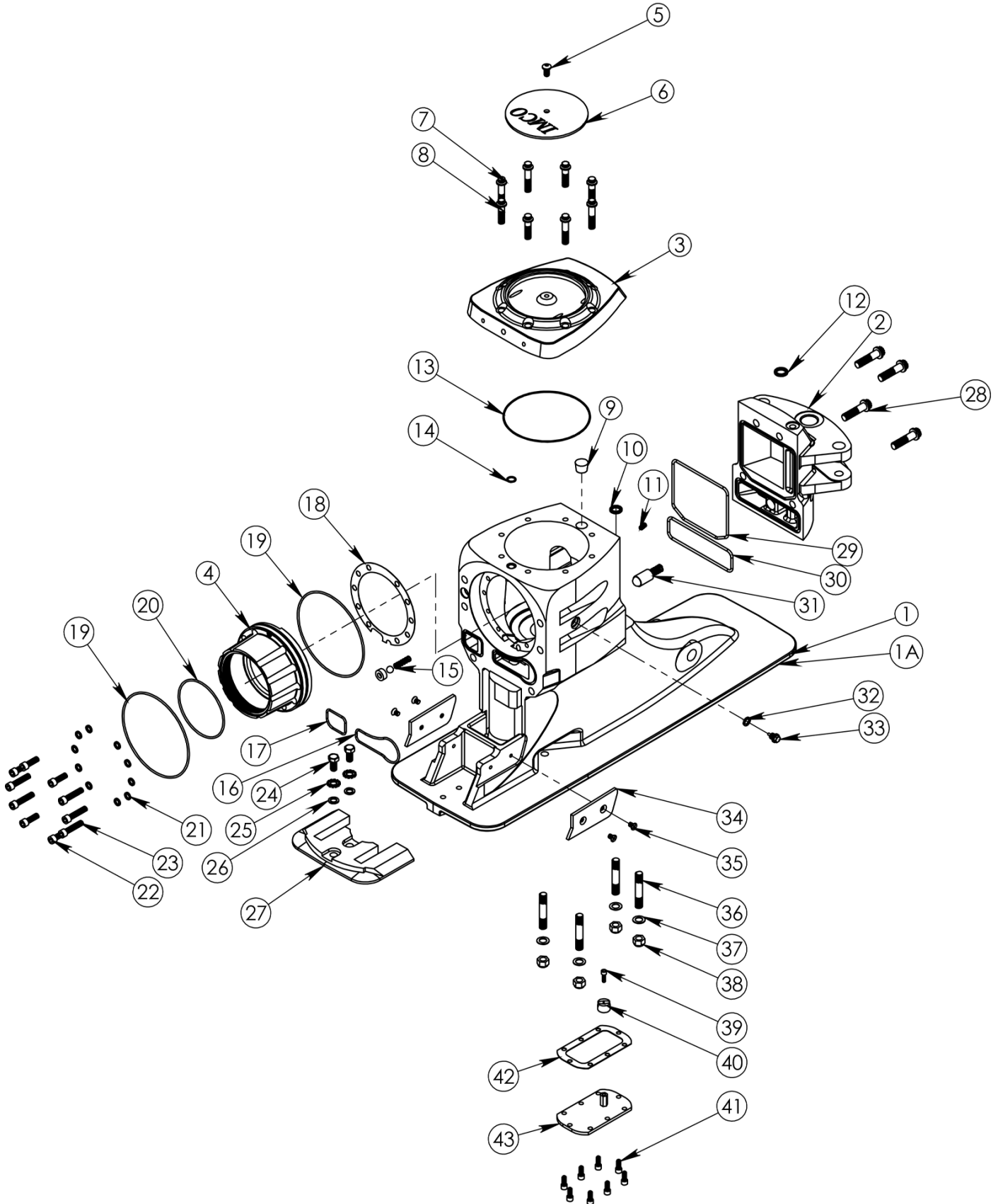
UPPER GEAR CASE-DISASSEMBLY

NOTE: The following instructions assume that the drive has been removed from the transom assembly and is shifted to the "neutral" position. The lower unit has also been removed, along with the yoke coupler end, center socket, and cross and bearings. Steps followed by asterisk (**) are required only if inspection indicates component replacement. Brackets following the part name represent the drawing figure # and item #.

1. Remove upper cap screws [1-7,8], remove upper cap [1-3].
2. Remove steering cap screws [1-28], remove steering cap [1-2]
3. Remove detent kit from steering cap [1-31].
4. Remove cotter key [2-23].
5. Remove shift link [2-24], shift cable retainer [2-21], shift arm [2-22]. (Shift link removal is out front of gear case).**
6. Remove shift shaft screws [2-27].
7. Remove shift shaft plug [1-9], shift shaft [2-26], yoke & cam [2-28].
8. Remove pinion hub screws [1-(22,23)].
9. Remove pinion hub assembly [2-(31-45)].
10. Disassemble pinion hub assembly.
11. Remove yoke nut [2-36], and washer [2-37].
12. Remove yoke [2-32].
13. Remove retainer nut [2-31].
14. Remove Yoke gear end shims [2-42], pinion shoulder washer [2-43], and pinion seal carrier [2-45].
15. Remove bearings [2-(38,41)], bearing cups [2-(39,40)], and pinion gear [2-12].
Note; be sure to maintain correct assembly position of the upper & lower thrust bearings & races.
16. Remove upper thrust race [2-6], and upper thrust bearing [2-7].
17. Remove gear assembly [2-(7-17)].
18. Disassemble gear assembly, press down on upper clutch gear to release the clutch shaft retainer keepers and remove all components from the clutch shaft.
19. Remove lower thrust race [2-6], lower thrust bearing [2-7].
20. Remove oil tank cover [1-43], inspect magnet [1-40].

Upper Case Hardware & Seals

Fig-1



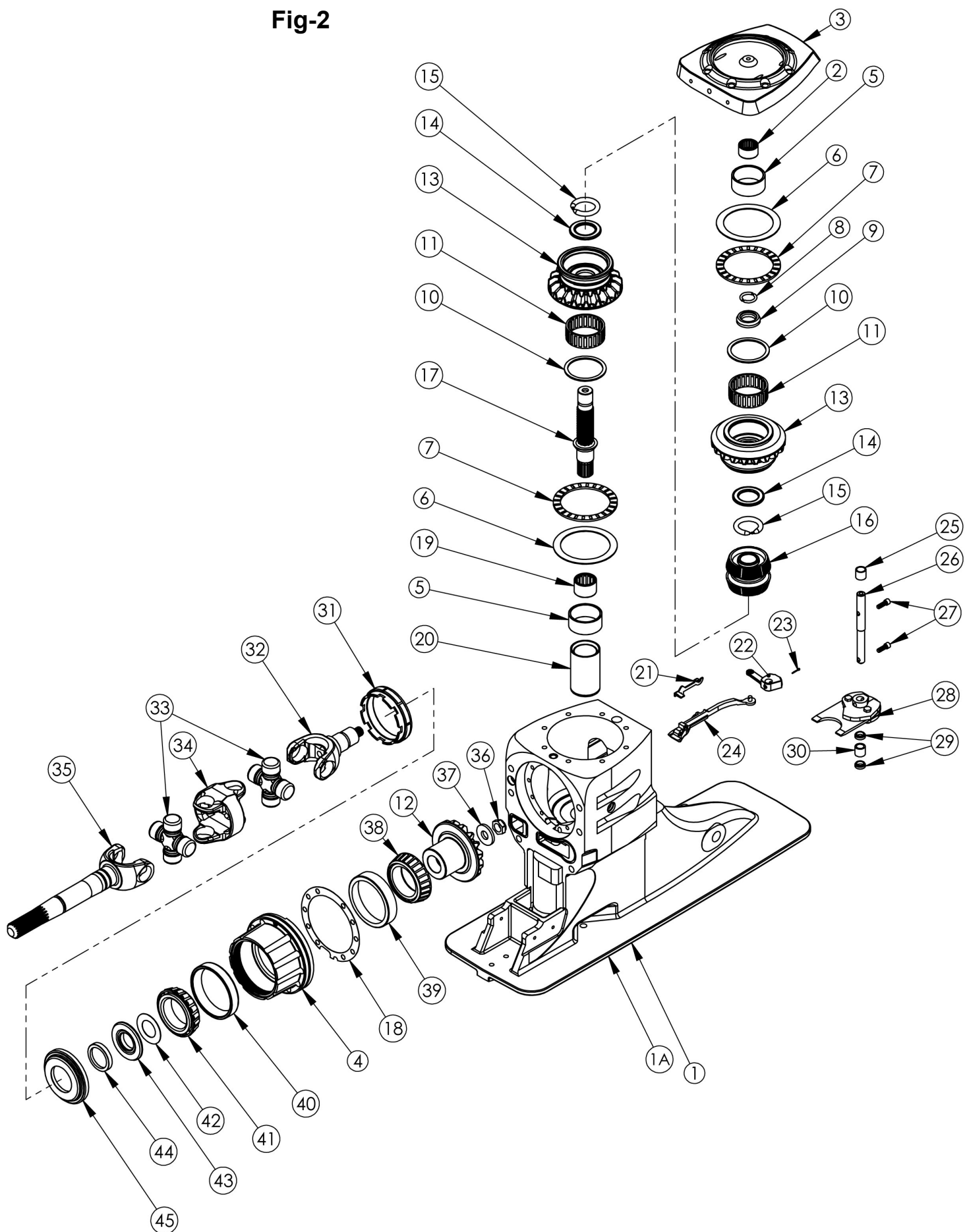
Upper Case Hardware & Seals

Fig-1

Item	Description	Qty	Part Number
1	Upper Case Black	1	01-1550
1A	Upper Case Silver	1	01-1557
2	See website for steering caps	1	n/a
3	Upper Cap	1	01-2555
4	Pinion Hub	1	01-2560
5	Screw (5/16-18 x 1/2" Button Head)	1	08-040705041
6	Top Cap Lid	1	01-2071
7	Screw (3/8-16 x 1 3/4" S/S 12 Point)	4	08-070806111
8	Screw (3/8-16 x 1 1/2" S/S 12 Point)	4	08-070806101
9	Shift Shaft Plug	1	11-1024
10	Quad Ring (Cooling Water, Bottom)	1	11-4024
11	Screw (5/16-18 x 1/2" Allen Set)(Tower Retainer)	1	08-050705041
12	Quad Ring (Cooling Water, Top)	1	11-4025
13	"O" Ring (Top Cap)	1	11-2049
14	"O" Ring (Top Cap Oil Pressure)	1	11-2013
15	Spring Kit (Seal, Ball & Spring)	Kit	01-2045
16	"O" Ring (Water Passage-Upper to Gimbal)	1	11-2148
17	"O" Ring (Shift Linkage)	1	11-2129
18	Pinion Hub Shims	Kit	01-2548
19	"O" Ring (Pinion Hub)	2	11-2161
20	"O" Ring (Pinion Retainer Nut)	1	11-2154
21	Pinion Hub (5/16" Copper Sealing Washers)	10	08-120700004
22	Screw (5/16-18 x 1" Socket Cap)	4	08-060705082
23	Screw (5/16-18 x 1 1/2" Socket Cap)	6	08-060705102
24	Screw (3/8-16 x 3/4" HH)	2	08-010806061
25	Washer (3/8" Star)	2	08-110800001
26	Washer (3/8" AN)	2	08-100800001
27	Anode	1	01-2067
28	Screw (7/16-14 x 1 3/4" S/S 12 Point)	4	08-070907111
29	"O" Ring (Steering Cap, Oil)	1	11-2250
30	"O" Ring (Steering Cap, Shift Cavity)	1	11-2242
31	Detent Kit (Spring & Ball Cylinder)	Kit	01-2044
32	Drain Screw Sealing Washer	1	11-1017
33	Drain Screw	1	01-2504
34	Guide Pads (Port & Starboard)	2	01-2471
35	Screw (1/4-20 x 1/2" Flat Head Undercut)	4	08-020604041
36	Stud (7/16 x 2 1/2")	4	08-130904141
37	Washer (7/16" AN S/S)	4	08-100900001
38	Nut (7/16-20 Nylock S/S)	4	08-080904001
39	Screw (10-24 x 5/8" Socket Cap)	1	08-060403052
40	Magnet	1	01-9587
41	Screw (1/4-20x 5/8" Socket Cap)	8	08-060604051
42	Oil Tank Gasket	1	11-1030
43	Oil Tank Cover	1	01-2574
	SCX, SCX4, SCXT, SCX4T Upper Seal Kit	Kit	11-8008

Upper Case Gear & Components

Fig-2



Upper Case Gear & Components

Fig-2

Item	Description	Qty	Part Number
1	Upper Case Black	1	01-1550
1A	Upper Case Silver	1	01-1557
2	Roller Bearing (Clutch Shaft Cap)	1	10-3042
3	Upper Cap	1	01-2555
4	Pinion Hub	1	01-2560
5	Tower Race	2	10-6041
6	Thrust Race	2	10-5045-X
7	Thrust Bearing (Gear)	2	10-4044
8	Keepers (Clutch Shaft)	2	01-2047
9	Clutch Shaft Retainer (Thrust Collar)	1	01-2189
10	Spirol Retainer Ring	2	01-2055
11	Roller Bearing (Internal Gear)	2	10-3046
12	SCX Pinion Gear	1	01-4538
13	SCX Clutch Gear	2	01-4539
14	Thrust Bearing (Clutch Spring)	2	10-4020
15	Clutch Spring	2	01-2056
16	SCX Clutch	1	01-2562
17	SCX Clutch Shaft	1	01-3556
18	Pinion Hub Shims	Kit	01-2548-X
19	Roller Bearing (Clutch Shaft Tower)	1	10-3043
20	SCX Tower	1	01-2561
21	SCX Shift Cable Retainer	1	01-2573
22	SCX Shift Arm	1	01-1578
23	Cotter Key	1	08-150200141
24	SCX Shift Link	1	01-1577
25	Shift Shaft Bushing	1	10-7018
26	SCX Shift Shaft	1	01-3559
27	Screw (1/4-28 x 3/4" Socket Cap)	2	08-060602062
28	Yoke & Cam	1	01-8095
29	Seal, Shift Shaft	2	11-3030
30	Shift Shaft Bushing	1	10-7019
31	Retainer Nut	1	01-2239
32	Yoke Gear End	1	01-2085
33	Cross & Bearing	2	01-2086
34	Center Socket	1	01-2087
35	Yoke Coupler End	1	01-2088
36	Nut (Yoke Gear End)(5/8-18 Thin Nylock Steel)	1	08-091105002
37	Washer (Yoke Gear End)	1	08-121100002
38	Bearing Cone (Pinion Bearing)	1	10-1021
39	Bearing Cup (Pinion Bearing)	1	10-2022
40	Bearing Cup (Pinion Bearing)	1	10-2024
41	Bearing Cone (Pinion Bearing)	1	10-1023
42	Yoke Gear End Shims	Kit	01-2020-X
43	Pinion Shoulder Washer	1	01-2241
44	Yoke Gear End Seal	1	11-3029
45	Pinion Seal Carrier	1	01-2240
	SCX, Pinion Bearing Kit (No Spacer)	Kit	10-8021
	SCX, Upper Bearing Kit	Kit	10-8076

UPPER GEAR CASE-ASSEMBLY

NOTE: Optimum performance of the upper gear case requires “setting up” the pinion & clutch gears with IMCO procedure as follows.

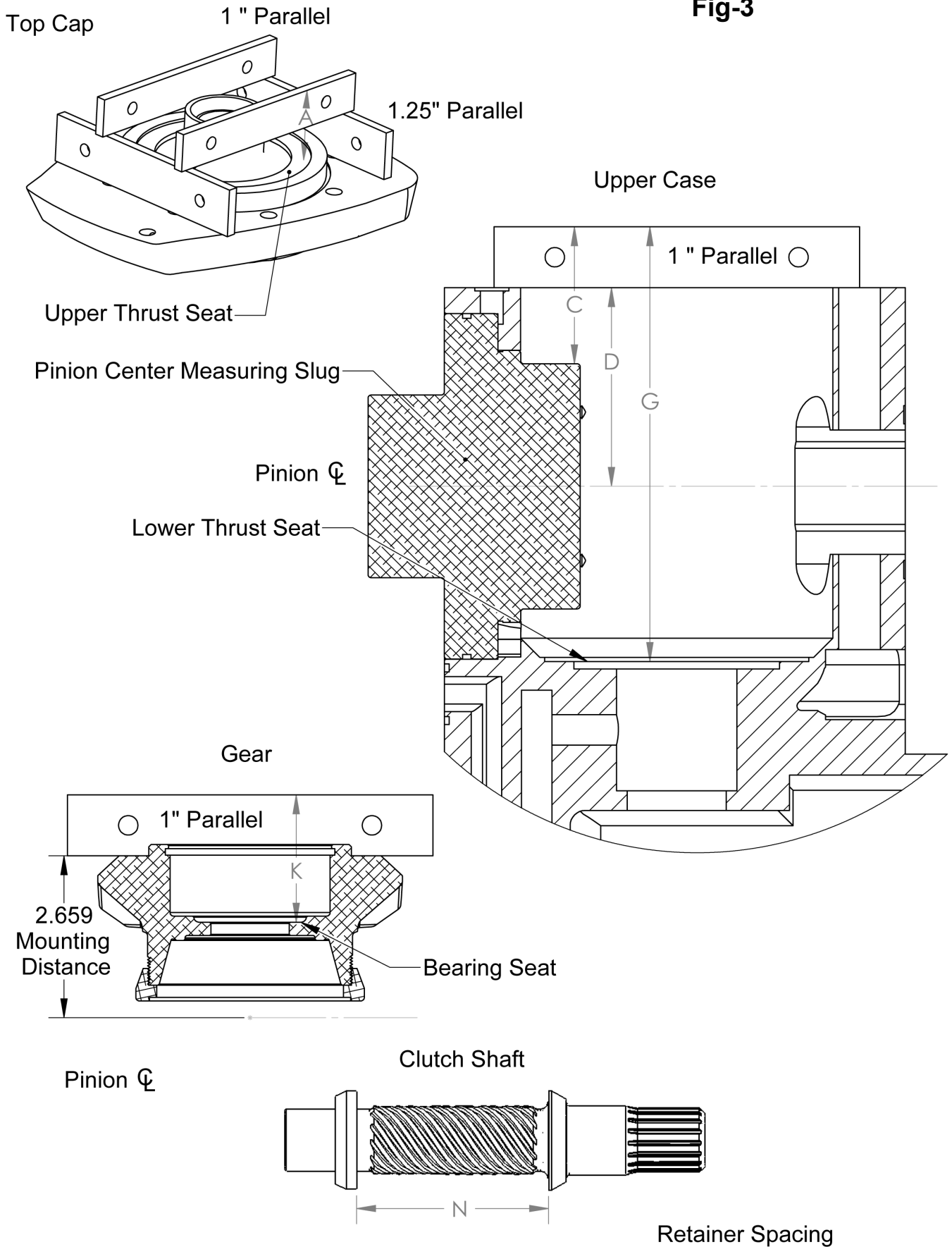
1. Take all measurements using the “SCX Setup Diagrams” (Fig 3) and the “SCX Work Sheet” (Fig 4).
2. After all measurements are taken and proper race thickness has been determined, place lower race [2-6] and thrust bearing [2-7] in case.
3. Place lower clutch gear [2-13] with attached tool (backlash tower 01-5579) into case.
4. Adjust rolling preload (8-10 in/lbs) on pinion gear by changing Yoke Gear End Shims [2-42]. Tighten nut [2-36] to 75 ft/lbs.
5. After proper rolling preload is determined, assemble pinion pack with pinion retainer nut “O” ring [1-20] between pinion seal carrier [2-45] and retainer nut [2-31].
6. Torque retainer nut to 200 ft/lbs. (Tool: Pinion Retainer Nut Driver 01-5590) (torque wrench centered on retainer nut, or, if using longer tool be sure to compensate on torque value). Use new lock nut [2-36] and torque to 75 ft/lbs.
7. Install pinion pack using 4 screws [1-23] for testing.
8. Install dial indicator (indicator bracket 01-5588) and pinion gear locking tool (pinion gear lock 01-5587) Fig-5.
9. Check backlash, adjust backlash with pinion hub shims [2-18] (average backlash should be .007-.010).
10. Once backlash is determined. Check upper clutch gear by placing gear in lower position with lower thrust race and backlash tower. This will insure backlash is .007 -.010 is correct on upper gear.
11. Assemble drive shaft gear assembly [2-(8-17)].
12. Place the lower clutch gear [2-13] onto the clutch shaft [2-17], allowing it to rest on the thrust collar.
13. Place the lower clutch spring thrust bearing [2-14] (silver side “up), lower clutch spring [2-15], clutch cone [2-16], upper clutch spring [2-15], upper clutch spring thrust bearing [2-14], (Note; use a thin layer of grease between the bearing and the gear to keep bearing in place during assembly), (silver side “down”), upper clutch gear [2-13], clutch shaft retainer [2-9] onto the upper clutch shaft [2-17].
14. Compress the upper clutch gear and install the upper drive shaft retainer keepers [2-8].
15. Install complete clutch shaft assembly into gear case.
16. Align the clutch gear timing marks (“+” over “-“, or “-“ over “+”) with the center of the rear face of the gear case.
17. Install pinion pack with “O” ring [1-19] and shims [2-18] (shims must be properly aligned).
18. Torque pinion pack screws [1-(22-23)] (Important: make sure copper sealing washers [1-21] are in place, short screws in 2 top holes & 2 bottom holes [1-22] longer screws in 3 port & 3 starboard holes [1-23] to 20 ft/lbs. Use “Loctite 242” on all screws. Note: make sure that the clutch gear timing marks align to case timing marks, roll pinion to check.

UPPER GEAR CASE-ASSEMBLY

19. Place the shift yoke & cam assembly [2-28] into the clutch cone groove with the nuts facing down.
20. Insert the shift link [2-24] with shift cable retainer [2-21] through front of gear case.
21. From the rear of gear case, place the small hole of the shift arm [2-22] onto the “pin” of the shift link and secure with cotter pin [2-23]. (Be sure that the shift arm is positioned to except the detent kit [1-31].
22. Install shift shaft [2-26] through the yoke & cam (note: use caution while installing to avoid cutting seals) and shift arm [2-22].
23. Torque the 2 shift shaft screws [2-27] to 100 in/lbs. Use “Loctite 262” on screws.
24. Install quad ring [1-10] steering cap [1-2] including detent kit [1-31], insure “O” rings [1-29 & 1-30] are in place.
25. Torque steering cap screws to 35 ft/lbs. Use “Perfect Seal” on threads.
26. Install quad ring [1-12] in steering cap, shift shaft plug [1-9], top cap “O” ring [1-13] top cap oil pressure “O” ring [1-14]
27. Install top cap.
28. Torque top cap screws [1-8] (Important: short screws in 2 front & 2 rear holes [1-7] longer screws in 2 port and 2 starboard holes) to 25 ft/lbs. Use “Perfect Seal” on threads.
29. Install oil tank cover [1-43], oil tank gasket [1-42] with “Permatex Form-Gasket 2’ (note: use a very thin layer on gasket), oil tank cover screws [1-41] with “Loctite 242”, torque to 10 ft/lbs.

SCX Setup Diagrams

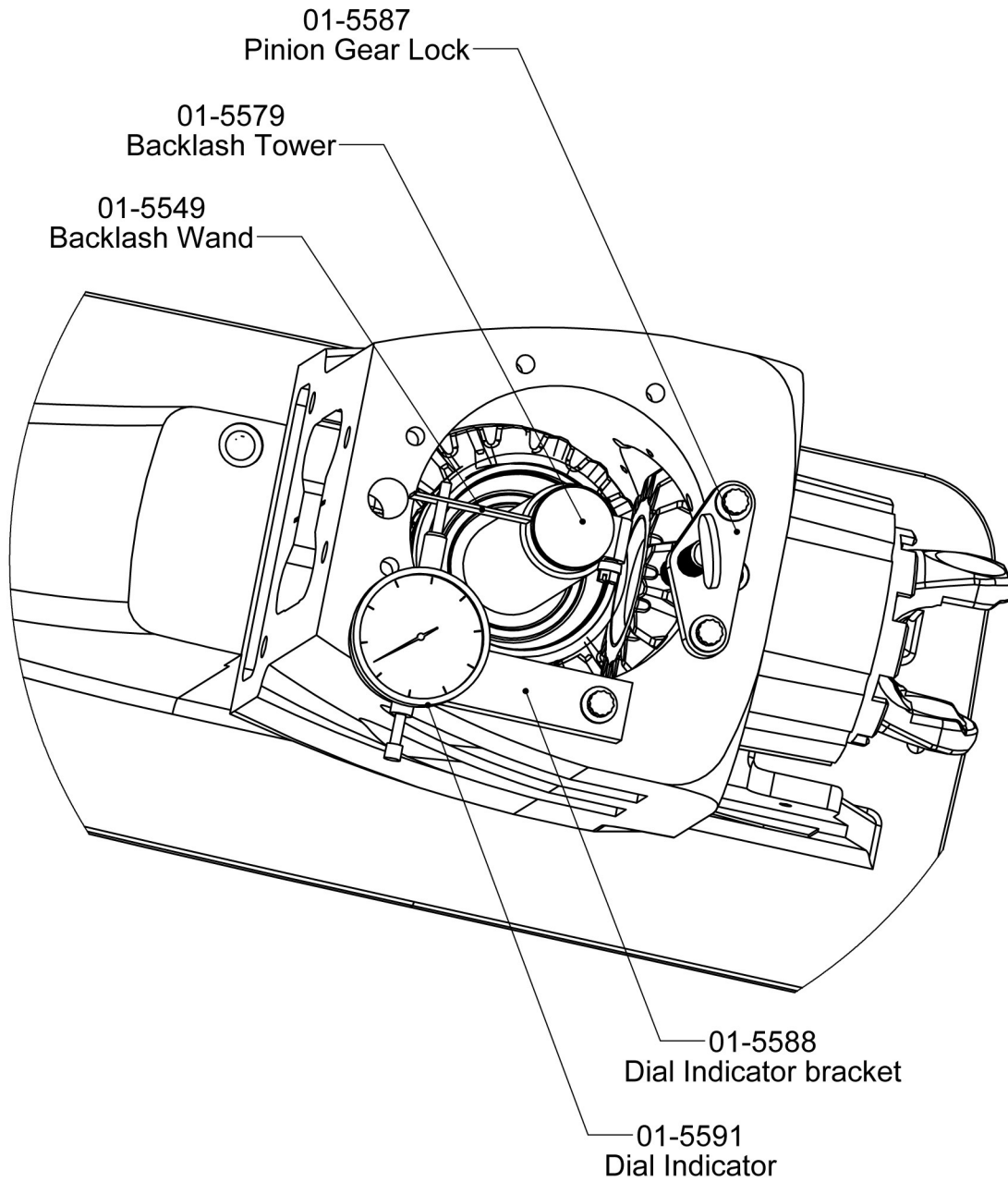
Fig-3



SCX, SCX4 WORK SHEET				Serial #	
				UPPER CAP	
	Parallels			2.250	
	Measurement	A	-		Norm 1.862
Cap Deck to Thrust Seat	Total	B	=		Norm 0.388
				DECK TO PINION CENTERLINE	
Deck to Tool	Measurement	C			Norm 2.252
	Less Parallel		-	1.000	
	Total				Norm 1.252
	Plus 1/2 tool		+	2.012	
Deck to Pinion CL	Total	D	=		Norm 3.264
				UPPER THRUST SEAT	
Deck to Pinion CL		D			Norm 3.264
		B	-		Norm 0.388
Pinion CL to Upper Thrust Seat	Total	E	=		Norm 2.876
	Bearing Thickness		-	0.157	
	Mounting Distance		-	2.661	
	Race Thickness	F	=		Norm 0.060
				LOWER THRUST SEAT	
	Measurement	G			Norm 7.138
	Parallel		-	1.000	
Deck to Lower Thrust Seat	Total		=		Norm 6.138
Deck to Pinion CL		D	-		Norm 3.262
Pinion CL to Lower Thrust Seat	Total	H	=		Norm 2.876
	Bearing Thickness		-	0.157	
	Mounting Distance		-	2.661	
	Race Thickness	J	=		Norm 0.060
				GEAR MEASUREMENTS	
Gear One	Measurement	K1			Norm 2.091
	Less Parallel		-	1.000	
Gear Depth One	Total	L	=		Norm 1.091
Gear Two	Measurement	K2			Norm 2.091
	Less Parallel			1.000	
Gear Depth Two	Total	M	=		Norm 1.091
				GEAR ASSEMBLY	
Gear Depth One		L			Norm 1.091
Gear Depth Two		M	+		Norm 1.091
	Race Thickness	F	+		Norm 0.060
	Race Thickness	J	+		Norm 0.060
	2 x Bearing Thickness		+	0.314	
Retainer Spacing	Measurement	N	+		Norm 3.162
Gear Assembly	Total	O	=		5.778
				CAP CRUSH	
Pinion CL to Upper Thrust Seat		E	+		Norm 2.876
Pinion CL to Lower Thrust Seat		H	+		Norm 2.876
Upper Thrust Seat to Lower Thrust Seat	Total	P	=		Norm 5.752
Gear Assembly	Total	O	=		Norm 5.778
Cap Crush			=		Norm .020-.030

Backlash Assembly

Fig-5



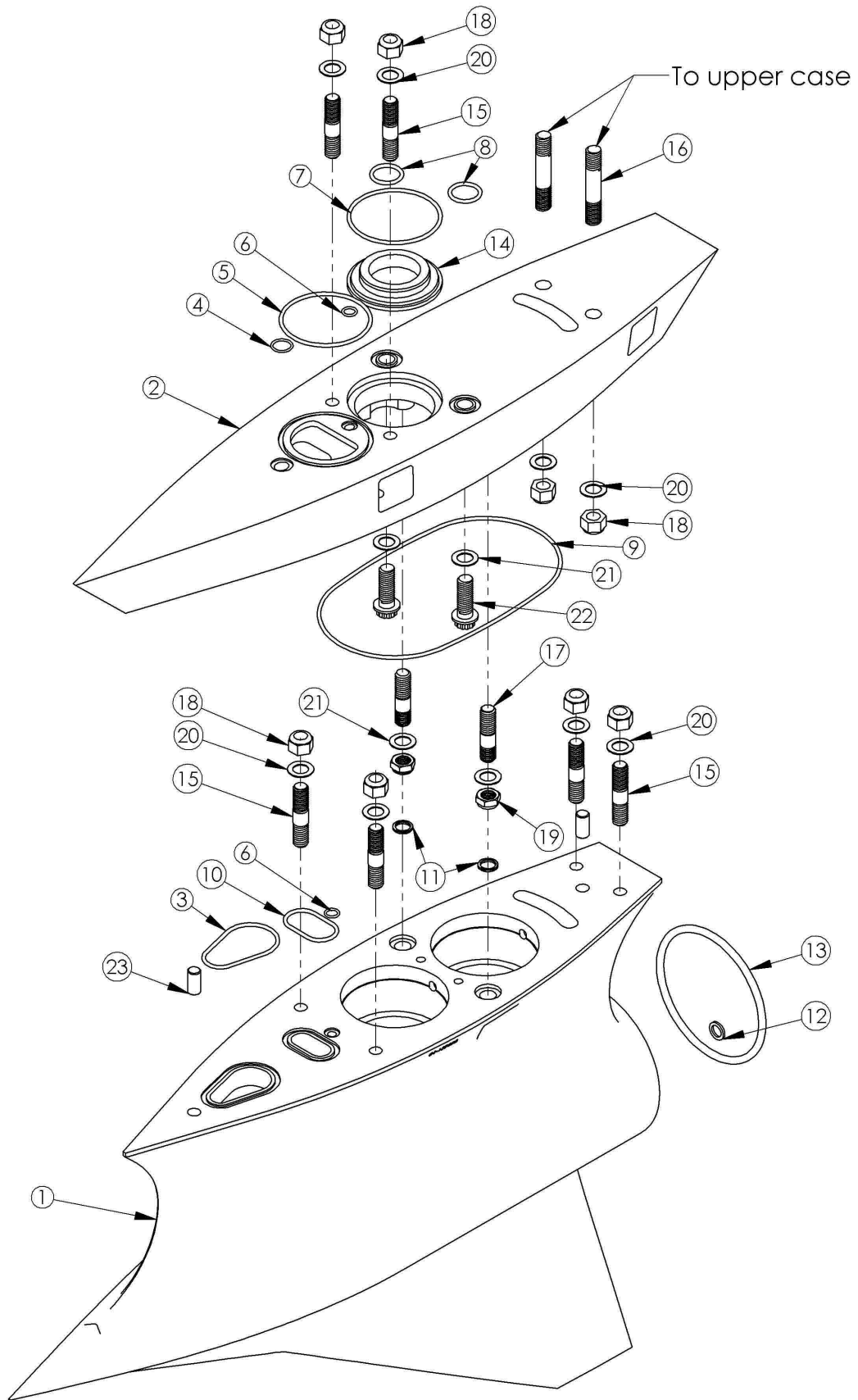
LOWER GEAR CASE-DISASSEMBLY

NOTE: Steps followed by asterisks(**) are required only if inspection indicates component replacement. Brackets following the part name represent the drawing figure # and item #.

1. Remove lower from spur gear spacer [6-2] (6 nuts) [6-18&19]. Spacer will remain on the upper.
2. Remove spacer from the upper (4 nuts/2 bolts) [6-18&22].
3. Bend tab washers [7-7] on both spur gear retainer nuts [7-6].
4. Remove retainer nuts [7-6] and tab washers [7-7].
5. Bend the tabs of the bearing carrier tab washer [7-35] away from the bearing carrier retainer nut [7-36].
6. Remove the bearing carrier retainer nut [7-36].
7. Remove bearing carrier [7-32].
8. Remove the prop shaft [7-24]. (The prop shaft bushing [7-22], used only with the 01-8244 & 01-8248 gear sets, may come out with the prop shaft). Remove the rear gear shim [7-23] from prop shaft.
9. Remove Flange nuts [7-27] from both pinion gears. Remove rear pinion gear [7-21].
10. Bend both vertical shaft tab washers [7-10] away from the vertical shaft preload nuts [7-9].
11. Remove both vertical shaft preload nuts [7-9], and vertical shaft tab washers [7-10], and then both vertical shafts [7-3&4].
12. Remove front pinion gear [7-21], and prop gear [7-21].
13. Remove both lower vertical shaft bearing cups [7-15], and shims [7-16].**
14. Remove both the vertical shaft roller bearings [7-17].**
15. Remove the upper [7-13], and lower [7-14] bearing cones from both vertical shafts [7-3&4].**
16. Remove the roller bearing race [7-17] from both vertical shafts [7-3&4].**
17. Remove the bearing cup [7-31] from the bearing carrier [7-32].**
18. Remove the prop gear bearing cone [7-20] from the prop gear [7-21].**
19. Remove the prop gear bearing cup [7-19], and shims [7-18].**
20. Remove the bearing cone [7-30] along with prop gear [7-21] from the prop shaft.**

Lower Gear Case

Fig-6



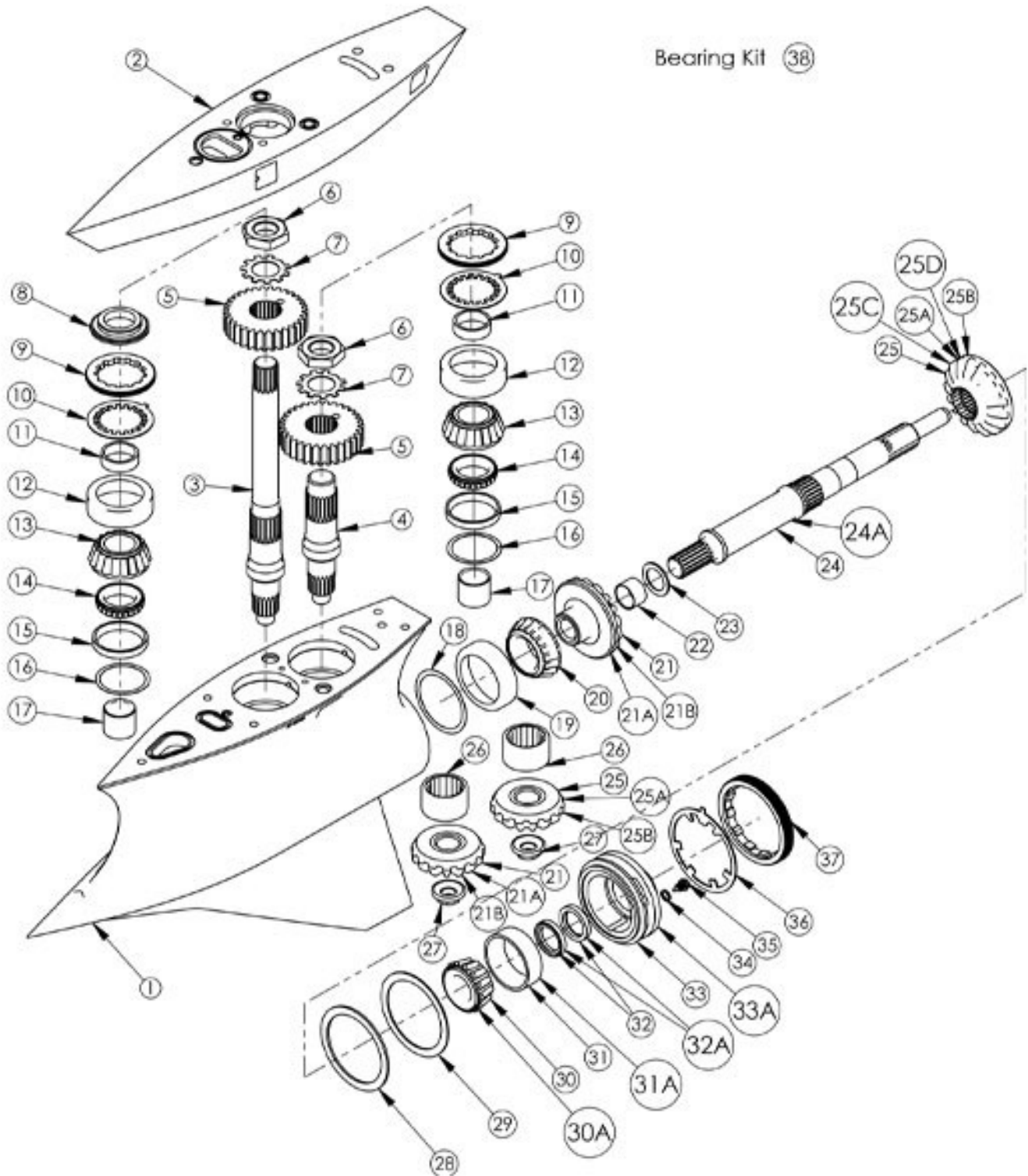
Lower Case

Fig-6

Item	Description	Qty	Part Number
1	Dual Downshaft Lower Case	1	01-1393
1A	Dual Downshaft Lower Case V2	1	01-1395
2	Dual Downshaft Spacer	1	01-1715
3	"O" Ring (Cooling Water Passage Lower)	1	11-2135
4	"O" Ring (Cooling Water Passage Spacer)	1	11-2014
5	"O" Ring (Water Passage)	1	11-2143
6	"O" Ring (PTFE Oil Passage)	1	11-4011
7	"O" Ring (Alignment Spacer)	1	11-2144
8	"O" Ring (Upper Stud)	2	11-2401
9	"O" Ring (Spur Gears)	1	11-2165
10	"O" Ring (Water Passage 2)	1	11-2126
11	"O" Ring (Lower Stud)	2	11-4025
12	Drain Screw Sealing Washer	1	11-1017
13	"O" Ring (Bearing Carrier)	1	11-2344
14	Alignment Spacer	1	01-2401
15	Stud (7/16 x 2" S/S) (Spacer and Lower Case)	6	08-130904121
16	Stud (7/16 x 2 1/2" S/S) (Upper Case)	2	08-130904141
17	Stud (7/16 x 1 3/4" S/S) (Spacer)	2	08-130904111
18	Nut (7/16-20 Nylock S/S)	6	08-080904001
19	Nut (7/16-20 Nylock S/S Thin)	2	08-090904001
20	Washer (7/16" AN S/S)	10	08-100900001
21	Washer (7/16" AN S/S Thin)	2	08-160900001
22	Screw (7/16-14 x 1 1/2" 12 Point S/S)(Thin Head)	2	08-070907101
23	Dowel Pin (3/8" x 3/4")	2	01-2115

Lower Case Gear

Figure-7



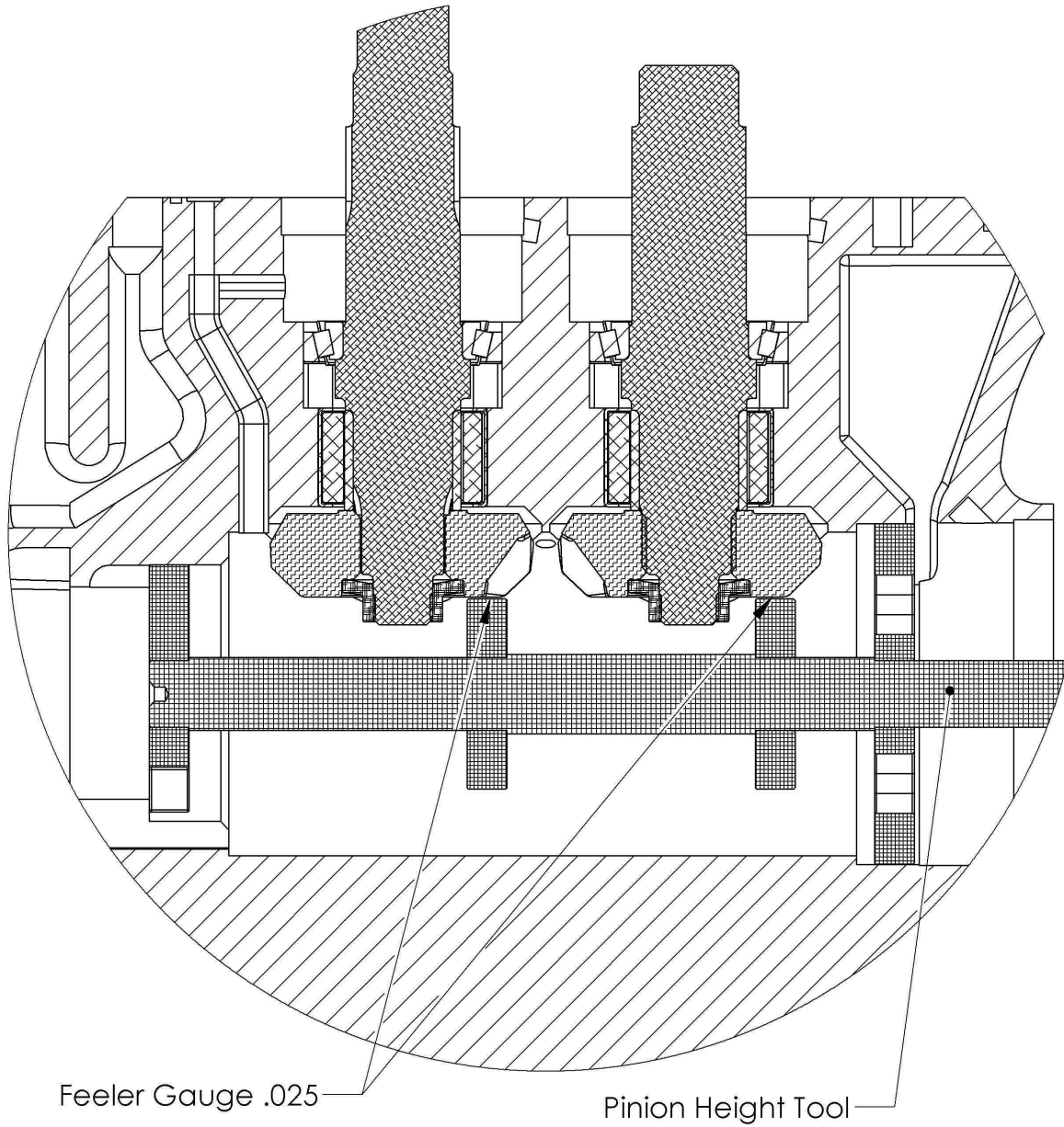
Lower Case Gear

Fig-7

Item	Description	Qty	Part Number
1	Dual Downshaft Lower Case	1	01-1393
2	Dual Downshaft Spacer	1	01-1715
3	Vertical Shaft (Long)	1	01-3575
4	Vertical Shaft (Short)	1	01-3576
5	Spur Gear	2	01-4543
6	Spur Gear Retainer Nut	2	01-9036
7	Tab Washer (Spur Gear Retainer Nut)	2	01-2297
8	Alignment Spacer	1	01-2401
9	Vertical Shaft Preload Nut	2	01-2281
10	Tab Washer (Vertical Shaft Preload Nut)	2	01-2157
11	Spur Gear Sleeve	2	01-9040
12	Cup (Vertical Shaft, Upper Bearing)	2	10-2042
13	Cone (Vertical Shaft, Upper Bearing)	2	10-1042
14	Cone (Vertical Shaft, Lower Bearing)	2	10-1017
15	Cup (Vertical Shaft, Lower Bearing)	2	10-2018
16	Shim (Vertical Shaft)	Kit	01-9037
17	Vertical Shaft Race	2	10-6005
18	Shim (Prop Gear)	Kit	01-2014
19	Cup (Prop Gear)	1	10-2007
20	Cone (Prop Gear)	1	10-1008
21	Prop & Pinion Gear 1:50	Set	01-8240
21 A	Prop & Pinion Gear 1:34	Set	01-8244
21B	Prop & Pinion Gear 1:25	Set	01-8248
22	Bushing - Prop Shaft -X	1	01-2178
23	Shim (Prop Gear 2)	Kit	01-9035
24	Dual Downshaft Prop Shaft 1 1/4"	1	01-3572
25	Prop & Pinion Gear 2 1:50	1	01-8250
25A	Prop & Pinion Gear 2 1:34	1	01-8252
25B	Prop & Pinion Gear 2 1:25	1	01-8254
26	Bearing (Roller)	2	10-3006
27	Nut (Pinion Gear)	2	01-2252
28	Thrust Washer (.109 Thick)	1	01-2590
29	Shim (Bearing Carrier)	Kit	01-2011
30	Cone (Prop Shaft)	1	10-1015
31	Cup (Prop Shaft)	1	10-2016
32	Seal (Prop Shaft 1 1/4")	2	11-3033
33	Dual Downshaft Bearing Carrier	1	01-7180
34	Drain Screw Sealing Washer	1	11-1017
35	Drain Screw	1	01-2504
36	Tab Washer (Bearing Carrier)	1	01-2042
37	Cover Nut	1	01-2065
38	SCX Dual Downshaft Bearing Kit 1 1/4" PS	1	10-8092
38	SCX Dual Downshaft Bearing Kit 1 7/16" PS	1	10-8093

Lower Pinion Height Measurements

Fig-8



Pinion gear height must be set one gear at a time.

LOWER GEAR CASE DUAL DOWN SHAFT-ASSEMBLY

NOTE; Optimum performance of lower gears requires pinion height setup, use “lower pinion gear height instruction sheet” fig 8.

1. Install both vertical shaft roller bearings [7-17] into the gear case [7-1].
2. Install both vertical shaft lower bearing cups [7-15], and shims [7-16].
3. Install the lower [7-14], upper [7-13] bearing cones, and roller bearing race [7-17] onto the vertical shafts [7-3&4].
4. Install front vertical shaft (long) [7-3] into the gear case [7-1].
5. Install upper cup [7-12], vertical shaft preload tab washer [7-10], and vertical shaft preload nut [7-9] (right hand). Tighten nut to 8-9 in/lbs rolling torque (new), 2-3 in/lbs rolling torque (used).
6. Temporarily install the pinion gear [7-21], and pinion flange nut [7-27].
7. Check the pinion gear height (optimum .025) (see “Lower Pinion Height Measurement”) (Fig. 8).
8. Adjust lower cup shims [7-16] to obtain .025.
9. Repeat the same procedure on the rear vertical shaft (short) [7-4].
10. Remove both long [7-3] and short [7-4] vertical shafts and pinion gears [7-21].
11. Install the prop gear bearing shims [7-18], and prop gear bearing cup [7-19] into the gear case [7-1].
12. Install the prop gear bearing cone [7-20] onto the prop gear [7-21].
13. Install the prop gear [7-21] with bearing [7-20] into the gear case. (The prop shaft bushing [7-22], used only with the 01-8244 and 01-8248 gear sets, must be installed into the prop gear at this time).
14. Re-install the vertical shaft components described above, torque pinion flange nut [7-27] to 150 ft/lbs.
15. Install rear prop gear [7-25], then bearing carrier bearing cone [7-30] onto the prop shaft [7-24].
16. Install the prop shaft [7-24] with bearing [7-30] into the gear case.
17. Install the prop shaft seals [7-32], and bearing carrier bearing cup [7-31] into the bearing carrier [7-33].
18. Temporarily install the bearing carrier [7-33] into the gear housing [7-1].
19. Install bearing carrier [7-33], tab washer [7-36], and retainer nut [7-37], torque to 20 in/lbs rolling.
20. Rotate the vertical shaft at least 3 turns and check the front prop gear backlash (optimum .012-.015).
21. Adjust the thickness of the prop gear bearing cup shims [7-18] to obtain the correct backlash readings.
22. Remove retainer nut [7-37], bearing carrier [7-33], prop shaft [7-24].
23. Remove front pinion nut [7-27], pinion gear [7-21], and vertical shaft (long) [7-3].
24. Leave front prop gear in case.
25. Install rear vertical shaft (short) [7-4], vertical preload tab washer 7-7], pinion preload nut [7-9] (tighten to 8-9 in/lbs rolling torque).
26. Install rear pinion gear [7-25], pinion flange nut [7-27] torque to 150 ft/lbs.
27. Install prop shaft with shim [7-23] between front prop gear [7-21] and prop shaft spline seat (shoulder).
28. Install bearing carrier [7-33], tab washer [7-36], and retainer nut [7-37], torque to 20 in/lbs rolling.

Fig-8

29. Rotate the vertical shaft at least 3 turns and check the prop gear backlash (optimum .012 to .015). Adjust shim [7-23] between front gear and prop shaft shoulder for back lash.
30. Remove cover nut [7-37], tab washer [7-36], bearing carrier [7-33], prop shaft [7-24], and shim [7-23] between front gear and prop shaft shoulder.
31. Install front vertical shaft [7-3], and pinion gear [7-21].
32. Install tab washer [7-10], vertical shaft preload nut [7-9], and torque nut to 8-9 in/lb rolling.
33. Remove rear pinion flange nut [7-27] and reinstall with #262 Loctite and torque to 150 ft/lbs.
34. Install tab washer [7-10], vertical shaft preload nut [7-9], to rear vertical shaft [7-4] and torque nut to 8-9 in/lb rolling.
35. Bend vertical shaft preload nut tab washers both front and back up, to lock nuts.
36. Install prop shaft [7-24] with shim [7-23] on front of prop shaft.
37. Temporarily install the bearing carrier thrust washer [7-28], and shims [7-29], prop shaft [7-24], prop gear shim [7-23], and bearing carrier [7-33], bearing carrier tab washer [736], and cover nut [7-37]. Torque cover nut to 150 ft/lbs.
38. Check overall rolling torque at the vertical shaft [7-3] (optimum 28-30 in/lbs).
39. Adjust the thickness of the bearing carrier shims [7-29] to obtain the correct rolling torque readings.
40. Upon final assembly, be sure to install the bearing carrier "O" ring [6-13] prior to installation of the bearing carrier.

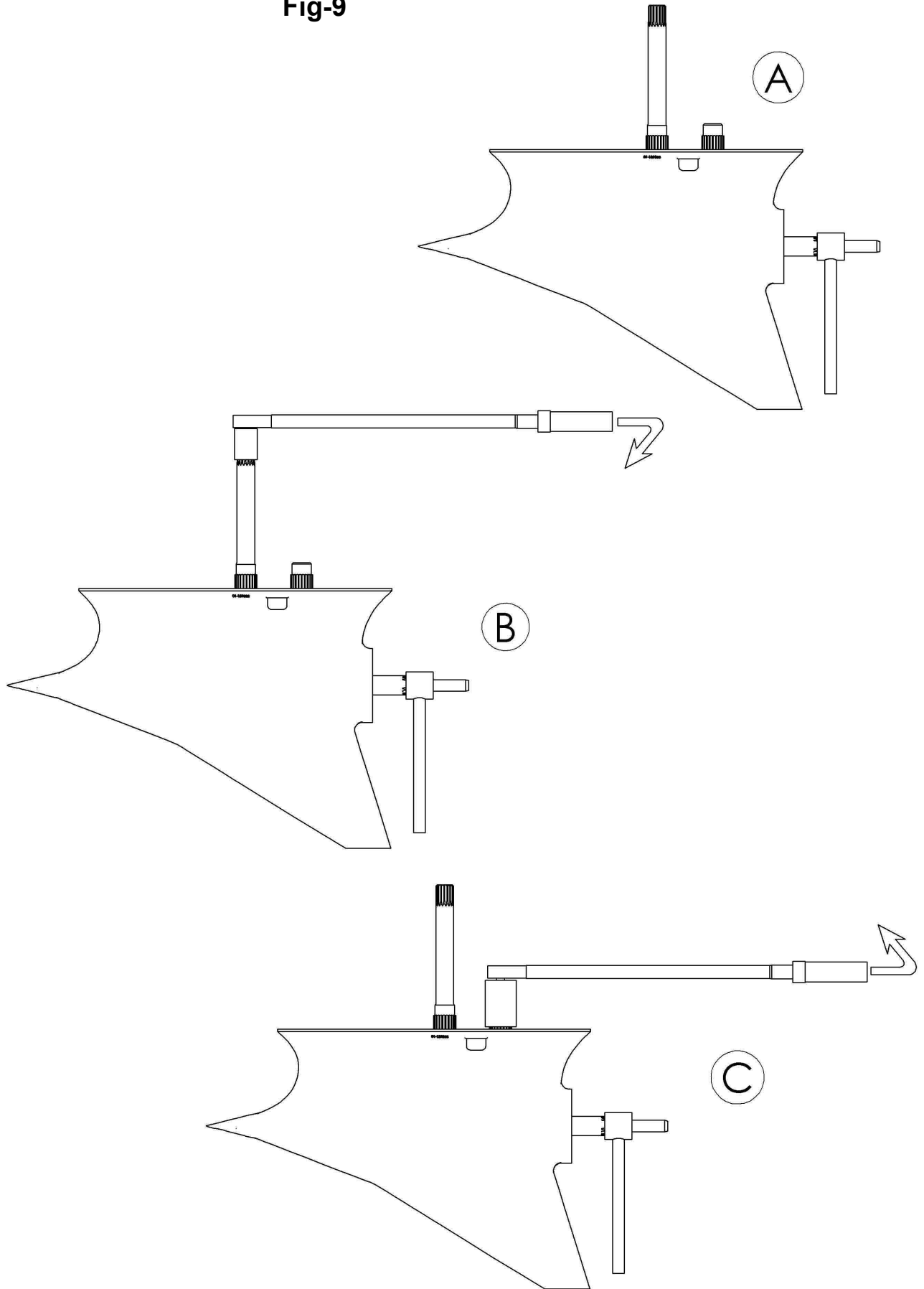
Spline Seat-Running Load (Fig-9)

41. Use prop shaft wrench to lock prop shaft.
42. Use torque wrench to seat gear to splines on all shafts 300 ft/lbs.
Note: Right hand rotation on front vertical shaft [7-3].
Left hand rotation on rear vertical shaft [7-4].
43. Install spur gear spacers [7-11] on both vertical shafts [7-3,4].
44. Install spur gear [7-5] on front vertical shaft [7-3] with tab washer [7-7] and spur gear retainer nut [7-6]. Torque to 25 ft/lbs.
45. Hold front vertical shaft [7-3] in the direction it will be turning (slight load) with spline wrench on the rear vertical shaft [7-4] (slight load) in the opposite direction. Install rear spur gear [7-5] turning until it drops on the vertical shaft [7-4].
46. Install tab washer [7-7] and spur gear retainer nut [7-6]. Torque to 150 ft/lbs, use red loctite.
47. Use a 1/4" copper rod to seat front spur gear. Remove rod, check rear spur gear for contact with front spur gear, with slight pressure on front and rear shafts. Readjust rear spur gear if needed.
48. Install tab washer [7-7], and spur gear retaining nut [7-6], torque to 150 ft/lbs, use red loctite Then use 1/4" copper rod to seat rear spur gear to front spur gear.

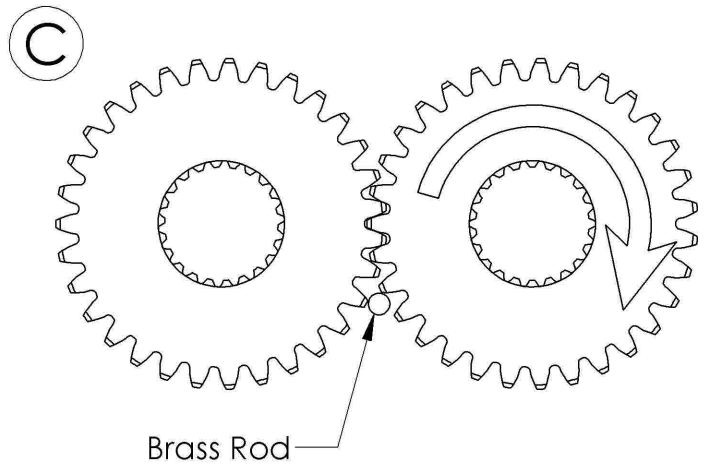
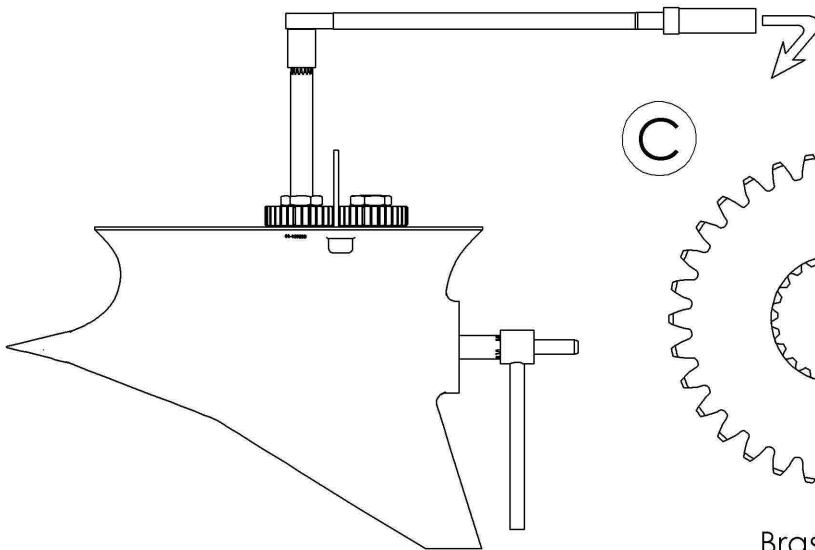
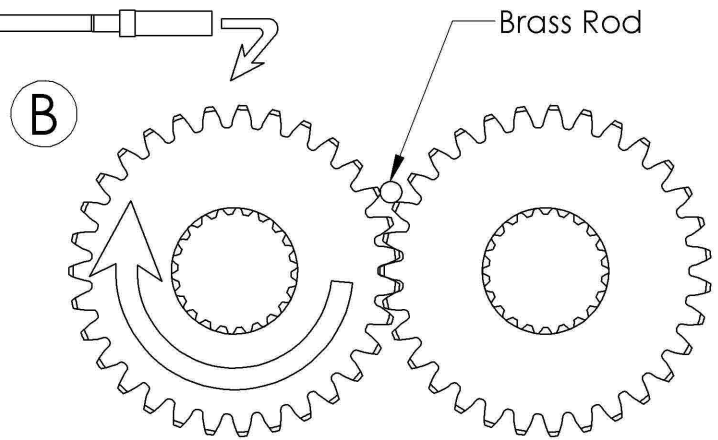
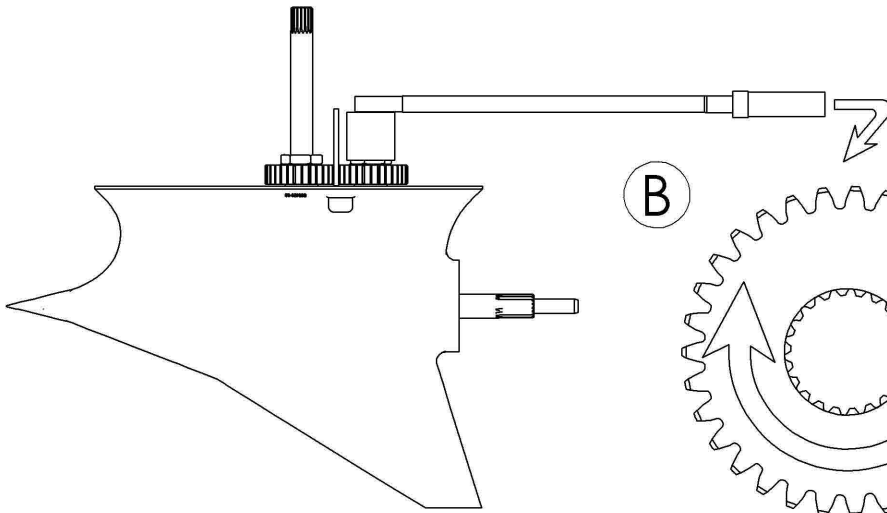
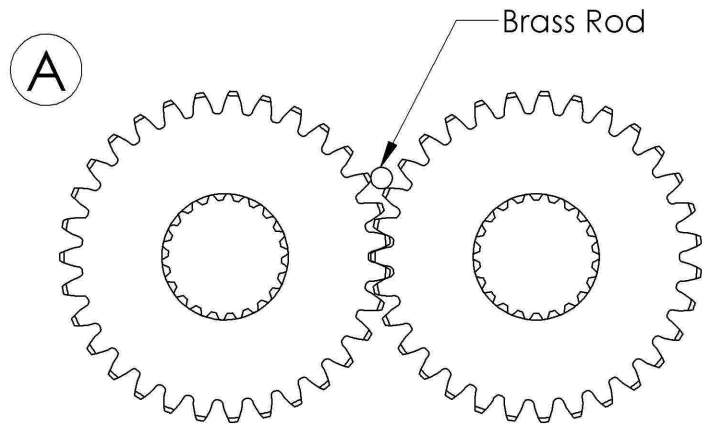
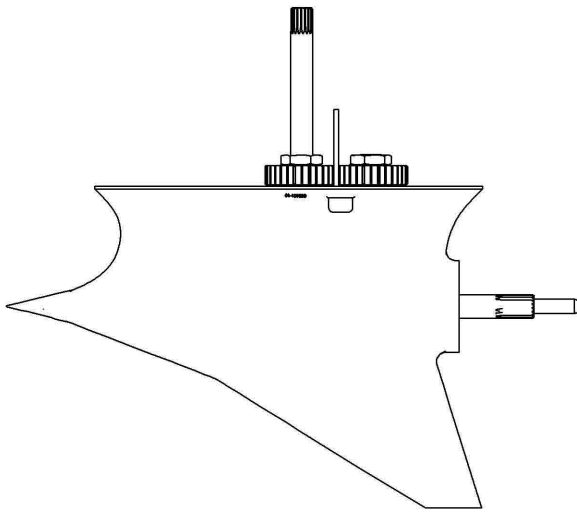
Note: If all gears are not in full contact, turn front spur gear 1-tooth on spline and start sequence over. When all gears are in full contact bend tabs on spur gear nuts. With slight pressure on front vertical shaft (RH) take your hand and feel no movement! Release vertical shaft pressure and rear spur will have slight free play.

Spline Seat

Fig-9



Running Load



Disassembly-Assembly Tools

SCX Upper

1.	Tower & Cap Race Puller Kit	01-5443
2.	Tower Internal Bearing Puller Kit	01-5445
3.	Tower Removal Tool Kit	01-5448
4.	Pinion Retainer Nut Driver	01-5590
5.	Pinion Center Measuring Slug	01-5583
6.	Pinion Bearing Cup Installer (Front)	01-5580
7.	Pinion Bearing Cup Installer (Back)	01-5592
8.	Bearing & Race Installer (Cap)	01-5581
9.	Bearing & Race Installer (Tower)	01-5582
10.	Backlash Tool Kit	01-8017
	A. Backlash Tower	01-5579
	B. Indicator Bracket	01-5588
	C. Pinion Gear Lock	01-5587
	D. Backlash Wand	01-5449
	E. Dial Indicator	01-5591
	Upper Tool Kit	01-8088