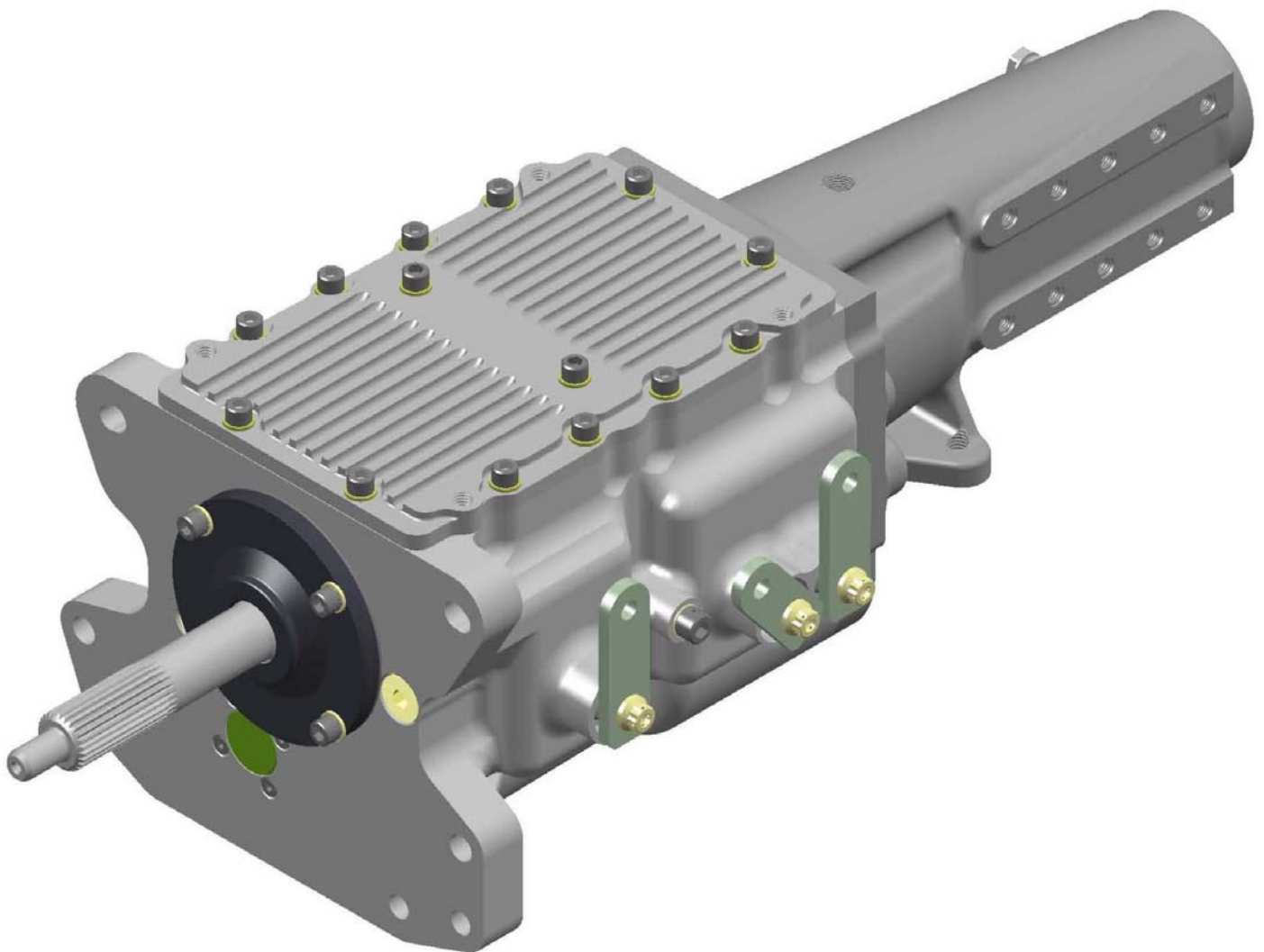




EGB-44T Technical Manual





703 South Girls School Road
Indianapolis, IN 46231
Tel: 317 243 3836
Fax: 317 243 3873
www.emco-gears.com

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1.0 - Specifications

1.1 Torques

Component	Torque	Note	Use	Part Number
5/16UNC SHCS	16 lb/ft	Blue Thread Locker	Top/Front Cover	447170 / 447172
5/16UNF SHCS	18 lb/ft	Blue Thread Locker	Shift Forks	447160 / 447162
3/8 UNF NAS Bolt	40 lb/ft	Copper Anit-Seize	Shift Cam/Arm	447120
7/16UNC SHCS	25 lb/ft	Blue Thread Locker	Tailhousing	447180

1.2 Oil Capacity

Without Pump	Fill to fill line (1.25 qt)
With Pump	0.75-1.00 qt. + line and cooler volume

1.3 Front Covers

- Available to suit Chevy, Dodge, and Ford bellhousings.
- Available to suit Tilton and Quarter Master Clutches

1.4 Dry Weight *excluding shifter

- 80lbs.

2.0 - Lifting Chart

Component	Life
1st Sets	1,800 - 2,200 mi.
Wide & Nar. Gear Sets	1,800 - 2,200 mi.
Shafts	3,000 - 3,500 mi.
Shift Rails	3,000 - 3,500 mi.
Shift Forks	As Needed
Shift Arms	As Needed
Shift Cams	As Needed
Dog Rings & Sliders	As Needed
Bearing Kit	2,000 - 2,500 mi.
Snap Ring Kit	2,000 - 2,500 mi.
Detent Kit	Every Race (500 mi.)
Seal Kit	2,000 - 2,500 mi.

EGB-44 Ratio List

Input Sets:

Pos	Teeth	Teeth: Ratio:	Input Sets:										
			29-21	28-21	27-21	27-22	26-22	26-23	25-23	25-24	24-24	24-25	23-25
			1.381	1.333	1.286	1.227	1.182	1.130	1.087	1.042	1.000	0.960	0.920
3rd	26 - 22	1.182	1.632	1.576	1.519	1.450	1.397	1.336	1.285	1.231	1.182	1.135	1.087
3rd	26 - 23	1.130	1.561	1.507	1.453	1.387	1.336	1.278	1.229	1.178	1.130	1.085	1.040
3rd	25 - 23	1.087	1.501	1.449	1.398	1.334	1.285	1.229	1.181	1.132	1.087	1.043	1.000
3rd	25 - 24	1.042	1.438	1.389	1.339	1.278	1.231	1.178	1.132	1.085	1.042	1.000	0.958
3rd	24 - 24	1.000	1.381	1.333	1.286	1.227	1.182	1.130	1.087	1.042	1.000	0.960	0.920
3rd	24 - 25	0.960	1.326	1.280	1.234	1.178	1.135	1.085	1.043	1.000	0.960	0.922	0.883
3rd	20 - 21	0.952	1.315	1.270	1.224	1.169	1.126	1.077	1.035	0.992	0.952	0.914	0.876
3rd	23 - 25	0.920	1.270	1.227	1.183	1.129	1.087	1.040	1.000	0.958	0.920	0.883	0.846
3rd	23 - 26	0.885	1.222	1.179	1.137	1.086	1.045	1.000	0.962	0.921	0.885	0.849	0.814
2nd	29 - 20	1.450	2.002	1.933	1.864	1.780	1.714	1.639	1.576	1.510	1.450	1.392	1.334
2nd	28 - 20	1.400	1.933	1.867	1.800	1.718	1.655	1.583	1.522	1.458	1.400	1.344	1.288
2nd	29 - 21	1.381	1.907	1.841	1.776	1.695	1.632	1.561	1.501	1.438	1.381	1.326	1.270
2nd	28 - 21	1.333	1.841	1.778	1.714	1.636	1.576	1.507	1.449	1.389	1.333	1.280	1.227
2nd	27 - 21	1.286	1.776	1.714	1.653	1.578	1.519	1.453	1.398	1.339	1.286	1.234	1.183
2nd	27 - 22	1.227	1.695	1.636	1.578	1.506	1.450	1.387	1.334	1.278	1.227	1.178	1.129
2nd	26 - 22	1.182	1.632	1.576	1.519	1.450	1.397	1.336	1.285	1.231	1.182	1.135	1.087
1st	34 - 15	2.267	3.130	3.022	2.914	2.782	2.679	2.562	2.464	2.361	2.267	2.176	2.085
1st	33 - 15	2.200	3.038	2.933	2.829	2.700	2.600	2.487	2.391	2.292	2.200	2.112	2.024
1st	34 - 16	2.125	2.935	2.833	2.732	2.608	2.511	2.402	2.310	2.214	2.125	2.040	1.955
1st	33 - 17	1.941	2.681	2.588	2.496	2.382	2.294	2.194	2.110	2.022	1.941	1.864	1.786
1st	32 - 18	1.778	2.455	2.370	2.286	2.182	2.101	2.010	1.932	1.852	1.778	1.707	1.636
1st	31 - 18	1.722	2.378	2.296	2.214	2.114	2.035	1.947	1.872	1.794	1.722	1.653	1.584
1st	32 - 19	1.684	2.326	2.246	2.165	2.067	1.990	1.904	1.831	1.754	1.684	1.617	1.549
1st	31 - 19	1.632	2.253	2.175	2.098	2.002	1.928	1.844	1.773	1.700	1.632	1.566	1.501
1st	30 - 20	1.500	2.071	2.000	1.929	1.841	1.773	1.696	1.630	1.563	1.500	1.440	1.380
1st	29 - 20	1.450	2.002	1.933	1.864	1.780	1.714	1.639	1.576	1.510	1.450	1.392	1.334
1st	30 - 21	1.429	1.973	1.905	1.837	1.753	1.688	1.615	1.553	1.488	1.429	1.371	1.314
1st	29 - 21	1.381	1.907	1.841	1.776	1.695	1.632	1.561	1.501	1.438	1.381	1.326	1.270
1st	27 - 20	1.350	1.864	1.800	1.736	1.657	1.595	1.526	1.467	1.406	1.350	1.296	1.242

EGB-44 Parts and Price List / Toploader Only

Qty/ Box	Part #	Description	Price Ea.
-----	-----	-	-----
		Complete Unit	\$ 6,300.00

Cases

1	441015	Maincase, Toploader	\$ 1,750.00
1	441020	Front Cap, Ford with snout	\$ 75.00
1	441025	Front Cap, Ford (.805)	\$ 75.00
1	441026	Front Cap, Ford (.855)	\$ 75.00
1	441027	Front Cap, Ford, No snout	\$ 125.00
1	441030	Front Cap, Chevy/Dodge no snout	\$ 50.00
1	441032	Front Cap, Chevy/Dodge with snout	\$ 75.00
1	441035	Front Cap, Chevy/Dodge (.705)	\$ 75.00
1	441060	Tailhousing	\$ 550.00
1	441070	Top Cover, Toploader	\$ 250.00
1	441080	Mid-support, Bottom, Toploader	\$ 125.00
1	441082	Mid-support, Top, Toploader	\$ 125.00

Shafts

1	442010	Input Shaft	\$ 495.00
1	442012	Input Shaft, Extended Spline	\$ 595.00
1	442020	Output Shaft	\$ 995.00
1	442055	Reverse Idler Bearing Shaft, Toploader	\$ 95.00
1	442060	Internal Bearing Shaft, Toploader	\$ 115.00
1	442070	Internal Bearing Shaft Cap, Toploader	\$ 75.00
1	442080	Internal Bearing Shaft Bushing, Rear, Toploader	\$ 75.00
2	442090	Thrust Washer for Internal Bearing Shaft Cap, Toploader	\$ 5.00

Geartrain

1	443060	1-2 Slider/Reverse Gear	\$ 150.00
1	443064	1-2 Slider/Reverse Gear (Pocket)	\$ 150.00
1	443070	Reverse Slider Gear	\$ 95.00
1	443080	Thrust Washer, Output Shaft, Front	\$ 10.00
1	443090	Thrust Washer, 1st Gear	\$ 15.00
1	443110	Spacer, 3rd Gear Bearing Hub	\$ 20.00
2	443112	Spacer, Reverse Idler, Toploader	\$ 0.50
1	443120	Mid Bearing Race, Cluster Shaft	\$ 50.00

Shift Mechanism

1	444010	3-4 Slider	\$ 145.00
1	444014	3-4 Slider (Pocket)	\$ 145.00
1	444020	3-4 Slider Hub	\$ 125.00
3	443032	Dog Ring 1-3 (Rib)	\$ 225.00
3	443034	Dog Ring 1-3 (Pocket)	\$ 225.00
1	444042	Dog Ring Input (Rib)	\$ 225.00
1	444044	Dog Ring Input (Pocket)	\$ 225.00

1	444054	Shift Fork 1-2, Toploader (Pocket)	\$ 225.00
1	444055	Shift Fork 1-2, Toploader	\$ 225.00
1	444064	Shift Fork 3-4, Toploader (Pocket)	\$ 225.00
1	444065	Shift Fork 3-4, Toploader	\$ 225.00
1	444075	Shift Fork Reverse, Toploader	\$ 225.00
1	444085	Shift Rail 1-2, Toploader	\$ 50.00
1	444095	Shift Rail 3-4, Toploader	\$ 50.00
1	444105	Shift Rail Reverse, Toploader	\$ 50.00
2	444110	Interlock Pawl (Short), 1-2/3-4, 3-4/Rev	\$ 20.00
1	444120	Interlock Pawl (Long), 1-2/Rev	\$ 20.00
3	444130	Shift Cam	\$ 90.00
2	444140	Shift Arm 1-2 / 3-4	\$ 45.00
1	444145	Shift Arm 1-2, Toploader (opt)	\$ 45.00
1	444146	Shift Arm 3-4, Toploader (opt)	\$ 45.00
1	444150	Shift Arm Reverse	\$ 45.00

Oil Pump

1	445015	Oil Pump Gear, Driver, Toploader	\$ 40.00
1	445016	Oil Pump Gear, Rev Idler 37T, Toploader	\$ 40.00
1	445017	Oil Pump Gear, Pump Shaft 53T, Toploader	\$ 40.00
1	445025	Oil Pump Gear, Driven, Toploader	\$ 40.00
1	445050	Oil Pump Cap	\$ 40.00
1	445052	Oil Pump Cap, no holes (opt)	\$ 40.00
2	445054	Oil Plug -6, when no pump (opt)	\$ 2.00
2	445056	Oil Plug, Rear Tail Feed, when no pump/no tail feed	\$ 1.00
1	445060	Oil Screen	\$ 37.50
1	445070	Oil Pickup	\$ 40.00
1	445080	Oil Spray bar w/ alum plug	\$ 40.00

Bearings / Seals / O-rings

1	446010	Bearing, Ball - Front Input (w/AR)	\$ 25.00
2	446020	Bearing, Ball - Rear Output (w/AR)	\$ 20.00
2	446030	Bearing, Caged Needle Roller, 1st Gear	\$ 12.00
4	446040	Bearing, Caged Needle Roller, 2nd-3rd Gear	\$ 10.00
1	446050	Bearing, Needle Roller w/o race, Mid Cluster Shaft(w/AR)	\$ 50.00
1	446062	Bearing, Drawn Cup Needle Roller, Top, Rev Idler, Front	\$ 20.00
1	446064	Bearing, Needle Roller w/race, Top, Rev Idler, Rear	\$ 25.00
2	446066	Bearing, Thrust, Top, Cluster Shaft	\$ 3.00
1	446070	Bearing, Caged Needle Roller, I/O Shaft	\$ 15.00
4	446095	Bearing, Caged Needle Roller, Top, Front/Rear Cluster Shft	\$ 15.00
1	446100	Bearing, Needle Roller, Tailhousing	\$ 25.00
1	446126	Gasket, Front Bearing	\$ 25.00
1	446130	Seal, Front Cover	\$ 4.50
1	446140	Seal, Teflon, Front Cover (opt)	\$ 54.00
1	446150	Seal, Rear Tailhousing	\$ 5.00
1	446160	Seal, Teflon, Rear Tailhousing (1.997) (opt)	\$ 85.00
1	446170	Seal, Teflon, Rear Tailhousing (1.885) (opt)	\$ 88.50
3	446180	Seal, Shift Cam	\$ 5.00
10	446190	O-Ring Cord, for Cases (per foot)	\$ 1.00
1	446200	O-Ring, Spray rail, Tailhousing	\$ 1.00

1	446202	O-Ring, Scavenge port, Tailhousing, Toploader	\$ 1.00
2	446210	O-Ring, Scavenge port TH, Oil Screen, Spray Rail TH	\$ 1.00
3	446212	O-Ring, Spray rail, Top Loader	\$ 1.00
1	446230	O-Ring, Front Cluster Cap	\$ 1.00

Hardware

1	447010	Snap Ring, Input Shaft-Front	\$ 2.00
1	447020	Snap Ring, Input Shaft-Rear	\$ 2.00
4	447030	Snap Ring, Cluster Shaft	\$ 2.00
1	447040	Snap Ring, Output Shaft-Front	\$ 2.00
1	447050	Snap Ring, Output Shaft-Rear	\$ 2.00
1	447060	Snap Ring, Tailhousing Bearing	\$ 2.00
1	447072	Snap Ring, Inner Brg Shaft Retaining ring	\$ 0.25
1	447074	Snap Ring, Oil Pump Input Gear, Toploader	\$ 1.00
3	447090	Anti-rotation pins, Bearings	\$ 3.00
1	447100	Anti-rotation pin, Cluster Shft Brg Ret/Spray Bar, Toploader	\$ 0.25
1	447102	Anti-rotation pin, Inner bearing shaft	\$ 0.25
1	447104	Key, for Reverse Idler Bearing Shaft	\$ 1.00
7	447110	Dowel pins for Maincase, 4 Case, 2 Mid Supp, 1 Tail Hse	\$ 0.50
4	447112	Dowel, hollow, Top/Bottom Mid support, Top Cover	\$ 5.00
3	447120	Bolts for Shift Cams/Arms	\$ 9.50
2	447160	Socket Head Cap Screws for Shift Fork (1-2 Toploader, Both Clamshell)	\$ 3.00
1	447162	Socket Head Cap Screws for Shift Fork (3-4 Toploader)	\$ 3.00
16	447170	Socket Head Cap Screws for Front Cap, and Top Cover	\$ 0.50
2	447172	Socket Head Cap Screws for Mid Brg Support	\$ 1.00
1	447174	Socket Head Cap Screws for Mid Brg Support Bearing Anti rotation	\$ 1.00
5	447180	Socket Head Cap Screws for Tail Housing	\$ 1.00
4	447190	Socket Head Cap Screws, Flat Head, for Oil Pump	\$ 1.00
9	447194	Socket Head Cap Screws, Flat Head, for cluster bushing	\$ 0.25
5	447210	Washers for Tail Housing Bolts	\$ 0.25
16	447215	Washers for Front Cap, and Top Cover	\$ 0.25
4	447230	Detent	\$ 0.25
2	447240	Detent Spring - Short, Clamshell	\$ 2.00
2	447242	Detent Spring - Long, Toploader	\$ 1.00
1	447250	Detent Screw (3-4)	\$ 3.00
3	447260	Detent washer	\$ 0.25
1	447270	Freeze Plug for 3-4 rail	\$ 1.00
1	447272	Freeze Plug for Oil Pickup block off	\$ 1.00
1	447274	Pipe Plug, Maincase Front, Spray rail hole	\$ 1.00
1	447276	Freeze Plug for Reverse Idler Brg Shaft	\$ 2.00
1	447281	Oil Plug for bottom mid support oil feed to cluster bearing	\$ 0.25
1	447282	Oil Plug for Spray Rail and Detent Screw (1-2) Toploader	\$ 1.00
1	447283	Oil Plug for Spray Rail, Top Loader	\$ 0.25
1	447284	Oil Windage Tray, Front	\$ 10.00
1	447285	Oil Windage Tray, Rear	\$ 10.00
4	447286	Socket Head Cap Screws for Front Tray	\$ 2.00
4	447287	Socket Head Cap Screws for Rear Tray	\$ 2.00
8	447288	Washer for Windage Trays, Top	\$ 0.25
8	447289	Washer for Windage Trays, Bottom	\$ 0.25

1	447300	Maincase Drain Plug	\$ 1.00
1	447310	Maincase Fill Plug	\$ 5.00
2	447320	Oil pressure fitting, Maincase/Tailhousing	\$ 2.00
1	447322	Oil transfer pipe (opt w/pump), (2 washers only w/o pump)	\$ 150.00
2	447323	Oil transfer pipe plugs (opt)	\$ 2.00
1	447324	Oil feed for Tailhousing bearing (opt)	\$ 25.00
2	447326	Oil passage plug for Tailhousing and Maincase Front (3-4 Rail hole)	\$ 1.00
1	447340	Rear Seal Retainer	\$ 2.00

Sets, Kits, Other Spares

	449020	2nd/3rd Set	\$ 450.00
	449030	1st Set - Toploader	\$ 1,470.00
	449040	Input Set	\$ 450.00
	449060	Seal Kit (Standard)-6130,6150,3-6180,4-6190,6200,6210,6220	\$ 28.50
	449062	Seal Kit (Teflon)-6140,6170,3-6180,4-6190,6200,6210,6220	\$ 161.50
	449080	Snap Ring Kit-7010,7020,4-7030,7040,7050,7060,3-7120,7270,2-7360	\$ 49.50
	449082	Shift Cam/Arm Kit-3-4130,2-4140,4150	\$ 315.00
	449084	Detent/Ball Kit-4-7230,4-7240	\$ 9.00
	449088	Case Kit (1) 1015,1070,1080,1082,7174,7090,7281,7194 (4)7112,7170,7215 (7)7110	\$ 2,293.00
	449400	3-4 Overdrive Shifter Rail	\$ 75.00
	449402	Std. Shifter (Slide / 3-4)	\$ 80.00
	449410	Rev Overdrive Shifter Rail	\$ 75.00

5.0 - Case Prep

5.1 Parts for Assembly:

Qty.	Part No.	Description
1	441015	Maincase
1	441060	Tail Housing
1	441080	Mid brg. Support (bottom.)
1	441082	Mid brg. Support (top)
1	442070	I.B.S. Cap
1	442080	I.B.S. Bushing
1	445052	Oil Pump Cap
2	445054	Oil Plug (-6)
2	445056	Oil plug (-3)
2	445058	Aluminum Crush Washers (-3)
1	446050	Bearing - Mid Support
1	446062	Bearing - Rev. Idler (Front.)
1	446064	Bearing - Rev. Idler. (Rear)
1	446100	Bearing - Tail Housing
1	446150	Seal - Tail Hsg.
3	446180	Seal - Shift Cam
1	446190	O-Ring - Tail Housing
1	446202	O-Ring - Tail Housing Scavenge
1	446210	O-Ring - Tail Housing Spray Rail
1	446230	O-Ring - I.B.S. Front. Cap
1	447060	Snap Ring - Tail Housing
1	447174	S.H.C.S. - Anti-Rotation - Mid Support Brg.
9	447194	Flat S.H.C.S. - I.B.S. Cap & Bushing & Rev. Brg.
2	447300	Fill/Drain Plug
1	447312	Port plug - 3/4 Rail (-8)
1	447314	Port plug - Spray Rail (-6)

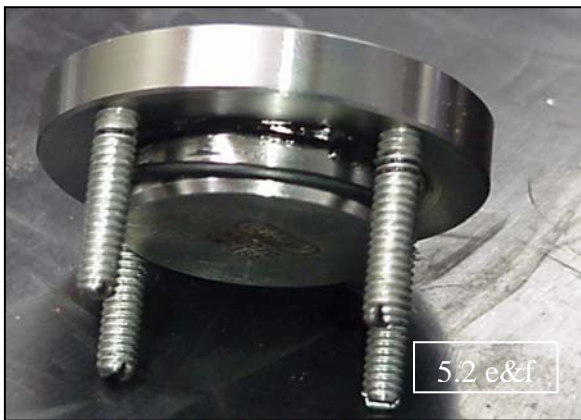
5.2 Maincase Preparation:

Qty.	Part No.	Description
1	441015	Maincase
1	442070	I.B.S. Cap
1	442080	I.B.S. Bushing
1	446062	Brg. Rev. Frt.
1	446064	Brg. Rev. Rear
3	446180	Seal - Shift Cam
1	446230	O-Ring - I.B.S. Cap
9	447194	Flat S.H.C.S.

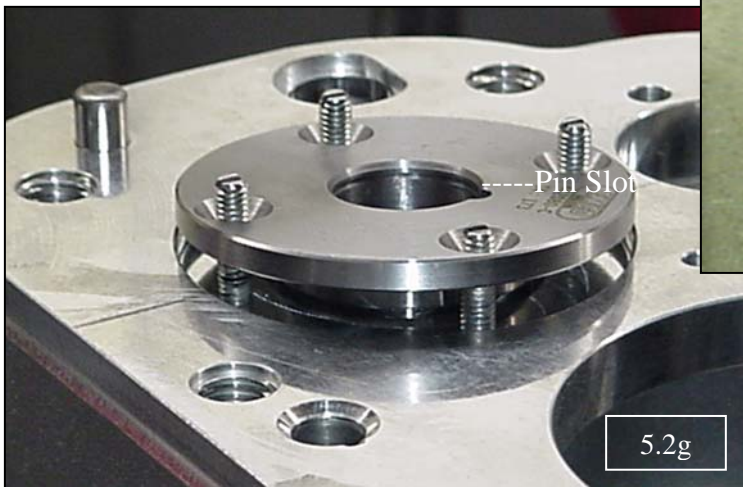
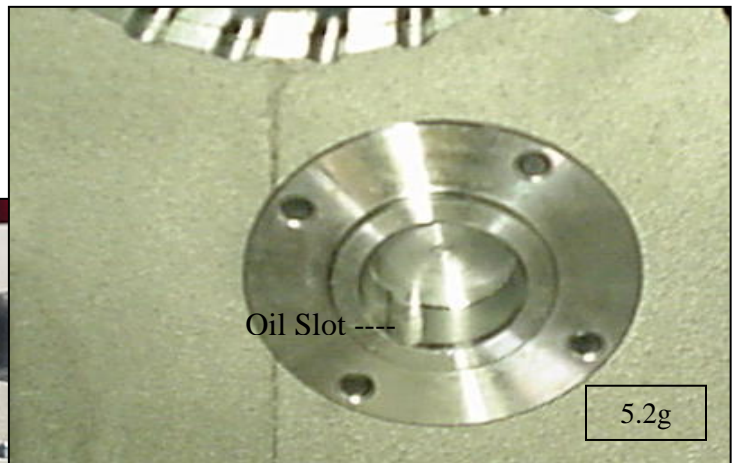
5.2a Preheat oven to 220 deg. (DO NOT exceed 220 deg. as case may distort).

5.2b Remove the reverse brg. retaining screw from maincase to be used later.

- 5.2c Heat maincase approx. 30 min.
- 5.2d While maincase is heating, clean flat head screws & front i.b.s. cap (447194 & 442070) with fast evaporating brake clean. (see photo)
- 5.2e Tooling screws (10-24) will aid in installing i.b.s. inserts. (see photo)
- 5.2f Apply a thin bead of silicone to the front i.b.s. cap (442070) & install O-Ring (446230). (see photo)



5.2g Install front i.b.s. cap first, orienting oil slot toward the bottom of maincase (use red threadlocker on front cap screws). Install rear i.b.s. bushing in the same manner - except the notch goes up (use blue threadlocker on rear bushing screws). (see photos)

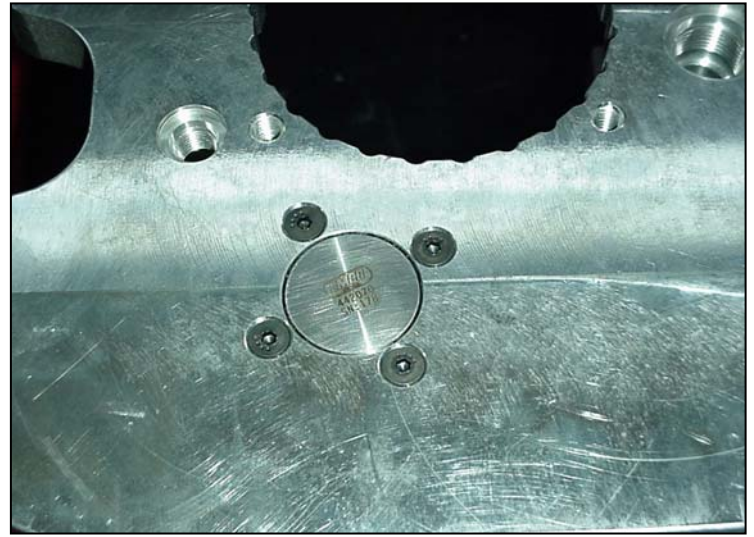
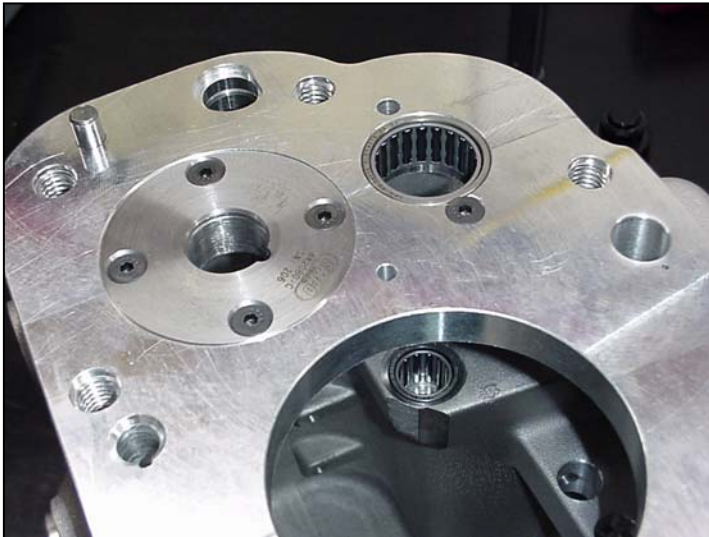


5.2h Next install shift cam seals (446180)

with 3/4" socket. (see photo)
5.2i Finally, install the front & rear reverse bearings. (see photo)



Installed parts should look like this:



5.2j Set case aside to cool.

5.3 Tail Housing Preparation:

Qty.	Part No.	Description	Notes
1	441060	Tail Housing	
1	445052	Pump Cap**	**for use without pump - see sect. 8.0 for pump installation
1	445054	Oil Plug (-6)**	
2	445056	Oil Plug (-3)**	
2	445058	Aluminum Crush Washers (-3)**	
1	446100	Bearing - Tail Housing	
1	446150	Seal - Tail Housing	
1	446190	O-Ring - Tail Housing	
1	446202	O-Ring - Tail Housing - Scavenge	
1	446210	O-Ring - Tail Housing - Spray Rail	
1	447060	Snap Ring - Tail Housing Bearing	

5.3a Preheat oven to 220 deg. (do not exceed 220 deg. as case may distort)

5.3b Remove Tail Housing Snap Ring (447060), tail housing o-ring (446190), scavenge o-ring (446202), & spray rail o-ring (446210) for later use.

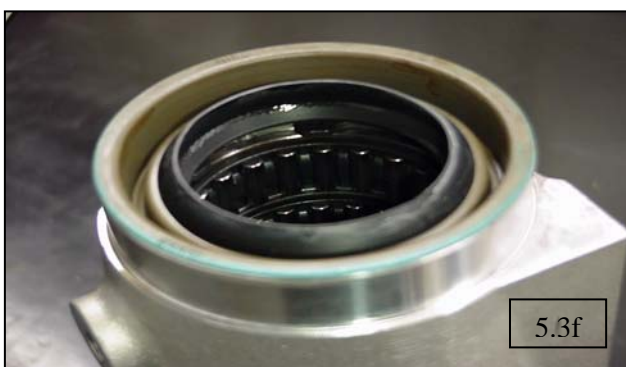
5.3c Heat tail housing approx. 20 min.

5.3d After case has reached temperature, install tail bearing (446100). (use a brass punch if necessary - bearing should fall in easily)

5.3e Now, install snap ring (447060) with gap *down* for oil transfer. (see photo)



5.3f Finally, install seal (446150) using seal driver or aluminum disk. (see photo)



5.3g Set case aside to cool.

5.4 Mid Support Preparation:

Qty.	Part No.	Description
1	441080	Mid Support - Bottom
1	441082	Mid Support - Top
1	446050	Bearing - Mid Support
1	447174	S.H.C.S - Bearing Anti-Rotaion

5.4a Preheat oven to 220 deg. (do not exceed 220 deg. as case may distort)

5.4b Remove anti-rotation s.h.c.s. (447174) for later use.

5.4c Heat mid support (441080) approx. 15 min.

5.4d After case has reached temperature, install bearing.(446050) Be sure slot in bearing aligns with threaded hole for s.h.c.s.



5.4e Carefully set case aside to cool - making sure bearing does not move.

5.5 Front Bearing/Seal Retainer Preparation: **Retainers vary with application

Qty.	Part No.	Description
1	441030	Front Bearing/Seal Retainer
1	446130	Seal - Bearing/Seal Ret.

5.8a Preheat oven to 220 deg. (do not exceed 220 deg. as case may distort)

5.8b Heat Front retainer (441030) approx. 10 min.

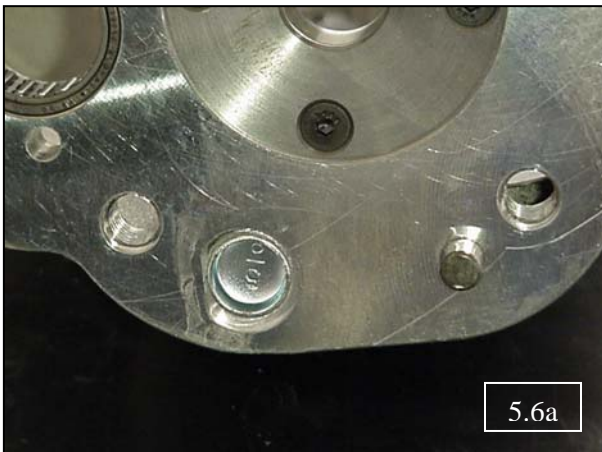
5.8c After case has reached temperature, install front seal (446130) using seal driver.

5.8d Set reatainer aside to cool.

5.6 Maincase - Final Preparation:

Qty.	Part No.	Description
1	447194	Flat S.H.C.S. - Rear Reverse Bearing
1	447284	Windage Tray - Front
1	447285	Windage Tray - Rear
4	447286	S.H.C.S. - Front Tray (10-24)
4	447287	S.H.C.S. - Rear Tray (10-24)
8	447288	Washers - Front & rear Tray (#10 thin s.s.)
8	447289	Washers - Rear Tray (#10 thick AN)

5.6a After case has cooled, install 5/8" freeze plug (447272) using plug driver or 1/2" socket. (only if oil pump is not used) If using pump, install o-ring (446210) then insert oil pickup assembly (445070). **Apply small amount of oil or assy. lube to pickup before installing. (see photo) Now install spray rail plug in front of case (44



5.6b Use screw you removed earlier to retain the rear reverse bearing. (apply blue thread-locker) Be sure to check fit of reverse i.b.s. (442055) after tightening - adjust to fit i.b.s.

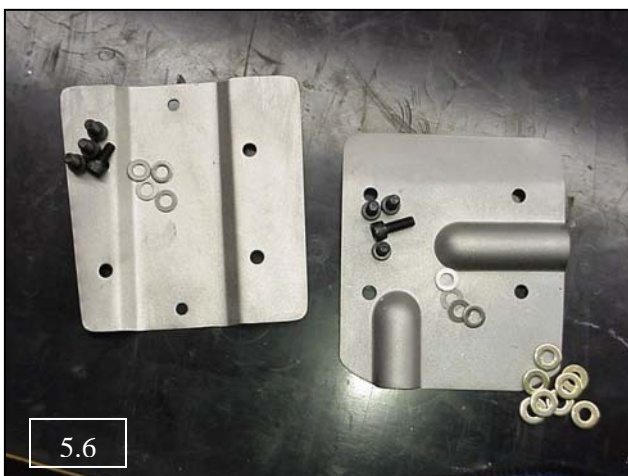
5.6c Now, install rear windage tray (447285) using tooling screws. (10-24 as in earlier sect. - 5.2e) Stack 2 thick washers (447289) on each screw. (see photo) - stack tray on washers.

5.6d Removing one tooling screw at a time, install s.h.c.s. (447288) with thin washers (447288). **Apply blue threadlocker to screws.

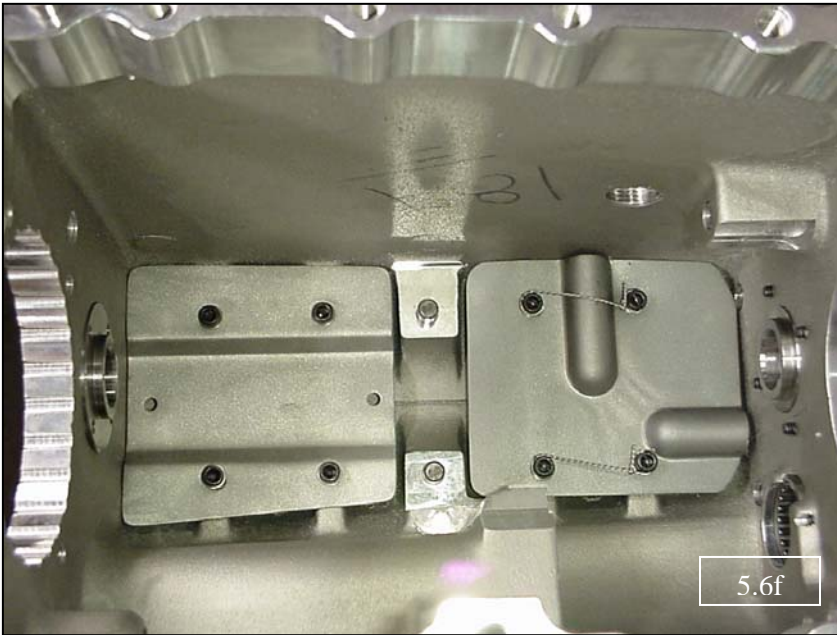
5.6e Install front tray using s.h.c.s. (447286) & thin washers (447288).

**Apply blue threadlocker to screws.

5.6f Safety wire all screws as example in photo (use .025 wire). (see photo)



5.6 Maincase - Final Preparation:



5.6g Install oil plug (445054). (only if pump is not used) If using pump, install oil fitting (447230).

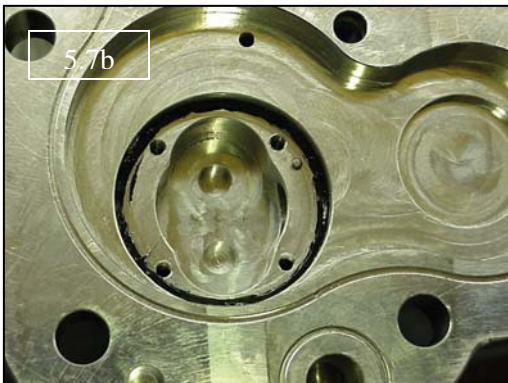
5.6h Maincase is now ready for geartrain installation.

5.7 Tail Housing Final Preparation:

Qty.	Part No.	Description	Note
1	445052	Pump Cap**	**for use without pump - see sect. 8.0 for pump installation
1	445054	Oil Plug (-6)**	
2	445056	Oil Plug (-3)**	
2	445058	Aluminum Crush Washer (-3)**	
1	446190	O-Ring - Tail Housing	
1	446202	O-Ring - Scavenge	
1	446210	O-Ring - Spray Rail	
4	447190	Flat S.H.C.S. - Oil Pump Cap	

5.7a Install oil plug (445054) on "oil out" port. Install oil plugs (445056) & aluminum crush washers (445058). **Apply a small amount of thread sealant to 445056 threads. If using pump, install oil fitting (447230) in place of 445054 & rear bearing feed (447324) in place of 445056.

5.7b Now, install pump cap (445052) using flat s.h.c.s. **Apply silicone to tail housing. (see photo) **Use blue threadlocker on screws.



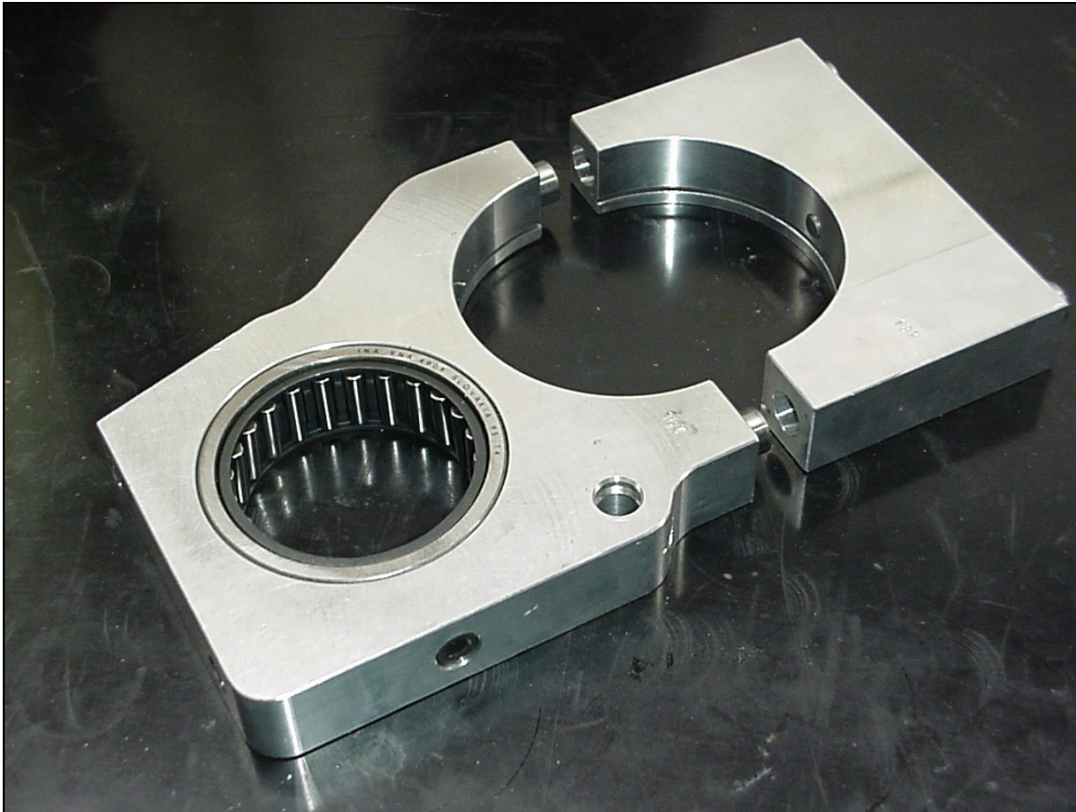
5.7c Finally, install o-rings removed earlier.

5.7d Tail Housing is now ready for installation.

5.8 Mid Support Final Preparation:

5.8a Install anti-rotation s.h.c.s. (447174). **Use blue treadlocker.

5.8b Mid Support is now ready for geartrain installation.



6.0 – Gear Train Assembly & Installation

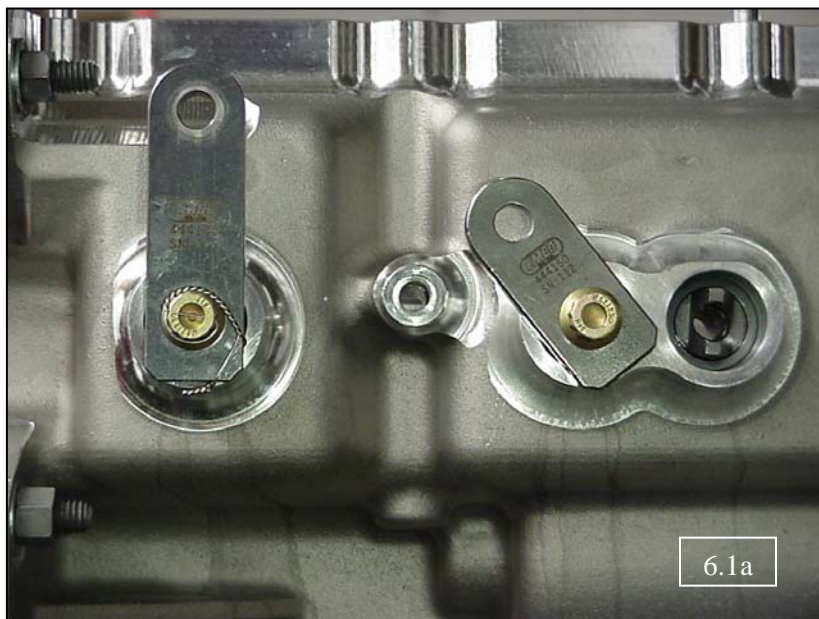
6.1 Shift Cam Assembly:

Qty.	Part No.	Description
3	444130	Shift Cam
2	444140	Shift Arm (1-2/3-4)
1	444150	Shift Arm (Reverse)
3	447120	Bolts - NAS - Shift Arm/Cam

6.1a Install shift cams (444130) using a small amount of oil or assy. lube. (see photo)

6.1b Apply copper anti-seize to shift cam/arm bolts (447120). Install bolts through shift arms (444140 & 444150) into shift cams and torque. Use 1" wrench to hold arm. (see torque chart - sect. 1.1)

6.1c Now, safety wire bolts to arms using .032" wire. (see photo)



6.2 Reverse Idler Installation:

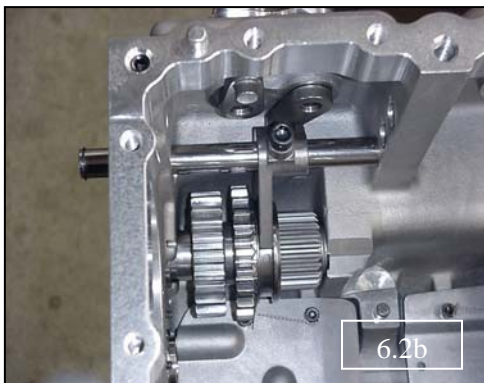
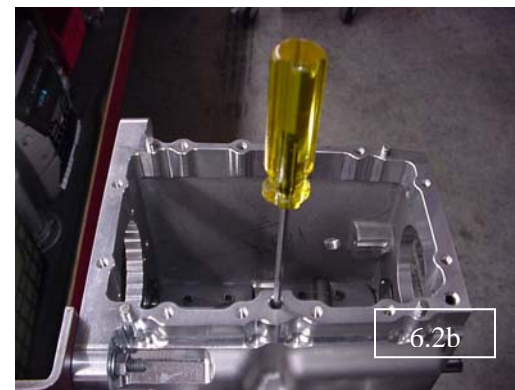
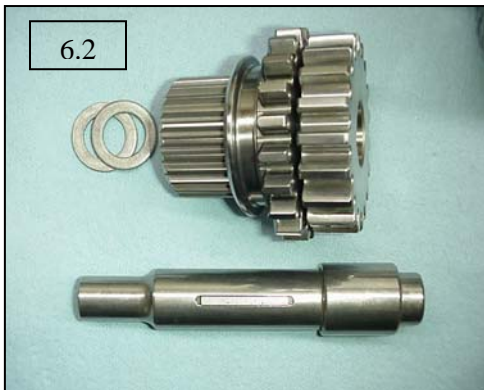
Qty.	Part No.	Description
1	442045	Reverse Idler (Ratios Vary)
1	442055	Reverse I.B.S.
1	443070	Reverse Slider
2	443112	Washers - Reverse Idler
1	444075	Shift Fork - Reverse
1	444105	Shift Rail - Reverse
1	447104	Key - Reverse I.B.S.
1	447160	S.H.C.S. - Shift Fork (1-2/Rev.)
1	447230	Detent Ball
1	447240	Detent Spring (3-4/Rev.)

6.2a Lay reverse idler (442045) & reverse slider (443070) in maincase. Install key (447104) into the reverse i.b.s. (442055) then insert assy. into reverse idler. The two reverse washers (443112) install on tip of i.b.s. before it is placed into the front bearing. (see photo)

6.2b Clean reverse fork (444075) and fork s.h.c.s. (447160) with fast evaporating brake clean.

6.2c Lay fork on reverse slider (be sure to line up shift cam pin) and install reverse shift rail (444105) into fork. Slide rail up to (but not covering) detent bore. Install detent spring (447240) in bore first, then detent ball (447230). Using 3/16" allen driver, depress ball & spring & insert reverse rail.

6.2d Now install fork screw and torque. (see torque chart - sect.1.1) **Use blue threadlocker (fork screws may be safety-wired if desired) Install spiral-lock ring (447052) in groove on rail. (see photo)



6.3 Cluster Shaft Assembly:

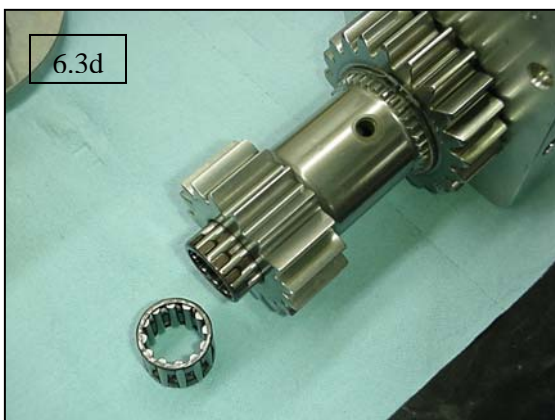
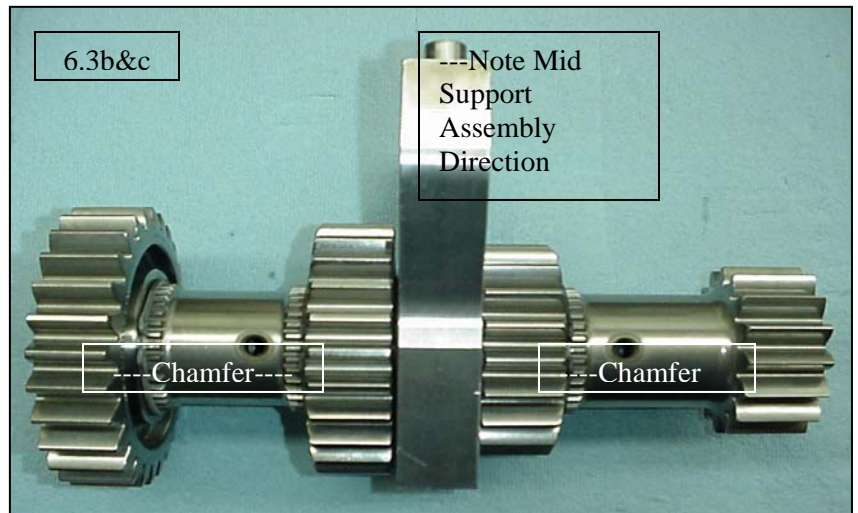
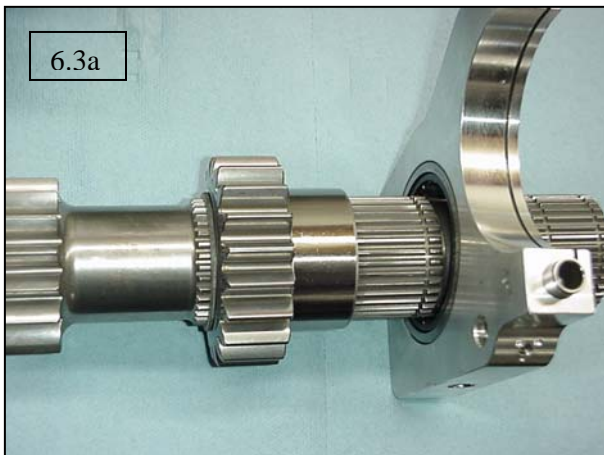
Qty.	Part No.	Description
1	Mid Support - Assembled	
1	442035	Cluster Shaft (Ratios Vary)
1	443020	Input Pinion (Raios Vary)
2	443040	2nd/3rd Pinon (Ratios vary)
1	443120	Race - Mid Support
4	446095	Bearing - Internal - I.B.S.
4	447030	Snap Ring - Cluster Shaft

6.3a Install snap ring (447030) in groove closest to gear on cluster shaft (442035).

6.3b Place 2nd gear pinion (443040) against snap ring on shaft, noting chamfer on gear. (see photo)

6.3c Place mid support race (443120) against 2nd gear. Install mid support assembly noting direction (If using oil pump, install spray rail o-rings - 446212; see sect. 8.0) (see photo).

6.3d Place 3rd gear pinion (443040) against mid support race/mid bearing assembly. Install two following snap rings followed by input pinion (443020) and last snap ring. Insert internal bearings (446095 - two on each end of shaft).



6.4 Output Shaft Assembly: **See note on Pocket & Rib dog system assembly - Sect. 6.5Note

Qty.	Part No.	Description	Notes
1	442020	Output Shaft	
2	443030	2nd/3rd Gear (Ratios Vary)	
1	443050	1st Gear (Ratios Vary)	
1	443064	1-2 Slider (Pocket)**	**There are two versions of dog ring available - see sect.6.5Note
1	443090	Thrust Washer - 1st Gear	
1	443110	Spacer - 3rd Gear Bearing	
1	444014	3-4 Slider (Pocket)**	
1	444020	3-4 Slider Hub	
3	444034	1-3 Dog Ring (Pocket)**	
1	446020	Bearing - Mid Support Output Shaft	
2	446030	Bearing - 1st Gear	
4	446040	Bearing - 2nd/3rd Gear	
1	447040	Snap Ring - Output Shaft (Front)	

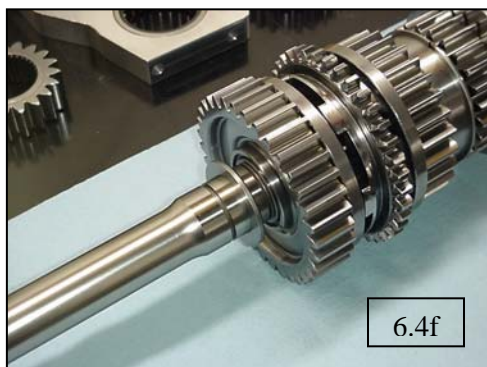
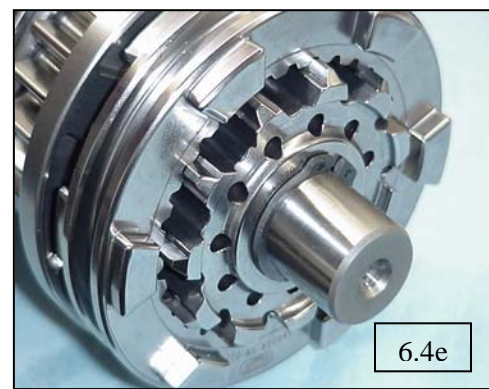
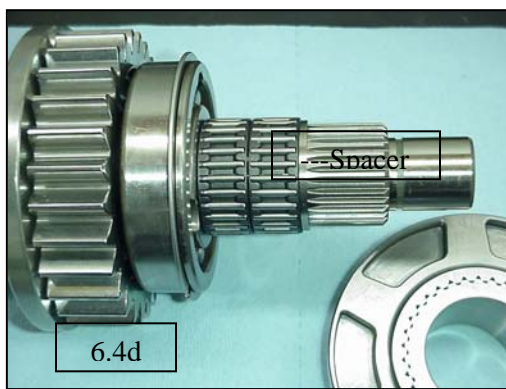
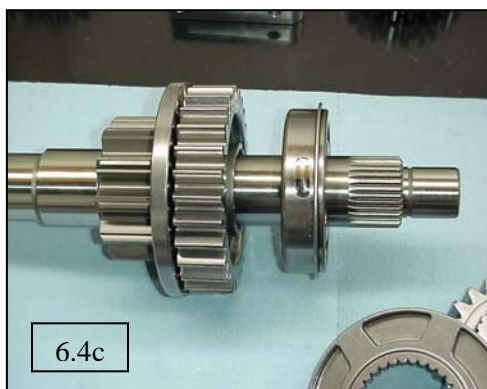
6.4a Install two 2nd/3rd bearings (446040) on front of output shaft (442020) against 1-2 slider hub.

6.4b Install 2nd gear (443030) with dog ring (444034) onto bearings. (Always place dog rings "dog" side up - away from gear).

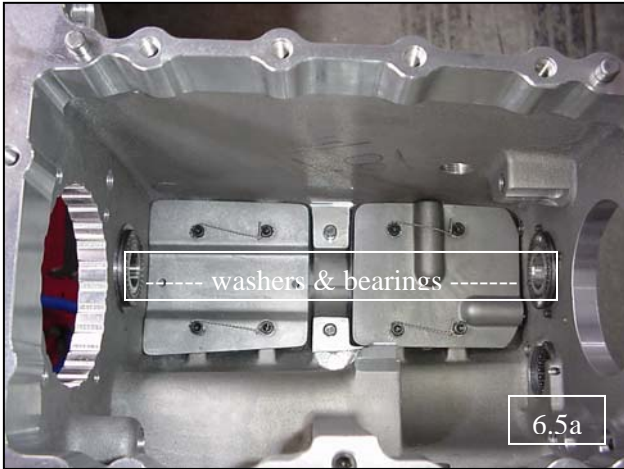
6.4c Next, install mid support bearing (446020) on shaft (fit is usually snug). (see photo)

6.4d Now install the two remaining 2nd/3rd bearings and 3rd gear spacer (443110), along with 3rd gear (443030) and dog ring. (see photo)

6.4e Install 3-4 hub (444020), 3-4 slider (444014) and retain with snap ring (447040). (see photo) 6.4f Finally, install 1st/2nd slider (443064), 1st gear (443050) and dog ring with bearings (446030), and washer (443090) Be sure chamfer on washer is against 1st gear.



6.5 Gear Train installation:



6.5a Install cluster shaft washers (442090) and bearings (446066). (If using oil pump, install spray o-ring - 446212; see sect. 8.0) (see photo)

6.5b Install assembled mid support/cluster shaft assembly.

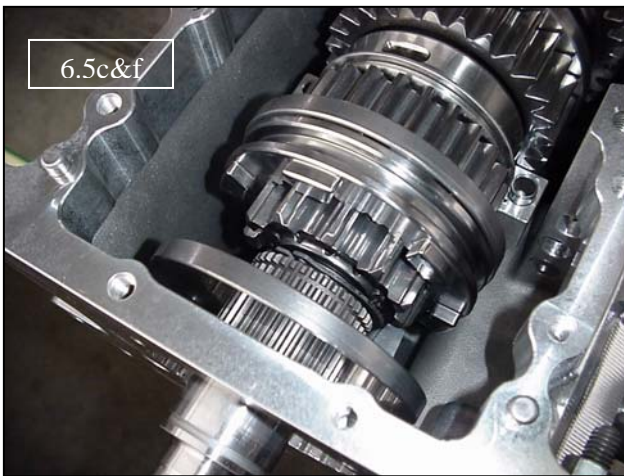
6.5c Insert output shaft assembly; making sure slot in mid bearing is up (see photo).

6.5d Place rear input shaft snap ring (447020) on tip of output shaft (see photo).

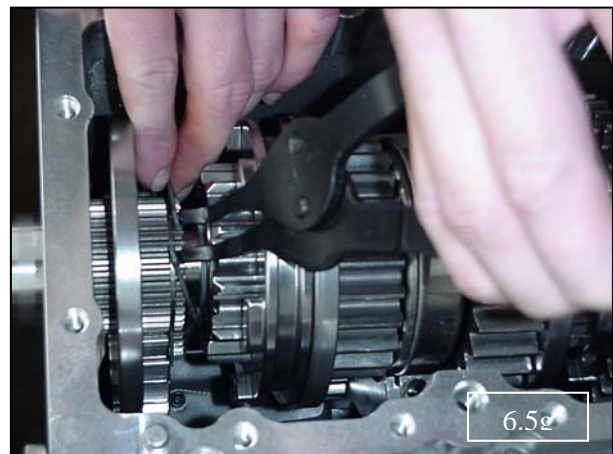
6.5e Lift output shaft and place input dog ring on shaft tip (444044) (see photo).

6.5f Insert I/O bearing (446070) into input shaft (442010). Insert input shaft onto tip of output shaft. Place input dog ring onto input shaft. (see photo)

6.5g Install snap ring (45 deg. or 90 deg. snap ring pliers work best). (see photo)



6.5h Install input gear (443010). Then, install input bearing with anti-rotation pin (447090) making sure pin stays upright. Install snap ring (447010). (see photo)



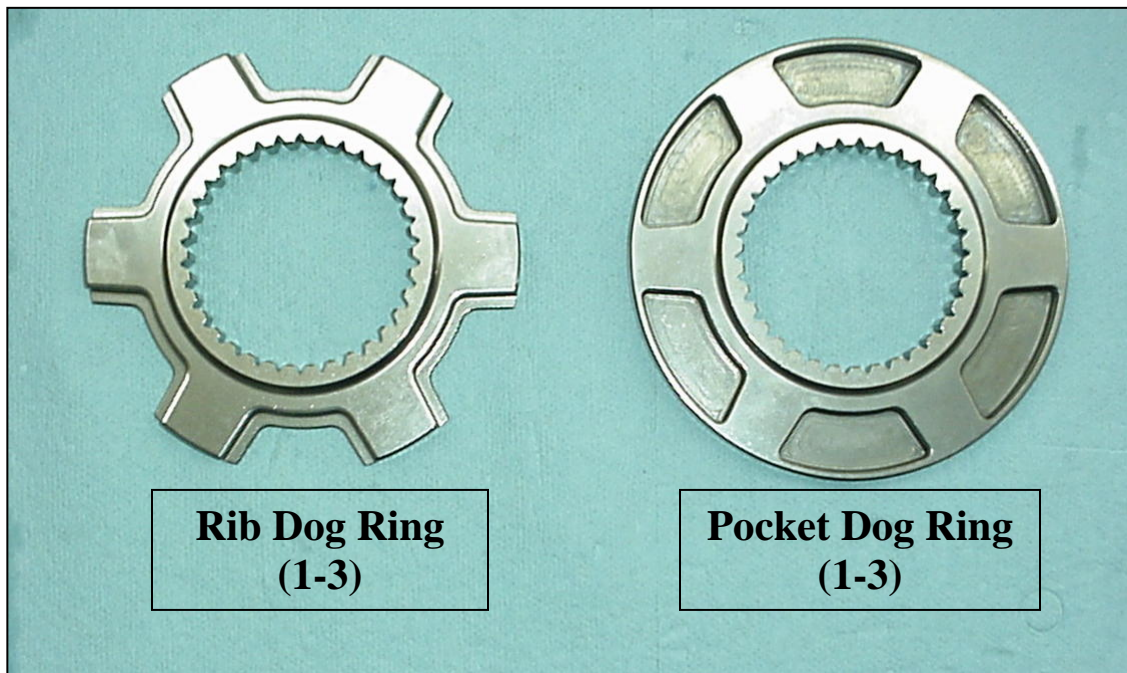
6.5 Gear Train Installation:



- 6.5 i Repeat for rear bearing (446020) installation. Install rear snap ring (447050).
6.5j Install mid support top (441082).
6.5k Install cluster i.b.s. (442060) using anti-rotation pin (447102) and snap ring (447072). Make sure snap ring groove is away from pin (see photo).

6.5Note Rib Dog System Assembly:

The rib dog system assembles similarly to pocket system, however the input assembly is slightly different. You may install the rear input shaft snap ring (447020) and rib input dog ring (444034) prior to input shaft installation. The complete input shaft assembly (shaft, snap ring, dog ring & i/o brg) may be inserted in maincase *before* the output shaft assembly. Simply rest input dog ring in front of the input pinion on cluster shaft during output shaft installation.



6.6 Fork Installation:

Qty.	Part No.	Description
1	444054	Shift Fork - 1-2 (Pocket)
1	444064	Shift Fork - 3-4 (Pocket)
1	444085	Shift Rail - 1-2
1	444095	Shift Rail - 3-4
2	444110	Interlock Pawl (1-2/3-4 & 3-4/Rev.)
1	444112	Interlock Pawl (1-2/Rev.)
1	447160	S.H.C.S. - Shift Fork (1-2/Rev.)
1	447162	S.H.C.S. - Shift Fork (3-4)
3	447230	Detent Ball
1	447240	Detent Spring (3-4/Rev.)
2	447242	Detent Spring (1-2)
1	447250	Detent S.H.C.S. (3-4)
1	447260	Detent Washer (3-4)
2	447282	Detent Set Screw (1-2)
1	447312	Plug - 3-4 Shift Rail

6.6a First, install 1-2/Rev. interlock Pawl (444112) in rear detent bore above reverse rail. Next, install 3-4/Rev. interlock Pawl (444110) in front detent bore.

6.6b Clean all forks and screws with fast evaporating brake clean.

6.6c Now, install 3-4 shift fork (444064) into slider groove (be sure to line up shift cam pin). Insert 3-4 shift rail (444095) into fork.

6.6d Install 3-4 fork s.h.c.s. (447162) and torque. (see torque chart - sect 1.1)
**Use blue threadlocker on screw. (fork screws may be safety-wired if desired)

6.6e Install 1-2/3-4 interlock pawl (444110) in front detent bore.

6.6f Next, install 1-2 shift fork (444054) into slider groove. Insert 1-2 shift rail (444085) into fork.

6.6g Install 1-2 fork s.h.c.s. (447160) and torque. **Use blue threadlocker on screw.

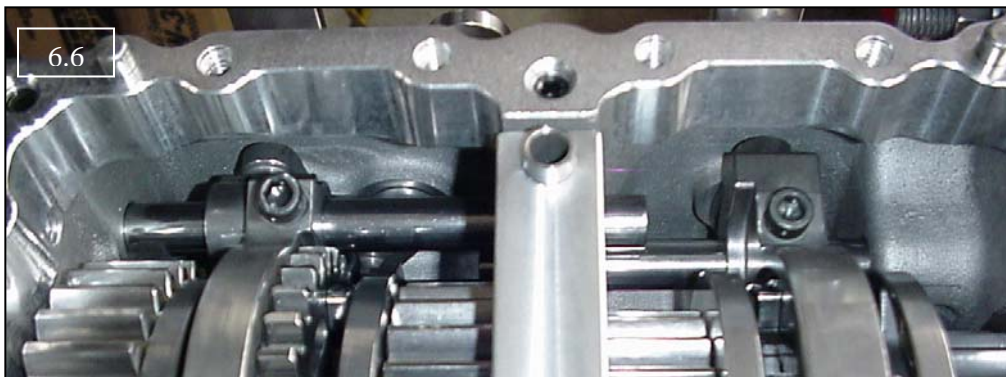
6.6h Insert detent balls (447230) into detent bores, followed by detent springs (447240 & 447242).

6.6i Install 1-2 detent set screws (447282) and tighten 2 turns past flush. **Use blue threadlocker.

6.6j Install 3-4 detent s.h.c.s. (447250) and washer (447260). Use blue threadlocker.

6.6k Install 3-4 shift rail plug (447312)

6.6l Check interlock by engaging one gear, then try to engage another.



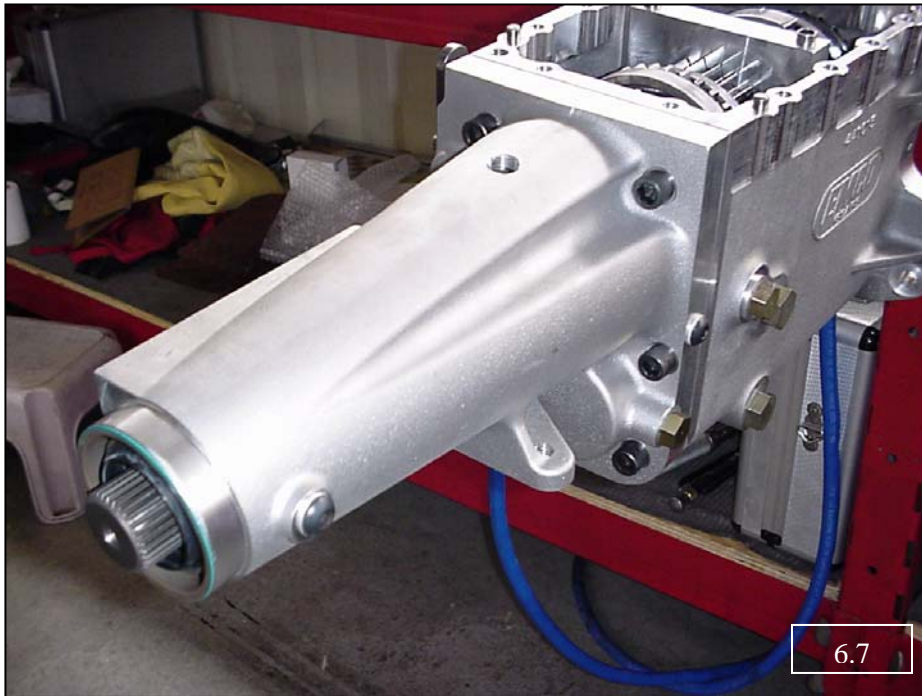
6.7 Tail Housing Installation:

Qty.	Part No.	Description
1		Tail housing Assembly
6	447180	S.H.C.S. - Tail Housing
6	447210	Washers - Tail Housing

6.7a Install assembled tail housing over rear bearing & dowel.

6.7b Clean s.h.c.s. (447180) using fast evaporating brake clean.

6.7c Install s.h.c.s. and washers (447210) and torque (see torque chart - sect. 1.1) **Use blue threadlocker on screws.



6.8 Front Bearing/Seal Retainer Installation:

Qty.	Part No.	Description
1		Front Bearing/Seal Retainer Assembly
1	446126	Front Gasket
4	447170	S.H.C.S. - Front/Top Cover

6.8a Install front gasket (446126)

6.8b Install assembled front retainer onto input shaft and front bearing. (be careful to not damage seal)

6.8c Clean front s.h.c.s. (447170) using fast evaporating brake clean.

6.8d Install s.h.c.s. and torque (see torque chart - sect. 1.1) **Use blue threadlocker.

6.9 Top Cover Installation:

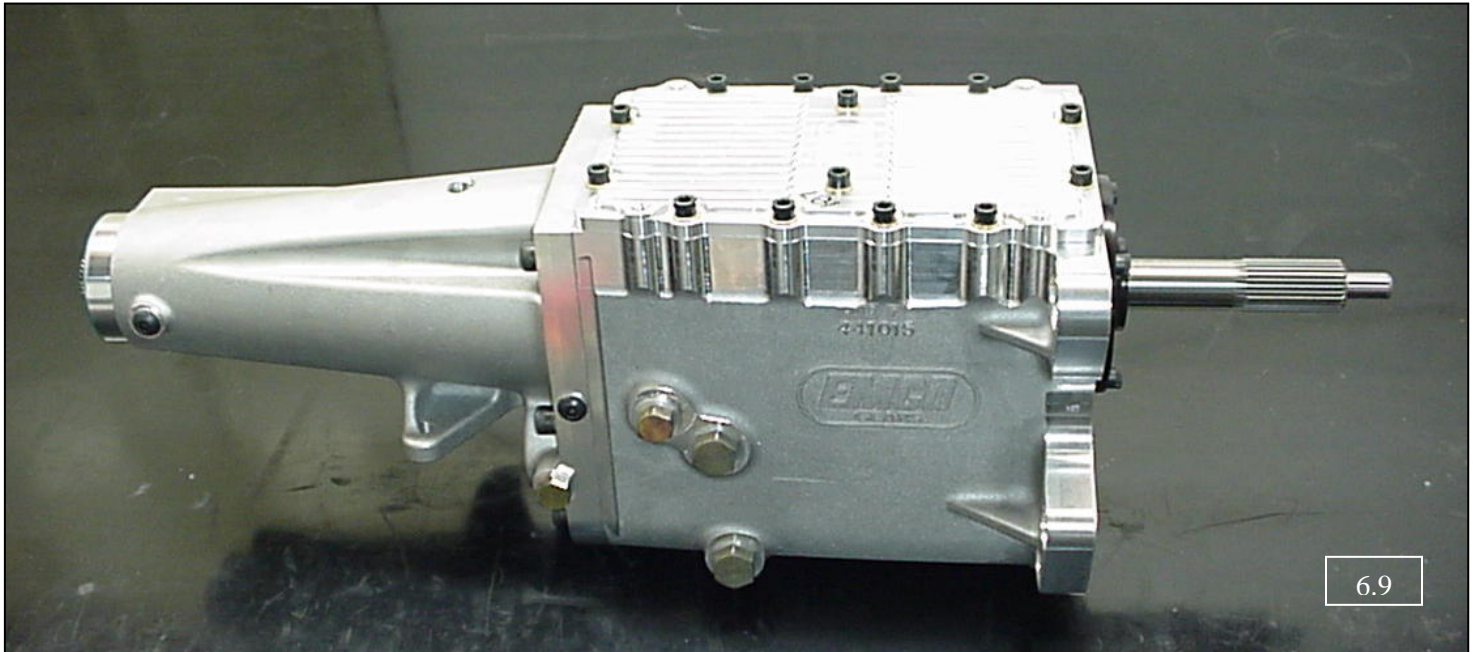
Qty.	Part No.	Description
1	441070	Top Cover
1	446190	O-Ring - Top Cover
12	447170	S.H.C.S. - Top/Front Cover
2	447172	S.H.C.S. - Mid Support
14	447215	Washers - Top/Front Cover

6.9a Install o-ring (446190) in top cover (441070), and install cover on maincase.

6.9b Clean s.h.c.s. (447170) using fast evaporating brake clean.

6.9c Install s.h.c.s. and washers (447215) and torque. (see torque chart - sect. 1.1) **Use blue threadlocker.

6.9d Install drain and fill plugs (447310).



7.0 - Shifter Setup

9.1 If installing shifter, use the following setup procedure:

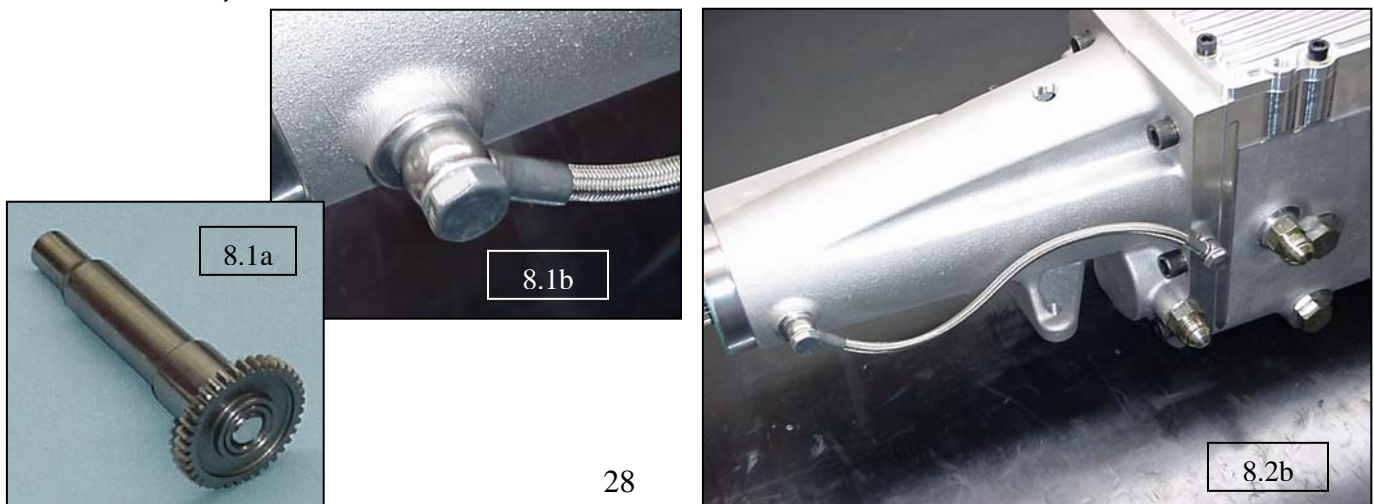
- 7.1a After installing shifter hardware, shifter, and rods; remove top cover.
- 7.1b Make sure arms are centered. To do this, "center" shift rods so they do not bind (preload) shift arms.
- 7.1c Once rods are centered, tighten jam nuts.
- 7.1d Now, engage 3rd gear using shift arm (do not use shift handle).
- 7.1e Use dial indicator: mounted to shifter body indicating handle movement.
- 7.1f "Zero" indicator and tighten the 1st/3rd shifter stop screw until indicator moves off of zero. Tighten stop screw jam nut. Repeat for 2nd/4th stop screw.
- 7.1g Check shifter stops in each gear position, to make sure no force can be applied to dog/gear.
- 7.1h Replace top cover and hardware. Torque to specifications.

8.0 - Oil Pump Installation

8.1 Scavenge & Spray Rail Assembly

Qty.	Part No.	Description
1	442055	Reverse I.B.S.
1	445015	Internal Pump Gear - "Driver"
1	445016	Pump Gear - 37T
1	445017	Pump Gear - 53T
1	445025	Internal Pump Gear - "Driven"
1	445050	Oil Pump Cap
4	445058	Aluminum Crush Washers (-3)
1	445070	Oil Pickup (incl. 445060 - Oil Screen)
1	445080	Spray Rail
1	446210	O-Ring - Oil Pickup
3	446212	O-Ring - Spray Rail
1	447074	Snap Ring - Oil Pump Gear (53T)
4	447190	Flat S.H.C.S. - Oil Pump Cap
2	447320	Oil Fitting (-6 to -8)
1	447324	Oil Feed Line - Tail Housing Bearing

- 8.1a Clean both reverse i.b.s. (442055) and oil pump gear (445016) using fast evaporating brake clean. Apply "oil tolerant" green cylindrical retaining compound to i.b.s. Press pump gear onto i.b.s. (see photo) Install i.b.s. in maincase.
- 8.1b Remove oil plugs (445054) from tail housing and maincase. Remove oil plugs (445056) from tailhousing. Install oil fittings (447320) in maincase and tail housing. Install oil feed line (447324) in tail housing. (see photo)
- 8.1c Remove 5/8" freeze plug (447272) from oil pickup bore and install oil pickup o-ring (446210).
- 8.1d Install oil pickup (445070) (Apply oil or assy. lube to avoid damage to o-ring)
- 8.1e Install spray rail o-rings (446212) in maincase and mid support. (see photo)
- 8.1f Install spray rail (445080). (Spray rail should be installed after geartrain is in maincase)



8.2 Pump Gear Installation

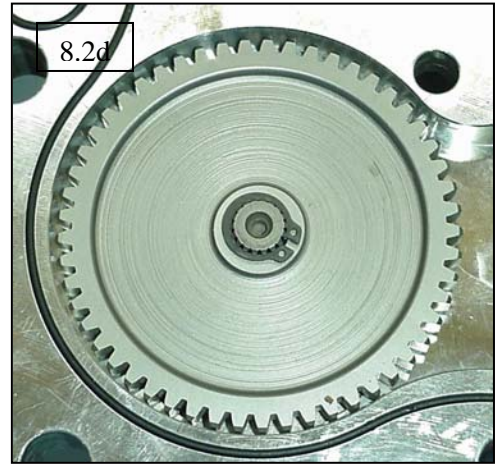
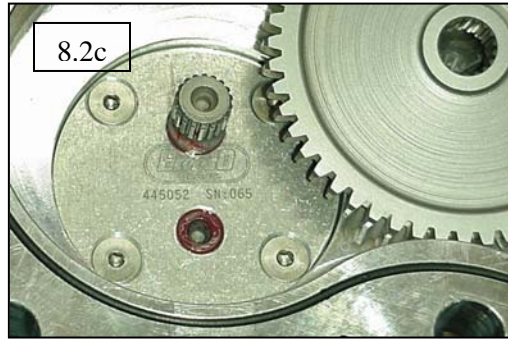
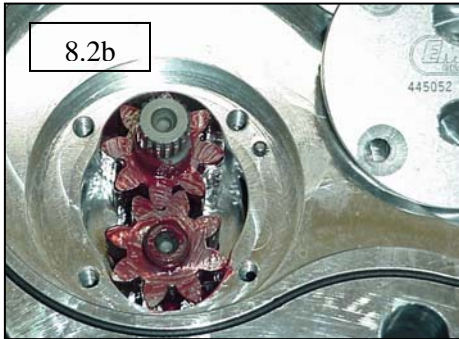
8.2a Clean flat s.h.c.s. (447190) and tail housing threads using fast evaporating brake clean.

8.2b Insert internal pump gears (445015 & 445025). (Apply oil or assy. lube to avoid damage to housing and gears) (see photo)

8.2c Install pump cap using flat s.h.c.s. **Use blue threadlocker.

8.2d Install 53T pump gear (445017) on internal pump driver using pump snap ring (447074). *Note direction of gear is shoulder (engraving side) down. (see photo)

8.2e Install tail housing.



9.0 - Gear Change Procedure **This example will show complete gear change - all ratios.

9.1 Gear Train Removal:

- 9.1a Remove drain plug and drain oil.
- 9.1b Next, remove bolts for shift rods from shift arms.
- 9.1c Now, remove tail housing bolts and washers.
- 9.1d Remove front bearing/seal retainer bolts and retainer. (Be careful to not damage seal during removal) Now, remove front gasket.
- 9.1e Remove top cover bolts and washers, then remove top cover.
- 9.1f Remove mid support top.
- 9.1g Now, remove all detent screws, springs, and balls (1-2 & 3-4)
- 9.1h Remove 1-2 fork screw, rail, and fork. Now, remove interlock pawls (1-2/Rev. & 1-2/3-4).
- 9.1i Next, remove 3-4 rail plug on front of case. Remove 3-4 fork screw, rail, and fork. Now, remove interlock pawl (3-4/Rev.).
- 9.1j Remove front and rear snap rings, bearings, and anti-rotation pins.
- 9.1k Next, remove input gear and 1st gear washer.
- 9.1l If using pocket dog system, lift geartrain, slide input dog ring forward, and remove rear input snap ring. Then, remove input shaft and input dog ring. If using rib dog system, lift geartrain, and remove input assembly from output assembly. Rest rib input dog ring in front of input pinion.
- 9.1m Remove output shaft assembly. (If using rib dog system, remove input assembly)
- 9.1n Now, remove cluster i.b.s. snap ring, anti-rotation pin, and cluster i.b.s. With some ratios you may need to remove cluster i.b.s. before removing output assembly.
- 9.1o Remove cluster shaft/mid support assembly.

9.2 Gear Change:

- 9.2a Remove input pinion cluster shaft snap ring and input pinion.
- 9.2b Remove next input snap ring, 3rd gear snap ring, and 3rd gear. Now, remove mid support, mid support race, 2nd gear, and 2nd gear snap ring.
- 9.2c Remove 1st gear (with dog ring) and bearings
- 9.2d Now, remove 3-4 slider, front output shaft snap ring, 3-4 slider hub, and 3rd gear (with dog ring).
- 9.2e Remove 3rd spacer and bearings, and mid support bearing. Next, remove 2nd gear (with dog ring) and bearings.
- 9.2f Finally, remove reverse i.b.s., reverse idler, reverse washers, and reverse slider.
- 9.2g Assembly is reverse of removal.

